

FOR SERVICE TECHNICIAN'S USE ONLY

NOTE: This sheet contains important Technical Service Data

Do Not Remove Or Destroy

⚠ DANGER

Electrical Shock Hazard

Only authorized technicians should perform diagnostic voltage measurements.

After performing voltage measurements, disconnect power before servicing.

Failure to follow these instructions can result in death or electrical shock.

⚠ WARNING

Electrical Shock Hazard

Disconnect power before servicing.

Replace all parts and panels before operating.

Failure to do so can result in death or electrical shock.

Voltage Measurement Safety Information

When performing live voltage measurements, you must do the following:

- **Verify the controls are in the off position so that the appliance does not start when energized.**
- **Allow enough space to perform the voltage measurements without obstructions.**
- **Keep other people a safe distance away from the appliance to prevent potential injury.**
- **Always use the proper testing equipment.**
- **After voltage measurements, always disconnect power before servicing.**

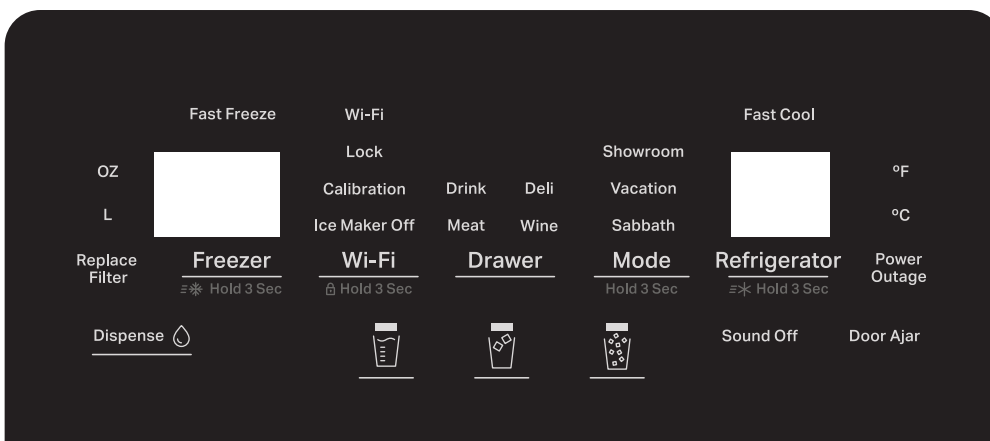
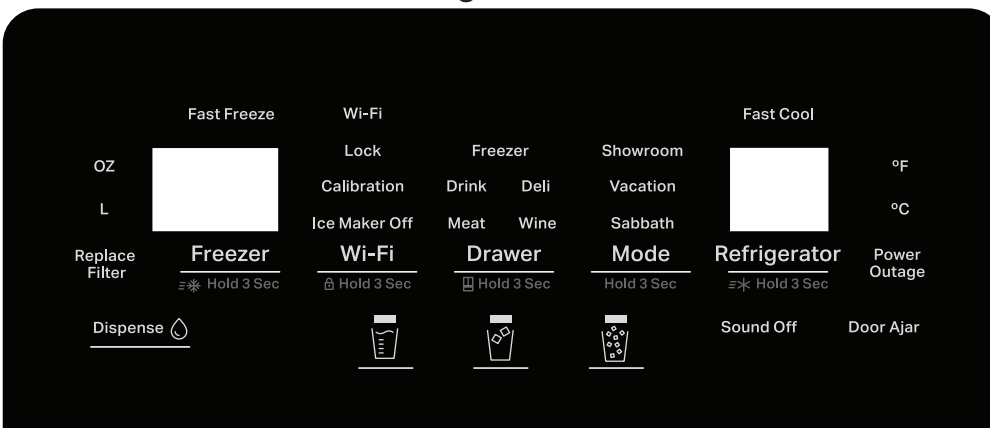
Component Specifications

