TOYOTOMI

www.toyotomi.com - Made in Japan

BALANCED FLUE SPACE HEATER
INSTALLATION & OPERATING INSTRUCTIONS

MODEL **LASER FF 95** (Type C)

IMPORTANT

1) READ AND UNDERSTAND INSTRUCTIONS BEFORE INSTALLING OR USING HEATER.
2) RETAIN INSTRUCTIONS IN A SAFE PLACE FOR FUTURE REFERENCE.
3) CHECK LOCAL AUTHORITY & BUILDING CODES FOR INSTALLATION REQUIREMENTS.
4) ABBREVIATED SHORT FORM INSTRUCTIONS ARE LOCATED ON THE LEFT-HAND END OF THE FF-95 HEATER, BUT IT IS THE FIRST OWNER'S RESPONSIBILITY TO ENSURE THAT SUBSEQUENT OWNERS RECEIVE THIS COMPLETE INSTRUCTION MANUAL

CONTENTS

Page No

SECTION A:
Specifications 2
Safety Features 3

SECTION B:
Safety Tips for Operation 4

SECTION C:
Fuel Guide 4

SECTION D:
Operating Controls and Part Names 5
Control Panel 6

SECTION E:
Operation
USER GUIDE
Before Ignition 7
Operation Overview 7
Manual Operation 8
Automatic Operatic 9
To Manually Switch Heater Off 10
Power Failure Recovery System 11
Manual Combustion Operation 11

SECTION F:
Installation
Tools Needed for Installation 12
Standard Installation Parts 13
Optional Accessory Parts 14
Example Installation Solutions 15
Installation Advice 17
Installation of Heater and Flue Pipe 18
Permanent Wiring 23
Seismic Restraint 24
Wall Bracket Installation 25
Thermostatic Fire Valve 26

SECTION G:
Fuel Storage & Supply System 30
External Tank Installation 31
Copper Pipe Information 32

SECTION H:
Troubleshooting (before requesting a service call) 33
Error Codes 34

SECTION I:
Routine Maintenance 36
Preventative Maintenance 37
Cleaning Combustion Components 38

SECTION J:
Long Term Storage 39
Transportation 39

WARRANTY 41

Sole NZ Distributor : Avon Electric Ltd - 25 Taurus Place, Christchurch - email: info@avonelectic.co.nz - Ph: 0800 379 247

AVON
Electric Ltd

SUPPLIER DECLARATION OF CONFORMITY

SUPPLIER:
Avon Electric Ltd
25 Taurus Place,
Bromley,
Christchurch
info@avonelectric.co.nz / 0800 379 247

Declare that the Toyotomi Laser FF95 Type C Diesel Heaters are tested to and conform with:

AS/NZS1375:2013 - Industrial Fuel-Fired Appliances

Approval No: **BUR2307**

Must be Installed in Accordance with:
- Manufacturers Installation Instructions
- AS1691 (With amendments as per C/AS1 Para 3.1.4)
- NZ Building Code and any applicable Local Regulations.

Toyotomi commenced diesel heater production in 1948. Photo shows Toyotomi Management and staff celebration the production of the 65th million heater, at Toyotomi Factory in Nagoya, Japan (November 2014)

INTRODUCTION - IMPORTANT NOTES

Read and understand this Installation and Operating Instructions Manual before installing or operating the FF-95C. Retain original instructions for future reference.

Basic & routine Maintenance (e.g. Burner & Igniter Cleaning Cycles) must be performed regularly to prolong heater life & ensure efficient combustion (read and understand directions on Pages 36-38).

Specifications subject to change without notice.

INSTALLATION CONSENT AND BUILDING CODE COMPLIANCE

No combustion heater can be installed in New Zealand homes or other premises unless the Local Authority has issued a "Consent to Install". When the installation is complete, the Local Authority will issue a formal approved CONSENT, which will become part of the documentation of the building. Search your local Authority website for information to install liquid fueled Heaters. Any problems contact Avon Electric 0800 39 247.

Before any operation, this Heater, its Balanced Flue System, Fuel Tank & Outdoor Fire Safety Valve must be installed in a manner which complies with the NZ Building Code. **Non Compliance may void building insurance policies.**

COMPLIANCE WITH CLAUSE E2 (EXTERNAL MOISTURE)

The NZ Building Code (NZBC Clause E2 "External Moisture") has stringent regulations regarding any wall holes. Avon "Balanced Flue Installation Guide" is a book which details 2 methods to comply with NZBC: Clause E2. Study the Balanced Flue Installation Guide and determine which method is applicable to your installation before starting.

For homes built or renovated (requiring a Building Consent) after 1991, an application for "Consent to Install" must be accompanied by a copy of the Avon Balanced Flue Installation Guide, together with a copy of this Instruction Manual. Copies of which are available in electronic or hard copy - contact Avon on 0800 379 247 & inquire.

For homes built prior to 1991, the regulation (NZBC Clause E2) requires weather tightness to a standard of durability that ensures least 15 years service. Actual method of weather tightness may vary & is dependent on the construction of the home. Consult your local Consent Authority or email photos of the interior and exterior cladding of your home to info@avonelectric.co.nz for advice.

Unless Avon is informed of the age of the home Avon will not supply any special parts or instructions necessary for Compliance with NZBC Clause E2. The more information you supply to Avon about your installation site the easier we can select and supply at no extra cost the special parts to comply with NZBC Clause E2.

SPECIAL NOTE

While the Balanced Flue exhaust is not as hot as solid fuel heater flues, the outside area where the Flue exits the home needs to be clear of any combustible debris, and not present a hazard to any person. As installation detail at each site varies, while Avon can offer advice, (see Optional Flue Outlet Guard page 13) special guarding or safety barriers may be required. Suggest considering the need for additional guarding after the FF-95 has been installed and operated.

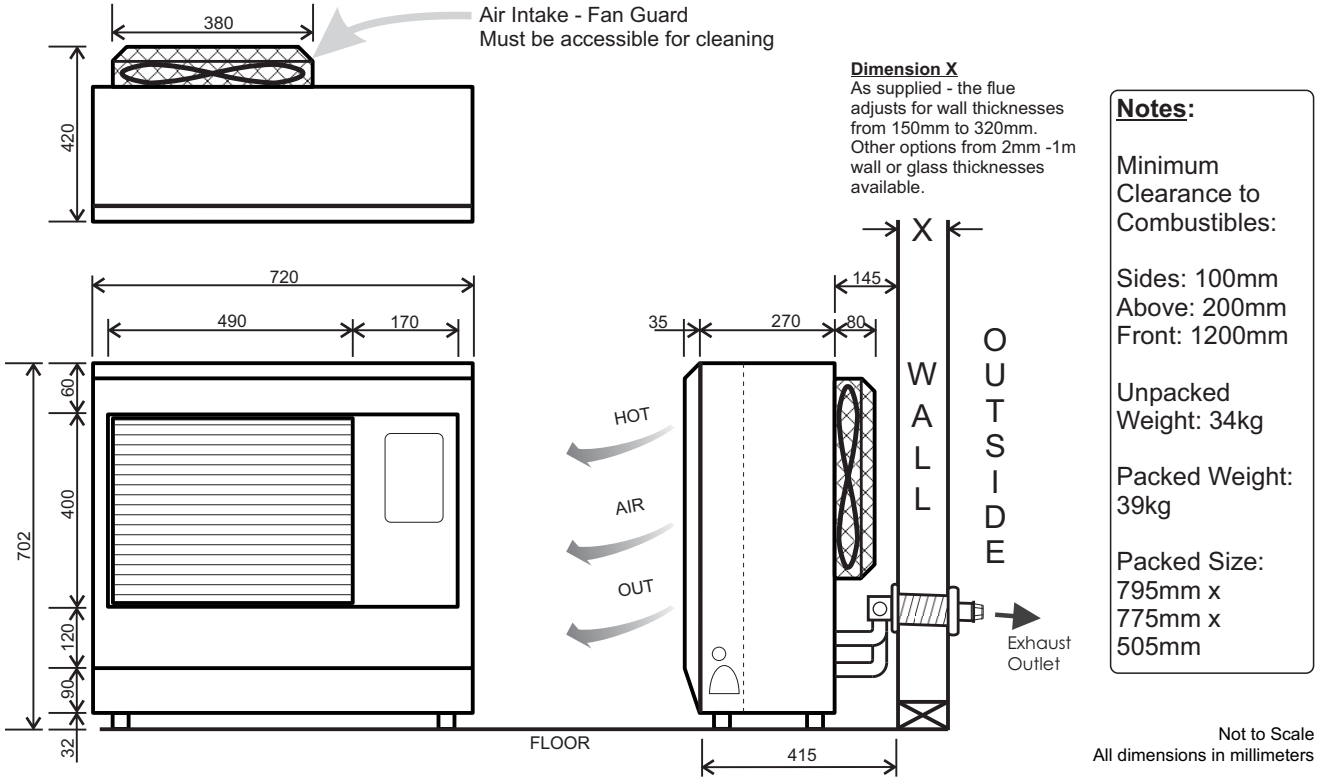
SECTION A: SPECIFICATIONS

Model:	FF 95 (Type C)
Heater Efficiency:	92.4% (1)
Heat Rating:	High - 9.50 kW (32,400 BTU/h) Med - 5.49 kW (18,700 BTU/h) Low - 2.96 kW (10,100 BTU/h)
Fuel Consumption:	High - 1.07 L/h Med - 0.620 L/h Low - 0.334 L/h
Fuel System:	External tank (2)
Fuel Type:	Automotive Diesel Only
Dimensions (W × H × D):	760 × 700 × 427 mm
Weight:	34 kg
Balanced Flue Wall Hole:	Can be between 70 ~ 80 mm diameter
Maximum Length of Vent Pipe System:	3m long & up to 3 x 90° bends (Section F “Installation”)
Electrical Rating:	230 Volts AC, 50 Hz (+/- 6%) During Preheating — 280 W / Continuous Burning — 52 W
Approval No:	**BUR2307**
Tested to:	AS1375:2013
Must be Installed in Accordance with:	- Manufacturers Installation Instructions - AS1691 (With amendments as per C/AS1 Para 3.1.4) - NZ Building Code and any applicable Local Regulations.

SPECIAL NOTES:

(1) While heat and vaporised water can be produced by fuel combustion, a Test Report (GL1215 - dated 29 March 2017 by GasLab Tauranga) states their tests of the FF-95C flue outlet demonstrates that flue discharge condensate is not possible.
(2) Diesel Tank not included - contact your supplier for tank options. Avon offer an 84L Toyotomi Stainless Steel Fuel Tank - see **www.avonheating.co.nz** for details. Note fuel flow from tank to heater is gravity fed - see Section G “Fuel Storage & Supply System”. An optional Fuel Lifter Pump is available to automatically supply fuel to Heaters installed up to 8m above the Diesel Tank.- see optional accessory parts pages 13 & 14.

DIMENSIONS - with (supplied) standard installation components



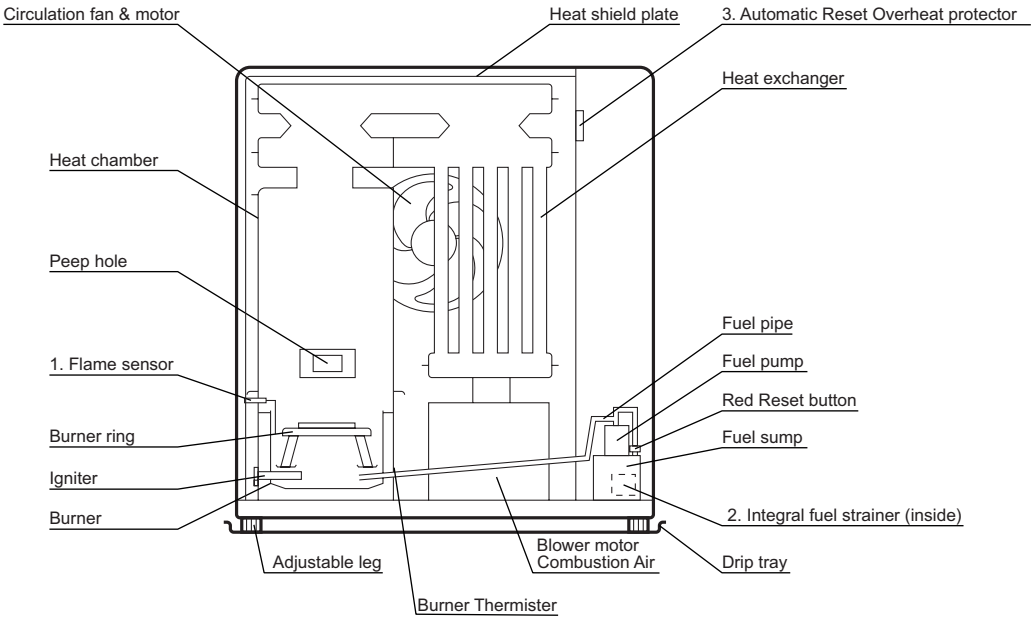
SAFETY FEATURES

The FF-95 Diesel Heater is equipped with a number of integral safety features. Please familiarize yourself with these features.
If the Heater shuts down due to the operation of any safety device, ensure the problem is identified and corrected. See Trouble Shooting Guide Page 33.

Note that it is normal;

a) To see combustion flames inside the combustion chamber, (blue with yellow flashes) through the “peep hole”, located in the front bottom left hand corner of the hot air outlet louvres

b) To hear clicking noises which are caused by the internal burner components heating & cooling



1. Flame Sensor (Inside Burner)
Heater will automatically stop all operations if ignition fails or if flame fails during combustion, in order to prevent fuel overflow. Error code will be displayed on the digital indicator (page 34).

2. Fuel Strainer (Filter)
An integral fuel filter within the Fuel Sump prevents impurities entering the burner, & should never need cleaning because the primary fuel filter (6. below) (supplied), is installed on or near the fuel tank outlet.

3. Overheat Protector
Automatically stops all operations if heater cabinet reaches abnormally high temperature due to any major electrical malfunction or abnormal combustion. Do not continue to operate the heater if this control regularly operates. Check that there is nothing restricting the recirculating airflow from the back of the heater to the front air outlet grille.

4. Power Failure Recovery System
After a power failure, during normal operation, when power resumes, the heater will automatically reignite, and maintain the selected room temperature.
NOTE: The restart operation varies depending on the power failure duration and other conditions - see page 11 for details.

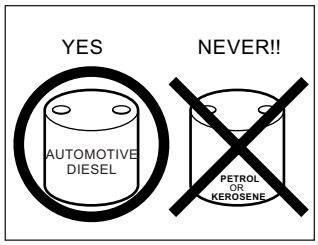
5. Fully Vented System (Balanced Flue)
The “Balanced Flue” automatically exchanges exhausted combustion gasses with outdoor air. This Balanced Flue will not alter the composition of indoor air other than to heat, and combustion gases or odours should never be noticed indoors.

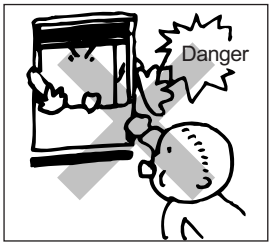
6. Water Block Filter
A USA made Fuel Filter “(Garber) Water Block Filter” is supplied. It must be correctly fitted to the fuel tank outlet. No debris can pass through this fuel filter. Unless the installer left debris in the fuel pipe between the Water Block Filter & the Heater at the time of install, it will never be necessary to remove, clean or replace fuel strainer (2) above. Unless fitted with the Garber Filter, warranty is void.

7. Thermostatic Fire Shut Off Valve
This item is supplied with, but is not located on the FF-95 and has to be installed outdoors, but is a most important safety feature - see pages 26 to 29 for details.

SECTION B:
TIPS FOR SAFE OPERATION (LASER FF-95)

- **Toyotomi Heaters are ultra safe and simple to use, but plain common sense requires <u>ANY</u> combustion heater to be treated with respect and care.**
- **SAFETY FIRST: Keep children, furniture and clothing etc well clear of the FF-95 while in operation. (See clearances on Page 18).**
- **The Heater should not be operated by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction & fully understand its operation.**
- **NEVER OPERATE THE HEATER - when indoors or outdoors the presence of any combustible dusts or gasses can be ignited by the normal operation of the Heater.**
- **NEVER use any fuel other than clean, fresh, Automotive Diesel (Class 3.1D). NEVER USE PETROL, or any other highly volatile fuel which will lead to uncontrollable flames, resulting in a destructive & potentially life threatening fire.**
- **Do not allow Children to play with the appliance.**
- **If installed near an opening in the house (e.g. a window), secure the opening, so it cannot be opened. Combusted exhaust gas entering the home from outside can be dangerous.**
- **Cleaning, basic & routine Maintenance (e.g. Burner & Igniter Cleaning Cycles) to prolong heater life (Page 36) must be carried out by a responsible person who has read, and understands, this instruction manual.**





<u>CAUTION</u>: Heater and Balanced Flue system must be properly installed before operation. Please follow instructions under Section F “Installation” (Page 12).

<u>SPECIAL NOTE - FOR YOUR INFORMATION</u>

Most Building Insurance Policies include clauses that require **<u>you to inform the Insurer of any changes to the insured property.</u>** When installing the FF-95 Diesel Heater we recommend **<u>inform your Insurance Company in writing that a Worksafe NZ approved FF-95 Diesel Heater has been installed and consented by your local Authority.</u>**

One (loose) copy of the Specification page for the FF-95 is supplied with this Manual, send copy to your insurer, quote the Workplace Safety Approval Number (BUR1801) and Local Council Consent number. <u>Request a formal letter of acknowledgement from your Insurer.</u> **All insurance documentation** should be safely stored elsewhere.

(FYI - Toyotomi has been sold in NZ since 2005, No Insurance claim has ever been made).

SECTION C:
FUEL GUIDE

The FF-95 is designed ONLY for use with (fresh) Automotive Diesel. Use of any low-quality diesel or other fuel will reduce burner performance, cause abnormal combustion, and reduce Heater life.

What to Buy . . .

ALWAYS:	Clean and fresh Automotive **Diesel**.
ALWAYS:	Fuel free of contaminants, water or cloudiness.
NEVER	Gasoline, alcohol, white gas, camp stove fuel, Kerosene or non approved additives.
NEVER:	Yellow or sour-smelling fuel.

Fuel Storage . . .

ALWAYS: Store in an outdoor fuel storage tank, **approved** by your local Authority.

NEVER store or transport Diesel fuel in other than a metal or plastic container that is acceptable for Diesel and clearly marked “DIESEL”. NEVER store Diesel fuel indoors.

Why Fuel Quality is Important . . .

Pure, clean fuel is essential for safe and efficient heater operation. Poor quality or contaminated fuel can cause:

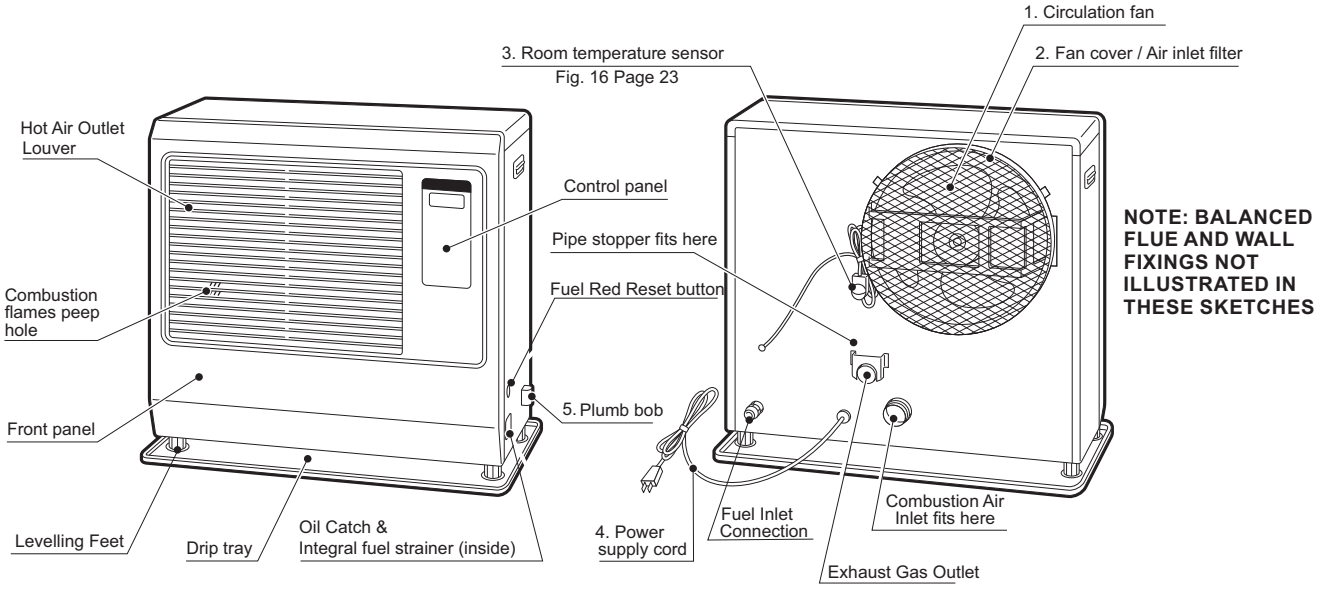
- Deposits in the Fuel Pipes, Sump, Fuel Pump, Nozzle & Flame Detector.
- Excess carbon and/or tar deposits in the burner and flue pipe
- Incomplete combustion
- Reduced Heater life

Diesel Algae/Bug

“Algae” (Diesel Bug)is a microbial organism that “grows” in diesel fuel. Diesel algae is not common in “Fresh Fuel”, but it is a possibility if the tank has old fuel and / or is exposed to warm temperatures/sunlight. It makes the fuel appear cloudy & thickens the viscosity of the fuel. If there is enough algae it may block the fuel tank outlet & fuel filter. To check for algae, take a sample of fuel - it should be clear. It should not be cloudy or contain what looks like translucent “fluffy” contamination. It is not common in home heating systems, but if you are concerned, diesel additive (Fuel additives retard algae growth) brands that we have tested and recommend are; Repco House Brand, Wynns & Kleen Flo (available ex Avon).

