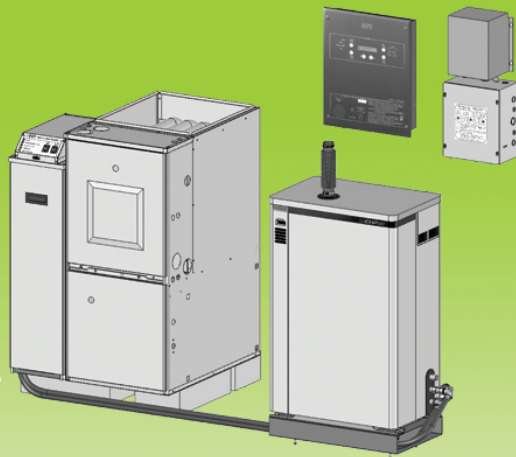


freewatt®



Warm Air freewatt Plus System, Models WAJ & WDJ

POWERED by HONDA™

COMMISSIONING PROCEDURE

CUSTOMER NAME	freewatt System Serial Number

An ISO 9001-2008 Certified Company
ECR International, Inc.
2201 Dwyer Ave.
Utica, NY 13501



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Check our website frequently for updates: www.freewatt.com www.ecrinternational.com

WDJ/WAJ COMMISSIONING PROCEDURE

CHECKLIST	
<input type="checkbox"/>	CHECK HONDA:
	<input type="checkbox"/> ENGINE OIL LEVEL
	<input type="checkbox"/> RED SHIPPING BRACKET REMOVED
	<input type="checkbox"/> CONDENSATE TRAP FILLED WITH WATER
	<input type="checkbox"/> GAS VALVE ON
<input type="checkbox"/>	FURNACE
	<input type="checkbox"/> GAS VALVE ON
	<input type="checkbox"/> RECEIVING 120V POWER
<input type="checkbox"/>	HYBRID INTEGRATION MODEL
	<input type="checkbox"/> PUMP'S POWER CABLE IS PLUGGED INTO CONTROL MODULE
	<input type="checkbox"/> CHECK PIPING & CONNECTIONS
<input type="checkbox"/>	DIRECT-FIRED WATER HEATER (MODEL WDJ ONLY)
	<input type="checkbox"/> AQUASTAT SET AT 120-125° F
	<input type="checkbox"/> ANTI-SCALD MIXING VALVE INSTALLED
<input type="checkbox"/>	HEAT REJECTION
	<input type="checkbox"/> POWER CABLE CONNECTED FROM HEAT REJECTION UNIT TO J19 ON CONTROL BOARD
	<input type="checkbox"/> INSPECT ALL PIPING AND ELECTRICAL CONNECTIONS
<input type="checkbox"/>	ACCESSORIES
	<input type="checkbox"/> ALL EXTERNAL DEVICES THAT ARE INTEGRAL TO THE HEATING SYSTEM ARE ON A NON-DELAYABLE BACKED UP LOAD

COMMISSIONING PROCEDURE

FURNACE

1. Place control module's CHP MODE switch in OFF position
2. Ensure 120 VAC power is supplied to control module and furnace
3. Confirm proper operation of furnace and perform furnace commissioning according to furnace IOM (Installation Operation and Maintenance Manual) which includes calculating temperature rise (Start up Procedures and Air Flow Sections of FW95V Furnace IOM)
4. Ensure jumper P5 on Furnace control board is set to "NONE" position

WDJ/WAJ COMMISSIONING PROCEDURE

HI MODULE

1. Fill coolant reservoir with supplied Honda MCHP Long Life Coolant (LLC).
 - A. Continue to add coolant until reservoir is full and coolant level is stable.
 - B. Replace cap on coolant reservoir.
 - C. Check all connections for coolant leaks.

HONDA MCHP

1. Install Honda Battery in electrical cabinet on bottom, left side of MCHP
2. Turn grid power ON to Honda MCHP
 - A. Dedicated breaker at electrical service panel
 - B. Outdoor disconnect switch (if present)
 - C. MCHP Local 240v service switch
 - D. If NO power present, check electrical wiring
3. Turn MCHP Power ON
 - A. Remove small panel on top, left side of MCHP
 - B. Rotate rotary switch to ON position
 - C. Switch on top front panel to ON position

WARM AIR freewatt PLUS SYSTEM, MODEL WAJ/WDJ

1. Connect laptop to freewatt control module with RS-232 serial cable and connect to system using MINT service tool software.
2. Record following information from MINT:

RCC Firmware Revision	RCC Serial Number

3. Check coolant reservoir is full. Add coolant if necessary, and replace cap.
4. Check there are no leaks between Honda MCHP and HI-Module or inside HI-Module.

