



Ammonia Valve Station Controller



Table of Contents

Power and Mechanics	3
I/O Resources	3
Communication	3
Operating Conditions	3
I/O Terminal Assignment & Wiring Map	4
Auto Remote	6
Auto Local	6
Manual Defrost	6
Energy Management (Pause)	6
Read/Write Visual Conventions	8
Main Screen	9
Temperatures Screen	10
Cooling & Alarm Settings	11
Alarm Status	12
Input Status	13
Output Status	14
General Settings	15
Defrost Start Times	16
Defrost Duration Settings	17
Auto Defrost Settings	18
Demand Control – Weekdays (1)	19
Demand Control – Weekdays (2)	20
Demand Control – Saturday	21
Demand Control – Sunday	22
Demand Control – Time of Use (TOU)	23
TOU (1): Global options & hours 00–05	23
TOU (2): Hours 06–17	23
TOU (3): Hours 18–23 & live status	23
Demand Control – Cycles	25
Air-Off Setup	26
Air-On & Defrost – extra Input Type	27
External Setpoint Setup	28
Analogue Input – Raw Values	29
Valve Opening – Setup	30
• If the actuator moves in the wrong direction, check field wiring or the actuator’s direction setting.	30
Fan Speed – Setup	31
Control Temperature – Analogue Output	32
Control Temperature Setup	33
Analogue Output (Volt / mA) – Raw Values	35
PID Settings & Controller Type	36
Digital Input Setup	38
Digital Output Setup	40
Outputs (1)	40
Outputs (2)	40

Introduction

This document describes the Ammonia Cooler Control solution implemented on the akYtec PR205 programmable relay. The system coordinates safe and efficient operation of ammonia evaporators using a staged control sequence (Cooling Low/High, Soft-Defrost, Defrost, Drain, Fan-Delay, and Precooling), with support for local and remote control, time-of-use scheduling, and protective interlocks.

The manual is intended for commissioning engineers, maintenance technicians, and system integrators. It explains the control philosophy, I/O mapping, configuration parameters, and operating procedures required to install, start up, and maintain the controller.

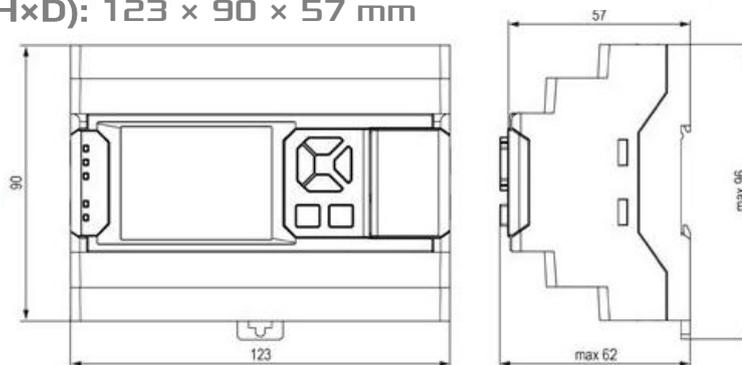


Technical Information

This section summarizes the key hardware specifications of the akYtec PR205 as used by the NH3 Evaporator Control application.

Power and Mechanics

- **Supply voltage:** 24 VDC (tolerant 20...27 VDC)
50 Hz VAC supply variant available.
- **Power consumption (max):** 8 W
- **Mounting:** DIN-rail (35 mm)
- **Protection class:** IP20
- **Weight:** ≈ 600 g
- **Average service life:** 8 years
- **Dimensions (W×H×D):** 123 × 90 × 57 mm



I/O Resources

- **Digital inputs:** 8 total, of which 2 are high-speed ("Fast") inputs for counting/pulse applications.
- **Universal inputs (DI/AI) :** 4 channels configurable as :
 - 0...10 V, or
 - 4...20 mA, or
 - 0...300 kΩ (resistive/RTD converters)
- **Fast digital inputs:** 2 (subset of the 8 DI)
- **Digital outputs:** 8 × relay, NO contacts
- **Analog outputs:** 0...10 V and/or 4...20 mA (channels as per project option)

Communication

- **Interfaces:** 1 × Ethernet, 2 × RS-485 (Modbus RTU/TCP)

Operating Conditions

These specifications provide the baseline for wiring, sizing, and environmental suitability when installing the controller in refrigeration plants.

- **Ambient temperature:** -20...+55 °C
- **Relative humidity:** up to 80 % at +35 °C, non-condensing
- **Storage temperature:** -25...+55 °C
- **Altitude:** up to 2000 m above sea level
- **Safety/EMC:** conforms to IEC 61000-6-2/-6-4

I/O Terminal Assignment & Wiring Map

Category	Channel	Terminal No	Signal Name	Wiring Note
Power & Analogue Inputs	Common	1	0VDC	
	Power	2	24VDC	
	AI1 (I)	5		
	AI1 (U)	6	Air-Off	
	Common	7	Air-Off/On	
	AI2 (U)	8	Air-On	
	AI2 (I)	9		
	AI3 (I)	10		
	AI3 (U)	11	Defrost	
	Common	12	Defrost/Ext SP	
	AI4 (U)	13		
	AI4 (I)	14	External SP	

Category	Channel	Terminal No	Signal Name	Wiring Note
Digital Inputs	Common	15	0VDC	
	DI1	16	Auto Remote	
	DI2	17	Auto Local	
	DI3	18	Manual Defrost	
	DI4	19	Ext Low Temp	
	Common	20	0VDC	
	DI5	21	Fans Run	
	DI6	22	Fault	
	Common	23	0VDC	
	FDI7	24	System Ok	
	FDI8	25	Pressure Fan Fault	

Category	Channel	Terminal No	Signal Name	Wiring Note
Analogue Outputs	V+	26	24VDC	
	V-	27	0VDC	
	AOU1 (0)	28	Valve (4-20mA)	
	AOU1 (V-)	29	Common (0VDC)	
	AOU2 (0)	30	Fan VFD (4-20mA)	
	AOU2 (V-)	31	Common (0VDC)	
	AOU3 (0)	32	Temp Out (4-20mA)	
	AOU2 (V-)	33	Common (0VDC)	

Category	Channel	Terminal No	Signal Name	Wiring Note
Digital Outputs	D01	38	System On	
	Common	39	240VAC	
	D02	40	Suction Solenoid	
	D03	41	Liquid Solenoid	
	Common	42	240VAC	
	D04	43	Hot Gas Solenoid	
	D05	44	Bleed Solenoid	
	Common	45	240VAC	
	D06	46	Cooler Fans	
	D07	47	Soft Defrost Sol	
	Common	48	0VDC	
	D08	49	Pod/Pressure Fan	

Category	Channel	Terminal No	Signal Name	Wiring Note
RS485	D1-	34	B	
	D1+	35	A	
	D2-	36	B	
	D2+	37	A	

Modes & Energy Management

Auto Remote

When the selector is wired to *Auto Remote* and a valid *heartbeat* is present, the PR205 accepts commands and setpoints from a remote PC/SCADA. In this mode the panel behaves like a remote I/O and control node: start/stop, setpoints, and trims are driven from the supervisory system. If the heartbeat is lost, control transfers smoothly to Auto Local (see below) so cooling can continue safely.

Auto Local

When the selector is wired to *Auto Local* (or if the remote heartbeat is not available), the PR205 runs on its own internal schedules, setpoints and protections. No external computer is required. Other SCADA systems may still write the published registers if desired; once written, the controller will operate *independently* using those values.

Manual Defrost

The *Manual Defrost* input forces a defrost cycle on operator request. The controller manages the full sequence (soft defrost, hot-gas, drain and fan delay) and then returns to normal cooling. Safety limits always remain active.

Energy Management (Pause)

The controller supports non-disruptive energy savings through a single concept: *Pause*.

Pause can be activated in two ways:

- *By time* – configurable *Pause Week* / *Pause Saturday* / *Pause Sunday* windows, and optional *Time-of-Use* (TOU) settings for Standard and Peak hours. During a Pause window, cooling is temporarily held off; protection and defrost sequences are not interrupted.
- *By SCADA* – a supervisory system can request Pause directly (e.g., demand-response or load shedding). This works whether the plant is in Auto Remote or Auto Local.

How the pieces fit

- Wiring labels on the terminals correspond to the three operator selections: *Auto Remote*, *Auto Local*, and *Manual Defrost*.
- With a heartbeat, a remote PC can take full control; without it, the PR205 keeps running on its own logic and any last written registers.
- Pause is an overlay: when active, cooling outputs are held off; when it ends, the unit resumes normal operation automatically.

Navigating User, Setup & System Screens

Use the front-panel keys to move between the three screen groups: User, Setup, and System. The actions below describe exactly how to switch and browse.

- Enter System screens
Press and hold OK for 10 seconds. The controller opens the System menu group.
- Exit System → User screens
From any System screen, press and hold ESC for 10 seconds to return to the User screens.
- Enter Setup screens (technician level)
From the User screens, press and hold ↓ (Down) to open the Setup screen group.
- Browse within Setup
While in Setup, short-press ↓ to go to the next setup screen, or short-press ↑ (Up) to go to the previous setup screen. The screens rotate in sequence.
- Exit Setup → User screens
Long-press ESC to leave Setup and return to the User screens.
- Browse within User screens
Short-press ↑/↓ to move to the previous/next user screen.

Key legend: ↑ = Up, ↓ = Down, « = Left, SEL, ESC, OK

Editing Values on a Screen

When a field is editable, use the keys below to change it digit-by-digit.

- Enter edit mode: Press SEL. The cursor jumps to the first editable value on the screen.
- Move between digits: Press « (Left) to shift the cursor one digit to the left.
 - When the cursor is already on the left-most (most significant) digit, another Left press wraps around to the right-most (least significant) digit.
 - Digits continue to cycle from left → right → left as you keep pressing Left.
- Change the digit:
 - ↑ (Up) increases the selected digit.
 - ↓ (Down) decreases the selected digit.
- Confirm a value / go to next field: Press OK. The current value is stored and the cursor moves to the next editable variable on the screen. Continue until all variables are set.
- Cancel editing / return to navigation: Press ESC at any time to exit edit mode without advancing to the next field. The unit returns to normal screen navigation, where ↑/↓ browse to the previous/next screen.

Key legend: ↑ = Up, ↓ = Down, « = Left, SEL, ESC, OK

User Screens

Read/Write Visual Conventions

- Read-only values
 - **Appearance:** white text on a black background.
 - **Meaning:** Live measurements or statuses; they cannot be edited.
- Editable values (general screens)
 - **Appearance:** white text on a blue background (**RGB 26, 126, 195 / HEX #1A7EC3**).
 - **Meaning:** User-set parameters; press **SEL** to enter edit mode, then adjust as described in *Editing Values*.
- Main screen exception
 - Only the **Setpoint** is editable. Other items on the main screen are read-only even if their colours differ from the rule above (main screen may use alternative colours for layout/branding).

