ADVANCED TEMPERATURE CONTROL
TRUCK REFRIGERATION SYSTEMS

CONTROLLER MANUAL

FOR ALL REFRIGERATION UNITS

ADVANCED TEMPERATURE CONTROL
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Manual P.N **M960244**

Controller Hardware **M910207**
Controller Software **1.5**
ECU Hardware **M910208**
ECU Software **1.1**

Innovation, Science and
Economic Development Canada

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1) INTRODUCTION

The electronic refrigeration controller **M910207** is a microprocessor-based controller, designed to control a refrigeration and defrost system. It can operate in a temperature range of -40°C to +80°C. The **M910207** communicates with the input/output (I/O) module, **M910208**, through one wire communication. The controller + module monitor nine inputs: high- and low-pressure transducers, door sensor, electric standby input, ignition input, proximity sensor and three temperature sensors; return, evaporator and condenser temperature sensors. In addition, it monitors seven digital outputs: compressor cutch, heating, evaporator blower(s), hot gas solenoid valve, electrical heating strips and a PWM output for the condenser fan(s). The **M910207** PWM output operates with the **M920165** (condenser fan speed module). The I/O module also has a USB port for data logging. The I/O module has an optional output available for an external buzzer or warning light. Lastly, a Bluetooth Low Energy (BLE) modem allows a smartphone to control and interact with the **M910207** controller.

2) SYSTEM OPERATION

2.1) Control Panel

The controller contains a main CPU and is composed of a keyboard for programming and controlling of the refrigeration system, a Bluetooth modem for connection and interaction with a smartphone device, an optional external buzzer output for warnings and a screen for viewing parameters, operating status, battery voltage and temperature.

2.2) Power

Controller operation will start when the controller is supplied either 12VDC or 24VDC, however temperature control begins only after the controller finishes monitoring two input signals: electric standby and ignition. If both signals are ever ON at the same time, the controller will alert the operator by flashing a "**SBY"** fault on the display and toggling the external buzzer output, prior to beginning temperature control following standby logic. Ignition road compressor operation will only start if the ignition input is ON **and** the electric standby input is OFF. The external alarm and fault warning will only stop when only **one** of the signals is detected (engine turned off or wall plug unplugged). Note that the controllers **El+Ign.Alm** parameter controls this safety feature and by default is set to **Enable.**

The controller begins temperature control based on the setting used for the **Init.State** parameter. The three different settings for **Init.State** are: **OFF, ON, and Last State**.

When **Init.State** is set to **OFF**, and an input signal (either electric input from wall plug or ignition input) is active, the controller will turn on in standby mode. During standby mode, the display will be off and only the key will be on. To turn the controller ON and begin temperature control, press the key once. The ATC logo and controller software version will flash on the screen, prior to the screen displaying either the setpoint or return temperature (depending on the adjustable parameter **Temp.Shown**) and initiating temperature control. To return to standby mode, press the key down once.

When the parameter **Init.State** is set to **ON**, the controller will automatically turn on and initiate cooling if at least one of the signals (either electric or ignition) is active. This mode prevents the operator from turning off temperature control. If the key is pressed, the controller will momentarily turn off before automatically turning back on and resuming temperature control.

When the parameter **Init.State** is set to **Last State**, the product will start to operate according to the last state from the last power cycle. For example, this means the controller will continue cooling if it was last cooling or it will remain in standby, if it was last in standby. By default, all controllers are programmed to be **Last State**.

2.3) Default Display Temperature

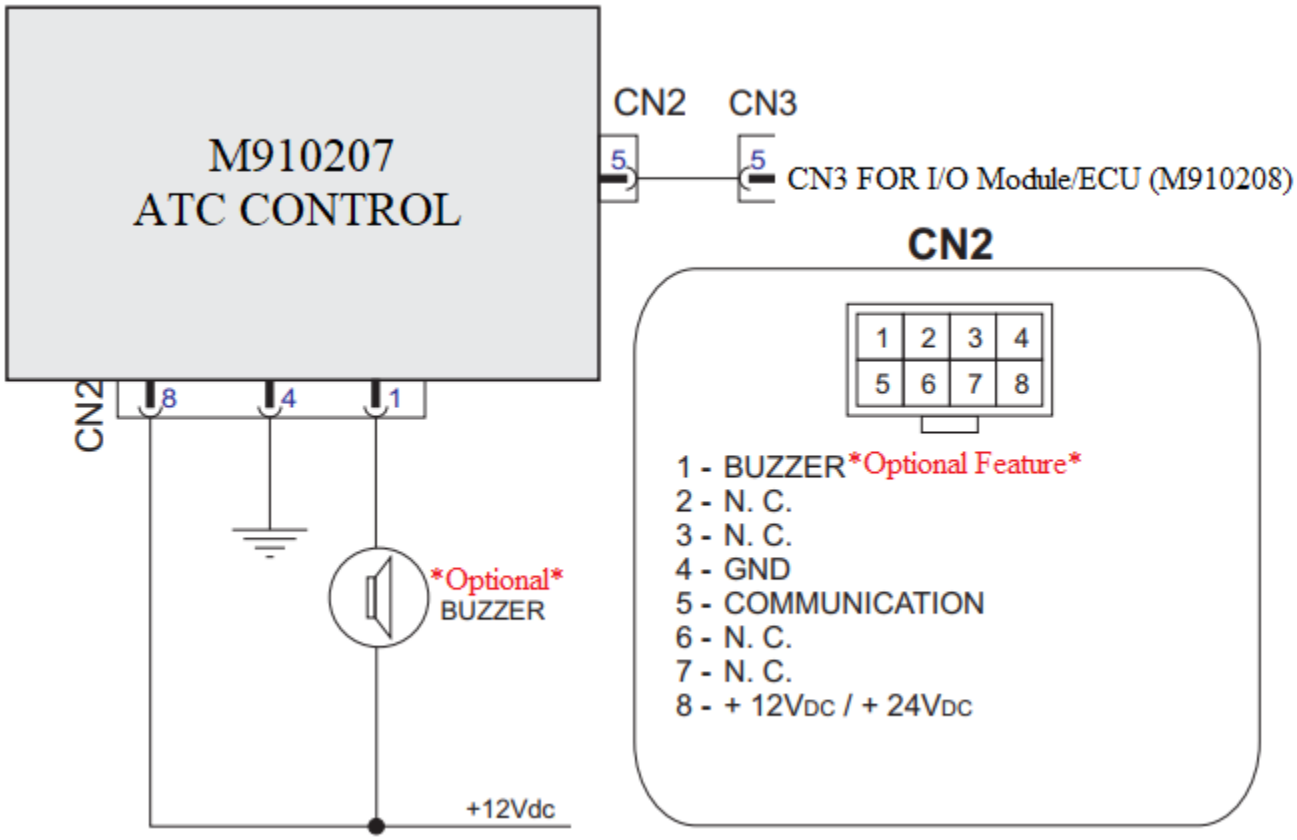
The default display temperature on the controller display for startup and system operation can be set to either the **Return or Setpoint temperature**. The display temperature is configured using the **Temp.Shown** parameter. Instructions for changing parameters is discussed in section 3.4 “System Parameters”.

2.4) Graphical display

The screen displays the setpoint value and active control state. It also allows the user to visualize the various temperature probe readings, transducer pressure readings as well as other parameters. In addition, it is used to warn users of any system faults/failures.

2.5) Optional External Alarm Output

The controller has an optional external alarm output that can be used to alert and communicate specific conditions to the operator. This optional output is located at the back of the controller connector, this is for ease of access and to provide the ability to install any desired alarm indicator close to the operator.



The buzzer output will activate if any of these conditions occur:

- Door sensor is installed, the door is open and the parameter **DoorOp.Alm** is set to **Enable**
- Proximity sensor is installed, an object triggers the sensor and the parameter **RoofPr.Alm** is set to **Enable**
- Electrical and Ignition inputs are active at the same time and the parameter **El+Ign.Alm** is set to **Enable**
- Communication fault between controller and I/O module

The controller display will also warn the operator if any faults are occurring. Refer to section 3.10 “Faults and Alarms” for more details.

2.6) Temperature sensors

The controller uses three temperatures sensors inputs measured at the I/O module: Return, Evaporator coil/Serpentine and a Condenser temperature sensor. The key can be used to toggle through these temperatures. Once the desired temperature has been viewed, do not click anything as the system will automatically timeout and return to the default display temperature.

The two-letter codes shown below can be used to identify the temperature being displayed.

- **SP** – Setpoint
- **RT** – Return
- **EV** – Evaporator
- **CD** – Condenser

In addition, there are 3 parameters available for temperature sensors requiring further calibration/tuning.

- **Ret.Offset** allows an offset for calibrating the return temperature reading
- **Ev.Offset** allows an offset for calibrating the evaporator temperature reading
- **Con.Offset** allows an offset for calibrating the condenser temperature reading

Problems with the sensors will trigger a fault, which will be shown on the controller display, in the data log and within the fault's menu. These faults are covered in more detail in section 3.10 "Faults and Alarms".

2.7) Setpoint

The Setpoint is the desired temperature inside the cabin. To adjust, press the or key. Initially, the setpoint temperature will flash on the display, after which it will increment or decrease depending on which key is used. Continue to use or , stopping when the desired setpoint is reached.

