freewatt®

HDZ
Hydronic freewatt System
POWERED by HONDA™

COMMISSIONING, START-UP, OPERATING AND CHECKOUT PROCEDURE

CUSTOMER NAME	**freewatt** System Serial Number

An ISO 9001-2008 Certified Company
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ecr innovative living™

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	☐ RED SHIPPING BRACKET REMOVED
	☐ CONDENSATE TRAP FILLED WITH WATER
	☐ GAS VALVE ON
☐	**BOILER**
	☐ CONDENSATE TRAP FILLED WITH WATER
	☐ GAS VALVE ON
☐	**HYBRID INTEGRATION MODULE**
	☐ PUMP'S POWER CABLE IS PLUGGED INTO CONTROL MODULE
	☐ CHECK PIPING & CONNECTIONS
☐	**INDIRECT WATER HEATER**
	☐ AQUASTAT SET AT 120°F MAXIMUM
	☐ ANTI-SCALD MIXING VALVE INSTALLED

2 - COMMISSIONING PROCEDURE

2.1 - BOILER

1. Place Control Module's CHP MODE switch in ***OFF*** position.
2. Verify 120 VAC power is supplied to Control Module and boiler.
3. Confirm proper operation of boiler, perform boiler commissioning according to boiler IOM, which includes combustion gas analysis (boiler startup section of FW95M-200 Controls and Troubleshooting Manual).
4. Modify boiler parameters:

PARAMETER / DESCRIPTION		FACTORY SETTING	Finned Tube BB; Cast Iron Baseboard or Radiators	Over-Radiated Finned Tube Radiant (Below Floor Stapled)	Radiant (Thin Slab; Above Floor Sleeper System)	Radiant (Slab On-Grade)
1	T3 Set DHW	150	120	120	120	120
4	T1 Top CH-Mode	180	160	160	140	120
5	T1 Foot CH-Mode	120	100	90	90	80
11	Boost Mode	30	0	0	0	0

5. Allow water heater's aquastat to signal heat call to Control Module & boiler.
6. Check hot water tap to confirm water heated & mixing valve set properly.

2 - COMMISSIONING PROCEDURE

2.2 - HI MODULE

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

2.3 - HONDA MCHP

1. Turn MCHP Power ***ON***
   A. Remove small panel on top, left side of MCHP
   B. Rotate rotary switch to ***ON*** position
2. Turn 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, see troubleshooting section (Page 6)

2.4 - HYDRONIC freewatt SYSTEM, MODEL HDZ

1. Turn all zones ***DOWN*** or ***OFF*** except for Smart Zone with HAI Thermostat.
2. 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. (If thermostat does not immediately call for heat, wait for short cycling delay until there is heat call).
3. If outside temperature is over 40°F, please continue to step 4. If temperature is below 40°F, turn ***OFF*** boiler when boiler supply temperature reaches 120°F-130°F.
4. Connect laptop to freewatt Control Module with RS-232 serial cable and connect to system using MINT service tool software.
5. Record following information from MINT:

RCC Firmware Revision	RCC Serial Number

6. Check coolant reservoir is full. Add coolant if necessary, and replace cap.
7. Check no leaks between Honda MCHP and HI-Module or inside HI-Module.

2.5 - 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, 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, 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 1-2 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.

2.6 - MCHP COOLANT TEMPERATURE

1. Switch ***OFF*** power at freewatt Control Module.
2. After 10 seconds, switch power to Control Module ***ON*** .
3. Move MCHP mode switch on freewatt Control Module to ***ON*** position. MCHP should start and operate smoothly.
4. Reconnect via MINT tool.
5. Operate MCHP unit until MCHP Coolant Temperature stabilizes between 170 to 174° F (Wait at least 30 minutes for total purge of air bubbles). Coolant Temperature is visible in System Status window or by clicking "Status" button at top of MINT screen.
   A. If MCHP Coolant Temperature stabilizes lower than 170°F and MCHP is still operating, increase mixing valve's setting (+). Remember, every full turn of mixing valve is about 10°F.
   B. If MCHP Water Temperature stabilizes higher than 174°F and MCHP is still operating, check following items in order:
      i. Coolant Flow: Verify coolant pump is powered ***ON*** and flow is occurring (Temperature Differential across MCHP = 20°F or higher)
      ii. Hydronic Water Flow: Verify circulator on hydronic loop side of Hi-Module is powered ***ON*** (Relay switch LED & Terminal Block Pump LED) and flow is occurring (pump's motor is rotating). This circulator operates based on MCHP Water Temperature and switches ON when the MCHP Coolant Temperature reaches ~170°F.
      iii. Plumbing: Ensure that all MCHP coolant loop and MCHP hydronic loop connections are routed appropriately:
         - LLC Out (upper) port on MCHP is plumbed to front, left port of heat exchanger in HI-Module.
         - Hydronic side water line closest to zone returns flows to port at right rear of HI-Module heat exchanger.
      iv. Mixing Valve: Decrease the mixing valve's setting (-). Remember that every full turn of the mixing valve is about 10° F.
      v. Please record:

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 tubing connections.

