FUJITSU AIRSTAGE

V-Series
J-Series

APPLICATION BULLETIN

Form # A20250124A January 24th, 2025

Subject: Airstage VRF Auxiliary Heat Control Settings for ARUX**TLAV2 MPAHU (R-410a ONLY)

Introduction:

This bulletin provides supplemental instruction for required indoor and outdoor unit unction setting configurations, when installing the UTZ-EU**M Series electric heat kits, used exclusively with R-410a, ARUX18-60TLAV2 Airstage multi-position, ducted VRF air handling units. For a complete description of UTZ-EU**M electric heater installation and auxiliary heat configuration settings, please refer to the ARUX**TLAV2 indoor unit Installation Manual, outdoor unit Installation Manual and VRF Design and Technical Manuals.

IMPORTANT! Use of the UTZ-EU****** Heater Kits requires:

1. Function settings– Check and adjustment function settings in both indoor unit and outdoor units depending upon the desired auxiliary heat control strategy. Function settings are explained, commencing on p. 2.
2. DIP switch setting check on the ARUX**TLAV2 indoor unit PCB. See p. 17. Default DIP switch settings may be used but should be confirmed.

Discussion:

External output description

ARUX**TLAV2 VRF ducted units provide (2) low voltage, external outputs that are used to control UTZ-EU**M series electric heater operation. The auxiliary heat setting functions are highly configurable to meet most any supplemental, emergency heat and defrost sequence requirements.

The ARUX auxiliary heat control outputs connections are made using the provided Heater Kit cable, with outputs identified as:

- Stage 1 (Heater 1) – 24 VAC from PCB connector CN112, pins 1 & 3.
- Stage 2 (Heater 2) - 12 VDC from PCB connector CNB01, pins 1 & 4. (UTY-XWZXZC cable accessory is provided and pre-wired)

NOTE– 2-stage UTZ-EU*****2 electric heater kit models include the 12 volt DC relay used for 2nd heater stage operation.

Auxiliary heat operation strategies

Indoor unit function settings, accessed via the Remote Control or "Service Tool" software, are used to configure auxiliary heat operation. There are many auxiliary heat control options available. In summary, auxiliary heat control for supplemental operation may be configured to operate in one of several patterns as described in the ARUX**TLAV2 Installation Manual function setting 61. The patterns can be described as:

- Demand based only– Difference between the heat setpoint and room temperature.
- Heat pump prohibition- Heat in provided from the auxiliary source only, no heat pump operation.
- Auxiliary heat lockout– An outdoor air temperature is referenced to prevent auxiliary heat operation regardless of demand, when the outdoor air is above the adjustable temperature setting. (as determined by the outdoor unit temperature sensor) This feature may be used when a "balance point" temperature is desired to minimize auxiliary heat use. This setting also allows an optional outdoor unit lockout temperature where only the auxiliary heat will operate below an adjustable outdoor air temperature.
- Auxiliary heat pump control– Same as "Balance point" explanation above, except the staging is reversed; auxiliary heat is primary and the heat pump is the secondary source. (This configuration is not explained in this document.)

Note: To advance directly to the initial auxiliary heat setup table, click HERE or go to section 2 on p. 4.

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I. Indoor unit function settings- The following "Function setting" explanations are referenced from the ARUX**TLAV2 Installation Manual and the VRF Design & Technical Manuals. Default settings are outlined in a red square for reference.

1. Function Setting 60- "Switching functions for external inputs and external outputs"

- UTZ-EU*****- Single stage heater– 60-00 (default setting)
- UTZ-EU*****2- Two stage heater– 60-10 (options– 60-11, 60-12, if other functions are required)

Setting 60 is used to determine how the ARUX PCB external outputs are used for auxiliary heater control. This setting also defines various other input and output functions which can be disregarded for auxiliary heat operation discussion purposes in this document. Use ONLY the factory provided connectors for heater stage control below.

IMPORTANT– Please see notes below regarding ARUX PCB CNB01 "External output" use for the UTZ-EU*** Heater Kits:

- Output 4 Pins 1-5- "External heater output" - DO NOT USE for UTZ-EU***** Heater Kit control.
- Output 3 Pins 1-4- "External heater 2 output" - Used with UTZ-EU*****2 stage Heater Kits ONLY.

Function setting	Situation	External input		External output			
		CNA01 CNA02	CNA03 CNA04	CNB01			
		EXT. IN1	EXT. IN2	Output 1 Pins 1-2	Output 2 Pins 1-3	Output 3 Pins 1-4	Output 4 Pins 1-5
60-00	Thermostat off by external input	Operation/ Stop (46-00) or Emergency stop (46-01) or Forced stop (46-02)	Forced thermostat off	Operation status	Error status	Indoor unit fan operation status	External heater output
60-01	Fresh air conditioner for external control module		VRF cooling off	Cooling thermostat on	Error status	Indoor unit fan operation status	External heater output
60-02	Economizer 1 Cooling 1 output		Forced thermostat off	Cooling thermostat on	Error status	Remote controller output	External heater output
60-03	Economizer 2 Cooling 2 output Nothing error output		VRF cooling on	Cooling thermostat on	Cooling HIGH/LOW output	Remote controller output	External heater output
60-04	Economizer 3 Cooling 2 output Nothing heater output		VRF cooling on	Cooling thermostat on	Error status	Remote controller output	Cooling HIGH/LOW output
60-05	Humidifier 1 Nothing operation status output		Forced thermostat off	Heating thermostat on	Error status	Indoor unit fan operation status	External heater output
60-06	Humidifier 2 Nothing heater output		Forced thermostat off	Operation status	Error status	Indoor unit fan operation status	Heating thermostat on
60-07	Humidifier 3 + Fresh air conditioner for external module		VRF cooling off	Cooling thermostat on	Error status	Heating thermostat on	External heater output
60-08	Humidifier 4 + Economizer 1		Forced thermostat off	Cooling thermostat on	Heating thermostat on	Remote controller output	External heater output
60-10	Thermostat off by external input Heater 2 output		Forced thermostat off	Operation status	Error status	External heater 2 output	External heater 1 output
60-11	Ventilation Heater 2 output		Forced thermostat off	Indoor unit fan operation status	Error status	External heater 2 output	External heater 1 output
60-12	Humidifier Heater 2 output		Forced thermostat off	Heating thermostat on	Indoor unit fan operation status	External heater 2 output	External heater 1 output

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1.1. UTZ-EU*****2- Two stage heater control connection notes:

a. See Fig. 1– Connect the provided UTY-XWZXZC cable to ARUX PCB CNB01.

b. See Figures. 2 & 3– Confirm pins 1 & 4 are prewired to the 12 VDC relay coil in the UTZ heater control box. The relay coil is not polarity sensitive.

d. Confirm all unused UTY-XWZXZC connector leads are capped to avoid accidental grounding.

Fig. 1.

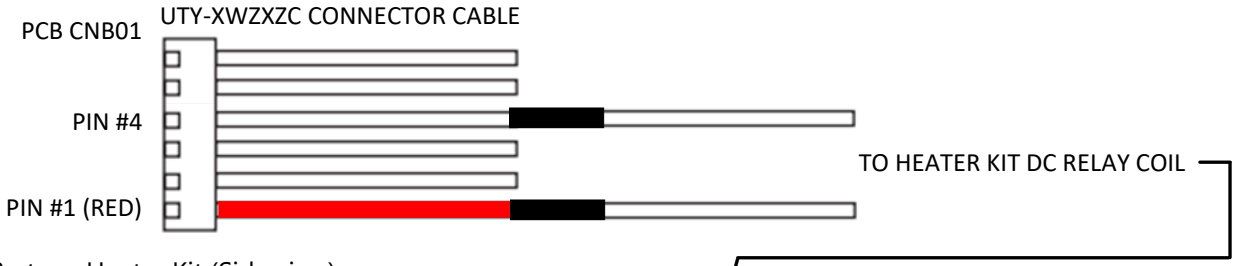
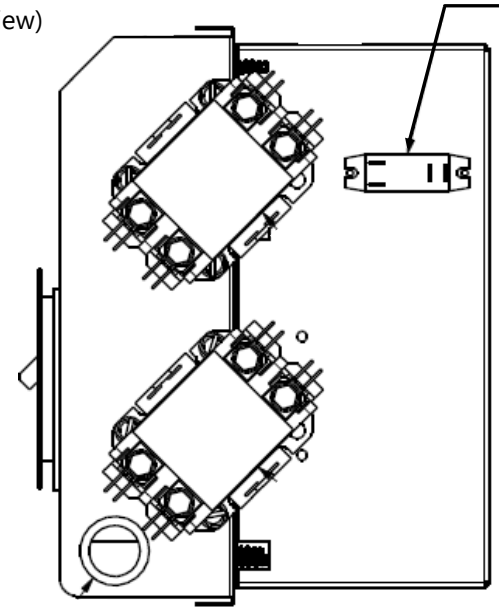