WDJ/WAJ COMMISSIONING PROCEDURE

PURGING AIR FROM COOLANT SYSTEM

Next several steps will require continuous attention to level of coolant in reservoir. Once pump turns on first time, remove cap and add coolant as necessary to prevent level from falling below Minimum mark. Failure to ensure adequate coolant level may result in damage to pump.

1. In MINT, go to Install and Configure Test Operate Manually.
2. Click "Turn ON Pump" button and run pump until no more air bubbles are displaced from system.
3. Click "Turn OFF Pump" button and leave pump off until no more air bubbles are displaced from system.
4. Repeat steps 2-3 until as much air as possible has been purged from system.
5. After purging air from coolant loop, power OFF coolant pump via MINT.
6. Close Manual Control window using "Close" button.
7. Disconnect from MINT.

MCHP COOLANT TEMPERATURE MIXING VALVE ADJUSTMENT

1. Move System Power switch on **freewatt** control module to OFF position.
2. After 10 seconds, move System Power switch to ON position.
3. Move CHP mode switch on **freewatt** control module to ON position.
4. Increase set point temperature of HAI Thermostat to 5 degrees above current room temperature and switch thermostat mode to "Heat" to generate call for heat.
5. Reconnect via MINT tool.
 - A. With HI Module mixing valve set to full cold, operate MCHP until air bubbles are purged. Adjust mixing valve to 1/4 turn from full hot. Step may need to be repeated until all air bubbles are purged.
 - B. Operate MCHP unit until MCHP Inlet Cooling Temperature stabilizes between 152 to 154° F (Wait 30 minutes for total purge of air bubbles). Inlet Coolant Temperature is visible in MCHP Maintenance window.
 - C. If MCHP Water Temperature stabilizes lower than 150°F and MCHP is still operating, increase mixing valve's setting (+).
 - D. If MCHP Inlet Coolant Temperature stabilizes higher than 154°F and MCHP is still operating, check following items in order:
 - i. Coolant Flow: Ensure coolant pump is powered ON and flow occurring (Temperature Differential across MCHP = 10°F or higher)
 - ii. Furnace Air Flow: Ensure furnace blower motor is operating and HI Module air coil is unobstructed.
 - iii. Plumbing: Ensure all coolant tubing is routed appropriately:
 - HI port on MCHP is plumbed to front side of HI Module (Into hot side of mixing valve.)
 - iv. Repeat Step A: Ensure all air bubbles are purged from system.
 - v. Mixing Valve: Decrease mixing valve's setting (-).
 - vi. Please record:

WDJ/WAJ COMMISSIONING PROCEDURE

Coolant Flow Issues	Hydronic Water Flow Issues	Mixing Valve Turns (+/-)

6. Check level of coolant in reservoir and fill to Maximum indicator. Close cap tightly.
7. Recheck for leaks at all coolant tubing connections.

DOMESTIC WATER HEATING RECIRCULATION LOOP (WDJ Only)

