

freewatt®



Hydronic freewatt Plus System, Model HDJ

POWERED by HONDA™

User's Information Manual



Information and specifications in the manual were in effect at time of printing of this manual. ECR International reserves the right to discontinue, change specifications or system design at any time without notice and without incurring any obligation, whatsoever.

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HYDRONIC SYSTEM, MODEL HDJ

Use manual with following manuals.

- Hydronic **freewatt** PLUS System Installation Manual & Operating Instructions
- **freewatt** FW95M-200 Boiler Installation, Operation and Maintenance Manual.
- HONDA MCHP, Model1.2D and MCHP1.2DP, Type UCFJ, Installation Manual and Owner's Manual.
- HAI Thermostat Installation Instructions and Owner's Manual
- **freewatt** Transfer Switch Site Preparation and Setup Guide.
- APC Universal Transfer Switch Installation, Site Preparation and Installation Guide.



As an Energy Star partner, ECR International has determined the Boiler included as part of **freewatt PLUS** System meets Energy Star guidelines for energy efficiency.



Honda MCHP is an Intertek-ETL Listed, "Utility Interactive, Cogeneration, Stationary Engine-Generator Assembly, Control # 3163904 (US).



Boiler and HI Module assembly is design certified in US and Canada by Canadian Standards Association.



NOTICE

Do not destroy this manual.

Read and keep in safe place for future reference by service technician.

INTRODUCTION

NOTICE

Read instructions thoroughly before attempting to operate this system.

Introduction

Use of this manual is for following systems.

HDJ:

- HDJ200N00A, HDJ200L00A, HDJRCKN00A and HDJRCKL00A.
- Hydronic **freewatt PLUS** System User's Information manual outlines safety information, operating instructions and maintenance information.
- Read warranty policy to fully understand its coverage and ownership responsibilities. Warranty policy is separate document and should be provided to you by your dealer.
- Local **freewatt** dealer is specially trained in servicing requirements of Hydronic **freewatt PLUS** System. Dealer is available to answer any questions about your system.
- **freewatt** control module can be connected to high-speed internet connection and configured to allow your service provider to continuously monitor your system's operating characteristics. If system has any operating characteristics outside normal operating range, control module can notify service provider of abnormality. Internet connection allows you view of control module's webpage, monitor system's operation and modify thermostat settings. This communication link can be configured to operate either from inside or outside your home's local area network. Contact your dealer to inquire about connecting your freewatt system to the internet.

How Does freewatt PLUS Work?

- The Hydronic **freewatt PLUS** System is a micro-combined heat and power system that replaces your standard home heating appliance.
- By integrating state-of-the-art Honda MCHP technology with a high efficiency Hydronic Condensing Boiler, **freewatt PLUS** offers homeowners the ability to make their own electrical power while heating their house.
- **freewatt** control module accepts data from communicating thermostat and outdoor temperature sensor and uses its custom-engineered heating algorithm to supply heat to the home.
- **freewatt** control module maximizes operating hours of Honda MCHP unit and power production, while continuously providing low level of heat to your home.

- Homeowners immediately feel improved comfort level. If additional heat is needed, high efficiency boiler starts and delivers required heat.

How freewatt PLUS Saves Money:

- Hydronic **freewatt PLUS** System is designed to produce significant electric power annually, while heating your house. Reducing amount of power your home takes from electric grid and lowers your electric bill, during heating season.

How freewatt PLUS Provides Back-Up Power:

- **freewatt PLUS** System monitors grid power and in event of power failure, Honda MCHP provides automatic back-up power to APC smart load center after short warm-up period. Using your existing fuel gas connection, system powers your predetermined back-up loads for extended power outages.

Any Questions?

- Visit **freewatt** website, www.freewatt.com, and check FAQ (Frequently Asked Questions) page for answers to common questions about Hydronic **freewatt PLUS** System. To learn more about **freewatt** products contact your local **freewatt** dealer.

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Safety Symbols

This manual contains important safety information, read carefully. Read all **freewatt PLUS** System manuals for safety information and warnings.

DANGER

Indicates a hazardous situation which, if not avoided, WILL result in death or serious injury.

WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates information which should be followed to ensure proper installation and operation.

WARNING

If instructions are not followed exactly, fire or explosion could result in personal injury or loss of life causing or property damage.

WARNING

Furnace and engine exhaust from this system contain chemicals known to state of California to cause cancer, birth defects or other reproductive harm.

WARNING

Exhaust gases from this system contain chemicals which may include carbon monoxide (CO). Carbon monoxide is odorless, tasteless, clear colorless gas, which is highly toxic. Low concentrations are suspected of causing birth defects and other reproductive harm.

UL and ULC recognized CO detectors are required for all buildings equipped with freewatt plus system. Install CO detectors in accordance with manufacturer's instructions and applicable local building codes.

WARNING

Natural gas and propane are normally odorized by fuel supplier. Odorant may not be perceivable. Installation of ul and cul recognized fuel gas detectors installed in accordance with manufacturer's instructions is recommended.

1 - IMPORTANT SAFETY INFORMATION

WARNING

What to do if you smell gas:

- Do not try to light any appliance.
- Do not touch any electrical switch.
- Do not use any phone in your building.
- Immediately call your gas supplier from neighbor's phone, or cellular phone from location well away from building. Follow gas supplier's instructions.
- If you cannot reach your gas supplier, call fire department.
- Do not re-enter the building until authorized to do so by gas supplier or fire department.

Do not store or use gasoline or other flammable vapors and liquids, or other combustible materials in vicinity of this or any other appliance.

Improper installation, adjustment, alteration, service or maintenance can cause injury, or loss of life. Installation and service must be performed by qualified installer, service agency or gas supplier

WARNING

Should overheating occur or gas burners or internal combustion engine fail to shut off, close manual gas valves for furnace and MCHP before shutting off electrical power to furnace. Failure to do so can cause an explosion or fire resulting in personal injury or loss of life.

Before restarting furnace or MCHP, have freewatt dealer or service agency check all plastic vents, gas connectors and wiring for damage.

WARNING

If instructions are not followed exactly, fire or explosion could result in personal injury or loss of life causing or property damage.