SECTION D:
OPERATING CONTROLS AND PART NAMES

Before using FF-95 Heater, familiarize yourself with the following operating controls and part names.



1. Circulation fan: Three speed circulation fan motor automatically supplies high-capacity warm air flow during combustion for heating the room u quickly, and its three fan speeds are automatically switched as room temperatures rise or fall.

2. Fan cover / Air inlet filter: Fan cover / Air inlet filter prevents injury by fan blades. The cover filters larger particulate (dust) from the recirculating room air. Check the cover regularly & remove any dust that may accumulate on its surface.

3. Room temperature sensor: Constantly senses room temperature and supplies information to heater so “the set” room temperature can is maintained. See pages 22 & 23, Figs 15 & 16.

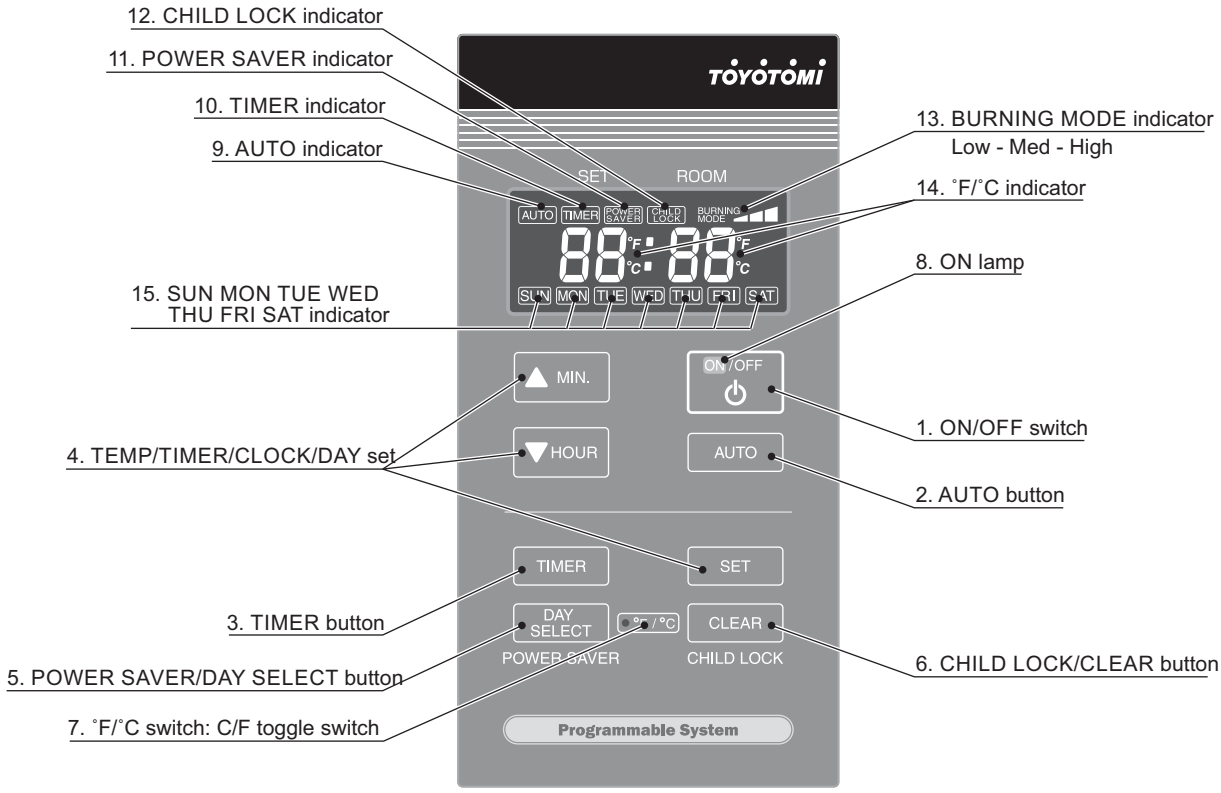
4. Power supply cord: For use in 230V AC 50Hz electrical outlet. (refer to SECTION A, Page 2)

5. Plumb bob: Check that heater is level (especially after any seismic activity).

ALSO REFER TO THE PARTS LISTS ON PAGES 13 & 14.

The above only refers to the heater - accessory items associated with the Flue and Fuel Tank are located elsewhere.

FF-95C CONTROL PANEL



1. ON/OFF Switch: Press to switch Heater On and Off. When switched On, Heater begins operation and after a warm up time of approx 3-7 minutes, heating commences. (See page 8)

2. AUTO Button: This button turns On & Off Auto operation mode if programmed into the “Weekly Timer” function.

3. TIMER Button: This button turns weekly timer set mode On and Off.

4. TEMP/TIMER/CLOCK/DAY Set: TEMP/TIMER/CLOCK/DAY set modes can be set by pressing the ▲/MIN. or ▼/HOUR buttons.

5. POWER SAVER/DAY SELECT Button: The button turns POWER SAVER operation mode On and Off. When setting the weekly timer, this button is used to select a day of the week.

6. CHILD LOCK/CLEAR Button: The button turns CHILD LOCK operation mode On and Off. When setting weekly timer, the CLEAR button is used.

7. ˚F/˚C Toggle Switch. Toggle switch to select readout °F or °C.

8. ON Lamp: When LIT – Heater is in operation.
Flashing – Pre-heating and pre-purging.

9. AUTO Indicator: When LIT – Weekly timer operation is in use.

10. TIMER Indicator: When LIT – Heater operating in weekly timer set mode.

11. POWER SAVER Indicator: When LIT – Heater operation in POWER SAVER mode.

12. CHILD LOCK Indicator: When LIT – Heater operation in CHILD LOCK mode.

13. BURNING MODE Indicator: When LIT – Indicates operating mode - Low - Med - High.

14. ˚F/˚C Indicator: When LIT – Digital indicator shows current temp.
Flashing – Current temp can be changed.

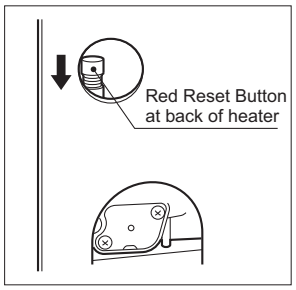
15. SUN-MON-TUE-WED-THU-FRI-SAT Indicator: When LIT – Digital indicator shows current day or timer day.

SECTION E:
OPERATION

BEFORE INITIAL IGNITION (USUALLY BY INSTALLER)

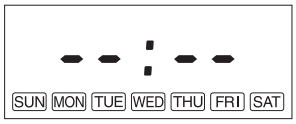
1. Open the Fuel Tank Supply Valve(s)

Check the Tank Valve & the Fire Safety Valve (pages 26-29 & 32) are both fully open. Diesel must be available at the fuel connection at the back of the heater at all times. All installation work must be clean - absolutely no foreign materials allowed to enter the Tank Filter, Fuel Pipe or Fire Valve System during installation.



2. Start the Fuel flow

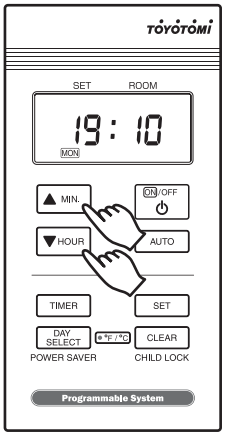
If using the Heater for the first time, press & hold the red reset button for 2 seconds then release. Fuel will now flow to the fuel sump for combustion to commence, air bubbles are automatically purged by the fuel pump. NOTE: Ensure there is no fuel leakage from the fuel line or joints. Also ensure fuel tank is not too high, see page 31 External Tank Installation. Wait 10 minutes (for fuel to flow to heater) before proceeding to 4. below.



3. Connect the Heater

Connect heater to a 230V AC, 50hz power supply. (i.e. a common household 3 pin power point). When power is switched ON the digital indicator will display *-- two dashes.*

NOTE: We do not recommend connect to an outlet shared with other appliances. A continuous & reliable power supply is important. A Surge Protector is recommended (See page 22)



4. Set the Clock

IMPORTANT: Set the clock to current time and day.

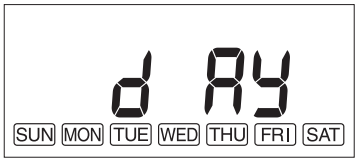
NOTE: In the event of a power failure (more than approx. 30 min.), all clock and day memory settings may be cancelled.

5. Setting the Time and current Day of the Week.

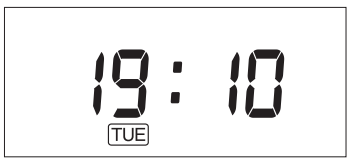
1) Setting the current time

1. Press the "▲MIN." button to set minutes and press the " ▼HOUR" button to set hours while heater is not in operation.
2. Press the "SET" button to complete setting the current time.

2) Setting a day of the week



1. "dAy" sign is shown on the display and all of a day of the week will flash. Press the "▲MIN." button or the "▼HOUR" button to select a day of the week. NOTE: When pressing the "▲MIN." button at the position of "SAT", you will hear a beep sound and "SAT" is not able to be changed any more. When pressing the "▼HOUR" button at the position of "SUN", you can hear a beep sound and "SUN" is not able to be changed any more.
2. Press the "SET" button to complete setting the current day of the week. The current time and day of week will show on the display.



For first time use...

and any future time that the Heater is to be restarted after a "fuel run out", remember after replenishing the fuel supply, wait approx 5 minutes for fuel to flow by gravity from Diesel Tank to Heater.

Operation of the Heater is under the direct control of the user...

Complete automatic time control is an option (Page 9). However many homeowners prefer Manual Control (Page 8). To manually operate: simply press the ON/OFF Button & set the room temperature. The FF-95 will start and be automatically controlled by the 3 stage thermostat. The Heater temperature setting can be manually turned down overnight. Note it usually costs less to keep some "background heat" in the heated spaces than allow rooms to completely cool down and then warm them up again.

MANUAL OPERATION

1. Switching the Heater "ON" (Fig. 1)

1. Press the **ON /OFF** switch to the **ON** position. The digital **time** display is replaced by the **room temperature** and the thermostat **SET** temperature. The thermostat **SET** temperature must be higher than the **room temperature.** The Burner **ON** indicator light will flash **on** and **off** for 2 to 4 minutes, while the burner is preheating. When burner *preheating* is complete, ignition automatically takes place, and both the burner and the air circulation fan, will progressively start.

2. After another 3 or 3 minutes when the burner, has achieved *normal* ***operating*** *temperature*, the burner indicator light, will change from flashing **on** and **off** to continuous illumination.

3. The burner and the room circulation fan will operate on HIGH FIRE until the thermostat **SET** temperature is achieved. Then heater will automatically switch to MEDIUM and LOW as the room temperature increases. The 3 indicator lights in the top right hand corner of the digital dial indicate LOW, MEDIUM, & HIGH heat output.

   Sometimes, if the space has been warmed by afternoon sun, the heater will switch **OFF** and will automatically re-start when the space temperature cools

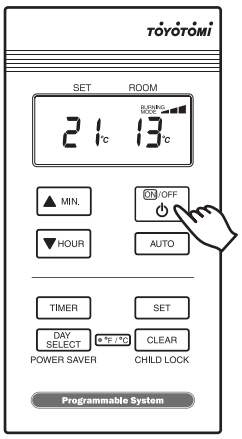


Fig. 1

4. The delay times mentioned in 1) & 2) above, depend on the temperature of the room when the heater is first switched **ON**. Burner preheating takes longer for a cold room than for a warm room.

   e.g. Room temperature:
   *** under 0˚C - approx 5 minutes**
   *** 0˚C - 15˚C - approx 3 minutes**
   *** 15˚C - approx 2 minutes**

Note during preheating time it is normal for indicator lights on the digital display to flash and fan speed to increase & decrease. It may also be possible to hear an audible "clicking" noise as the Burner warms up, and an audible "chugging" sound as the fuel pump purges air bubbles.

2. Setting Room Temperature (Fig. 2)

1. Press "▲MIN." or " ▼HOUR" button. ˚F or ˚C will start to flash - select your preference.
2. Press "▲MIN." or " ▼HOUR" button as required. Room temperature can be set from 10˚C (50˚F) to 32°C (90˚F). (Initial setting : 13˚C (56˚F))
   Desired temperature setting will be displayed on the Digital Display when you set the room temperature.
   When room temperature reaches the selected setting, heat output & fan speed will automatically reduce to "MED" or "LOW" burning mode as required to maintain the desired temperature. When room temperature exceeds the selected setting by approx. 2˚C (4˚F), (e.g. on a sunny afternoon), the heater will automatically shut off. Later, as room temperature drops, the heater will automatically re-start to maintain the desired temperature.

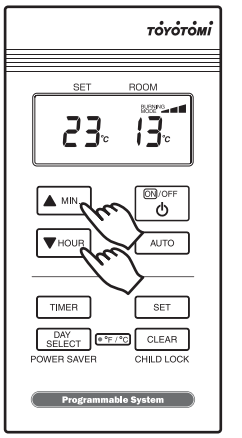


Fig. 2

POWER SAVER OPERATION (Fig. 3)

The Power Saver mode reduces the frequency of ignition actions, and slightly reduces power consumption. When the heater is actually operating the power consumption is 50W. Initial ignition & preheating power consumption is 260 Watts (only for a few minutes).

1. Press the POWER SAVER (DAY SELECT) button "ON" while in operation to start the "POWER SAVER" operation. "POWER SAVER" sign will be shown on the digital indicator.
   When the room temperature exceeds the selected setting by approximately 6˚C (10˚F), the heater will automatically shut off. As the room temperature becomes lower than the selected setting, the heater will automatically re-start to maintain the desired temperature. In homes that are not well insulated, the FF-95 will provide more even temperatures if the Power Saver function is not used.

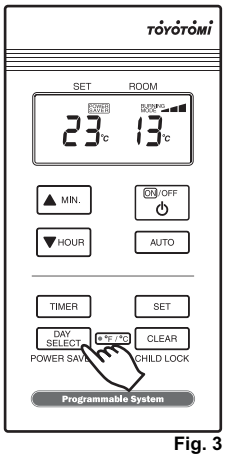


Fig. 3

CHILD LOCK OPERATION (Fig. 4)

The childproof lock can be used to prevent children accidentally changing the heater settings. When the heater is burning and the childproof lock is on, the heater can only be switched OFF, all other functions are blocked. If the heater has already been switched OFF, the childproof lock prevents accidental ignition of the heater.

1. Press the CHILD LOCK (CLEAR) button for more than 3 seconds to set the childproof lock either while in operation or not in operation. "CHILD LOCK" sign will be shown on the digital indicator.
   To clear the child lock operation, press the CHILD LOCK (CLEAR) button for more than 3 seconds.

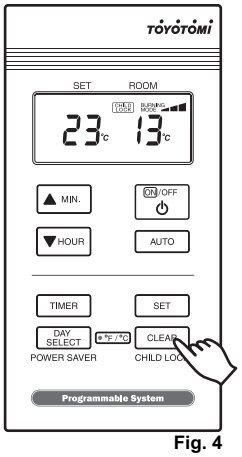


Fig. 4

AUTOMATIC OPERATION

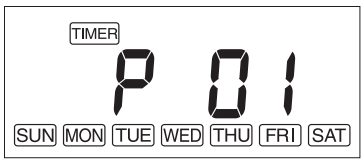
WEEKLY TIMER OPERATION

1. Set the Weekly Timer

After setting the current time and day of the week, press the “TIMER” button to enter the weekly timer setting mode. “TIMER” is shown on the display. When the “TIMER” button is pressed again during setting of the weekly timer, the “TIMER” sign disappears and the current clock time is shown on the display.

NOTE: You cannot enter the weekly timer setting mode, while in AUTO operation mode.

1) Select the program number



1. Press the “▲MIN.” or the “▼HOUR” button to select a program number. The maximum number of programs is 30. The unset program number will flash on the display. When first setting the weekly timer, “P01” is shown on the display and will flash. All of the days of the week will also flash.

NOTE: When pressing the “▲MIN.” button at the position of “P30”, you will hear the beep sound and “P30” will not change any more.
When pressing the “ ▼HOUR” button at the position of “P01”, you will hear the beep sound and “P01” will not change any more.

After the program is set, the next unset program number is shown on the display. If the program is set until “P30”, “P30” is shown on the display. Even though the program is set until “P30”, if there is an unset program number, the smallest unset program number is shown on the display.

Example:

When “P01” and “P02” programs are already set and “P03” is not set yet, the display is indicated as follows.

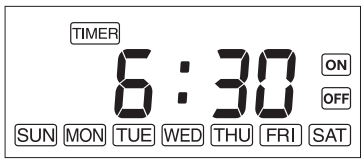
“P01” – lighting → “P02” – lighting → “P03” – flashing

When “P01” and “P04” programs are already set and “P02” and “P03” are not set yet, the display is indicated as follows.

“P01” – lighting → “P02” – flashing → “P03” – flashing → “P04” – lighting

2. Press the “SET” button to move to the next step (2) (Set the timer).
The program number settings are eliminated by holding the “CLEAR” button continuously for 3 seconds.

2) Set the timer



1. Press the “▲MIN.” button or the “ ▼HOUR” button to set timer.
2. Press the “SET” button to complete setting the timer and to go to the next step (3) Set program ON/OFF.

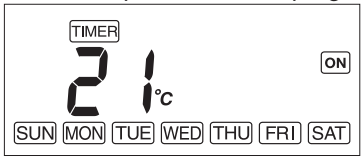
NOTE: When “SET” button is pressed when showing the bars sign on the display, you can hear the beep sound and cannot move to the next step.

3) Set program ON/OFF

1. ON and all days of the week will flash on the display.
Press the “▲MIN” button or the “ ▼HOUR” button to select ON or OFF.

2. Press “SET” to complete setting the program ON/OFF.
When you set ON, the next step is 4) Set the temperature set of the program.
When you set OFF, the next step is 5) Set a day of the week of the program.

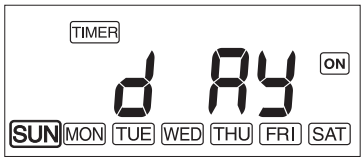
4) Set the temperature of the program



The set temperature “21” will be shown on the display and it will flash.

1. Press the “▲MIN.” button or the “ ▼ HOUR” button to change the temperature of the program.
2. Press the “SET” button to complete setting the program temperature and move to the next step (5) Set the program day of the week.

5) Set a day of the week of the program

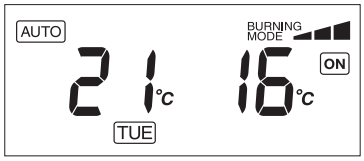


1. The “dAy” sign will be shown on the display and “SUN” will flash. Press the “ ▲MIN.” button or the “▼HOUR” button to select a day of the week . Press the “▲MIN.” button, to select the required days of the week. The selected days of the week will be illuminated. Press the “▼HOUR” button to unselect days of the week that are not required. The unselected day of the week will go off. Once each day is selected/unselected, it will automatically move to the next day of the week.

   When pressing the “DAY SELECT” button, the display will be shown the next day of the week without resetting.
2. Press the “SET” button to complete setting the day of the week of the program and the display will go back to the program number selection.

   NOTE: If no day of week is selected, when pressing the “SET” button, you can hear a beep sound and cannot move to the next step.

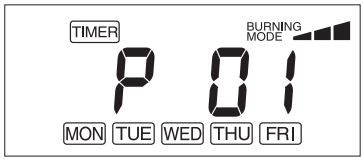
2. Activate Weekly Timer Operation



1. During operation (in a SW/ON position), press the “AUTO” button to enter the weekly timer operation mode. The “AUTO” sign will be shown on the display.

   NOTE: If no program is set, you can hear the beep sound and cannot enter the weekly timer operation mode.
2. Press the “▲MIN.” button or the “ ▼HOUR” button to change the set temperature.

   NOTE: If the next program starts, the temperature will be changed to the temperature of the next program.



3. During operation, press the “TIMER” button to enter the weekly timer set mode (Select of the program number).

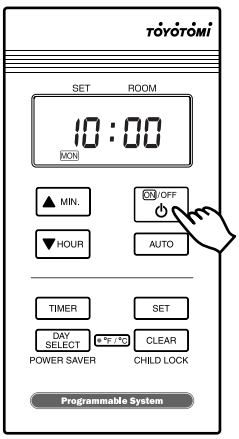
   NOTE: If the “TIMER” button is pressed during the setting of the weekly timer set mode, the weekly timer set mode is released.

   Change of setting is applied as soon as the AUTO operation starts.

   NOTE: If ON/OFF switch is pressed during the weekly timer operation mode, the weekly timer operation mode is canceled.

TO MANUALLY SWITCH HEATER OFF

When Heater is operating, press ON/OFF button to switch “OFF”. The **ON** lamp will flash while the Circulation Fan Blower Motor continue to run for approx. three (3) minutes to cool down the heater. **The ON lamp goes out when the fan stops.**



POWER FAILURE RECOVERY SYSTEM

If a power outage occurs while the Heater is operating, the FF-95 will automatically restart when power is restored, but depending on the duration of the power outage, it may be necessary to reset each erased setting as indicated below.