Tip: If the field highlights and a digit begin blinking after SEL, it's editable. If nothing highlights, the field is read-only.

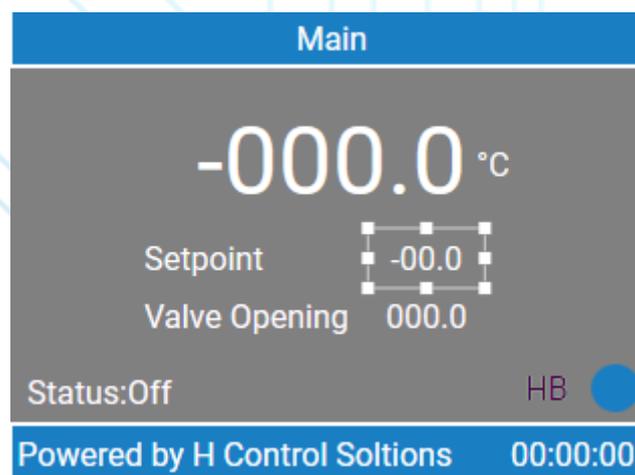
Main Screen

Purpose

The Main screen provides a quick, at-a-glance view of the current process temperature and the two most important controls/status items.

Elements

- **Process Temperature (large digits)**
Live reading in °C. This value is read-only.
- **Setpoint**
Editable target temperature. Valid range: *-99.9 ... +99.9 °C*.
To edit: press *SEL*, use *↑/↓* to change the digit, *«* to move to the next digit, then *OK* to confirm.
- **Valve Opening (%)**
Display of the commanded valve position. This item on the Main screen is *read-only* (even if coloured differently for layout).
- **Status**
Text summary of the current operating state (e.g., *Off*, *Cooling*, *Defrost*, etc.).
Read-only.
- **HB (Heartbeat) indicator**
Shows whether the controller is being driven by a remote PC/SCADA:
 - **Flashes** (1 s on / 1 s off): *Remote control active*.
 - **Solid grey**: *Local control* (no active heartbeat).
- **Footer**
Branding and an elapsed runtime clock.



Temperatures Screen

Purpose

View key temperature readings and switch the refrigeration system *On/Off*.

Fields

- **Air-Off (°C)** — Discharge air temperature leaving the evaporator. *Read-only*.
- **Air-On (°C)** — Return air temperature entering the evaporator. *Read-only*.
- **Control Temperature (°C)** — The temperature used for automatic control in *Auto Local*.
 - It is a blend of *Air-Off* and *Air-On* based on the *Damper Ratio* set in the setup screens:
 - *Damper = 100 %* → *Control Temperature = Air-Off*
 - *Damper = 0 %* → *Control Temperature = Air-On*
 - Intermediate values linearly mix the two readings. *Read-only here.*
- **Defrost Temperature (°C)** — Probe used for defrosting logic. *Read-only*.
- **Temperature Difference (°C)** — (*Air-On* – *Air-Off*) for quick load indication. *Read-only*.
- **Valve Opening (%)** — Commanded valve position. *Read-only*.
- **System On/Off** — Enables or disables the refrigeration cycle from this screen.
- Select the blue field, choose *On* or *Off*, press *OK* to confirm.

Colour convention

Values on a *black* background are read-only. Blue fields (e.g., *System On/Off*) are editable.

Temperatures			
Air Off (°C)	-000.0	Air On (°C)	-000.0
Control Temperature (°C)	-000.0		
Defrost Temperature (°C)	-000.0		
Temperature Difference (°C)	-000.0		
Valve Opening (%)	000.0		
System On/Off	Off ▼		
Status:Off			
Powered by H Control Solutions		00:00:00	

Cooling & Alarm Settings

Purpose

Configure the cooling setpoint used for automatic control and define high/low alarm limits with delays.

Fields

- **Cooling Setpoint (°C)** — Target temperature for control in *Auto Local*.
 - Range: -100.0 ... +100.0 °C.
 - *Editable (blue field)*.
- **Cooling Setpoint Diff (°C)** — Differential (dead-band) around the setpoint to prevent rapid cycling.
 - Range: 0.0 ... 40.0 °C.
 - *Editable*.
- **External Setpoint Used** — Indicates whether an external analogue setpoint is active (configured in Setup).
 - When enabled in Setup, the controller reads the setpoint from a *4-20 mA* or *0-10 V* signal; otherwise, it uses the local Cooling Setpoint above.
 - *Indicator only*.
- **Selected Setpoint (°C)** — Read-only display of the setpoint currently in use (external, if enabled; otherwise, local).
- **Low Alarm (°C) and Delay (min)** — Low-temperature alarm threshold and time delay before the alarm is raised.
 - Threshold range: -100.0 ... +100.0 °C
 - Delay range: 0 ... 120 min
 - *Editable*.
- **High Alarm (°C) and Delay (min)** — High-temperature alarm threshold and delay.
 - Threshold range: -100.0 ... +100.0 °C
 - Delay range: 0 ... 120 min
 - *Editable*.

Cooling & Alarm Settings	
Cooling Setpoint (°C)	-000.0
Cooling Setpoint Diff (°C)	00.0
External Setpoint Used	<input checked="" type="radio"/>
Selected Setpoint (°C)	-000.0
Low Alarm (°C)	-000.0
Delay (Min)	000
High Alarm (°C)	-000.0
Delay (Min)	000
Status: Off	
Powered by H Control Solutions	00:00:00

Alarm Status

Purpose

A quick, at-a-glance view of all safety and process alarms. Any active item turns its indicator *red*. If *any* alarm is red, *General Alarm* is red as well.

Indicators (what each light means)

- **General Alarm** – Summary flag; red if one or more alarms are active.
- **Ext Low Temp** – External low-temperature alarm input is active.
- **System Ok** – Controller health. *Blue = healthy, red = system fault*.
- **Air-On / Air-Off / Defrost** – Temperature plausibility checks; red if the respective sensor is out of valid range or fails a sanity check.
- **External SP** – External setpoint input fault (enabled but signal missing/out of range).
- **High Alarm / Low Alarm** – Process temperature above/below limits per the thresholds and delays set in *Cooling & Alarm Settings*.
- **Fan Trip (Cooler Fans)** – Trip detected on the cooler-fan VFD/overload (renamed from "Trip/Fault").
- **Pressure Fan Trip** – Trip detected on the pressure/extraction fan.
- **Critical** – A critical error condition; the controller halts outputs for safety.

Colour legend

- **Blue** = OK/normal (used for *System Ok*).
- **Red** = Alarm/Fault (requires attention).

Behaviour

When *Critical* is active, all cooling/defrost outputs are disabled until the fault clears and normal operation is restored.

Alarm Status			
Ext Low Temp	●	General Alarm	●
System Ok	●	Fan Trip	●
Air On	●	Air Off	●
External SP	●	Defrost	●
High Alarm	●	Critical	●
Low Alarm	●	Press Fan Trip	●
Status:Off			
Powered by H Control Solutions		00:00:00	

Input Status

What this shows

Live state of the PR205’s digital inputs for quick wiring and mode verification.

Colour logic

- **Blue** = Input present / condition OK
- **Red** = Fault or alarm condition

Indicators

- **General Alarm** – Red if any alarm is active.
- **Auto Remote** – Remote system requests automatic control (heartbeat present).
- **Auto Local** – Local automatic control is selected.
- **Manual Defrost** – Manual-defrost request is present.
- **Cooler Fans Run** – Fans run command/input is present.
- **Low Temp** – External low-temperature alarm input (red if triggered).
- **Fan Trip (Cooler Fans)** – Trip on the cooler-fan drive/overload.
- **Press Fan Trip** – Trip on the pressure/extraction fan.
- **System Ok** – *Blue* when healthy; *red* if a system fault is detected.

Use this page to confirm wiring and operating mode immediately and to diagnose alarms quickly.

Input Status

General Alarm		●
Auto Remote	● Auto Local	●
Manual Defrost	● Low Temp	●
Cooler Fans Run	● Fan Trip	●
System Ok	● Press Fan Trip	●

Status:Off

Powered by H Control Soltions
00:00:00

Output Status

This page shows the live state of all *controller outputs*.

Colour logic

- **Blue** = output is *ON / energized*
- **Gray** = output is *OFF / de-energized*
- **General Alarm** repeats the system alarm summary and turns **red** when any alarm is active.

Items shown

- **System On** – Main run output.
- **Liquid Sol** – Liquid line solenoid.
- **Bleed Sol** – Bleed/cooler purge solenoid.
- **Soft Defrost** – Soft-defrost output.
- **Suction Sol** – Suction solenoid.
- **Hot Gas Sol** – Hot-gas defrost solenoid.
- **Cooler Fans** – Evaporator/cooler fan relay.
- **VFD (%)** – Commanded fan speed; read-only numeric value (fan VFD demand).
- **Pod / Pressure Fan** – The label depends on setup:
 - If *Pod Enabled* is set in Setup, this output is shown as *Pod*.
 - Otherwise, the same terminal is presented as *Pressure Fan*.

Use this screen to confirm what the controller is currently driving and to verify fan-speed demand during operation.

Output Status

General Alarm		●
System On	●	Suction Sol ●
Liquid Sol	●	Hot Gas Sol ●
Bleed Sol	●	Cooler Fans ●
Soft Defrost	●	VFD (%) 000.0
Pod	●	Pressure Fan ●
Status:Off		
Powered by H Control Solutions		00:00:00

General Settings

All values on this page have a *blue* background (editable). Use *SEL* to enter edit mode, *←* to move between digits, *↑/↓* to change values, *OK* to accept, *ESC* to exit.

Start Delay (Seconds)

Range: 0–9 999 s

Applies a one-time delay after the system is enabled (or after power-up) before any cooling outputs are allowed to start. Use to stagger multiple systems on a common supply.

Bleed Duration (Minutes)

Range: 0–20 min

When a bleed sequence is required, keeps the *Bleed Sol* output energized for this duration. Set to *0* to disable the bleed step.

Pressure Fan Delay (Minutes)

Range: 0–60 min

Delays the *Pressure Fan / Pod* start after the system enters cooling. Useful to avoid nuisance pressure swings on startup. *0* = no delay.

After Pause Delay (Seconds)

Range: 0–999 s

Minimum time the controller waits after any *Pause* period clears (TOU/Week/Sat/Sun/SCADA) before restarting cooling. Prevents rapid cycling when energy-management windows end.