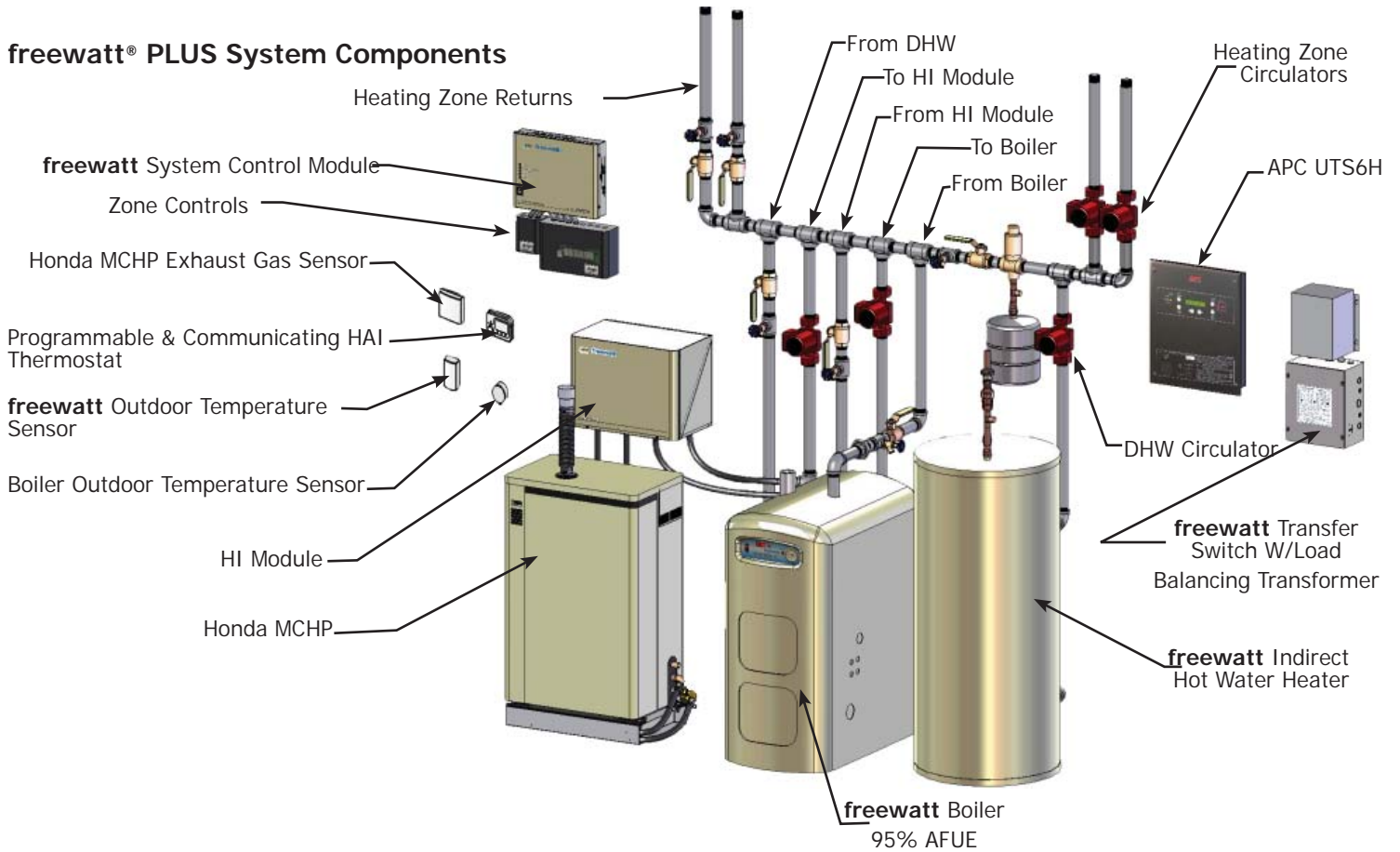
1.1 Safety Information

- **freewatt PLUS** System needs adequate amounts of combustion and ventilation air to operate properly. Do not block or obstruct air openings on Boiler or Honda MCHP, or air openings supplying combustion or ventilation air to area where system is installed. There are many areas from which your Boiler and Honda MCHP could be receiving combustion and ventilation air including from within the heated area (inside air), from outdoors, and attic or crawl space. If renovations are done, be sure air supply openings are not inadvertently covered over with insulation, vapor barrier, carpet, wood flooring or other similar construction material.
- All doors and panels must be in place during normal system operation. Attempting to operate system with missing doors or panels could lead to creation of carbon monoxide or allow moving parts to be exposed.
- If system is installed in confined space or if you intend to build Boiler room where insulation is present, be aware some insulating materials are combustible. Do not allow building insulating materials to come into contact with system.
- Any additions, alterations or conversions required in order for system to properly match application requirements must be done by qualified and certified **freewatt** dealer.
- Familiarize yourself with the location of manual gas shut-off valves and electrical switches, fuses or circuit breakers associated with system.
- Should over-heating occur, or if gas valve fails to shut off burners, shut off gas supply with manual gas shut-off valve, then power off electrical supply to system. Call qualified and certified **freewatt** dealer for immediate service.
- If system has been subjected to flood conditions, i.e., if any part of system has been under water, call your **freewatt** dealer for complete inspection. Electronic controls and gas train components may become unstable and unreliable. System must not be used until it has been checked, and any affected parts have been replaced.
- Do not allow snow, ice or debris to accumulate around system's outdoor exhaust and combustion air intake terminals. Blockage of exhaust or combustion intake terminals can result in inadequate performance or nuisance shut-downs.
- Combustible materials should not be stored against or around the system. Keep the system area clear and free from all combustible materials such as newspapers, rags, cardboard, foam, plastic, paper-backed fiberglass insulation, clothing, etc. This applies especially to gasoline and other flammable vapors and liquids.

2 - SYSTEM COMPONENTS

Hydronic **freewatt PLUS** System, Model HDJ, includes the integration of 8 main components: Hybrid Integration (HI) Module, **freewatt PLUS** control module, Boiler (FW95M), Honda MCHP (MCHP1.2D), **freewatt** transfer switch, load balancing transformer, APC Universal Transfer Switch (UTS6H) and **freewatt** RC-1000 Thermostat. These components are outlined below:

freewatt® PLUS System Components



As an Energy Star partner, ECR International has determined the Boiler included as part of **freewatt PLUS** System meets Energy Star guidelines for energy efficiency.



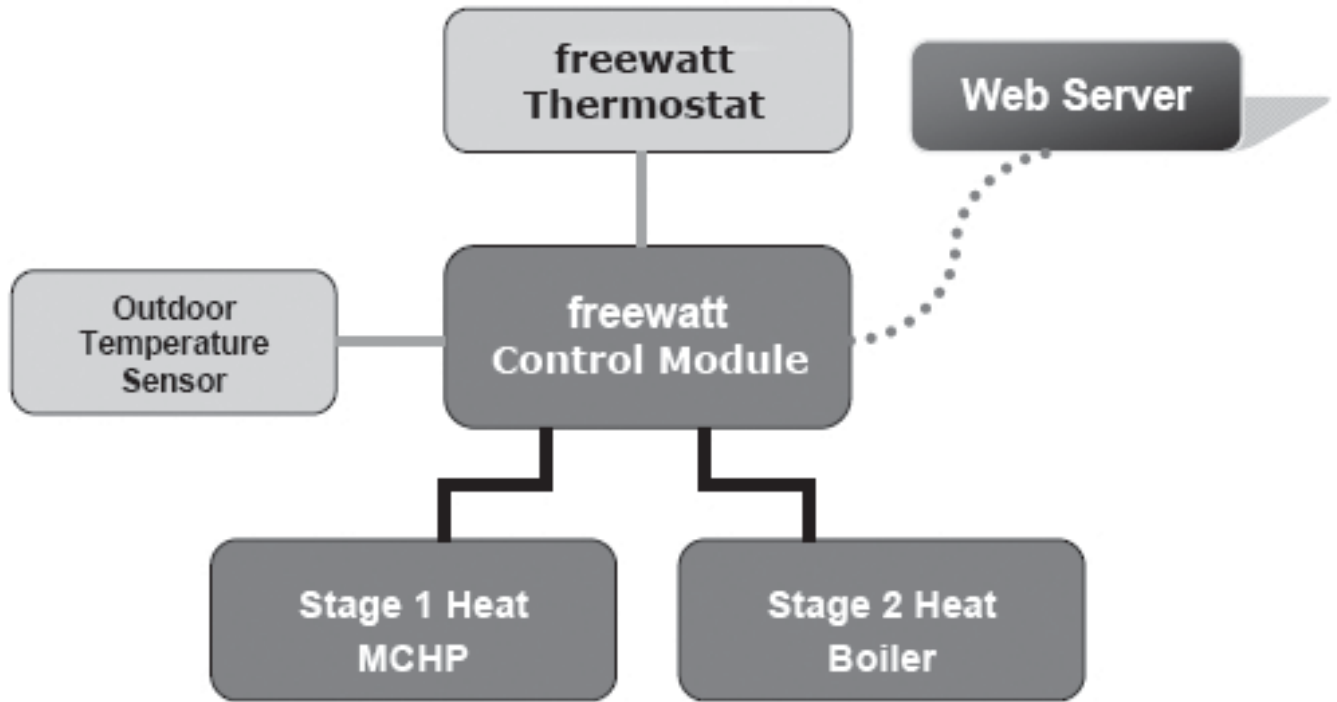
Boiler and HI Module assembly is design certified in US and Canada by Canadian Standards Association.