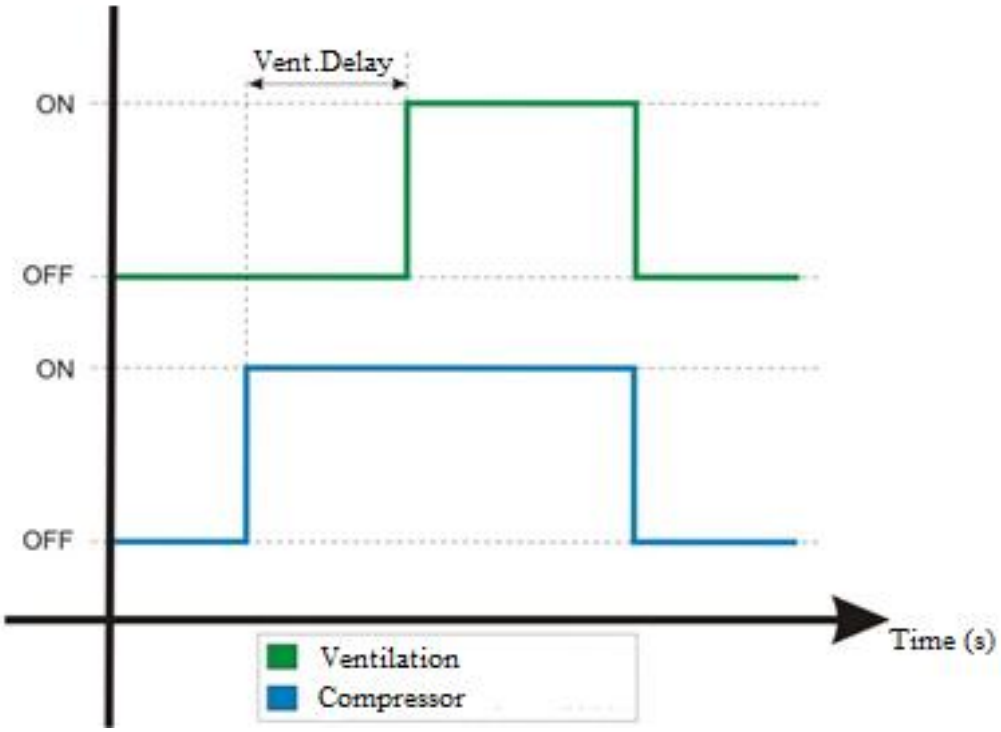
If the **SetP.Block** parameter is set to **Enable** and the or key is pressed, the display will show a **BLK** message indicating that setpoint changes are blocked. **SetP.Block** can be used to control the operators ability to alter system temperature.

2.8) Ventilation / Evaporator Output

The evaporator blower initiates after a short delay following compressor activation. This delay can be adjusted with the **Vent.Delay** parameter. Ventilation logic can also be customized for when the cabin door is opened or when the compressor is off.

Ventilation by default is on when the refrigeration door is opened, this setting is adjusted using the parameter **V.Door.Open**. If **V.Door.Open** is set to **Disable**, ventilation will be off while the door is opened and if **V.Door.Open** is set to **Enable**, ventilation will remain on when the door is opened. Note that this default is chosen, since this feature can only be used if a door sensor/switch has been installed.

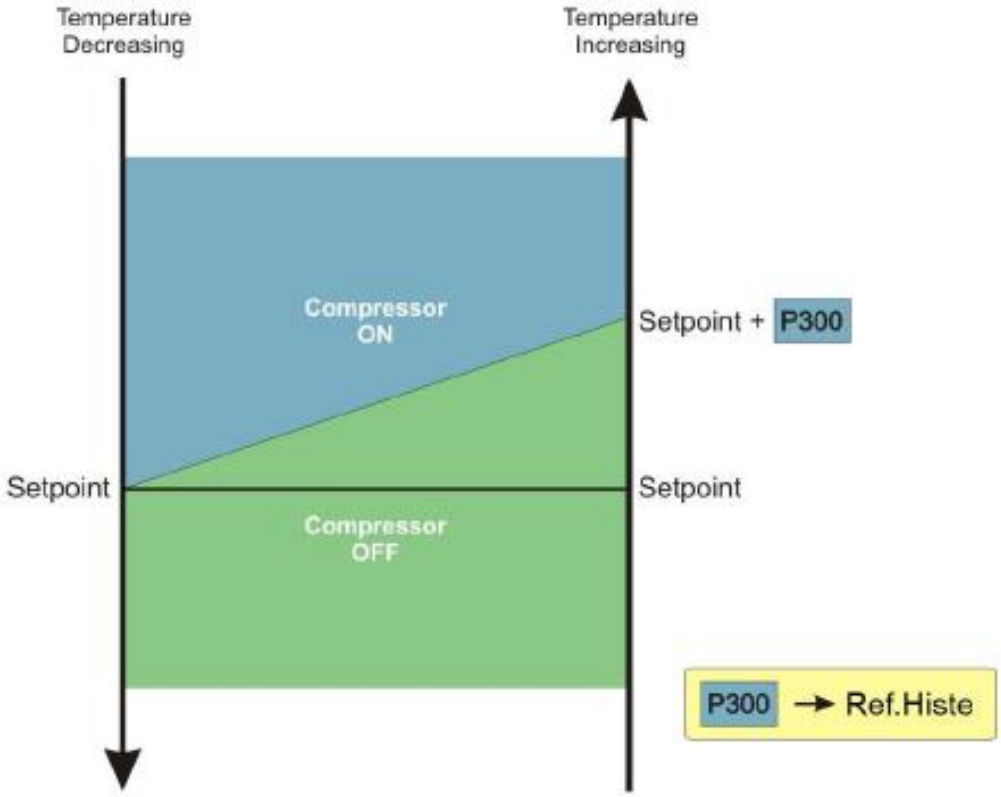
By default, ventilation will be ON regardless of the compressor state. This can be adjusted using the parameter **V.Comp.Off**. When set to **ON**, ventilation can still occur when the compressor is off. If changed to **OFF**, ventilation will never occur if the compressor is in the off state. However, during defrost, ventilation will behave based on the set point for **Op.Mode**. This is covered in section 2.12 “Defrost”.



Note: During a Communication Failure (CF). The controller turns off all outputs after 30 seconds.

2.9) Cooling

The controller will turn on and follow **Init.State** as described previously in section 2.2 “Power”. Cooling will then begin when the return temperature is higher than the desired **setpoint** + **Ref.Histe**, where **Ref.Histe** is the cooling differential, a programmable parameter. Cooling will turn off whenever the return temperature reaches the **setpoint**. A visual representation is shown below.



Note: Conditions to begin a cooling cycle will differ after a heating cycle. Refer to the section “Cooling after a heating cycle” found on page 11.

To completely turn off temperature control, press once. Recall, temperature control cannot be turned off when **Init.State** is set to **ON**. In addition, it is important to recall that there is a 30 second protection to protect the compressor if it is repeatedly turned on and off with .

Pressure Protection:

The ATC control operates with two digital pressure transducers (for high and low side pressures). These digital pressure transducers provide real-time pressure measurements. The operator can view these pressure readings at any time using the key. In addition, if Bluetooth is enabled the operator can view these readings using the ATC mobile application. This is explained in more detail in section 3.13.

Transducer pressure readings are also used for system protection. There are up to 5 faults for system protection. The pressure faults **CinLPress** and **CoutLPress** for the low or suction-pressure transducer, and faults **CinHPress, CoutHPress and MinHPress** for the high or discharge-pressure transducer.

The parameter **CoutLPress** is the low side pressure where the compressor will cut-out (turn off). The system will remain off, while safety measures attempt to bring the pressure up to the cut-in pressure set in **CinLPress.**

The parameter **CoutHPress** is the high side pressure where the compressor will cut-out (turn off). The compressor will remain off until the high side pressure comes down to the cut-in pressure set in **CinHPress.**

The parameter **MinHpress** is the minimum allowable high side/discharge pressure, any high side pressure reading below this value will cut-out (turn off) the compressor. The compressor will remain off until the high side pressure reaches a value above the **MinHPress** setpoint.

Lastly, there is a continuous internal check to ensure the high side/discharge pressure is always at least 15 PSI higher than the low side/suction pressure. If this condition not satisfied, the control will trigger a **Pressure Difference** fault and lock the system. This means the user must manually interact with the control either by turning the control OFF and back ON or by forcing the system to heating or another operating mode (using setpoint button). The **Pressure Difference** fault does not auto correct when the pressure is back in range to ensure the user does not operate the system with transducers that have failed sensors. These various faults and the corresponding fault codes are summarized in the table below.

Transducer Protection Summary			
Description	**Trigger**	**Removal**	**Fault Code**
High/Discharge Pressure	Discharge ≥ **CoutHPress**	Discharge < **CinHPress**	HPF
Low/Suction Pressure	Suction ≤ **CoutLPress**	Suction ≥ **CinLPress**	LPF
Minimal Discharge Pressure	Discharge < **MinHPress**	Discharge ≥ **MinHPress**	HPF
Pressure Difference	(Suction – Discharge) ≥ **15 psi**	Cycle ON/OFF or entering another operation mode (heating, defrost, test mode and etc). **It will not recover automatically.**	HPF

All of the explained pressure faults are applicable while in cooling mode. However, this is not the case for all control states, for example in heating mode there are no pressure faults except when using hot gas heat. A complete summary of which pressure faults are active in the various operating modes can be viewed in the table below.