2.7 - 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 optional internet connection:
   A. Refer to instructions in freewatt System Installation, Operation and Maintenance Manual.
   B. Apply IP Address, Netmask, Router, and DNS information in Network Setup tab of MINT.
3. If internet monitoring capability is being utilized, turn on reporting from freewatt System to ECR International, Inc.:
   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 the Enable Sampling checkbox
   D. Click Update
4. Disconnect the MINT tool from Control Module.

Commissioning procedure is completed. Store this sheet in Hydronic HI Module for future reference:

DATE	**freewatt** TECHNICIAN

3 - COMMISSIONING PROCEDURE - TROUBLESHOOTING

3.1 - 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, go back to Step A above and repeat.

C. If 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.

3.2 - 3 FLASHES OF RED LED ON freewatt CONTROL MODULE: ERROR CODE 3

Power ***OFF*** Honda MCHP, Control Module and Boiler. Power ***ON*** Honda MCHP and THEN power ***ON*** Control Module and Boiler switch.

A. Check 240VAC and MCHP ON/OFF Power Switch to Honda MCHP.

B. Check MCHP Communications Cable between Control Module and Honda MCHP.

C. Check Outdoor Disconnect Switch, if present.

3.3 - HONDA MCHP OVERHEAT

Check following items in order:

A. Coolant Flow: Verify coolant pump is powered ***ON*** and flow is occurring (Temperature Differential across MCHP = 20°F or higher)

B. Hydronic Water Flow: Verify circulator on hydronic loop side of Hi-Module is powered ***ON*** (Relay switch LED & terminal block) and flow is occurring (pump’s motor is rotating). This circulator operates based on MCHP Coolant Temperature and does not switch ***ON*** until MCHP Water Temperature reaches ~170°F.

C. Plumbing: Verify all coolant tubing is routed appropriately:
    i. MCHP Coolant Piping: MCHP coolant pump inside HI Module connects to lower (LLC In) port on MCHP. MCHP’s top (LLC Out) port connects to hot connection of HI Module’s mixing valve.
    ii. Hydronic MCHP Piping: Return from hydronic manifold connects to right rear port on HI Module brazed plate heat exchanger. Supply to hydronic manifold connects to right front outlet on HI Module brazed plate heat exchanger.

D. Mixing Valve: Decrease mixing valve’s setting (-). Remember every full turn of mixing valve is about 10° F.

3.4 - 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. Honda MCHP: Check and verify proper connections of cable on Honda MCHP.
iii. Exhaust Gas Leak Sensor Cable: Check cable for continuity and integrity.

If error persists, replace Sensor or cable.

3.5 - 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 these components.
iii. 24 VAC Power: Check 24 VAC power supply for Control Module.

If error persists, replace thermostat or cable.

4 - START-UP AND OPERATING PROCEDURES

⚠WARNING

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch or use any phone in the building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you can not contact your gas supplier, call the fire department.

NOTICE

Before modifying mixing valve's factory-setting, please check following items:

- Hydronic circulator connected to HI module is moving hydronic water
- Coolant lines are not blocked
- Coolant pump is operating properly.

NOTICE

Approximately 0.75 gallons of coolant will be needed for filling procedure.

4.1 - IMPORTANT OPERATING NOTES

- Coolant Tank cap should be tightened to ensure no evaporation of coolant occurs.
- Clean up any coolant spills and discard rags and containers properly.
- Check Honda MCHP, Hydronic HI Module and coolant tubing and fittings for any leaks.
- System does not have pilot. System is equipped with ignition device that automatically lights burner on boiler and spark plug that automatically lights within MCHP unit. Do NOT try to light boiler's burner by hand!
- Before operating, smell all around system area for gas. Be sure to smell next to floor because some gas is heavier than air and will settle to floor.
- Use only your hand to turn gas ball valve. Never use tools. If valve will not turn by hand, do not attempt to repair it, call qualified service technician. Force or attempted repair may cause fire or explosion.
- Do not use system if any part has been underwater. Immediately call qualified service technician to inspect system and to replace any part of control system and any gas control that has been under water.
- Before operating system verify there is water in condensate traps of both boiler and MCHP unit. Condensate trap of MCHP unit can be filled by temporarily removing rubber hose vent section and slowly pouring approximately one cup of cold water into combustion gas exhaust vent at the top of MCHP unit.
- Boiler condensate trap can be filled by pouring approximately one cup of water into exhaust gas vent. Flow of water from condensate drain in each case confirms that trap is filled with water.