Component	Specifications all parts - 115 VAC/60 Hz unless noted	
Cooling		
Compressor	BTUH	921 BTUH VTD1116Y
	Watt	169 W
	Current lock rotor	2.53 A
	Current full load	0.9 A (Ambient Temperature < 85°C), 1.0 A (Ambient Temperature < 80°C)
	Resistance full windings	26.2 Ω (no starting winding for VCC)
	Resistance start windings	N/A
Electric Damper Control*	Maximum closing time	10 seconds
	Temperature rating	-30°C to 45°C
	RPM	333 pps
Condenser Motor <small>NOTE: Fan blade must be fully seated on shaft to achieve proper airflow.</small>	Rotation (facing name plate side)	Clockwise
	RPM	1500
	Watt	2.0 ± 15% W @ 12.7 VDC
Evaporator Fan Motor <small>(Only applicable to the dual evaporator models)</small>	Rotation (facing name plate side)	Clockwise
	RPM	1900
	Watt	5.08 ± 15% W @ 12.7 VDC
Freezer Evaporator Fan Motor	Rotation (facing name plate side)	Counter-Clockwise
	RPM	1700
	Watt	5.6 ± 15% W @ 12.7 VDC
Freezer Evaporator Heater	Wattage	340 ± 5% W @ 115 VAC
Evaporator Heater <small>(Applicable only for certain models)</small>	Resistance	38.9 ± 5% Ω
	Wattage	125 ± 5% W @ 115 VAC
Controls		
Control Board	Voltage	120 ± 10% VAC
	Temperature	Resistance
Thermistor	77°F (25°C)	2,692 Ω
	36°F (2.2°C)	7,828 Ω
	0°F (-18°C)	22,774 Ω
	Type	Reed Switch (Magnetic)
Light Switch*	Voltage	12.7 V
	Current	0.5 ADC Maximum

Component	Specifications all parts - 115 VAC/60 Hz unless noted	
Ice and Water		
Dual Water Valve	Wattage	20 W at 23°C and 12.7 VDC
Isolation Valve	Wattage	20 W at 23°C and 120 VAC
Triple Water Valve	Wattage	20 W at 23°C and 12.7 VDC
Ice Box Fan <small>(Only applicable to in-door-ice models)</small>	Rotation (facing name plate side)	Counter-clockwise
	RPM	3000
	Wattage	3.28 ± 1.51 W @ 12.7 VDC

*IEC 60079-15 certified for use in explosive atmosphere.

Control Board Troubleshooting Accessing Service Mode



To Enter Service Diagnostics Mode:

The service test functions are performed using the Refrigerator Temperature Display and keypad.

Enter the Service Test Mode by performing the following sequence of events: Press and release any 3 keypad buttons, three times: 1,2,3; 1,2,3; 1,2,3.

NOTE: The 3 selected keypad buttons must be pressed consecutively and within 8 seconds.

To exit Service Test Mode, press first selected button for 3 seconds.

Button	Press Duration	Navigation Action
1st button	Short	Confirm the execution step
	3 seconds	Back
	5 seconds	Return to main menu
2nd button	Short	Decrement
	3 seconds	Fast decrement
	5 seconds	No action
3rd button	Short	Advance
	3 seconds	Fast advance
	5 seconds	No action

Service Test - 10 Service Sensor FC Evaporator Sensor

- Reads the current thermistor temperature in either °C or °F, depending on the state the user has selected prior to entering service mode, and displays to the service technician.
- If the result is higher than the maximum threshold value, should display OPEN Circuit.
- If the result is higher than the minimum threshold value, it should display SHORT Circuit.
- Threshold values must be component dependent.

Service Test - 12 Service Sensor FC Sensor

- Reads the current thermistor temperature in either °C or °F, depending on the state the user has selected prior to entering service mode, and displays to the service technician.
- If the result is higher than the maximum threshold value, should display OPEN Circuit.
- If the result is higher than the minimum threshold value, it should display SHORT Circuit.
- Threshold values must be component dependent.