Honda MCHP is Intertek-ETL Listed, "Utility Interactive, Cogeneration, Stationary Engine-Generator Assembly, Control # 3163904 (US).

3 - CONTROLS & FEATURES

The Hydronic **freewatt PLUS** System has several levels of controls and inputs in its design. The schematic below outlines the major controls and inputs to the system.



CONTROLS AND FEATURES	DESCRIPTION
Thermostat	freewatt thermostat is a communicating, programmable thermostat that sends its settings and indoor temperature reading to freewatt control module. freewatt control module uses this information with outdoor temperature measurement to maximize power production of freewatt PLUS system.
Web Server	Web Server resides on freewatt control module allowing homeowner access to system's operating information, including thermostat settings, operating hours, etc., over home's local network through a standard web browser.
freewatt Control Module	freewatt control module is brain center for system's operation. Control module uses micro-processor to monitor and control system's operation and maximize its power production.
Stage 1 Heat - MCHP	First stage of heat is provided by Honda MCHP unit. During winter months, heat is delivered almost continuously at low level, increasing comfort level within the dwelling.
Stage 2 Heat – Boiler	Second stage of heat is provided by boiler using outdoor reset programming. Boiler will provide additional heat anytime low level heat from Honda MCHP alone is not enough to comfortably heat the home. Boiler will provide heat for the house in proportion to outside temperature.

3 - CONTROLS & FEATURES

3.1 Thermostat

NOTICE

Please read RC-1000 HAI communicating thermostat User's Guide before proceeding.

RC-1000 HAI communicating thermostat is precision digital thermostat for single stage heating and cooling systems. Thermostat is designed with following features:

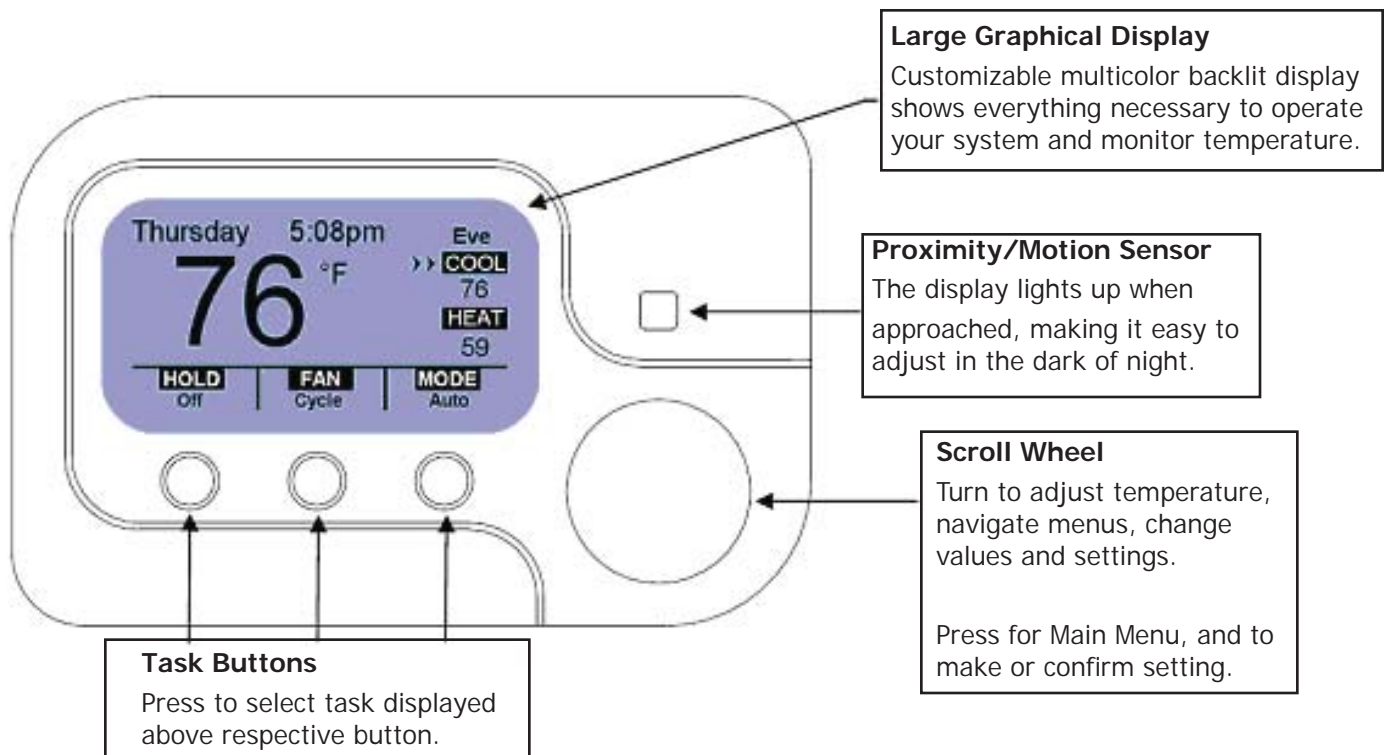
- Display shows current time, temperature, outdoor temperature and mode of operation
 - Local and remote control
 - Programmability, up to 4 periods of day for each day of the week
 - Energy Star qualified
 - Maintenance free
-
- Hydronic freewatt PLUS System requires communicating thermostat to provide information, including thermostat setpoints, indoor temperature, etc., to system control module so heating algorithm can maintain thermal comfort in home.
 - Conventional thermostats, even programmable thermostats, are not necessarily communicating. **freewatt PLUS** System will not operate without communicating thermostat working properly. If your **freewatt PLUS** communicating thermostat is not working properly, please contact your service provider to service or replace it.

NOTICE

Setback Operation: Although conventional heating equipment often suggests using setback as effective method of increasing energy efficiency, **freewatt PLUS** System delivers better savings, both financially and environmentally, when thermostat is set to your most comfortable temperature and not changed.

SET IT, FORGET IT & SAVE!

THERMOSTAT SETTING: freewatt PLUS System continuously delivers low level heat rather than cycling on and off, which has been found to result in increased comfort level. System benefit has resulted in homeowners lowering their thermostats.