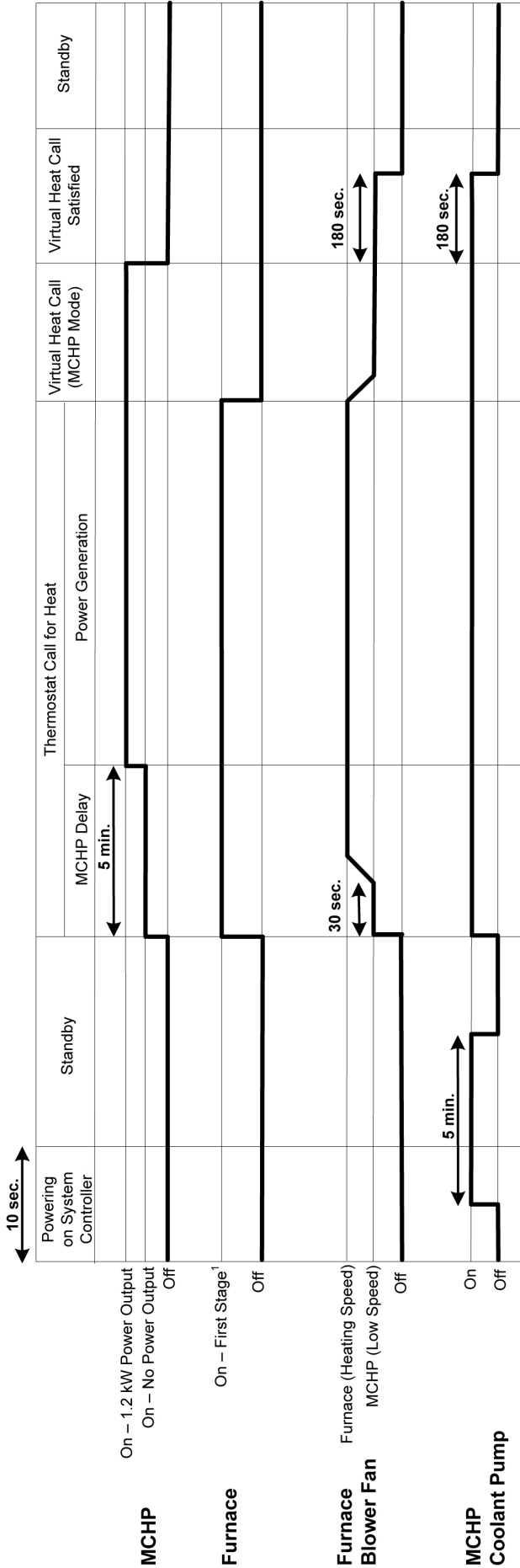
1. Initiate heat call on direct fired water heater aquastat.
 - A. As water heater exhaust stack temperature rises (~5 minutes), MCHP should turn ON in DHW Mode
2. While connected with MINT tool, open "Additional Settings" window (found under Install and Configure Tab).
 - A. If MCHP started, ensure "DHW Present" Is Enabled.
 - B. If MCHP did not start, check thermistor connections and insulation. "DHW Present" can be manually enabled here.
3. Turn aquastat on Domestic hot water heater to OFF position.

BACKUP POWER TEST

1. Ensure APC UTS6H is configured per Warm Air freewatt WAJ & WDJ IOM (PN 240007714)
2. Ensure no call for heat from thermostat or aquastat, MCHP is not running, and CHP MODE switch is ON.
3. Locate main power panel where backed up loads are located.
 - A. Each backed up load should be marked in panel corresponding to circuit numbers on APC.
 - B. Turn Main Breaker for panel OFF.
 - C. MCHP should start in Back up power mode. See sequence of operation (page 7):
 - D. Check to make sure Heat Rejection is energized and working
 - E. Check heat rejection piping and HI Module for water leaks
 - F. Switch all circuits back to ON position.
 - G. MCHP will shut down. If MCHP was in back up mode for less than 30 minutes, it will turn back ON to satisfy 30 minute runtime requirement
 - i. If MCHP was operating for over 30 minutes, coolant pump and heat rejection will remain ON to cool MCHP.