Fig. 2. 2-stage Heater Kit (Side view)

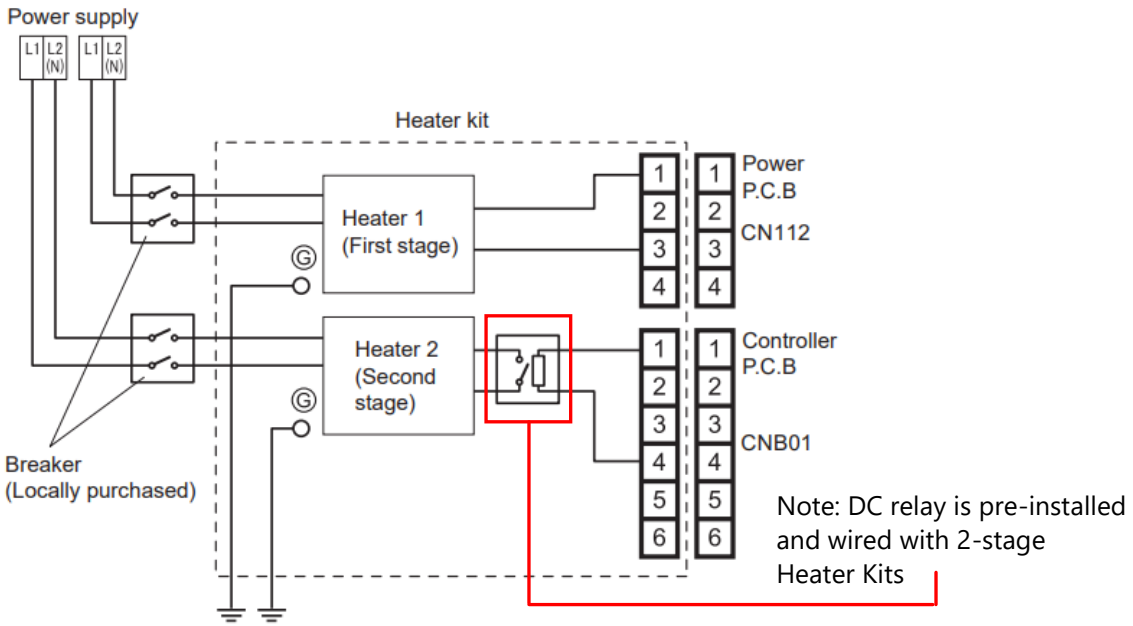


2nd stage (Heater 2):

The 12 VDC relay is pre-installed and wired in all 2-stage Heater Kits.

See note 1.1b and c. above to confirm.

Fig. 3. Typical UTZ** 2-stage Heater Kit connection diagram



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2. Function Setting 61- "Switching functions for external inputs and external outputs"

- UTZ-EU*****- Single stage heater– 61-01 (ARUX series default setting)

Setting 61 assigns the auxiliary heat control strategy, such as providing options of adding an outdoor temperature balance point and/or low ambient heat pump lockout. The default setting for ARUX models of 61-01 may be used, or changed based upon a desired auxiliary heat operation sequence.

- 61-00- "Auxiliary heater control 1"- This setting assigns the heat pump as the primary heat source, with auxiliary heat operation based upon the difference between the heat setpoint and room temperature.

  IMPORTANT! The 61-00 setting option will lock out auxiliary heat operation if the room temperature is ≤ 21.6° from setpoint (21.6° below room temp.) . This setting is generally not recommended for North American use.

- 61-01- "Auxiliary heater control 2"- (ARUX series default setting) This setting option is identical to "Auxiliary heater control 1" above, except the setpoint differential lockout which 61-00 has for auxiliary heat operation is not used.

  Note- See IDU function setting 62 for the auxiliary heat ON and OFF temperatures when using function 61-00, 61-01, 61-03 through 61-05.

- 61-02– Heat pump prohibition control– This setting provides heating exclusively from the auxiliary heat source, and heat pump operation is locked out. Setting 61-02 is intended for other auxiliary heat types (hydronic, baseboard, external duct heaters, etc.) and is not recommended for ARUX indoor unit and UTZ Heater Kit use.

Function	Function number	Setting number		Default	Details
Control switching of external heaters	61	00	Auxiliary heater control 1		Sets the control method for the external heater being used. For details of the control method, refer to the Design & Technical manual.
		01	Auxiliary heater control 2	○	Default setting for ARUX MPAHU
		02	Heat pump prohibition control		
		03	Heater selection control using outdoor temperature 1		
		04	Heater selection control using outdoor temperature 2		
		05	Auxiliary heater control by outdoor temperature 3		
		06	Auxiliary heat pump control		
		07	Auxiliary heat pump control by outdoor temperature 1		
		08	Auxiliary heat pump control by outdoor temperature 2		
		09	Auxiliary heat pump control by outdoor temperature 3		

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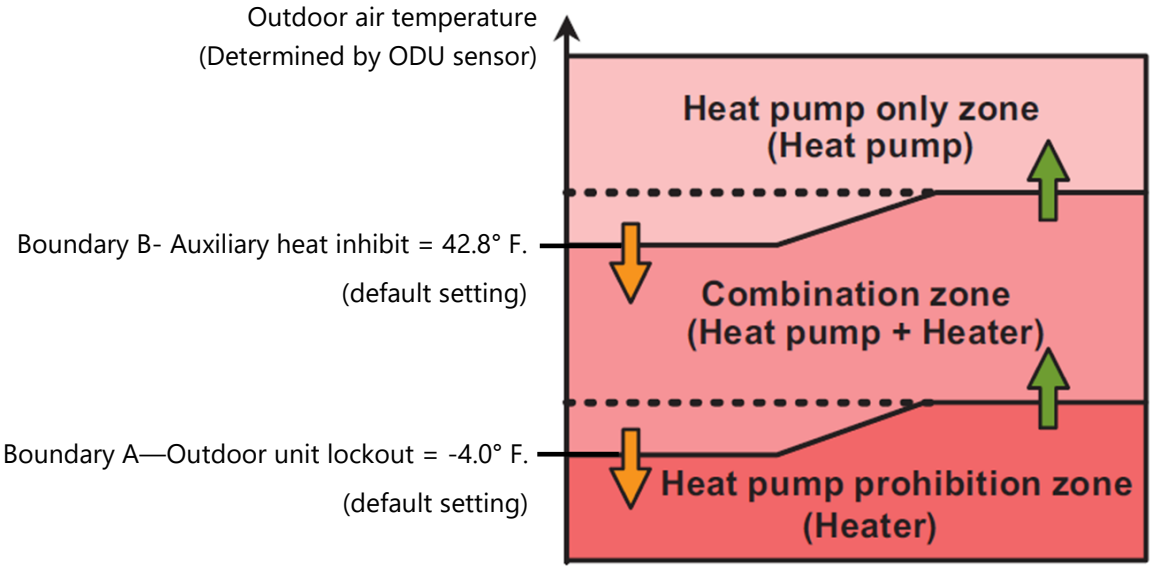
- 61-03- "Auxiliary heater control by outdoor temperature 1"- This setting provides both an outdoor air temperature balance point and low ambient heat pump lockout. See image below.

  ◊ Balance point- "Boundary B"- Auxiliary heater operation is not permitted, regardless of demand, when the outdoor temperature is above the default (42.8° F.) or adjustable setting. This setting may be used when a calculated or arbitrary "balance point" temperature is desired to inhibit auxiliary heat operation above this setting.

  "Boundary B" outdoor air temperature settings are adjustable via outdoor unit function setting 37. See p. 16 or the outdoor unit Installation Manual for available balance point temperature selection options.

  Example: Auxiliary heat enable- Referencing the Fig. 4 default "Boundary B" outdoor air temperature of 42.8° F., the auxiliary heat will not be allowed to energize until BOTH conditions are met:

  1. The outdoor air temperature (as sensed by the ODU air thermistor) is BELOW 42.8° F.
  2. Heat demand– Based upon difference between heat setpoint compared to room temperature.



  ◊ Low ambient lockout (Heat pump prohibition zone)- "Boundary A"- When the outdoor air temperature is below this setting, heating operation from the outdoor unit will stop. Heating will be provided exclusively from the auxiliary heat source, as outdoor unit operation is locked out until the outdoor air temperature rises 3.6° F. above the Boundary A temperature setting. (The 3.6° F. differential is not adjustable.)