Service Test - 13 Service Sensor RC Sensor

- Reads the current thermistor temperature in either °C or °F, depending on the state the user has selected prior to entering service mode, and displays to the service technician.
- If the result is higher than the maximum threshold value, should display OPEN Circuit.
- If the result is higher than the minimum threshold value, it should display SHORT Circuit.
- Threshold values must be component dependent.

Service Test - 14 Service Sensor In-Door Ice Maker Sensor

- Reads the current thermistor temperature in either °C or °F, depending on the state the user has selected prior to entering service mode, and displays to the service technician.
- If the result is higher than the maximum threshold value, should display OPEN Circuit.
- If the result is higher than the minimum threshold value, it should display SHORT Circuit.
- Threshold values must be component dependent.

Service Test - 15 Service Sensor Freezer Compartment Ice Maker Sensor (Some models)

- Reads the current thermistor temperature in either °C or °F, depending on the state the user has selected prior to entering service mode, and displays to the service technician.
- If the result is higher than the maximum threshold value, should display OPEN Circuit.
- If the result is higher than the minimum threshold value, it should display SHORT Circuit.
- Threshold values must be component dependent.

Service Test - 16 Service Sensor IceBox Sensor

- Reads the current thermistor temperature in either °C or °F, depending on the state the user has selected prior to entering service mode, and displays to the service technician.
- If the result is higher than the maximum threshold value, should display OPEN Circuit.
- If the result is higher than the minimum threshold value, it should display SHORT Circuit.
- Threshold values must be component dependent.

Service Test - 17 Service Sensor Pantry Sensor

- Reads the current thermistor temperature in either °C or °F, depending on the state the user has selected prior to entering service mode, and displays to the service technician.
- If the result is higher than the maximum threshold value, should display OPEN Circuit.
- If the result is higher than the minimum threshold value, it should display SHORT Circuit.
- Threshold values must be component dependent.

Service Test - 25 Service Sensor Ambient 0 Sensor

- Reads the current thermistor temperature in either °C or °F, depending on the state the user has selected prior to entering service mode, and displays to the service technician.
- If the result is higher than the maximum threshold value, should display OPEN Circuit.
- If the result is higher than the minimum threshold value, it should display SHORT Circuit.
- Threshold values must be component dependent.

Service Test - 29 Service Sensor Humidity 0 Sensor

- Reads and displays the current Relative Humidity percentage.
- NOTE:** If the sensor measurement is smaller than the sensor range (See Component Datasheet), the UI shall show Open Circuit. If the value is higher than the sensor range, the UI shall show Short Circuit.

Service Test - 40 Service Door CC Door (Only 4 door Models)

- Polls the feedback signal state of the door switch.
- Displays the state of the door switch, the following designation shall be used.
- UI shall display if Door is Open or Closed.

Service Test - 41 Service Door FC Door

- Polls the feedback signal state of the door switch.
- Displays the state of the door switch, the following designation shall be used.
- UI shall display if Door is Open or Closed.

Service Test - 43 Service Door RC Left Door

- Polls the feedback signal state of the door switch.
- Displays the state of the door switch, the following designation shall be used.
- UI shall display if Door is Open or Closed.

Service Test - 44 Service Door RC Right Door

- Polls the feedback signal state of the door switch.
- Displays the state of the door switch, the following designation shall be used.
- UI shall display if Door is Open or Closed.

Service Test - 48 Service Door ICE Bin Switch 1 Door

- Polls the feedback signal state of the door switch.
- Displays the state of the door switch, the following designation shall be used.
- UI shall display if Door is Open or Closed.

Service Test - 61 Service Defrost Forced FC Defrost

- Entering the test, the display shows the forced defrost state of the unit in the related compartment. Upon exiting Service Mode the forced defrost routine shall be executed.

Service Test - 72 Service Compressor Cooling Test Compressor

- For all configurations, run the compressor at 100%.
- For Single Evaporator Models
 - After entering, the compressor + condenser fan will be turned ON and will be turned OFF when leaving the step.
- For Dual Evaporator Models
 - All routines are timed and automatically progress to the next routine. The user is allowed to exit the step during the test. If re-engaging this step, the routine shall go to the first state.