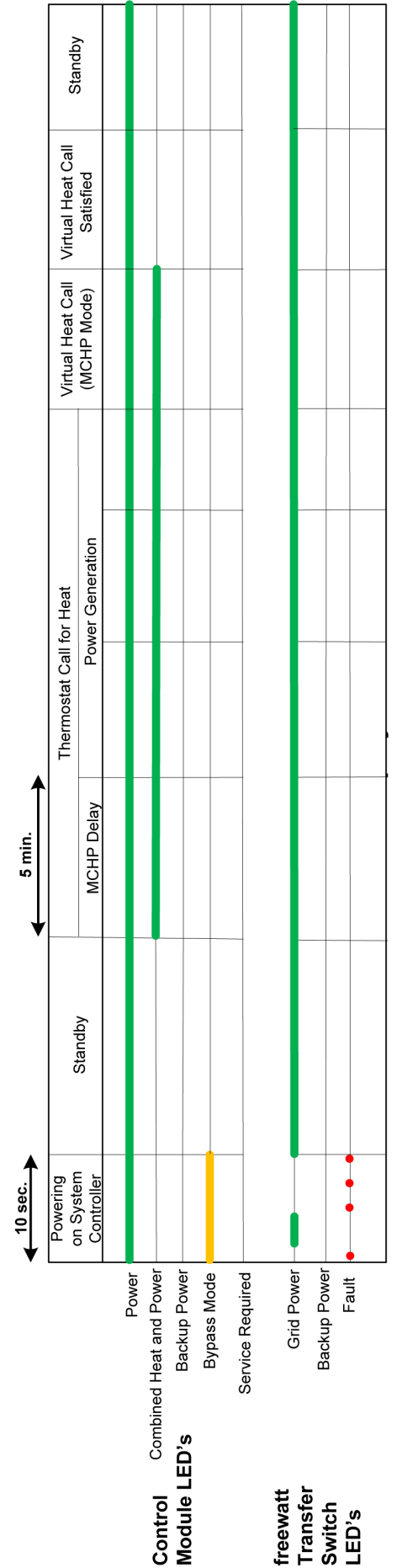
WARM AIR FREEWATT SYSTEM Model WAJ-WDJ
Sequence of Operation/Timeline: Normal MCHP Mode

Mechanical Operations



¹If the heat call lasts for longer than 10 minutes, the furnace will enter 2nd stage heating with a higher heat output and blower fan speed