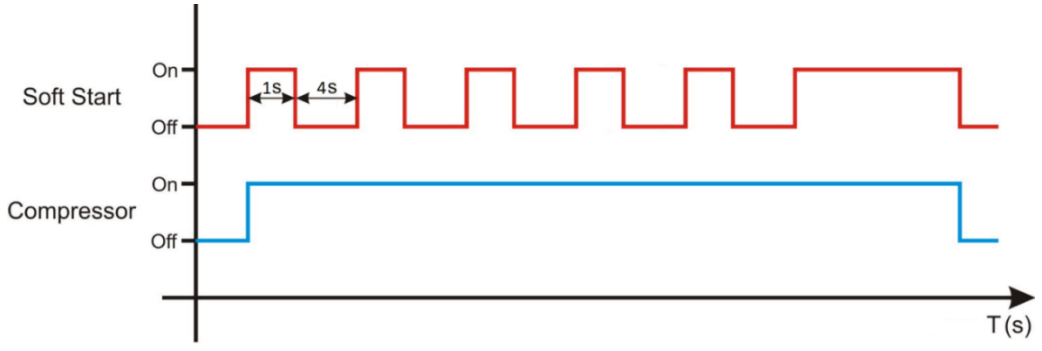
<table>
<tr><th>Op. Mode</th><th colspan="2">Pressure protection during Heating</th><th>Pressure protection during Cooling</th><th>Pressure protection during Defrost and Dripping</th></tr>
<tr><td>R134a Medium</td><td colspan="2" rowspan="3">NA (No protection)</td><td rowspan="4">- High Discharge
- Low Suction
- Minimal Discharge
- Pressure Difference</td><td rowspan="4">- High Discharge
- Low Suction
- Minimal Discharge</td></tr>
<tr><td>R134a Low</td></tr>
<tr><td>R404a Low</td></tr>
<tr><td>R404a HG</td><td>Electric input ON:
NA (No protection)</td><td>Electric input OFF:
- High Discharge
- Low Suction</td></tr>
</table>

General system safety:

- For faults that are not **Pressure Difference**, the system will turn ON 3 minutes after the fault is fixed
- Additional pressure fault logic is explained in section 3.10 “Faults”
- In the case of communication failures (CF), the system will turn off all outputs after 30 seconds

Bump Start:

When using the ignition (road compressor) for cooling, at initial startup for the first cooling cycle the system can implement the **Bump Start** feature to avoid flooded starts. **Bump Start** works to protect the engine compressor from liquid sludge buildup at startup. This is done by turning the compressor on for 1 second and then off for 4 seconds for a total of 5 cycles (20 seconds), as shown below. Set **Bump Start** to **Disable** if this operation is not desired. By default, all controllers are programmed to use the **Bump Start** safety when using the road compressor. Bump start is only active for the **first ignition start up** or the **first shift from standby to ignition operation**.

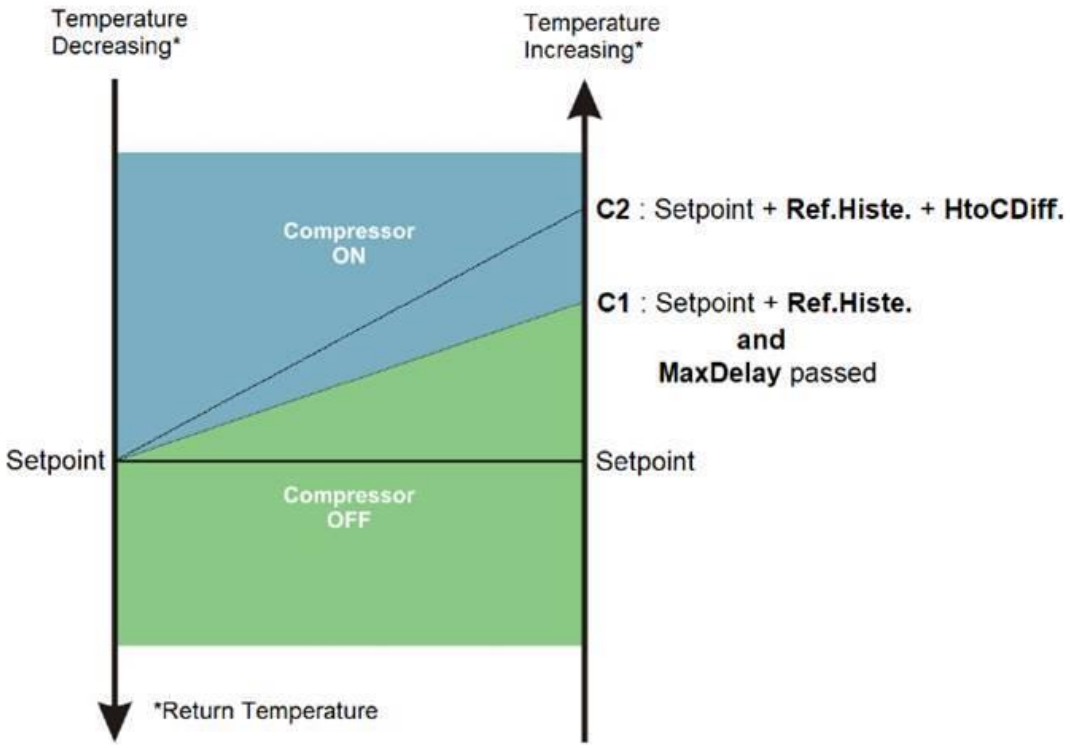


Cooling after a heating cycle:

Cooling after a heating cycle can only occur if any one of the two conditions C1 or C2 are satisfied. C1 is considered the time-based condition for starting a cooling cycle after heating has been completed. When the return temperature reaches **setpoint** + **Ref.Histe** an internal timer will begin counting. When the timer reaches the time set in the parameter **MaxDelay** the controller considers C1 satisfied and will begin cooling.

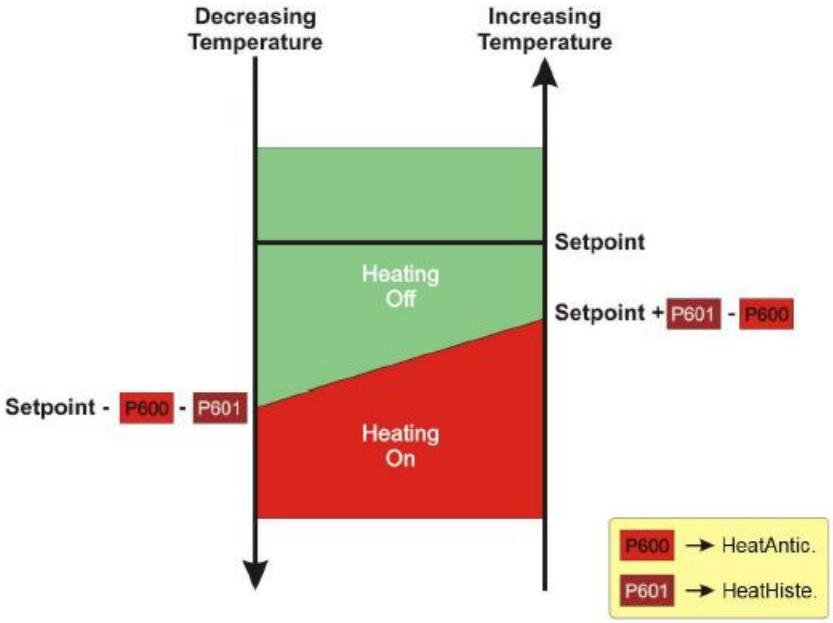
However, the controller can also begin cooling if the return temperature continues to rise during the controllers count to **MaxDelay** and it instead satisfies the C2 condition first. C2 is considered the temperature - based condition for starting a cooling cycle after heating has been completed. Cooling will begin if the return temperature reaches **setpoint** + **Ref.Histe + HtoCDiff.,** where **HtoCDiff** is a minimum temperature differential for beginning cooling after heating. A visual representation is shown below.

Note: The heating to cooling conditions C1 and C2 can be bypassed if the operator restarts the controller, adjusts the setpoint or enters test mode. Therefore, this explained logic works best when the desired setpoint is set and the system is left uninterrupted by manual interaction.



2.10) Heating

The system will only allow heating if the parameter **Heating** is set to ON (Default setting). If **Heating** is set to OFF, the controller will bypass heating logic and instead ventilate (i.e., evaporator fans ON), while it waits for the controller to be back in the range of cooling. However, if this parameter is set to ON, heating will begin when the return temperature is lower than the **setpoint - Heat Antic- Heat Histe**, where **Heat Histe** and **Heat Antic** are programmable heating differentials. Heating will automatically turn off when the return temperature is higher than **setpoint + Heat Histe- Heat Antic**. The following graph illustrates heating logic.



Note: For systems installed with hot gas heat, Op.mode will be set to R-404 HG. This will ensure when using engine power, the compressor and hot gas solenoid also engage to further increase heating. In addition, to avoid excessive amp draw, the controller verifies that the system is not using Electric Input for its power source. This eliminates the possibility of the compressor and electric heating elements operating at the same time. Refer to the table below for a breakdown of the heating logic for the various Op.modes.