WHEN HEATER WAS IN OPERATION WHEN POWER WAS DISCONNECTED

TIME LENGTH OF POWER FAILURE	LESS THAN 3 SECONDS	MORE THAN 3 SECONDS	
		IN BACKUP MEMORY	OUT OF BACKUP MEMORY
OPERATION	Restart combustion with the same settings as before the power failure.	Start the combustion from the beginning.	Start the combustion from the beginning. Set temperature will change to 13˚C (56˚F) for safety. Set temperature and room temperature will be blank if power failure is more than 30 min. To stop the blinking set temperature and room temperature, press any button once.
POWER SAVER OPERATION	Keep the same setting as before the power failure.	Keep the same setting as before the power failure.	Keep the same setting as before the power failure.
AUTO OPERATION	Keep the same setting as before the power failure.	Keep the same setting as before the power failure.	The setting will be erased. (refer to SECTION E)
CHILD LOCK OPERATION	Keep the same setting as before the power failure.	The setting will be erased. (refer to SECTION E)	The setting will be erased. (refer to SECTION E)

If a brief power outage occurs when the heater is NOT operating, when the FF-95 is next operated, it will restart with the same settings as before the power outage. If the power outage is more than 3 seconds, the following settings will be erased. Please reset each setting.

WHEN HEATER IS NOT IN OPERATION

IN BACKUP MEMORY	Child lock operation
OUT OF BACKUP MEMORY	Clock and Day setting
	Child lock operation

MANUAL COMBUSTION OPERATION

NOTE - THIS FEATURE IS DESIGNED FOR FAULT TESTING PURPOSES ONLY AND NOT FOR DAY TO DAY USE

The FF-95 can be kept burning at desired combustion mode (High, Medium or low) manually, regardless of room temp.

1. Press the " ▲MIN." button and " ▼HOUR" button at the same time for more than three (3) seconds when ON / OFF switch is "ON".
2. P1, P2 or P3 will be displayed on the Digital indicator;
   P1 = Low mode P2 = Medium mode P3 = High mode
   Then select desired combustion mode by pressing " ▲MIN." or " ▼HOUR" button. " ▲MIN." button changes combustion mode to higher, " ▼HOUR" button changes combustion mode to lower.
3. To clear, press the " ▲MIN." button and " ▼HOUR" button at the same time for more than (3) seconds until normal temperature display returns.
4. Manual control is provided as a test facility and should never be used for normal comfort heating requirements.

SECTION F:
HEATER INSTALLATION - FOR INSTALLER

GENERAL DESCRIPTION: Mechanical installation of FF-95C Heater. See page 30 for information on external fuel tanks and connecting pipe work.

The FF-95C Diesel Heater is designed to be installed on an outside wall, no fire surround or hearth is required. **While some flue extensions are available, the only acceptable way flue gases can be exhausted through any part of the building structure, & comply with the NZ Building Code, is via the Toyotomi Balanced Flue (no exceptions).** The New Zealand Building Code has stringent requirements regarding any (wall hole) penetration of any outside wall , (Clause E2 NZBC), in relation to; the balanced wall flue and the fuel pipe. See special note page 2 regarding compliance with NZBC Clause E2 & refer to Avon "**Balanced Flue Installation Guide**", which applies to homes built or renovated after 1991. FF95C Diesel Heaters must Comply with AS1691:1985 or BS5410:PT1-1997 and NZBC C/AS1.

The FF 95 Heater **must never be installed** with…… **A)** a vertical flue inside any chimney. **B)** an underfloor flue.

Two totally different types of Flue Pipe wall extensions are available. Read and understand the limitation of Flue Pipe extension options (page 13) or **enquire to Avon**. (For Avon to comment we need photos of the proposed site).

BASIC TOOLS NEEDED FOR INSTALLATION

(Site conditions may require other tools)

Tool:	Use:
Phillips Head Screwdriver	Installation of Balanced Flue Pipe, etc.
Electric Drill (or other as appropriate)	Drilling hole in wall for Balanced Flue Pipe and fuel pipe.
Drill bits (4mm & 10mm)	Making holes in wall for mounting brackets.
Hole Saw, suitable for 70mm to 80mm	Making hole in wall for Balanced Flue Pipe.
Very long masonry drill bits	May be required for pilot holes if exterior cladding is masonry or brick or concrete.
Tube Cutter and Flare Tool	For fitting fuel copper pipe (various diameters to suit site).
Spanner	To fit fuel pipe

Before creating any wall holes, check there are no internal obstructions, then, before you create the 70-80mm Flue Hole, first pierce a 5mm pilot hole right through the wall, from inside, (using the wall template), then create the 70-80mm hole. A hole saw can be used for weatherboard walls. An optional extra "Weatherboard Spacer" (See Page 13) is available to make the outdoor weatherboard surface flat, so the outdoor flue flange can make a durable, weathertight seal. Fix and seal the Weatherboard Packing Piece with an approved outdoor sealant such as Expandite SB or equivalent. Other custom made outdoor surface "trims" are available - i.e. for installing flue through a corrugated Iron wall or other irregular external cladding - contact Avon to discuss your requirements.

Critical Dimensions

The outside diameter of the FF-95 (Green) Balanced Flue is 62mm. The diameter of the outer flue flange (indoors and outdoors) is 115mm. For the outer flange to seal in accordance with NZBC Clause E2, the maximum diameter of the flue hole in the outside wall should not exceed 90mm, and preferably, be approx 70-80mm. When the installer has read these instructions, and noted the dimensions, inspect the parts and decide what hole sizes are appropriate for the particular installation - refer details page 16.

NZ BUILDING CODE & LOCAL COMPLIANCE AUTHORITY REQUIREMENTS

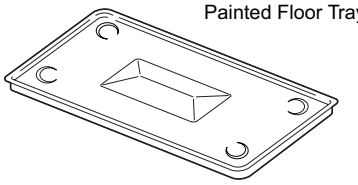
a) The NZ Building Code Clause E2 (External Moisture) requires OUTDOOR wall penetrations to be permanently weather sealed, (to prevent the ingress of moisture, air, or rain). Wall claddings vary and, this manual cannot detail specific instructions, except to state that the outdoor stainless steel flange of the Balanced Flue Pipe is a "universal" type, supplied with a mastic impregnated polyurethane foam compressible gasket, which, when installed outdoors, is compressed and protected by the stainless steel flange. The gasket & flange provides a permanent weather-tight seal against most, but maybe not all outside cladding. Compliance with NZBC Clause E2 is the installers responsibility. Our advice is: **when application is made to local Authority for an Installation Consent,** provide the Local Authority with details of how the wall penetrations for the Balanced Flue Pipe and the fuel pipe, are to be sealed in a manner that complies with NZBC E2 - see Notes Page 2 and if appropriate refer to Avon ***"Balanced Flue Installation Guide"*** or contact Avon Helpline Ph 0800-379-247, for advice.

b) Consent to install any combustion heater requires the installation of a smoke alarm(s) in compliance with **NZBC F7/AS1 Warning Systems**. Your Council website will detail requirements. An excellent example is the Christchurch City Council, see **www.ccc.govt** - search for "smoke alarms", and Information Sheet B-311

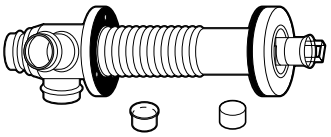
STANDARD INSTALLATION PARTS - SUPPLIED WITH HEATER

The following standard installation parts are supplied with each FF-95. For alternate installation methods, you may need to purchase additional accessories which are available from your TOYOTOMI dealer. See “Accessory Parts”.

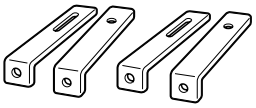
Painted Floor Tray



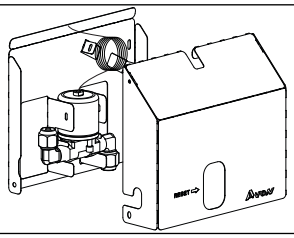
See Label Page 17



Balanced Flue (1) (PART #17206096)
Exhaust Air Cap (1) (PART #17212661)
Intake Air Cap (1) (PART #17212656)



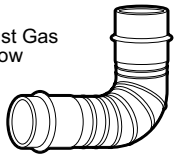
Painted Wall Bracket (2 sets of 2 pieces)
Supplied with 2 x “Driller Toggle” Wall Anchors & 2 x 65mm x No8 CSK Screws (not illustrated) - see page 24



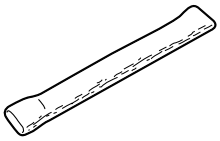
Thermostatic Fire Valve & Stainless Steel (two part) Mounting & Cover

See Details Pages 26-29

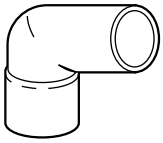
Exhaust Gas Elbow



Bent Joint (L) (1)
(PART #20474584)



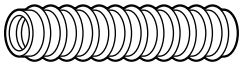
Fibreglass Insulating Cover
(PART #20474955)



Combustion Air L-Shaped Hose (2) (PART #20474975)

Fig. 12 Page 21

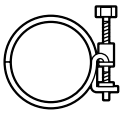
Pipe Holder (1) (PART #17212685)



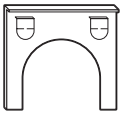
Combustion Air Inlet Hose (1) (PART #17212693)

Pop Rivet each Flue Joint

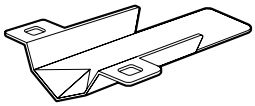
1/8" Austenitic SS Pop Rivets (x 10)



Combustion Air Pipe Hose Clips (2x) (PART #20474977) (Hose Clamp)



Pipe Stopper (1) (PART #17212778)

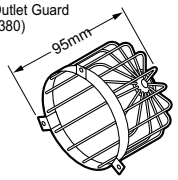


Oil Catch (1) (PART #17187525)

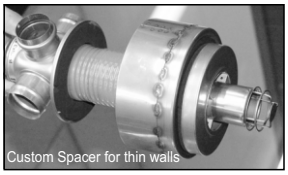
Garber Fuel Filter with Fuel Fittings & Mounting Bracket

OPTIONAL ACCESSORY PARTS

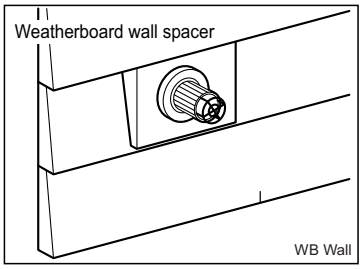
Flue Outlet Guard (FFP-380)



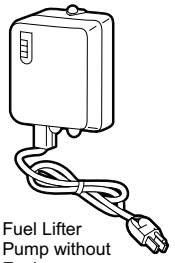
PART #17206093



Weatherboard wall spacer



Fuel Lifter Pump & Weathertight Enclosure.

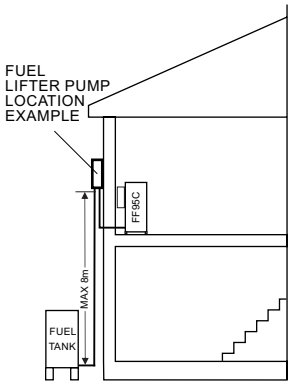


Fuel Lifter Pump without Enclosure

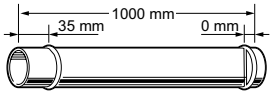
Where the FF-95C heater is installed above the fuel tank i.e. on a hillside or upstairs in a 2 storey home, an accessory fuel lifter pump is available. It will automatically lift fuel, up to 8-10m max above the fuel tank. Can be installed near and above the Heater. When enquiring for details of the fuel lifter pump please provide actual site photographs or a sketch, (or both) with all relevant dimensions of your installation.

Approx Enclosure Dimensions:
400mm(W)x500mm(H)x140mm(D)
(See photo A below)

Example Fuel Lifter Pump Installation

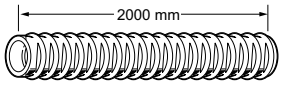


Exhaust Extension Pipe



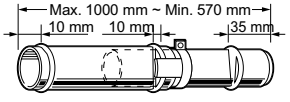
PART #17206089

Intake Pipe



PART #17206091

Adjustable Exhaust Extension Pipe



PART #17206027

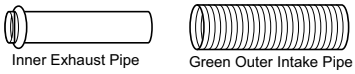
Intake Pipe Joint

PART #17206092

Pipe Support Hardware

PART #17206004

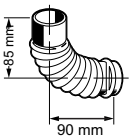
Parts To Extend The Green Balanced Flue Assembly (UP TO 1100mm) - for thick walls Figs A & B Page 16



Inner Exhaust Pipe — Green Outer Intake Pipe

PART #17206051 Flue pipe ext. (for wall up to 330 mm - 410 mm)
PART #17206052 Flue pipe ext. (for wall up to 410 mm - 510 mm)
PART #17206053 Flue pipe ext. (for wall up to 510 mm - 610 mm)

L-Shaped Exhaust Joint/Elbow



PART #17187098

Constant Pressure Valve

- (NOT ILLUSTRATED) Where the fuel tank is installed high above the Heater. If the level of fuel in the tank (when full) is greater than 2.4m above the floor that the Heater stands upon, a Toyotomi Constant Pressure Valve **must be** fitted to the Heater - contact Avon for advice.

OPTIONAL ACCESSORY PARTS CONT.

Only use genuine Toyotomi parts and accessories, makeshift or alternative parts will affect safety, void insurance, warranty and reduce performance. NEVER cut or modify any Toyotomi Balanced Flue assembly or pipe extension. The Toyotomi Balanced Flue assembly must be used in every installation, and must not be installed other than through an outside wall, with a slight (2°) "fall" to outside to drain storm water. ***The Balanced Flue Assembly must never be installed vertically.***

EXTENDING THE COMBUSTION AIR AND EXHAUST PIPE SYSTEM

There are two ways to extend the Combustion Air & Exhaust Pipe System as follows. See pages 13-16 for example installation solutions. Contact Avon for further details. For our best response please include photographs of your site, or a sketch, or both with approx dimensions, and intended route of Flue Extensions.

1) Extension Pipe Kits type Large (L), Medium (M) and Small (S)

These stainless steel pipe assemblies are telescopic and allow installer to adjust the exhaust pipe length to exactly suit the distance between the Heater and the Balanced Flue. They must only be installed by **surface (exposed) mounting, inside the heated space** and terminate by connecting to the Balanced Flue which is the only approved means to transport hot exhaust flue gasses to outside. Extension pipe kits (L), (M) and (S) are provided with an Insulating Cloth Cover for the hot exhaust pipe, but depending on the site, **more insulation may be necessary**. Extension pipe kits type (L), (M) and (S) and **must not be enclosed, or concealed within a building cavity or pass through any wall.** See installation examples in **"Installation Advice"** - Page 17 Fig 3.

Telescopic Extension pipe kits (L), (M) and (S) are only suitable for maximum distances in combinations of up to 3m and with up to 3 x 90º bends, (Elbows). The distance between the heater and the Balanced Flue must never be greater than 3m (refer note 7 and Fig 3 page 17).

At the "exhaust end" of Extension pipe kits (L), (M) and (S), the **Green Balanced Flue** (only through an outside wall) MUST ALWAYS BE INSTALLED.

Accessory	Part No.	Application	
Extension pipe kit (L)*	17206013	Extends inner & outer pipe system between 1570 mm to 2000 mm	Refer to photo "B" below
Extension pipe kit (M)*	17206012	Extends inner & outer pipe system between 570 mm to 1000 mm	
Extension pipe kit (S)*	17206011	Extends inner & outer pipe system between 320 mm to 500 mm	
L-Shaped exhaust joint*	17206016	(Elbow) for 90 degree bend in exhaust pipe	
Exhaust extension pipe 1000	17206089	Short extension for difficult sites	Such as Corner Installs - see Fig A & B - Page 15
Exhaust extension pipe 500	17206083	Short extension for difficult sites	
Exhaust extension pipe 300	17206084	Short extension for difficult sites	
Exhaust extension pipe 200	17206087	Short extension for difficult sites	
Exhaust extension pipe 100	17206088	Short extension for difficult sites	
Exhaust extension pipe (S)	17206098	Short extension for difficult sites	
Flue Pipe Wall Extension	17206051	Extends Balanced Flue from 320 mm to 420 mm	Refer to photo "B" below
Flue Pipe Wall Extension	17206052	Extends Balanced Flue from 420 mm to 520 mm	
Flue Pipe Wall Extension	17206053	Extends Balanced Flue from 520 mm to 620 mm	
L-Shaped Exhaust Joint	17206016	90 degree exhaust pipe bend or "Elbow"	

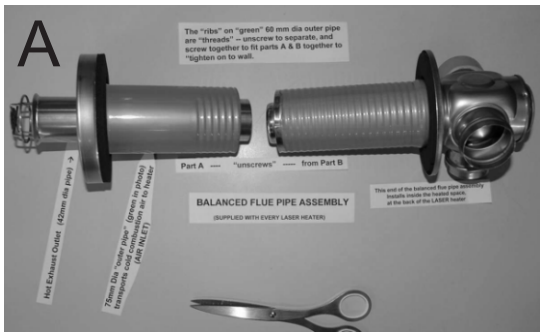
2) Extension pipe kits type L, M, and S (Long, Medium, Short)

The only (compliant) way exhaust gases can pass through any outside wall, is via the Toyotomi Balanced Flue. Only one "Thru Wall" Balanced Flue can be used per FF-95C heater. That means that extension pipe kits L, M, and S, cannot pass through an internal wall or a floor. Exceptions possible but require a Fire Engineer Certification.

Extension pipe kits L, M, and S, can be extended up to 3m, and include up to 3 x 90° bends.

The NZBC requires hot surfaces to be adequately protected (see Page 16 - 90° install). Photograph and sketch your installation site, and we can usually provide an acceptable solution - contact Avon Electric.

The Toyotomi Balanced Flue, has an inner and outer tube assembly, and as supplied with each heater is suitable for walls from 150mm up to 320mm thick. This Balanced Flue assembly can be extended up to approximately 1100mm. Examples where this type of extension can be used include for very thick walls, an existing fireplace (see (X) Fig A, Page 16), or where the flue has to pass through a shallow cupboard to outdoors.

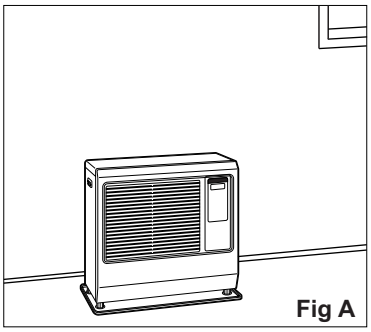


TOYOTOMI STANDARD BALANCED FLUE

EXAMPLE BALANCED FLUE EXTENSIONS

STANDARD WALL INSTALLATION

Install the FF-95C on an external wall (Fig A). The Green Balanced Flue passes straight through the wall, and no additional installation parts are usually required.



STANDARD WALL INSTALL

1. The Balanced Flue supplied with the Heater is adjustable for walls between 130mm - 320mm thick - Photo **A** Page 14.
2. Optional extra extensions are available to extend the green Balanced Flue Pipe sections up to 1100mm - Photo **B** Page 14.
3. Minimum internal & external clearances from combustible materials as per page 18.
4. Especially note Seismic Restraint requirements. Compliance with NZS4219 is Installers responsibility - see page 24

Fig B

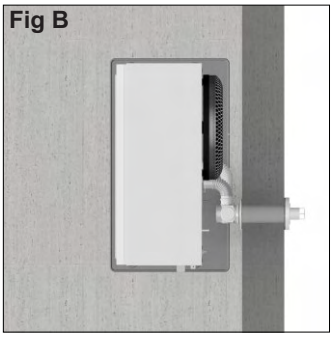
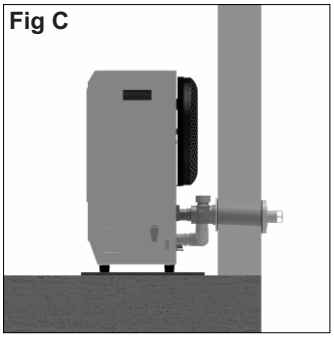


Fig C



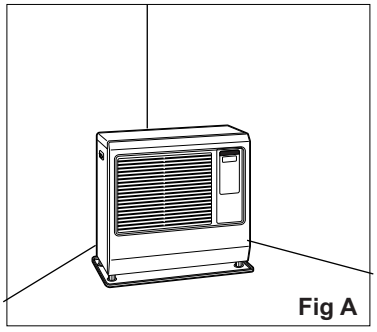
NOTE:
WALL BRACKETS NOT SHOWN IN SKETCHES ON PAGE 15 & 16 REFER TO PAGES 24 & 25.

EXAMPLES OF OTHER TYPES OF INSTALLATIONS

The following are examples of non standard installation solutions, each requires additional flue components, further information available on request. As each site varies, we need plans / photos of the proposed installation location to advise specific requirements. There may be other ways of installing - if you have a query email plans/photos to info@avonelectric.co.nz & contact Avon on 0800 379 247 to discuss. Note the Green Balanced Flue MUST pass through an external wall.
Compliance with Seismic Restraint Regulations is installers responsibility, see page 24 for details.

CORNER INSTALLATION

The FF-95C can be installed in a corner with the addition of optional extra flue components (Fig A). One wall must be an external wall.



CORNER INSTALL

1. The FF-95C can be installed with the flue to the right (Fig B) or left hand side (Fig C) (When looking at the front of the heater).
2. When ordering specify Corner Mounting Brackets.
3. If site photos are supplied to Avon we supply & charge a range of parts that can be used for the exhaust installation - those parts not required can be returned (in "as new" condition) for credit when installation is complete.
4. Note minimum internal & external clearances as per page 18.