3 - CONTROLS & FEATURES

3.2 Web Server

- Web server is factory-installed onto system control module. If your **freewatt PLUS** system is connected to internet, web server can be accessed through standard web browser (i.e. Windows Internet Explorer). Server displays status of your **freewatt PLUS** System, current indoor and outdoor temperatures, heating and cooling set points and ability to control programmable thermostat's schedule. Accessible from any computer on your home's network.
- As part of our installation services, **freewatt PLUS** product technician can set up **freewatt PLUS** to connect to your home router and allow for connectivity from outside your home's network. This will allow you to check your system from work, vacation or other remote locations.

Basic system status screen includes information about your **freewatt PLUS** System, including :

- model number,
- serial number,
- network information,

- operating information
- thermostat settings

Other screens include:

- Change Temp screen,
- Setup System screen,
- Company Website screen

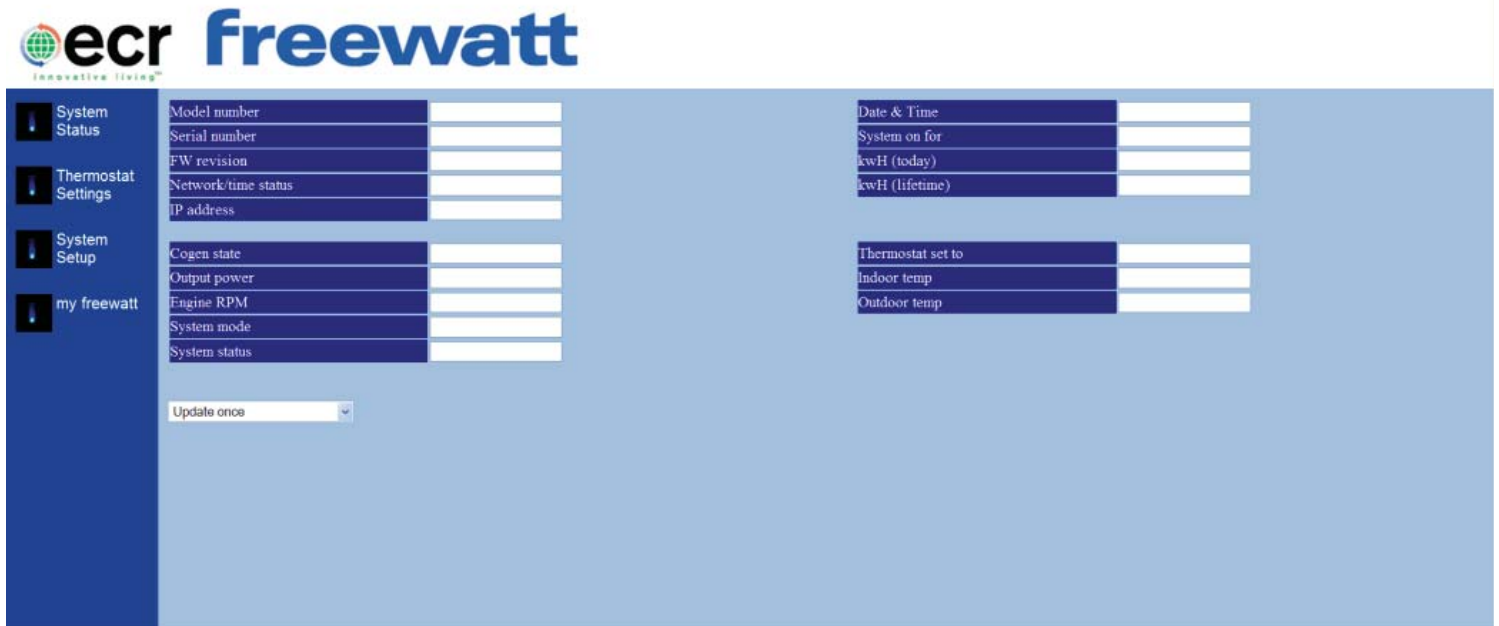
Change Temp and Setup System screens are secure screens and require passwords to enter. Ensures random users cannot change your settings.

Change Temp screen shows all programmable settings from communicating thermostat and allows user ability to modify settings as necessary.

Setup System screen should only be used by **freewatt PLUS** Product Technician or network professional to setup web browser on your local network.

Figure 2 shows System Status screen for **freewatt PLUS** System.

Figure - 2 Web Page System Status Screen



3 - CONTROLS & FEATURES

3.3 Front Panel of freewatt Control Module

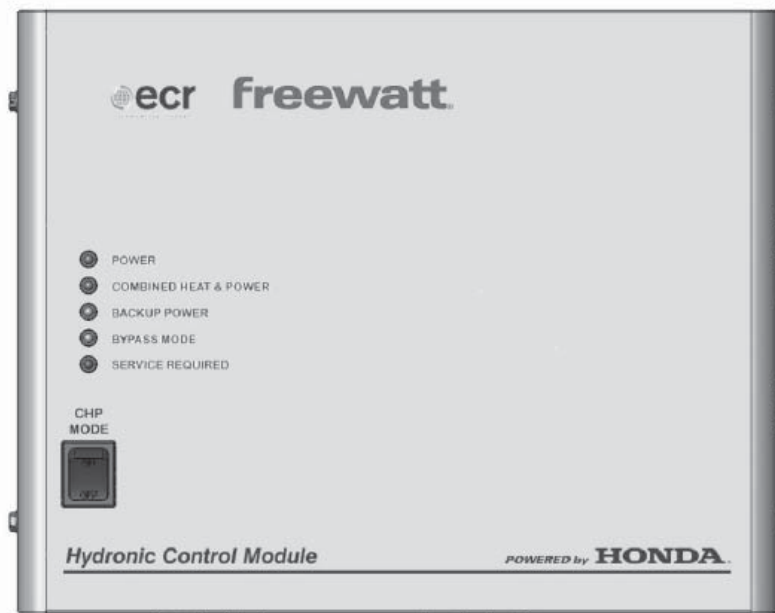
Front panel of **freewatt** control module has one switch, 5 display lights and serial connection port, shown in Figure 3. Switch is for CHP Mode.

Five display lights signal system's operating status:

- Power,
 - Combined Heat & Power,
 - Bypass Mode,
 - Backup Power
 - Service Required.
- Serial connection port is DB-9 specification and allows service technician to directly monitor and control **freewatt PLUS** System for diagnostics and troubleshooting procedures.
 - Field supplied 120 VAC power switch shuts off **freewatt** control module, zone controls and boiler for servicing and also allows for service to be performed on HI Module.
 - NOTE: If service is required on Honda MCHP, 240 VAC Honda MCHP service switch must be turned to OFF position.
 - CHP Mode switch notifies **freewatt** control module that Honda MCHP unit is not to be operated or is not installed. If Honda MCHP is installed, **freewatt** control module sends signal to Honda MCHP and shuts off unit.