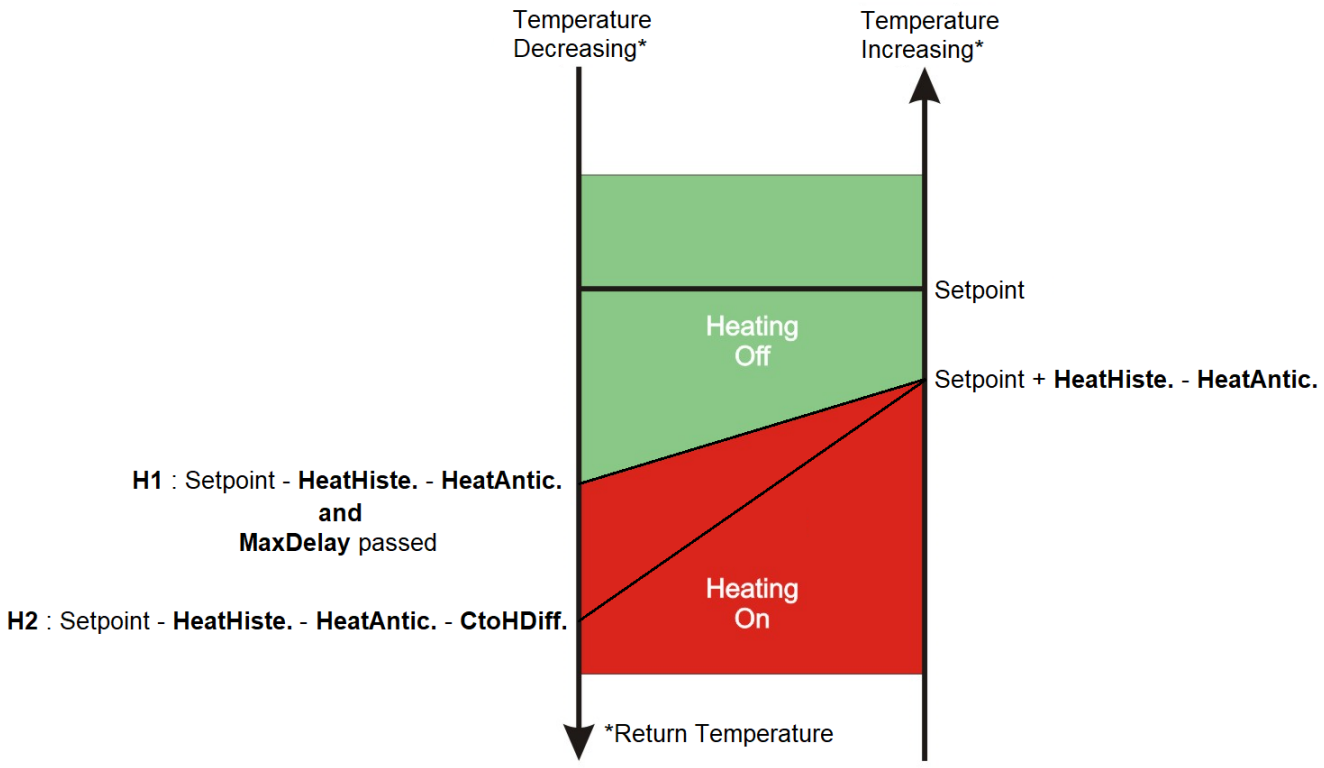
Op.Mode	R-134a Med	R-134a Low	R-404A Low	R-404 HG
Heating	Heating **ON** Evap Blower **ON** Compressor **OFF** Condenser **OFF** Hot Gas **OFF**			Heating **ON** Evap Blower **ON** Compressor **ON** Condenser **OFF** Electric Input OFF: Compressor **ON** Hot Gas **ON** Electric Input ON: Compressor **OFF** Hot Gas **OFF**

Heating after a cooling cycle:

Heating after a cooling cycle can only occur if the **Heating** parameter is set to ON and any one of the two conditions H1 or H2 are satisfied. H1 is considered the time-based condition for starting a heating cycle. When the return temperature reaches **setpoint** - **Heat.Histe** - **Heat.Antic** an internal timer will begin counting. When the timer reaches the time set in the parameter **MaxDelay** the controller considers H1 satisfied and will begin heating.

However, the controller can also begin heating if the return temperature continues to drop during the controllers count to **MaxDelay** and it instead satisfies the H2 condition first. H2 is considered the temperature - based condition for starting a heating cycle after cooling has been completed. Heating will begin if the return temperature reaches **setpoint** - **Heat.Histe** - **Heat.Antic – CtoHDiff.** where **CtoHDiff** is a minimum temperature differential for beginning heating after cooling. A visual representation is shown below.

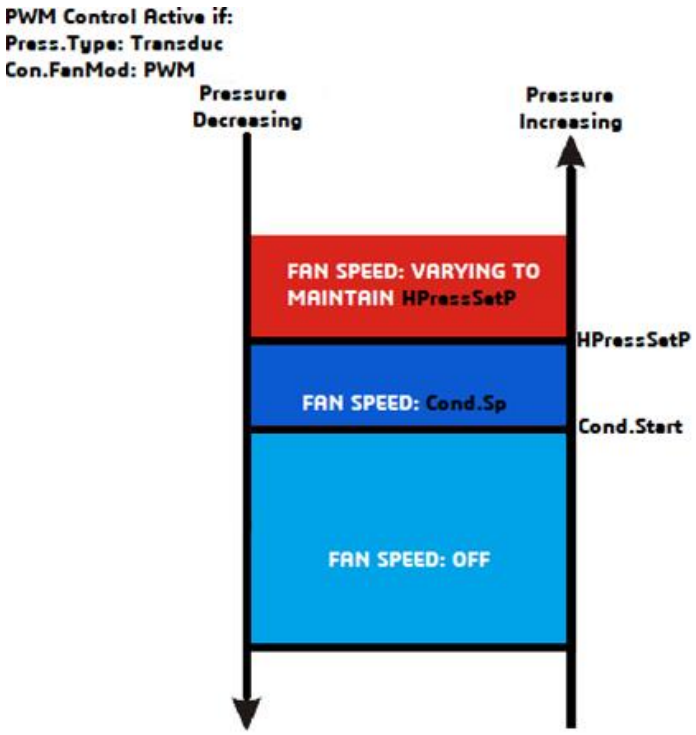
Note: The MaxDelay timer for H1 can be bypassed if the operator restarts the controller and when the operator changes the setpoint. Therefore, this explained logic works best when the desired setpoint is set and the system is left uninterrupted by manual interaction, allowing it to heat or cool as required to maintain the setpoint.



2.11) Condenser

The condenser fan(s) operate with PWM control, using the instant feedback provided by the high-pressure transducer readings.

Specifically, the condenser fan will remain off (PWM of 0) until the start pressure set in **Cond.Start** is reached. Once **Cond.Start** is reached, condenser fan(s) will start at a speed of **Cond.Sp**. (default 30%). If the pressure continues to rise and reaches the pressure set in **HPressSetP**, fan speed will begin to increase or decrease as necessary to maintain the system pressure at **HPressSetP**. In addition, PWM fan control is only active while the compressor is on, or if a high-pressure fault is triggered. Refer to the figure below for a visual of PWM operation.



HPressSetP is maintained using PID logic through the parameters **PID KP**, **PID KI** and **PID TA**. These values are preselected by ATC and should not be changed.

Refer to the table below for the **Cond.Start**, **Cond.Sp** and **HPressSetP** default values for the different refrigerant systems.

Op.Mode	R-134M	R-134L	R-404L	R-404HG
Cond.Start (PSI)	170	170	190	190
Cond.Sp (% PWM)	30% PWM	30% PWM	30% PWM	30% PWM
HPressSetP (PSI)	200	200	225	225

Safety measures:

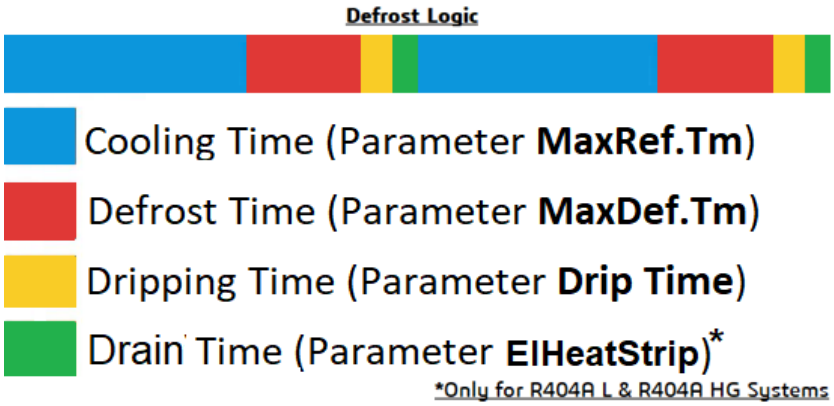
****Note**:** Like all outputs, the condenser output will turn off 30 seconds after any communication failure.

2.12) Defrost

The controller varies defrost operation depending on whether the ATC unit is for a R-134 or R-404 system, and whether the system has a medium or low temperature application. The unit type is preprogrammed at ATC, using the **Op.Mode** parameter. The table below describes how defrost operation changes for each refrigerant mode. In addition, the illustration below provides a visual of the overall defrost loop. Note: For all R-134a systems operating with default settings, the drain period is skipped.

Op.Mode	R-134a Med Temp	R-134a Low Temp	R-404A Low Temp	R-404 HG
Cooling	Normal	Normal	Normal	Normal
Defrost	Blower **ON** Compressor. **OFF**	Blower **OFF** Hot Gas **ON** Compressor **ON**	Blower **OFF** Hot Gas **ON** Compressor **ON** Heat Strip **ON**	Blower **OFF** Hot Gas **ON** Compressor **ON** Heat Strip **ON**
Dripping	Blower **OFF** Compressor **ON**	Blower **OFF** Hot Gas **OFF** Compressor **ON**	Blower **OFF** Hot Gas **OFF** Compressor **ON** Heat Strip **ON**	Blower **OFF** Hot Gas **OFF** Compressor **ON** Heat Strip **ON**
Cooling	Normal	Normal	Normal + Heat Strip*	Normal + Heat Strip*

***Heat Strip represents the heatstrip parameter and controls the additional time that the heat strips remain active after a R-404A dripping period. This function is further discussed in the "Drain Time" section.**



By default, when defrosting is enabled, the display temperature (return or setpoint temperature) reading will be blocked and a **"DEF"** message will be displayed on the controller. Although the display is blocked, the key can still be used to view temperature probe readings. If the **"DEF"** message is undesired, the parameter **Def.Tp.Blk** should be set to **Disable**.

2.12.1) Automatic Defrost

Whether the parameter **Def.S.Mode** is set to **time** , **temperature** or there is a fault with the coil sensor, automatic defrost initiates based on the timer set in the adjustable parameter **MaxRef.Tm**. Once the evaporator temperature reaches the **Def.S.Temp**, the internal timer begins counting. Defrost then starts after the counter reaches the time set in **MaxRef.Tm**. Defrost remains active until a specific temperature (**Def.E.Temp**) or time (**Max.Def.Tm**) depending on the defrost mode selected in **Def.S.Mode**. In addition, if the evaporator temperature reaches **Def.S.Temp** but then begins to drastically rise and exceed the defrost exit temperature **Def.E.Temp,** the timer will be saved and paused. The timer will continue from the saved time, the next time **Def.S.Temp** is reached.