Service Test - 75 Service Compressor Set Speed Compressor (not applicable for 1 button method)

- Compressor will run at the speed selected by the technician by the use of Enter Button (HMI only) to increase speed. Shall have a fast increase mode with the rate of change, size of the step change, being Project Specific. Shall not run at resonance frequencies defined at Resonance Filter Parameters. Minimum and maximum value of compressor speed shall follow compressor manager parameters.

Service Test - 80 Service Damper RC Damper

- Runs continuous operation of the air baffle and polls the feedback signal of the air baffle home position. Compartment fan will also be turned on. If feedback is available and functional or the damper doesn't have feedback, HMI will display the state of the damper as Opening or Closing. If the feedback is available but not working, the HMI will display that damper has Feedback Fault.

Service Test - 81 Service Damper Pantry Damper

- Runs continuous operation of the air baffle and polls the feedback signal of the air baffle home position. Compartment fan will also be turned on. If feedback is available and functional or the damper doesn't have feedback, HMI will display the state of the damper as Opening or Closing. If the feedback is available but not working, the HMI will display that damper has Feedback Fault.

Service Test - 90 Service Light CC Light (Only 4 Door Models)

- Turn on the lighting output for the specified load.

Service Test - 91 Service Light FC Light

- Turn on the lighting output for the specified load.

Service Test - 92 Service Light RC Light

- Turn on the lighting output for the specified load.

Service Test - 111 Service Fan FC Fan

- Turns the fan to the ON state operating at 100% duty cycle.

Service Test - 112 Service Fan ICEBOX Fan

- Turns the fan to the ON state operating at 100% duty cycle.

Service Test - 113 Service Fan Condenser Fan

- Turns the fan to the ON state operating at 100% duty cycle.

Service Test - 131 Service Heater Defrost FC Heater

- Turn the heater to the ON state operating at 100% duty cycle.
- NOTE:** As a protection to the defrost system and to prevent thermofuse failure, the technician shall be limited to running the defrost heaters for a maximum of 5 minutes. Following this time duration the defrost heater shall transition to the OFF state.

Service Test - 132 Service Heater Defrost CC Heater (Only 4 Door Models)

- Turn the heater to the ON state operating at 100% duty cycle.
- NOTE:** As a protection to the defrost system and to prevent thermofuse failure, the technician shall be limited to running the defrost heaters for a maximum of 5 minutes. Following this time duration the defrost heater shall transition to the OFF state.

Service Test - 134 Service Heater Flipper Heater

- Turn the heater to the ON state operating at 100% duty cycle.

Service Test - 139 Service Heater Damper RC Heater

- Turn the heater to the ON state operating at 100% duty cycle.

Service Test - 140 Service Heater Damper Pantry Heater

- Turn the heater to the ON state operating at 100% duty cycle.

Service Test - 142 Service Heater ICEMAKER Duct Heater

- Turn the heater to the ON state operating at 100% duty cycle.

Service Test - 143 Service Heater In-Door Ice Maker Fill Tube Heater

- Turn the heater to the ON state operating at 100% duty cycle.

Service Test - 144 Service Heater Freezer Compartment Ice Maker Fill Tube Heater (Some models)

- Turn the heater to the ON state operating at 100% duty cycle.

Service Test - 145 Service Heater Dispenser Heater

- Turn the heater to the ON state operating at 100% duty cycle.

Service Test - 154 Service Heater Flipper Heater Activation Mode

- Entering the display shows the current activation mode for the selected heater. It is possible to change the activation mode by pressing the Enter Button (HMI only).
 - “0”-Humidity Dependent
 - “1”-Independent of Humidity Measurement (Runs 100% PWM all the time)
- The activation mode will be saved in the non volatile memory and will be used during normal mode for undetermined time.