Fan Speed High Setpoint (°C)

Range: –99.9 ... +99.9 °C

Upper temperature threshold for the fan-speed band. Above this temperature the controller commands *High* fan speed.

Fan Speed Low Setpoint (°C)

Range: –99.9 ... +99.9 °C

Lower temperature threshold for the fan-speed band. At or below this temperature the controller commands *Low* fan speed.

Notes

- The fan-speed band creates a two-point control: *Low* inside the band, *High* outside the band (with internal hysteresis to avoid hunting).
- Set *Low Setpoint* ≤ *High Setpoint*. If entered otherwise, the controller internally swaps them.

General Settings	
Start Delay (Seconds)	0000
Bleed Duration (Minutes)	00
Pressure Fan Delay (Minutes)	00
After Pause Delay (Seconds)	000
Fan Speed High Setpoint (°C)	-00.0
Fan Speed Low Setpoint (°C)	-00.0
Status:	Off
Powered by H Control Solutions	00:00:00

Defrost Start Times

This page lets you schedule up to six automatics defrost starts per day.

- **Enable:** Each line has an *Off / On* selector. Set to *On* to activate that start time.
- **Hour:** 0–23 (24-hour clock).
- **Minute:** 0–59.

How it works

- At the programmed time, the controller initiates a defrost cycle using the durations and steps defined in the defrost settings pages.
- Times repeat *every day* unless energy-management *Pause* windows or *TOU* rules are active; in that case a scheduled start is skipped, and the system remains paused.
- If two start times are the same, they are treated as one (duplicates are ignored).
- If a new start time falls while a defrost is already running, it is *ignored*; the current defrost completes normally.
- Midnight wrap is supported—e.g., a defrost that begins at 23:55 and runs across 00:00 continues without interruption.

Tips

- Stagger rooms or systems a few minutes apart to avoid peak load.
- Use *Manual Defrost* from the Inputs/SCADA when you need an immediate defrost outside the schedule.

Defrost Start Times			
Defrost Start Time 1	Off ▾	00	00
Defrost Start Time 2	Off ▾	00	00
Defrost Start Time 3	Off ▾	00	00
Defrost Start Time 4	Off ▾	00	00
Defrost Start Time 5	Off ▾	00	00
Defrost Start Time 6	Off ▾	00	00
Status:Off			
Powered by H Control Solutions		00:00:00	

Defrost Duration Settings

Purpose

Configure how long each step of a defrost cycle runs and provide two service tools (Manual Defrost and Next Stage) for on-demand control.

Fields

- **Soft Defrost Duration (sec)**
Range: 0–999 s.
Optional pre-defrost warm-up. Set to 0 to skip.
- **Defrost Duration (min)**
Range: 0–180 min.
Main heater/hot-gas defrost time.
- **Drain Duration (min)**
Range: 0–99 min.
Time allowed for meltwater to drain after defrost completes.
- **Fan Delay (sec)**
Range: 0–1800sec.
Post-drain delay before evaporator fans restart, to prevent water carry-over.
- **Manual Defrost**
On starts an immediate defrost using the durations above, then this field *resets to Off* automatically.
Use for maintenance or when a scheduled defrost was missed.
- **Next Stage**
Works *only while a defrost is active*. When set *On*, the controller advances to the *next step* in the sequence (Defrost → Drain → Fan Delay → Cooling), then this field *resets to Off*.

Notes

- Changing durations applies to the *next* cycle (or immediately if you run *Manual Defrost*).
- If *Next Stage* is used during Drain or Fan Delay, the controller advances to the following step.
- Energy-management pauses (TOU/Pause windows) can prevent a defrost from starting; active defrosts complete normally unless a critical fault occurs.

Defrost Duration Settings	
Soft Defrost Duration (Sec)	000
Defrost Duration (Min)	000
Drain Duration (Min)	00
Fan Delay (Sec)	0000
Manual Defrost	Off <input type="checkbox"/>
Next Stage	Off <input type="checkbox"/>
Status:	Off
Powered by H Control Solutions 00:00:00	

Auto Defrost Settings

Purpose

Enable/disable temperature-triggered defrosts and set a lockout time between any two defrosts.

Fields

- **Defrost Temperature (°C)**
Read-only coil/evaporator sensor temperature used to judge ice build-up.
- **Auto Defrost Enabled**
Yes/No. When *Yes*, the controller will start a defrost whenever the *Defrost Temperature* is at or below the *Auto Defrost Setpoint* and no defrost-lockout is active.
- **Auto Defrost Setpoint (°C)**
Threshold temperature for auto-defrost. Typical values are very low (e.g., *-6.0 °C*); set to the coil temperature that indicates frost accumulation for your system.
- **Delay Between Defrosts (Min)**
0-9999 minutes. Lockout period after any defrost finishes. During this delay the controller *skips both Auto and Scheduled* defrosts.
- The lockout *does not* block *Manual Defrost* (service/force) and is *cleared by a power cycle*.

Notes

- Energy-management pauses (TOU / Pause windows) can prevent a new defrost from starting; active defrosts run to completion.
- Use a realistic lockout (e.g., 60–180 min) to avoid back-to-back defrosts when ambient or load conditions fluctuate.

Auto Defrost Settings	
Defrost Temperature (°C)	-000.0
Auto Defrost Enabled	No ▾
Auto Defrost Setpoint (°C)	-00.0
Delay Between Defrosts (Min)	0000
Status:Off	
Powered by H Control Soltions	00:00:00

Demand Control — Weekdays (1)

Purpose

Define up to *four pause windows* during weekdays when the controller intentionally suspends cooling to reduce demand (e.g., high tariff periods, load-shedding, generator/battery operation).

How it works

- Each window has a *Start* (HH:mm) and *End* (HH:mm). Valid ranges: *hours 0-23, minutes 0-59*.
- When the current time falls inside any active window, the system enters *Pause*:
- Cooling stages are inhibited.
- The control loop holds output; safety interlocks and alarms remain active.
- Windows can *cross midnight* (e.g., Start 22:30, End 01:00). The pause remains active through 00:00 until the End time.
- If *Start = End*, that window is *disabled*.
- *Overlaps* are allowed; overlapping windows behave as one continuous pause.
- The header *Status* shows *On/Off* to indicate whether a weekday pause is currently active.

Priority & interactions

- Weekday pauses work alongside *TOU* and *SCADA* controls:
 - If *SCADA* issues a pause, it will also hold the system regardless of these times.
 - Active defrosts are allowed to finish safely; new defrosts are suppressed while paused.
- Manual "System On/Off" still respects safety logic; turning the system Off overrides pause status.

Typical use

- Enter the utility's *peak windows* (e.g., 06:00–08:00, 17:00–19:00) to cap demand.
- Define shorter windows during scheduled *load-shedding* to protect backup power.

Demand Control Weekdays (1)

Start 1	<input type="text" value="00"/>	<input type="text" value="00"/>	End 1	<input type="text" value="00"/>	<input type="text" value="00"/>
Start 2	<input type="text" value="00"/>	<input type="text" value="00"/>	End 2	<input type="text" value="00"/>	<input type="text" value="00"/>
Start 3	<input type="text" value="00"/>	<input type="text" value="00"/>	End 3	<input type="text" value="00"/>	<input type="text" value="00"/>
Start 4	<input type="text" value="00"/>	<input type="text" value="00"/>	End 4	<input type="text" value="00"/>	<input type="text" value="00"/>

Status: Off

Powered by H Control Solutions
00:00:00

Demand Control — Weekdays (2)

What this page does

Choose *which weekdays* the four pause windows (set on the previous page) will apply to.

Fields

- **Week Enabled** – Master switch.
 - **Yes:** the weekday demand-control function is active.
 - **No:** all weekdays pause windows are ignored, regardless of the day toggles below.
- **Monday ... Friday** – Per-day enables. Set **Yes** for each day that should honour the Start/End windows from “Weekdays (1)”.

Status

- **Status:** *On* shows a weekday pause is currently active (time now is inside any enabled window and on an enabled day).
- **Status:** *Off* means no active weekday pause.

Notes & tips

- Changes take effect immediately; no reboot required.
- If a day is *No*, the controller runs normally on that day even if *Week Enabled* = *Yes*.
- Saturday and Sunday are configured on their own pages; they are not affected by these toggles.
- Weekday pauses cooperate with TOU/SCADA pauses; any active pause will hold cooling while keeping safety and alarms active.

Demand Control Weekdays (2)	
Week Enabled	No ▾
Monday	No ▾
Tuesday	No ▾
Wednesday	No ▾
Thursday	No ▾
Friday	No ▾
Status:Off	
Powered by H Control Solutions	00:00:00

Demand Control – Saturday

What this page does

Defines up to *four pause windows* for *Saturday*. During an active window the controller pauses cooling (safety and alarms remain active).

Fields

- **Saturday Enabled** – Master switch for Saturday demand control.
 - **Yes:** the Start/End windows below are evaluated.
 - **No:** Saturday pauses are ignored.
- **Start 1 ... Start 4 / End 1 ... End 4** – Up to four-time windows.
 - **Hour:** 00–23 **Minute:** 00–59
 - Windows can span midnight (e.g., Start 22:30, End 01:00).
 - Leave a window at *00:00–00:00* to disable it.

Status

- **Status:** *On* appears when the current time falls within any enabled Saturday window.
- **Status:** *Off* otherwise.

Notes

- Saturday control is independent of weekday and Sunday pages.
- If another pause source is active (TOU, SCADA command, or fault interlock), the unit remains paused until all pause conditions clear.
- Changes apply immediately; no restart required.

Demand Control Saturday

Saturday Enabled		No <input checked="" type="checkbox"/>
Start 1	<input type="text" value="00"/> <input type="text" value="00"/>	End 1 <input type="text" value="00"/> <input type="text" value="00"/>
Start 2	<input type="text" value="00"/> <input type="text" value="00"/>	End 2 <input type="text" value="00"/> <input type="text" value="00"/>
Start 3	<input type="text" value="00"/> <input type="text" value="00"/>	End 3 <input type="text" value="00"/> <input type="text" value="00"/>
Start 4	<input type="text" value="00"/> <input type="text" value="00"/>	End 4 <input type="text" value="00"/> <input type="text" value="00"/>
Status:Off		
Powered by H Control Solutions		00:00:00

Demand Control – Sunday

What this page does

Configures up to four pause windows for Sunday. When a window is active, the controller pauses cooling (safety and alarms remain active).

Fields

- **Sunday Enabled** – Master switch for Sunday demand control.
 - **Yes:** the Start/End windows below are used.
 - **No:** Sunday pauses are ignored.
- **Start 1 ... Start 4 / End 1 ... End 4** – Define time windows.
- **Hour:** 00–23 **Minute:** 00–59
- Windows may *cross midnight* (e.g., Start 22:30, End 01:00).
- Set **00:00–00:00** to disable a window.