2.12.1.A) Time-based defrost

When **Def.S.Mode** is set to **time**, defrost remains enabled until the time set in **MaxDef.Tm.**

Small clock next to the icon indicates a time based defrost.

2.12.1.B) Temperature-based defrost

When **Def.S.Mode** is set to **temperature**, defrost remains enabled for the time programmed in **MaxDef.Tm** or until the evaporator coil temperature reaches the defrost end temperature set in **Def.E.Temp**. Defrost will end based on whichever occurs first.

Small thermometer next to the icon indicates a temperature based defrost

2.12.2) Manual Defrost

Defrost can also be manually started by the operator. Hold the key down for 3 seconds to attempt a manual defrost. However, like automatic defrost, manual defrost operation is dependent on whether **Def.S.Mode** is set to **time or temperature mode**.

The controller indicates a manual defrost with the icon and “Ma” text.

2.12.2.A) Time-based defrost

If **Def.S.Mode** is set to **time**, manual defrost may be enabled at any time by pressing the key for 3 seconds. Defrost will remain enabled for the time programmed in **MaxDef.Tm**.

2.12.2.B) Temperature-based defrost

When **Def.S.Mode** is set to **temperature**, defrost can be manually attempted at any time but will only be enabled if the evaporator coil temperature is lower than **Def.E.Temp**. When a manual defrost is attempted and the coil temperature is still above **Def.E.Temp**, the warning message **“ADT EVP”** will flash on the display. However, if the evaporator temperature criteria is satisfied, defrost will begin and remain enabled for the time programmed in **MaxDef.Tm**, or until the coil temperature reaches **Def.E.Temp**. Defrost will end based on whichever one of these conditions occurs first.

2.13) Dripping

After each defrost the system goes into dripping mode to prevent coil damage. Drip mode ensures that ventilation is not enabled until the time set in the parameter **Drip Time** elapses. The Got icon is displayed while drip mode is enabled.

2.14) Drain Time

For any system that uses R-404 refrigerant (**Op.Mode** set to **R-404L or R-404HG)** and **HeatStMode** is set to **Timed**, the heat strips will initiate immediately after the dripping period elapses. During this period, the heat strips in the R-404 evaporator will remain active for the time set in the parameter **Heat Strip**. This additional time is used to drain leftover defrost water so that it does not solidify in the drain ducts.

The parameter **HeatStMode** controls heat strip operation. By default, this parameter is set to **Timed**, where the heat strips will follow the default logic as explained above. For more extensive coil safety, the parameter **HeatStMode** can be set to **On**. This ensures the heat strips are always **On**, regardless if it is a R-134 or R-404 system and regardless if the controller is refrigerating, heating or defrosting. Lastly, **HeatStMode** can be set to **off**, in which case the heat strips will be **off** throughout system operation.

2.15) Voltage Monitoring and Voltage Control

The controller is always measuring the supplied voltage, which can be observed using the visualization screen or by downloading a data log. Refer to section 3.6 “Inputs and Outputs Visualization” for information on observing this measurement in the visualization screen and section 3.2 “Data Logging” for more information on collecting a data log.

2.16) Door Sensor

The controller I/O module features a digital input to monitor the truck/chamber door. If this feature is desired the parameter **DoorOp.Alm** should be set to **enable** and the installer should acquire and connect a door sensor. This feature operates with a negative input. When the door is closed, the input should be **"GND"**. When the door is open, there is an open contact at the same input. The ventilation while the door is open is controlled with the **V.DoorOpen** parameter as explained earlier in section 2.8 "Ventilation/Blower Output".

In addition, whenever the door input is triggered the controller will warn the operator by flashing a **"D"** in the center and bottom right corner of the display, along with generating a log file. In addition, the controller will activate the optional external alarm output. This warning will remain active until the door is closed. An example of the warning message is shown below.

3) ADDITIONAL FEATURES

3.1) Time and Date

Contact ATC Dealer for information on changing the date and time of the M910207 controller.

3.2) Data Logging

By default, for warranty and troubleshooting purposes data logging is enabled by ATC. If the date and time has been set by the installing dealer, the I/O module will generate and save a log file every time a USB drive is inserted into the I/O module. When the USB drive is connected, the module automatically starts downloading the log, which will also be indicated on the controller display. When all data is collected, a message on the controller display will prompt that the USB may be removed. The module generates a file named **"LOGRXXXX.csv"** where XXXX starts at 0000 and increases so that old log files on the USB are not overwritten.

Logs are generated based on both fixed time intervals and event triggers. Any changes to parameters such as: setpoint, control state (cooling, heating, defrost, drain, off), system faults, and door, ignition or electric standby inputs are events that trigger a new log line.

The fixed time interval for log generation can be changed using the **Log Freq** parameter. The parameter can be set to any time interval between **0 to 60 minutes (Default is 5 minutes)**.

The log generated by the module contains the following information:

- Date and time
- Supply voltage
- Return temperature
- Evaporator temperature
- Condenser temperature
- Setpoint
- Compressor status
- Product hourmeter
- Standby hourmeter
- Compressor hourmeter
- Pressure transducers
- Hot gas defrost status
- Electric input status
- Condenser PWM
- Events (alarms & faults)

The main menu features a **data log** screen, where you can view the log status. Since **datalogger** is set to **Enable**, it will indicate that the log is generating.

1. To access the data log screen, simultaneously hold the and keys for 3 seconds
2. Use the and keys to scroll through main menu and the key to select the **data log** option

3. To return to the main menu screen press . Exit the main menu by pressing again or by waiting 30 seconds.

The data log can also be reset by accessing the **Reset Parameters** feature in the menu.

Contact ATC Dealer for information on resetting the data log for the M910207 controller

3.3) Log File & Over-The-Air Datalogging

The “.csv” data log file generated by the I/O module uses the controller date and time to provide time stamps for all recorded logs. The log file provides information such as Setpoint, Control state (Cooling, Heating, Defrost, Off…), product hour meters, door status and system faults.

In addition, If the operator has a IOS mobile phone with the ATC mobile app, Log files can be downloaded over the air (OTA) via Bluetooth. Within the mobile app there is a “Log” option where the data log download can be initiated. Using this method eliminates the need for a USB or any physical connection into the module. However, it is still recommended to use a USB drive whenever possible. This is because OTA datalogging takes longer (best case scenario 1 line/second) and because OTA datalogging may be interrupted at any time if more important tasks are required by the control.

The following helpful tips are provided for OTA data logging:

1. Limit OTA datalogging for shorter tests/troubleshooting
    - Note: 1 line/second equates to 16 minutes minimum for any log over 1000 lines
2. Avoid taking data logs during normal operation as memory extensive features will lead to the controller eliminating OTA data logging for high priority functions
    - Note: All logs captured before data logging stopped will be saved, but future log downloads will resume from the beginning.
3. Recommendation is that OTA data logs are taken when vehicle/wall plug is ON, but the control is OFF, therefore no memory is required for any other features
    - Note: To maximize OTA download speeds, in this specific scenario the control will not take any new logs. For example, if the vehicle/Wall plug was ON with the controller OFF for 20 minutes of data log transfer time, the last 20 minutes will not appear in the data log. The idea is that this specific scenario is being utilized only to maximize data log capture speeds and since the display is off, there would be no useful information captured.
4. Lastly, keeping the controller and mobile app close together during OTA data log downloading will promote better signal quality
5. Disable Auto-Lock for your iOS to ensure the iPhone does not time-out and exit the mobile app

3.4) System Parameters

Contact ATC Dealer for information on changing parameter settings for the M910207 controller.

Shown on the next page is the various adjustable parameters:

3.4.1) Adjustable Parameters Table (°F)

Parameters	Description	Default				Minimum	Maximum
		R134A Medium	R134A Low	R404 Low	R404 HG		
Op. Mode	Operation mode	**R134A Medium**	**R134A Low**	**R404 Low**	**R404 HG**		
Ret.Offset (°F)	Return temperature Sensor off-set	0°F	0°F	0°F	0°F	-9	9
Ev.Offset (°F)	Evaporator temperature sensor off-set	0°F	0°F	0°F	0°F	-9	9
Con.Offset (°F)	Condenser temperature sensor off-set	0°F	0°F	0°F	0°F	-9	9
DataLogger	Data logger status	Enable	Enable	Enable	Enable	Disable	Enable
Log Freq. (min)	Log frequency	5	5	5	5	0	60
Def.S.Temp (°F)	Defrost start temperature	26°F	26°F	26°F	26°F	-13	40
Def.E.Temp (°F)	Defrost end temperature	39°F	36°F	40°F	40°F	30	59
MaxDef.Tm (min)	Maximum defrost time	20	15	15	15	1	60
Drip Time (sec)	Drip time	60	60	60	60	0	240
Heat Strip (min)	Heat strip operating time	5	5	5	5	1	240
HeatStmode	Heat strip operating mode	Off	Off	Timed	Timed	Off	On
MaxRef.Tm (min)	Maximum refrigeration time	40	40	40	40	10	600
Ref.Histe. (°F)	Refrigeration hysteresis	2°F	2°F	2°F	2°F	1	15
HeatHiste. (°F)	Heating hysteresis	2°F	2°F	2°F	2°F	1	11
HeatAntic. (°F)	Heat anticipation	2°F	2°F	2°F	2°F	1	7
Temp.Shown	Default Display Temperature	Temperatu.	Temperatu.	Temperatu.	Temperatu.	Temperatu.	Setpoint
Init.State	Initial state	Last State	Last State	Last State	Last State	Off	Last State
Def.S.Mode	Defrost start mode	Temperatu.	Temperatu.	Temperatu.	Temperatu.	Temperatu.	Time