  IMPORTANT: "Boundary A" outdoor air temperature settings are adjustable via outdoor unit function setting 36. See p. 15 or the outdoor unit Installation Manual for available low ambient lockout setting temperatures.

  Example: Outdoor unit OFF- Referencing the Fig. 4 default "Boundary A" outdoor air temperature of –4.0° F., the outdoor unit will be locked out and heating will be provided by the auxiliary source only. The outdoor unit will resume operation when:

  1. The outdoor air temperature (sensed by the ODU air thermistor) is Boundary A setting + 3.6 ° F. ≥ 0.4° F. (-4.0° + 3.6° = -0.4° F., referencing the default function setting 36 value)

IMPORTANT! When selecting 61-03:

1. OUTDOOR UNIT function setting 35 **MUST BE CHANGED.** See p. 15, "Outdoor unit function settings" for details. Balance point and ODU lockout temperatures are sensed by the outdoor units outdoor air temperature sensor (thermistor).
2. Boundary B– "Heat pump only" zone. Outdoor air temperature above this value will not allow auxiliary heat operation regardless of RC heat setpoint setting.
3. Boundary A- "Heat pump prohibition zone". Outdoor air temperature below this value will not allow the heat pump to operate. All heating is performed by the auxiliary heat source.

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- 61-04- "Auxiliary heater control by outdoor temperature 2"- This setting provides a low ambient heat pump lockout only; no outdoor air temperature restriction is imposed for auxiliary heat operation. See image below.

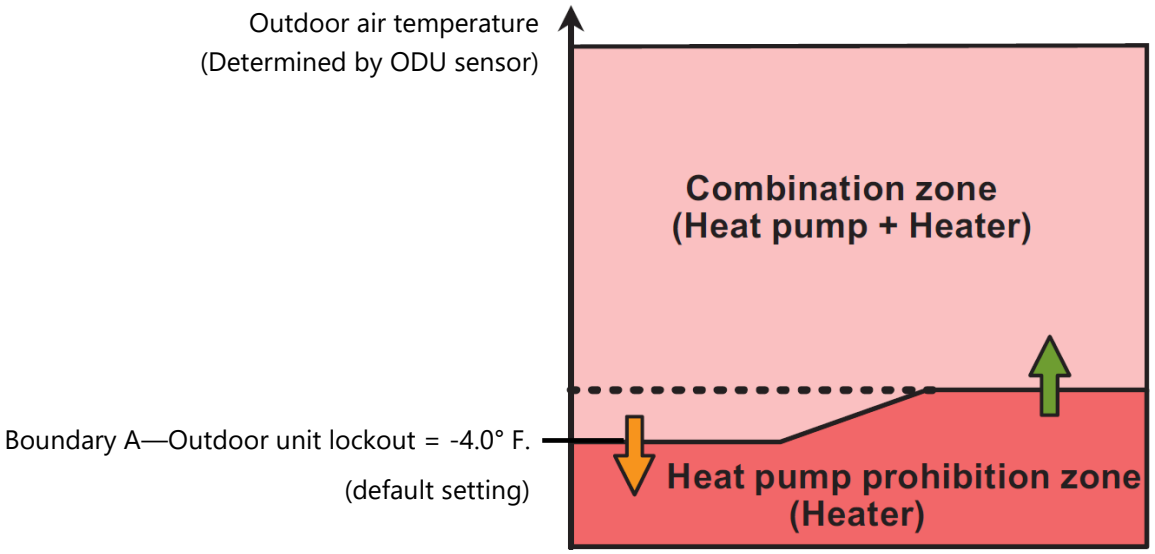
  ◊ "Combination zone"- Auxiliary heater operation is determined upon difference between heat setpoint compared to room temperature, as set from indoor unit function 62.

  ◊ Low ambient lockout (Heat pump prohibition control)- "Boundary A"- When the outdoor air temperature is below this setting, heating operation from the outdoor unit will stop. Heating will be provided exclusively from the auxiliary heat source, as outdoor unit operation is locked out until the outdoor air temperature rises 3.6° F. above the Boundary A temperature setting. (The 3.6° F. differential is not adjustable.)

  IMPORTANT: "Boundary A" outdoor air temperature settings are adjustable via outdoor unit function setting 36. See p. 15 or the applicable outdoor unit Installation Manual for low ambient lockout setting temperatures.

  Example: Outdoor unit OFF- Referencing the below image, if the outdoor air temperature is less than the (default) "Boundary A" outdoor air temperature of –4.0° F., the outdoor unit will be locked out and heating will be provided by the auxiliary source only. The outdoor unit will resume operation when:

  1. The outdoor air temperature (sensed by the ODU air thermistor) is Boundary A setting + 3.6 ° F. ≥ 0.4° F. (-4.0° + 3.6° = -0.4° F., referencing the default function setting 36 value)



IMPORTANT! When selecting 61-04:

1. OUTDOOR UNIT function setting 35 **MUST BE CHANGED.** See p. 15, "Outdoor unit function settings" for details. ODU lockout (Heat pump prohibition zone) temperatures are sensed by the outdoor units outdoor air temperature sensor (thermistor).
2. Boundary A- "Heat pump prohibition zone". Outdoor air temperature below this value will not allow the heat pump to operate. All heating is performed by the auxiliary heat source.

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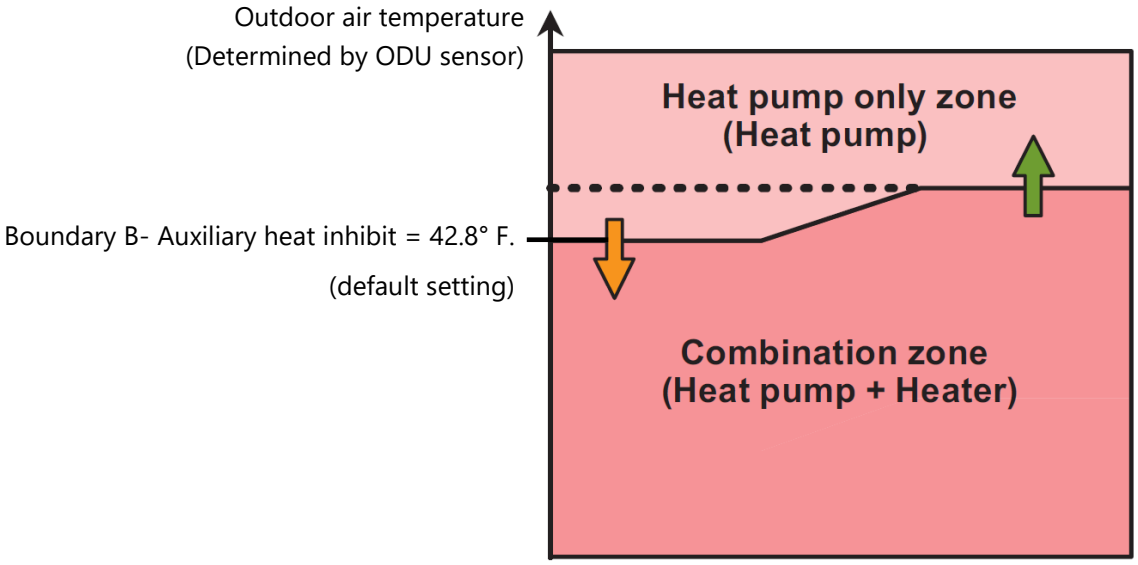
- 61-05- "Auxiliary heater control by outdoor temperature 3"- This setting provides an outdoor air temperature inhibit (lockout) for auxiliary heat operation. See image below.

  ◊ Balance point- "Boundary B"- Auxiliary heater operation is not permitted, regardless of demand, when the outdoor temperature is above the default (42.8° F.) or adjustable setting.

  "Boundary B" outdoor air temperature settings are adjustable via outdoor unit function setting 37. See p. 16 or the applicable outdoor unit Installation Manual for available auxiliary heat inhibit temperature selection options.

  Example: Auxiliary heat enable- Referencing the below image, if the outdoor air temperature is greater than the (default) "Boundary B" outdoor air temperature of 42.8° F., the auxiliary heat will not be allowed to energize until BOTH conditions are met:

  1. The outdoor air temperature (as sensed by the ODU air thermistor) is BELOW 42.8° F.
  2. Heat demand– Based upon difference between heat setpoint compared to room temperature. Note– See function setting 62 to determine auxiliary heat ON and OFF conditions.



  Heat pump only zone– Once the outdoor air temperature falls below the Boundary B setting, the auxiliary heat inhibit (heat pump only zone) will not be enabled until the outdoor air temperature rises 3.6° F., from this setting. (The 3.6° F. differential is not adjustable.) For example, once Boundary B is enabled, the heat pump only zone will not be allowed until the outdoor air temperature reaches 46.4° F. (42.8° + 3.6° F.) using the default setting.

