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| REV | 00 |
| Date | 04/2024 |
| Supersedes | |

**Collective Housing Management
D-EIOOC01008-23_01EN**

Air to water heat pump units with scroll compressors

EWYT~CZ / EWAT~CZ

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1. COLLECTIVE HOUSING

This document describes the features of the Collective Housing option that allows the automatic change of the operating mode of the unit, between heat-pump and chiller, depending on the temperature value read by a probe, that can be called "Changeover Probe", placed in the plant.

Basic set up of the Collective Housing control first requires set one parameter available in the unit configuration menu and secondly to activate the functionality itself with its own enable parameter.

HMI EVCO Parameters

| Parameter | Default | Range | Description |
|-----------------------------------|---------|-----------------------------|---|
| [15.12] Heating Customized Enable | 0 | 0 = Disabled 1 = Enabled | After a restart of the UC the function will be enabled to start |
| [26.00] Collective Housing Enable | 0 | 0 = Off 1 = On | Enabling the changeover option. |

web HMI Path: Main Menu → Commission Unit → Configuration → Collective Housing

| Setpoint/Sub Menu | Default | Range | Description |
|---------------------------|---------|-----------------|---|
| Heating Customized Enable | Disable | Disable, Enable | After a restart of the UC the function will be enabled to start |

web HMI Path: Main Menu → Commission Unit → Configuration → Options

Notice that, for Web HMI, "Connectivity Kit" is required.



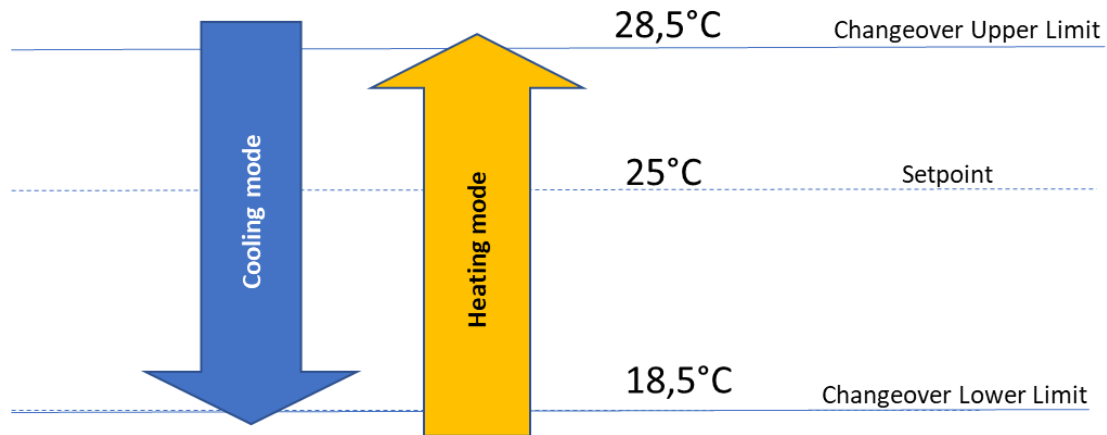
Collective Housing

This functionality is available only with EKRSCIO - IO extension for Heating Application accessory. Enabling Heating Customized without accessory module connected to the unit won't allow Collective Housing start.

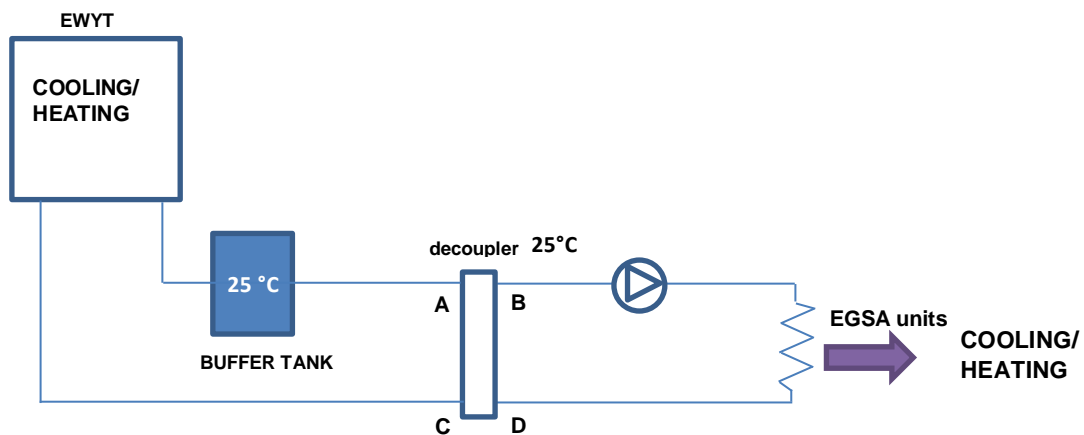
2. SET-UP

In case the Collective Housing option is selected the control system is to maintain collective housing the water temperature of external tank inside a specific range, desired for the plant, for example between 28,5°C (Changeover Upper Limit) and 18,5°C (Changeover Lower Limit). Water temperature Setpoint inside the tank is set to 25°C.

