IMPORTANT
Read and understand instructions before installing or using the stove. Retain instructions for future reference.
Check and local codes for permitted use.

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# I. SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>NS-1850RV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Forced-flue (FF type), pot type</td>
</tr>
<tr>
<td>Ignition</td>
<td>Electric lighting (coil heater)</td>
</tr>
<tr>
<td>Fuel type</td>
<td>Water-clear Kerosene/Diesel oil</td>
</tr>
<tr>
<td>Heat rating</td>
<td>High 1500 kcal/h, 1750 W (6,300 BTU/h)</td>
</tr>
<tr>
<td></td>
<td>Low 900 kcal/h, 1050 W (3,800 BTU/h)</td>
</tr>
<tr>
<td>Fuel consumption</td>
<td>High: 0.18 l/h (0.048 gal./h)</td>
</tr>
<tr>
<td></td>
<td>Low: 0.11 l/h (0.029 gal./h)</td>
</tr>
<tr>
<td>Heating efficiency</td>
<td>Approx. 90%</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Width 464 mm (18-1/4 in.)</td>
</tr>
<tr>
<td></td>
<td>Depth 350 mm (13-3/4 in.)</td>
</tr>
<tr>
<td></td>
<td>Height 220 mm (8-5/8 in.)</td>
</tr>
<tr>
<td>Weight</td>
<td>11.0 kg (24.3 lbs.)</td>
</tr>
<tr>
<td>Power source</td>
<td>DC 12 V (DC 10 — 16 V)</td>
</tr>
<tr>
<td>Power consumption</td>
<td>Igniting: 78 W (3 min.)</td>
</tr>
<tr>
<td></td>
<td>Burning: High 17 W</td>
</tr>
<tr>
<td></td>
<td>Low 10 W</td>
</tr>
<tr>
<td>Current fuse</td>
<td>10 A</td>
</tr>
<tr>
<td>Safety devices</td>
<td>* Ignition safety device</td>
</tr>
<tr>
<td></td>
<td>* Flame sensor</td>
</tr>
<tr>
<td></td>
<td>* Overheat prevention device</td>
</tr>
<tr>
<td></td>
<td>* Power failure safety device</td>
</tr>
<tr>
<td></td>
<td>* Burner bottom temp. sensor</td>
</tr>
<tr>
<td></td>
<td>* Low/high/reverse voltage safety device</td>
</tr>
<tr>
<td>Exhaust pipe</td>
<td>Nominal: φ 25 mm (φ 1 in.)</td>
</tr>
<tr>
<td>Intake pipe</td>
<td>φ 30 mm (φ 1-3/16 in.)</td>
</tr>
<tr>
<td>Cooking plate</td>
<td>Ceramic glass</td>
</tr>
<tr>
<td>Boiling efficiency</td>
<td>High: Approx. 45% (Flat pot)</td>
</tr>
</tbody>
</table>

---

![Diagram of the appliance with measurements]
II. NAMES OF PARTS AND ACCESSORIES

ACCESSORIES:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flue pipe top</td>
<td>1 pc.</td>
</tr>
<tr>
<td>Flexible exhaust pipe</td>
<td>1 pc. 0.5 m (19-3/4 in.)</td>
</tr>
<tr>
<td>Flexible intake air pipe</td>
<td>1 pc. 0.5 m (19-3/4 in.)</td>
</tr>
<tr>
<td>Pipe holder</td>
<td>2 pcs.</td>
</tr>
<tr>
<td>Pipe band</td>
<td>2 pcs.</td>
</tr>
<tr>
<td>Power supply cord</td>
<td>1 m (3-1/4 ft.)</td>
</tr>
<tr>
<td>Fuel pipe</td>
<td>1 m (3-1/4 ft.)</td>
</tr>
<tr>
<td>Strainer</td>
<td>1 pc.</td>
</tr>
<tr>
<td>Tank cap adaptor</td>
<td>1 pc.</td>
</tr>
<tr>
<td>Insert cap nut</td>
<td>2 pcs.</td>
</tr>
<tr>
<td>Sleeve</td>
<td>2 pcs.</td>
</tr>
<tr>
<td>Tapping screw</td>
<td>12 pcs. (φ4 × 16)</td>
</tr>
<tr>
<td>Tapping screw</td>
<td>2 pcs. (φ3 × 16)</td>
</tr>
</tbody>
</table>
III. OPERATION AND PRECAUTIONS

A. CHECK BEFORE OPERATION:

* Make sure that there is no oil leakage in the fuel feed line between the fuel tank and the fuel pipe jointed to the stove unit.

* Make sure also that there is no inflammable objects left out around the ceramic top plate and the exhaust pipe.

* Flue pipe top must be installed in such a manner that it’s top comes outdoors.

* Do not use stove while in drive.

* This stove is the forced-flue type having the structure by which emission gas is forcedly exhausted to outdoor. Make sure, therefore, that all the joints of the exhaust pipes are connected securely. Care must be taken not to let emission gas into the rooms, since it is extremely dangerous to human life.