- 61-06 through 61-09- "Auxiliary heat pump control" options. These settings provide a sequence where the Heater Kit is the primary heat source, with the heat pump as secondary. The ARUX**TLAV2 function settings 61-06 though 61-09 are not discussed in this bulletin; please refer to the applicable version of the J-Series or V-Series VRF outdoor unit Design & Technical Manual for these auxiliary heat pump control options.

  IMPORTANT! When selecting 61-05:

  1. OUTDOOR UNIT function setting 35 **MUST BE CHANGED.** See p. 15, "Outdoor unit function settings" for details. Balance point and ODU lockout temperatures are sensed by the outdoor unit outdoor air temperature sensor (thermistor).
  2. Boundary B– "Heat pump only" zone. Outdoor air temperature above this value will not allow auxiliary heat operation regardless of RC heat setpoint setting.

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3. Function Setting 62- "Operating temperature switching of external heaters (external heater 1)"

1st stage auxiliary heat (Heater 1) only- The purpose of ARUX**TLAV2 function setting 62 is to assign the UTZ-EU***** first stage electric heat ON and OFF differential temperature. The values are temperature differentials from the heat setpoint.

NOTE– Using the default ARUX function settings of 61-01 and 62-00, the result will cycle the auxiliary heater ON and OFF at the same time as the compressor:

- Auxiliary heat ON– (Heat setpoint - 0.9° F.)
- Auxiliary heat OFF– (Heat setpoint + 0.9° F.)

Changing the Heater Kit first stage ON and OFF temperatures:

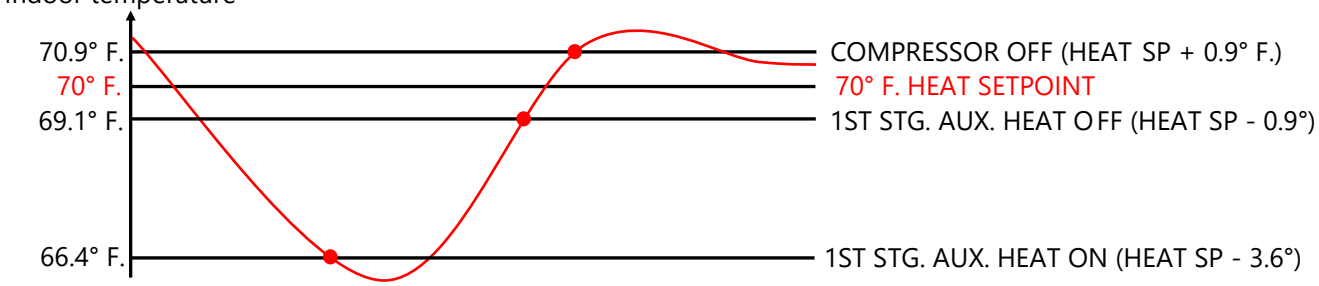
The electric heat ON and OFF temperatures may be adjusted as needed. Please note the 1st stage heater ON and OFF temperature selection columns used for function 62 are determined by the function 61 setting. When using the default ARUX function setting 61-01, or any adjusted 61 value from 61-02 to 61-09, use the heater ON and OFF temperatures in the "01 to 09" columns.

Operating temperature switching of external heaters (external heater 1)	62	00	Setting 0	○
		01	Setting 1	
		02	Setting 2	
		03	Setting 3	
		04	Setting 4	
		05	Setting 5	
		06	Setting 6	
		07	Setting 7	
		08	Setting 8	
		09	Setting 9	
		10	Setting 10	
		11	Setting 11	
		12	Setting 12	
		13	Setting 13	
		14	Setting 14	
		15	Setting 15	
		16	Setting 16	
		17	Setting 17	

Set value of function: 62	Set value of function: 61 — 00 ON	00 OFF	01 to 09 ON	01 to 09 OFF
00	~~t < -5.4°F (-3°C)~~	~~t ≥ -1.8°F (-1°C)~~	t ≤ -0.9°F (-0.5°C)	t ≥ +0.9°F (+0.5°C)
01	t < -3.6°F (-2°C)	t ≥ -1.8°F (-1°C)	t ≤ -1.8°F (-1°C)	t ≥ +0.9°F (+0.5°C)
02	t < -3.6°F (-2°C)	t ≥ -1.8°F (-1°C)	t ≤ -3.6°F (-2°C)	t ≥ +0.9°F (+0.5°C)
03	t < -5.4°F (-3°C)	t ≥ -1.8°F (-1°C)	t ≤ -5.4°F (-3°C)	t ≥ +0.9°F (+0.5°C)
04	t < -7.2°F (-4°C)	t ≥ -1.8°F (-1°C)	t ≤ -7.2°F (-4°C)	t ≥ +0.9°F (+0.5°C)
05	t < -9.0°F (-5°C)	t ≥ -1.8°F (-1°C)	t ≤ -9.0°F (-5°C)	t ≥ +0.9°F (+0.5°C)
06	t < -5.4°F (-3°C)	t ≥ -0.9°F (-0.5°C)	t ≤ -0.9°F (-0.5°C)	t ≥ 0°F (0°C)
07	t < -3.6°F (-2°C)	t ≥ -0.9°F (-0.5°C)	t ≤ -1.8°F (-1°C)	t ≥ 0°F (0°C)
08	t < -3.6°F (-2°C)	t ≥ -0.9°F (-0.5°C)	t ≤ -3.6°F (-2°C)	t ≥ 0°F (0°C)
09	t < -5.4°F (-3°C)	t ≥ -0.9°F (-0.5°C)	t ≤ -5.4°F (-3°C)	t ≥ 0°F (0°C)
10	t < -7.2°F (-4°C)	t ≥ -0.9°F (-0.5°C)	t ≤ -7.2°F (-4°C)	t ≥ 0°F (0°C)
11	t < -9.0°F (-5°C)	t ≥ -0.9°F (-0.5°C)	t ≤ -9.0°F (-5°C)	t ≥ 0°F (0°C)
12	t < -5.4°F (-3°C)	t ≥ 0°F (0°C)	t ≤ -0.9°F (-0.5°C)	t ≥ -0.9°F (-0.5°C)
13	t < -3.6°F (-2°C)	t ≥ 0°F (0°C)	t ≤ -1.8°F (-1°C)	t ≥ -0.9°F (-0.5°C)
14	t < -3.6°F (-2°C)	t ≥ 0°F (0°C)	t ≤ -3.6°F (-2°C)	t ≥ -0.9°F (-0.5°C)
15	t < -5.4°F (-3°C)	t ≥ 0°F (0°C)	t ≤ -5.4°F (-3°C)	t ≥ -0.9°F (-0.5°C)
16	t < -7.2°F (-4°C)	t ≥ 0°F (0°C)	t ≤ -7.2°F (-4°C)	t ≥ -0.9°F (-0.5°C)
17	t < -9.0°F (-5°C)	t ≥ 0°F (0°C)	t ≤ -9.0°F (-5°C)	t ≥ -0.9°F (-0.5°C)

Example:

- 61-01
- 62- Change heater ON and OFF temperatures to function 62-14:



IMPORTANT! 2 stage Heater Kits– When using any of the UTZ-EU*****2, two-stage Heater Kits, see indoor unit function setting 77 description on the next page to determine 2nd stage ON and OFF temperatures.

- 61-00– When using any UTY-EU*****2, two-stage Heater Kit, if setting value 61-00 is used, both auxiliary heat stages will energize and de-energize simultaneously. (F 77 value will be 0° F.)