Service Test - 158 Service Heater Dispenser Heater Activation Mode

- Entering the display shows the current activation mode for the selected heater. It is possible to change the activation mode by pressing the Enter Button (HMI only).
 - “0”-Humidity Dependent
 - “1”-Independent of Humidity Measurement (Runs 100% PWM all the time)
- The activation mode will be saved in the non volatile memory and will be used during normal mode for undetermined time.

Service Test - 162 Service Valve Water Valve

- Turn the valve to the ON state. If the application has an Isolation Valve also turns the isolation valve to ON state.
- NOTE:** As a protection to the water valve and prevent overfilling, the technician shall be limited to running the valves for a maximum of 5 seconds. Following this time duration the valve shall transition to the OFF state.

Service Test - 164 Service Valve ICEMAKER 1 Valve

- Turn the valve to the ON state. If the application has an Isolation Valve also turns the isolation valve to ON state.
- NOTE:** As a protection to the water valve and prevent overfilling, the technician shall be limited to running the valves for a maximum of 5 seconds. Following this time duration the valve shall transition to the OFF state.

Service Test - 165 Service Valve ICEMAKER 2 Valve

- Turn the valve to the ON state. If the application has an Isolation Valve also turns the isolation valve to ON state.
- NOTE:** As a protection to the water valve and prevent overfilling, the technician shall be limited to running the valves for a maximum of 5 seconds. Following this time duration the valve shall transition to the OFF state.

Service Test - 180 Service IM Harvest IM1 ICE MAKER

- Inside this step a technician forces the ice maker module to execute a homing and harvest cycle. Display will indicate “on”, while the test is running.

Service Test - 181 Service IM Harvest IM2 ICE MAKER

- Inside this step a technician forces the ice maker module to execute a homing and harvest cycle. Display will indicate “on”, while the test is running.

Service Test - 184 Service IM Door Control ICE MAKER

- Allows the technician to control the Ice Door Motor with the dispensing pad. When the pad is pressed, the motor will begin moving the door to the open state. When reached the door will remain open for 1 second prior to closing. With the pad released the door will begin closing. When the door reaches the closed state it will remain there for 1 second prior to an opening command.

Service Test - 200 Service UI LED All ON UI

- Light all LED indicators and icons in all available UIs in the system.
- NOTE:** To protect boards, Step will timeout after 30 seconds and return to the main menu.

Service Test - 240 Service Filter Water Remains Liters Filter

- Entering this Step allows the technician to read the remaining gallons left of usage of the water filter. Gallons remaining will be subtracted from the parameter found in the flashmap/settings file.
- NOTE:** The allowable range of this is from 0 to 999. The actual maximum value is found within the flashmap/settings file.

Service Test - 241 Service Filter Water Remain Days Filter

- Entering this Step allows the technician to read the remaining days left of usage of the water filter. Days remaining will be subtracted from the parameter found in the flashmap/settings file.
- NOTE:** The allowable range of this is from 0 to 999 days. The actual maximum value is found within the flashmap/settings file.

Service Test - 242 Service Filter Water Remain Days Since Reset Filter

- Entering this Step allows the technician to read the days since the filter reset key was pressed by the user.
- NOTE:** The allowable range of this is from 0 to 999 days. If 999 days are reached this number will be held until a reset occurs.

Service Test - 243 Service Filter Water Number of Resets Filter

- Entering this Step allows the technician to view how many times the user has reset their water filter.
- NOTE:** The allowable range of this is from 0 to 999 resets. If 999 resets occurs. This number will no longer be incremented.