Fig B

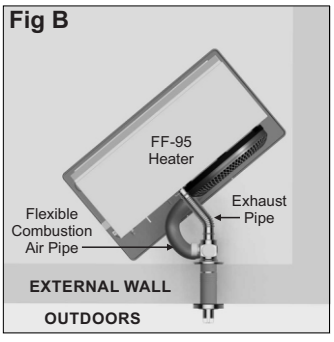
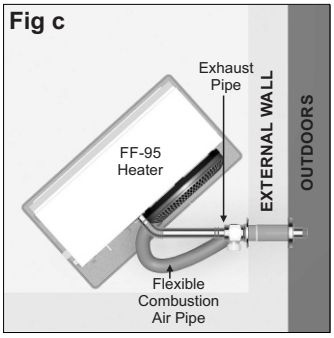
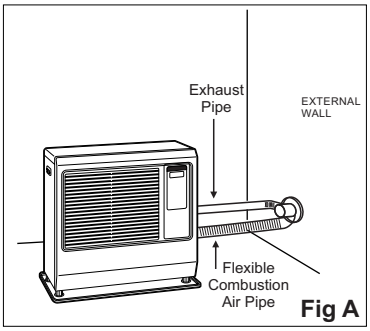


Fig c



INSTALLATION @ 90°C TO OUTSIDE WALL

Where the external wall is adjacent but at a 90° angle to the wall the Heater is to be installed on, optional extras enable installation similar to Fig A. It is possible to install the flue components at an angle. Specify if the external wall is to left or right of the heater.

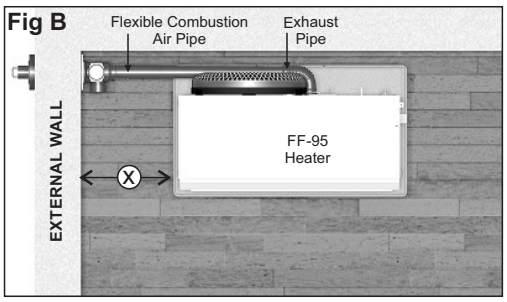


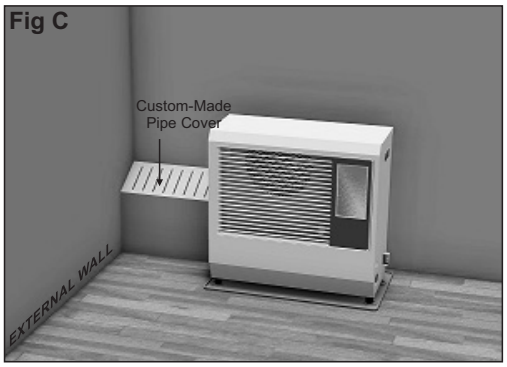
EXAMPLE 90° INSTALL

1. The FF-95 can be installed with the Flue to the right or left side of the heater, as shown in Fig A & B (example).

2. We supply a range of Toyotomi Flue Extension parts that can be used for the exhaust installation - those not required (if returned in "as new" condition) will be credited (Pages 13 & 14).

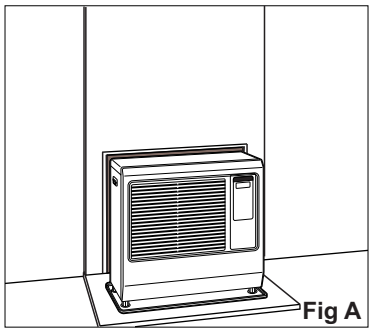
3. A custom-made optional extra sheet metal Cover as per example shown in Fig C is available to cover Flue Extension pipes up to 3m long and can be powder coated any colour. The Cover is made to measure - we need detailed site dimensions & colour.





FIREPLACE INSTALLATION

A fireplace installation kit that enables the FF-95C to be installed in front of a fireplace (Fig A). The Green, Balanced Flue is extended to suit (specify dimension (**X**).



FIREPLACE INSTALL

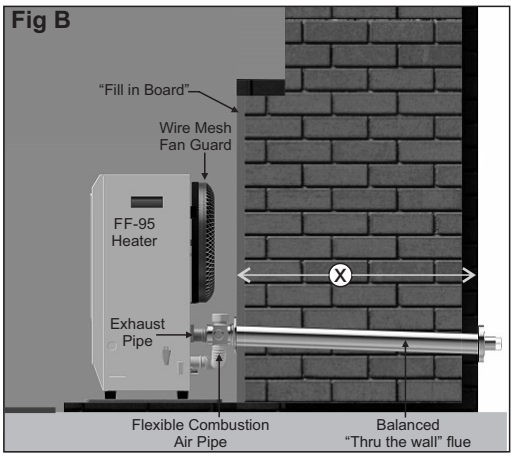
1. It is important that once installed the Wire Mesh Circulation Fan Guard at the back of the Heater is always accessible (by hand) to enable any accumulated fluff & dust to be easily removed.

2. The Fuel Sump Overtemperature Reset button must be accessible after installation (see location Page 3).

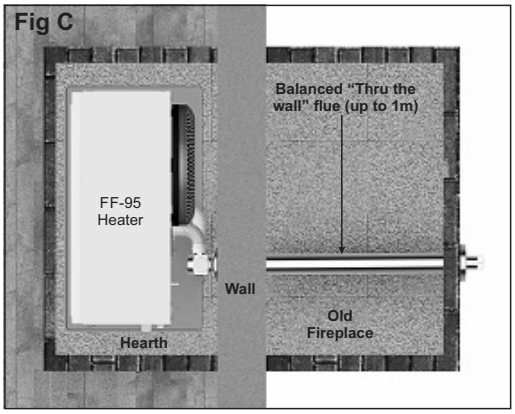
3. A "Fill In" board (25mm plywood) or similar required to be secured to fire surround and for Heater Wall Brackets to be affixed.

4. The Hearth needs to be wide enough to accept the 'base footprint' of the FF-95C - see specifications on page 2 at front of this manual.

5. Contact Avon for more detailed advice and instructions (0800 279 247).



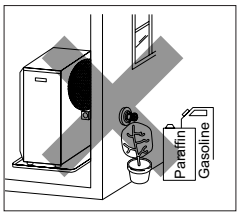
Section View



Plan View

INSTALLATION ADVICE (STANDARD INSTALLATION)

1. DO NOT install the Balanced Flue where the air **supply** or **exhaust** gas outlet might become covered by snowdrifts, fouled by outdoor debris, sand or directly exposed to winds over 50 kp/h see Fig. 1 & 2 below and Fig 2 & 3 Page 18.



IMPORTANT:
Install with extension flue pipe as necessary.

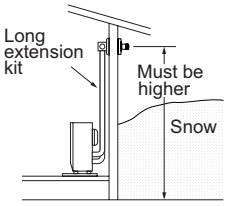


Fig. 1 (side view)

IMPORTANT:
In open area with strong wind, a wind break **may** be necessary.

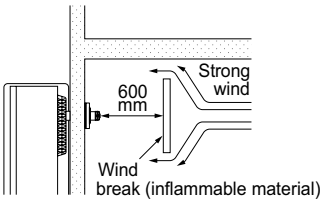
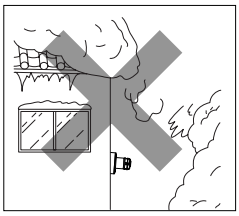
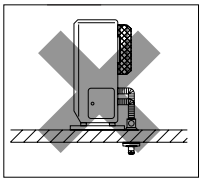


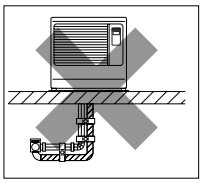
Fig. 2 (plan view)



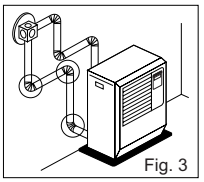
2. Before creating the Balanced Flue wall hole, ensure the wall cavity is free of electrical wires, gas & water pipes and other obstacles. Carefully Drill a 5 mm "pilot hole" from inside enables the final hole (and any associated "mess") to be completed from outside - note 2° angle Fig 6, Page 19. For homes built or renovated (requiring a Building Consent) after 1991, see notes regarding compliance with NZBC Clause E2 (Wall Underlay Regulations) Page 2 - you must have and refer to separate booklet - Avon ***"Balanced Flue Installation Manual"***.



3. Intake air and exhaust flue pipe openings of the Balanced Flue must be fully exposed to outside. ***The Balanced Flue Exhaust Outlet must never vent into a chimney, garage, basement, under-floor or ceiling cavity or any enclosed area, or be installed vertically.*** The Toyotomi Balanced Flue is a Heat Exchanger, designed to transfer exhaust gas heat to the incoming combustion air. That heat transfer effect causes outdoor Combustion air to be warmed, and the exhaust gas is cooled - improving burner efficiency.



4. Install Balanced Flue (See Figs. 2, 3, & 4 Page 18 and Figs. 5, 6, 7, & 8, Page 19). Note the volume and temperature of the hot exhaust gas that discharges to outside is minimal and does not create condensate, but ensure FLUE OUTLET is at least 600 - 800mm clear of plants, shrubs, and any outdoor materials that can form debris that might later restrict the flow of combustion air and exhaust gases. See clearances Page 18, Figs1, 2 & 3.



5. **NEVER** install the Balanced Flue below any floor.

6. Flue clearance from Diesel Tank: See Figs 2 & 3, Page 18 & Diesel Tank Clearances Page 30. Flue Accessories (pages 13, 14 & also note Photos on page 21), can be used to extend flue to achieve clearance (Call Avon)

7. Flue Extension Pipe Kits (L, M or S) allow parts of Flue to be vertical, up to a total of 3m - see sketch Fig. 3 - up to 3 x 90° bends are permitted.

NOTE: When using Extension Pipe Kitset L, M or S, all parts of the exposed hot exhaust pipe must be insulated with the insulating cloth cover supplied & protected by a durable, non inflammable cover: see Fig B, top of page 16 and also contact Avon for more info. For some installs extra insulation may be necessary.

8. For ALL heater installations, the Balanced Flue must always be installed horizontal with slight fall to outside to ensure storm water drains to outside.... - Page 19, Para 4, Fig 6.
NEVER install the Flue inside an unused fire place chimney.

Installing the FF-95 can be simplified if you provide Avon Electric with information that enables us to interpret special circumstances relating to the installation. To provide the best advice we need lots of indoor & outdoor photos, and a simple sketch that shows the house, the proposed location of the Heater & Tank & fuel pipe route with dimensions that show the distance from the FF-95 Heater to other walls, or other structural items in the room i.e. the distance from a fireplace or a window or fuel tank.

From outside your home photograph the proposed tank location and the wall where the Balanced Flue will exit the outside wall. Place a mark, or an indicator on the wall that will show up in the photograph that shows (approximately) where you believe the exhaust flue will exit the wall. Take photographs from a distance of approximately 1m, **and** from 4 or 5 m away, so we can interpret if there are any other site restrictions that need to be considered. If the fuel tank is to be close to the heater include that in the photograph, i.e. place a spade or some other indication mark on the wall so that we can identify approximately where the fuel tank is to be located. An additional (Tank) Fire Valve is required if tank is more than 3m away from Heater.

Consider the difficulty of fuel pipe install if there are concrete paths or a driveway, or if the house has a concrete floor (Never drill a hole right through a concrete floor) or if the fuel pipe can be installed under the (wooden) floor.

STANDARD INSTALLATION OF HEATER AND FLUE PIPE

A) Before commencing any installation work, check that the proposed installation will comply with Building Code requirements and Local Consent Authority rules that may apply to vented heaters in your area. (Check your Local Authority website, or consult your Installer / Supplier.).

B) The Balanced Flue Pipe can be installed through the wall of any conventional building cladding, including Brick, Hebel, Linear, Gibraltar and Plaster Board, Tiles, Weatherboard, Plastered Polystyrene, and metal profiles etc. For unusual profiles vertical or horizontal corrugated iron cladding, additional accessories may be necessary - enquire to Avon.

C) The FF-95C is designed to be operated at altitudes up to 900m above sea level. For installation at altitudes above 900m and up to 1800m above sea level, inform us of the installed height and we will adjust the fuel system for that altitude, prior to dispatch.

1. Select heater location. Ensure minimum clearances are as indicated below between heater and nearest combustible materials (See Fig. 1.). However the FF-95C heater is installed, (especially in fireplaces), owner must ensure easy access to the Red Reset Button on the side of the FF-95 (See Page 5) and cleaning access to the Circulation Fan Mesh Guard at the back of the FF-95C heater (Figs 2 & 3 below). The circulation fan processes huge amounts of room air. Room air contains carpet, and other fabric dust, which will accumulate on the surface of the recirculation fan mesh guard. The fan guard must be easily cleanable to avoid overheating & nuisance tripping of the Internal Automatic Reset Overtemperature Thermostat.

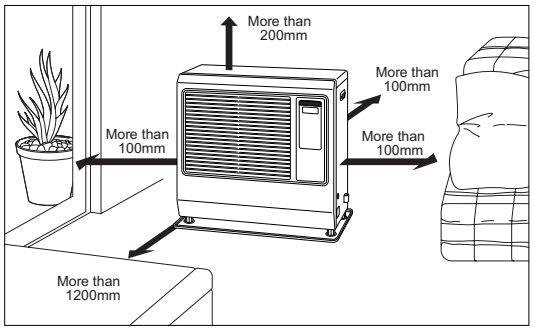
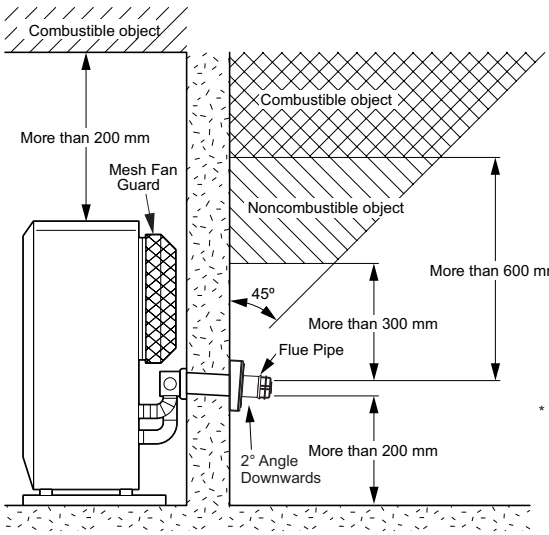


Fig. 1

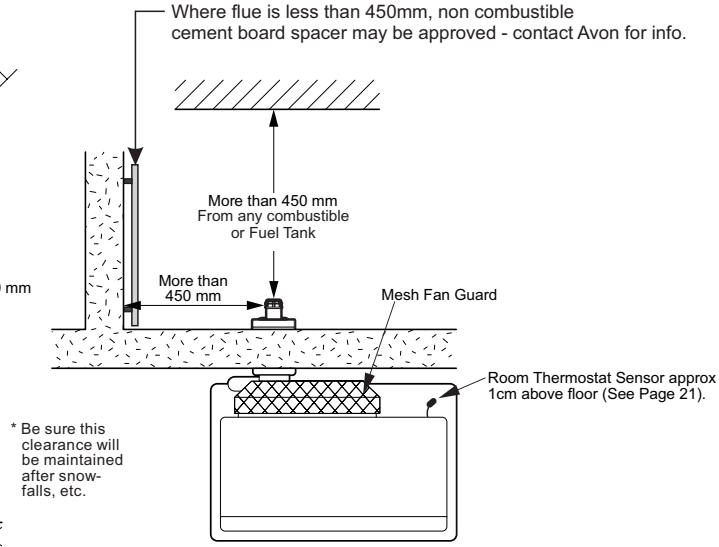
IF YOUR HOME HAS BEEN BUILT OR RENOVATED AFTER 1991 - INSTALLATION MUST COMPLY WITH NZBC-E2 - SEE DETAILS IN AVON "BALANCED FLUE INSTALLATION GUIDE" BOOKLET. YOU WILL NEED A COPY FOR YOUR LOCAL COUNCIL. CALL AVON - 0800 379 247.

2. Although outdoor flue exhaust gas is minimal in volume, ensure the outdoor flue discharge area is clear of anything that might be affected by the hot flue exhaust gas. See Figs. 2 and 3 below. (also see page 17, Para 1 - 6).

The standard Flue Pipe (as in Fig. 2), is for wall thickness from 130 mm to 320 mm, (extensions are available) - see pages 13 & 14.



Side View Fig. 2 Balanced Flue Pipe Installation



Plan Fig. 3

3. A wall template is supplied with each FF-95C. Affix to the wall (see fig 4) with removable tape or drawing pins to identify and follow instructions re location of the wall hole for the Balanced Flue Pipe & Fuel Pipe.

NOTE Heater should be installed on a sturdy floor that is level and flat. Adjust feet using Plumb Bob to ensure Heater is level.

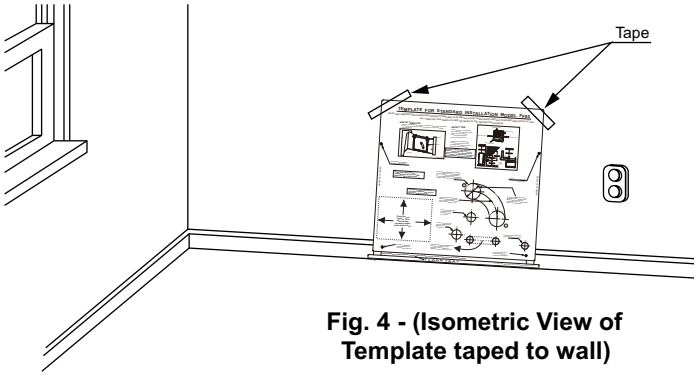


Fig. 4 - (Isometric View of Template taped to wall)

4. Install the Balanced Flue Pipe with a (2°) slight downward slope to outside, (See Fig. 6), to prevent ingress of rain or any other water source (watering systems etc). Before drilling the final size hole for the Balanced Flue, we recommend first, pierce the wall with a small "pilot hole", right through the wall (say 5mm diameter) from inside to outside. This method enables the angle of the final hole to be better controlled. Then enlarge the hole (to between 70mm and 80mm), starting from outside and maintaining the downward slope of approx 2° (See Fig. 6). (Warning: if the pilot hole is too big, it may make the final hole drilling difficult).

Weatherboards are a common NZ cladding. An optional H4 treated timber Weatherboard Wall Spacer (sketch page 13, Part "WB Wall"), designed to make the external wall "flat" is available from your supplier - or make one to suit the wall cladding on your home. Avon can custom make wall spacers to suit any wall - including corrugated iron walls.

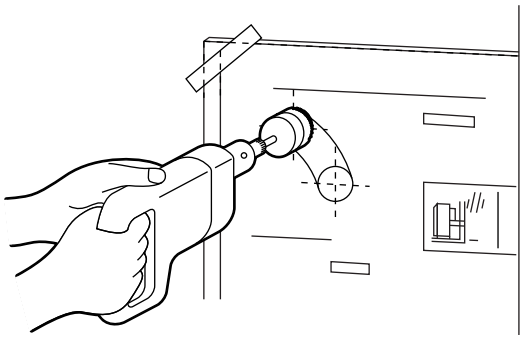


Fig. 5

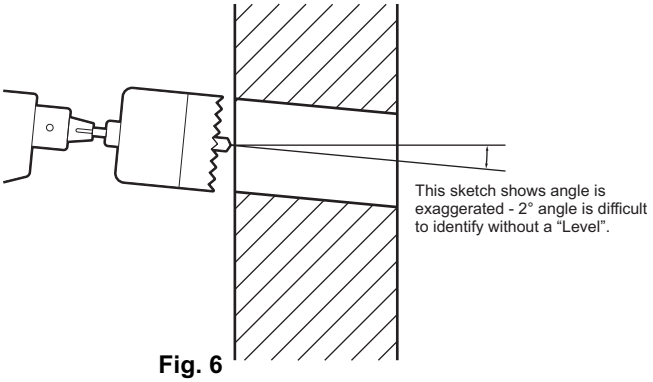


Fig. 6

NOTE: After creating the holes for the Balanced Flue assembly and Fuel Pipe, discard the wall template.

If you need advice re drilling wall holes - email Avon a photo of installation site and contact us on 0800 379 247

5. Install the Green Balanced Flue. FF-95C Heaters can be supplied with extensions to the outer and inner Balanced Flue sections (See Fig. 8) to enable the Balanced Flue to be installed in walls over 150mm & up to 320 mm thick. If the wall is less than 230 mm thick, the 130mm Inner & Outer Flue Extensions as in Para 5b, Fig. 8 are superfluous.

5a. From indoors, insert the Balanced Flue Pipe (Fig 7) into the hole. Ensure the arrow on the inner flue flange is pointing UP.

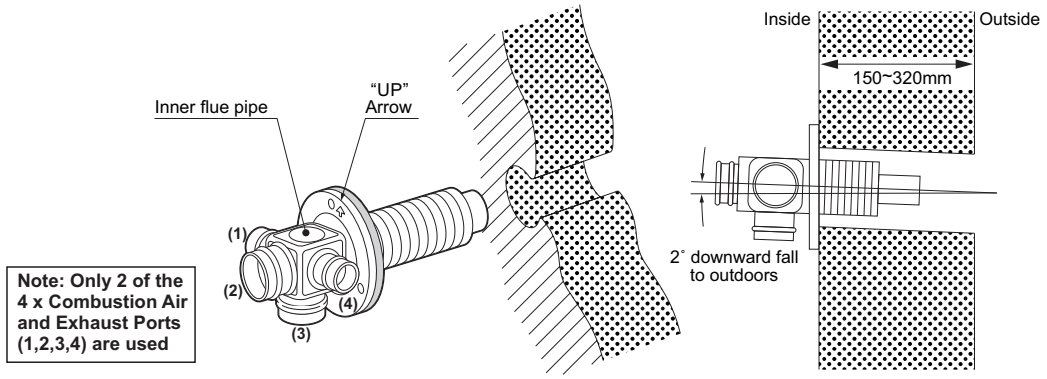


Fig. 7

5b. Where the wall thickness is between 150-230mm, discard the optional 130mm long Inner and Outer Extensions if supplied (See Fig 8).

Where the wall thickness is 230mm to 320mm thick, the optional 130mm long Inner and Outer flue pipe extensions are required.

