SIEMENS

Room Automation Stations

DXR2 Heat Pump Start-up Procedures

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Building Technologies

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Security Best Practices

Network setup must avoid direct connection from Internet to the end device.

- Implement Port Security to disallow the connection and network participation of any unauthorized laptop/device to a switch.

- Unauthorized access should be prevented by physical security measures. Meaning, access to the devices (controllers) must be limited only to people who require it. Equipment can further be monitored via CCTV.

- When possible, physically segment control systems from non-control systems.- Apply the concept of Least Privilege to minimize the impact in case of a compromise of user credentials.

- Ensure that complex and strong passwords are required. Furthermore, ensure that administrator passwords are at least 12 characters long for users with administrative privileges and at least 8 characters long for non-administrative users.

- Ensure that the same username/password credentials are unique for each site within the country/office.

- Ensure that users each have their own individual unique login accounts. User accounts must not be shared.

- Configure account lockout settings (Threshold, Observation Windows, Duration) to protect the system from password guessing or brute force attacks.

- Ensure that accounts are removed within a reasonable time when users no longer work at the site.

- Ensure that firmware is downloaded only from legitimate / known locations.

Cyber Security Disclaimer

Siemens products and solutions provide security functions to ensure the secure operation of building comfort, fire safety, security management and physical security systems. The security functions on these products and solutions are important components of a comprehensive security concept.

It is, however, necessary to implement and maintain a comprehensive, state-of-the-art security concept that is customized to individual security needs. Such a security concept may result in additional site-specific preventive action to ensure that the building comfort, fire safety, security management or physical security system for your site are operated in a secure manner. These measures may include, but are not limited to, separating networks, physically protecting system components, user awareness programs, defense in depth, etc.

For additional information on building technology security and our offerings, contact your Siemens sales or project department. We strongly recommend customers to follow our security advisories, which provide information on the latest security threats, patches and other mitigation measures.

http://www.siemens.com/cert/en/cert-security-advisories.htm

Before You Begin

User Knowledge

ABT Site has two online help systems:
- ABT Site online help
- Application online help

ABT-Site online help is the “tool” help - how to create projects, load templates etc. To access, click the Help button (pressing F1 key also opens the tool help).
Application online help describes functions and features of the application types and templates loaded in the ABT-Site Library. To access, see **Application selection** in ABT-Site Help. This topic has information explaining when and how to access the Application help.
Open ABT-Site > press F1 > then follow **Configuration > Application selection**

Prerequisites

- ABT Site installed.
- Working knowledge of ABT Site features and functionality.
- Users should be trained and knowledgeable regarding the technical principles and concepts of Desigo Room Automation (RA) including the Room/segment concept.

Design Engineer

Best practice

- Application templates with any configuration changes are completed by the Design Engineer prior to handoff.
- Parameter default values have been entered for each DXR2 automation station to minimize technician online setup time.

ABT Site Project Data

If following the recommended ABT project workflow for start-up, make sure that you have received the required ABT Site project data. This will include:

- ABT Site project requires User name and Password (both are case sensitive).
- Common project settings including user profiles.
- Engineered DXR2 automation stations.
- Application templates with any configuration changes are completed by the Design Engineer prior to handoff.
- Checkout reports.

ABT Site project data
Project data must be completed using ABT Site (ABT-Site license required).

ABT-Site library with standard or custom templates/types must be installed so that changes applied during commissioning can be backed up following start-up.

Job Site

Prerequisites at the job site

- Electrical tested and available.
- Automation stations installed and pass Basic Sanity test (LED steady green).
- All needed mechanical documentation (plans and specifications) are available.

Equipment

Required equipment depends on the connection method and type of automation station.

Connection Method	Automation Station
Room operator unit	USB-KNX Interface (Siemens OCI702 stock number S55800-Y101)
USB	USB cable (A/B)
Ethernet IP connection (DXR2.E only)	- LAN cable - If necessary: USB to Ethernet adaptor

Navigating ABT-SSA

Prerequisites

- Users are trained and knowledgeable with ABT Site and comfortable with the online help systems.
- ABT-Site is loaded, licensed and running.
- See topics under the “Online” book in ABT Site Help.

To get to the properties of an object, click on the properties icon  .

After clicking the properties icon, click the filter button  , to filter out most of the properties / parameters that don’t typically need to be checked. (the filter button is a toggle – you can reverse your choice by clicking it a second time).

Common data point icons

ABT-Site uses icons to visually identify the different types of points in the DXR automation station.

When online and viewing points in the DXR automation station, some items will have icons and some will not.

If an item has an icon next to it, it means the item is a BACnet object.

Items without icons are properties or parameters of an object.

Icon	Description	BACnet object type
	Input value	AI, BI, BlsIn, LgtIn, MI
	Output value	AO, BO, BlsOut, EmgLgt, LgtAOut, LgtBOut, MO
	Calculated value	ACalcVal, BCalcVal, MCalcVal, PrphDev
	Process value	APrcVal, BPrcVal, MPrcVal
	Configuration value	ACnfVal, BCnfVal, MCnfVal, UCnfVal
	Application function	FuncView: Functional view "parent" object that contains (owns) or references other objects.

For a complete list, open ABT-Site help and go to **ABT-SSA > User interface overview > Online icons**.

Setting up the Automation Station

Establishing a Connection to the Automation Station

▷ The proper equipment is physically connected.

▷ In ABT Site, the desired project is open.

1. In the **Start-up** component, **Set up connection** task, select one of the following connection method tabs:
   - **Room unit connection**
   - **USB**
   - **Ethernet**
2. Do one of the following:
   - If using a room unit connection, click **Connect** and proceed to next section.
   - If using a USB or Ethernet connection, continue with the remaining steps.
3. Under **Target selection**, select the **Device type** you want to work with:
   - **IP device** (for DXR2.E automation station)
   - **MS/TP device** (for DXR2.M automation station)

Note
The **Device type** you want to work with does not have to be the same automation station that you are using to connect to the network.

4. Select IP address.
5. Select the desired **Network interface** from the drop-down list (use "Network connections…" if needed).
6. Click **Connect**.
   ⇨ The connection is established.

Configure and Load Pre-engineered Automation Stations (Recommended workflow)

⚠ CAUTION

Recommended workflow
You must use this workflow if your job requires custom application templates defined by the Design Engineer.

The following steps show how to configure and load pre-engineered Automation stations (AS). You can also use engineered serial numbers or configure / load multiple devices in parallel. See **Startup** in ABT Site Help for detailed information on these topics. These workflow(s) are more efficient than manual configuration.

If you choose to manually configure the automation stations, skip the following and proceed to Manual Configuration [➞ 9].

1. (Connection to DXR is established)
   In the **Startup** component, **Configure and download** task, the connected AS is automatically discovered and displayed under **Discovered devices**.
   ⇨ In some cases with an Ethernet connection or IP device, you may need to click **Discover** and wait a few moments before the connected AS displays. To extend discovery to other automation stations, ensure "All devices" is selected in the Discover drop-down menu.

Note
For MS/TP device connected through a room unit, discovery is limited to the local network (the network that the automation station is connected to).

2. Under the **Engineered devices** list, expand the building(s) and floor(s) to display the automation stations. Select the device to be loaded.
3. Under the **Discovered devices** list, select the device to be configured and loaded. Make sure the equipment ID of the discovered device matches the equipment ID of the engineered device. They must be the same.
4. Select **Assign > Device network configuration**.
5. Wait 15 seconds for the update to finish and the **Message** column to show **Configured**.
   ⇨ The communication settings of the automation station are now configured. At this point, the **Status** column will show **Download required** indicating that no application parameters have been loaded.
6. Select **Assign > Application configuration** to load application parameters.
   ⇨ When the **Status** column displays **Operational** (up to 4 - 5 minutes for slower connections) the automation station is ready to **Go online**.
7. If connected through a room unit, do the following after 4 - 5 minutes to refresh the Discovered devices list: Click **Clear table**, and then click **Discover**. Repeat if necessary until **Status** column displays **Operational**.
8. Repeat steps 4 through 8 for other automation stations as needed.
9. When ready, proceed to Verify Configuration Settings [→ 11].