Status

- **Status:** *On* when the current time is inside any enabled Sunday window.
- **Status:** *Off* otherwise.

Notes

- Sunday settings are independent from Weekday and Saturday pages.
- If any other pause condition is active (TOU, SCADA pause, or interlock), the unit stays paused until all conditions clear.
- Changes take effect immediately.

Demand Control Sunday			
Sunday Enabled			No <input checked="" type="checkbox"/>
Start 1	<input type="text" value="00"/>	<input type="text" value="00"/>	End 1 <input type="text" value="00"/> <input type="text" value="00"/>
Start 2	<input type="text" value="00"/>	<input type="text" value="00"/>	End 2 <input type="text" value="00"/> <input type="text" value="00"/>
Start 3	<input type="text" value="00"/>	<input type="text" value="00"/>	End 3 <input type="text" value="00"/> <input type="text" value="00"/>
Start 4	<input type="text" value="00"/>	<input type="text" value="00"/>	End 4 <input type="text" value="00"/> <input type="text" value="00"/>
Status:Off			
Powered by H Control Solutions			00:00:00

Demand Control – Time of Use (TOU)

What TOU does

Time-of-Use lets you pause refrigeration during expensive energy periods. You assign a tariff to each hour of the day—*Off-Peak*, *Standard*, or *Peak*—and the controller will pause whenever the current hour matches a tariff that has been enabled to pause.

TOU (1): Global options & hours 00–05

- **Weekdays Only**
 - *Yes*: TOU applies Monday–Friday only.
 - *No*: TOU applies every day (Monday–Sunday).
- **Standard Enabled / Peak Enabled**
 - Choose *Yes* to make that tariff *active for pausing*.
 - If *Standard Enabled = No*, hours marked *Standard* will be treated like *Off-Peak* (no pause).
 - If *Peak Enabled = No*, hours marked *Peak* will be treated like *Off-Peak*.
- **Hour selectors (00–05)**
 - For each hour, pick *Off Peak*, *Standard*, or *Peak*.
 - The hour label is the start of the hour (e.g., “03” covers 03:00–03:59).

TOU (2): Hours 06–17

- Continue assigning *Off Peak* / *Standard* / *Peak* for each hour in this block.
- Your choices here follow the same enable rules set on TOU (1).

TOU (3): Hours 18–23 & live status

- **Hour selectors (18–23)**
 - Finish the 24-hour schedule with the same three tariff choices.
- **Live indicators**
 - *Off Peak: Green* when the current hour is Off-Peak.
 - *Standard: Yellow* when the current hour is Standard.
 - *Peak: Red* when the current hour is Peak.
 - Grey = not active.
- **Remote pause permissions**
 - *Standard* (On/Off) and *Peak* (On/Off) toggles below the indicators show what a SCADA/PC is currently requesting.
 - If the PC connection drops, these can be switched *Off* locally so the controller ignores remote pause requests and continues autonomously.

How pausing is decided (simple rule)

1. Determine today (Weekdays-only or all days).
2. Look up the current hour's tariff (Off-Peak / Standard / Peak).
3. If *Standard Enabled = Yes* and the tariff = *Standard*, the controller *pauses*.
4. If *Peak Enabled = Yes* and the tariff = *Peak*, the controller *pauses*.
5. Otherwise, it *runs normally*.

Tip: Use TOU together with the *Weekday / Saturday / Sunday Demand Control windows* for fine-grained demand management or leave those off and use TOU alone for a simple tariff-based pause schedule.

Demand Control - Time of Use (1)

Weekdays Only	No <input type="button" value="v"/>
Standard Enabled	No <input type="button" value="v"/>
Peak Enabled	No <input type="button" value="v"/>
00 <input type="button" value="Off Peak v"/>	01 <input type="button" value="Off Peak v"/>
02 <input type="button" value="Off Peak v"/>	03 <input type="button" value="Off Peak v"/>
04 <input type="button" value="Off Peak v"/>	05 <input type="button" value="Off Peak v"/>

Status:Off

Powered by H Control Soltions 00:00:00

Demand Control - Time of Use (2)

06 <input type="button" value="Off Peak v"/>	07 <input type="button" value="Off Peak v"/>
08 <input type="button" value="Off Peak v"/>	09 <input type="button" value="Off Peak v"/>
10 <input type="button" value="Off Peak v"/>	11 <input type="button" value="Off Peak v"/>
12 <input type="button" value="Off Peak v"/>	13 <input type="button" value="Off Peak v"/>
14 <input type="button" value="Off Peak v"/>	15 <input type="button" value="Off Peak v"/>
16 <input type="button" value="Off Peak v"/>	17 <input type="button" value="Off Peak v"/>

Status:Off

Powered by H Control Soltions 00:00:00

Demand Control - Time of Use (3)

18 <input type="button" value="Off Peak v"/>	19 <input type="button" value="Off Peak v"/>
20 <input type="button" value="Off Peak v"/>	21 <input type="button" value="Off Peak v"/>
22 <input type="button" value="Off Peak v"/>	23 <input type="button" value="Off Peak v"/>

Off Peak ●

Standard Off ●

Peak Off ●

Status:Off

Powered by H Control Soltions 00:00:00

Demand Control – Cycles

This page lets you *distribute cooling load over repeating time slots*. Up to *six cycles (01-06)* can be used, each the same length. The controller steps through them from midnight and then repeats.

What you set

- **01 ... 06 (On/Off):** Turn a cycle *on* to make it part of the rotation. Leave it *off* to skip it.
- **Cycle Time (Minutes):** Length of each slot. The active cycle changes every *Cycle Time* minutes.
- **Cycle Nr (read-only):** Shows which cycle is active right now.
- **Cycle On indicator:** Blue = the cycle is currently in effect.

How it works

- The sequence starts at *00:00* with *Cycle 01*, then advances *01 → 02 → ... → 06 → 01*.
- Only cycles that are *enabled* participate; disabled ones are skipped.
- *All pause features (Weekday/Saturday/Sunday windows and TOU)* are *applied only while the current cycle is enabled*.
- *Exception:* SCADA-driven *Standard Pause* or *Peak Pause* always take effect, even if cycles are disabled.
- This lets you stagger rooms across different cycles, so total kW stays within limits while maintaining cooling.

Example

If *Cycle Time = 10 min* and only *01, 03, 05* are enabled:

00:00–00:09 → Cycle 01 (pauses allowed)

00:10–00:19 → Cycle 02 (skipped)

00:20–00:29 → Cycle 03 (pauses allowed)

00:30–00:39 → Cycle 04 (skipped)

00:40–00:49 → Cycle 05 (pauses allowed)

...then the pattern repeats.

Tip: Use cycles to spread defrosts or pauses across rooms; pair them with TOU/Weekday windows to keep demand under control without sacrificing product temperature.

Demand Control - Cycles					
01	Off	●	02	Off	●
03	Off	●	04	Off	●
05	Off	●	06	Off	●
Cycle On					●
Cycle Nr					00
Cycle Time (Minutes)					000
Status:Off					
Powered by H Control Solutions					00:00:00

Air-Off Setup

Use this page to configure how the **Air-Off** temperature is read and validated.

Input Type

Choose where the reading comes from:

- **Probe** – uses a temperature sensor (all supported probe types are listed in the *Sensors & Probes* section: e.g., PT1000, PT500, NTC, etc.).
- **0–10 V** – linear analogue input.
- **4–20 mA** – linear analogue input.

Air-Off (°C)

Current measured value (read-only).

Offset (°C)

Adds a fine correction to the measured value. Range **-20.0 ... +20.0**.

Use this to match a trusted reference thermometer.

Max / Min (°C)

Define the engineering range for *linear scaling* when the input type is **0–10 V** or **4–20 mA**.

- Min maps to 0 V or 4 mA; Max maps to 10 V or 20 mA.
- Typical range **-100.0 ... +100.0 °C**.
Ignored when a *Probe* type is selected.

Limit Max / Limit Min (°C)

Plausibility window for the Air-Off reading. If the value goes outside this band, the controller flags an *error* and may inhibit cooling, according to alarm rules.

Range **-100.0 ... +100.0 °C**.

Forced Val (°C) / Force OnOff

- **Force OnOff = On** → the Air-Off value is overridden with **Forced Val**.
- Useful for *commissioning*, simulations, or when a supervisory system needs to inject a value.
- Set **Force OnOff = Off** to return to the real input.

Tips

- Start with sensible **Max/Min** that match your expected room temperature range before applying any **Offset**.
- Keep **Limit Min/Max** slightly wider than Max/Min to avoid nuisance alarms during recovery.
- Only enable **Force** during testing; remember to turn it **Off** for normal operation.

The same setup model applies to Air-On and Defrost Temperature.

Air-On & Defrost – extra Input Type

Add the following bullet under *Input Type* for both the *Air-On Setup* and *Defrost Temperature Setup* pages:

- *Off* – disables this temperature channel. The controller reports a fixed value of $-100.0\text{ }^{\circ}\text{C}$ and ignores alarms/logic tied to this sensor. Use when the probe is not installed or the signal is not required.

Everything else (Offset, Max/Min, Limit Max/Min, Forced Val / Force OnOff) behaves the same as described in Air-Off Setup.

Air-Off Setup			
Input Type	0-10V <input type="button" value="v"/>		
Air Off (°C)	-000.0		
Offset (°C)	-000.0		
Max (°C)	-000.0	Min (°C)	-000.0
Limit Max	-000.0	Limit Min	-000.0
Forced Val	-000.0	Force OnOff	Off <input type="button" value="v"/>
Powered by H Control Soltions		00:00:00	

Air-On Setup			
Input Type	0-10V <input type="button" value="v"/>		
Air On (°C)	-000.0		
Offset (°C)	-000.0		
Max (°C)	-000.0	Min (°C)	-000.0
Limit Max	-000.0	Limit Min	-000.0
Forced Val	-000.0	Force OnOff	Off <input type="button" value="v"/>
Powered by H Control Soltions		00:00:00	

Defrost Temperature Setup			
Input Type	0-10V <input type="button" value="v"/>		
Defrost Temperature (°C)	-000.0		
Offset (°C)	-000.0		
Max (°C)	-000.0	Min (°C)	-000.0
Limit Max	-000.0	Limit Min	-000.0
Forced Val	-000.0	Force OnOff	Off <input type="button" value="v"/>
Powered by H Control Soltions		00:00:00	

External Setpoint Setup

Purpose

Allows a remote analogue signal to define the cooling setpoint. When enabled, the controller ignores the local setpoint and uses the value derived from the analogue input.