If the wall is thinner than 150mm, you will need a "spacer" see Page 13 example - contact Avon with wall thickness.

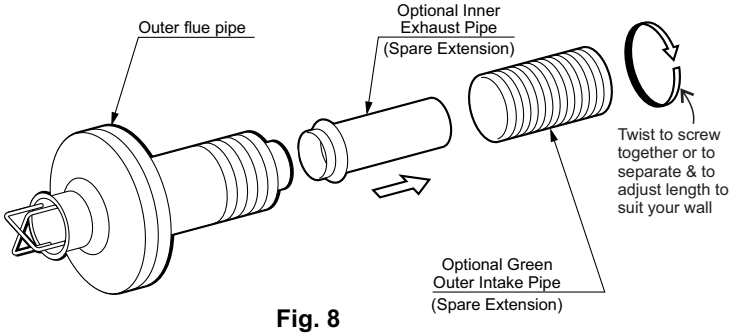


Fig. 8

REFER PAGE 34 FOR ERROR CODES

5c. From outside, insert the outer part of the Balanced Flue Pipe into the wall hole, and rotate so the outside section is firmly "threaded" on to the inside Flue Pipe section. Keep turning (screwing) the outside Flue Pipe clockwise, until the outside flange and its Polyurethane Foam Gasket, (See "A" in Fig. 9) is tightly sealed against the outside cladding of the home. Ensure the arrow on the outer flange of the Balanced Flue Pipe is "UP" - Fig 7 Pg 19 as marked. Note: - effective outdoor weather tight sealing of the outdoor Flue Pipe flange must Comply with NZBC, regardless of outdoor cladding surface - (See "B" at top of Page 18).

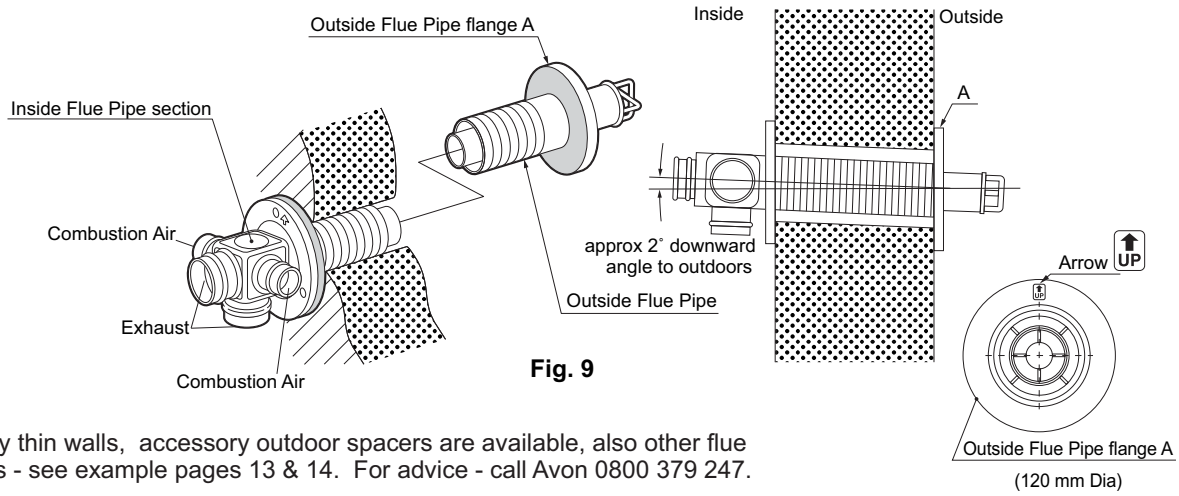


Fig. 9

For very thin walls, accessory outdoor spacers are available, also other flue spacers - see example pages 13 & 14. For advice - call Avon 0800 379 247.

6. Create a hole through the floor or wall (as appropriate for the particular site) for the copper fuel pipe between the heater and the remote fuel tank. Where the hole passes through a wall to outside, drill the wall hole with a slight (2°) downwards slope to outside, then use an appropriate sealant to achieve permanent weather tightness to comply with NZBC Clause E2. Locate the hole so there is sufficient pipe length inside the house, to enable easy access to the pipe connection at the back of the heater, and to enable the "flare nut" to be tightened, before finally positioning and fixing the

NOTE: The Thermostatic Fire Valve (TFV) Capillary & Sensor (pages 26-29) must be passed through the wall hole ***before*** the copper fuel pipe is installed (if the copper fuel pipe is installed first, the TFV sensor may not fit through). Once the TFV Capillary & Sensor has been pushed through the wall hole, loosely install and form the copper fuel pipe (outside), to connect to the TFV.

Fuel Pipe Diameter: ***Unless Winter outdoor temps are very cold*** - i.e. Central Otago, Methven, Central N.I. Plateau, our experience is that 1/4" (6mm OD) pipe from the Fire Valve to the Heater is suitable. For very cold areas, increase pipe size to 5/16" (7.2mm) or 3/8" (10mm) outside diameter (up to 15m). For longer installs in very cold climates, contact supplier or Avon (0800 379 247).

7a. The Balanced Flue has four connection "ports" indoors (see Fig. 9). Two options for the Exhaust "Elbow" and two options for the Silicone Rubber Combustion Air intake pipe, only one of each is used. To "Blank Off" the unused combustion / exhaust "port" (Fig. 10 Page 21), a Stainless Steel Cap (Exhaust) and a Rubber Cap (Combustion Air)) are provided. All Exhaust Connections and Ports are sealed with an internal silicone "O" ring and a stainless steel pop rivet (supplied), All exhaust joints must be fitted with a silicone rubber "O" ring. The combustion air intake "Elbows" have internal molded "Threads" to fit the "ribs" on the rubber air intake flexible pipe.

Apply Soapy water to make assembly of the Rubber and Stainless Steel Components easier.

7b. Insert the "bent joint" (Stainless Steel "Elbow" See Fig. 10 page 21), to the exhaust opening of the Balanced Flue, & secure with stainless steel "pipe holder". (See Fig. 12 page 21)

7c. Fit the "Insulating Cloth Cover" over the "bent joint" (Elbow). Do not shorten the Insulating Cloth Cover. Fold the extra length of the Insulating Cloth Cover, inwards at each end to create a double thickness at each end, wrinkles create additional insulation. Now fit the Insulating Cloth Cover to the "bent Joint" (Elbow), but do not permanently position until later (Fig 12c Page 21).

7d. If necessary, shorten the Combustion Air Inlet pipe to suit the distance between the rubber "Elbows", the Balanced Flue and the heater. Fit the rubber "Elbows" to the combustion air pipe, the Balanced Flue and the heater "Inlet opening" (See Fig. 11 Page 21). Secure rubber elbows to heater and Balanced Flue with Hose Clamps. Use the rubber cap with hose clamp to seal the unused air intake "port" on the Balanced Flue Pipe.

7e. Install the stainless steel "Exhaust Air Cap", to seal the unused exhaust opening on the Balanced Flue (See Fig. 10.). Use a light hammer to tap the cap into the Balanced Flue (with "O" ring), so that sealing is guaranteed (Leaking exhaust gasses are a hazard). Only use the Stainless Steel caps to blank off the unused Exhaust ports, and the Rubber caps to blank off the alternative (unused) Air Inlet ports.

Every Stainless Steel joint to be secured with at least 1 x Austenitic Stainless Steel pop rivet (supplied)

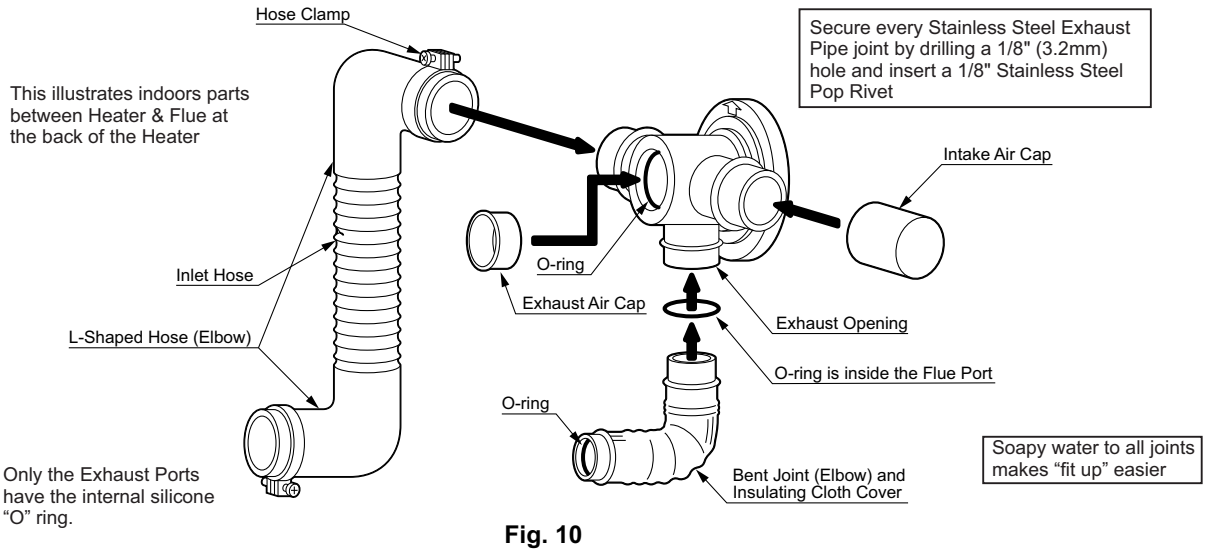


Fig. 10

8. Position the Heater (with drip tray under). Connect the "bent joint" (Stainless Steel Elbow), to the exhaust "Outlet Opening" of the heater (the exhaust outlet is the higher of the two 42mm diameter pipes which exit at the back of the heater (See Fig.11), and secure with the "U" shaped "pipe stopper". (See Fig.12). Spread the Insulating Cloth Cover over the full length of the exhaust "Bent Joint" (Elbow), so that it entirely covers & insulates the Elbow and the pipe stopper at the Balanced Flue Pipe end of the "Bent Joint". Note do not cut the insulating cloth, wrinkles in the Insulating Cloth Cover are encouraged (as in photos A & C, Fig 12 below).

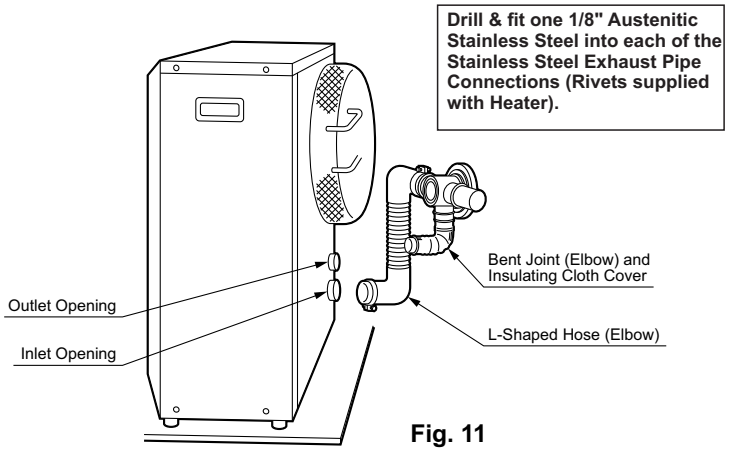


Fig. 11

Optional extra flue extensions are available - see pages 13 & 14 (Can be used to clear internal wall obstructions)

9. If any Extension Pipe Kit (type L, M, or S) is used, secure the pipe holders & clamps supplied with the Extension Pipe Kits to make permanent the connection between the bent joint (Stainless Steel Elbow) and the extension pipe.

Fig. 12

10. Level the heater with the 4 x adjustable feet, using the “plumb bob” located on the right side of the heater. When viewed from above the heater is level when, the plumb bob “weight” is within the circle. If not, adjust (by rotating) the heater “feet” until the plumb bob weight is within the circle (See Fig. 13 and Fig. 14).

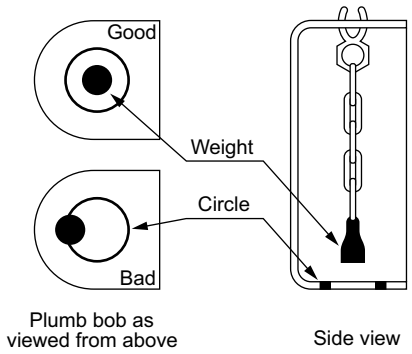


Fig. 13

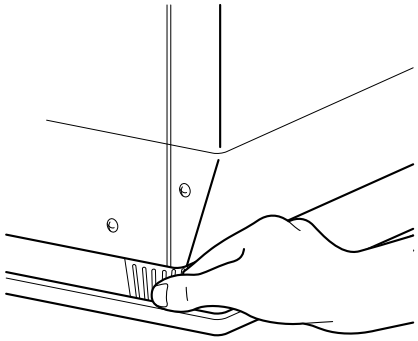


Fig. 14

11. **Seismic Restraint (Required by NZBC C/AS1 & NZS4219)** - The FF-95 Heater must be fixed to the main structure of the building to ensure compliance with NZBC C/AS1 & NZS4219. See pages 24 & 25 for details on FF-95C Wall Brackets and Seismic Restraint requirements. **It is the installers responsibility to ensure that Seismic Restraint Compliance is achieved.**

12. **Installing the Thermostatic Fire Valve (TFV):** Pages 26-29 detail installation , Fig 4, Page 28 shows two small pipes, the Fuel Pipe and the Capillary Tube of the Thermostatic Fire Valve that pass through the outside wall to the heater indoors.

    Remember that the large diameter sensor that is at the end of the TFV Capillary must be installed before the Fuel Pipe, because the fuel pipe wall hole (or “Sleeve” Pipe, depending on appropriate installation method as detailed in Avon Balanced Flue Installation Guide (See notes page 2)) will not permit the sensor to pass through AFTER the Fuel Pipe has been installed.

13. A ***Remote Room Temperature Sensor*** is provided at the end of a 2.4m long extension wire, which exits from the rear of the FF-95C cabinet. Typically, the coldest part of any room is at floor level. Locating the sensor approx 1cm above floor level behind the Heater, is a location where it is unaffected by the heat radiated from the back of the FF-95C, is recommended, and it is unlikely that it will ever need to be relocated elsewhere. If necessary, the sensor wire can be cut and extended up to 30m with ordinary twin core cable. **Wherever the sensor & extension wire is located, ensure it is not in direct sunlight, drafts or an area affected by radiant heat or warm air at the back of the Heater.**

    If preferred, the room temperature sensor can be affixed to a wall with suitable fixing (Fig.15). Screw the fixing into the desired location on the wall. Hook the back of the room temperature sensor over the fixing, or secure with double sided wall adhesive tape.

    The most simple and effective location is shown in the example photo (Fig. 16). Wind the Thermostat sensor cable around the fuel pipe so that the bottom of the Thermostat Sensor is between 6mm - 15mm above the floor.

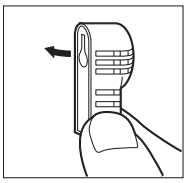
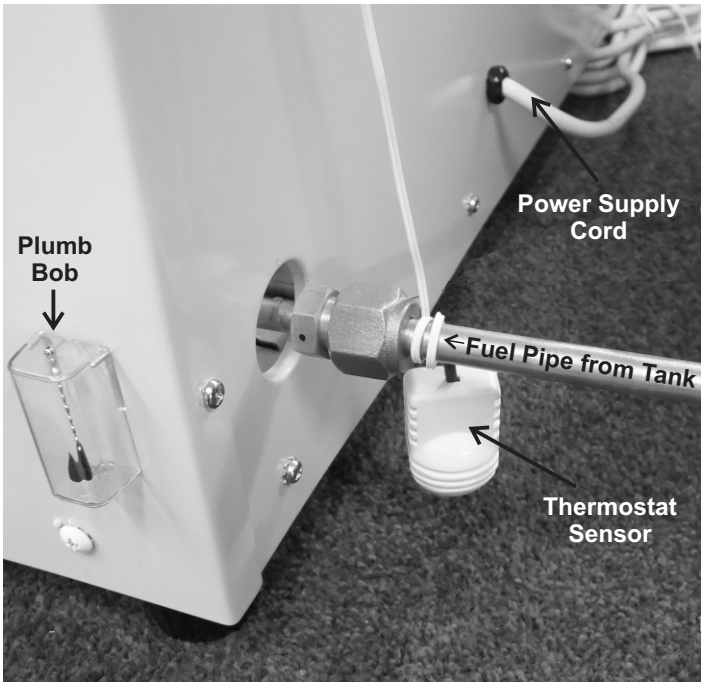


Fig. 15



Rear view of Heater **Fig. 16**
Ideal Thermostat Sensor Location

14. **Before First ignition, and Commissioning / Operation (SECTION E), check the following:**

a. All fuel connections are tight and firm.
b. The heater is level, and secured to the wall as per this instruction manual.
c. Installation is as per these instructions, and complies with Local Authority Codes & NZBC requirements.
d. There are no combustible materials, solvents, vapours or explosive dusts near to the FF-95 Heater or the outdoor flue exit.

Any queries re installation contact Avon 0800-379-247.

PERMANENT WIRING AND EXTENDING THE POWER SUPPLY CABLE

The heater is supplied with a 2.4 metre flexible cord with a side entry three pin plug.

A dedicated power supply socket is recommended. The heater power supply should not be interrupted as may occur if the heater shares the plug socket with other appliances.

The FF-95C requires 230V 50Hz AC power to operate. Power consumption is minimal. Automatic ignition (startup) requires 260W for approx. 4 minutes. After ignition, for normal heating, (on high), FF95 power consumption is approx just 50W.

POWER SURGES

Power Surge faults (lightening, etc.) can damage the Electronic Systems, not only the FF-95C but also other household appliances. We recommend a 10 Amp Power Surge Protector is installed in the FF-95 Power Outlet. There are many suppliers of Power Surge Protectors, Bunnings offer an Arlec Plug-in Power Surge Protector at a low cost.

POWER OUTAGES

If power supply reliability at your home is a concern, some options could be as follows, contact Avon to discuss suitability.

1) A Generator

Unlike a Heat Pump that usually requires a high capacity generator to “Start” the Compressor, the FF-95C will easily start with a 2000 watt generator. (Inverter Type). To select a generator that suits your needs, make a list of the electrical appliances you will need in a power outage. (i.e. approx power in watts)... e.g. Hot water Cylinder 3000W, Refrigerator 400W, Microwave 700W, Electric jug 2000W, TV 110W, some lights 300W. Now add up the Power (W) of the appliances that you think you will need in a power outage, and use this total to select a generator. The maximum power consumption of the FF-95C is a minor factor when selecting a generator to protect your household against power outages,

2) An Inverter (with a car battery)
Only a true “sine wave” inverter is suitable. (12V DC to 230V 50Hz To allow for “in rush current”, Not less than 1000 Watts). - Suggest JAYCAR ELECTRONICS. A 12V DC car battery will operate the FF-95C for 70-120 hours, depending on capacity and condition. Contact battery supplier for advice.

SEISMIC RESTRAINT - INSTALLERS RESPONSIBILITY

1. Installation of the Heater & Diesel Tank must comply with the Seismic Restraint Regulations of New Zealand Standard NZS:4219, and the requirements of NZBC C/AS1 para 3.1.4.

2. NZBC C/AS1 (Para 3.1.4) details minimum stability requirements for the Heater, i.e. the Heater must be secured to the wall by a means that will continuously withstand a pulling force (applied to the front centre of the Heater) equal to 0.40 times the weight of the (34kG) Heater, with no significant movement of the structure to which the Heater is affixed to.

3. **Each FF-95 is supplied with 4 x adjustable wall mounting brackets (Fig 2.), two Cobra "Driller Toggles" Type (360SE) (Fig. 3) and 2 x 65mm x No 8 CSK Wood Screws.**

4. It is impractical to apply a pulling force to the front centre of the FF-95C Heater. Avon's calculations (simplified) are..... Assume a conventional Gib/Fibrous Plaster wall with standard stud spacing of 600mm centres. Install the 2 x 360SE Driller Toggles anywhere between the 600mm Wall Studs, (each withstands 23kg horizontal pulling force), to secure the 2 x top wall brackets. Affix the 2 x lower wall brackets with the 2 x 65mm No 8 Wood Screws, (through the skirting board to the floor plate located behind the Gib lining). NZBC "withstand force" is 0.40 x the weight of the FF-95C - the FF-95C weighs 34kg (x.40)=13.6kg ÷ 4 (wall fixings) = 3.4kg for each wall fixing. Compliance is achieved if each of the 4 x fixings can withstand a pulling force of approx. 3.4kg each with no significant movement of the structure to which it is affixed to.

5. For Gib Board and most fibrous plaster walls (up to 13mm thick), "Driller Toggles" provide compliant fixing, but as Avon does not know actual site detail, Seismic Compliance is installers responsibility. Example pictures and sketches herein are a guide. If your installation requires a screw into a wooden or steel wall stud, you will need to source and provide the correct type of fixing screw as appropriate for the wall material.

6. The four (slotted/adjustable), wall fixing brackets are each supplied with a "#4 Phillips head screw" to "fix" the final position of the heater. Ensure they are tightened sufficiently to require a tool to remove (see photo E, page 25).

It is the installers responsibility to ensure that NZS4219 is fully complied with.