If this temperature goes above 28,5°C, the unit must change its operating mode in Cool, and cool the water under Changeover Lower Limit; the same if the temperature goes below 18,5°C the unit must turn into Heat Pump in order to heat the water in the loop.



It is strongly recommended to position the changeover probe at point B, and at the outlet of an eventual decoupler. It is possible to power EGSA units which are a System of ground source Heat Pump for Heating, Cooling & Hot Water.

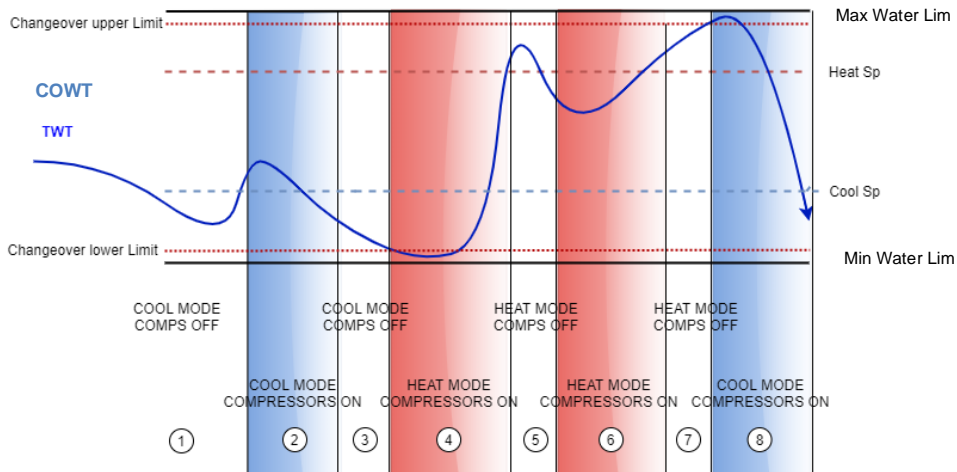


Please note that during Collective Housing, M/S, Bivalent Operation, and DHW functions are not allowed. Check unit configuration before start.

3. THERMOSTATIC CONTROL

The thermoregulation logic follows the standard one on the ELWT probe, with also the StageUp, StageDn, StartUp and StopDn temperatures. But, for the Changeover function the software will look at the Changeover probe, to change the operating mode of the unit.

- COWT = Changeover Water Temperature
- CUL = Changeover Upper Limit
- CLL = Changeover Lower Limit
- TWT = Tank Water Temperature



As shown in the figure above, to maintain the normal logic of thermoregulation, in phases 1-2-3 the value of Start-Up permits the chiller to turn on in cool mode and cool the water till the Shut-down temperature, where the unit shuts off the compressor and wait the load to turn on again.

Then, if the $COWT < ChangeoverLowerLimit$, the unit switches its operating mode into heat pump and heat the water up to Shut-Dn temperature Heat ($Heat\ Sp + ShutDnDt$), as in the phase 4. For thermoregulation, the unit switched to off and wait till the water goes below StartUp Heat Value to turn on again the compressor, as in phase 6.

But, the water temperature, of the Changeover probe, increase and reach the $ChangeoverUpperLimit$, phases 7-8, so the unit switch its operating mode in cooling, and cool the water till the value of ShutDn temperature Cool ($CoolSp - ShutDnDt$).

The values of all these parameters can be modified by interface, but they will be limited to avoid some cases that would introduce conflicts between changeover and thermoregulation logic.