Parameters	Description	Default				Minimum	Maximum
		R134A Medium	R134A Low	R404 Low	R404 HG		
V.Comp.Off	Ventilation while compressor off	On	On	On	On	Off	On
SetP.Block	Setpoint block	Disable	Disable	Disable	Disable	Disable	Enable
Def.Tp.Blk	Temperature Block During Defrost	Enable	Enable	Enable	Enable	Disable	Enable
Ev.Blk.Tm (min)	During DEF Evap temp block time	5	5	5	5	0	60
Min.SetP (°F)	Minimum setpoint	33°F	0°F	-20°F	-20°F	-40	**Max.SetP**
Max.SetP (°F)	Maximum setpoint	80°F	80°F	80°F	80°F	**Min.SetP**	87
Vent.Delay (sec)	Ventilation start delay	3	3	3	3	0	10
Language	Language	English	English	English	English	Portuguese	English
V.DoorOpen	Ventilation while door open	Enable	Enable	Enable	Enable	Disable	Enable
Con.FanMod	Condenser fan mode	PWM	PWM	PWM	PWM	On/Off	PWM
Press.Type	Pressure input type	Transducer	Transducer	Transducer	Transducer	Switch	Transducer
DoorOp.Alm	Door open alarm	Disable	Disable	Disable	Disable	Disable	Enable
RoofPr.Alm	Roof proximity alarm	Enable	Enable	Enable	Enable	Disable	Enable
El+Ign.Alm	Electric standby plugged in with ignition alarm	Enable	Enable	Enable	Enable	Disable	Enable
Bump Start	Bump start	Enable	Enable	Enable	Enable	Disable	Enable
CoutLPress (PSI)	Cut out suction pressure	3	3	3	3	-10	20
CinLPress (PSI)	Cut in suction pressure	20	20	20	20	5	50
CoutHPress (PSI)	Cut out discharge pressure	300	300	425	425	100	500
CinHPress (PSI)	Cut in discharge pressure	200	200	325	325	100	500
HpressSetP (PSI)	Condenser PWM pressure setpoint	200	200	225	225	100	500
Cond.Start (PSI)	Condenser Fan Start Pressure.	170	170	190	190	120	250
Cond.Spd. (%PWM)	PWM normal speed	30	30	30	30	10	50
HPr.Offset (PSI)	Discharge pressure offset	0.0	0.0	0.0	0.0	-9.9	9.9
LPr.Offset (PSI)	Suction pressure offset	0.0	0.0	0.0	0.0	-9.9	9.9

Parameters	Description	Default				Minimum	Maximum
		R134A Medium	R134A Low	R404 Low	R404 HG		
PID KP.	Condenser PWM control proportional	30.0	30.0	30.0	30.0	0.1	99.9
PID KI.	Condenser PWM control integral	3.0	3.0	3.0	3.0	0.1	99.9
PID TS.	Condenser PWM control time sample	1	1	1	1	1	100
BT Mod.	Bluetooth module	Disable	Disable	Disable	Disable	Disable	Enable
Sensor Eq.	Transducer sensor equation	JCI	JCI	JCI	JCI	TD	Sensata
HtoCDiff. (°F)	Heating to cooling differential	4°F	4°F	4°F	4°F	0	9
CtoHDiff. (°F)	Cooling to heating differential	2°F	2°F	2°F	2°F	0	9
MaxDelay (min)	Auto Heating/Cooling mode switch delay	5	5	5	5	5	90
MinHpress (PSI)	Minimum High Side Pressure	15	15	40	40	10	100
Heating	Enable heating	Off	Off	Off	Off	Off	On
Volt.Ctrl.	Voltage Control Type	Disable	Disable	Disable	Disable	Disable	Both Ctrl.
Min.Volt. (DC Voltage)	Minimum operating voltage	11.4	11.4	11.4	11.4	11.0	13.0
Max.Volt. (DC Voltage)	Maximum operating voltage	15.8	15.8	15.8	15.8	14.0	19.0
Volt.Hyst (DC Voltage)	Voltage hysteresis	1.1	1.1	1.1	1.1	0.2	2.0

Note:

Changing the Op.Mode parameter will automatically change refrigerant related parameters to their default values displayed in this table (this is further covered in section 3.12 "Op.Mode")

3.4.2) Adjustable Parameters Table (°C)

Parameters	Description	Default				Minimum	Maximum
		R134A Medium	R134A Low	R404 Low	R404 HG		
Op. Mode	Operation mode	**R134A Medium**	**R134A Low**	**R404 Low**	**R404 HG**		
Ret.Offset (°C)	Return temperature Sensor off-set	0°C	0°C	0°C	0°C	-5	5
Ev.Offset (°C)	Evaporator temperature sensor off-set	0°C	0°C	0°C	0°C	-5	5
Con.Offset (°C)	Condenser temperature sensor off-set	0°C	0°C	0°C	0°C	-5	5
DataLogger	Data logger status	Enable	Enable	Enable	Enable	Disable	Enable
Log Freq. (min)	Log frequency	5	5	5	5	1	60
Def.S.Temp (°C)	Defost start temperature	-3°C	-3°C	-3°C	-3°C	-25	4
Def.E.Temp (°C)	Defrost end temperature	3°C	2°C	4°C	4°C	-1	15
MaxDef.Tm (min)	Maximum defrost time	20	15	15	15	1	60
Drip Time (sec)	Drip time	60	60	60	60	0	240
Heat Strip (min)	Heat strip operating time	5	5	5	5	1	240
HeatStmode	Heat strip operating mode	Off	Off	Timed	Timed	Off	On
MaxRef.Tm (min)	Maximum refrigeration time	40	40	40	40	10	600
Ref.Histe. (°C)	Refrigeration hysteresis	1°C	1°C	1°C	1°C	0	8
HeatHiste. (°C)	Heating hysteresis	1°C	1°C	1°C	1°C	0	6
HeatAntic. (°C)	Heat anticipation	1°C	1°C	1°C	1°C	0	3
Temp.Shown	Default Display Temperature	Temperatu.	Temperatu.	Temperatu.	Temperatu.	Temperatu.	Setpoint
Init.State	Initial state	Last State	Last State	Last State	Last State	Off	Last State
Def.S.Mode	Defrost start mode	Temperatu.	Temperatu.	Temperatu.	Temperatu.	Temperatu.	Time

Parameters	Description	Default				Minimum	Maximum
		R134A Medium	R134A Low	R404 Low	R404 HG		
V.Comp.Off	Ventilation while compressor off	On	On	On	On	Off	On
SetP.Block	Setpoint block	Disable	Disable	Disable	Disable	Disable	Enable
Def.Tp.Blk	Temperature Block During Defrost	Enable	Enable	Enable	Enable	Disable	Enable
Ev.Blk.Tm (min)	During DEF Evap temp block time	5	5	5	5	0	60
Min.SetP (°C)	Minimum setpoint	0°C	-17°C	-28°C	-28°C	-40	**Max.SetP**
Max.SetP (°C)	Maximum setpoint	26°C	26°C	26°C	26°C	**Min.SetP**	30
Vent.Delay (sec)	Ventilation start delay	3	3	3	3	0	10
Language	Language	English	English	English	English	Portuguese	English
V.DoorOpen	Ventilation while door open	Enable	Enable	Enable	Enable	Disable	Enable
Con.FanMod	Condenser fan mode	PWM	PWM	PWM	PWM	On/Off	PWM
Press.Type	Pressure input type	Transducer	Transducer	Transducer	Transducer	Switch	Transducer
DoorOp.Alm	Door open alarm	Disable	Disable	Disable	Disable	Disable	Enable
RoofPr.Alm	Roof proximity alarm	Enable	Enable	Enable	Enable	Disable	Enable
El+Ign.Alm	Electric standby plugged in with ignition alarm	Enable	Enable	Enable	Enable	Disable	Enable
Bump Start	Bump start	Enable	Enable	Enable	Enable	Disable	Enable
CoutLPress (PSI)	Cut out suction pressure	3	3	3	3	-10	20
CinLPress (PSI)	Cut in suction pressure	20	20	20	20	5	50
CoutHPress (PSI)	Cut out discharge pressure	300	300	425	425	100	500
CinHPress (PSI)	Cut in discharge pressure	200	200	325	325	100	500
HpressSetP (PSI)	Condenser PWM pressure setpoint	200	200	225	225	100	500
Cond.Start (PSI)	Condenser Fan Start Pressure.	170	170	190	190	120	250
Cond.Spd. (%PWM)	PWM normal speed	30	30	30	30	0	50
HPr.Offset (PSI)	Discharge pressure offset	0	0	0	0	-9.9	9.9
LPr.Offset (PSI)	Suction pressure offset	0	0	0	0	-9.9	9.9

Parameters	Description	Default				Minimum	Maximum
		R134A Medium	R134A Low	R404 Low	R404 HG		
PID KP.	Condenser PWM control proportional	30.0	30.0	30.0	30.0	0.1	99.9
PID KI.	Condenser PWM control integral	3.0	3.0	3.0	3.0	0.1	99.9
PID TS.	Condenser PWM control time sample	1	1	1	1	1	100
BT Mod.	Bluetooth module	Disable	Disable	Disable	Disable	Disable	Enable
Sensor Eq.	Transducer sensor equation	JCI	JCI	JCI	JCI	TD	Sensata
HtoCDiff. (°C)	Heating to cooling differential	2°C	2°C	2°C	2°C	0	5
CtoHDiff. (°C)	Cooling to heating differential	1°C	1°C	1°C	1°C	0	5
MaxDelay (min)	Auto Heating/Cooling mode switch delay	5	5	5	5	5	90
MinHpress (PSI)	Minimum High Side Pressure	15	15	40	40	10	100
Heating	Enable heating	Off	Off	Off	Off	Off	On
Volt.Ctrl.	Voltage Control Type	Disable	Disable	Disable	Disable	Disable	Both Ctrl.
Min.Volt. (DC Voltage)	Minimum operating voltage	11.4	11.4	11.4	11.4	11.0	13.0
Max.Volt. (DC Voltage)	Maximum operating voltage	15.8	15.8	15.8	15.8	14.0	19.0
Volt.Hyst (DC Voltage)	Voltage hysteresis	1.1	1.1	1.1	1.1	0.2	2.0

Note:

Changing the Op.Mode parameter will automatically change refrigerant related parameters to their default values displayed in this table (this is further covered in section 3.12 "Op.Mode")

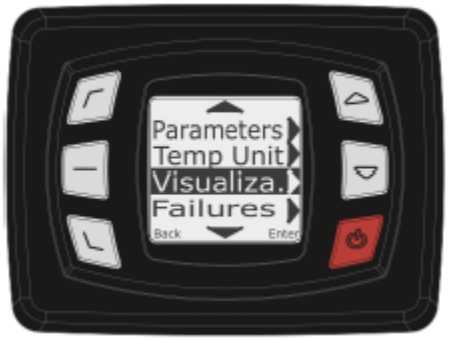
3.5) Saving and Loading Parameters through USB disk

Contact ATC Dealer for information on saving and loading parameters using a USB

3.6) Inputs and Outputs Visualization

This setting can be used for servicing or troubleshooting the system. It allows the user to view the real time status of various inputs and outputs being detected by the I/O module.