* Do not operate stove with ceramic plate broken.

B. FUEL

This stove can be used with kerosene or diesel oil. Use only water-clear kerosene or diesel oil. Never use gasoline or other flammable liquids.

C. LIGHTING

Press the power “ON” switch on, so that the power lamp will light up and the igniter will be heated in red. In approximately six (6) seconds, blower motor and fuel pump start at “LOW” mode. Flame sensor starts in approx. three (3) minutes after the power switch is turned on. Igniter will be off at this time. Furthermore, after a low combustion of two minutes, either of “HIGH” or “LOW” burning can be selected at option. Flame lamp lights up while flames are in the stove.

Caution: It may take a few lighting actions to light up the stove in the first operation, since fuel may not be properly filled in the fuel line in the beginning. Try lighting up after waiting for a while.

Caution: When you first use your stove, or fuel is out, fuel pump may produce an audible operation noise at ignition. This is only temporary.

Caution: It will take several hours after the first operation to remove odor of adhesives for heat insulator inside of unit by heat.
Caution: The blower motor repeats its “on and off” power from when the power “ON” switch is pressed to when the “FLAME” lamp lights up. The fuel pump makes a slight vibration periodically (once or twice per second), which is of no problem in design.

Caution: Too low a battery power may cause the stove difficult to be lit.

Caution: When igniting, the flue pipe may release a white smoke outsides, with an offensive smell in the room.

D. HOW TO USE:

Lift the safety guard next place the cooking ware directly on the hot ceramic plate for cooking. Thus, the upper heated-air outlet in the ceramic plate will be closed and the rear heated-air outlet will be opened. On the contrary, when placing the safety guard over the ceramic plate, the operation is changed to the heating mode, by which heated air will be blown forward from the upper heated-air outlet, through the surface of the ceramic plate.

Caution: A flat-soled cooking ware is recommended for heat efficiency and safe cooking.

Caution: Do not hit the cooking ware or any solid object to the ceramic plate, since the plate has an excellent heat resistance, but is breakable by mechanical shock. Be sure to use the cooking ware, but do not cook directly on the ceramic plate.

Caution: After cooking, always clean the surface of the ceramic plate with a piece of soft and wet cloth.

Caution: The ceramic plate must not be ground or rubbed.

Caution: Special plate must be taken not to burn yourself with hot ceramic plate which in operation.

Caution: Starting of the vehicle engine while the stove is in operation may lower the battery voltage all at once and, thereby stop the stove operation.

Caution: Do not close the side air inlet and the rear heated-air outlet while the stove is in operation, which otherwise causes the internal system of the stove to overheat.

E. POWER ADJUSTMENT:

Burning power is selective in two steps of “HIGH” and “LOW” by select switch, in five minutes after lighting up. In case of high combustion, “HIGH” lamp will light up.

Heating power: Right — High 600 kcal/h, Low 350 kcal/h  
(2,400 BTU/h, Low 1,400 BTU/h)  
Left — High 350 kcal/h, Low 200 kcal/h  
(1,400 BTU/h, Low 800 BTU/h)

Note: The right and left burners cannot be used independently.
F. TURNING STOVE OFF:

To turn off flames, press the power “OFF” switch, so “POWER” lamp goes off and next “FLAME” lamp goes off. Blower motor only keeps operation for two minutes before being stopped.

Caution: No re-lighting operation can be given for two minutes above.

Caution: Do not disconnect power supply to put off burning.
Blower motor must be continued operation at least for two minutes to prevent the stove from overheating.

Caution: Do not touch the ceramic plate due to high surface temperatures on operation and just after turning off.

G. MALFUNCTION OR TROUBLE:

If a malfunction occurs the stove will stop and the indicator lamps will flash. The flashing lamps indicate the cause of the malfunction as shown here:

<table>
<thead>
<tr>
<th>Malfunction or trouble</th>
<th>Power</th>
<th>Flame</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>No ignition, no flame</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burner bottom thermistor activated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Igniter malfunction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power source, too high (12 V → more than 17 V)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power source, too low (12 V → less than 8.5 V)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON/OFF switch on before power connected</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High limit switch activated</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
IV. INSTALLATION

A. INSTALLATION OF STOVE UNIT

* Select an installing place free of inflammable objects around the stove and exhaust pipe. Since surface of stove and exhaust pipe often gets extremely hot, install stove and exhaust pipe in a place where it does not directly touch the structure of the building or its surrounding equipment.

* As illustrated in the above figures, determine the installing position as shown above and next make the square holes of 430 × 315 mm (16-15/16 × 12-3/8 in.) through the mounting frames. Next, release the six (6) screws which have been placed from the upper side of the stove unit to remove the top plate beforehand. Then, place the stove unit in the mounting frames and fix it with the eight (8) screws supplied. After this, fix the top plate with the six (6) screws securely.