FIG 1. **2 x DRILLER TOGGLES INCLUDED WITH EACH HEATER FOR UPPER WALL BRACKETS**

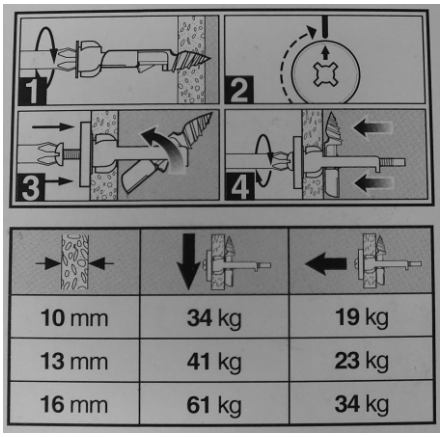


FIG 3. **DRILLER TOGGLES INSTRUCTIONS**

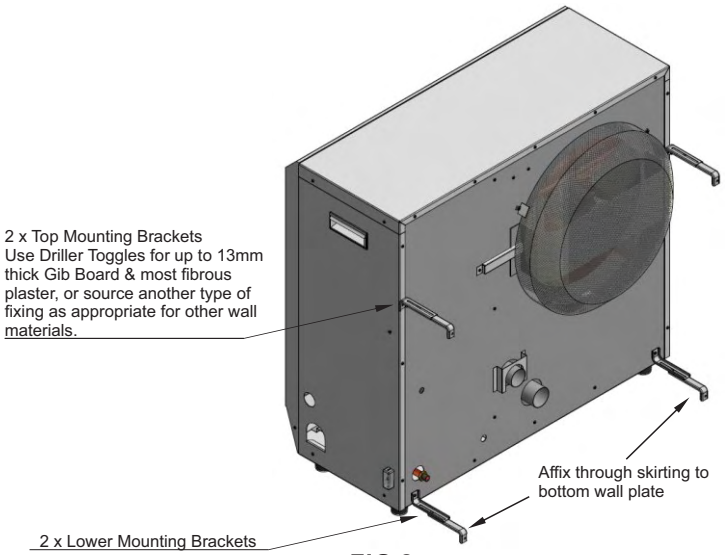


FIG 2. **4 x ADJUSTABLE (SLOTTED) BRACKETS SUPPLIED - SEE PHOTO "E" PAGE 25**

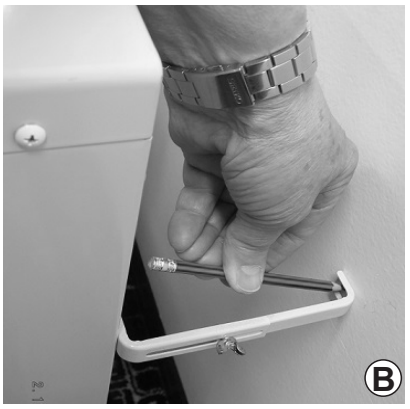
WALL BRACKET INSTALLATION

These instructions encourage the installer to take pride in their work, especially when affixing the Heater to the wall, and apply to a conventional installation to affix the heater parallel to the inside of a Gib or Fibrous Plaster External Wall. Owners expect a neat and tidy installation.

If installation site conditions are different, other fixing methods may be necessary. NZBC Compliance is detailed on Page 24. Any doubts, provide detailed photos / plans to Avon, and contact for advice (0800 379 247) - we cannot advise unless we have sufficient detailed photos/plans that demonstrate the problem.

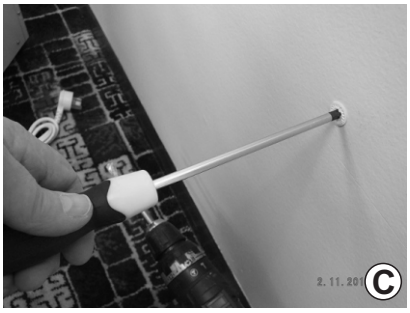
For Upper and Lower Wall Mounting Brackets (4 off)

1) Affix each of the 4 sets of slotted 2 piece wall brackets to the back of the Heater as shown in Fig. 2 (page 24) (Use wall template to determine where brackets are located on back of Heater).
2) Use a pencil to mark the (upper) wall and (lower) skirting board where the fixing holes are to be located (see Photo **B**). The height above the floor of the lower brackets MUST be of a dimension that ensures a 65mm woodscrew passes through the skirting **and affixes to the bottom wall plate within the wall cavity.**
3) Now move Heater (with attached wall brackets) clear of wall.



Fitting the 2 x Upper Wall Mounting Brackets with Driller Toggles

4) Drill a pilot hole for each Driller Toggle (approx. 4mm dia), through the Gib Wall.
5) Insert a “thin probe”, at least 70mm into each pilot hole, “wiggle it around”, to confirm there are no obstructions or services within the wall that will foul the Toggle when it is inserted.
6) Carefully enlarge each Pilot Hole with a “neat” 10mm dia hole.
7) Install each Toggle in the wall (see Toggle details page 24 and Photo **C**).
8) Ensure arrow on Driller Toggle head is pointing upwards.
9) Using the 4mm threaded screw and washer supplied, fit each wall mounting bracket as per Photo d (To simplify separate each wall bracket and fix half of each wall bracket to heater and wall separately).

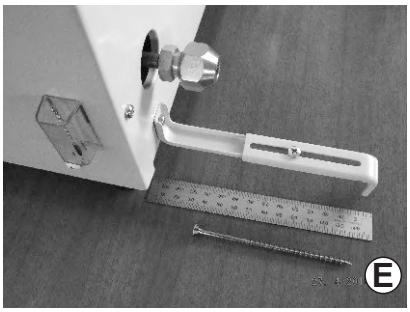


Fitting the 2 x Lower Wall Mounting Brackets with 65mm Wood Screws

10) Drill pilot holes for the two woodscrews (one for each lower bracket) (suggest 3.5mm dia to a depth of approx 65mm).
11) Use the 65mm wood screws supplied to affix “one ½” of the two bottom wall brackets to the skirting board (and into the Bottom (concealed) Wall Plate).

Completing wall bracket installation

12) Return the heater to installed location.
13) Align all the “halves” of the Wall Brackets and secure by inserting the “#4 Phillips Head Screw” as shown in Photo **“E”**.
14) Ensure all 3 fixings on each wall bracket are tightened firm but do not over tighten. Law requires the #4 Phillips Head Screw to be tightened, so it cannot be removed without a tool (Child safety).
15) The dimension between the back of the Heater & Wall is automatically “set” by the installation of Exhaust flue fittings…. Usually approx 148mm



Warning: 1. Any short cuts, risk damage to heater paintwork.
2. Actual fixings supplied may vary from photos.

THERMOSTATIC FIRE VALVE (TFV)

An automatic safety Fuel Shut off Valve is required to comply with New Zealand Safety Regulations and must be installed **outdoors.**

HOW IT WORKS...

The Thermostatic Fire Valve (TFV) must be installed outdoors to provide automatic fuel shut off in the event of an overheat within the Diesel Heater, and is “fail safe” in the event of a Capillary Tube or Temperature Sensor failure.

There are 4 key parts of the Thermostatic Fire Valve (TFV).
1 - The Valve Body, which must be installed outside the external wall UPRIGHT (Fig 2 - Example Photo).
2 - The Capillary Tube, which “runs” from the Valve Body to the Sensor.
3 - The Sensor, which is to be located in the “pocket” at the back of the Heater.
4 - The Reset Button located at the bottom of the Valve Body (Fig. 2)

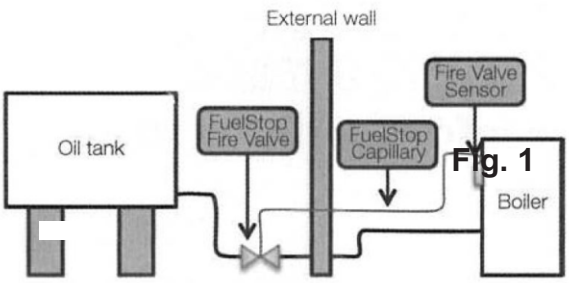


Fig. 1

If the temperature within the FF-95 exceeds a safe temperature, the liquid inside the Capillary and Sensor expands, and causes the TFV to immediately cut off the supply of Fuel to the Heater.

Because there is a small reservoir of Diesel between the outdoor TFV and the Heater, it is normal for combustion to continue for 3 - 4 minutes AFTER the TFV has “tripped” (during the Heater combustion “running on”), until all the Fuel in the “Sump” has been consumed. When all the Fuel in the Sump has been consumed, combustion will cease and the Heater will then cool down. This can take approx. 10 - 25 minutes.

INSTALLATION ADVICE

Carefully ready info and study pictures on pages 26-29.

1) Install the TFV **upright** as in photo 1 and position in accordance with NZ Building Code Clause C (the TFV **must be** installed outdoors).

2) The inlet and outlet ports on the TFV are 3/8 pipe. They can be fitted with straight unions or elbows. If Avon has received photographs of the proposed installation we will have done our best to select and provide unions or elbows as appropriate for the installation.

3) Suggest initially loosely install the TFV (details Page 28 & 29), because, after the Capillary and the TFV Sensor have been installed, only then is it practical to “tidy up” the Capillary Tube by re-coiling any surplus. The Capillary Tube contains an expansion liquid and gas, if the Tube is broken or damaged, the contents will leak, and the TFV will never open.

4) Take great care handling the Capillary Tube, endeavour to recreate the coils of the Capillary Tube as was first received, and, use cable ties (supplied) to neatly bundle the surplus Capillary Tube. NEVER cut, or flatten, or bend sharply, the Capillary Tube. Also note that copper tubing work hardens every time it is bent or straightened, so the less Capillary, or any copper tube, is “worked”, the softer the tube will be and the easier it will be to “tidy up”, as the installation comes to an end (see copper pipe information page 32).

5) ***Before*** *installing the fuel pipe between the TFV and the Heater fuel inlet connection*, assess the route that the Capillary Tube is to be installed to enable the Temperature Sensor “phial” to be installed in the TFV Sensor pocket at the back of the Heater, (see photos page 27) then unroll sufficient Capillary Tube to prevent twisting and sharp bends, and carefully thread the Capillary Tube through the hole in the wall *that will later* accommodate the fuel pipe from the TFV to the fuel and left at the back of the Heater.

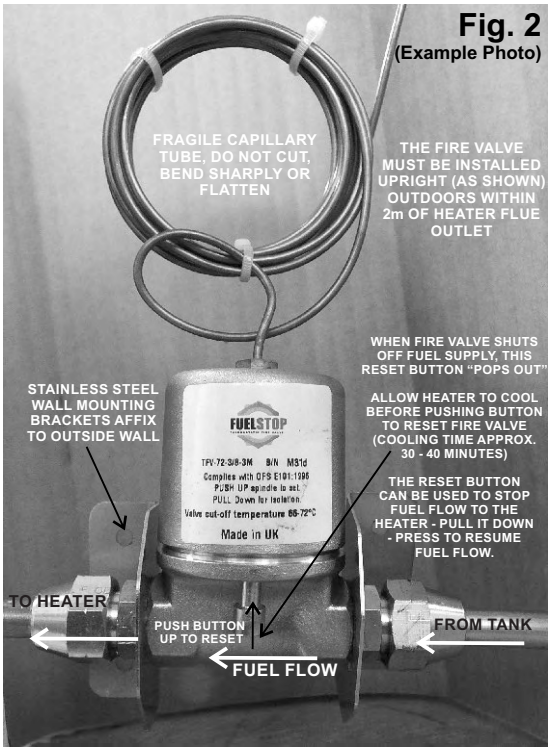


Fig. 2
(Example Photo)

6) When pipe tightening fittings and connections use two spanners (hold on to one and use the other to tighten. DO NOT HOLD THE TFV HEAD, DO NOT OVERTIGHTEN THE VALVE CONNECTIONS.
Thermostatic Fire Valves are factory calibrated; there are NO serviceable parts, do not attempt to dismantle.

7) Safety Regulations are breached unless the TFV Sensor is firmly secured in the Sensor Pocket within the Heater, so that the only way the Sensor can be removed is by the use of a tool. A Capillary clamp is provided for this purpose (see photos A-D page 27).

Do not disregard this instruction, and NEVER operate the Heater unless a fully serviceable TFV is correctly installed as per these instructions.

8) Any surplus TFV Capillary at the back of the Heater should be carefully straightened and arranged to follow a reasonably direct line from the Capillary clamp to the hole in the wall through which the fuel pipe can now be installed. Once the surplus

Capillary is outdoors, carefully re-coil the surplus Capillary without twisting or crimping, as close as possible to the coiled condition the Capillary Tube was in when first received. (It is not essential that the Capillary Tube surplus is simply to make it tidy and to condense it in a small practical space so that it will not become damaged or fouled by later activities near the Fire Valve, and to ensure that the reset button is not rendered inaccessible.

9) Should the TFV ever need testing withdraw the Sensor from the Sensor Pocket at the back of the Heater and insert the full length of the Sensor into hot water that is not less than 85°C. If the TFV is serviceable the reset button will trip “out”, in 15 to 20 seconds. The TFVis not serviceable, if it does not operate as described above, and it must be replaced. NEVER attempt to repair or to bypass a faulty TFV.

Recommended Sequence to Locate / Install Thermostatic Fire (TFV) and Capillary Tube with Sensor

a) Drill Fuel Pipe wall hole under the Balanced Flue wall hole. Distance between both wall holes will vary between sites, see more examples in Picture Book. Allow for the Ø15mm white PVC plumbers flanges to fit over the Fuel Pipe and for the indoors flange to clear the skirting board.

b) Fit the TFV Mounting Plate.

c) Push the Capillary Tube and Sensor through the Fuel Pipe wall hole.

d) Before installing Fuel Pipe, fit and form Fuel Pipe from tank close to final position of TFV (If pipes are exposed to below 0°C for more than 4 hours, insulate the (outdoor) pipes with thickest diameter plumbers sponge foam pipe insulation.)

e) Fit and form Fuel Pipe from TFV through wall to heater fuel inlet and seal to prevent **any water ingress.**

INSTALLING TFV SENSOR TO BACK OF HEATER

1) Bend Capillary Tube 200mm from end of TFV Sensor, as shown in Photo A) below.
2) Straighten approx 250mm - 300mm of the Capillary Tube.
3) Push TFV Sensor into the Sensor Pocket as far as it will go (Photo B).
4) *Loosen* the screw that secures the Capillary Clamp (Photo C).
5) Slide Capillary Tube behind Capillary Clamp and tighten screw.
6) Regulations require the use of a tool to remove the TFV Sensor from its pocket. **Failure to secure the TFV Sensor in its Pocket *is a serious safety omission*.**
7) Any loose capillary tube: carefully return to outdoors through Fuel Pipe wall hole.

Any problems or queries, call AVON Technical Support -- **0800-379-247**

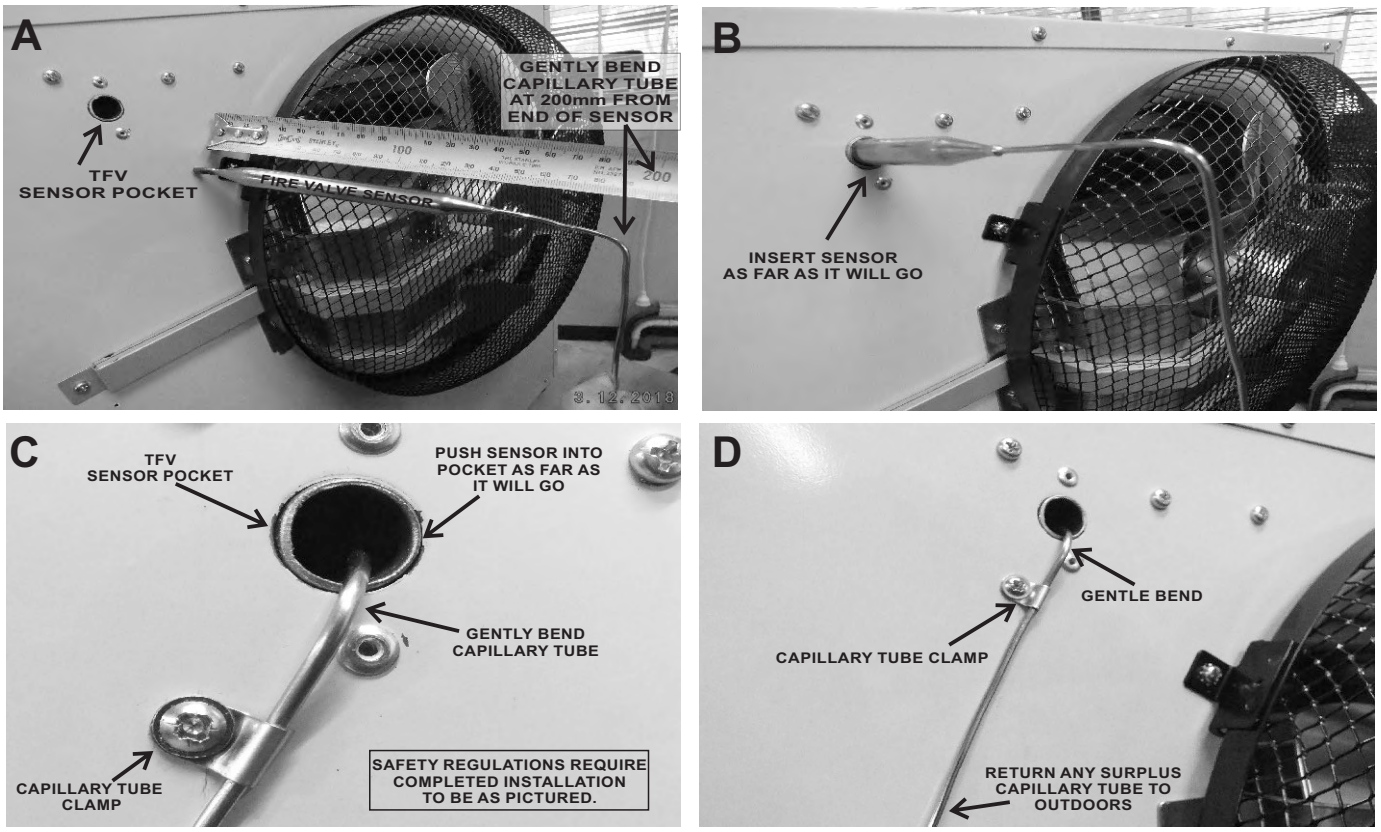


Fig. 3 - Installing Thermostatic Fire Valve Sensor

INSTALLING FIRE VALVE COVER AND FIRE VALVE

(EXAMPLE) Fire Valve Cover for Flat Surface

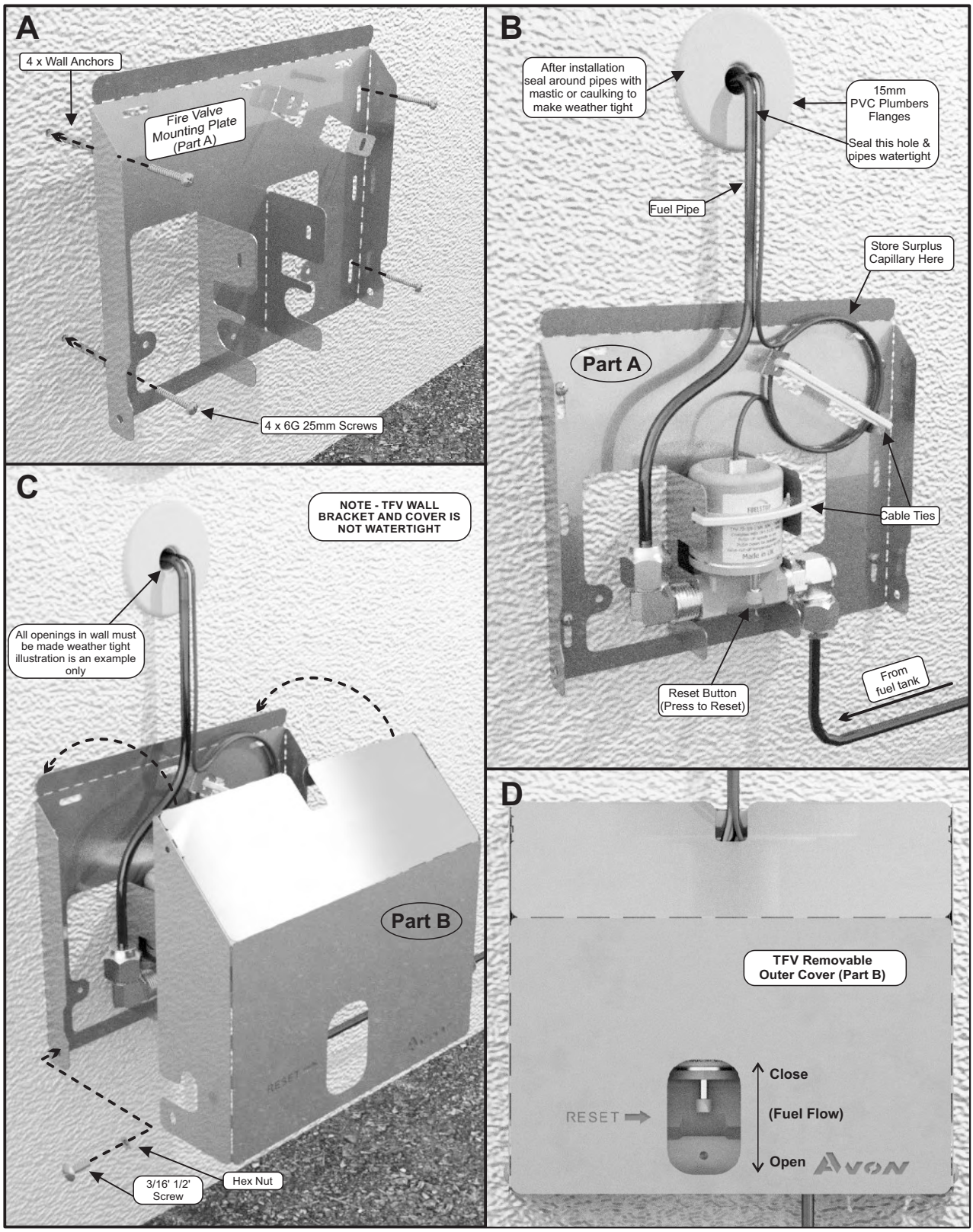


Fig. 4 - Installing Thermostatic Fire Valve (TFV) and Cover

INSTALLING THERMOSTATIC FIRE VALVE WITH MOUNTING PLATE & COVER

Fig 4 (Sketches A-D) shows an example flat brick or concrete wall mounting. Study site and sketches to select the best method to fit your TFV.