1. To access the input and outputs, simultaneously hold the and keys for 3 seconds
2. Use the and keys to scroll through main menu and the key to select the **Visualiza.** option



3. When prompted for a passcode input **11**
   - Use to increment the first digit
   - Use to increment the second digit.
   - Press to enter passcode

4. The first value shown is the ReturnT, to scroll through the viewable inputs and outputs use and (a list of all inputs and outputs are provided on the following page).
5. To return to the main menu screen press . Exit the main menu by pressing again or by waiting 30 seconds

Shown below is the list of inputs and values which can be viewed.

Indication	Description
ReturnT	Return temperature input
Evap.T.	Evaporator temperature input
Cond.T.	Condenser temperature input
H.Strip	Electric heat strip output
Heating	Heating output
Ev.Fan	Evaporator fan output
Hot Gas	Solenoid output
Comp.	Compressor output
CondFan	Condenser fan output
H.Press	High pressure transducer input
L.Press	Low pressure transducer input
Ign.Sw.	Ignition switch input
DoorOp.	Door open input
El.Stby	Electric standby input
Proxim.	Proximity sensor input
BLoader	ECU bootloader version
ECU SW	ECU software version
S.Volt.	Controller Supply Voltage
PBLoad.	Controller bootloader version
BLE V.	Bluetooth modem version
BLE S.	Bluetooth status
Buzzer	Buzzer

Use the table below to understand the various values which might be present for the inputs and output shown in the **Visualization** setting.

Indication	Meaning
XXX	Value read
On	Input with signal / Output on
Off	Input without signal / Output off
F!	Fault with this variable, check Failure menu
CF	Communication failure and variable is at remote module

3.7) Test Mode

With Control:

Test mode can be used to view controller inputs or troubleshoot controller outputs. In addition, this feature can be used to isolate some components of the refrigeration system (e.g., toggle ON condenser fan).

1. To access test mode, simultaneously hold the and keys for 3 seconds
2. Use the and keys to scroll through main menu and the key to select the **Test Mode** option

3. When prompted for a passcode input **86**
   - Use to increment the first digit
   - Use to increment the second digit.
   - Press to enter passcode

4. The first parameter shown is ReturnT. To scroll through viewable and testable parameters, use the and keys. Press to toggle values for the test (note only features that are testable will execute a test).
5. To return to the main menu screen press . Exit the main menu by pressing again or by waiting 30 seconds

Shown below is a complete list of parameters which can be tested with test mode

Indication	Description
ReturnT	Return temperature
Evap.T.	Evaporator temperature
Cond.T.	Condenser temperature
H.Strip	Electric heat strip output
Heating	Heating output
Ev.Fan	Evaporator fan output
Hot Gas	Solenoid output
Gas Ch.	Compressor output (turns on comp & cond/evap fans)
CondFan	Condenser fan output
H.Press	High pressure transducer input
L.Press	Low pressure transducer input
Ign.Sw.	Ignition switch
DoorOp.	Door open input
El.Stby	Electric standby input
Proxim.	Proximity sensor
BLoader	Boot loader software version
ECU SW	ECU software version
S.Volt.	Controller Supply Voltage
PBLoad.	Controller bootloader version
B.Light	Backlight
Keys	Keys and .
BLE V.	Bluetooth modem version
BLE S.	Bluetooth status
Clock	Seconds running
Buzzer	Buzzer

Use the table below to understand the values which might be present for the tests conducted during test mode.

Indication	Meaning
XXX	Value read
On	Input with signal / Output on
Off	Input without signal / Output off
F!	Variable Fault, check Failure menu
CF	Communication failure and variable is at remote module

With Mobile app:

Test mode can also be accessed over the air (OTA) through the Bluetooth connection between the controller and a IOS mobile phone using the “ATC Mobile” application. The “Test Mode” feature can be accessed in the App menu. Like the controller, mobile test mode can be used to view controller inputs or manually activate outputs. This functionality adds some mobility for experienced dealers to command outputs using their mobile app instead of interacting with the controller. However, this feature is not intended to be a reliable link between devices and the end user.

Although security measures are present (for example, the app requires passwords for test mode and forces outputs off whenever the mobile app loses connection to the controller), the mobile app is not a software intended to act as a standalone maintenance tool and does not offer (or pretend to offer) a risk-free platform for running tests. To safely utilize OTA test mode, dealers require an extensive knowledge base on ATC refrigeration systems and how these outputs work, which can only be obtained through years of training. Dealers planning to utilize this feature should take a high level of care because of the following:

- Mobile phone operations, features and behaviors are out of the mobile apps control
- Mobile phones (especially older versions) may close the app at any time because of required battery savings, critical operations (i.e., updates) or because of unexpected errors

Dealers must understand they should not manipulate system features or outputs while activating outputs OTA. An abundance of caution should always be taken when using test mode, especially OTA. Lastly, if test mode is entered through the controller and mobile app simultaneously, the controller takes priority, this means the mobile app will not be able to execute tests.

3.8) Parameter Resetting

Contact ATC Dealer for information on resetting parameter settings for the M910207 controller

3.9) Temperature Unit

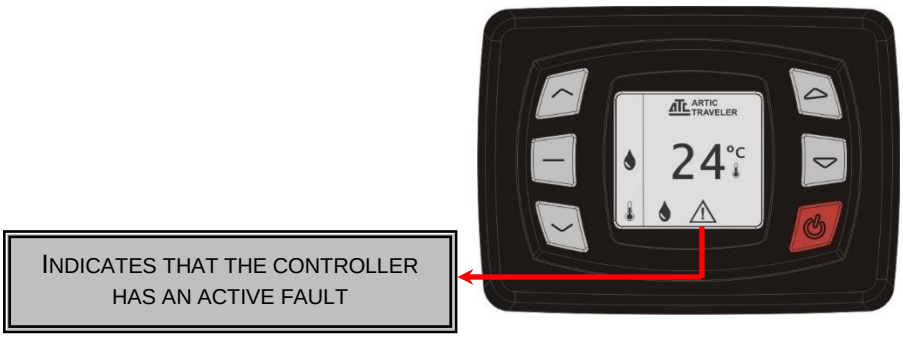
This option is used to change the controller temperature units to either Fahrenheit (°F) or Celsius (°C). By default, the controller is programmed to display °F.

1. To access the temperature unit screen, simultaneously hold the and keys for 3 seconds
2. Use the and keys to scroll through main menu and the key to select the **Temp Unit** option

3. Use the and keys to scroll through °F or °C and the key to verify the temperature unit
4. To return to the main menu screen press . Exit the main menu by pressing again or by waiting 30 seconds

3.10) Faults and Alarms

In the case of any system faults, an alert icon will blink on the display. The fault screen in the main menu can be used to view all current system faults



1. To access the fault screen, simultaneously hold the and keys for 3 seconds
2. Use the and keys to scroll through main menu and the key to select the **Failures** option

3. The next screen displays the active faults. Use the and keys to scroll through active faults and the key for more details on specific faults
4. Press to return to the faults screen

5. To return to the main menu screen press . Exit the main menu by pressing again or by waiting 30 seconds

Refer to the legend below to identify faults.

Indication	Description	Action
RTO	Return temperature sensor open	(*) Temperature control will follow open loop according to the table below
RTS	Return temperature sensor short circuit	
EVO	Evaporator coil temperature sensor open	(**) Defrost control will allow manual defrosts (user requested) and will continue to perform defrosts based on time (**MaxRef.Tm**)
EVS	Evaporator coil temperature sensor short circuit	
CDO	Condenser temperature sensor open	Faults are displayed but no influence on controller performance
CDS	Condenser temperature sensor short circuit	
ADT	Above defrost temperature	Warning displayed when the user attempts a manual defrost at temperature higher than **Def.E.Temp**
HT	Evaporator temperature above 59°F	Indicator if evaporator temperature exceeds 59°F (will not flash on display)
BLK	Setpoint Changes Blocked	Warning when the user attempts a setpoint change, while manual setpoint changes are blocked
CF	Communication failure	**(***)**Critical system fault**, problem with module and controller communication. Check wires and connections. I/O Module outputs will turn off after 30 seconds without communication.
D	Door open	Warning shown on display, buzzer output ON, and logs generated until door closed
HPF	High pressure failure	Compressor off until high pressure drops or until **MinHpress** or **Pressure Difference** fault fixed. 3 min delay after fix for compressor to turn on, unless caused by Pressure Difference fault which does not auto fix
LPF	Low pressure failure	Compressor off until low pressure rises, 3 min delay after fix for compressor to turn on
RPA	Roof proximity alarm	Object close to sensor. Warning shown on display, buzzer output ON and log generated.
SBY	Electric stand by connected	Warning shown on display, buzzer output activates and logs generated until one power supply turned off.
DF	Already defrosting	Warning if manual defrost attempted while a defrost is already happening
HTF	High pressure transducer fault	HP Transducer signal lost, PWM set to max and 30 sec delay after a fix for compressor to turn on
LVF	Low battery voltage	(****) Input voltage is to low or high. Control requests the control system to turn off. Warning shown on display and buzzer output ON
HFV	High batter voltage	

Note: The buzzer output will toggle ON, but this feature will only be present at the installing dealers discretion

(*) During a return sensor fault, the controller will take control of cooling as shown below. Starting at the “ON “ cycle.