Input Type

- **0-10 V** or **4-20 mA** (probe/sensor types are not available for this input).

Fields (same behaviour as temperature inputs, adapted for setpoint):

- **External Setpoint (°C)** – Live, read-only value after scaling and offset are applied.
- **Offset (°C)** – Fine calibration (e.g., enter +0.5 if the external source reads 0.5 °C low).
- **External SP Enabled** – *On/Off*. When *On*, the controller uses the external setpoint; when *Off*, it uses the local setpoint.
- **Max / Min (°C)** – Scaling limits for the analogue range:
 - For **0-10 V**: *Min* maps to 0 V, *Max* maps to 10 V.
 - For **4-20 mA**: *Min* maps to 4 mA, *Max* maps to 20 mA.
 Set to the usable setpoint span (e.g., *Min* = -10 °C, *Max* = +10 °C).
- **Limit Max / Limit Min (°C)** – Plausibility window. If the calculated setpoint goes outside these limits, an error is raised and the setpoint is rejected.
- **Forced Val (°C)** and **Force OnOff** – When **Force OnOff = On**, the controller ignores the analogue signal and applies **Forced Val** as the external setpoint (useful for commissioning). Set **Force OnOff = Off** for normal operation.

Best practice

- Configure **Max/Min** first, then trim with **Offset**.
- Ensure the external source (PLC/ trim pot) and wiring match the chosen **Input Type**.
- Choose **Limit Min/Max** slightly wider than the expected operating range to avoid nuisance faults while still catching wiring or source errors.
- Remember: enabling **External Setpoint** hands setpoint authority to the analogue source; disable it to return control to the local setpoint.

External Setpoint Setup			
Input Type	0-10V <input type="button" value="v"/>		
External Setpoint (°C)	-000.0		
Offset (°C)	-000.0		
External SP Enabled	Off <input type="button" value="v"/>		
Max (°C)	-000.0	Min (°C)	-000.0
Limit Max	-000.0	Limit Min	-000.0
Forced Val	-000.0	Force OnOff	Off <input type="button" value="v"/>
Powered by H Control Solutions		00:00:00	

Analogue Input — Raw Values

This page shows the *live, unprocessed readings* of the four analogue inputs (AIN1–AIN4) in three columns:

- **Volt** – the measured voltage when the input is configured as **0–10 V**.
 - Example: 9.34 V means the channel is receiving ~9.34 volts.
 - **mA** will read 0.00 and **Raw** will track the internal ADC counts ($\approx -4000...+4000$).
- **mA** – the measured current when the input is configured as **4–20 mA**.
 - Example: 7.24 mA indicates the loop current.
 - **Volt** will read 0.00 and **Raw** will track the ADC counts ($\approx -4000...+4000$).
- **Raw** – the controller’s internal, dimensionless ADC value (about **-4000 to +4000**).
 - Use this for diagnostics and calibration (it rises with the electrical signal, independent of scaling/offsets).
 - When a **probe/sensor** type is selected, **Volt** and **mA** show 0.00, and **Raw** represents the decoded **temperature** value from the probe.

Notes

- Small fluctuations are normal due to sensor/ADC noise.
- If you see non-zero **Volt** and **mA** simultaneously, check the channel’s configured **Input Type** and wiring.
- For temperature probes, verify the probe type in **Setup** to ensure the raw reading corresponds to a realistic temperature.

Analogue Input(Volt) (mA) (Raw Values)			
	Volt	mA	Raw
AIN 1	-00.00	-00.00	-0000.0
AIN 2	-00.00	-00.00	-0000.0
AIN 3	-00.00	-00.00	-0000.0
AIN 4	-00.00	-00.00	-0000.0

Powered by H Control Solutions 00:00:00

Valve Opening — Setup

Purpose

Configure the analogue output that drives the expansion valve (or any 0–10 V / 4–20 mA actuator). The controller computes *Valve Opening (%)* and maps it to the selected output type.

Fields

- **Output Type**
Choose the physical signal: *0–10 V* or *4–20 mA*. (Off = output disabled.)
- **Valve Opening (%)** (*read-only*)
The current command from the controller, 0.0–100.0 %.
- **Max (%) / Min (%)**
Clamp the command to the actuator's usable range (0–100).
Example: Min=5, Max=95 → the signal is limited to 5–95 %.
- **Forced Val**
Percentage to output when forcing is enabled (see below).
- **Force OnOff**
On → bypass control and output *Forced Val* continuously (hand/commissioning mode).
Off → normal automatic control.
- **Raw Value** (*read-only*)
The electrical output corresponding to the command, shown in volts or milliamps depending on *Output Type*.

Notes

- Adjust *Min/Max* to match the actuator's safe operating window.
- Use *Force OnOff* only during commissioning or maintenance; remember to set it back to *Off* for normal operation.
- If the actuator moves in the wrong direction, check field wiring or the actuator's direction setting.

Valve Opening Setup	
Output Type	Off ▾
Valve Opening(%)	000.0
Max (%)	000.0
Min (%)	000.0
Forced Val	000.0
Force OnOff	Off ▾
Raw Value	00.00
Powered by H Control Soltions 00:00:00	

Fan Speed — Setup

Purpose

Configure the analogue command to the cooler-fans VFD. The controller calculates Fan Speed (%) and converts it to the selected output signal.

Fields

- **Output Type**
Output mode: *Off*, *0–10 V*, or *4–20 mA*.
- **Fan Speed (%)** (*read-only*)
Current speed demand from the controller (0.0–100.0 %).
- **Max (%) / Min (%)**
Clamp the commanded speed to the usable range of the VFD/fans (0–100).
Example: Min=20, Max=90 → output limited to 20–90 % to avoid stall or over-speed.
- **Forced Val**
The fixed percentage to output when forcing is enabled—useful for commissioning and testing.
- **Force OnOff**
On → bypass control and output *Forced Val* continuously.
Off → normal automatic speed control.
- **Raw Value** (*read-only*)
The actual electrical signal being sent (volts or milliamps, matching *Output Type*).

Notes

- Match *Min/Max* to the VFD's minimum/maximum frequency limits and fan safe operating range.
- When *Output Type* is *Off*, the analogue command is disabled (fans will follow the VFD's local state/wiring).
- If speed response is inverted or scaled incorrectly, check VFD analogue input configuration and wiring.

Fan Speed Setup	
Output Type	Off <input type="checkbox"/>
Fan Speed (%)	000.0
Max (%)	000.0
Min (%)	000.0
Forced Val	000.0
Force OnOff	Off <input type="checkbox"/>
Raw Value	00.00
Powered by H Control Solutions 00:00:00	

Control Temperature — Analogue Output

Purpose

Publishes the controller's *Control Temperature* (the blend of *Air-On* and *Air-Off* as set in *Control Temp Setup*) as a standard analogue signal for external PLCs/instruments.

Fields

- **Output Type**
Off, 0-10 V, or 4-20 mA.
- **Control Temp (°C)** (*read-only*)
The live blended temperature the controller regulates to in Auto Local.
- **Upper Range (°C) / Lower Range (°C)**
Define the linear scaling between temperature and output signal.
 - Lower Range maps to *0 V / 4 mA.*
 - Upper Range maps to *10 V / 20 mA.*
Values are clamped to this span. (If you deliberately swap them, the output inverts.)
- **Forced Val**
Fixed output level (in °C terms) used when forcing is enabled—handy for commissioning.
- **Force OnOff**
On → bypass scaling and drive the output from *Forced Val.*
Off → normal live scaling from *Control Temp.*
- **Raw Value** (*read-only*)
Actual electrical output (V or mA) after scaling/forcing.

Example

Lower = -10 °C, Upper = 10 °C, Output Type = 0-10 V →
-10 °C → 0 V, 0 °C → 5 V, 10 °C → 10 V (temperatures outside -10..10 °C are clamped).

Control Temperature Out	
Output Type	Off <input type="checkbox"/>
Control Temp (°C)	000.0
Upper Range (°C)	-000.0
Lower Range (°C)	-000.0
Forced Val	-000.0
Force OnOff	Off <input type="checkbox"/>
Raw Value	00.00
Powered by H Control Solutions 00:00:00	

Control Temperature Setup

Purpose

Defines how the controller derives the single *Control Temperature (°C)* used for cooling logic from the two measured channels *Air-Off* and *Air-On*.

Live readouts (read-only)

- **Air-Off (°C)** – current value and health flag (OK / Error).
- **Air-On (°C)** – current value and health flag (OK / Error).
- **Control Temp (°C)** – the resulting mixed value after applying the damper and any fallback.

Mixing

- **Damper (%)** – sets the blend between Air-Off and Air-On.
 - 100% ⇒ Control Temp = *Air-Off*
 - 0% ⇒ Control Temp = *Air-On*
 - Intermediate values linearly mix the two:

$$\text{Control Temp} = \frac{\text{Damper}}{100} \cdot (\text{Air-Off}) + \left(1 - \frac{\text{Damper}}{100}\right) \cdot (\text{Air-On})$$

Error handling

- **Ignore Air-Off Error – Yes** = treat Air-Off as valid even if its channel reports an error (use with caution).
- **Ignore Air-On Error – Yes** = treat Air-On as valid even if its channel reports an error.

Fallback logic

- **Allow Fallback – Yes** enables automatic substitution if one source is faulty or disabled:
 - If Air-Off is in error (or *Input Type = Off* on the Air-Off setup) and Air-On is healthy ⇒ *Control Temp falls back to Air-On*.
 - If Air-On is in error (or *Input Type = Off* on the Air-On setup) and Air-Off is healthy ⇒ *Control Temp falls back to Air-Off*.
 - If both sources are invalid, the controller flags an error; Control Temp is not trusted.
- **Fallback (indicator)** – shows *Yes/No* in real time when a fallback is currently active.

Notes & tips

- For most refrigeration applications, start with *Damper = 100%* (pure Air-Off control).
- If coil inlet temperature (Air-On) should influence stability, back the damper down (e.g., 60–80%) to soften responses.
- Use *Allow Fallback = Yes* to keep the plant running if one probe fails; you can still alarm on the failed channel.

Control Temperature Setup		
Air Off (°C)	Ok	-000.0
Air On (°C)	Ok	-000.0
Damper (%)		000.0
Control Temp (°C)	Ok	-000.0
Ignore Air Off Error		No ▾
Ignore Air On Error		No ▾
Allow Fallback	No ▾	Fallback No
Powered by H Control Solutions		00:00:00

Analogue Output (Volt / mA) – Raw Values

Purpose

Read-only diagnostics for the three analogue outputs (AOUT1...AOUT3).