4 - START-UP AND OPERATING PROCEDURES

4.2 NORMAL freewatt STARTUP

1. Enable HONDA MCHP
   A. Open gas valve on MCHP gas supply line.
   B. Set 240 VAC service switch to ON position.
   C. Check rotary switch on enclosed front panel of MCHP is in ON position. (Normally, this will be case after commissioning of system.)
2. Control Module/HI Module/Boiler.
   A. Set 120 VAC Service Switch to ON.
   B. Set CHP MODE switch to ON position.
   C. Turn ON boiler power supply switch and check Boiler Parameters for Preferred Setting.
3. Set Smart Zone Thermostat to Heat Mode (Thermostat may take few seconds to initialize after 120 VAC Service Switch set in ON position).
4. When there is call for heat, MCHP, coolant pump and. hydronic circulators will start. If MCHP does not satisfy call for heat, after period of time boiler will turn on and supply higher level of heat to distribution system.

4.3 - freewatt SHUTDOWN PROCEDURE

A. Preferred Shutdown Method: Set CHP MODE switch on control module to OFF. After shut down cycle of approximately three minutes is completed, set 120 VAC Service Switch to OFF position.
B. Emergency Shutdown Method: Set 120 VAC Service Switch and CHP MODE switch to OFF. Due to coolant pump turning off, HONDA MCHP may overheat and flash error message.

4.4 - TURNING OFF GAS TO THE SYSTEM

freewatt System consists of two gas-fired units; boiler and HONDA MCHP unit. Each unit is installed with separate gas valve.

1. Use preferred shutdown procedure.
2. If service is required, turn off all electrical power to system (boiler and MCHP unit) at 120VAC and 240VAC circuit breakers serving freewatt System. Also, turn off 240VAC Service Switch and 120VAC Service Switch.
3. Boiler - Turn gas ball valve off, handle should be perpendicular to gas pipe.
4. MCHP unit
   - Follow flexible stainless steel gas connector extending from right side of MCHP unit to its connection to gas piping.
   - Turn gas ball valve off, handle should be perpendicular to gas pipe.

⚠ WARNING

Should overheating occur or gas burners or internal combustion engine fail to shut off, close manual gas valves for boiler and MCHP before shutting off electrical power to boiler. Failure to do so can cause an explosion or fire resulting in property damage, personal injury or loss of life. Before restarting boiler or MCHP, check all plastic vents, gas connectors and wiring for damage.

4.5 - Use of Bypass Mode

- Bypass Mode disables freewatt Control Module/Hybrid Integration Module and HONDA MCHP.
- Mode also connects thermostat directly to boiler and allows system to deliver heat to dwelling.
- Switch CHP Mode Switch to OFF to force bypass mode of operation. This is useful to disable Honda MCHP operation while final approval for grid interconnection is pending.
- freewatt System will go automatically into bypass if fault develops in subsystem (Control module/HI Module and Honda MCHP) or critical MCHP maintenance procedure is not performed on schedule.
- Bypass mode is also useful in temporarily stopping operation of MCHP unit if fault condition is indicated or any other operational concerns arise with MCHP unit operation.
- freewatt System may be left in Bypass Mode until service can be provided as boiler will continue to provide heat.

5 - CHECKOUT PROCEDURES AND ADJUSTMENTS

- **Boiler and Honda MCHP** unit have specific checkout procedures outlined in their Installation, Operation and Maintenance manuals. Please review these manuals before proceeding to system procedures found below.

- **Verify Sequence of Operation -** Sequence of operation containing potential faults can be found in Section 13of the Model HDZ Hydronic freewatt IOM.

- **Confirm Boiler Parameters** - Operate boiler and verify boiler parameters have been modified to operate optimally with **freewatt** System (Parameters 1, 4, 5 & 11). Refer to page 2 in this document for more information. **freewatt** Boiler should be checked and adjusted per manuals provided.

- **Confirm Control Module Jumper Setting -** Operate **freewatt** System and verify jumper setting (Zone1 = Heat; Zone1 = DHW) has been set correctly for installation. Refer to Section 17 of the Model HDZ Hydronic freewatt IOM – Electrical Wiring for more information.