Manual Configuration

This procedure assumes the DXR has not been previously configured.

1. (Connection to DXR is established)

   In the **Startup** component, **Configure and download** task, click the icon for **Discovered devices** pane ( ).

   ⇨ The connected AS is automatically discovered and displayed under **Discovered devices**. In some cases with an Ethernet connection or IP device, you may need to click **Discover** and wait a few moments before the connected AS displays.

Note
For MS/TP device connected through a room unit, discovery is limited to the local network (the network that the automation station is connected to).

2. Under the **Discovered devices** list, right click on the AS to be configured and select **Manually configure**.
3. Complete the configuration details and click **Configure**.
4. Wait 15 seconds for the update to finish and the **Message** column to show **Configured**.

   ⇨ The communication settings of the automation station are now configured. At this point, the **Status** column will show **Download required** indicating that no application parameters have been loaded.

5. Select **Go online**.
6. Enter the default user name and password and click **Login**.

   ⇨ You are prompted for Old password, New password, and Confirm new password.

7. After confirming the new password, wait for the screen to load and then select the desired **application type** by clicking the icon to the left of the description. Note the engineering units (see caution note).

CAUTION

Engineering Units MUST be correct

It is crucial to select the correct application type – **this includes engineering units**. The example above shows US engineering units (**UsUn**). Select the type and engineering units you need.

8. Select one of the pre-loaded application templates by click the following, in order:
   a. **Select application**
   b. The **Select** button
   c. The desired template, and then click **OK**.

   Note:
   If the entire template name is not visible, hover your cursor over the truncated name to display a pop-up with the full template name. See the table at the end of this section for correct (full) template names.
9. To activate the selected application, click the **Command** arrow and then select **Activate** from the drop-down list.
   ⇨ The DXR takes time to process the command and restart. Before continuing, wait until the screen changes and **APPLICATION** displays at the top of the list. (the top parameter displays a status of **Operational**)

   When finished, click the menu icon ≡ (upper left) and select **Application**.

HPU Templates

Box type	Number	Description	AS hardware
Heat Pump Unit	14070	Heat Pump Variable Speed with Rev Vlv, Vari-Spd Fan, 2-Stage Electric Heat and 1-Stage Electric Radiator and OA Damper	DXR2x18.xx
	14071	Heat Pump Multi-Stage with Rev Vlv, Multi-Spd Fan, 2-Stage Electric Heat and HW Radiator and OA Damper	
	14072	Heat Pump Multi-Stage, Ground Source with Internal Rev Vlv and Hot Gas Reheat, Vari-Spd Fan, 1-Stage Electric Heat and HW Radiator and OA Damper	
	14170	Heat Pump Variable Speed, Water Source with Rev Vlv, Vari-Spd Fan, HW Heat and Modulating Electric Radiator and OA Damper	
	14171	Heat Pump Multi-Stage with Rev Vlv and Hot Gas Reheat, Multi-Spd Fan, 1-Stage Electric Heat and HW Radiator and OA Damper	
	14270	Heat Pump Single Stage with Rev Vlv, 1-Spd Fan, 1-Stage Electric Heat and HW Radiator and OA Damper	
Heat Pump Unit	14670	Heat Pump Single Stage with Rev Vlv, 1-Spd Fan, 1-Stage Electric Heat and HW Radiator and OA Damper	DXR2M11.xx
	14672	Heat Pump Multi-Stage with Internal Rev Vlv, 1-Spd Fan and Modulating Electric Heat and OA Damper	

Verify Configuration Settings

(Optional)

This step, if done, is part of the recommended workflow and follows **Configure and Load Pre-engineered Automation Stations**.

The following should be verified (see **Reports Component** in the Help) prior to going online with the automation station.

- MAC address
- Instance number
- Network number
- Baud rate (Link speed) → Network port

Note
How to create reports is covered in ABT Site Help; search for "creating reports" using the search function in the Help.

Point Verification and Checkout

Before checking or setting points using ABT-SSA (Setup and Service Assistant), the automation station(s) must be Configured and Operational. Refer to previous steps if necessary.

To save time, read the **Navigating ABT-SSA** section earlier in this document before going online with the tool . Also, for a better understanding of application template functionality and related parameters, read the Application Notes documentation available on InfoLink (InfoLink > Automation > Desigo DXR) as well as the ABT Site Help.

Going online with ABT-SSA

First, establish a connection with the automation station(s). Then in the Startup component, Configure and download task: Under **Discovered automation stations**, right click on the desired automation station and select **Go online**.

In ABT-SSA, changes made during a live session should save automatically. To force a save, use the **Log out** feature when you quit a session. Logout is located in the user management menu dropdown (upper right).

KNX PL-Link Device(s)

If only one device with KNX PL-Link is connected to the network, it is typically detected and automatically configured. To verify that **any/all** KNX PL-Link devices are configured and operational, follow these steps:

1. Click the navigation menu icon and select **Installation**.
   ⇨ Wait for the screen to fully load (10 seconds).
2. Select **KNX PL-Link bus**.
3. Select **Identification**.
4. Confirm that each KNX PL-Link device on the bus displays.
5. Verify that each device is in the State: **Operational**.
6. Click the navigation menu icon .
7. Select **Application** and proceed to the next section.

Note
If the state of any KNX PL-Link device is **Device not assigned**, follow the instructions in ABT Site Help > Online. (search for "Assigning KNX PL-Link devices")

Favorite room status

For a quick overview of the room (its "status"), the room status Favorites comprise the main setpoints and mode points. Point values do not need to be changed here.

1. In the Application menu, select **Favorites**.
2. Select **Room > Favorite room status**.

⇨ The room status Favorites display.

Description	Object / Property Name	Comment	Default	Template
Room operating mode	ROpMod RM OP MODE	Displays current value. Commandable for testing purposes. [Protection | Economy | Pre-Comfort | Comfort]	Comfort	All
Present operating mode	PrOpMod OP MODE EFF	Displays current value.	Comfort	All
Plant operating mode	PltOpMod PLANT OPMODE	Displays current value. Commandable for testing purposes.	Comfort	All
Room temperature	RTemp RM TEMP EVAL	Displays the result of one or more room temperature sources.	—°F	All
Relative humidity for room	RHuRel RM HUM EVAL	Displays current (average) value of one or more room RH inputs (for QMX3.P74 room unit or similar).	–	Hpu templates
Room air quality	RAQual RM DCV EVAL	Displays current (average) value of one or more room air quality inputs (for QMX3.P74 room unit or similar).	–	Hpu templates
Heating/cooling state	HCSta H.C STATE	Displays current value. **Note:** There is a two-minute delay when switching from heating to cooling.	–	All
Room temperature setpoint (Room unit display only)	SpTR RM TEMP STPT	Display only. Displays last heating/cooing Comfort (or Pre-Comfort) setpoint for use on room unit. **CAUTION**: Commanding this point does not change the setpoint for control (instead use Present cooling or Present heating setpoint).	72.5°F	All
Room temperature setpoint shift	SpTRShft RM TEMP SHFT	The current setpoint shift from Room operator unit. Commandable for testing purposes.. **CAUTION:** Commanded / overridden @ Prio8 will prevent input requests from room unit (Prio13) from taking effect.	0.0°F	All
Present cooling setpoint	PrSpC CLG STPT EFF	Result of inputs from Room operating mode, cooling setpoints, and user input. Commandable for testing purposes.	75.0°F	All
Present heating setpoint	PrSpH HTG STPT EFF	Result of inputs from Room operating mode, heating setpoints, and user input. Commandable for testing purposes.	70.0°F	–

Favorite room, start-up & checkout

The room startup and checkout Favorites provide points that regulate room functions.