- If Honda MCHP unit is not installed, switch signals the **freewatt PLUS** control module so only boiler will be operated. This switch effectively turns **freewatt PLUS** system into conventional heating appliance with boiler providing heat.
- Five display lights signal operating status of **freewatt PLUS** system and signal error/fault messages.
 - POWER light is green and signifies control module and boiler are receiving 120 VAC power.
 - COMBINED HEAT & POWER light is green and signifies Honda MCHP unit is operating.
 - BYPASS light is yellow and signifies Honda MCHP is being bypassed automatically or manually (check CHP mode switch).
 - BACKUP POWER light signifies **freewatt PLUS** System is operating in back-up power mode and supplying back-up power to APC Load Panel (Universal Transfer Switch).
 - SERVICE REQUIRED light is red and signifies **freewatt PLUS** System requires service.
- Front panel serial connection is used by your **freewatt** technician to investigate your system's operation and evaluate any operating issues. Cable connects technician's portable computer to **freewatt PLUS** System's service port and uses special diagnostic software for troubleshooting. Serial connection should only be used by your **freewatt** technician.

Figure - 3 Front Panel of freewatt Plus System



3 - CONTROLS & FEATURES

3.4 Boiler

- **freewatt** Boiler is 95% AFUE Energy Star-qualified gas boiler featuring, mono-block aluminum heat exchanger.
- Boiler has front display showing operating status, pressure or any fault/error. **freewatt PLUS** certified service technician will use information shown on boiler's screen to diagnose root cause of error, if error or fault occurs on boiler.

3.5 Honda MCHP Unit

- Honda MCHP Unit is custom-engineered micro-combined heat and power unit that will only operate, after properly installed, when **freewatt** control module sends start signal to unit.
- All operating information and error codes from Honda MCHP unit are sent to system control module through MCHP communication cable and information is presented through our webpage or on front panel of control module.
- Alternatively, **freewatt** service technician can use service tool to diagnosis or monitor Honda MCHP unit through system control module by connecting to service port on control module.

3.6 freewatt Transfer Switch

freewatt transfer switch is specifically designed to allow micro-combined heat and power system to switch between supplying power to house and utility grid in normal MCHP mode or supplying power to house in backup power mode. Off-the-shelf transfer switches are not designed for this application.

Three LEDs on front cover signal following conditions:

- Backup Power (Yellow LED),
- Utility Grid Power (Green LED)
- Fault (Red LED).

If fault LED is powered, please consult **freewatt** transfer switch manual or call your local **freewatt** service technician.

3.7 APC Universal Transfer Switch

- APC Universal Transfer Switch (Model UTS6H) is integrated with Warm Air **freewatt PLUS** System to provide load management and optimize power production of Honda MCHP in backup power mode.
- Switch automatically switches to Backup Power and uses its patented Adaptive Load Management™ technology to load switch between six circuits landed in panel. Switch is easily configured by your **freewatt PLUS** installer and shows operating characteristics of circuits on front LCD screen.
- Please consult APC Universal Transfer Switch manual (Model UTS6H) for details regarding display and any fault messages that may be displayed to homeowner.

4 - SYSTEM OPERATION INFORMATION

After **freewatt PLUS** System is commissioned by your **freewatt** dealer follow operating guidelines below:

4.1 Preparation

freewatt PLUS System needs several utilities to be functioning before starting system:

Utility	Description
Electrical	Set dedicated electrical circuits for MCHP (240 VAC) and boiler (120 VAC) in ON position. Ensure APC Universal Transfer Switch and freewatt Transfer Switch are powered.
Gas	Turn gas supply valves for MCHP and boiler to ON position.
Thermostat	Set thermostat on AUTO or HEAT and set desired temperature.

4.2 Starting System

- **freewatt PLUS** System will operate based on thermostat setting and outdoor temperature sensor, after system is commissioned by your **freewatt** dealer.
- If thermostat determines home needs heat, signal is sent to **freewatt** control module and Honda MCHP unit is turned on.
- If Honda MCHP unit's first stage of heat alone provides inadequate level of heat, boiler will be signaled to start.
- All operation should happen automatically based on thermostat's settings.

4.3 System Operation

freewatt transfer switch constantly monitors utility grid power and communicates with **freewatt** control module

Following operating modes are controlled by control module and transfer switch:

- **NORMAL MODE:** **freewatt** transfer switch will remain closed while utility power is present, allowing power to flow through **freewatt** transfer switch and to MCHP unit. MCHP unit will generate fixed 1200 watts of power when operating. Power will flow back through **freewatt** transfer switch to main utility panel and back to utility if surplus power is being generated. Balancing transformer is not used in this mode.

- **BOOST MODE:** Power will flow same way as Normal Mode, except authorized Electric Utility can send remote command to **freewatt PLUS** System requesting Boost Mode operation. Boost Mode temporarily increases power output from fixed 1200 watts to fixed 1800 watts, and is used with utility demand/response programs. Balancing transformer is not used in this mode.

- **BACKUP MODE:** **freewatt** transfer switch will automatically open and begin backup mode sequence when utility power is not present. MCHP unit's 240 VAC power output will load follow between 0-1,800 watts, and will be delivered into load balancing transformer to create 120 VAC. This 120 VAC power will be delivered to APC Universal Transfer Switch (UTS) and unit will load manage back-up loads. **freewatt** transfer switch, **freewatt** control module, MCHP unit and APC UTS will monitor state of utility grid, while initiating backup power sequence.

4.4 Shutting Down the System

WARNING

Electrical shock may cause serious injury or death. Following procedures may expose you to dangerous line voltage use caution to avoid touching live electrical contacts. All service must be performed by trained, experienced service technician.

Preferred Method:

- Set thermostat to OFF by pressing MODE button until display reads OFF.
- After shut down cycle of approximately three minutes is completed (coolant pump stops), turn SYSTEM POWER switch to OFF and Honda MCHP power switch to OFF.
- Turn main breakers in service panel to the OFF position if performing service inside boiler or Honda MCHP.

Emergency Method:

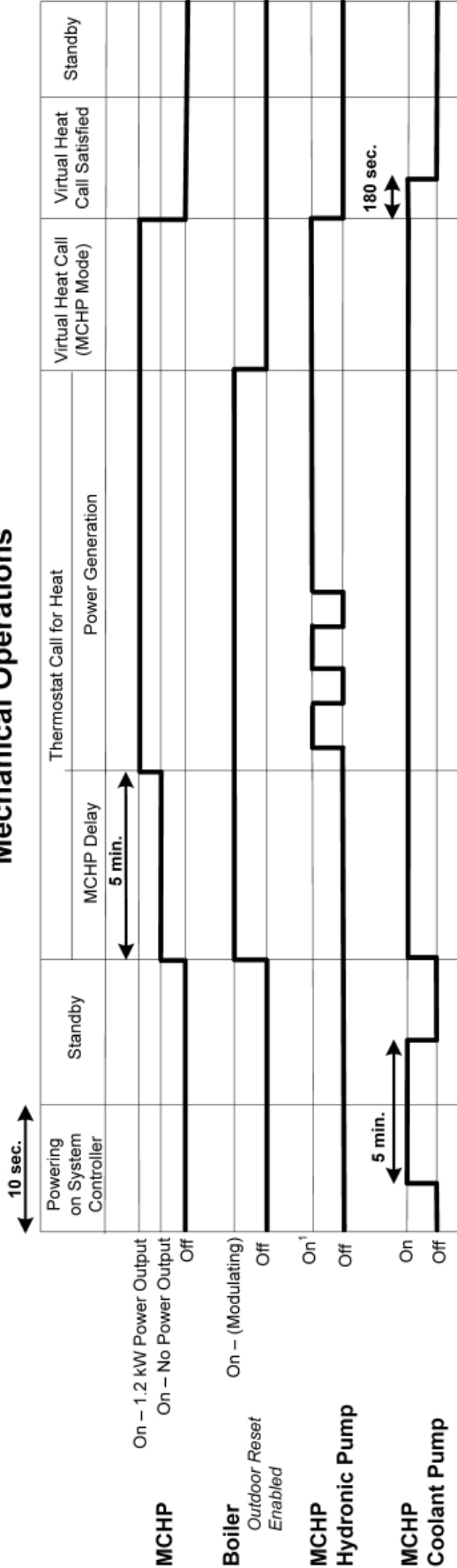
- Turn 120 VAC service switch and CHP MODE to OFF and Honda MCHP power switch to OFF. MCHP may overheat and flash error message if system is restarted soon after turning system OFF, due to coolant pump turning off.
- Turn main breakers in service panel to OFF position, if performing service inside boiler or Honda MCHP.