Note that the TFV is fitted *after* the fuel pipe wall hole has been created.

1) Use slots or holes on Mounting Plate as a template to anchor to wall.

2) Install and align both fuel pipes (that connect to the TFV) to approx final location.

3) Confirm suitability of supplied TFV pipe fittings, (other brass fitting options are available). Assess how TFV & both fuel pipes will fit neatly on Mounting Plate and **under** the Cover.

4) The Capillary Tube (with temperature sensor at end) is 3m long. Most installations will require approx 1.2m to 1.5m of Capillary. CUTTING THE CAPILLARY TUBE will destroy the TFV. **NEVER CUT THE CAPILLARY TUBE.** Before uncoiling the Capillary Tube, read info on page 32 “General Copper Pipe Information”.

5) Carefully uncoil sufficient Capillary Tube, (see explanation on Page 26), without kinking or damage.

6) Hold the TFV a convenient distance from fuel pipe wall hole and push the Capillary Sensor with sufficient Capillary Tube through the fuel pipe hole so that when the FF-95 Heater is finally installed (indoors), there is ***just sufficient*** Capillary Tube to push the Sensor into the Heater Sensor Pocket and clamp to the back of the Heater as shown on Page 27 Fig 3. (Photos A-D). When the FF-95 is installed, carefully hand form the Capillary Tube as neatly as practical at the back of the Heater. Ensure that the Capillary Tube does not touch the Exhaust Pipe or Flue.

7) As the Capillary Tube is pushed through the fuel pipe hole, move the TFV towards the TFV Mounting Plate.

8) Carefully coil or arrange any unused coils of Capillary Tube so they can be neatly clamped on to the Mounting Plate as illustrated in Fig 4 (B) Page 28.

9) Secure TFV as indicated in Fig 4, and secure tightly with cable ties (supplied). Ensure the cable ties secure the TFV so firmly that the Reset Button can be conveniently pushed up (CLOSE) or pulled down (OPEN).

10) If the Fuel Pipe and Capillary Tube are not able to pass through the top centre of the mounting plate, there is provision for the Fuel Pipe and Capillary to pass horizontally through the mounting plate.

11) The fold-back lid on the top of the TFV Cover will rest on top of the Mounting Plate, once it is in place, fasten the Cover with a pair of screws and nuts (supplied) on its sides as indicated in Fig 4 (C).

Note: All wall penetrations must be Weathertight to comply with NZBC Clause E2.

To comply with NZBC Clause E2, for homes built after 1991, wall penetrations must not only be weather tight, but within the wall cavity, any hole in the “wall underlay” must be restored to “as built”. When Avon is informed the home is “built post 1991", we will have provided 2 copies of our “Balanced Flue Installation Guide” that explains and illustrates how to penetrate & restore the wall underlay - do not install the FF-95 heater in any home built after 1991 unless the instructions in the Balanced Flue Installation Guide are followed.
In homes built prior to 1991, common sense “best practice” weather tightness procedures to prevent water/moisture ingress from outdoors in to the wall cavity will be a requirement of the building inspection.

DO NOT INSTALL ANY OTHER SAFETY DEVICE WITHOUT THE WRITTEN APPROVAL OF AVON

SECTION G:
FUEL STORAGE AND SUPPLY SYSTEM

WARNING: Only use clean, fresh, Automotive Diesel. NEVER USE PETROL, White Spirits, or other flammable liquids, which can lead to explosive and destructive fire, and may cause serious injury or death.

FF-95 FUEL TANK OPTIONS

The illustration overpage is a Toyotomi 84L Stainless Steel tank. Fuel suppliers usually will not deliver less than 250L. Larger capacity external tanks are available from your supplier. Recent modifications to regulations require tank manufacturers to advise if their tank is compliant and provide confirmation in writing. Contact supplier for tank options to suit your site.

Depending on actual site conditions, siting the Tank for compliance with your local council regulations should be clarified with the local council when the application for a "Consent to Install" is submitted.

EXTERNAL TANK INSTALLATION

External tank installations must comply with the NZBC, and Standard AS1691:1985 and subsequent amendments, or superceding Standards, plus any applicable local Authority Codes or Rules. Installation Standards Page 2 make Compliance the installers responsibility, but the following information may be of interest.

1) Some Consent Authorities require domestic fuel tanks to be installed with a secondary containment system known as a "Bund" Tank. The Primary Tank is installed "in" the Bund Tank which is intended to catch and hold any fuel leaks from the Primary Tank. Check your local Council website, for local rules that apply to your installation address.

2) Remote Fuel Tanks must be installed "outdoors" - under eaves is usually OK, but not under a "lean to" / carport - check with your local Council.

3) The fuel tank Vent & Filler must be a minimum of 1000mm from any opening into the building. The definition of "opening" means fixed and opening windows and doors, and may also include foundation ventilation grates in raised floor homes.

4) Fuel flows by gravity from the fuel tank to the heater. **Install the fuel tank so the bottom of the tank is not less than 400mm above the surface of the floor upon which the FF-95 is installed.**

5) Where the remote fuel tank can only be installed below the heater, (multi story homes and hillsides) an optional "fuel lifter pump" is available to "lift" diesel from up to 8m below the heater, to the heater (Sketch Page 13). Contact your supplier for further information.

6) Where the fuel tank is considerably higher than the Heater, it is important to avoid excess gravity fuel pressure to the Heater. When the fuel tank is full, the level of the fuel in the tank must not be more than 2.5m higher than the surface of the floor that the heater is installed upon. If this is impractical, Avon can supply a Constant Pressure Valve, to be installed behind the heater, to limit the pressure of fuel being delivered to the heater.

7) Fuel tank should be located at least 1.5m away from all significant heat sources. Fuel Tank contents must not exceed 40˚C in normal conditions.

8) Only use clean, new, soft drawn copper tubing for fuel line (8mm or 5/16" OD). If Fuel Pipe must be joined, mechanical flare nuts and unions are recommended. If necessary to braze joint (extend) copper tube, ensure that internal "scale" caused by brazing, is purged from the inside of the pipe with dry compressed air or, dry nitrogen, CO2, or by allowing at least three liter's of diesel to flow through the pipe to "wash away" internal copper pipe "scale" so the scale does not cause restriction the integral fuel filter /strainer (Para 6 Page 32). Galvanised pipe fittings or fuel tanks must not be used to store or transport diesel fuel. Diesel reacts adversly (it "gels") in contact with Galvanising.

9) To prevent "air locks" in fuel pipe, the path of the fuel line should be generally parallel to horizontal with no U-shaped or "P" trap type "rise and fall" bends.

10) Every tank requires a shut-off valve and a drain condensate valve, as shown on Fig.1 Page 31.

11) Fuel tank condensate drain outlet is usually located at that end of the tank opposite the fuel outlet. As part of the installation procedure, install the fuel tank on an angle, so that as internal condensate accumulates within the tank it gravitates to the lowest end of the tank. An appropriate angle is 15-20mm lower for a 1200mm long Tank. Ensure the condensate drain valve has a sealing plug or cap to avoid accidental opening. Internal condensate can be minimised if the tank is painted a light colour, or located away from direct sunlight. Sunshine causes the air in the top of the tank to expand and be released from the tank vent when the air is warm (daytime), and as the air cools down (at night), humid outdoor air is drawn into the tank via the vent and causes condensate to accumulate on the cold inside surfaces of the Fuel Tank.

12) **Fuel Filter** - **Each Toyotomi Heater is supplied with a Garber R2000 Fuel Filter** (www.Garberfilters.com), which traps & holds (by absorption) moisture. Diesel fuel flow / firing rate capacity is 10 US Gallons per hour. Toyotomi Heaters consume less than 1/40th of the Garber filter flow rate capacity. The Garber Filter should not require replacement unless it has rusted & leaks, or is fouled with water or other serious impurities in the fuel in which case the tank should also be drained and cleaned, and contaminated fuel disposed of. **Avons' warranty only applies to Toyotomi Heaters which are fitted with a serviceable Garber R2000 Fuel Filter.** Any condensate that enters the FF95C will cause irreparable damage to the Burner.

13) Fuel pipe-work must be located or guarded so that it is protected against physical damage in normal service. Secure with pipe saddles as appropriate (not supplied). If winter freezing can be a problem, insulate pipe with thickest plumbers EPDM Flexible Foam Pipe Insulation.

14) A separate booklet, titled "Toyotomi Tank Instructions" is supplied with the technical data for the Toyotomi Tank. More specialised and general information on Toyotomi Tanks is within that booklet, but content is relevant to other fuel tanks.

15) In addition to the integral Safety Controls within the FF-95C, NZ HSWA Regulations require a "thermally triggered device" to shut off the fuel supply in the event of two fault conditions, ie….

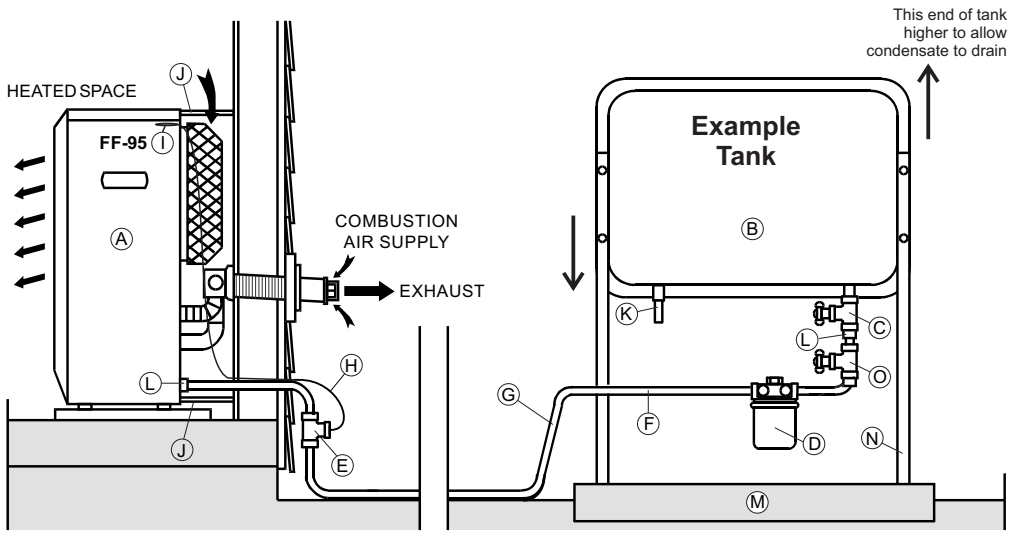
A) A fire within the heater. **B) A fire near the fuel tank.**

Avon supplies the Thermostatic Fire Valve (TFV) (which must be installed outside), (or an equivalent Fire Shut Off Valve), to prevent the Heater from causing fire. (See pages 26-29).

16) An additional TFV must be fitted, if the tank is located more than 3m from the Building or the Heater. Where required, Avon can supply a secondary Auto Shut Off Valve to be fitted to the fuel tank. (See O in Fig 1 below and Fig 2 Page 32).

Typical Heater Installation with Toyotomi 84L Tank (other tank options available)

Notes
1. This sketch does not show a 'Bund' Tank which may be required - check with Local Authority.
2. Locate & install tank in accordance with local codes.
3. Top of tank to be no more than 2.4m above floor of home.
4. Fuel outlet to be at least 400mm above floor of home.



Ⓐ – TOYOTOMI FF-95
Ⓑ – Example Fuel Tank
Ⓒ – Fuel hand shut off valve
Ⓓ – Fuel Filter (model GAR-BER R2000)
Ⓔ – Thermostatic Fire Valve (TFV)
Ⓕ – Copper Fuel Pipe
Ⓖ – Insulate Pipe against freezing (only if necessary)
Ⓗ – Thermostatic Fire Valve Capillary Tube
Ⓘ – Thermostatic Fire Valve Sensor (Installed In Back of FF-95)
Ⓙ – Seismic Restraint Brackets
Ⓚ – Condensate Drain
Ⓛ – Fuel Pipe Connection
Ⓜ – Base (to comply with sesimic restraint regulations) (& AS1691:1985)
Ⓝ – Mounting Brackets as supplied with tank (other mounting options available)
Ⓞ – Fire-O-Matic Shut off Valve (only required if tank is more than 3m from building

EXAMPLE ONLY

FIG. 1

FIRE-O-MATIC SHUT OFF VALVE

REQUIRED IF FUEL TANK IS **MORE THAN** 3m AWAY FROM THE HEATER FLUE OUTLET

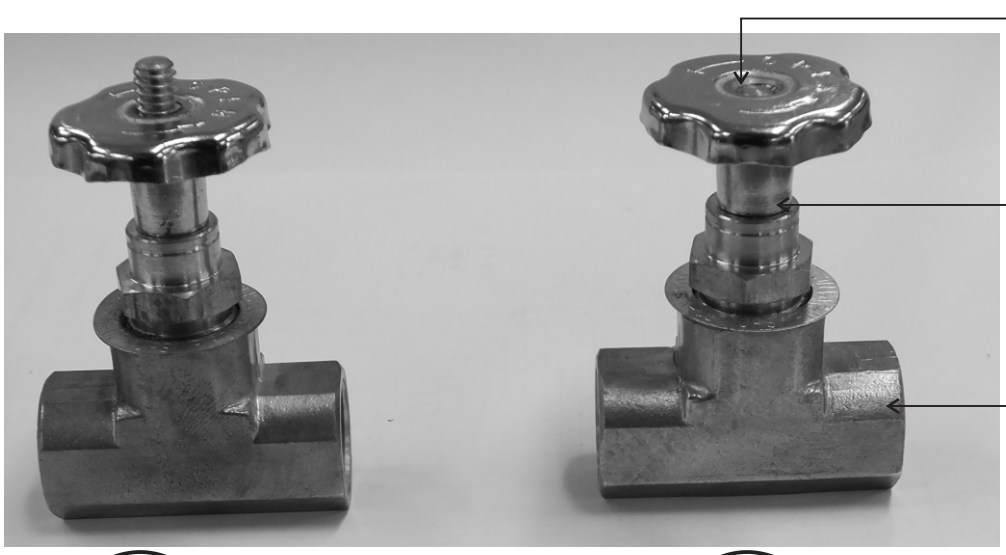


FIG. 2

GENERAL COPPER PIPE INFORMATION

The following is general and abbreviated. Fuel Pipe installation is an installer responsibility.

Before ***preparing to lay concrete***, or installing copper fuel pipe close to foundation of a new home, contact Avon for more advice and example "How To" photos -- but the following may be of interest.....

Because Copper Pipe expands and contracts with every temperature variation --- up to Plus / Minus 60mm over 15 m of length, between summer and winter any installation must allow for expansion and contractions, or the pipe will fracture. Also as copper flexes or bends it becomes "*work hardened*" and susceptible for fatigue cracking. Try bending *and straightening* a 200mm pipe scrap.

Where copper pipe is exposed, (e.g. from Tank to house) make secure from damage by nearby activities with Copper or plastic Pipe saddle's, clamps or an outer "sleeve" of PVC pipe (e.g. Garden irrigation pipe).

Where Copper Pipe is to pass through or under a new concrete floor or foundation or pathway, NEVER allow the copper to be in direct contact with concrete. Free Expansion / Contraction MUST be provided for. Install the copper pipe in a Durable Plastic Sleeve Pipe to be at least 2 times the diameter of the copper tube is often the solution. All fuel pipe bends must be Sweeping Bends -- not tight bends. Failure to provide for adequate expansion / contraction will result in failure of the Copper pipe.

EPDM Expanded Foam Thermal Insulating Tube, (used by Plumbers) when slid over then ends of semi rigid plastic pipe (20mm PVC) is OK to make a ***sweeping bend*** through concrete**.** Tape the Sleeve Pipe joints and the Foam Insulation pipe joint with PVC or similar insulating tape. The tape only has to serve the short term purpose of sealing concrete from Copper Tube until the concrete is set. Check with concrete supplier that the concrete contains no chemicals that can corrode copper.

What diameter Copper Pipe?
The Heater Fuel Pipe inlet connection is 3/8 Flare. (Avon can lend Flare Tools). If Avon is provided with site pipework detail and if frost is not a problem, we may supply at no charge the short section of pipe between the Heater and the Spring Lever Fire Valve. Because many variables need to be considered, unless we are provided with full site details and photos, pipework is for installer to assess, however installer is welcome to contact Avon on 0800 379 247 for advice.

Joining Copper Fuel Pipe.
Use Brass Flare Nuts and Unions to mechanically join copper pipe. Brazing copper tube (unless simultaneously purging the tube with Dry Nitrogen) causes copper scale / ash to form inside the pipe. Unless ALL the scale is purged from within the pipe (with at least 3 litres of diesel per 15m of pipe) the scale can cause the integral Fuel Filter (located within the Heater "sump") to be restricted. When purging a brazed joint ensure the direction of flow of purge diesel is opposite to normal flow.

Pipe Insulation.
Cold temperatures cause diesel fuel viscosity to thicken, and flow is slowed down if diesel is cooled to temperatures below -3°C for sustained periods of time. If those conditions apply to your site we recommend insulating the pipe (or bury the pipe underground). Plumbers Flexible EPDM sponge rubber pipe insulation to be installed as fuel pipe is installed. Also insulate Fuel Filter - Self Adhesive Thermobreak sponge insulation is ideal. Avon can supply if Local sources cannot.

SECTION H: TROUBLESHOOTING

The FF-95C is the latest version of a similar heater (Laser 73), 12 million similar models have been manufactured and distributed worldwide since 1991 (www.toyotomi.jp). Required maintenance is minimal.

Before contacting Avon (0800-379-247), you can save yourself and Avon time, service costs and down time if you check all the following and note any abnormalities...

BEFORE REQUESTING A SERVICE CALL

First check ……. that all matters external to the FF-95C Heater are satisfactory -- i.e. …Press (outdoor) Thermostatic Fire Valve Reset Button upwards to allow fuel to flow (see page 28) and check *that clean fresh fuel (at the rate of not less than 1.07 Litres per hour) is available (flowing) at the fuel inlet to the Heater at all times.* (if any doubt, disconnect the fuel pipe at the back of the heater and measure the rate of flow into a graduated millimetre container) Flow must be more than 33.6 mils per 2 minutes (Constant). Check that no water or algae is in the fuel, that the Fuel Tank and connecting pipework is correctly installed.

- Check that the Red Reset Button on the Fuel Sump (on the right hand side of the Heater) has been pressed for 2 seconds (After fuel flow to the heater fuel inlet has been proven). There is a clear plastic clip under the Red Button - do not remove.

- If any of the two automatic reset Overtemperature Thermostats operate, they will not reset until the heater has cooled down - that can take 5-20 minutes. While awaiting restart, carefully examine the heater and surrounding area to identify why the Overtemperature Thermostats operated - i.e. airflow.

- Check the Fuel Pump is not making a rapid “chugging” noise as described on page 34 (indicates fuel shortage or restriction).

- That Manual Igniter Cleaning as described on page 37 has been carried out at least once every 3 months.

- That the power supply has not been interrupted, that the FF-95C Heater is level, and that the Wire Mesh Cover that protects the Room Circulation Fan (at the back of the FF-95C) is, and always has been clean, and air flow through the Heater has not been interrupted for any reason - i.e. something has been draped over the fan guard & restricted airflow.

- Also, note that combustion air to the burner is taken from outdoors and outdoor air intake must not be impeded in any way, i.e. no outdoor debris is fouling or restricting the combustion air intake, and that combusted exhaust gasses can freely discharge from the flue and not be sucked back into the Combustion Air Intake, depriving the Heater of oxygen for combustion. Especially check for any signs that insects might have caused some restriction. Wasps, Bees Nests, sand and garden debris fouling the outdoor Combustion Air Inlet on the Flue are not uncommon.

- Check the cleaning mode function is not activated. Display reads CL - (See page 38 Para 3)

Contact Avon if any of the following are noted ….

a) **Any combusted diesel odours in the home.** The FF-95 should net release any burnt diesel odours into the home. If any diesel fumes are noticed indoors, first check the fumes are not outdoor fumes that somehow find there way into the home (vie leaky windows or doors etc). **If diesel exhaust fumes persist** contact Avon on 0800 379 247 for advice.

b) Black soot on the (inner) exhaust pipe of the outdoor flue outlet, indicates a possible fuel or combustion problem. Take clear photos of the outdoor flue outlet from a distance of approx. 500mm and also from approx 3m to 4m, e-mail these to Avon; “**info@avonelectric.co.nz**” - be sure to include your contact phone number.

c) Ensure that windows and doors located near the outdoor flue outlet terminal are closed, and when the heater has been operating normally on High for at least 15 minutes, press the Burner Button OFF, and allow the FF-95 burner to cool down and for the heater to automatically switch OFF. In the approx 90 seconds **after** the Heater completely shuts down, check there is no combusted diesel odour (coming from the FF-95 Heater itself) noticeable in the home.

We also recommend that approx 1 month prior to each winter, clean any dust from the Heater (See page 35) and its surrounds, then check all the items listed above & on page 34. If checks a), b) and c) above indicate problems, call Avon on 0800 379 247 for advice.