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4. Function Setting 77- "Operating temperature switching of external heaters (external heater 2)"

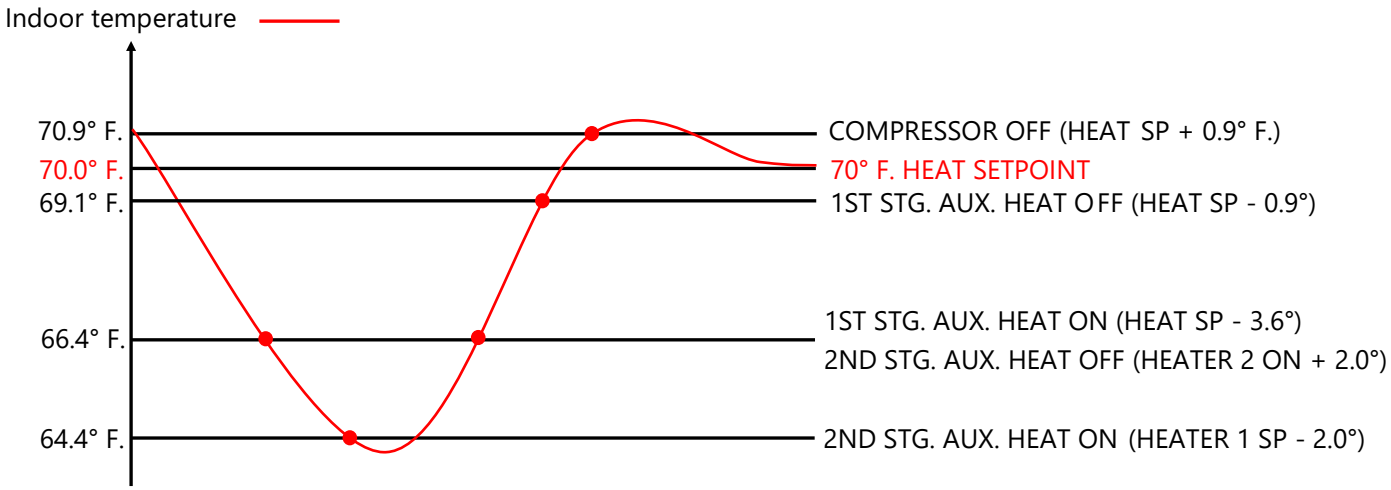
2nd stage auxiliary heat (Heater 2) only- The purpose of ARUX**TLAV2 function setting 77 is to assign the UTZ-EU*****2, second stage electric heat ON and OFF differential temperature. This value is a differential temperature, subtracted from the 1st heater stage ON temperature as assigned using function 62.

		Set value of function: 61	
		00	01 to 09
Set value of function: 77	00	0°F (0°C)	0°F (0°C)
	01		1°F (0.5°C)
	02		2°F (1.0°C)
	03		3°F (1.5°C)
	04		4°F (2.0°C)

Set value of function: 62	Set value of function: 61			
	00		01 to 09	
	ON	OFF	ON	OFF
00	t < -5.4°F (-3°C)	t ≥ -1.8°F (-1°C)	t ≤ -0.9°F (-0.5°C)	t ≥ +0.9°F (+0.5°C)
01	t < -3.6°F (-2°C)	t ≥ -1.8°F (-1°C)	t ≤ -1.8°F (-1°C)	t ≥ +0.9°F (+0.5°C)
02	t < -3.6°F (-2°C)	t ≥ -1.8°F (-1°C)	t ≤ -3.6°F (-2°C)	t ≥ +0.9°F (+0.5°C)
03	t < -5.4°F (-3°C)	t ≥ -1.8°F (-1°C)	t ≤ -5.4°F (-3°C)	t ≥ +0.9°F (+0.5°C)
04	t < -7.2°F (-4°C)	t ≥ -1.8°F (-1°C)	t ≤ -7.2°F (-4°C)	t ≥ +0.9°F (+0.5°C)
05	t < -9.0°F (-5°C)	t ≥ -1.8°F (-1°C)	t ≤ -9.0°F (-5°C)	t ≥ +0.9°F (+0.5°C)
06	t < -5.4°F (-3°C)	t ≥ -0.9°F (-0.5°C)	t ≤ -0.9°F (-0.5°C)	t ≥ 0°F (0°C)
07	t < -5.4°F (-3°C)	t ≥ -0.9°F (-0.5°C)	t ≤ -1.8°F (-1°C)	t ≥ 0°F (0°C)
08	t < -3.6°F (-2°C)	t ≥ -0.9°F (-0.5°C)	t ≤ -3.6°F (-2°C)	t ≥ 0°F (0°C)
09	t < -5.4°F (-3°C)	t ≥ -0.9°F (-0.5°C)	t ≤ -5.4°F (-3°C)	t ≥ 0°F (0°C)
10	t < -7.2°F (-4°C)	t ≥ -0.9°F (-0.5°C)	t ≤ -7.2°F (-4°C)	t ≥ 0°F (0°C)
11	t < -9.0°F (-5°C)	t ≥ -0.9°F (-0.5°C)	t ≤ -9.0°F (-5°C)	t ≥ 0°F (0°C)
12	t < -5.4°F (-3°C)	t ≥ 0°F (0°C)	t ≤ -0.9°F (-0.5°C)	t ≥ -0.9°F (-0.5°C)
13	t < -3.6°F (-2°C)	t ≥ 0°F (0°C)	t ≤ -1.8°F (-1°C)	t ≥ -0.9°F (-0.5°C)
14	t < -3.6°F (-2°C)	t ≥ 0°F (0°C)	t ≤ -3.6°F (-2°C)	t ≥ -0.9°F (-0.5°C)
15	t < -5.4°F (-3°C)	t ≥ 0°F (0°C)	t ≤ -5.4°F (-3°C)	t ≥ -0.9°F (-0.5°C)
16	t < -7.2°F (-4°C)	t ≥ 0°F (0°C)	t ≤ -7.2°F (-4°C)	t ≥ -0.9°F (-0.5°C)
17	t < -9.0°F (-5°C)	t ≥ 0°F (0°C)	t ≤ -9.0°F (-5°C)	t ≥ -0.9°F (-0.5°C)

Example: Heat setpoint 70° F.

- Function 62-14
  - ◊ 1st stage heat (62-14)
    - ♦ ON = 66.4° F. (70° - 3.6° F.)
    - ♦ OFF = 69.1° F. (70° - 0.9° F.)
- Function 77-02
  - ◊ 2nd stage heat (77-02)
    - ♦ ON = 64.4° F. (66.4° - 2.0° F.)
    - ♦ OFF = 66.4° F. (HEATER 2 ON + 2.0° F.)



Subject: Airstage VRF Auxiliary Heat Control Settings for ARUX**TLAV2 MPAHU

5. Function Setting 68- "Auto mode type"

- Single setpoint auto mode (traditional)– 68-00 (default setting)

Setting 68 is not related to ARUX auxiliary heat operation, however is useful when using dual setpoint capable Fujitsu controls, such as the Kagami and UTY-RNRUZ5 series Remote Controls. When leaving the default settings, only a single setpoint can be used for both heating and cooling operation modes. For example, if the setpoint is 70° F., this will be used as both heating and cooling setpoint.

Generally, when using a Fujitsu Remote Control capable of supporting dual setpoints for an auto mode, it is recommended to change the default setting to option 68-01 for "Dual setpoint mode".

Auto mode type (*3)	68	00	Single setpoint auto mode (traditional)	○	• Switch the setting method of auto mode to single or dual (cooling/heating). • For heat pump systems, it is necessary to set the master indoor unit (by wired remote controller).
		01	Dual setpoint auto mode		

6. Function Setting 69- "Deadband value"

- 0° deadband– 69-00 (default setting)

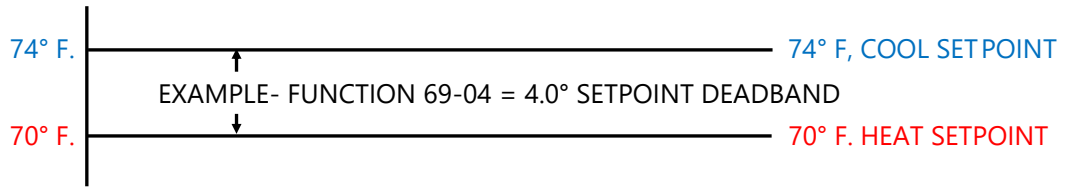
Setting 69 assigns the minimum allowable difference between heating and cooling setpoint temperatures, when using a Fujitsu Remote Control or Central Controller. This setting limits the setpoint deadband only and does NOT define the actual mode changeover temperatures. The "Dual setpoint mode" from function 68 must be set in order to use function 69 for the deadband value, and the mode for the system must be "Auto" in order for the deadband to be active.

NOTE- "Auto changover" must be enabled by outdoor unit function setting F2-21 and by assigning an administrative (Master) indoor unit from the RC.

Example:

- Function 69-04 (4° deadband*)
- RC mode- "Auto"
- Heat- If the Heat setpoint is set to 70° F., the minimum COOL setpoint is 74° F. (heat setpoint + 4° F.)
- Cool- If the COOL setpoint is set to 75° F., the maximum HEAT setpoint is 71° F. (heat setpoint - 4° F.)

Deadband value*	69	00	0°F (0°C)	○	Choose the minimum temperature between cooling and heating settings (deadband) for Dual setpoint auto mode (set in No. 68).
		01	1°F (0.5°C)		
		02	2°F (1.0°C)		
		03	3°F (1.5°C)		
		04	4°F (2.0°C)		
		05	5°F (2.5°C)		
		06	6°F (3.0°C)		
		07	7°F (3.5°C)		
		08	8°F (4.0°C)		
		09	9°F (4.5°C)		



* Dual setpoints will not be allowed to be set closer than the selected deadband value.