LED Display

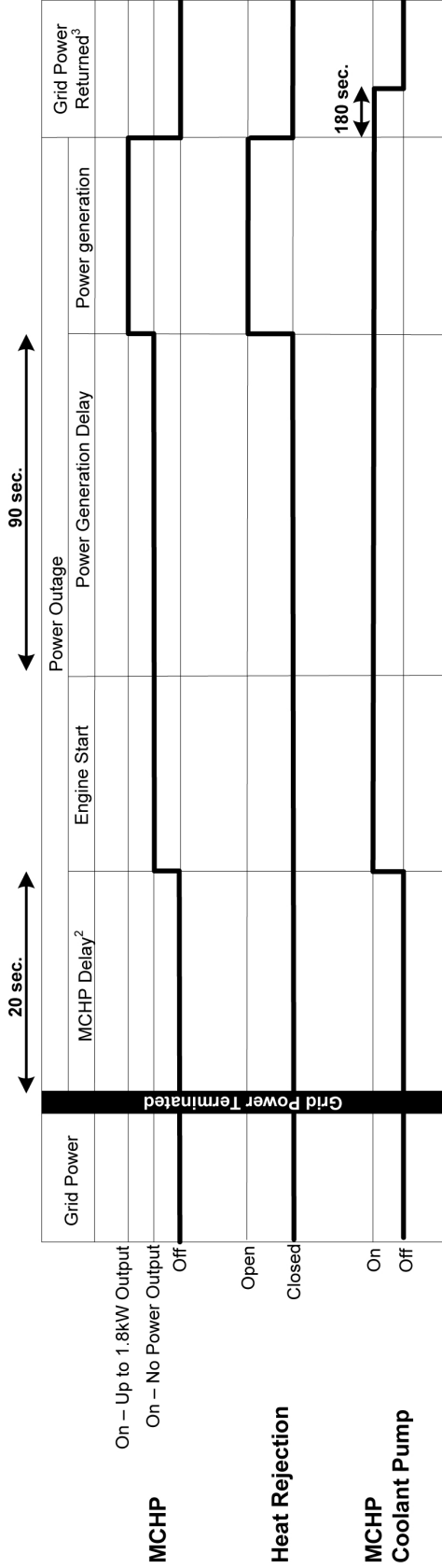


WDJ/WAJ COMMISSIONING PROCEDURE

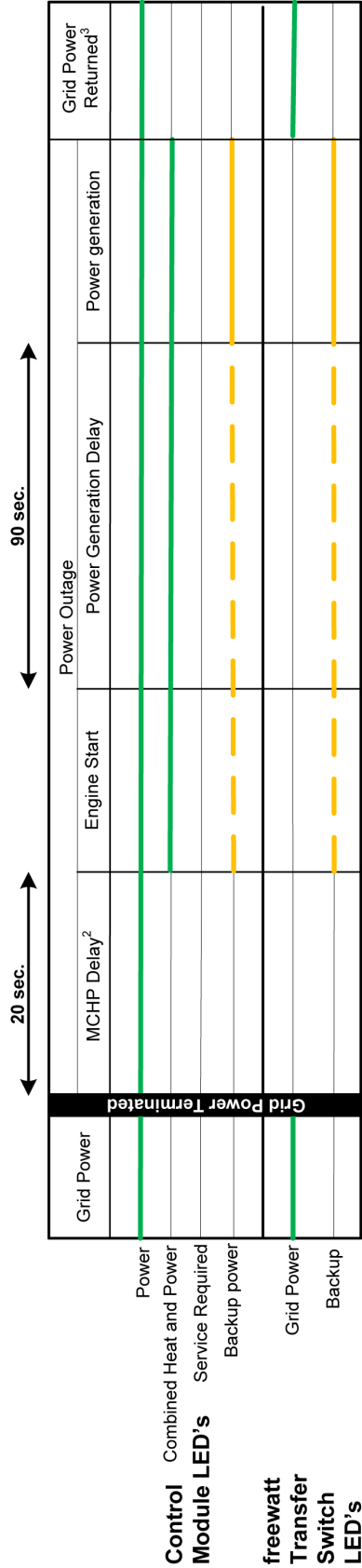
WARM AIR FREEWATT SYSTEM Model WAJ-WDJ

Sequence of Operation/Timeline: Backup Mode

Mechanical Operations¹



LED Display¹



¹ This sequence of operation assumes no thermostat or aquastat heat call. If there is a call for heat, the heat rejection will turn off and MCHP heat will be directed to the active space heating or water heating (WDJ only) brazed plate heat exchanger in the HI Module. Heat calls are handled in the order of priority as shown below:

1. Actual Domestic hot water call (WDJ Only)
 2. Actual Space Heating call *Notes: In backup power mode, 2nd stage furnace is disabled*
 3. Virtual Domestic hot water call (WDJ Only)
 4. Virtual Space Heating Call
- In the absence of a heating load, the heat rejection will be turned on for thermal management during backup mode and boost mode.*

² If the MCHP is running while grid power is terminated, the MCHP will remain running for 15 seconds during the MCHP delay

³ If the MCHP runs for less than 30 minutes in backup mode, the MCHP will run to complete 30 minutes minimum post-run mode. If there is no servicable call for heat, the heat rejection will be turned on.

WDJ/WAJ COMMISSIONING PROCEDURE

GRID INTERCONNECTION/INTERNET CONNECTION

1. If grid interconnect permit has not yet been obtained:
 - A. Set control module's CHP Mode switch to OFF position.
 - B. Show homeowner CHP Mode switch and how to turn system ON after receiving grid interconnection approval from UTILITY.
2. Set up internet connection:
 - A. Refer to instructions in **freewatt** System Installation Manual.
 - B. Apply IP Address, Netmask, Router, and DNS information in Network Setup tab of MINT.
3. If homeowner has signed and/or accepted monitoring consent form, turn on reporting from **freewatt** System to Climate Energy:
 - A. In MINT, click Alerting Setup
 - B. Verify:
 - i. Database Address is telemetry.freewatt.com
 - ii. Sampling rate is 86400 (this is one report per day)
 - C. Click Enable Sampling check box
 - D. Click Update
4. Disconnect MINT tool from control module.

Commissioning procedure is complete. Save sheet and store in Hydronic HI Module for future reference:

DATE	freewatt TECHNICIAN

WDJ/WAJ COMMISSIONING PROCEDURE- TROUBLESHOOTING

ERROR CODE	INDICATES	CHECK OR REPAIR
1	THERMOSTAT COMMUNICATIONS ERROR	1. CHP MODE SWITCH IN ON POSITION 2. CABLES AND CONNECTIONS BETWEEN THE THERMOSTAT AND THE HI MODULE 3. LOWER FURNACE ACCESS PANEL INSTALLED 4. IMPROPERLY PROGRAMMED THERMOSTAT
2	OUTDOOR SENSOR ERROR	1. CHECK OUTDOOR SENSOR AND CONNECTION OR INTERNAL 20k OHM DEFAULT RESISTOR
3	MCHP COMMUNICATIONS ERROR	1. RESET SYSTEM POWER 2. POWER TO MCHP 3. CABLES AND CONNECTIONS BETWEEN HONDA MCHP AND HI MODULE
4	MCHP DEVICE ERROR (MCHP ASSERTING "FAILURE" STATUS, IE. A HARD ERROR)	CHECK HONDA MCHP DIAGNOSTICS
5	MCHP DEVICE WARNING (MCHP ASSERTING "WARNING" STATUS, IE. A SOFT ERROR)	
6	freewatt plus FLASH PARAMETER INTEGRITY CHECK ERROR	SERVICE REQUIRED
7	SYSTEM POWER SWITCH OFF, UNABLE TO ENTER BACKUP MODE (NOTE: NOT DEFINED IN HYDRONIC SYSTEM)	
8	MCHP PLACED IN LOCKED MODE BY SERVICE TECH, PREVENTS MCHP OPERATION	
9	RESERVED FOR FUTURE USE	
10	ERROR CODE 10 NOT USED	
11	LOW DWELLING TEMPERATURE. BOILER DOWN OR THERMOSTAT "OFF" BY MISTAKE	
12	RESERVED FOR FUTURE USE	
13	VIRTUAL WATCHDOG TIME-OUT. AN UNEXPECTED FIRMWARE EXECUTION ERROR OCCURRED.	REPLACE CONTROLLER MODULE
14	EXHAUST GAS LEAK SENSOR FAILURE, HONDA MCHP ERROR 39.0 (EX_SENS_FAIL)	
15	EXHAUST GAS LEAK SENSOR POWER FAILURE, HONDA MCHP ERROR 39.1,(EX_SENS_POWER_FAIL)	
16	EXHAUST GAS LEAK SENSOR ALARM, COMBUSTION GAS DETECTED, HONDA MCHP ERROR 10.1, (EX_LEAKAGE_FAIL)	
17	NO DC POWER SUPPLY VOLTAGE DETECTED IN BACKUP MODE. (LOAD_PWR_FAULT)	INDICATES A FAULT IN 120V LOAD CIRCUIT
18	DETECTED A freewatt PLUS TRANSFER SWITCH COMMUNICATIONS FAILURE	Check FTS communications cable
19	DETECTED A freewatt PLUS TRANSFER SWITCH DEVICE ERROR	see freewatt transfer switch IOM
20	ERROR CODE 20 NOT USED	
21	DETECTED A freewatt PLUS TRANSFER SWITCH STATE ERROR	see freewatt transfer switch IOM
22	RESERVED FOR FUTURE USE	
23	DETECTED A freewatt PLUS TRANSFER SWITCH CONTACTOR #1 ERROR	see freewatt transfer switch IOM
24	DETECTED A freewatt PLUS TRANSFER SWITCH CONTACTOR #2 ERROR	see freewatt transfer switch IOM
25	EXHAUST GAS LEAK SENSOR TEST BUTTON PRESSED	
26	VOLTAGE DETECTED ON THE freewatt PLUS TRANSFER SWITCH ISLAND NODES (I1 OR I2) IN BACKUP POWER MODE	see freewatt transfer switch IOM
27	RESERVED FOR FUTURE USE	
28	MISSING L1 OR L2 OF AC POWER (FTS_AC_FAULT)	BLOWN FUSE, FAULTY WIRING, UTILITY FAULT
29-98	RESERVED FOR FUTURE USE	
99	VIRTUAL WATCHDOG TIME-OUT OCCURRED 5 OR MORE TIMES. MULTIPLE UNEXPECTED FIRMWARE EXECUTION ERRORS OCCURRED.	REPLACE CONTROL MODULE

WDJ/WAJ COMMISSIONING PROCEDURE- TROUBLESHOOTING

HONDA MCHP NOT STARTING

Press white "Trial" button located next to rotary power switch on Honda MCHP.