4 - SYSTEM OPERATION INFORMATION

4.5 Sequence of Operation

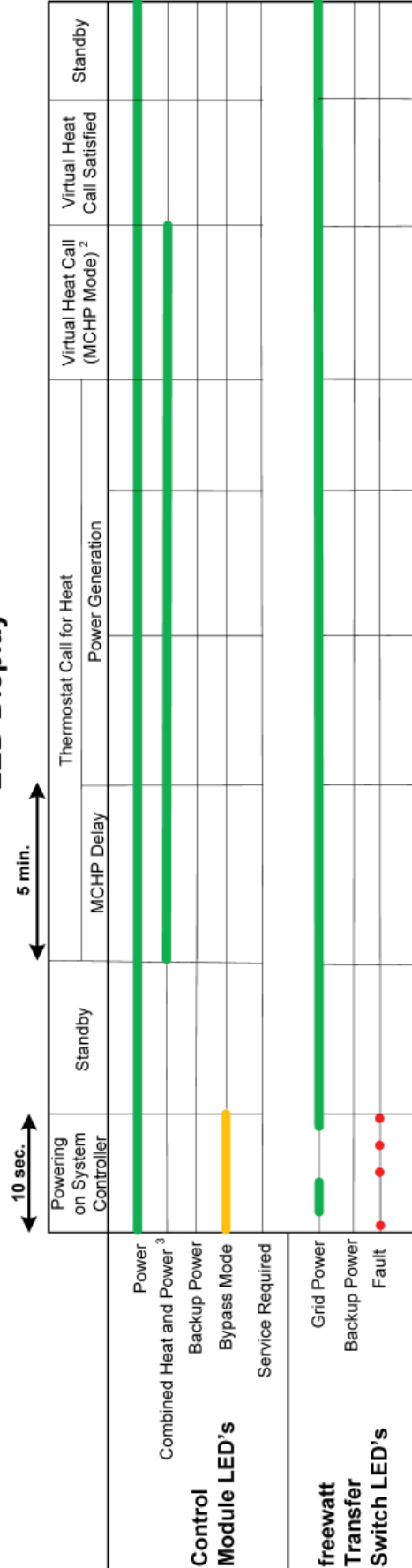
HYDRONIC FREEWATT SYSTEM Model HDJ
Sequence of Operation/Timeline: Normal MCHP Mode

Mechanical Operations



¹The System Controller will cycle the MCHP hydronic pump to maintain MCHP coolant temperatures

LED Display



²If every 2 minutes the Zone Controller turns OFF for 2 seconds and back ON, this is a normal function to inspect an expansion module for "Heat Call" activity during a Virtual Space Heating Call or Virtual Domestic Hot Water Call.

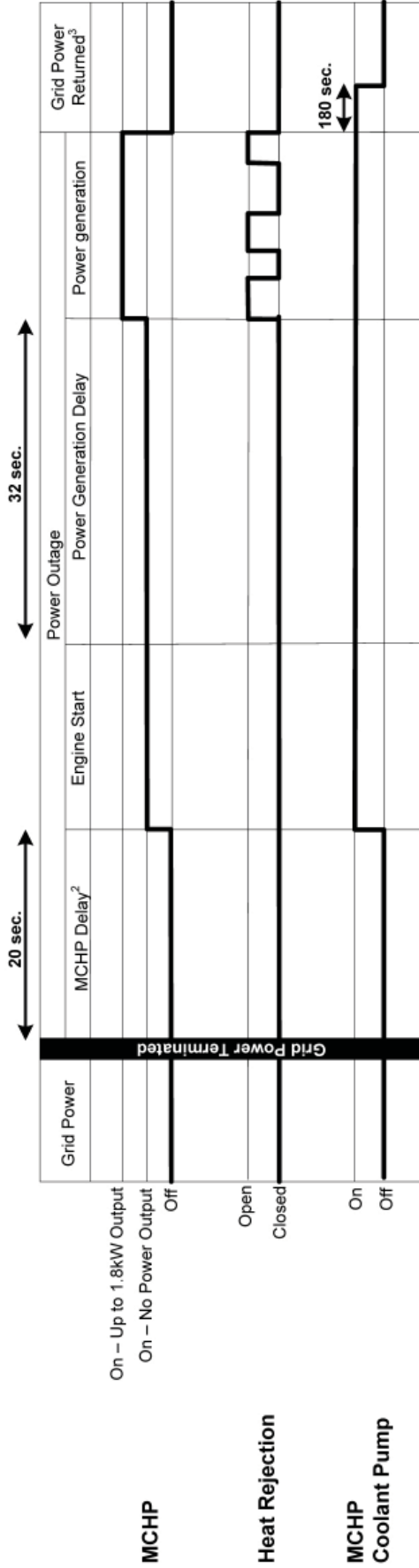
³If the CHP LED (Green) is flashing, this is a safety mode of operation that turns off the MCHP based on a spike of the coolant temperature above its recommended range of normal operation. In most cases, this mode will be temporary, but if it persists, please contact your dealer.

4 - SYSTEM OPERATION INFORMATION

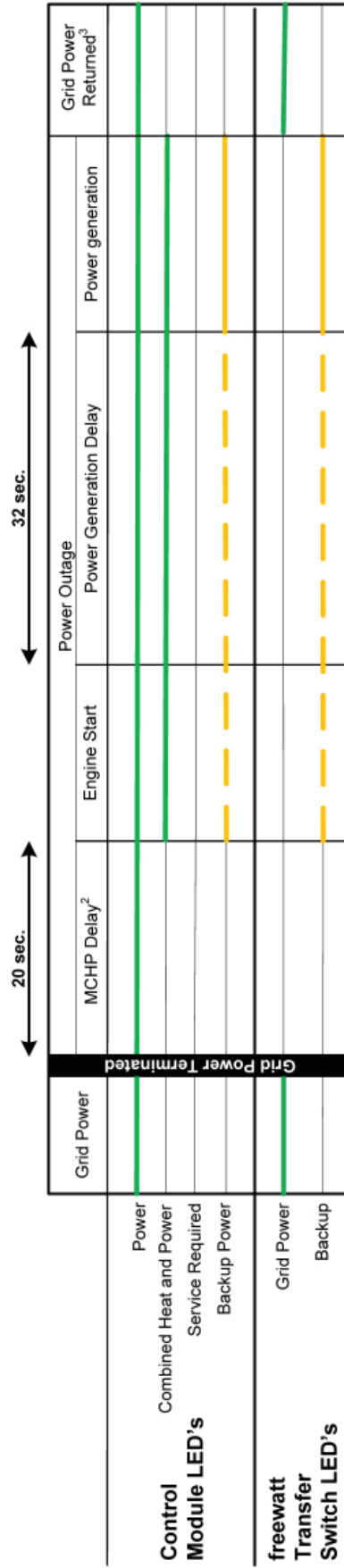
HYDRONIC FREEWATT SYSTEM Model HDJ

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 hydronic heating loop and appropriate heating zone. Heat calls are handled in the order of priority as shown below:

1. Actual Domestic hot water call
2. Actual Space Heating call
3. Virtual Domestic hot water call
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 (Engine ON; No power Generation) 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 serviceable call for heat, the heat rejection will be turned on.