Subject: Airstage VRF Auxiliary Heat Control Settings for ARUX**TLAV2 MPAHU

7. Function Setting 71- "Standby time for auxiliary equipment operation (external heater 1)"

- Standby time– 71-00 disabled (default setting)

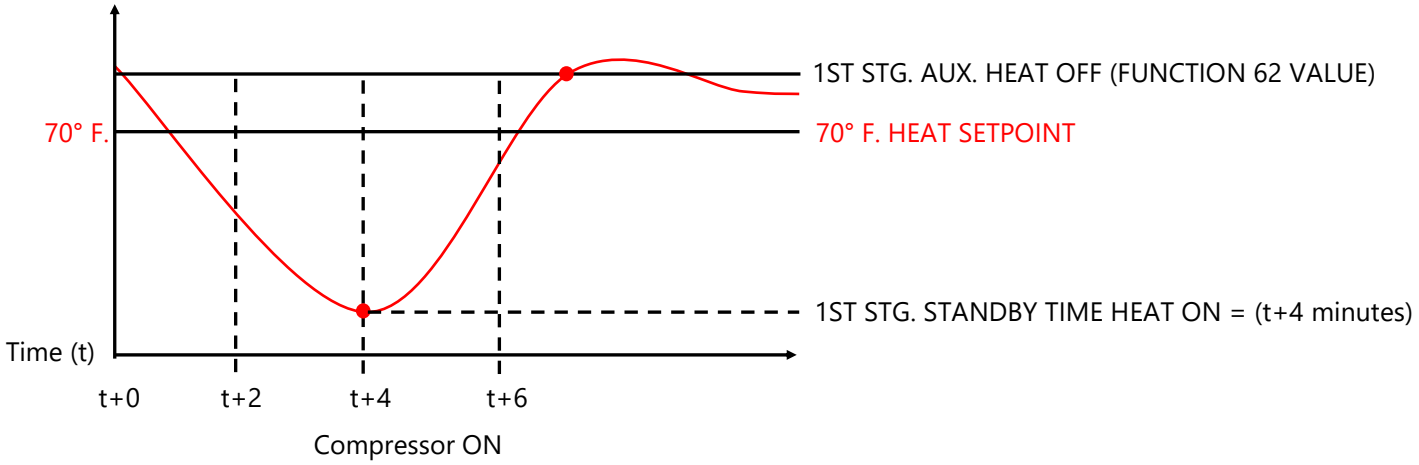
This function setting allows a timed ON delay for 1st stage auxiliary heat operation. The time increment selected will commence when the compressor is turned ON, and reset when the compressor turns OFF. The function option values coincide with the ON delay time, in ascending order from 1 to 99 minutes. When leaving the default setting, the delay is disabled; the heater will operate as per ARUX function 61 and 62 settings.

NOTE– The standby delay setting will override any other auxiliary heater setting, and will energize upon completion of the ON delay, within a compressor cycle. When the compressor is turned OFF, the standby time delay is reset.

Standby Time example:

- 77-04 (4 min.)

Standby time for auxiliary equipment operation (external heater 1)	71	00	Disable	○	Sets the standby time until the auxiliary equipment operation starts during primary equipment operation.
		01	1 minutes		
		02	2 minutes		
		⋮	⋮	⋮	
		98	98 minutes		
		99	99 minutes		



Subject: Airstage VRF Auxiliary Heat Control Settings for ARUX**TLAV2 MPAHU

8. Function setting 73- "Emergency heat"

- Emergency heat mode- 73-00 disabled (default setting)

In the event of a heat pump not being able to operate, the purpose of an emergency heat mode is to allow the user to manually select a mode where heat is provided exclusively from the UTZ-***** electric heater(s). When the "emergency heat" mode is selected, the outdoor unit is prohibited from operating.

Emergency heat	73	00	Disable	○	Enables or disable of emergency heat input.
		01	Enable		

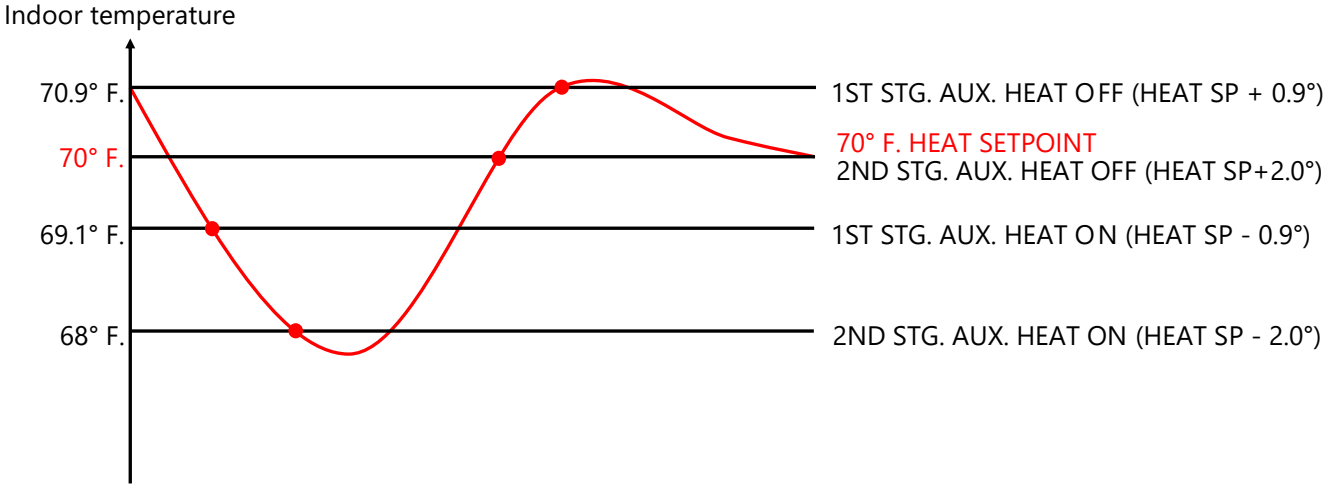
NOTE– In the emergency heat mode, the heating capacity is limited to the kW of the installed heater(s). Depending upon the auxiliary heater selection, this may or may not be able to meet the user expectations for the needed heating capacity. Thus, use of "emergency heat" is only to be used as a temporary measure when compressor operation is not possible.

- 1st stage heat– Function 62 setting is overridden when an emergency heat cycle is selected. 1st stage heater operation is cycled with the fixed temperature conditions of:
  - ◊ ON = Heat SP - 0.9° F.
  - ◊ OFF = Heat SP + 0.9° F.
  - ◊ 71– Heater 1 standby ON setting completion (if used)
- 2nd stage heat– With 2 stage heater kits, the heater second stage will turn ON according to ARUX indoor function:
  - ◊ 77– Heater 2 temperature differential settings (from heat setpoint)
  - ◊ 78- Heater 2 standby time ON setting completion (if used)

Emergency heat mode example, 70° heat setpoint:

- Heater 1 ON = 69.1° F. (70° F. - 0.9° F.)
- Heater 2 ON = 68° F. (70° F. - 2.0° F.)
  - ◊ F77-02

		Set value of function: 61	
		00	01 to 09
Set value of function: 77	00	0°F (0°C)	0°F (0°C)
	01		1°F (0.5°C)
	02		2°F (1.0°C)
	03		3°F (1.5°C)
	04		4°F (2.0°C)



Subject: Airstage VRF Auxiliary Heat Control Settings for ARUX**TLAV2 MPAHU

9. Function Setting 75- "External heater use in defrost "

- Heater use in defrost– 75-00 disabled (default setting)

When the UTZ-***** heater(s) are installed, function 75 provides the option to have the UTZ-EU***** heaters ON during the defrost cycle, tempering the supply air to the conditioned space. By default DIP SW SET2-3 setting, when the system is in defrost, the ARUX fan will remain ON.

External heater use in defrosting. (*4)	75	00	Disable	○	Enables or disables the external heater use in defrosting.
		01	Enable		

NOTES–

- The default setting is deenergized.
- Temperature rise (reheat) during defrost will depend upon the heater kW.

10. Function setting 78- "Standby time for auxiliary equipment operation (external heater 2)"

- Standby time– 78-00 disabled (default setting)

This function setting allows a timed ON delay for 2nd stage auxiliary heat operation. The time increment selected will commence when the compressor is turned ON, and reset when the compressor turns OFF. The function option values coincide with the ON delay time, in ascending order from 1 to 99 minutes. When leaving the default setting, the delay is disabled; the heater will operate as per ARUX function 61 and 62 settings.