What you see

- **Volt** – live voltage when the channel is configured as **0-10 V**.
- **mA** – live current when the channel is configured as **4-20 mA**.
- **Raw** – normalized value in the range **0.000 ... 1.000** (three decimals), proportional to the output drive:
 - 0.000 = 0% command
 - 1.000 = 100% command

Display logic

- If the output type is **4-20 mA**: **mA** shows the measured current; **Volt** is **0.00**.
- If the output type is **0-10 V**: **Volt** shows the measured voltage; **mA** is **0.00**.

Reference mapping

- 0-10 V mode: $\text{Volt} \approx 10.0 \times \text{Raw}$ (e.g., Raw 0.730 → ~7.30 V).
- 4-20 mA mode: $\text{mA} \approx 4 + 16 \times \text{Raw}$ (e.g., Raw 0.500 → ~12.00 mA).

Use this page to verify wiring, scaling, and commanded levels during commissioning and fault-finding.

Analogue Output(Volt) (mA) (Raw Values)			
	Volt	mA	Raw
AOUT 1	-00.00	-00.00	0.000
AOUT 2	-00.00	-00.00	0.000
AOUT 3	-00.00	-00.00	0.000

Powered by H Control Solutions 00:00:00

PID Settings & Controller Type

This page selects how the controller drives cooling and shows the key PID parameters and indicators.

Controller Type

Choose one of three output strategies:

- **Differential** – Simple on/off (two-state) control with a deadband.
Use when driving a relay/solenoid directly.
The controller compares **Control Temp** to a **Differential SP** (deadband) around **SP** and turns the output fully **ON** or **OFF**. The blue **Differential Y** dot indicates when the output is ON.
- **PWM (Pulse Width Modulation)** – Time-proportioning of a digital output.
Use when a relay or digital valve must be modulated by duty-cycle.
The blue **PWM Y** dot shows activity; the duty-cycle is computed from the PID loop. **Pulse Width Period (ms)** sets the full cycle time (e.g., 5000 ms \Rightarrow 5 s cycle).
- **Modulate** – True analogue modulation (e.g., 0–10 V / 4–20 mA).
Use when driving a proportional valve or VFD.
The PID loop sets a continuous output (shown on other pages as Valve Opening % / Fan Speed %).

Tip: Start with **Differential** for simple systems; use **PWM** when you need smoother power delivery with a digital device; choose **Modulate** for analogue hardware.

Parameters / Fields

- **SP** – Cooling setpoint (°C). The target temperature used by all modes.
- **PV/Out** – Process Value (current control temperature) and, for Modulate/PWM, the instantaneous controller output.
- **P, I, D** – Proportional, Integral, and Derivative gains for the PID regulator.
- Use **P** to set basic reaction strength.
- Add **I** to remove steady-state error (slow drift).
- Add small **D** only if needed to damp overshoot.
- **Differential SP** (shown in *Differential* mode) – Half-band around **SP** that avoids rapid cycling.
Example: **SP** = 2.0 °C and **Differential SP** = 0.5 °C \rightarrow output turns ON above 2.5 °C and OFF below 1.5 °C.
- **Differential Y** – Indicator (blue = output ON) for the two-state differential output.
- **PWM Y** – Indicator for the PWM time-proportioned output (blue when the PWM line is active).
- **Integration Time (sec)** – The I-term window or sample integration time used by the internal PID; larger values make integral action slower/softer.
- **Pulse Width Period (msec)** – Total PWM cycle length. Short = faster modulation; long = gentler switching for relays.

Practical tuning hints

- Begin with *P* only: increase until you see small, acceptable oscillation.
- Add *I* to remove offset; use longer *Integration Time* for stable behaviour.
- Add a small *D* only if overshoot persists.
- For *PWM*, choose a period that suits the actuator (e.g., 15-30 s for solenoids).
- For *Differential*, set a differential band wide enough to prevent rapid cycling while still meeting temperature stability needs.

PID Settings and Controller Type				
Controller Type	Differential			
SP	-000.0	-000.0	PV/Out	-000.0 -000.0
P	00.00	I	000.0	D 000.0
Differential SP	00.0			
Differential Y	<input type="radio"/>	PWM Y	<input type="radio"/>	
Integration Time (sec)	000.0			
Pulse Width Period (msec)	00000			
Powered by H Control Solutions			00:00:00	

Digital Input Setup

Use these pages to define how each physical input is interpreted by the controller and to verify its live state.

What you can set (Mode)

Each input has a **Mode** selector with three options:

- **Normal** – The input is taken from the field wiring (the physical terminal).
- **Force On** – The input is overridden to *active/ON* regardless of the terminal state.
- **Force Off** – The input is overridden to *inactive/OFF* regardless of the terminal state.

*Forcing is intended for commissioning and troubleshooting only. While an input is forced, control logic will behave as if that signal were truly ON/OFF. Return the Mode to **Normal** for standard operation.*

What you can see (Status)

The *Status* dot shows the real-time state presented to the control logic *after* any forcing:

- **Blue** = input is *active/ON*
- **Grey** = input is *inactive/OFF*
- **Red** (where applicable, e.g., trip/fault inputs) = alarm/trip condition detected

Inputs on these pages

- **Auto Remote** – Requests remote (SCADA/PC) control when active.
- **Auto Local** – Selects local automatic control when active.
- **Manual Defrost** – Momentary/maintained request to start a defrost cycle.
- **Ext Low Temperature** – External low-temperature alarm input.
- **Cooler Fans Run** – Fan run command/feedback.
- **Cooler Fans Trip** – Fan trip/fault indication (alarm if active).
- **System Ok** – Controller health/interlock input (active = healthy).
- **Pressure Fan Fault** – Pressure/booster fan trip input (alarm if active).

Tip: Use the Status column during commissioning to confirm wiring and logic, and use *Force On/Off* briefly to test sequences without changing field wiring

Digital Input Setup (1)		
Description	Mode	Status
Auto Remote	Normal	●
Auto Local	Normal	●
Manual Defrost	Normal	●
Ext Low Temperature	Normal	●

Powered by H Control Soltions 00:00:00

Digital Input Setup (2)		
Description	Mode	Status
Cooler Fans Run	Normal	●
Cooler Fans Trip	Normal	●
System Ok	Normal	●
Pressure Fan Fault	Normal	●

Powered by H Control Soltions 00:00:00

Digital Output Setup

Use these pages to define how each *relay output* behaves during operation and to view its live state.

How to read the screen

- **Description** – Output name (hardware relay).
- **Mode** – Control source for that output.
 - **Normal:** Controlled by the controller's logic (cooling/defrost/alarms/pause).
 - **Force On:** Relay is driven ON continuously, overriding logic. *Use only for commissioning or fault-finding; remember to return to Normal.*
 - **Force Off:** Relay is kept OFF regardless of logic.
- **Status** – Live indication of the relay:
 - **Blue** = ON
 - **Grey** = OFF

Safety: Forced modes ignore protections. Do not leave a safety-critical output Forced On.

Outputs (1)

- **System On** – Main enable output for plant interlocks/contactors.
- **Suction Solenoid** – Suction (evaporator inlet) valve command.
- **Liquid Solenoid** – Liquid line valve command.
- **Hot Gas Solenoid** – Hot-gas valve for defrost.
- **Bleed Solenoid** – Bleed/bypass valve used in certain stages.

These outputs follow the controller stages in Normal mode (Cooling, Defrost, Drain, Fan Delay, etc.).

Outputs (2)

- **Cooler Fans** – Fans run command (relay). In *Normal* it follows the active stage; fan-delay logic can keep it OFF after defrost.
- **Soft Defrost** – Drives the soft-defrost relay when the soft-defrost stage is active.
- **Pod / Pressure Fan** – A single relay used either for *POD* (power-open damper) or a *Pressure Fan*.
- **Pod Enabled** = *Yes* → the relay is labelled *Pod* and is used during pre-cooling/pressure control.

- **Pod Enabled = No** → the relay is labelled *Pressure Fan* and is used for room/duct pressure relief.
- **Pressure Fan Delay (Min)** – When *Pod Enabled = No*, this delay (0–120 min) starts when cooling begins; the *Pressure Fan* relay only turns ON after the delay expires. In *Forced* modes the delay is ignored.

Notes

If the *System On/Off* (user control) is OFF, the controller turns *all outputs OFF* regardless of the setup, and no alarm is raised for that condition.

Forced modes are stored per output; review them before handing over to automatic operation.

Digital Output Setup (1)		
Description	Mode	Status
System On	Normal	<input checked="" type="radio"/>
Suction Solenoid	Normal	<input checked="" type="radio"/>
Liquid Solenoid	Normal	<input checked="" type="radio"/>
Hot Gas Solenoid	Normal	<input checked="" type="radio"/>
Bleed Solenoid	Normal	<input checked="" type="radio"/>
Powered by H Control Soltions		00:00:00

Digital Output Setup (2)		
Description	Mode	Status
Cooler Fans	Normal	<input checked="" type="radio"/>
Soft Defrost	Normal	<input checked="" type="radio"/>
Pod / Pressure Fan	Normal	<input checked="" type="radio"/>
Pod Enabled	No	Pod Diff <input type="text" value="00.0"/>
Pressure Fan Delay (Min)		<input type="text" value="000"/>
Powered by H Control Soltions		00:00:00

Modbus Register Map

Defrost Settings

Variable name	Data type	Persistence	Register address	Default value	Access
defEn1	INT	TRUE	16400	0	R/W
defEn2	INT	TRUE	16401	0	R/W
defEn3	INT	TRUE	16402	0	R/W
defEn4	INT	TRUE	16403	0	R/W
defEn5	INT	TRUE	16404	0	R/W
defEn6	INT	TRUE	16405	0	R/W
defHr1	INT	TRUE	16406	6	R/W
defHr2	INT	TRUE	16407	12	R/W
defHr3	INT	TRUE	16408	18	R/W
defHr4	INT	TRUE	16409	0	R/W
defHr5	INT	TRUE	16410	0	R/W
defHr6	INT	TRUE	16411	0	R/W
defMin1	INT	TRUE	16412	0	R/W
defMin2	INT	TRUE	16413	0	R/W
defMin3	INT	TRUE	16414	0	R/W
defMin4	INT	TRUE	16415	0	R/W
defMin5	INT	TRUE	16416	0	R/W
defMin6	INT	TRUE	16417	0	R/W
defrostDur	INT	TRUE	16418	40	R/W
defrostAutoSp	REAL	TRUE	16419	-6	R/W
defrostAutoDelay	INT	TRUE	16421	180	R/W
autoDefrostEnabled	INT	TRUE	16422	0	R/W
softDefrostDur	INT	TRUE	16423	0	R/W
bleedDur	INT	TRUE	16424	2	R/W
drainDur	INT	TRUE	16425	5	R/W
fanDelay	INT	TRUE	16426	5	R/W
nextStage	INT	FALSE	16427	0	R/W
manualDefrost	INT	FALSE	16428	0	R/W