(**) The coil temperature sensor fault occurs only when the **Def.S.Mode** parameter is equal to **Temperatu**.

(***) In the event of a system communication failure (CF), the system will turn off all outputs for 30 seconds.

(****) Triggered if voltage control is enabled.

*In case there is a fault with the feedback of the return temperature sensor, the controller will take control of cooling as shown below. The control will begin with the “ON” cycle.

Operating Range	Setpoint		Cooling ON	Cooling OFF
	°C	°F		
Range #4	> 10 ºC	>18°F	9 min.	21 min.
Range #3	10 ºC	18°F	15 min.	15 min.
	9 ºC	16°F		
	8 ºC	14°F		
	7 ºC	13°F		
	6 ºC	11°F		
Range #2	5 ºC	9°F	21 min.	9 min.
	4 ºC	7°F		
	3 ºC	5°F		
	2 ºC	4°F		
	1 ºC	2°F		
Range #1	< 1 ºC	<2°F	Always on	-
The defrosting control remains unchanged.				

Evaporator coil sensor faults will only be shown if **Def.S.Mode is set to **Temperature**.

Obs: In case the evaporator coil sensor faults, defrost control will continue in time-based mode, and will still allow manual defrost with time based operation.

3.11) Hourmeters

There are 3 separate hour meters that are logged to keep track of runtime.

- The road compressor hour meter increments when ignition is ON and the control is in cooling.
- The standby compressor hour meter increments when electric input is ON and cooling
- The controller hour meter increments whenever the controller is ON.

1. To access the hour meters, simultaneously hold the and keys for 3 seconds
2. Use the and keys to scroll through main menu and the key to select the **Hourmeter** option

3. The next screen shows the cumulative time for each hour meter;

4. To return to the main menu screen press . Exit the main menu by pressing again or by waiting 30 seconds. However, to clear hour meters hold the and keys simultaneously for 3 seconds

Contact ATC Dealer for more information on clearing hour meters for the M910207 controller.

3.12) Op.Mode Settings

For ease in programming different refrigerant systems, changing the **Op.Mode** refrigerant setting will automatically adjust the following controller parameters to the shown default values.

3.12.1) Op.Mode Default Parameters Table (°F)

Parameters	Description	Default				Minimum	Maximum
		R134A Medium	R134A Low	R404 Low	R404 HG		
Op. Mode	**Operation mode**	**R134A Medium**	**R134A Low**	**R404 Low**	**R404 HG**		
Def.S.Temp (°F)	Defost start temperature	26°F	26°F	26°F	26°F	-13	42
Def.E.Temp (°F)	Defrost end temperature	39°F	36°F	40°F	40°F	30	59
MaxDef.Tm (min)	Maximum defrost time	20	15	15	15	1	60
Drip Time (sec)	Drip time	60	60	60	60	0	240
Heat Strip (min)	Heat strip Operating Time	5	5	5	5	1	240
HeatStmode	Heat strip Operating Mode	Off	Off	Timed	Timed	Off	On
MaxRef.Tm (min)	Maximum refrigeration time	40	40	40	40	10	600
Init.State	Initial state	Last State	Last State	Last State	Last State	Off	Last State
Def.S.Mode	Defrost start mode	Temperatu.	Temperatu.	Temperatu.	Temperatu.	Temperatu.	Time
V.Comp.Off	Ventilation while compressor off	On	On	On	On	Off	On
Def.Tp.Blk	Temperature Block During Defrost	Enable	Enable	Enable	Enable	Disable	Enable
Min.SetP (°F)	Minimum setpoint	33°F	0°F	-20°F	-20°F	-40	**Max.SetP**
Max.SetP (°F)	Maximum setpoint	80°F	80°F	80°F	80°F	**Min.SetP**	87
CoutLPress (PSI)	Cut out suction pressure	3	3	3	3	-10	20
CinLPress (PSI)	Cut in suction pressure	20	20	20	20	5	50
CoutHPress (PSI)	Cut out discharge pressure	300	300	425	425	100	500
CinHPress (PSI)	Cut in discharge pressure	200	200	325	325	100	500
HpressSetP (PSI)	Condenser PWM pressure setpoint	200	200	225	225	100	500
Cond.Start (PSI)	Condenser Fan Start Pressure.	170	170	190	190	120	250
Cond.Spd. (%PWM)	PWM normal speed	30	30	30	30	10	50

3.12.2) Op.Mode Default Parameters Table (°C)

Parameters	Description	Default				Minimum	Maximum
		R134A Medium	R134A Low	R404 Low	R404 HG		
Op. Mode	**Operation mode**	**R134A Medium**	**R134A Low**	**R404 Low**	**R404 HG**		
Def.S.Temp (°C)	Defost start temperature	-3°C	-3°C	-3°C	-3°C	-25	5
Def.E.Temp (°C)	Defrost end temperature	3°C	2°C	4°C	4°C	-1	15
MaxDef.Tm (min)	Maximum defrost time	20	15	15	15	1	60
Drip Time (sec)	Drip time	60	60	60	60	0	240
Heat Strip (min)	Heat strip Operating Time	5	5	5	5	1	240
HeatStmode	Heat strip Operating Mode	Off	Off	Timed	Timed	Off	On
MaxRef.Tm (min)	Maximum refrigeration time	40	40	40	40	10	600
Init.State	Initial state	Last State	Last State	Last State	Last State	Off	Last State
Def.S.Mode	Defrost start mode	Temperatu.	Temperatu.	Temperatu.	Temperatu.	Temperatu.	Time
V.Comp.Off	Ventilation while compressor off	On	On	On	On	Off	On
Def.Tp.Blk	Temperature Block During Defrost	Enable	Enable	Enable	Enable	Disable	Enable
Min.SetP (°C)	Minimum setpoint	0°C	-17°C	-28°C	-28°C	-40	**Max.SetP**
Max.SetP (°C)	Maximum setpoint	26°C	26°C	26°C	26°C	**Min.SetP**	30
CoutLPress (PSI)	Cut out suction pressure	3	3	3	3	-10	20
CinLPress (PSI)	Cut in suction pressure	30	20	20	20	5	50
CoutHPress (PSI)	Cut out discharge pressure	300	300	425	425	100	500
CinHPress (PSI)	Cut in discharge pressure	200	200	325	325	100	500
HpressSetP (PSI)	Condenser PWM pressure setpoint	200	200	225	225	100	500
Cond.Start (PSI)	Condenser Fan Start Pressure.	170	170	190	190	120	250
Cond.Spd. (%PWM)	PWM normal speed	30	30	30	30	10	50

3.13) Bluetooth and Mobile Application

The Bluetooth Low Energy (BLE) interface is connectable using modern IOS phones. With the mobile app it is possible to turn ON/OFF the system, start manual defrost, adjust setpoint and monitor information like temperature, pressure, input and outputs, failures and etc. The name used by the controller to inform its presence in the wireless medium is called advertising name and can be searched by Bluetooth scanners (cell phones, computers and other BLE devices scanning for advertising names). After connection, the name appears on the top of the users app.

Instructions for changing advertising name:

The advertising name is randomly generated after the first power up on the control. However, if it is desired to change the name into something more meaningful or more easily identified, for example changing “ATC 50 78 93” to “Georges Truck”, the user can follow the instructions below.

Contact ATC for information on changing the advertising name for the M910207 controller.

Note:

After a manual name change occurs the Bluetooth address will randomly be redefined. This means the user must manually reconnect to the controller whenever they change the advertising name.

If the mobile app functionality is desired, the ATC mobile app can be downloaded in the IOS Appstore. However, the user must enable the **BT Mod.** parameter, because as shown in tables **3.4.1** and **3.4.2,** by default it is disabled. When Bluetooth functionality is enabled, the user will observe a Bluetooth icon on the screen. This icon will continuously blink If Bluetooth is enabled but not connected to a mobile device, whereas it will be solid once connected to a mobile phone through the ATC mobile app. Lastly, as observed on first start-up, the Bluetooth icon is not present if the **BT Mod.** parameter is set to disabled.

For more information on the mobile app and its features refer to the **“ATC Mobile Application Guide”**

4) OPERABILITY

- This controller can operate from -40C to 80C
- This controller operates under nominal voltages 12 VDC and 24 VDC
- In continuous operation, controller should operate under voltage range from 10VDC to 30 VDC, preserving the integrity of all functions
- The electronics should withstand 32 VDC for 5 minutes without being permanently damaged
- The control circuit should withstand -12VDC/-24 VDC polarity reversal for an indefinite period without being permanently damaged

5) FCC/ICES INFORMATION

- This device must be installed to provide a separation distance of at least 20 cm from all persons, and must not be co-located or operation in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product guidelines. Approved for OEM integration only. The grantee must provide OEM integrators, or end-users if marketed directly to end-users, with installation and operating instructions for satisfying FCC multi-transmitter product guidelines. This grant is valid only when the device is sold OEM integrators and the OEM integrators are instructed to ensure that the end user has no manual instructions to remove or install the device.
- This device incorporates a module with FCC ID: S9NSPBTLERF
- This device incorporates a module with IC: 8976C-SPBTLERF

6) REVISON HISTORY

REV	Date	Description	Author

7) NOTES