4 - SYSTEM OPERATION INFORMATION

4.6 In Event of Power Failure

- HI module, system control module and boiler will immediately shut down and MCHP generator will disconnect from grid automatically.
- Honda MCHP unit's engine will continue to operate for 15 seconds before complete shutdown. Although engine is operating, generator is not producing power and is completely disconnected from grid.
- Feature protects unit in case power failure was momentary event, allowing Honda MCHP to quickly reconnect to grid and make power for your home.
- **freewatt PLUS** System enters backup power mode to provide back-up power to APC Universal Transfer Switch if power is out for 20 seconds.
- MCHP unit starts up in backup power mode and delivers 240VAC variable output power, up to maximum of 1800 watts to **freewatt** transfer switch.
- **freewatt** transfer switch will divert 240 VAC power to load balancing transformer to convert MCHP unit's 240VAC power to 120 VAC power compatible with loads on APC UTS. This reduces amount of available backup to maximum of 1700 watts.
- Adaptive Load Management of APC UTS will optimize Honda MCHP's power production by managing loads.

- MCHP unit will continue to operate in Backup Mode until **freewatt** transfer switch senses return of utility power.
- **freewatt** control module will safely command **freewatt** transfer switch to reclose to utility power after MCHP unit ceases backup mode operation, and system will subsequently return to Normal Mode.

4.7 Alerts and Alarms

freewatt PLUS System has several ways to alert homeowner and **freewatt** dealer that system is not operating properly:

- LED signals on front cover of HI module
- LCD display on front of **freewatt** boiler
- Thermostat display
- LEDs on **freewatt** Transfer Switch's front cover
- LCD display on APC Universal Transfer Switch
- Error messages found on webpage
- Remote monitoring, if system is properly internet connected and configured

If service or repair is required, please contact your **freewatt** dealer and have **freewatt PLUS** service technician check your system.

5 - SERVICE & MAINTENANCE

WARNING

Disconnect electrical power supply before attempting any maintenance. Failure to do so can cause electrical shock resulting in personal injury or loss of life.

CAUTION

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

Always verify proper operation after servicing.

NOTICE

Maintenance should be performed by your **freewatt** Dealer or service agency. Instructions contained in this manual should be strictly followed

NOTICE

It is recommended that your **freewatt PLUS** System be checked by your **freewatt** Dealer or service agency once a year.

- **freewatt PLUS** System does not have any user serviceable parts. It is recommended that **freewatt** Dealer or service agency perform any repairs or routine maintenance.
- If your system is internet-connected and communicating properly, our **freewatt** service center will be monitoring operating hours on your **freewatt PLUS** System to determine when your next maintenance interval should occur. Your **freewatt** dealer should contact you to schedule maintenance visit and order any parts required.

5 - SERVICE & MAINTENANCE

Regular service and maintenance by your freewatt Dealer or service agency must be performed to assure safe, trouble-free operation and maximum efficiency. It is recommended servicing or inspecting system at least once every 12 months.

It is recommended use of only new, genuine parts or equivalents for repair and replacement to ensure best quality and reliability.

Schedule annual service call by your **freewatt** dealer or service agency, which includes:

- **Boiler:** Examine boiler per annual inspection/service procedures outlined in boiler Installation, Operation and Maintenance Manual. Inspections include, but are not limited to:

- Heat Exchanger
- Burners
- Drainage
- Combustion Air Blower
- Electrical
- Condensate Drain
- Intake Air and Exhaust Piping
- Boiler Operation (Safeties, Temperature Rise & Burner Ignition)

- **Control Module/Hybrid Integration (HI) Module:**

Examine control module and HI Module per its annual inspection/service procedures outlined below:

- System Control Module: Check system control module's functions through laptop computer or PDA. Detailed procedures are found in MINT Tool Supplemental.
- Communication/Electrical Connections: Inspect connections to and within Control Module to verify they are secure and connected properly.
- Bypass Switch: Depress bypass switch and operate boiler to verify switch is working properly.
- Coolant Level: Check coolant level in coolant tank and fill with coolant, if necessary.
- Mixing Valve: Check coolant temperature being delivered by valve while system is operating. Check for leaks and fix.
- Pump: Inspect pump and connections. Check for leaks and fix.
- Coolant Tubing and Connections: Inspect coolant tubing and connections for leaks and fix.

- **Honda MCHP unit:** Honda MCHP unit requires periodic inspection by **freewatt** service professional to maintain acceptable performance and ensure safe operation. Inspection/service procedures are outlined in unit's Installation, Operation and Maintenance Manual. Typically, services are required every 6,000 hours, so operating time of unit will directly impact service interval. Inspections include, but are not limited to:

- Starting Ease
- Oil Leakage
- Engine Coolant
- Breather Tube
- Condensate and Condensate Drain
- Air Cleaner Element
- Intake Air and Exhaust Piping
- Ventilation Air Inlet and Outlet
- Coolant Tubing and Connections
- Electrical System and Connections
- Communication System and Connections
- Replace:
 1. Engine Oil and Drain Washer.
 2. Engine Oil Filter Cartridge.
 3. Spark Plugs.
 4. Adjust Clearance Between Tappets.
 5. Breather Separator.

MCHP Owner's Manual outlines specific maintenance intervals (6,000, 12,000, 18,000 & 24,000 hours) and requirements for each interval. Maintenance should be conducted by **freewatt** service professional to maintain acceptable performance and ensure safe operation of your Honda MCHP.

6 - ROUTINE MAINTENANCE BY HOMEOWNER

freewatt PLUS system does not have any user serviceable parts. Do not modify or attempt to repair **freewatt** boiler, HI module or Honda MCHP unit. It is recommended only **freewatt** dealer or service agency perform any repairs or routine maintenance.

6.1 Cleaning

- Before cleaning **freewatt PLUS** System, shutdown system following procedure found in Section 4.4. Allow system to adequately cool before attempting any cleanup activities.
- Outside of **freewatt PLUS** System may be lightly cleaned with soft cloth dampened with water and squeezed firmly.
- **Never attempt to wash system with water.**
- **Never use gasoline, thinner, benzene or polishing powder to clean system.**

7 - STORAGE (SHUTDOWN) FOR ONE MONTH OR MORE

It is suggested following precautions be followed when **freewatt PLUS** System is not used for one month or more:

- Shutdown system as specified in Section 4.4.
- Close gas valves for boiler and Honda MCHP unit.
- Make proper provisions to prevent any possible blockage (i.e. animals, birds, children's toys, etc.), depending on location of exhaust outlets.