- **Confirm ECR Switch Setting(S) -** Visually inspect PRIORITY switch setting and confirm it's correct setting.

- **Inspect Venting and Air Intake** - Operate system and verify all vent/air intake connections are gas-tight and watertight. Repair any leaks immediately.

- **Inspect Condensate Drain** - Verify all connections are watertight, and condensate flows freely. Repair any leaks immediately. If system is being checked out after long period of no use, verify condensate trap is adequately filled with water and no combustion products can freely vent from drain piping.

- **Inspect System Piping** - Verify all connections are not leaking coolant. Repair leaks immediately.

- **Inspect Coolant Reservoir** - Verify coolant reservoir is filled with long life coolant. If necessary, fill tank with Honda Long Life Coolant and repair leaks immediately. Fill to MAX fill line as necessary.

- **Check Fuel-Air Mixture and Natural Gas Input Rate** - Input rate and fuel-air mixture of MCHP are not adjustable. Consult MCHP IOM for details concerning operation.

- **Inspect Thermostat -** Verify thermostat communicates with **freewatt** Control module and properly communicates required modes of operation (Heat, Cool, Continuous Fan, Auto, etc.).

- **Inspect Internet Connection** - Verify **freewatt** Control module is properly connected to your Local Area Network and is communicating. This can be accomplished by bringing web page up on network computer.

- **Inspect Website** - Verify **freewatt** website is operating properly. Perform steps outlined in User's Information Manual.

- **Inspect exhaust gas leak sensor System** - Verify Exhaust Gas Leak Sensor System is operating properly by executing Test Procedure. Follow instructions found in Section 5 of the Model HDZ Hydronic freewatt IOM.

- **Inspect Pressure Switch System -** Verify **freewatt** Pressure Switch System is operating properly for MCHP and blocked vent detection is also working for boiler. This can be done by temporarily covering outdoor vent terminations and observing shutdown of each unit.

6 - INSTALLATION CHECKLIST

Placing The System

- ☐ MCHP Stand Installed
- ☐ < 10 ft. between HI Module and MCHP

HI Module/Control Module

- ☐ HI Module installed above MCHP
- ☐ Strain relief installed on communication/signal cables
- ☐ Install 120VAC & Comm. Cables and Priority setting on ECR controls.
- ☐ Confirm Domestic Hot Water Jumper Setting

Connections

- ☐ Connect MCHP loop to Hydronic system upstream of Boiler connection
- ☐ Coolant Piping
- ☐ Condensate Drain Piping
- ☐ Mixing Valve on outlet of Indirect Hot Water Tank

Combustion Air and Vent Pipe

- ☐ Installed per Boiler Instructions
- ☐ Installed per HONDA MCHP Instructions
- ☐ Installed per requirements of Authority having jurisdiction.

Electrical Wiring & Connections

- ☐ Installed per Boiler Instructions
- ☐ Installed per HONDA MCHP Instructions
- ☐ Installed per AHJ's Requirements

Thermostat Wiring & Connections

- ☐ Thermostat (10-cond) Wire Installed for Smart Zone thermostat
- ☐ Smart Zone Thermostat installed as Zone 2 and properly wired.
- ☐ Program Thermostat
- ☐ Outdoor Reset / Temperature Sensors Installed for Boiler and Control module

Internet Connection

- ☐ Connected
- ☐ Tested

Safety Systems

- ☐ Pressure Switch System
- ☐ Exhaust Gas Sensor System
- ☐ UL approved Carbon Monoxide Detector (in addition to Exhaust Gas Senor System)
- ☐ Operational Check (Boiler & MCHP)

Start-Up Procedures

- ☐ Condensate Traps Filled With Water
- ☐ Check that MCHP Coolant drain valve is closed and capped.
- ☐ Coolant Level Acceptable

Grid Interconnect

- ☐ Permit Information
- ☐ Certificate of Completion
- ☐ Electrical Inspector Signature
- ☐ Forward Completed Certificate to Utility

Commissioning Checkout

- ☐ Verify Sequence of Operation
- ☐ Inspect Venting and Air Intake
- ☐ Inspect Condensate Drain
- ☐ Inspect System Piping & Connections
- ☐ Inspect Coolant Reservoir
- ☐ Check Boiler Gas Input Rate
- ☐ Confirm Boiler Settings

Documentation

- ☐ IOM & Users Manual
- ☐ Website Information
- ☐ Service Information
- ☐ Climate Rep Information

HONDA MCHP

- ☐ Strain Relief
- ☐ Y in Condensate Drain Tube

NOTES

NOTES

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