Modbus Register Map

Control Temp

Variable name	Data type	Persistence	Register address	Default value	Access
allowFallBack	INT	FALSE	16450	0	R/W
controlDiff	REAL	TRUE	16451	0.1	R/W
controlSp	REAL	TRUE	16453	-0.5	R/W
controlTemp	REAL	TRUE	16455	0	RO
coolingHi	INT	FALSE	16457	0	R/W
criticalErr	INT	FALSE	16458	0	RO
damperPerc	REAL	TRUE	16459	100	R/W
diffCoolY	INT	FALSE	16461	0	RO
fallBackUsed	INT	FALSE	16462	0	R/W
ignoreAirOffErr	INT	FALSE	16463	0	R/W
ignoreAirOnErr	INT	FALSE	16464	0	R/W
TD	REAL	FALSE	16465	0	RO

Modbus Register Map

Pause Week

Variable name	Data type	Persistence	Register address	Default value	Access
peakPause	INT	TRUE	16500	0	R/W
standardPause	INT	FALSE	16501	0	R/W
pauseWeek	INT	FALSE	16502	0	R/W
weekStartH1	INT	TRUE	16503	0	R/W
weekStartM1	INT	TRUE	16504	0	R/W
weekEndH1	INT	TRUE	16505	0	R/W
weekEndM1	INT	TRUE	16506	0	R/W
weekStartH2	INT	TRUE	16507	0	R/W
weekStartM2	INT	TRUE	16508	0	R/W
weekEndH2	INT	TRUE	16509	0	R/W
weekEndM2	INT	TRUE	16510	0	R/W
weekStartH3	INT	TRUE	16511	0	R/W
weekStartM3	INT	TRUE	16512	0	R/W
weekEndH3	INT	TRUE	16513	0	R/W
weekEndM3	INT	TRUE	16514	0	R/W
weekStartH4	INT	TRUE	16515	0	R/W
weekStartM4	INT	TRUE	16516	0	R/W
weekEndH4	INT	TRUE	16517	0	R/W
weekEndM4	INT	TRUE	16518	0	R/W
weekEnMon	INT	TRUE	16519	0	R/W
weekEnTue	INT	TRUE	16520	0	R/W
weekEnWed	INT	TRUE	16521	0	R/W
weekEnThu	INT	TRUE	16522	0	R/W
weekEnFri	INT	TRUE	16523	0	R/W
weekEn	INT	TRUE	16524	0	R/W

Modbus Register Map

Pause Saturday/Sunday

Variable name	Data type	Persistence	Register address	Default value	Access
pauseSat	INT	FALSE	16550	0	R/W
satStartMin	INT	FALSE	16551	0	R/W
satEndH1	INT	TRUE	16552	0	R/W
satStartH1	INT	TRUE	16553	0	R/W
satEndM1	INT	TRUE	16554	0	R/W
satStartH2	INT	TRUE	16555	0	R/W
satStartM2	INT	TRUE	16556	0	R/W
satEndH2	INT	TRUE	16557	0	R/W
satEndM2	INT	TRUE	16558	0	R/W
satStartH3	INT	TRUE	16559	0	R/W
satStartM3	INT	TRUE	16560	0	R/W
satEndH3	INT	TRUE	16561	0	R/W
satEndM3	INT	TRUE	16562	0	R/W
satStartH4	INT	TRUE	16563	0	R/W
satStartM4	INT	TRUE	16564	0	R/W
satEndH4	INT	TRUE	16565	0	R/W
satEndM4	INT	TRUE	16566	0	R/W
satEnPause	INT	TRUE	16567	0	R/W

Modbus Register Map

Remote Control

Variable name	Data type	Persistence	Register address	Default value	Access
heartBeat	INT	FALSE	16650	0	WD
remStatus	INT	FALSE	16651	0	R/W
valveOpeningRemote	REAL	FALSE	16652	50	R/W
fanSpeedRemote	REAL	FALSE	16654	100	R/W
remSystemOn	INT	FALSE	16656	0	R/W
remSuctionSol	INT	FALSE	16657	0	R/W
remLiquidSol	INT	FALSE	16658	0	R/W
remHotGasSol	INT	FALSE	16659	0	R/W
remBleedSol	INT	FALSE	16660	0	R/W
remSoftDefrost	INT	FALSE	16661	0	R/W
remPod	INT	FALSE	16662	0	R/W
remCoolerFans	INT	FALSE	16663	0	R/W

Modbus Register Map

Time

Variable name	Data type	Persistence	Register address	Default value	Access
rYear	INT	FALSE	16680	0	RO
rMonth	INT	FALSE	16681	0	RO
rDay	INT	FALSE	16682	0	RO
rDow	INT	FALSE	16683	0	RO
rHour	INT	FALSE	16684	0	RO
rMin	INT	FALSE	16685	0	RO
rSec	INT	FALSE	16686	0	RO

Modbus Register Map

Air-Off

Variable name	Data type	Persistence	Register address	Default value	Access
airOffOffset	REAL	TRUE	16700	0	R/W
airOffTemp	REAL	FALSE	16702	0	RO
errAirOff	INT	FALSE	16704	0	RO
forceAirOff	INT	TRUE	16705	0	R/W
forceAirOffTemp	REAL	TRUE	16706	1.1	R/W
iMa1	REAL	FALSE	16708	0	RO
inputType1	INT	TRUE	16710	2	R/W
limitMax1	REAL	TRUE	16711	65	R/W
limitMin1	REAL	FALSE	16713	-15	R/W
rawIn1	REAL	FALSE	16715	0	R/W
tMax1	REAL	TRUE	16717	40	R/W
tMin1	REAL	TRUE	16719	-10	R/W
vVolt1	REAL	FALSE	16721	0	RO

Modbus Register Map

Air-On

Variable name	Data type	Persistence	Register address	Default value	Access
airOffOffset	REAL	TRUE	16700	0	R/W
airOffTemp	REAL	FALSE	16702	0	RO
errAirOff	INT	FALSE	16704	0	RO
forceAirOff	INT	TRUE	16705	0	R/W
forceAirOffTemp	REAL	TRUE	16706	1.1	R/W
iMa1	REAL	FALSE	16708	0	RO
inputType1	INT	TRUE	16710	2	R/W
limitMax1	REAL	TRUE	16711	65	R/W
limitMin1	REAL	FALSE	16713	-15	R/W
rawIn1	REAL	FALSE	16715	0	R/W
tMax1	REAL	TRUE	16717	40	R/W
tMin1	REAL	TRUE	16719	-10	R/W
vVolt1	REAL	FALSE	16721	0	RO

Modbus Register Map

Temperature Out (4-20mA) / (0-10V)

Variable name	Data type	Persistence	Register address	Default value	Access
forceAOut3	INT	TRUE	16770	0	R/W
forceAOutValue3	REAL	TRUE	16771	0	R/W
mAVolt3	REAL	FALSE	16773	0	RO
outMa3	REAL	FALSE	16775	0	RO
outputMaxDegC	REAL	TRUE	16777	40	R/W
outputMinDegC	REAL	TRUE	16779	-10	R/W
outputRaw3	REAL	FALSE	16781	0	RO
outputType3	INT	TRUE	16783	2	R/W
outVolt3	REAL	FALSE	16784	0	RO

Modbus Register Map

External Setpoint (4-20mA) / (0-10V)

Variable name	Data type	Persistence	Register address	Default value	Access
forceAOut3	INT	TRUE	16770	0	R/W
forceAOutValue3	REAL	TRUE	16771	0	R/W
mAVolt3	REAL	FALSE	16773	0	RO
outMa3	REAL	FALSE	16775	0	RO
outputMaxDegC	REAL	TRUE	16777	40	R/W
outputMinDegC	REAL	TRUE	16779	-10	R/W
outputRaw3	REAL	FALSE	16781	0	RO
outputType3	INT	TRUE	16783	2	R/W
outVolt3	REAL	FALSE	16784	0	RO

Modbus Register Map

PID Settings

Variable name	Data type	Persistence	Register address	Default value	Access
controlType	INT	TRUE	16840	2	R/W
integrationTime	REAL	TRUE	16841	5	R/W
Kd	REAL	TRUE	16843	20	R/W
Ki	REAL	TRUE	16845	10	R/W
Kp	REAL	TRUE	16847	0.1	R/W
pidOn	INT	FALSE	16849	0	RO
pwmPeriodMs	REAL	TRUE	16850	300000	R/W
pwmPulseY	INT	FALSE	16852	0	RO
sampleRate	INT	TRUE	16853	100	R/W
selectSp	REAL	FALSE	16854	0	R/W
startMax	INT	TRUE	16856	0	R/W

Modbus Register Map

Defrost Temperature

Variable name	Data type	Persistence	Register address	Default value	Access
defrostOffset	REAL	TRUE	16870	0	R/W
defrostTemp	REAL	FALSE	16872	0	RO
errDefrost	INT	FALSE	16874	1300	RO
forceDefrost	INT	TRUE	16875	0	R/W
forceDefrostTemp	REAL	TRUE	16876	-3	R/W
iMa3	REAL	FALSE	16878	0	RO
inputType3	INT	TRUE	16880	2	R/W
limitMax3	REAL	TRUE	16881	65	R/W
limitMin3	REAL	TRUE	16883	-15	R/W
rawIn3	REAL	FALSE	16885	0	R/W
tMax3	REAL	TRUE	16887	40	R/W
tMin3	REAL	TRUE	16889	-10	R/W
vVolt3	REAL	FALSE	16891	0	RO

Modbus Register Map

General Settings

Variable name	Data type	Persistence	Register address	Default value	Access
afterPauseDelay	INT	TRUE	16900	20	R/W
highAlarmDelay	INT	TRUE	16901	20	R/W
highAlarmSp	REAL	TRUE	16902	25	R/W
lowAlarmDelay	INT	TRUE	16904	10	R/W
lowAlarmSp	REAL	TRUE	16905	-3	R/W
podEnabled	INT	TRUE	16907	0	R/W
podSp	REAL	TRUE	16908	2	R/W
pressureFanDelay	INT	TRUE	16910	15	R/W
startDelay	INT	TRUE	16911	20	R/W
systemOnOff	INT	TRUE	16912	0	R/W

Modbus Register Map

Valve/Actuator Settings

Variable name	Data type	Persistence	Register address	Default value	Access
forceAout1	INT	TRUE	16930	0	R/W
forceAOutValue1	REAL	TRUE	16931	0	R/W
mAVolt1	REAL	FALSE	16933	0	R/W
outmA1	REAL	FALSE	16935	0	RO
outputRaw1	REAL	FALSE	16937	0	RO
outputType1	INT	TRUE	16939	2	R/W
outVolt1	REAL	FALSE	16940	0	RO
valveMax	REAL	TRUE	16942	100	R/W
valveMin	REAL	TRUE	16944	0	R/W
valveOpening	REAL	FALSE	16946	0	RO
valveOpeningCtrl	REAL	FALSE	16948	0	RO