The ☆ icon in the **Verify** column indicates typical items to set or verify.

1. In the Application menu, select **Favorites**.
2. Select **Room > Favorite room, start-up & checkout**.
   ⇨ The Favorites for Room start-up & checkout display.
3. Proceed with point verification and checkout:
   a. Match the objects in the table with those in ABT-SSA.
   b. **IMPORTANT:** Read the notes in the Comment column for items you change or verify.

Manual setpoint adjustment & EefCndTrg

The default configuration for **Energy efficiency condition trigger** will reset a user-entered setpoint adjustment when the room mode changes. To eliminate this reset, do the following:
- Set **Comfort/Pre-Comfort to Economy (CmfPcfToEco)** to "**None**"
- Set **Comfort to Pre-Comfort (CmfToPcf)** to "**None**"
See below.

Verify	Description	Object / Property Name	Comment	Default
	Ventilation control	VntCtl	Displays current value.	1000 ppm
	Present cooling setpoint	PrSpC CLG STPT EFF	Result of inputs from Room operating mode, cooling setpoints, and user input. Commandable for testing purposes. See Cooling setpoint for comfort for additional information.	75°F
☆	Cooling setpoint for comfort	SpCCmf CMF CLG STPT	Initial configuration for cooling Comfort setpoint (set as relinquish default) Room operating units and other sources command this point at higher priorities.	75°F
☆	Delta cooling setpoint for pre-comfort	DSpCPcf STBY C DELTA	Configuration: Entered as positive offset from current Comfort cooling calculation.	2°F
☆	Cooling setpoint for economy	SpCEco ECO CLG STPT	Configuration for fixed cooling Economy modes. Automatically shifted by the system application to prevent changes from user input to prevent overlaps.	85°F
	Cooling setpoint for protection	SpCPrt PROT CLGSTPT	Adjustable configuration, but typically left at default. Protection mode can be set by the central system for extended unoccupied periods (e.g. holiday break)	104°F

Verify	Description	Object / Property Name	Comment	Default
	Present heating setpoint	PrSpH HTG STPT EFF	Result of inputs from Room operating mode, heating setpoints, and user input. Commandable for testing purposes. See Heating setpoint for comfort for additional information.	70°F
★	Heating setpoint for comfort	SpHCmf CMF HTG STPT	Initial configuration for heating Comfort setpoint. (set as relinquish default) Room units and other sources command this point at higher priorities.	70°F
★	Delta heating setpoint for pre-comfort	DSpHPcf STBY H DELTA	Entered as positive offset from current Comfort heating calculation.	2°F
★	Heating setpoint for economy	SpHEco ECO HTG STPT	Configuration for fixed heating Economy modes (unoccupied). Automatically shifted by the system application to prevent overlapping changes from user input.	55°F
	Heating setpoint for protection	SpHPrt PROT HTG SP	Adjustable configuration, but typically left at default. Protection mode can be set by the central system for extended unoccupied periods (e.g. holiday break).	45°F
	Room temperature setpoint (Room unit display only)	SpTR RM TEMP STPT	Display only. Displays last heating/cooing Comfort (or Pre-Comfort) setpoint for use on room unit. **CAUTION**: Commanding this point does not change the setpoint for control (instead use Present cooling or Present heating setpoint).	72.5°F
	Room temperature setpoint shift	SpTRShft RM TEMP SHFT	Displays current setpoint shift value (**SpShftIn**) configured in room operator unit. **CAUTION:** Commanded / overridden @ Prio8 will prevent input requests from room unit (Prio13) from taking effect. See also **Room operator unit configuration section**.	0.0°F
	Room operating mode	ROpMod RM OP MODE	Displays current value. Commandable for testing purposes. [Protection | Economy | Pre-Comfort | Comfort]	Comfort
	Present operating mode	PrOpMod OP MODE EFF	Displays current value.	Comfort
	Plant operating mode	PltOpMod PLANT OPMODE	Displays current value. Commandable for testing purposes. [Off | Protection | Economy | Pre-Comfort | Comfort | Warm-up | Cool down | Room low temp.prot. | Cond.overflow prot. | Free cooling | Night cooling | Ventilation | Equip.temp.prot. | Air vol.flow off | Not used | Not used | Not used] **Note:** Not all configurations support every plant mode.	Comfort
	Room temperature	RTemp RM TEMP EVAL	Displays the result (average) of one or more room temperature sources.	—°F
	Relative humidity for room	RHuRel RM HUM EVAL	Displays current (average) value of one or more room RH inputs (for QMX3.P74 room unit or similar).	%
	Room air quality	RAQual RM DCV EVAL	Displays current (average) value of one or more room air quality inputs (for QMX3.P74 room unit or similar).	ppm

Verify	Description	Object / Property Name	Comment	Default
	Heating/cooling state	HCSta H.C STATE	Displays current value. [Neither | Heat | Cool] **Note:** There is a two-minute delay when switching between heating and cooling.	–
☆	Room operating mode determination	ROpModDtr	Click the properties icon then click the filter button	Comfort
☆	Time for comfort button	TiCmfBtn	**TiCmfBtn** = time in Comfort mode when the Comfort button on the room unit is pressed. If **TiCmfBtn** = 0, Comfort button is disabled.	[120:0.0]min:s
☆	Comfort/Pre-Comfort to Economy - and - Comfort to Pre-Comfort	CmfPcfToEco CmfToPcf	Default configuration causes reset of user-entered setpoint adjustment when the room mode changes. To eliminate this reset, set both to **None**.	Energy efficiency condition

ROpModDtr
Room operating mode determination has additional configurable parameters. For detailed information on application functionality, read the Application Notes documentation available on InfoLink (InfoLink > Automation > Desigo DXR).

4. Return to the beginning of this section by repeating the initial navigating steps as follows:
   In the Application menu, select **Favorites**, then select **Room > Favorite room, start-up & checkout**.
5. Proceed with **Ventilation control** setup.

Verify	Description	Object / Property Name	Comment	Default
★	Ventilation control	VntCtl	Click the properties icon then click the filter button Ventilation control allows the fan and OA damper to operate for ventilation. It is important that ventilation control is configured so the fan will operate in the deadband. This is the default setting.	1000 ppm
★	Comfort configuration	CmfCnf	Set CmfCnf for ventilation options in Comfort mode: [Off | Min.ventilation | DCV | Min.ventilation & DCV] **Note** When configured as Min.ventilation, the ventilation setpoints function without IAQ sensor or DCV control. When configured as DCV, an IAQ sensor is mandatory in the room. Also set the desired outside air damper position for each mode (for example, DmpOaPosMinCmf).	Min.ventilation & DCV
★	Pre-Comfort configuration	PcfCnf	Set for ventilation options in Pre-Comfort mode: [Off | Min.ventilation | DCV | Min.ventilation & DCV] **Note** s/a Comfort	Min.ventilation
	Economy configuration	EcoCnf	Set for ventilation options in Economy mode: [OFF | Min.ventilation | DCV | Min.ventilation & DCV] **Note** s/a Comfort	Off
	Protection configuration	PrtCnf	Set for ventilation options in protection mode: [OFF | Min.ventilation | DCV | Min.ventilation & DCV] **Note** s/a Comfort	Off
★	Min.pos.outside air damper for comfort	DmpOaPosMinCmf	Set flow for minimum ventilation in Comfort mode. **Note** If flow setting is greater than zero, **CmfCnf** must not equal Off.	20%
★	Min.pos.outside air damp. for pre-comfort	DmpOaPosMinPcf	Set flow for minimum ventilation in Pre-Comfort mode. **Note** If flow setting is greater than zero, **PcfCnf** must not equal Off.	10%
	Min.pos.outside air damper for economy	DmpOaPosMinEco	Set flow for minimum ventilation in Economy mode. **Note** If flow setting is greater than zero, EcoCnf must not equal Off.	0%
	Min.pos.outside air damp. for protection	DmpOaPosMinPrt	Set flow for minimum ventilation in Comfort mode. **Note** If flow setting is greater than zero, PrtCnf must not equal Off.	0%

6. Return to the beginning of this section one last time by repeating the initial navigating steps as follows: In the Application menu, select **Favorites**, then select **Room > Favorite room, start-up & checkout**.
7. Set the following air quality control objects if required.