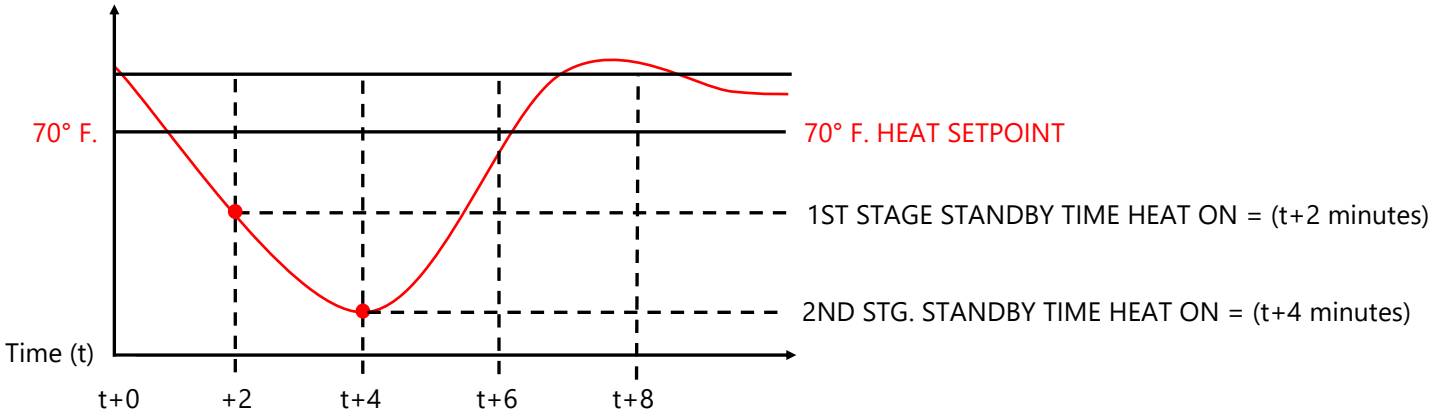
NOTES–

- The standby delay setting will override any other auxiliary heater setting, and will energize upon completion of the ON delay, within a compressor cycle. When the compressor is turned OFF, the standby time delay is reset.
- When other than default settings, the standby delay option settings will not be allowed to overlap, where the 2nd stage heater (Heater 2) could be turned ON before the first stage heater (Heater 1) per function setting 77.

Standby Time example:

- 1st stage - 77-02 (2 min.)
- 2nd stage– 78-04 (4 min.)

Standby time for auxiliary equipment operation (external heater 2)	78	00	Disable	○	Sets the standby time until the auxiliary equipment operation starts during primary equipment operation.
		01	1 minute		
		02	2 minutes		
		⋮	⋮	⋮	
		98	98 minutes		
		99	99 minutes		



Subject: Airstage VRF Auxiliary Heat Control Settings for ARUX**TLAV2 MPAHU

11. Function Setting 79- "Minimum fan speed setting"

- High– 79-01 (default setting)

When the UTZ-EU***** heater(s) are installed, function 79 provides a selectable minimum fan speed for the ARUX air handler any time the auxiliary heater(s) are energized. The table below details approximate temperature rise when the auxiliary heater is operating at LOW and HIGH fan speeds. The table reflects auxiliary heat operation ONLY, and does not include temperature rise from compressor operation.

Minimum fan speed setting	79	00	Disable		• Setting the minimum fan speed when the external heaters are in-lined. • When not using any external heaters or the external heater is not in-line, set to "00: Disable" and set the "DIP switch SET 2 SW3" to "off. Refer to "5.8.2 Indoor unit fan setting for external heater".
		01	High	○	
		02	Med		
		03	Low		

NOTES–

- The default setting is for HIGH fan speed.
- Compatible Heater Kit TD listed at LOW and HIGH CFM; shaded cells indicate incompatible heater kit selections.
- Temperature rise from the Heater Kit table below is from heater operation only; no compressor operation.
- Actual TD will depend upon the heater kW, line voltage, selected minimum fan speed and actual CFM.
- CFM values will vary upon air density and total external static pressure, ESP, "w.g.

AHU model #		ARUX12TLAV2	ARUX18TLAV2	ARUX24TLAV2	ARUX30TLAV2	ARUX36TLAV2	ARUX48TLAV2	ARUX60TLAV2
Heater Kit Model	BTU/h	TD ° F. @ LOW CFM						
UTZ-EU02MSA	6,824	22		12				
UTZ-EU03MMA	10,236		24		13	11		
UTZ-EU04MSA(2)	13,648	44		25				
UTZ-EU05MMA	17,060				22		14	12
UTZ-EU06MMA	20,472		47			22		
UTZ-EU08M*A(2)	27,296			50			22	
UTZ-EU10MLA	34,120				43			24
UTZ-EU12MMA2	40,944					45		
UTZ-EU16MLA2	54,592						45	
UTZ-EU20MLA2	68,240							47
		TD ° F. @ HIGH CFM						
UTZ-EU02MSA	6,824	18		10				
UTZ-EU03MMA	10,236		19		11	9		
UTZ-EU04MSA(2)	13,648	36		19				
UTZ-EU05MMA	17,060				18		11	9
UTZ-EU06MMA	20,472		38			18		
UTZ-EU08M*A(2)	27,296			39			18	
UTZ-EU10MLA	34,120				36			19
UTZ-EU12MMA2	40,944					36		
UTZ-EU16MLA2	54,592						36	
UTZ-EU20MLA2	68,240							37

Subject: Airstage VRF Auxiliary Heat Control Settings for ARUX**TLAV2 MPAHU

II. Outdoor unit function settings- The following "Function setting" explanations are referenced from the J-Series Single Phase outdoor unit Installation Manuals. Default settings are outlined in a red square for reference.

1. Function Setting 35- "Presence of heater selection control using outdoor temperature"

- Invalid– 35-00 (default setting, outdoor air temperature sensor not used for auxiliary heat operation)

Outdoor unit function setting 35 will enable the system to reference the outdoor air temperature sensor in the outdoor unit, when auxiliary heat operation requires an inhibit (lockout) temperature, and/or a low ambient lockout air temperature for the outdoor unit.

Change Function 35 setting option to "01 Valid" any time Indoor Unit function setting 61 is changed to any value that references outdoor temperature:

- 61-03, 61-04, 61-05, 61-07, 61-08, 61-09

35	Presence of heater selection control using outdoor temperature (*1)	Invalid	3	5	0	0	●
		Valid			0	1	
	If "Heater selection control 1 or 2 using outdoor temperature" is used for any of the indoor units of the refrigerant system, select "Valid". For more details on settings for this item, see the Design & Technical manual.						

2. Function Setting 36- "Outdoor temperature zone boundary temperature A"

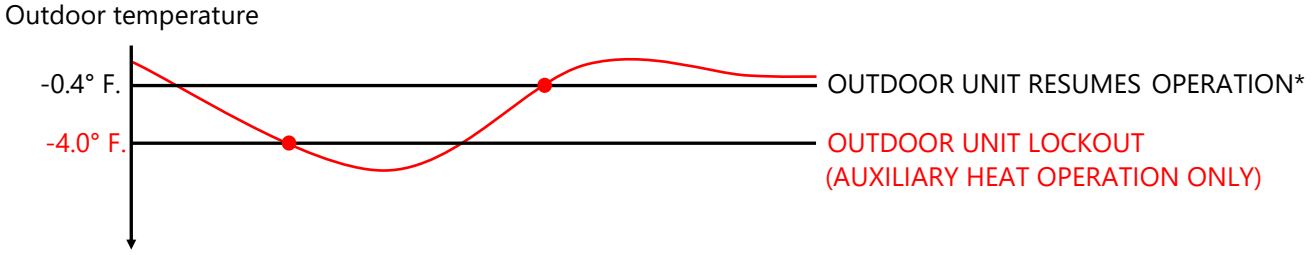
- Outdoor unit lockout air temperature, -4.0° F.– 36-00 (default setting)

Outdoor unit function setting 36 assigns an optional outdoor unit lockout, where heating is provided by the Heater Kit exclusively, any time the outdoor air temperature is below the setting option value. (Compressor operation is not allowed below this outdoor air temperature setting.)

Change Function 35 setting option to "01 Valid" any time Indoor Unit function setting 61 is changed to any value that references outdoor temperature as in Function setting 35 above.