Modbus Register Map

Cooler Fan VFD Settings

Variable name	Data type	Persistence	Register address	Default value	Access
fanSpeed	REAL	FALSE	16960	50	R/W
fanSpeedCtrl1	REAL	FALSE	16962	100	R/W
fanSpeedMax	REAL	TRUE	16964	100	R/W
fanSpeedMin	REAL	TRUE	16966	60	R/W
fanSpeedSpHigh	REAL	TRUE	16968	-2	R/W
fanSpeedSpLow	REAL	TRUE	16970	-3	R/W
forceAOut2	INT	TRUE	16972	0	R/W
forceAOutValue2	REAL	TRUE	16973	0	R/W
mAVolt2	REAL	FALSE	16975	0	RO
outMa2	REAL	FALSE	16977	0	RO
outputRaw2	REAL	FALSE	16979	0	RO
outputType2	INT	TRUE	16981	2	R/W
outVolt2	REAL	FALSE	16982	0	RO

Modbus Register Map

General Internal Bits

Variable name	Data type	Persistence	Register address	Default value	Access
availableIn	INT	FALSE	17040	0	RO
bleedSolOut	INT	FALSE	17041	0	RO
coolerFansOut	INT	FALSE	17042	0	RO
coolingLow	INT	FALSE	17043	0	RO
fansRunIn	INT	FALSE	17044	0	RO
faultIn	INT	FALSE	17045	0	RO
hotGasSolOut	INT	FALSE	17046	0	RO
liquidSolOut	INT	FALSE	17047	0	RO
lowTempIn	INT	FALSE	17048	0	RO
manCoolingIn	INT	FALSE	17049	0	RO
manDefrostIn	INT	FALSE	17050	0	RO
podOut	INT	FALSE	17051	0	RO
softDefrostOut	INT	FALSE	17052	0	RO
suctionSolOut	INT	FALSE	17053	0	RO
systemOkIn	INT	FALSE	17054	0	RO
systemOnOut	INT	FALSE	17055	0	RO
pressureFanFaultIn	INT	FALSE	17056	0	RO

Modbus Register Map

Demand Control – Time of Use

Variable name	Data type	Persistence	Register address	Default value	Access
Tou0	INT	TRUE	17000	0	R/W
Tou1	INT	TRUE	17001	0	R/W
Tou2	INT	TRUE	17002	0	R/W
Tou3	INT	TRUE	17003	0	R/W
Tou4	INT	TRUE	17004	0	R/W
Tou5	INT	TRUE	17005	0	R/W
Tou6	INT	TRUE	17006	0	R/W
Tou7	INT	TRUE	17007	0	R/W
Tou8	INT	TRUE	17008	0	R/W
Tou9	INT	TRUE	17009	0	R/W
Tou10	INT	TRUE	17010	0	R/W
Tou11	INT	TRUE	17011	0	R/W
Tou12	INT	TRUE	17012	0	R/W
Tou13	INT	TRUE	17013	0	R/W
Tou14	INT	TRUE	17014	0	R/W
Tou15	INT	TRUE	17015	0	R/W
Tou16	INT	TRUE	17016	0	R/W
Tou17	INT	TRUE	17017	0	R/W
Tou18	INT	TRUE	17018	0	R/W
Tou19	INT	TRUE	17019	0	R/W
Tou20	INT	TRUE	17020	0	R/W
Tou21	INT	TRUE	17021	0	R/W
Tou22	INT	TRUE	17022	0	R/W
Tou23	INT	TRUE	17023	0	R/W
OffPeakY	INT	FALSE	17024	0	RO
StandardEn	INT	TRUE	17025	0	R/W
PeakEn	INT	TRUE	17026	0	R/W
StandardY	INT	FALSE	17027	0	RO
PeakY	INT	FALSE	17028	0	R/W
weekDaysOnly	INT	TRUE	17029	0	R/W

Modbus Register Map

Status Words

Variable name	Data type	Persistence	Register address	Default value	Access
CurrentStage	INT	FALSE	17060	0	RO
DisplayStage	INT	FALSE	17061	0	RO
highAlarm	INT	FALSE	17062	0	RO
lowAlarm	INT	FALSE	17063	0	RO
pause	INT	FALSE	17064	0	RO
simulatedValue	INT	FALSE	17065	0	RO

Modbus Register Map

Digital Inputs

Variable name	Data type	Persistence	Register address	Default value	Access
availableX	INT	FALSE	17070	0	RO
manCoolingX	INT	FALSE	17071	0	RO
manDefrostX	INT	FALSE	17072	0	RO
lowTempX	INT	FALSE	17073	0	RO
fansRunX	INT	FALSE	17074	0	RO
faultX	INT	FALSE	17075	0	RO
systemOkX	INT	FALSE	17076	0	RO
pressureFanTripX	INT	FALSE	17077	0	RO

Modbus Register Map

Digital Outputs

Variable name	Data type	Persistence	Register address	Default value	Access
systemOnY	INT	FALSE	17080	0	RO
suctionSolY	INT	FALSE	17081	0	RO
liquidSolY	INT	FALSE	17082	0	RO
hotGasSolY	INT	FALSE	17083	0	RO
bleedSolY	INT	FALSE	17084	0	RO
coolerFansY	INT	FALSE	17085	0	RO
softDefrostY	INT	FALSE	17086	0	RO
podY	INT	FALSE	17087	0	RO
pressureFanY	INT	FALSE	17088	0	RO

Modbus Register Map

Normal / On / Off Modes

Variable name	Data type	Persistence	Register address	Default value	Access
systemOnMode	INT	TRUE	17100	0	R/W
suctionSolMode	INT	TRUE	17101	0	R/W
liquidSolMode	INT	TRUE	17102	0	R/W
hotGasSolMode	INT	TRUE	17103	0	R/W
bleedSolMode	INT	TRUE	17104	0	R/W
coolerFansMode	INT	TRUE	17105	0	R/W
softDefrostMode	INT	TRUE	17106	0	R/W
podMode	INT	TRUE	17107	0	R/W
availableMode	INT	TRUE	17108	0	R/W
manCoolingMode	INT	TRUE	17109	0	R/W
manDefrostMode	INT	TRUE	17110	0	R/W
lowTempMode	INT	TRUE	17111	0	R/W
fansRunMode	INT	TRUE	17112	0	R/W
faultMode	INT	TRUE	17113	0	R/W
systemOkMode	INT	TRUE	17114	0	R/W

Modbus Register Map

Software Version

Variable name	Data type	Persistence	Register address	Default value	Access
versionYear	INT	FALSE	17120	2025	RO
versionMonth	INT	FALSE	17121	10	RO
versionDay	INT	FALSE	17122	6	RO
versionPatch	INT	FALSE	17123	0	RO
deviceID	INT	FALSE	17124	100	RO

Modbus Register Map

Cycle Scheduler

Variable name	Data type	Persistence	Register address	Default value	Access
cycEn1	INT	TRUE	17130	1	R/W
cycEn2	INT	TRUE	17131	1	R/W
cycEn3	INT	TRUE	17132	1	R/W
cycEn4	INT	TRUE	17133	1	R/W
cycEn5	INT	TRUE	17134	1	R/W
cycEn6	INT	TRUE	17135	1	R/W
cycleNr	INT	FALSE	17136	0	RO
cycleTime	INT	TRUE	17137	60	R/W

Sensors/Probes

Option	Category	Nominal_R	Alpha or Beta	Notes
0-10 V	Analog signal			Voltage input from transmitter
4-20 mA	Analog signal			Current loop from transmitter
Pt500 (a=0.00385 1/°C)	RTD (Platinum)	500 Ω	α=0.00385	IEC 60751 class curve
Pt1000 (a=0.00385 1/°C)	RTD (Platinum)	1000 Ω	α=0.00385	IEC 60751 class curve
500P (a=0.00391 1/°C)	RTD (Platinum)	500 Ω	α=0.00391	American/older platinum curve
1000P (a=0.00391 1/°C)	RTD (Platinum)	1000 Ω	α=0.00391	American/older platinum curve
Cu500 (a=0.00426 1/°C)	RTD (Copper)	500 Ω	α=0.00426	Copper RTD
Cu1000 (a=0.00426 1/°C)	RTD (Copper)	1000 Ω	α=0.00426	Copper RTD
500M (a=0.00428 1/°C)	RTD (Metal)	500 Ω	α=0.00428	Manufacturer curve (metal RTD)
1000M (a=0.00428 1/°C)	RTD (Metal)	1000 Ω	α=0.00428	Manufacturer curve (metal RTD)
Ni500 (a=0.00617 1/°C)	RTD (Nickel)	500 Ω	α=0.00617	Nickel RTD
Ni1000 (a=0.00617 1/°C)	RTD (Nickel)	1000 Ω	α=0.00617	Nickel RTD
NTC1008 2 kΩhm	NTC Thermistor	2 kΩ	—	NTC model 1008
NTC8016 3 kΩhm	NTC Thermistor	3 kΩ	—	NTC model 8016
NTC8016 5 kΩhm	NTC Thermistor	5 kΩ	—	NTC model 8016
NTC8016 10 kΩhm	NTC Thermistor	10 kΩ	—	NTC model 8016
NTC8018 30 kΩhm	NTC Thermistor	30 kΩ	—	NTC model 8018
NTC2901 50 kΩhm	NTC Thermistor	50 kΩ	—	NTC model 2901
NTC3435 10 kΩhm	NTC Thermistor	10 kΩ	β≈3435	Common 10k/3435 curve
NTC3977 10 kΩhm	NTC Thermistor	10 kΩ	β≈3977	Common 10k/3977 curve
KTY82-110	Silicon PTC (KTY)	≈1 kΩ @25°C	—	KTY82 series
KTY82-120	Silicon PTC (KTY)	≈1 kΩ @25°C	—	KTY82 series
KTY82-121	Silicon PTC (KTY)	≈1 kΩ @25°C	—	KTY82 series
KTY82-122	Silicon PTC (KTY)	≈1 kΩ @25°C	—	KTY82 series
KTY82-150	Silicon PTC (KTY)	≈1 kΩ @25°C	—	KTY82 series
KTY82-151	Silicon PTC (KTY)	≈1 kΩ @25°C	—	KTY82 series
KTY82-152	Silicon PTC (KTY)	≈1 kΩ @25°C	—	KTY82 series