- A. Honda MCHP will try to start as it purges gas through its internal piping.
 - i. If Honda does not attempt to start, check 240v, Single Phase wiring to it.
- B. If Honda tries to start, but fails after several attempts, check gas supply to it:
 - i. Gas valve is ON.
 - ii. Gas is purged through external piping.
 - iii. After gas supply is confirmed, Press white "Trial" Button.
- C. If the Honda starts, proper wiring and gas flow to unit has been confirmed.

This confirms proper line voltage wiring and fuel gas supply. Check communications cable and exhaust gas sensor cable.

14/15 FLASHES OF RED LED ON freewatt CONTROL MODULE: ERROR CODE 14 OR 15

Exhaust Gas Leak Sensor issues. Check following items in order:

- i. Exhaust Gas Leak Sensor: Check and verify proper connections of cable on Sensor.
- ii. Control Module: Check and verify proper connections of cable on control module.
- iii. Exhaust Gas Leak Sensor Cable: Check cable for continuity and integrity.

If error persists, replace Sensor or cable.

1 FLASH OF RED LED ON freewatt CONTROL MODULE: ERROR CODE 1

No communication to Thermostat. Check following items in order:

- i. CHP Mode Switch: Verify in ON Position.
- ii. Thermostat/Control Module: Check cables and connections between components
- iii. 24 VAC Power: Check 24 VAC power supply for control module.

If error persists, replace thermostat or cable.

RED AND GREEN FLASHING TOGETHER ON freewatt TRANSFER SWITCH

No communication between **freewatt** control module and **freewatt** transfer switch:

- i. Verify **freewatt** transfer switch communication is connected to proper terminals at each end

If error persists, consult **freewatt** transfer switch Installation, Operation and Maintenance Manual

WDJ/WAJ INSTALLATION CHECK LIST

INSTALLATION CHECKLIST

Placing The System

- Ductwork Inspected
- Blocks Positioned
- MCHP Stand Installed

Attaching The HI Module/Furnace

- ¼" Sealing Foam Installed
- Front & Back Attachment Brackets
- Install 120VAC & Comm. Cables
- Place unit on 4 Concrete Blocks
- 4" Gap At Front of Blocks

Connections

- Attach/Seal Return/Supply Ductwork
- Coolant Piping (Max Length = 20 ft.)
- Proper Condensate Drain Piping ("Y")
- Furnace Trap Filled With Water

Combustion Air and Vent Pipe

- Installed per Furnace Instructions
- Installed per Honda MCHP Instructions
- Installed per AHJ's Requirements

Electrical Wiring & Connections

- Installed per Furnace Instructions
- Installed per Honda MCHP Instructions
- Installed per FTS Instructions
- Installed per APC UTS6H Instructions
- Installed per AHJ's Requirements

Thermostat Wiring & Connections

- Thermostat (10-cond) Wire Installed
- Properly Connected at Both Ends
- Verify thermostat operates properly
- Outdoor Temperature Sensor Installed

Internet Connection

- Cat 5 Cable Connected
- Network setup through Mint
- Port forwarding on router
- Check embedded **freewatt** page
- Homeowner signed and/or accepted monitoring consent form.

Safety Systems

- Test Exhaust Gas Leak System
- Operational Check (Furnace & MCHP)
- Commissioning procedure completed.

Start-Up Procedures

- Fill MCHP Condensate Trap
- Coolant Level Acceptable

Grid Interconnect

- Electrical Inspector Signature (Certificate of completion)
- Picture of MCHP with and without cover
- Picture of Panel with Generator Warning Sticker
- Picture of Outdoor Disconnect (if applicable)

Commissioning Checkout

- Confirm Furnace Jumper Settings
- Verify Sequence of Operation
- Inspect Venting and Air Intake
- Inspect Condensate Drain
- Inspect System Piping & Connections
- Inspect Coolant Reservoir
- Measure Gas Input Rate
- Commission furnace per furnace IOM (includes air flow temperature rise)

Documentation

- IOM & Users Manual left at jobsite
- Record system serial number
- Service contact Information given to owner

Honda MCHP

- Strain Relief
- Y in Condensate Drain Tube

WDJ/WAJ SERVICE NOTES

Date: _____

Service Technician: _____

Notes: _____

Date: _____

Service Technician: _____

Notes: _____

Date: _____

Service Technician: _____

Notes: _____

freewatt®



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