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Tech Sheet

Do Not Remove Or Destroy

ERROR CODES

CODE	ENG. CODE	PRIORITY	TYPE	DESCRIPTION
F3E1	0	16	-	Refrigerator Compartment Temperature Sensor
F3E2	0	15	-	Freezer Compartment Temperature Sensor
F3E4	0	13	-	Freezer Compartment or Main Evaporator In Sensor
F3E6	0	14	-	Refrigerator Compartment or Evaporator In Sensor
F3E8	0	22	-	External RH Sensor
F3E9	0	21	-	Ambient Temperature Sensor
F3EB	0	18	-	Pantry/CC Temperature Sensor
F4E1	0	3	TYPE 1	Freezer Compartment or Main Evaporator Heater
F4E2	0	4	TYPE 1	Refrigerator Compartment or Evaporator Heater
F6E1	0	1	-	Compressor Failure Between ACU 1 and HMI 1
F7E1	0	2	TYPE 2	Compressor Not Functioning
FAE1	0	6	TYPE 2	Refrigerator Evaporator Fan
FAE2	0	5	TYPE 2	Freezer Evaporator Fan
FAEB	0	7	DAMPER FAIL	Damper 1 (RC Damper)
FAEB	1	8	BLOCKED FAIL	Damper 1 (RC Duct)
FAEB	2	9	LEAKAGE FAIL	Damper 1 (RC Leakage)
FAEC	0	10	DAMPER FAIL	Damper 2 (Pantry Damper)
FAEC	1	11	BLOCKED FAIL	Damper 2 (Pantry Duct)
FAEC	2	12	LEAKAGE FAIL	Damper 2 (Pantry Leakage)
FBE1	0	17	-	Ice Box Sensor
FBE2	0	19	-	Ice Maker Temperature Sensor 1
FBEB	0	20	-	Ice Maker Temperature Sensor 2

VOLTAGE TABLE

ACU	Connector Port	From	To	Voltage	Conditions
Callisto	P1	P1-1	P1-2	115 VAC	CONSTANT 115 VAC
	P9	P9-4	P9-3		IDI MOTOR 115 VDC
		P9-5	P1-2		CONVERTIBLE COMPARTMENT HEATER 115 V
		P9-6	P1-2		RC DEFROST HEATER 115 V
		P9-7	P1-2		FC DEFROST HEATER 115 V
	P9-8	P1-2	ISOLATED VALVE 115 VAC		
	P4	P4-1	P4-4	12.7 VDC	POWER SUPPLY CH.1 12.7 VDC
		P4-3	COMMUNICATION	WIN DATA	
	P5	P5-1	P4-4	12.7 VDC	POWER SUPPLY CH.2 12.7 VDC
		P5-2	P5-3	12.7 VDC	3-WAY VALVE STEPPER A+, A-
		P5-4	P5-5	12.7 VDC	3-WAY VALVE STEPPER B+, B-
	P800	P800-1	P800-2	12.7 VDC	RC SKLIGHT LED 12.7 VDC STRIP LEDs 12.7 VDC
		P800-3	P800-4	12.7 VDC	FC POINT LED 350 mA
		P800-5	P800-6	12.7 VDC	CC POINT LED 350 mA (4 Door Products). RC POINT LED 350 mA
		P800-7	P800-8	12.7 VDC	UNDERSHELF STRIP LEDs 12.7 VDC
	P10	P100-10	P10-1	12.7 VDC	FC EVAPORATOR FAN POWER SUPPLY 12.7 VDC
		P10-2	P10-1	12.7 VDC	FC EVAPORATOR FAN SIGNAL OUTPUT = 5 VDC-12.7 VDC MAXIMUM
		P100-10	P10-3	12.7 VDC	RC EVAPORATOR FAN POWER SUPPLY 12.7 VDC
		P10-4	P10-3	12.7 VDC	RC EVAPORATOR FAN SIGNAL OUTPUT = 5 VDC-12.7 VDC MAXIMUM
		P100-10	P10-5	12.7 VDC	CONDENSER FAN POWER SUPPLY 12.7 VDC
		P10-6	P10-5	12.7 VDC	CONDENSER FAN SIGNAL OUTPUT = 5 VDC-12.7 VDC MAXIMUM
		P100-10	P10-7	12.7 VDC	ICE BOX FAN POWER SUPPLY 12.7 VDC
		P10-8	P10-7	12.7 VDC	ICE BOX FAN SIGNAL OUTPUT = 5 VDC-12.7 VDC MAXIMUM
		P10-9	P10-10	12.7 VDC	COMPRESSOR's VCC DRIVER SIGNAL= 5 VDC-12.7 VDC MAXIMUM
	P100	P100-2	P100-1	12.7 VDC	A40 HMI & Wi-Fi PCB POWER SUPPLY CH.1 12.7 VDC
		P100-4	P100-3	12.7 VDC	RC/FC DAMPER HEATER POWER SUPPLY CH.2 12.7 VDC
	P12	P12-1	P12-2	12.7 VDC	STEPPER A+, A- for FC ICE MAKER MOTOR 12.7 VDC
		P12-5	P12-6	12.7 VDC	STEPPER C+, C- for RC/FC DAMPER MOTOR 12.7 VDC
		P12-7	P12-8	12.7 VDC	STEPPER D+, D- for RC/FC DAMPER MOTOR 12.7 VDC
		P12-9	P12-10	12.7 VDC	STEPPER E+, E- for PANTRY (OR CC) DAMPER MOTOR 12.7 VDC
	P12-11	P12-12	12.7 VDC	STEPPER F+, F- for PANTRY (OR CC) DAMPER MOTOR 12.7 VDC	
	P22	P22-2	P22-1	5 VDC	RH&T SENSOR POWER SUPPLY 5 VDC
		P22-4	P22-1	5 VDC	AMBIENT TEMPERATURE SENSOR OUTPUT = 1.5 VDC-5VDC MAXIMUM
		P22-6	P22-1	5 VDC	AMBIENT R. HUMIDITY SENSOR OUTPUT = 1.5 VDC-5 VDC MAXIMUM
		P22-8	P22-7	5 VDC	CC DRAWER REED SWITCH 5 VDC WHEN CLOSED
		P22-10	P22-9	5 VDC	FC ICE MAKER SENSOR OUTPUT = 1.5 VDC-5 VDC MAXIMUM
		P22-12	P22-11	12.7 VDC	FC ICE MAKER TAC SWITCH FOR MOTOR FEEDBACK
		P22-14	P22-13	12.7 VDC	INTL W DISPENSER SWITCH
		P22-16	P22-15	12.7 VDC	RC/FC DAMPER FEEDBACK 12.7 VDC
		P22-18	P22-17	12.7 VDC	PANTRY (OR CC) DAMPER FEEDBACK 12.7 VDC
P100-4		P22-20	12.7 VDC	PANTRY (OR CC) DAMPER HEATER 12.7 VDC	
P100-4	P22-22	12.7 VDC	RC/FC DAMPER HEATER 12.7 VDC		