8 - TECHNICAL INFORMATION

HYDRONIC freewatt PLUS System

HYDRONIC freewatt® PLUS HEATING CAPACITIES			
Model	Natural Gas	HDJ200N00A	---
	Propane	---	HDJ200L00A
Honda MCHP - <i>MCHP Mode</i>	Input (Btu/hr) 0-3,300'	18,420	18,420
	Thermal Output (Btu/hr) 0-3,300'	12,300	12,300
Honda MCHP - <i>Back-Up or Grid Boost</i>	Input (Btu/hr) 0-3,300'	26,000	26,000
	Thermal Output (Btu/hr) 0-3,300'	17,000	17,000
Boiler	Input Range (Btu/hr) 0-2,000	80,000 - 200,000	80,000 - 200,000
	Output Range (Btu/hr) 0-2,000'	76,000 - 190,000	76,000 - 190,000
	Boiler Efficiency (AFUE)	95%	95%
BOILER HYDRONIC CONNECTION DIMENSIONS			
Supply		1½"	1½"
Return		1½"	1½"
MAXIMUM VENTING LENGTHS (EACH ELBOW EQUALS FIVE FEET)			
Venting Length (ft.) – Boiler (3")		100 ft.	100 ft.
Venting Length (ft.) – Honda MCHP (2")		110 ft.	110 ft.



As an Energy Star partner, ECR International has determined that the Boiler included as part of the **freewatt PLUS** System meets Energy Star guidelines for energy efficiency.

8 - TECHNICAL INFORMATION

Honda MCHP1.2D(P), Type UCFJ

Honda MCHP (UCFJ) Heating Capacities – Natural Gas & Propane		
Model	Natural Gas	MCHP1.2D
	Propane	MCHP1.2DP
Honda MCHP - <i>MCHP Mode</i>	Input (Btu/hr) 0-3,300'	18,420
	Thermal Output (Btu/hr) 0-3,300'	12,300
	Power Output (kW)	1.2
	Voltage (V)	240
	Current (A)	5
	Noise Level - dB(A) 1m	47
	MCHP Steady State Efficiency	89%
Honda MCHP - <i>Back-Up Mode</i>	Input (Btu/hr) 0-3,300'	18,420-26,000
	Thermal Output (Btu/hr) 0-3,300'	12,300-17,000
	Electrical Output (kW)	0 - 1.8*
	Voltage (V)	120
	Current (A)	0-15
	Noise Level - dB(A) 1m	47
	MCHP Steady State Efficiency	89%
Honda MCHP (UCFJ) - <i>Grid Boost Mode</i>	Input (Btu/hr) 0-3,300'	26,000
	Thermal Output (Btu/hr) 0-3,300'	17,000
	Electrical Output (kW)	1.8
	Voltage (V)	240
	Current (A)	7.5
	Noise Level - dB(A) 1m	47
	MCHP Steady State Efficiency	89%
Maximum Venting Lengths (Each Elbow Equals 5 Feet)		
Venting Length (ft.) – Honda MCHP (2")		110 ft.
* Maximum backup power available to connected loads is 1,700 Watts due to 100 Watt power consumption of load balancing transformer.		

freewatt® Transfer Switch (Model FTS-1.8)

freewatt® Transfer Switch Electrical Specification	
Manufacturer	ECR Int'l
Model No.	FTS-1.8
Max. Watts	1,800
Max. Single-Pole Circuits	4
Max. Double-Pole Circuits	0
Max. current@ 120VAC	15A
Max. current@240VAC	7.5A
Minimum Wire Gauge	14AWG
Conduit Trade-Size (diameter)	½"

8 - TECHNICAL INFORMATION

Load Balancing Transformer

240/120 VAC BALANCING TRANSFORMER ELECTRICAL SPECIFICATION			
Manufacturer	Schneider Electric	Acme Electric Corp.	Jefferson Electric
Brand	Square D	Acme Electric	Jefferson Electric
Catalog No.	2S1F	T-2-53012-S	411-0091-000
Power Rating	2 KVA	2 KVA	2 KVA
Phase	1	1	1
Primary Voltage Rating	480/240 VAC	480/240 VAC	480/240 VAC
Secondary Voltage Rating	240/120 VAC	240/120 VAC	240/120 VAC
Minimum Wire Gauge	14 AWG	14 AWG	14 AWG
Conduit Trade-Size (diameter)	½"	½"	½"

freewatt® Thermostat (RC-1000WH-ECR)

freewatt® THERMOSTAT Model RC-1000WH-ECR	
Manufacturer	HAI
Model No.	RC-1000WH-ECR
Voltage	24Vac
Current	2 Amps
Maximum Current (any circuit/total)	2/3 Amps
Frequency	50/60 Hz
Cable Specification	Honeywell Genesis (22AWG 10/C STR CM-CL2)

8 - TECHNICAL INFORMATION

APC Universal Transfer Switch (UTS6H w/ Hard wire Kit)

APC UNIVERSAL TRANSFER SWITCH Model UTS6H			
<i>Manufacturer</i>		American Power Conversion	
<i>Model No.</i>		UTS6H	
INPUT - UTILITY	Voltage Range	84 to 142Vac	
	Nominal Voltage	120 Vac Single Phase	
	Allowable Frequency	47 Hz to 63 Hz	
	Rated Current	20 A per circuit	
INPUT – Backup1 (MCHP GENERATOR)	Input Line	Hard wire Kit	
	Nominal Voltage	120 Vac/Single Phase	
	Rated Voltage	120 Vac	
	Allowable Frequency	47 Hz to 63 Hz	
	Rated Current	30 A per circuit	
	Maximum Voltage	84 to 142 Vrms	
INPUT – Backup2 (UPS)	Input Line	IEC 320 Male	
	Nominal Voltage	120 Vac Single Phase	
	Rated Voltage	120 Vac	
	Allowable Frequency	47 Hz to 63 Hz	
	Rated Current	15 A per circuit	
	Maximum Voltage	84 to 142 Vrms	
OUTPUT	Nominal Voltage	120 Vac (Six Total)	
	Current Per Circuit	20 A Maximum	
	Current for Circuits Combined	60 A Maximum	
	Convenience Outlet Type	NEMA 5-15 Female (120V 15A)	
	Protection	UL-Listed Class CC Branch rated fuses	
	Recommended 15 Amp Fuses		Ferraz-Shawmut ATMR15
			Littlefuse KLKR015
		Bussman LP-CC-15	

NOTES

9 - CUSTOMER SERVICE INFORMATION

Your **freewatt** Dealer or Service Center is trained in service and maintenance of your Warm Air **freewatt PLUS** System. This training includes equipment, servicing techniques, maintenance procedures and general operation of **freewatt PLUS** System. Please contact these trained professionals with any system questions.

If you are not satisfied with response of Dealer's or Service Center's management, please contact **freewatt** Customer Relations Office at:

freewatt Customer Relations Office

2201 Dwyer Avenue

Utica, NY 13501

Or call: 1-877-622-8934

Please have following information before calling:

- Model and Serial Number
- Name and address of **freewatt** Dealer who installed your system
- Name and address of **freewatt** Dealer who services your system
- Date of purchase
- Your name, address and telephone number
- A detailed description of the problem or issue

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