Verify	Description	Object / Property Name	Comment	Default
★	Ventilation control	VntCtl	Click the Link icon › to display additional vent control objects.	1000 ppm
	Present ventilation setpoint	PrSpVnt VENT SP EFF	Current setpoint based on operating mode Displays current value	— ppm
	Ventilation ctr.for outs.air damper	DmpOaVntCtr	Displays current value Ventilation controller (PID)	— %
	Ventilation controller for fan	FanVntCtr	Displays current value Ventilation controller for fan (PID)	— %
	Room control	RCtl	Displays current value (Group member)	-
★	Setpoint room air quality for comfort	SpAQualRCmf CMF IAQ STPT	Set for CO2 level in ppm in Comfort mode when optional DCV control and CO2 sensor present. Requires IAQ sensor (see note for CmfCnf parameter above).	1000 ppm
★	Setp.room air quality for pre-comfort	SpAQualRPcf STBY DCV SP	Set for CO2 level in ppm in Pre-Comfort mode when optional DCV control and CO2 sensor present. Requires IAQ sensor (see note for CmfCnf parameter above).	1200 ppm
	Setpoint room air quality for economy	SpAQualREco ECO DCV STPT	Set for CO2 level in ppm in Economy mode when optional DCV control and CO2 sensor present.	1500 ppm
	Setpoint room air quality for protection	SpAQualRPrt PROT DCV SP	Set for CO2 level in ppm in Protection mode when optional ventilation control and CO2 sensor present. Optional configuration - typically left at default.	1500 ppm

Favorite room control

The room control Favorites show the PID loop controllers for the room.

!

Tuning of PID controllers is limited to unstable operation. Parameters should not be changed otherwise.

1. In the Application menu, select **Favorites**.
2. Select **Room > Favorite room control**.
   ⇨ The room control Favorites display.
3. (*Optional or as required*) Display the parameters by clicking the icon ▷ next to the loop controller description.

Description	Object	Comment	Default	Template
Room temp.ctr.cooling for outs.air damp.	DmpOaTRCtrC	Loop controller	0.0%	All
Room temp.controller cooling for fan	FanTRCtrC	Loop controller	0.0%	14070 14170 14071 14171 14072
Room temp.ctr.cool.for heating/cool.coil (Heat pump cooling)	HCclTRCtrC	Loop controller	0.0%	All
Room temp.controller heating for fan	FanTRCtrH	Loop controller	0.0%	14070 14170 14071 14171 14072
Room temp.ctr.heat.for heating/cool.coil (Heat pump heating)	HCclTRCtrH	Loop controller	0.0%	All
Room temp.ctr.heating for heating coil	HclTRCtrH	Loop controller	0.0%	All
Room temp.controller heat.for radiator	RadTRCtrH	Loop controller	0.0%	All
Ventilation ctr.for outs.air damper	DmpOaVntCtr	Loop controller	0.0%	All
Ventilation controller for fan	FanVntCtr	Loop controller	0.0%	All
Dehumidification controller	DhuCtr	Loop controller	0.0%	All

Parameter favorites for a loop control object include:

- Controller type (PID or Staged)
- Controller output maximum
- Controller output minimum
- Controller output for offset
- Gain
- Number of stages (1 or 2 stages - only for Staged controller)
- Switch delay (Delay between stages for 2 stage control – 5 or 8min depending on HVAC device)
- Hysteresis switch-off
- Hysteresis switch-on
- Integral action-time Tn: 15min or 30min depending on the type of controller function (heating, cooling, or ventilation)
- Derivative action-time Tv: 0.0 sec

Additional room parameters

Some parameters that may need adjustment are not listed in Favorites. See the following.

The ★ icon in the **Verify** column indicates typical items to set or verify.

1. In the Application menu, select **List view**.
2. Select **Room > Room HVAC coordination**.
   ⇨ The sub items for **Room HVAC coordination** display.
3. Locate the following objects:
   a. Room temperature setpoint determination
   b. Dehumidification control
   c. Green leaf

Verify	Description	Object / Property Name	Comment	Default
★	Room temperature setpoint determination	SpTRDtr	Click the properties icon then click the filter button to display the **Display absolute room temp.setpoint** parameter (**SpTRAbsDspy**).	—°F
★	Display absolute room temp.setpoint	SpTRAbsDspy	Defines whether the room unit will display the current temperature control setpoint (Comfort or Pre-Comfort heating or cooling), or if it will display an average of the two. For example, if heating setpoint = 70 and cooling setpoint = 75, setting this parameter to **Average value** will result in the room operating unit displaying 72.5 If H.C mode is "Neither" (deadband) the last H or C setpoint displays. Display does not change if mode is Economy or Protection. [Average value | Present value]	Present value
★	Dehumidification control	DhuCtl	Click the properties icon then click the filter button	60%
	Comfort configuration Pre-comfort configuration Economy configuration Protection configuration	CmfCnf PcfCnf EcoCnf PrtCnf	Set as desired.	1:Dehumidify 1:Dehumidify 0:Off 0:Off
	Maximum deviation heating for dehumidify	HDvnMaxDhu	The maximum number of degrees below the room heating setpoint that the room temperature can drop and dehumidification is still possible. Below this point, dehumidification stops.	5.4°F

Verify	Description	Object / Property Name	Comment	Default
	Hys.for max.deviation heat.f.dehumidify	HysHDvnMaxDhu	The room temperature has to rise above dehumidification switch off point by a hysteresis value (HysHDvnMaxDhu) (default 1.8°F) before dehumidification can resume.	1.8°F
★	Dehumidification control		Click the Link icon › to display additional vent control objects.	60%
	Rel.room hum. sp for comfort Rel.room hum.sp for pre-comfort Rel.room hum.sp for economy Rel.room hum. sp for protection	SpHuRelRCmf SpHuRelRPcf SpHuRelREco SpHuRelRPrt	Set as desired.	60 [% r.h.] 60 [% r.h.] 70 [% r.h.] 70 [% r.h.]
★	Green leaf	RpdVntOp	Click the properties icon ⋮ then click the filter button ⏷ to display the **Max.tolerance of room temp.setp.shift** parameter (**TolMaxSpTRShft**).	—
★	Max.tolerance of room temp.setp.shift	TolMaxSpTRShft	Defines the limit of how much the temperature setpoint can shift (based on user changes) before the Green leaf LED changes from green to red.	3.6°F

Favorite room segment, start-up & checkout

The room segment startup and checkout Favorites provide points that regulate room segment functions.

The ★ icon in the **Verify** column indicates typical items to set or verify.

1. In the Application menu, select **Favorites**.
2. Select **Room segment > Favor.room segment, start-up & checkout**.
   ⇨ The Favorites for Room segment start-up & checkout display.