ACU	Connector Port	From	To	Voltage	Conditions
Callisto	P20	P20-2	P20-1	5 VDC	FC EVAPORATOR THERMISTOR OUTPUT = 1.5 VDC-5 VDC MAXIMUM
		P20-4	P20-3	5 VDC	RC THERMISTOR OUTPUT = 1.5 VDC-5 VDC MAXIMUM
		P20-6	P20-5	5 VDC	PANTRY EVAP THERMISTOR OUTPUT = 1.5 VDC-5 VDC MAXIMUM
		P20-8	P20-7	5 VDC	FC THERMISTOR OUTPUT = 1.5 VDC-5 VDC MAXIMUM
		P20-10	P20-9	5 VDC	RC EVAPORATOR THERMISTOR OUTPUT = 1.5 VDC-5 VDC MAXIMUM
		P20-12	P20-11	5 VDC	DOOR IN DOOR REED SWITCH 5 VDC WHEN ALL CLOSED
		P20-14	P20-13	12.7 VDC	DID PROXIMITY SENSOR 12.7 VDC WHEN ACTIVE
		P20-16	P20-15	5 VDC	RC LEFT REED SWITCH 5 VDC WHEN ALL CLOSED
		P20-18	P20-17	5 VDC	RC RIGHT REED SWITCH 5 VDC WHEN ALL CLOSED
		P20-20	P20-19	5 VDC	FC DRAWER REED SWITCH 5 VDC WHEN ALL CLOSED