SPECIAL NOTE:

If the front panel of the FF-95 has to be removed for any reason - ***disconnect heater from Power Supply,*** remove the two Phillips head screws - bottom left and right sides of the front cover, gently pull out the bottom of the front panel & carefully lift the front panel upwards to release it from the Heater. Before taking the front panel away from the Heater, note it is connected to the Heater with a fragile electronic circuit "tape" (See pic page 35). Be especially careful not to damage or stress the electronic tape in any way. The end of the Tape that connects to the Printed Circuit Computer Board that is affixed to the inside of the heater is a "plug". Use extreme care to disconnect the plug from the PC board, then the entire front panel can be removed away from the FF-95 Heater. Any service necessary within the Heater should only be carried out by a qualified person with the assistance of the Toyotomi FF-95 Service Manual.

Never remove front cover without disconnecting Heater from Power Supply.

Before you contact Avon, the more photos you can send with a written description, the easier it is for Avon to resolve problems.

ERROR CODE	INFORMATION	WHAT TO DO
E-0	Power failure (low voltage, unstable frequency)	Check power source.
E-2*	Ignition safety feature is activated. / No fuel	Check Fuel - see page 33.
E-6*	Extinguished during operation. / No fuel	Contact your dealer. / Refill fuel.
E-8	Blower motor malfunction	Contact your dealer.
E-12	Overheating safety feature is activated.	Clean the air filter and remove dust.
E-13	Burner thermistor malfunction	Contact your dealer.
	Excess fuel in the burner	Contact your dealer.
E-22	Ignition failure three times	Contact your dealer.
E-23	Primary flame rod (Flame Sensor) malfunction &/or dirty	Consult your dealer.
-- : --	Timer is not setting.	Set the timer.
Hi	Room temperature is higher than 35˚C (95˚F). Position of room temperature sensor is not correct or has been damaged.	Check the position of room temperature sensor. / Contact your dealer. See Page 23, Fig. 16.
Lo	Room temperature is lower than -10˚C (14˚F). Room thermistor malfunction or disconnected.	Check the position of room temperature sensor. - see Fig. 16 Page 23.

The following symptoms are normal during operation of the heater.

	CONDITION	REASON
When heater is started or extinguished.	White smoke or burning smell inside home when the heater is first used *after installation*.	Machine oil used in manufacture, factory assembly, or transit dust burns off the surfaces of the burner or heat exchanger.
	Yellow Flashing flames visible in viewing grille slots for a few minutes after ignition.	The burner is cold and igniter is kept running for a while after.
	Irregular metallic "cracking" noises when when heater is ignited or extinguished.	Expansion / contraction of hot metal components within the heater warming and cooling.
	Warm air is not discharged as soon as ignited.	Delay is to prevent nuisance discharge of cool air.
	Audible "rapid chugging sound" from fuel pump.	Air is in the fuel pump (No fuel). At the **very first** "Start Up" the rapid "chugging noise", may continue for a minute or two, until air is purged from the pump.
When heater is in operation.	Regular pulse ticking or chugging noise from heater.	Sound of fuel pump in normal operation.
	Heat chamber or heat exchanger can be seen through the air outlet louver's glowing red hot.	Normal
	Occasional yellow flickering in blue flame.	Normal

A very rapid “chugging sound” from the fuel pump (other than the first few minutes of normal operation), indicates air in the fuel pump (usually if the tank has run out of fuel or Fire Valve has shut off). If fuel supply is OK, purging air from fuel supply is automatic, wait 5 to 10 minutes with the heater OFF before attempting to restart. It is not normal if the fuel pump *continuously* makes an audible very rapid “chugging” sound. Such a noise, for more than 30-60 seconds indicates shortage of fuel or fuel restriction - check Fuel Tank & Fuel supply to Heater - see page 33.

- If the rapid *“chugging”* sound from fuel pump does not cease and if heater shuts OFF…….

1. Push Fuel Sump Red Reset Button. (refer to SECTION E, page 7) DO NOT hold down for more than 3 seconds.
2. Ensure the outdoor Thermostatic Fire Valve (P26) and (if fitted) the Fire-o-Matic Tank Valve P32) are fully open.
3. Ensure external fuel tank has adequate fuel and fuel filter is clean (Refer to page 37 regarding Fuel Algae).
4. Restart the Heater
5. If Heater does not ignite or if it shuts off again, check volume of fuel flowing into the Heater is as detailed on page 33.

Dust that accumulates in the heater over the summer may cause a burning smell the first time the heater is used after a long summer. - See reference to internal dust page 37.

If a burnt diesel odour is detected inside the home - cease use & contact supplier. No diesel odour should ever be noticed in the heated space If indoor diesel odour is identified - inspect the outdoor flue. It should not be sooty. A symptom of a cracked or worn Joint Packing Gasket is the presence of a combusted diesel odour when the heater switches “OFF” - see page 37 for details of how to check the Joint Packing Gasket. Contact Avon Electric for advice - 0800 379 247.

If error codes appear, reset by pressing the On/Off button for five seconds. Only attempt to reset 3 or 4 times. To continue to reset will flood the burner with diesel & make any fault worse - 99.9% of no flame faults is inadequate supply of clean diesel fuel.

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SECTION I:
ROUTINE & BASIC MAINTENANCE

CAUTION: Disconnect heater from power supply before performing any checks or cleaning.

CAUTION: Allow heater to cool completely before cleaning or maintenance.

FOR OPTIMUM HEATER PERFORMANCE, IT IS IMPORTANT THAT THE PARTS SHOWN BELOW SHOULD BE MAINTAINED IN A CLEAN CONDITION.

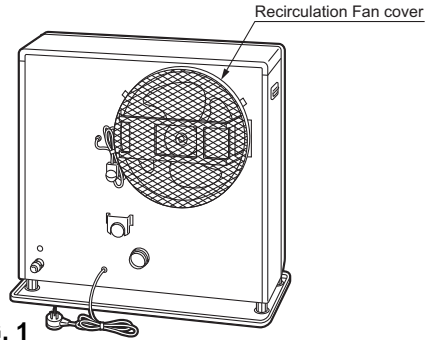


FIG. 1
Rear View

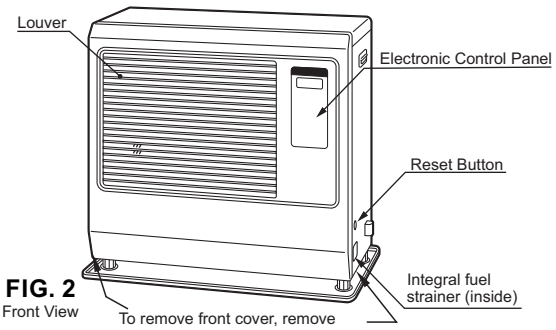
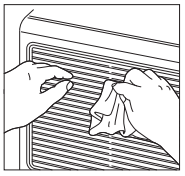
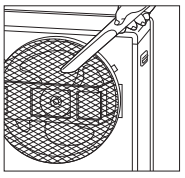


FIG. 2
Front View

To remove front cover, remove both these screws, pull bottom of front cover away from heater then lift front cover clear of heater - Photo 1 Page 37 shows Electronic Circuit Tape. Also see special note page 33 re Electronic Circuit Tape.



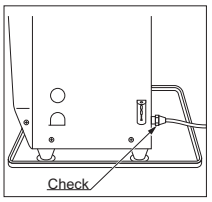
1. Clean Louvers (CHECK WEEKLY)
Dust and stains should be wiped off louvers with a damp cloth.



2. Clean Circulation Fan Cover / Air Filter (CHECK WEEKLY)
This filter is the mesh guard at the back of the Heater that protects the room air circulation fan.

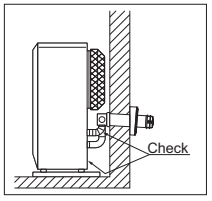
3. Check for Fuel Leaks (CHECK EACH TIME TANK IS FILLED)
Make it a habit to check for any sign of fuel leakage along the fuel line and at all fuel pipe joints.

4.



a. Check INDOOR Flue Pipe Area (CHECK REGULARLY)
NEVER allow clothing, newspapers, toys etc to accumulate behind the Heater.
Check the **Indoor** visible flue pipe joints to make sure connection is firm.
Use a vacuum cleaner or small paint brush to remove any dust, pet hair etc at the back of Heater.

b. Check OUTDOOR Flue Pipe Area (CHECK REGULARLY)
Keep Balance Flue outlet well clear of plants & debris (400mm minimum)
Check the **Outdoor** visible flue pipe joints to make sure connection is firm.
The Outdoor flue may show signs of soot, but not copious quantities of soot. Photo and email Avon for clarification.



5. Check the Thermostatic Fire Valve (outdoors) is open - see pages 26-29

6. Integral Fuel Strainer

The integral fuel strainer within the Heater is located in the fuel sump and **should never need cleaning** because the Garber Water Block Fuel Filter supplied with the FF-95C & installed close to Fuel Tank Outlet will not allow any contaminants to pass through.
In the unlikely event that the integral fuel strainer has to be serviced.....here is how...

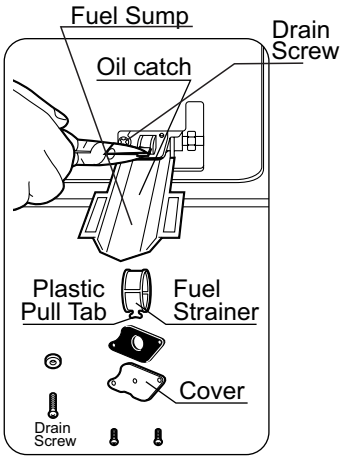
(a) Close the Fuel Tank outlet valve.

(b) To catch the fuel which will drain from the Fuel Sump, set the plastic “oil catch” below the strainer cover, with a small container under it. (2 or 3 egg cups of fuel will drain from the Fuel Sump)

(c) Loosen the two screws from the strainer cover and carefully prise and remove the cover - the gasket under the “cover” is reusable, but treat its removal with care.

(d) The Strainer has a plastic tab. Use long nose pliers to grip the plastic tab & gently pull to remove the Strainer. Wash the Strainer with clean Diesel Fuel.

(e) Return the strainer to its original position. Replace strainer cover & gasket and secure with both screws. Do not over tighten.



(f) Wipe away any spilled fuel. Open the fuel tank valve. Check Fuel Sump does not leak.

NOTE: If the heater is not to be used for approx 9 months or more, close the fuel tank valve then unscrew the drain screw (located to the top left of strainer cover) to drain fuel from the sump. When restarting the heater, open the fuel tank supply valve, allow time for the sump to fill and automatically purge any air (5 mins), then press the red reset button for 3 seconds & then start the heater.

Preventative Maintenance

To avoid delays during the busy cold weather/heating season, well before cold weather arrives...

1. Visually check the entire Heater Installation, for signs of any fuel leaks and check Fire Valve Reset Button position (see page 28).
2. Check outdoor Flue condition, if it is sooty, run the Heater and ensure that there are no Diesel odours inside the home, when the Heater switches off. If so, contact Avon for advice.

Annual Inspection of Internal Components

REMOVE FRONT COVER

The front cover is held on by two Phillips head screws, located at the bottom left and right corners of the front cover panel as per Fig. 2 above. After the screws are removed, gently pull the bottom of the front panel away from the heater, then lift panel upwards and away from the two top securing hooks. Be careful as the front panel is unhooked and removed, as it is still connected by fragile electronic circuit tape (See Special Note Page 33), do not remove or disconnect the tape from Heater or Front Panel, carefully site the front panel to one side with tape still attached as per Photo 1. below.

1. Cleaning Internal Dust

If the fan guard accumulates dust regularly (i.e. needs cleaning approx monthly), - recommend annually, prior to the beginning of the heating season, **disconnect the Heater from the power supply**, carefully remove the front cover (see Fig. 2), and inspect and clean any dust build up **inside** the Heater (See Photo 1. below), especially on the vertical tubes of the heat exchanger. The dust can build up **on the back of the vertical tubes** and so a torch and mirror is required to see if there is any dust build up on the back of the vertical heat exchanger pipes. Any excessive accumulation of internal dust can become a fire hazard.

2. Check Internal Gaskets

Check the Joint Packing Gasket for any sign of cracking or damage (Photo 2). If the Joint Packing Gasket is cracked, this is a minor repair and can be carried out by a handyman or tradesperson - contact Avon for a replacement Gasket & instructions.

A symptom of a Gasket fault is when the FF95 stops, a combustion diesel odour can be detected in the house. Any diesel odours in the house should be attended to ASAP.

PHOTO. 1

Heat Exchanger Vertical Tubes - Dust can accumulate on the back of the Vertical Tubes - check with a mirror and torch & clean as necessary.

Electronic Multi Core Circuit Tape. Do not damage or stress tape.

Photos show front panel removed

Location of 100mm dia, off white Fibre Joint Packing Gasket

PHOTO. 2

IMPORTANT - CLEANING BURNER & IGNITER

Regular cleaning of the Burner and Igniter maintains efficiency, a clean burner, and prolongs the life of the igniter and other combustion components. It is recommended that the Burner and Igniter Cleaning Cycles are performed weekly.

1. BURNER CLEANING CYCLE

The Burner Cleaning Cycle operates automatically if the burner operates for 2 hours continuously on HIGH burning mode. In many installations, to heat the space requires the FF-95 to run on HIGH for 2 hours everyday, but in some installations, especially in a mild winter, and in some smaller homes, the FF-95 is so effective that the room thermostat may not require HIGH burning mode to operate for 2 hours. If the Heater in your home runs for long periods, or day after day on LOW or MEDIUM burner mode, then Burner Cleaning will need to be performed manually as follows....

To run the Burner Cleaning Cycle the FF-95 must operate on HIGH Burner mode for 2 hours continuously:

- Set the Thermostat to its highest setting, to ensure that the FF-95 will continuously operate in HIGH Burning Mode for not less than 2 HOURS *without switching to a lower burning mode.*
- After two hours continuous burning on HIGH the FF-95 will automatically switch from HIGH to LOW, and the digital display will show code **CL:05.** The Burner Cleaning Cycle automatically commences, and the digital display will automatically count down to **CL:01** (CL:05 - 04 - 03 - 02 - 01).
- During the Burner Cleaning Cycle the FF-95 may make an unusual sound as internal components heat & cool down when cleaning is complete.
- Once the Cleaning Cycle is complete, the FF-95 automatically returns to the previous thermostat setting / normal operation - if the thermostat has been set to its highest setting to enable Burner Cleaning, this can now be returned to the usual temperature set point.
- It is recommended that the Burner is cleaned once a week.

2. IGNITER CLEANING CYCLE

AUTOMATIC MODE

When the FF-95 is ON and the clock is set (See “Set Clock” on page 7), it will automatically stop every day at 2.00am and run the Igniter Cleaning Cycle for 10 minutes. During The Igniter Cleaning Cycle the Digital Display will show “**CL:10**” . When the cleaning cycle is complete the FF-95 will automatically re-ignite and continue at the same setting as when the Igniter Cleaning Cycle commenced.

MANUAL CLEANING OF IGNITER

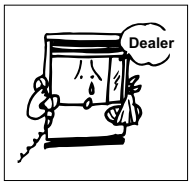
If the FF-95 is not “ON” at 2am, to manually clean the Igniter, perform the following....

1. When ON/OFF switch is “OFF”, press the “SET” button and “CLEAR” button simultaneously for more than 3 seconds.
2. “**CL:10**” will appear on the Digital Display. Cleaning will begin and end without any additional input.
   NOTE: To prolong igniter life, **it is recommended that the igniter is cleaned weekly.**
3. If you somehow make an error & the digital display reads P1 or some other unusual readout, press the Set & Clear buttons at the same time for 3-5 seconds to clear the “missread”.

SECTION J:
LONG TERM HEATER STORAGE

When you do not plan to use your heater for an extended period (more than 9 months), the manufacturer recommends the following...

1. Prior to when the Heater is to be unused for an extended period, calculate your fuel purchases so that you can use up most stored fuel. When fuel is stored for over six months, its quality may deteriorate & later affect Heater operation.
2. If your heater needs any service or repair, now is the time to call your dealer and have the Heater checked. That way your heater will be ready for immediate use when required.
3. If you plan to store your heater as installed (i.e Holiday Home),
   (a) Disconnect power supply.
   (b) Close the main Fuel Tank valve.
   (c) Remove all fuel from the fuel sump within the Heater (see Page 36).
   (d) Wipe off any stains or dust on heater cabinet with a damp cloth, then wipe once again with a dry cloth
   (e) Cover heater completely with a large plastic bag to protect from dust.



NEVER COVER HEATER CABINET UNLESS FUEL TANK SUPPLY IS SHUT OFF & CORDSET IS PHYSICALLY DISCONNECTED FROM POWER OUTLET.

4. To remove & store heater in another location - contact Avon.
5. At some sites, airborne dust can accumulate inside the heater. If you find it necessary to clean dust from the fan guard at the rear of the heater approx every month, we recommend that at the start of each heating season, disconnect the Heater from the power supply, remove the front cover, and clean all dust that is visible inside the heater - any excessive accumulation of internal dust can become a fire hazard - see “Paragraph 2 & Photo 1, Page 35” maintenance instructions for detailed instructions on internal cleaning.

NEVER REMOVE FRONT PANEL OR UNDERTAKE ANY INTERNAL ACCESS TO THE HEATER UNLESS THE POWER PLUG HAS BEEN REMOVED FROM THE POWER SUPPLY.

TRANSPORTATION

If the Heater is to be removed/relocated.....

- ALWAYS transport the Heater in an upright position.
- ALWAYS drain fuel from the integral fuel sump (page 36) before transportation.
- Seal the Heater Fuel inlet, because the Sump may retain a small quantity of fuel, which can spill from the Heater.

WARRANTY

PART 1) --- 2 YEARS FREE SERVICE

If the Heater is installed in accordance with these instructions. Avon (AVON Electric Ltd) warrants each Toyotomi Heater & all specific Toyotomi parts & accessories thereof, to be free from defects in materials or workmanship, in normal residential or light commercial service for 24 months from the date of delivery to the original retail purchaser, subject to the following terms & conditions:

PART 2) -- 5 YEAR LIMITED WARRANTY

After the expiry of the above 2 year warranty, and including the 'terms & conditions' in Part 2, Avon warrants the following components for a further 3 years, so long as any damage is NOT due to fuel quality… (Page 4) ÑÒÏÏĬĻ, ÑIJmaintenance (Page 36).

The stainless steel components comprising the Combustion Chamber, the Heat Exchanger, Burner Ring and Balanced Flue Assembly. The warranty does not reset after replacement of any parts

WHAT WE WILL DO ….

For items in Part 1) :- Avon will repair or replace at its discretion and meet reasonable costs of travel and the ordinary time of an Avon approved technician to return the heater to operation, when all faulty materials or parts claimed / replaced are returned to Avon intact within 20 days of the repair.

For Items in Part 2) :- Avon will repair or replace at its discretion any defective part as detailed in Part 2, that you return to your nearest Toyotomi Dealer or Service Company.

WHAT YOU MUST DO WHEN MAKING A WARRANTY CLAIM …

Contact your supplier, or call AVON (0800-379-247), quote the model and Serial No of the Heater, and provide a copy of proof of date of purchase, that you are the original retail customer. (see retail invoice, installation consent etc.) Ensure that the defective part (/s) are well packaged, and returned, intact, via ordinary transport, to Avon. We will reimburse returned freight costs, on presentation of the transport receipt if the part is faulty.

WARRANTY EXCLUSIONS

In addition to the 'terms & conditions' detailed in Part 1, the foregoing expresses all other of Avon's obligations & liabilities with respect to the quality of the Toyotomi Heater and Toyotomi Accessories. All other warranties, loss of use, or any consequential losses whatsoever, or any claim, is/are limited to the $ value (on Avon's original invoice) of the Toyotomi Heater (Serial No required), or Toyotomi accessory.

This warranty does not extend to any defect or failure caused by others, or as caused by events not related to normal use ie…. Unreasonable use or abuse, failure to properly install, operate, or maintain the heater, its accessories, safety controls, or damage by power supply variations or unacceptable fuel quality, or any variance from the Installation & Operating Instructions supplied with the Heater. This warranty does not extend to 'consumable accessories', fuel filters, gaskets and burner mats.

Avon will not recognise any claims where the value of the claim exceeds the original Avon invoice value of the particular heater.

Any warranty or claim, must be received in writing by Avon Electric Ltd within one calendar month of the event to which the claim relates.

No one, other than by written authority of Avon Electric Ltd has authority to extend or alter the terms & conditions of this Limited Warranty in any way whatsoever

AVON Electric Ltd
P.O. Box 19748 or 25 Taurus Place, Christchurch
Freephone: 0800-379-247

www.avonheating.co.nz Email: info@avonelectric.co.nz www.toyotomi.jp

Thank you for purchasing a FF-95 Diesel Heater, we know you will be very satisfied with its remarkable engineering, reliability, & performance. Please tell your friends just how good the FF-95 is!. In the unlikely event of any problems, please call us for a solution. (Freephone 0800-379-247).

We would very much appreciate your thoughts and comments on the FF-95 Heater, after a few months or years of actual service in your home.

Tell us about its performance, economy, convenience of use, noise, and its reliability, ------ compared to your old heating system.

Sole NZ Distributor : -***AVON*** Electric Ltd

PO BOX 19748, 25 TAURUS PLACE, CHRISTCHURCH, NZ

Ph:(03) 381-5595 Fax:(03) 381-5596

www.avonelectric.co.nz e-mail : **info@avonelectric.co.nz**

Improving lifestyles since 1939

TECHNICAL HELPLINE : 0800-379-247 (0800-DRY-AIR)

Avon & Toyotomi have a policy of continuous improvement. Information and specifications are subject to change at any time without notice. Avon is not responsible for non compliant installations or installation faults.

WARNING

TOYOTOMI CO., LTD.

5-17, Momozono-cho, Mizuho-ku, Nagoya 467

0855 - Japan

http://www.toyotomi.jp