Verify	Description	Object / Property Name	Comment	Default
★	Supply air temperature	TSu SPLY TEMP	Displays current value. Click the properties icon ⋮ then click the filter button ⏷	--- °F
	Commissioning state		(Optional) Can be used to enter commissioning stage.	
	Correction offset		Set as needed	0 degrees
★	Mixed air temperature	TMx MIXED TEMP	Displays current value. Click the properties icon ⋮ then click the filter button ⏷	--- °F
	Commissioning state		(Optional) Can be used to enter commissioning stage.	
	Correction offset		Set as needed	0 degrees

Verify	Description	Object / Property Name	Comment	Default
★	Outside air damper position	DmpOaPos OA DMP POS	Displays current value. Commandable for testing purposes. (For OA damper min positions that correspond to different operating modes, see Favorite room, start-up & checkout > Ventilation control.) Click the properties icon then click the filter button	--- °F
	Commissioning state		(Optional) Can be used to enter commissioning stage.	
★	Signal value 1 (Only for 0-10V actuators.)		Reset as needed for voltage at 0%. For example reverse acting (10V – 0V) set to 10V.	0.0
★	Signal value 2 (Only for 0-10V actuators.)		Reset as needed for voltage at 100%. For example, reverse acting (10V – 0V) set to 0V.	10.0
★	Single-speed fan, OR Multi-speed fan, OR Variable speed fan (depends on template selection / configuration)	Fan1Spd (FAN 1 SPD) FanMultiSpd (FAN MLT SD) FanVarSpd (FAN VAR SD)	Displays current value. Commandable for testing purposes. (Note: Interlocks may override manual commands. Fan may be held On at priority 5 (Equipment protection 2) by the AirFlHldH or AirFlHldC interlock signals or by the min-on time delay of the heat pump compressor.) Click the properties icon then click the filter button	--
	Commissioning state		(Optional) Can be used to enter commissioning stage.	
★	Signal value 1 (Only for 0-10V fan drives.)		Reset as needed for voltage at 0%.	0.0
★	Signal value 2 (Only for 0-10V fan drives.)		Reset as needed for voltage at 100%..	10.0
★	Enable fan speed	EnFanSpd FAN ENABLE	Displays current value. Commandable for testing purposes. Click the properties icon then click the filter button	No
	Commissioning state		(Optional) Can be used to enter commissioning stage.	

Heat pump speed/stages

In the table below, locate the appropriate Heat pump speed/stages object(s) that match your template configuration. Read warning note prior to any testing.

⚠ WARNING

Manual command of heat pump compressor stages

Equipment damage can occur by manually commanding heat pump compressor stages independent of the fan, reversing valve and other essential components. Also, existing interlocks may prevent manual commanding at priority 8 in order to protect equipment.
Recommendation: To test the compressor, manually command the effective heating or cooling setpoint, or the room temperature setpoint.

Note
Interlocks may override manual commands. Heat pump compressor may (at prio5, Equipment protection 2) be held On by the minimum On time delay, or held Off by the minimum Off time delay or by the low outside air lockout.

HCclHpu AF	Preloaded Hpu template	Compressor command objects	
		Desigo	Apogee
HCclHpu11 (variable speed)	**14070** **14170** (water source)	HpuVarSpd	HP VAR SPD
HCclHpu12 (single stage)	**14270** **14670** (M11 hardware)	HpuCmd	HP CMD
HCclHpu13 (multi-stage)	**14071**	HpuCmd1St HpuCmd2St	HP 1ST CMD HP 2ND CMD
HCclHpu16 (multi-stage)	**14171** (hot gas reheat)	HpuCmd1St HpuCmd2St	HP 1ST CMD HP 2ND CMD
HCclHpu19 (multi-stage, internal reversing)	**14672** (M11 hardware)	HpuCmdC1St HpuCmdC2St HpuCmdH1St HpuCmdH2St	HP CG1 CMD HP CG2 CMD HP HT1 CMD HP HT2 CMD
HCclHpu22 (multi-stage, internal reversing)	**14072** (ground source, hot gas reheat)	HpuCmdC1St HpuCmdC2St HpuCmdH1St HpuCmdH2St	HP CG1 CMD HP CG2 CMD HP HT1 CMD HP HT2 CMD

For Heat pump variable speed

Verify	Description	Object / Property Name	Comment	Default
★	Heat pump variable speed	HpuVarSpd HP VAR SPD	Click the properties icon then click the filter button	---
	Present maximum value		Reduce maximum speed as required, for example to reduce noise, to save energy if full capacity is never needed, etc.	100%
	Present minimum value		Set to heat pump/compressor manufacturer's requirements for minimum speed	0%
	Commissioning state		(Optional) Can be used to enter commissioning stage.	
★	Enable heat pump variable speed	EnHpuSpd HP ENABLE	Displays current value.	---
	Commissioning state		(Optional) Can be used to enter commissioning stage.	

Continue with the following sections. Note that the points will vary in terms of matching your heat pump template configuration.

Verify	Description	Object / Property Name	Comment	Default
	Heat pump reversing valve (Templates 14070, 14170, 14270, 14670, 14071, 14171)	HpuRvrVlv HP REV VLV	Displays current value. Commanding the reversing valve is possible but not recommended because of the potential for equipment damage. Depending on the type of reversing valve, the compressor may need to be Off or On at the time of reversing valve operation (heating to cooling or cooling to heating). Click the properties icon then click the filter button to display	---
	Commissioning state		(Optional) Can be used to enter commissioning stage.	

Heating stages

Note

Interlocks at prio5 (Equipment protection) may override manual commands.

Verify	Description	Object / Property Name	Comment	Default
	Heating coil electric position (For 1 stage electric heat) (templates 14270, 14670, 14171, 14072)	HclElPos HTG EL 1ST	Click the properties icon then click the filter button	---
	Commissioning state		(Optional) Can be used to enter commissioning stage.	
	Heating coil electric pos.first stage (For 2 stage electric heat) (templates 14070, 14071)	HclElPos HTG EL 1ST	Click the properties icon then click the filter button	---
	Commissioning state		(Optional) Can be used to enter commissioning stage.	
	Heating coil electric pos.second stage (templates 14070, 14071)	HclEl2StPos HTG EL 2ND	Click the properties icon then click the filter button	---
	Commissioning state		(Optional) Can be used to enter commissioning stage.	
	Heating coil electric position (modulating) (template 14672)	HclElPos HTG EL POS	Click the properties icon then click the filter button	---
	Commissioning state		(Optional) Can be used to enter commissioning stage.	
	Signal value 1 (Only for 0-10V actuators.)		Reset as needed for voltage at 0%.	0.0
	Signal value 2 (Only for 0-10V actuators.)		Reset as needed for voltage at 100%.	10.0

Hot water heating coil
Template 14170

Verify	Description	Object / Property Name	Comment	Default
★	Heating coil valve position (templates 14170)	HclVlvPos HTG V POS	Displays current value. Commandable for testing purposes. (Interlocks may override manual commands. Heating coil may be held On at prio5 (Equipment protection 2) for freeze protection. Click the properties icon then click the filter button	
	Commissioning state		(Optional) Can be used to enter commissioning stage.	
★	Rise time 0-100% (Only for floating control actuators.)		Floating control stroke time to open (in tenths of seconds). For example, for 130 seconds enter 1300.	130.0s
★	Fall time 100-0% (Only for floating control actuators.)		Floating control stroke time to close (in tenths of seconds). For example, for 130 seconds enter 1300.	130.0s
★	Control action (Only for floating control actuators.)		[Direct | Reverse]	Direct
★	Signal value 1 (Only for 0-10V actuators.)		Reset as needed for voltage at 0%. For example reverse acting (10V – 0V) set to 10V.	0.0v
★	Signal value 2 (Only for 0-10V actuators.)		Reset as needed for voltage at 100%. For example, reverse acting (10V – 0V) set to 0V.	10.0v

Radiator

Note
Interlocks at prio5 (Equipment protection) may override manual commands.

Verify	Description	Object / Property Name	Comment	Default
	Radiator electric position (for 1 stage electric heat)	RadElPos RAD EL POS	Click the properties icon then click the filter button	Off
	Commissioning state		(Optional) Can be used to enter commissioning stage.	
	Radiator electric position (for modulating electric heat)	RadElPos RAD EL POS	Click the properties icon then click the filter button	Off
	Signal value 1 (Only for 0-10V actuators.)		Reset as needed for voltage at 0%.	0.0v
	Signal value 2 (Only for 0-10V actuators.)		Reset as needed for voltage at 100%.	10.0v
	Commissioning state		(Optional) Can be used to enter commissioning stage.	