36	Outdoor temperature zone boundary temperature A (*1)	-4.0°F (-20°C)	3	6	0	0	●
		-0.4°F (-18°C)			0	1	
		3.2°F (-16°C)			0	2	
		6.8°F (-14°C)			0	3	
		10.4°F (-12°C)			0	4	
		14.0°F (-10°C)			0	5	
		17.6°F (-8°C)			0	6	
		21.2°F (-6°C)			0	7	
		24.8°F (-4°C)			0	8	
	For more details on settings for this item, see the Design & Technical manual.						

Example– Default Function setting 36-00, -4.0° F.:



*NOTE– The +3.6° F. differential temperature from Function 36 is not adjustable. (e.g. –4.0° + 3.6° = -0.4° F.)

Subject: Airstage VRF Auxiliary Heat Control Settings for ARUX**TLAV2 MPAHU

3. Function Setting 37- "Outdoor temperature zone boundary temperature B"

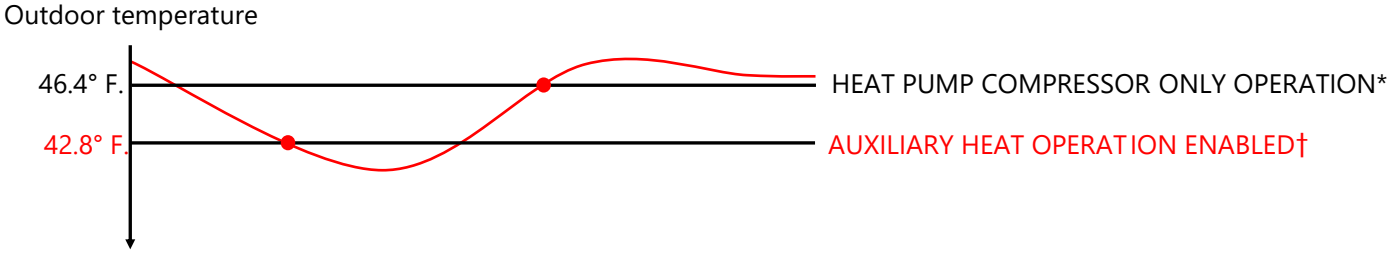
- Outdoor air temperature for auxiliary heat prevention, 42.8° F. – 37-00 (default setting)

Outdoor unit function setting 37 assigns an optional auxiliary heat lockout, where heating is provided by the heat pump (compressor) only, any time the outdoor air temperature is above the setting option value. Auxiliary heat operation is not allowed, regardless of demand, when outdoor air temperature is above this setting.

If a balance point temperature is desired to be used, Function 37 will lockout auxiliary heat operation when the outdoor air temperature is above this setting. This will allow for a higher COP using the heat pump only by preventing auxiliary heat operation regardless of demand, when the outdoor air temperature is above the function 37 setting.

37	Outdoor temperature zone boundary temperature B (*1)	42.8°F (6°C)	3	7	0	0	●
		14.0°F (-10°C)			0	1	
		17.6°F (-8°C)			0	2	
		21.2°F (-6°C)			0	3	
		24.8°F (-4°C)			0	4	
		28.4°F (-2°C)			0	5	
		32.0°F (0°C)			0	6	
		35.6°F (2°C)			0	7	
		39.2°F (4°C)			0	8	
		42.8°F (6°C)			0	9	
		46.4°F (8°C)			1	0	
		50.0°F (10°C)			1	1	
		53.6°F (12°C)			1	2	
		57.2°F (14°C)			1	3	
		60.8°F (16°C)			1	4	
		64.4°F (18°C)			1	5	
	For more details on settings for this item, see the Design & Technical manual.						

Example– Default Function setting 37-00, 42.8° F.:



*NOTE– The +3.6° F. differential temperature from Function 37 is not adjustable. (e.g. 42.8° + 3.6° = 46.4° F.)

† HEATER 1- IDU FUNCTION 62 SETS HEATER 1 ON TEMPERATURE. (RC SETPOINT TO ROOM TEMP DIFFERENTIAL)

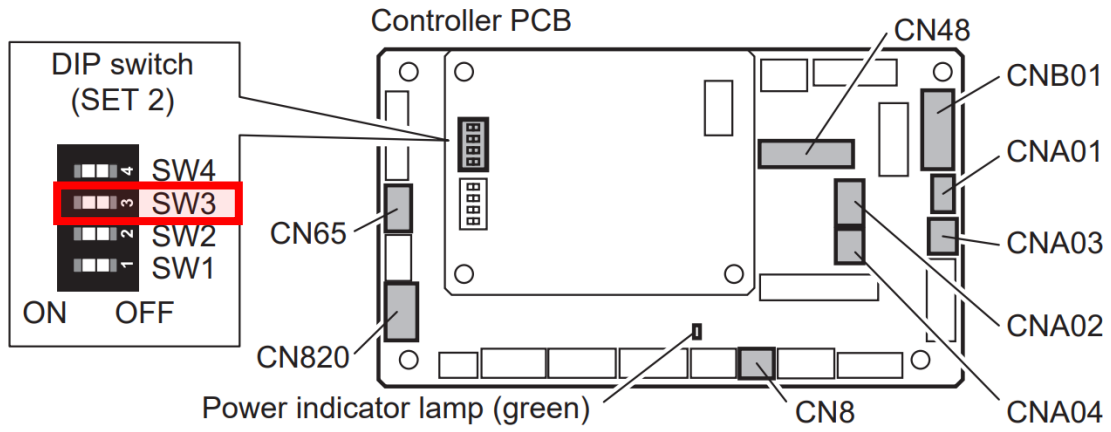
† HEATER 2- IDU FUNCTION 77 SETS HEATER 2 ON TEMPERATURE.

Subject: Airstage VRF Auxiliary Heat Control Settings for ARUX**TLAV2 MPAHU

III. Indoor unit DIP switch settings- The ARUX main PCB has two sets of DIP (Dual In-Line Package) switches, SET 2 and SET 3. When installing ARUX**TLAV2 units with UTZ-EU***** Heater Kits, there are no DIP switch setting changes required. However, it is a good practice to check and confirm that DIP switch SET 2-3 is ON, when UTZ-EU**** Heater Kits are installed:

1. SET 2-3, Auxiliary heat fan operation- SET 2-3 (SET 2, SW3) will command the ARUX AHU to use the fan during auxiliary heat operation. (Factory default setting is ON with ARUX series AHU)

- SET 2-3 ON (default)



2. SET 2-4- Supply air Temperature Protection Setting

The ARUX12-60TLAV2 VRF air handlers incorporate a unique control feature which limits auxiliary heater operation based upon a calculated supply air temperature. When the [calculated] supply air temperature is greater than the threshold temperatures in the table below, the auxiliary heat outputs will be sequentially turned OFF. Note- This feature does not affect compressor operation, only axillary heat outputs:

ARUX**TLAV2 (UTZ-EU** HEATER USE, 1 AND 2 STAGE MODELS)						
DIP SW 2-3 (AUX. HEAT FAN USE)	ON			ON		
DIP SW 2-4 (SUPPLY TEMPERATURE PROTECTION.)	ON			OFF		
	ODU	1ST STAGE	2ND STAGE	ODU	1ST STAGE	2ND STAGE
	HP	CN112	CNB01, 1-4	HP	CN112	CNB01, 1-4
		24 VAC	12 VDC		24 VAC	12 VDC
CALCULATED OUTLET AIR TEMPERATURE*						
>120° F.						
>90° ≤ 120° F.						
<90° F.						

HEATER OUTPUT ENABLED

HEATER OUTPUT OFF

Example: when the calculated supply air temperature is:

- Less than 90° F.:
  - ◊ Heater 1 output- (CN112) 24 VAC = ENABLED
  - ◊ Heater 2 output (CNB01, pins 1& 5) 12 VDC = ENABLED
- Between 90° and 120° F.:
  - ◊ Heater 1 output- (CN112) 24 VAC = ENABLED
  - ◊ Heater 2 output (CNB01, pins 1&4) 12 VDC = OFF
- Greater than 120° F.:
  - ◊ Heater 1 output- (CN112) 24 VAC = OFF
  - ◊ Heater 2 output (CNB01, pins 1& 5) 12 VDC = OFF

If it is desired to disable this supply air temperature protection feature, turn SET 2, SW4 OFF. (See above PCB image for DIP switch reference)

Subject: Airstage VRF Auxiliary Heat Control Settings for ARUX**TLAV2 MPAHU

Reference literature

For a complete description of Airstage VRF indoor unit external input and output use and functions, please log onto the Fujitsu **CONNECT** site for Installation and Design & Technical Manual downloads.

Additional support

To obtain additional support, please contact your regional Distributor TSA, Technical Service Advisor, or Fujitsu General America Service Department, **servicehvac@fujitsugeneral.com**.