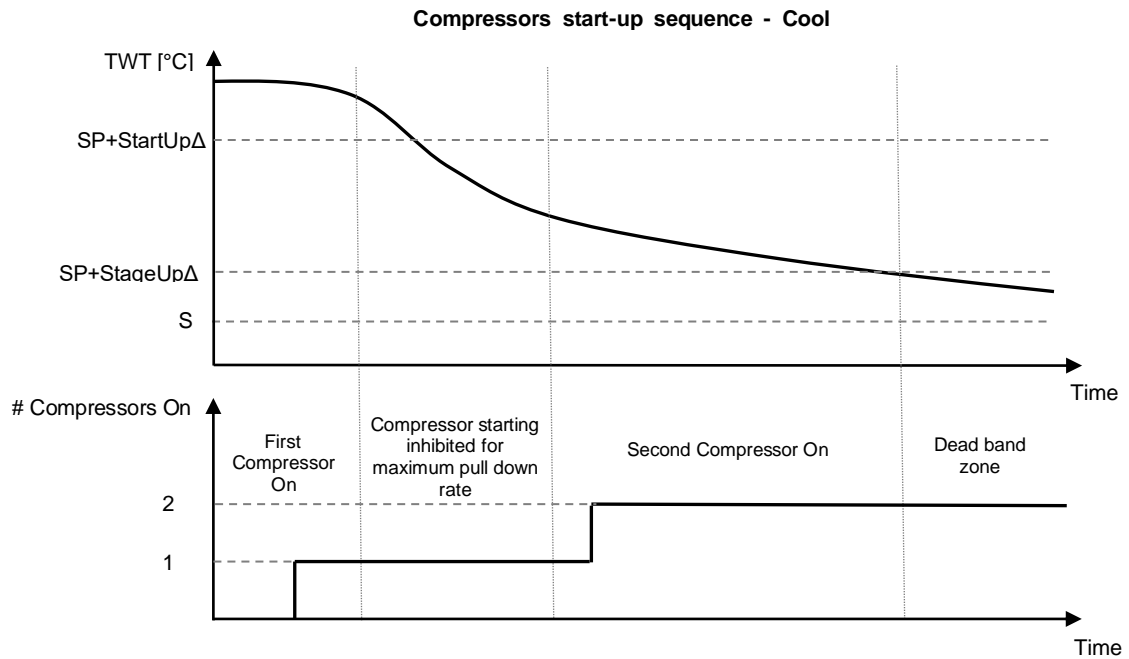
For example, the Shut-Dn temperature cannot coincide with the mode change temperature, otherwise the unit would shut down and restart too quickly.

| | Cool Mode | MIN | Heat Mode | MAX |
|-------------------------|----------------------------------|-----|----------------------------------|-----|
| First compressor start | $TWT > Setpoint + Start\ Up\ DT$ | | $TWT < Setpoint - Start\ Up\ DT$ | |
| Second compressor start | $TWT > Setpoint + Stage\ Up\ DT$ | | $TWT < Setpoint - Stage\ Up\ DT$ | |
| Last compressor stop | $TWT < Setpoint - Shut\ Dn\ DT$ | CLL | $TWT > Setpoint + Shut\ Dn\ DT$ | CUL |
| Second compressor stop | $TWT < Setpoint - Stage\ Dn\ DT$ | | $TWT > Setpoint + Stage\ Dn\ DT$ | |

Figure 1 - Setpoint Range Table

In addition, to increase the reliability of the compressors and the 4-way system, the distance between hot and cold setpoints should not be reduced too much.

EWYT's compressors are equipped with an inverter that regulates their speed depending on TWT value respect to Active Setpoint. If TWT value is close to Active Setpoint Compressor Speed decreases and vice versa.



If the unit was in Full Load, before the changeover, the next start-up in chiller mode will be delayed depending on the compressor timers.

4. CONDITION AT START

At starting point, when the unit is switched ON the operation mode will follow the following rules:

| | | |
|--------|---------------------------------------|-----------|
| IF | $CLL < TWT \leq Tank\ Sp$ (25 °C) | Heat Mode |
| ELSEIF | $Tank\ Sp (25\ ^\circ C) < TWT < CUL$ | Cool Mode |

Tank Sp variable manages the situation at start, in which otherwise the unit would keep the last operating mode, instead of considering the most efficient one at starting point.

Tank Sp is set to 25°C but it could be setted with a value between CUL and CLL.

5. COLLECTIVE HOUSING SETUP MENU

Table below reports all writable and readable parameters available in Collective Housing menu when function is enabled.

EVCO HMI Parameters

| Menu | Parameter | Default | Range | Description |
|-------------------------------|-------------------------------|---------|-----------------------------|--|
| [26] Collective Housing | [26.00] Collective Housing En | 0 | Off/On | Enabling the changeover option |
| | [26.01] Upper Lim | 28.5 | LowerLim... MaxHeatLwtSp | Value for the Changeover Upper Limit, when the Unit switch to Cool |
| | [26.02] Lower Lim | 18.5 | MinLwtSp... Upper Lim | Value for the Changeover Lower Limit, when the Unit switch to Heat |
| | [26.03] Tank Temp Sp | 25 | LowerLim... .Upper Lim | Setpoint that decides the starting condition of the unit when is switched ON depending on the COWT |
| | [26.04] Tank Temp | 0 | -50...9999 | Water Temperature inside Collective Housing Tank |
| | [26.05] Tank Sens Ofs | 0 | -5...+5 | Offset Water Temperature inside Collective Housing Tank |

All parameters can be configured in Web HMI at path:

“Main Menu -> Commission Unit -> Configuration -> Collective Housing”

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