Verify	Description	Object / Property Name	Comment	Default
	Radiator valve position (Hot water) (templates 14270, 14670, 14071, 14171, 14072)	RadVlvPos RAD V POS	Click the properties icon then click the filter button	---%
	Commissioning state		(Optional) Can be used to enter commissioning stage.	
	Signal value 1 (Only for 0-10V actuators.)		Reset as needed for voltage at 0%. For example reverse acting (10V – 0V) set to 10V.	0.0v
	Signal value 2 (Only for 0-10V actuators.)		Reset as needed for voltage at 100%. For example, reverse acting (10V – 0V) set to 0V.	10.0v

Additional room segment parameters

Some parameters that may need adjustment are not listed in Favorites. See the following.

The icon in the **Verify** column indicates typical items to set or verify.

Additional parameters for heat pump unit

1. In the Application menu, select **List view**.
2. Select **Room > HVAC**.
   ⇨ The sub items for "HVAC" display.
3. Locate **Heating/cooling coil** (main AF for the heat pump unit).
4. Click the properties icon then click the filter button
   ⇨ The heat pump device parameters display.

Verify	Description	Object / Property Name	Comment	Default
	Nominal electric power	NomElPwr	NomElPwr is used when the parameter HpuPwr is set to Calculated. Then, the HpuElPwr is calculated using NomElPwr in an algorithm based on the heat pump's type of compressor (single stage, multi-stage, variable speed). NomElPwr is obtained from the heat pump name plate or manufacturer.	0.40 kW
★	Heat pump power	HpuPwr	This Boolean HpuPwr parameter of the Heating/cooling coil object can be set to either Calculated or Measured. HpuPwr determines if HpuElPwr is either calculated from the NomElPwr (obtained from the heat pump name plate or manufacturer) or is measured from the power (Pwr) analog input object.	Calculated
	Switch-off delay f.hold f.air flow cool.	DlyOffAflHldC	Set per HP manufacturer's recommendation for air flow after compressor turns off from the cooling mode.	[0.0] s

Verify	Description	Object / Property Name	Comment	Default
	Switch-off delay f.hold f.air flow heat.	DlyOffAflHldH	Set per HP manufacturer's recommendation for air flow after compressor turns off from the heating mode.	[0.0] s
	Switch-on delay for air flow cool.req	DlyOnAirFlCReq	Time delay might be desired to avoid blowing humid air into the space on cooling starts.	[0.0] s
	Switch-on delay for air flow heat.req.	DlyOnAirFlHReq	Time delay might be desired to avoid blowing cold air into the space on heating starts.	[0.0] s
	Switch-on delay for air flow dehmdf.req	DlyOnAflDhuReq	Time delay might be desired to avoid blowing humid air (from wet coil) into the space on dehumidification starts.	[0.0] s
	Switch-off delay for air flow dehmdf.req	DlyOfAflDhuReq	Time delay to have fan continue to run to dry off wet coil after a dehumidification run.	[0.0] s
	Switch-off delay for enable source (Water source)	DlyOffEnSrc	When the present demand signal (heating, cooling or dehumidification) is greater than the switch-on point for enable source, this delay-off timer will be activated to prevent water source pump cycling. After the timer expires, the source demand (HpuSrcDmd) and enable source command (EnHpuSrc) will both be True.	[0.0] s
★	Source state monitoring (Water source)	SrcStaMon	The source state indicates (for water-source heat pump) that media is flowing and heat pump coils can be activated and the type of source state is configured to identify the location of the source (SrcStaMon). SrcStaMon is a multistate configuration parameter: **None** – the off command (at equipment safety priority) to device mode is released. **Monitor enable source** - When the water source is commanded On from the Enable Source signal, after a time delay (DlyOnSrcSta), the compressor will be released from being Off at equipment safety priority. **Monitor source state** - The source state (HpuSrcSta) comes from a local binary input sensor/switch wired to the automation station. When there is no source media flow, the compressor is commanded off at equipment safety priority.	None
	Switch-on delay for source state (Water source)	DlyOnSrcSta	Allows time to establish water flow across coil to ensure adequate heat transfer.	[0.0] s
★	Enable monitoring source state available (Water source)	EnMonSrcAvl	(for water-source heat pump) Enables monitoring of source availability to indicate that media is available (flowing) and heat pump coils can be activated. Source available indication can be from either of these inputs: • Central group function via Boolean process value (HpuSrcAvl) at priority 15 • Local source binary input sensor (HpuSrcInAvl) that can set HpuSrcAvl to Yes at priority 14. If source available monitoring function is enabled (EnMonSrcAvl is Yes), the above inputs are then functional. If media is not flowing, the inputs can command the device mode to Off with priority 4, disabling the heat pump temperature and humidity controllers. If media is flowing, the inputs can release the device mode from priority 4, unlocking the heat pump temperature and humidity controllers.	Yes

Verify	Description	Object / Property Name	Comment	Default
★	Reversing valve activated by	RvrVlvActv	The Heat pump mode (Heating or Cooling] that results by activating/energizing the reversing valve.	Cooling
★	Compr.state by switchover revers.valve	CprStaRvrVlv	Set to Off for heat pumps in which the compressor state must be off for reversing valve changeover operation. Set to On for heat pumps in which the compressor state must be on to assist reversing valve changeover operation.	Off
	Changeover delay for heating/cooling	ChovrDlyHC	Allows refrigerant pressures to equalize before reversing valve operates. This is for heat pumps in which the compressor state must be off for reversing valve changeover.	[5:0.0]min:s
	Minimum switch-on time for compressor	TiOnMinCpr	Minimum time before compressor will stop after starting. This ensures adequate lubrication of compressor and circulation of lubricant in refrigerant.	[3:0.0] min:s
	Minimum switch-off time for compressor	TiOffMinCpr	Minimum time before compressor will restart after stopping. This allows head pressure to bleed off for easier restarts.	[3:0.0] min:s
	Enable lockout HP at low outs.air temp.	EnLockHpuTOaLo	If Yes, heat pump compressor will be locked out when the outside air temperature is less than LockHpuTOaLo.	No
	Lockout heat pump at low outs.air temp.	LockHpuTOaLo	HP lock out temperature	39.2°F (4°C)
	Enable lockout heat.at low outs.air temp	EnLockHTOaLo	If Yes, heating coil will be locked out when the outside air temperature is less than LockHTOaLo.	No
	Lockout heating at low outside air temp.	LockHTOaLo	Heating coil lock out temperature.	39.2°F (4°C)

Additional objects for heat pump unit

1. In the Application menu, select **List view**.
2. Select **Room > HVAC**.
   ⇨ The sub items for "HVAC" display.
3. Locate **Heating/cooling coil** (main AF for the heat pump unit).
4. Click the Link icon › to display additional heat pump device objects.
5. Locate objects as needed; not all will be relevant depending on type of heat pump:

   - Collection of heat pump fault
   - Heat pump source input available (Water source)
   - Heat pump source available (Water source)
   - Heat pump state (Water source)
   - Heat pump electric power
   - Heat pump source demand (Water source)

   Variable speed compressor only:
   - Heat pump variable speed
   - Maximum heat pump speed for cooling
   - Minimum heat pump speed for cooling
   - Maximum heat pump speed for heating
   - Minimum heat pump speed for heating
   - Max. heat pump speed for dehumidification
   - Min. heat pump speed for dehumidification

Verify	Description	Object / Property Name	Comment	Default
	Collection of heat pump fault	HpuFltCol	Optional binary input objects pick up any Heat pump equipment alarm switch. - When the switch indicates a fault, the component sets device mode off at equipment safety priority (Prio 4). The "Available" signals (heating, cooling, dehumidification) also turn off. - When the switch indicates no fault, the command to the device mode is released.	Yes
	Heat pump source input available (Water source)	HpuSrcInAvl	Physical Boolean input [Yes|No] indicating from a local sensor that the heating/cooling source is available (water is flowing). HpuSrcInAvl can set the above HpuSrcAvl Boolean Process Value to Yes at priority 14 and, if necessary, overwrite the state written by the Central group function.	Yes
	Heat pump source available (Water source)	HpuSrcAvl	Boolean process value [Yes|No] indicating (at priority 15) from a central group, that the heating/cooling source is available (water is flowing).	Yes

Verify	Description	Object / Property Name	Comment	Default
	Heat pump state (Water source)	HpuSta	When the device mode (HCclDevMod) is Off, then the "Heat pump state" (HpuSta) is Off. When the device mode (HCclDevMod) is not Off, then the "Heating/cooling coil heat pump state" (HpuSta) depends on the configuration parameter "Reversing valve is activated by" (RvrVlvAcvt) and the "Heating/cooling coil heat pump reversing valve position" (HpuRvrVlv): - If RvrVlvAcvt = Cooling and HpuRvrVlv = Active, then HpuSta is Cooling; otherwise it is Heating. - If RvrVlvAcvt = Heating and HpuRvrVlv = Active, then HpuSta is Heating; otherwise it is Cooling.	Off
	Heat pump electric power	HpuElPwr	The heat pump unit electric power usage is provided for energy monitoring and coordination with other devices. HpuElPwr is either **calculated** from the NomElPwr (obtained from the heat pump name plate or manufacturer) or is **measured** from the power analog input object (Pwr). The Boolean HpuPwr parameter can be set to either Calculated or Measured. **Single stage compressor** - When the Heat pump is on, HpuElPwr is equal to NomElPwr. HpuElPwr equals zero when the Heat pump is off. **Multi-stage compressor** - When one stage of the Heat pump coil is on, HpuElPwr is equal to half nominal power (NomElPwr). When both stages of the Heat pump coil are on, HpuElPwr is equal to NomElPwr. HpuElPwr equals zero when the Heat pump coil is off. **Variable speed compressor** - When power is calculated, the variable speed compressor power usage in kW is estimated based on percent speed command and full-load kW rating. The following formula is used for an estimate of compressor power: HpuElPwr = NomElPwr * (HpuVarSpd/100%)^3 Where: HpuElPwr = compressor power at any speed percentage of HpuVarSpd; NomElPwr = full load nominal compressor power from manufacturer nameplate; HpuVarSpd = compressor speed as percentage of maximum speed	0.00kW
	Heat pump source demand (Water source)	HpuSrcDmd	A Boolean indication of the need for source water. When the present demand signal (heating, cooling or dehumidification) is greater than the switch-on value, a delay-off timer (DlyOffEnSrc) will be activated (default: 2 minutes) to prevent compressor cycling. Then the enable source command (EnHpuSrc) and the source demand (HpuSrcDmd) become Yes.	No

Minimum and maximum heat pump speeds

The following objects present additional methods for setting the minimum and maximum compressor speed in a variable speed heat pump.

There are two ways to configure the variable speed compressor to operate at minimum and maximum speeds via voltage output limits.

Method 1 (default): Leave HpuVarSpd AO properties for min and max values at default, 0% (0 volts) and 100% (10 volts) respectively. Then, manipulate the HpuSpdMaxC/H/Dhu values to less than 100 percent to limit the max signal voltage to the compressor speed controller accordingly. Likewise, manipulate the HpuSpdMinC/H/Dhu values to more than 0 percent to limit the minimum compressor speed as needed.

For example, setting HpuSpdMax = 80%, will limit the AO output (from the application) to a maximum of 8.0 volts. Similarly, setting HpuSpdMin = 20% will limit the AO output (from application demand control) to a minimum of 2.0 volts. Note that when the demand for the heat pump is zero, the application will set the AO to 0% (0 volts). The application will also command the compressor's associated BO to OFF when the demand/requests are zero.

Method 2: Set the HpuVarSpd AO min and max value properties to the required heat pump limits, then set the HpuSpdMinC/H/Dhu and HpuSpdMaxC/H/Dhu values to 0 or 100 percent.

For example, setting the property for AO max speed to 80% will limit the output voltage to a maximum of 8.0 volts; setting the AO min to 20% limits the min voltage to 2.0 volts. With HpuSpdMax at 100%, when the application commands full output (100) the AO will not exceed 8.0 volts. With the HpuSpdMin set to 0% and the application commanding the heat pump to be off, the AO will limit the voltage to 2.0 volts. Now when the C/H/Dhu demand is above 4%, the output voltage for compressor speed will be between the AO minimum (2.0 volts) and the AO maximum (8.0 volts).

Verify	Description	Object / Property Name	Comment	Default
	Maximum heat pump speed for cooling	HpuSpdMaxC	Can be set to less than 100% to conserve energy or reduce noise if the heat pump cooling capacity exceeds maximum possible cooling load.	100%
	Minimum heat pump speed for cooling	HpuSpdMinC	Do not set to a value resulting in a compressor speed below the heat pump manufacturer's recommendations.	20%
	Maximum heat pump speed for heating	HpuSpdMaxH	Can be set to less than 100% to conserve energy or reduce noise if the heat pump heating capacity exceeds maximum possible heating load.	100%
	Minimum heat pump speed for heating	HpuSpdMinH	Do not set to a value resulting in a compressor speed below the heat pump manufacturer's recommendations.	20%
	Max. heat pump speed for dehumidification	HpuSpdMaxDhu	Can be set to less than 100% to conserve energy or reduce noise if the heat pump dehumidification capacity exceeds maximum possible dehumidification load.	100%
	Min. heat pump speed for dehumidification	HpuSpdMinDhu	Do not set to a value resulting in a compressor speed below the heat pump manufacturer's recommendations.	20%

Additional parameters for radiators

1. In the Application menu, select **List view**.
2. Select **Room > HVAC**.
   ⇨ The sub items for "HVAC" display.
3. Locate **Radiator**.
4. Click the properties icon then click the filter button
   ⇨ The radiator parameters display.

Verify	Description	Object / Property Name	Comment	Default
★	Enable downdraft compensation	EnDndft	Enables downdraft compensation feature (to lessen excessive flow of cold air coming from walls or windows when OA temperature is extremely cold. [No | Yes]	No
	Downdraft charact.for outs.air temp.X1	X1DndftTOa	The OA temperature at which the radiator is fully on	23°F
	Downdraft charact.for electric pos.Y1	Y1DndftElPos	The fully on radiator value when downdraft compensation feature is at maximum	100%
	Downdraft charact.for outs.air temp.X2	X2DndftTOa	The OA temperature that triggers the radiator to go to 25%	50°F
	Downdraft charact.for electric pos.Y2	Y2DndftElPos	The initial radiator value when downdraft compensation features begins	25%

Note
If hot water radiator, look for **valve** pos.Yx instead of electric pos.Yx.
Example, Downdraft charact.for valve pos.Y1 (Y1DndftVlvPos).

Favorite room operator unit configuration

The room operator unit Favorites provide points that regulate the behavior of the room unit.

For detailed information on how the room operator unit functions, read the application template documentation and ABT Site Help. The most common settings are covered here in the startup.

The ★ icon in the **Verify** column indicates typical items to set or verify.

1. In the Application menu, select **Favorites**.
2. Select **Room segment > Favorite room operator unit config**.

!	*NOTICE*
	Room operator unit type Values for QMX3.P34, P74 are shown below.

Verify	Description	Object / Property Name	Comment	Default
★	Room operator unit device 1	-	Click the Link icon › to display additional vent control objects.	Operational
★	Room operator unit 1	ROpUn RM UNIT STA	Status of room unit. Click the properties icon ⋮ then click the filter button	Operational
★	Device type	-	Room operator unit model.	QMX3.P34 (QMX3.P74 if heat pump)
	Commissioning state	-	*(Optional)* Startup technician can enter commissioning stage. [Not checked | Check failed | Check successful]	Not checked
	Commissioning information	-	*(Optional)* Can be used to enter date and Tech ID.	-
	Room unit, display temperature	-	Defines which temperature values can be displayed. [None | Display room temperature | Display outside air temperature | Display room & outside air temp.] If **Display room & outside air temp.** is selected, toggling between the values is enabled.	Display room temperature
	Room unit, display humidity	-	Enable display of room humidity , outside air humidity or both. (requires humidity sensing room operator unit such as QMX3.P74) [None | Display room humidity | Display outside air temperature | Display room & outside air humidity.]	None (heat pump: Display room humidity)
	Room unit, display windows status	-	Enables display or window status [No | Yes]	No
	Room unit, display air quality	-	Enable display of room air quality, outside air quality or both. (requires humidity sensing room operator unit such as QMX3.P74) [None | Display room air quality | Display outside air temperature | Display room & outside air quality.]	None (heat pump, Display room air quality)
	Room unit, air quality display	-	Air quality display options [Numeric, in ppm | Symbolic | Textual]	Symbolic
	Room unit, display heat./cool. status	-	[No | Yes]	Yes
	Enable operation: Room temp. setpoint	-	Also see options for shift limits and Setpoint option [No | Yes]	Yes
★	Room unit, room temp. setpoint display	-	Setpoint display option [Absolute temperature setpoint | Relative setpoint shift]	Absolute temperature setpoint
	Enable operation: Fan speed setpoint	-	VAV / FPB: defines whether **Rapid ventilation** option is configured for activation via fan speed button on room unit. [No | Yes] FCU: defines if room unit provides visual indication of when fan is running. FCU has no rapid ventilation feature. HP: defines if room unit provides visual indication of when fan is running. HP has no rapid ventilation feature.	Yes (heat pump: No)

Verify	Description	Object / Property Name	Comment	Default
	Enable operation: Room humidity setp.	-	For humidity control [No | Yes]	No
	Enable operation: Air quality setpoint	-	With CO2 sensor present [No | Yes]	No
	Enable operation: Presence button	-	Defines if the user can activate / deactivate presence (Comfort mode) via push button (key 8). (If you change this to Yes, you must disable Temporary Comfort button below.) **Enable operation: Presence button** and **Enable operation: Temporary comfort** cannot both equal Yes because they use the same button on the room operator unit (key 8). [No | Yes]	No
★	Enable operation: Temporary comfort	-	Defines if the user can activate presence (Comfort mode) via push button (key 8) for a configurable time. **Enable operation: Temporary comfort** and **Enable operation: Presence button** cannot both equal Yes because they use the same button on the room operator unit (key 8). [No | Yes]	Yes
	Enable operation: Room op.mode	-	Room op mode control [No | Yes]	No
	Enable operation: Green leaf	-	Defines if the GreenLeaf icon on the room operator unit can change color (green/red) based on user changes. [No | Yes]	Yes

3. Return to the beginning of this section by repeating the initial navigation steps as follows:
   In the Application menu, select **Favorites**, then select **Room segment > Favorite room operator unit config**.
4. Locate **Room temperature** object.

Verify	Description	Object / Property Name	Comment	Default
★	Room temperature	TR	Displays current value. Click the properties icon then click the filter button	--- °F
	Commissioning state	-	*(Optional)* Startup technician can enter commissioning stage. [Not checked | Check failed | Check successful]	Not checked
	Commissioning information	-	*(Optional)* Can be used to enter date and Tech ID.	-
	Present maximum value	-	-	122.0 °F
	Present minimum value	-	-	32.0 °F
★	Correction offset	-	As necessary, enter correction offset (plus or minus).	0.00

5. Return to the beginning of this section by repeating the initial navigation steps as follows:
   In the Application menu, select **Favorites**, then select **Room segment > Favorite room operator unit config**.
6. Locate **Setpoint shift input value** object.

Verify	Description	Object / Property Name	Comment	Default
★	Setpoint shift input value	SpShftIn	Displays current input. The available range for shifting the setpoint is +/- 5.4 °F. Click the properties icon then click the filter button to display the **Setpoint shift input value** min / max shift values.	Operational
★	Present maximum value	-	Limit of setpoint shift up	5.4 F
★	Present minimum value	-	Limit of setpoint shift down	5.4 F

Favorite terminal control

The terminal control Favorites show the PID loop controllers for the terminal unit.

!

Tuning of PID controllers is limited to unstable operation. Parameters should not be changed otherwise.

1. In the Application menu, select **Favorites**.
2. Select **Room segment > Favorite terminal control**.
   ⇨ The terminal control Favorites display.
3. (*Optional or as required*) Display the parameters by clicking the icon next to the loop controller description.

Description	Object	Comment	Default	Template
Supply air temperature	SPLY TEMP 4	AI Click the properties icon then click the filter button to display/set Correction offset parameter as needed.	--- °F (°C)	All
Mixed air temperature	MIXED TEMP 15	AI Click the properties icon then click the filter button to display/set Correction offset parameter as needed.	--- °F (°C)	All
Mixed temp.ctr.cool.for outs.air damper	DmpOaTMxCtrC	Loop controller Click the properties icon then click the filter button	---%	All

Parameter favorites for a loop control object include:

- Controller type (PID / Staged)
- Controller output maximum
- Controller output minimum
- Controller output for offset
- Gain
- Hysteresis switch-off
- Hysteresis switch-on
- Integral action-time Tn: 15 - 30min dependant on controller function (heating, cooling, or ventilation)

- Derivative action-time Tv (0.0 sec)

Backup Commissioning Settings

ABT Site required for project data completion
ABT Site project data must be completed using ABT Site. It cannot be completed via ABT-SSA or other online tool.

Only **Application type** devices (automation stations) can be uploaded, not free-programmable devices.

1. In the **Startup** component, **Set up connection** task, establish a connection as described previously in **Establishing a Connection to the Automation Station**.
2. In the **Startup** component, **Upload** task, **Discovered automation stations** tab, the connected AS is automatically discovered and displayed.
3. Select the automation station to be uploaded.
4. Click **Upload**.

⇨ The status of the selected AS will display **Backup in progress**. After a few minutes, the status displays **Operational** when the upload is complete.

Appendix A

Data Point Icons

Datapoint icons represent BACnet objects associated with buildings, floors, and rooms.

In ABT-SSA, datapoint icons appear to the left of objects in the favorites tables. Clicking an icon exposes the object's parameters if any exist.

Indicator	Description	BACnet object type
Structured view objects		
	Building	AreaView (Bldg)
	Floor	AreaView (Floor)
	Room	AreaView (R)
	Room segment	AreaView (RSegm)
	Favorite view	FvrView
	Other special View Node Objects	ColView, DevView, InfraView, yyy(xxx)
Value objects		
	Input value	AI, BI, BlsIn, LgtIn, MI
	Output value	AO, BO, BlsOut, EmgLgt, LgtAOut, LgtBOut, MO
	Calculated value	ACalcVal, BCalcVal, MCalcVal, PrphDev
	Process value	APrcVal, BPrcVal, MPrcVal
	Configuration value	ACnfVal, BCnfVal, MCnfVal, UCnfVal
	Trigger value	MTrgVal
Centralized command grouping objects		
	Command object	CmdObj
	Central function	AreaView (CenFnct)
	Group master	GrpMaster
	Group member	GrpMbr
	Application function	FuncView
Structured view objects		
	Network view	NwkView

Indicator	Description	BACnet object type
	Scheduler	Schedule
	Calendar	Calendar
System objects		
	Automation station	ASView
	Controller	Controller
Alarm and trend objects		
	Common Event Enrollment	CmnEvtEnr, EvtEnr, DevAlert
	Trend log	TrndLogS
	Other special Objects	AppCnf, CmnEvt, DevObj, FileObj, FldBusMgmt, NotifClass, NwkPortIP, NwkPortMSTP, Pgm
System function objects		
	Diagnostics	Diag
	Event log	EvtLog

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