Caution: Fix the stove unit after the flue pipe, fuel pipe, remote control, and power supply cord have been installed.

Caution: A-part in the figure represents the heated-air outlet, through which heated air is exhausted while cooking. Provide an approximate ventilation opening to release heated air (approx. 60°C/140°F) outdoors, which enhances the ventilation effect while cooking.
B. INSTALLATION OF FLUE PIPE:

Connect the flue pipe to the stove unit using the extension pipes of related exhaust and intake pipes supplied. Install the flue pipe top to a wall in such a level it can be connected from the rear heated-air outlet and the air intake, within a distance of approx. 0.5 m (19-3/4 in.), provided their level must be lower than the exhaust and intake position of the flue pipe itself, for the purpose of avoiding rain from entering the flue pipe system.

* Make the hole into the wall, as illustrated in the following figure, and next fix the flue pipe with the screws supplied. Before fixing the flue pipe as below, connect the extension pipe of the exhaust pipe by using the pipe holder and that of the air intake pipe by using the pipe band respectively.

Caution: Do not install the exhaust and the air intake pipes to the wrong side.

Caution: Install the air intake side of the flue pipe as low as possible, to avoid exhaust gas from adversely entering the system.

Caution: Position the flue pipe in a place which is free of such a projected object as the B-part shown in the illustration, within a surrounding of 300 mm (11-3/4 in.). Care must also be given for the very high temperature (approx. 260°C/500°F) in the center part of the exhaust and the air intake pipings.

Caution: Coat the fixed screw parts of the flue pipe with caulking (silicon), to prevent rain or water from entering the piping system.

Caution: Care must be taken not to cause the remote control wire and the power supply cord from touching the extension piping of the exhaust and the air intake pipings. Use insulation as needs.
C. INSTALLATION OF FUEL TANK AND FUEL LINE

The parts 21 — 24 have been supplied together with the stove unit. Remove the protective cap from the suction inlet of the fuel pump which is provided at the lower part of the stove unit. Next, insert the cap nut 22 and the sleeve 23 into the fuel pipe 21 as illustrated and then fasten the cap nut 22 while firmly pushing the fuel pipe 21 in the arrow-marked direction.

Assemble the strainer 24 in a similar manner.

**Caution:** The length of fuel pipe supplied is 1.0 m (39-3/8 in.).

**Caution:** Be sure to install fuel pipe upwards to fuel tank. If fuel pipe is too long, be sure to cut to applicable size.

**Caution:** Fuel tank must be secured to prevent movement of the tank.

**Caution:** Be sure to install fuel tank in such a manner that its fuel level comes lower than stove bottom level (which is the suction inlet of fuel pump).

**Caution:** When stove is used for the first time, it may not pump up fuel from fuel tank. If this occurs, lift fuel tank above the level of stove before the stove ignites.

**Caution:** Remove any dust from the fuel line inlet before installing the fuel line. It may cause a fuel pump malfunction.
D. INSTALLATION OF REMOTE CONTROL

Connect the connectors of the remote control to the connection terminals for remote control, which are provided at the rear of the stove unit (two places colored black and white). The remote control can be either hung, or fixed to the wall with two (2) tapping screws (φ3) supplied, which can be made by first removing the screws from the C-part and next screwing the two (2) tapping screws, as illustrated in the figure.

E. INSTALLATION OF POWER SUPPLY CORD

Power supply cord supplied is approximately 2.5 meters (8-1/5 ft.). Connect the connection terminal for power supply cord, provided at the rear of the stove unit, to the terminal for subordinated power supply cord. The black-colored cord (plus side) and the white-colored cord (minus side) must be securely inserted into their respective terminal. The insufficient connection may cause the stove ignition to fail.

Caution: A 10A fuse is provided at the rear of the stove unit. Turn the fuse box counterclockwise to release for replacement.

NOTE: In case of using extension cord, always minimize the length as short as possible. Use of extension cord too long may occur ignition failure due to drop of voltage.
V. CROSS SECTION AND WIRING DIAGRAM

CROSS SECTION

Ceramic plate
Burner ring
 Flame rod
 Circulation fan
 Heat exchanger

DC Motor
Burner mat
Igniter
Burner thermistor
Blower motor fan
Fuel nozzle

Caution: Always install igniter at the position indicated below.

WIRING DIAGRAM

Ground
Flame rod
Remote control
Connector
High limit switch
Connector

Fuse 10A
Power source DC 12V
Igniter
Pump controller
Fuel pump
DC Motor
Motor controller
Transistor
HS-160RV
VI. TIME CHART:

### Diagram

- **Power switch**
- **Select switch**
- **High limit switch**
- **Burner thermistor**
  - 50kΩ
- **Flame rod**
  - 0.3μA
- **Power lamp**
- **Flame lamp**
- **High lamp**
- **Igniter**
- **Blower motor**
- **Blower motor switchover**
- **Fuel pump**
- **Fuel pump switchover**

### Time Intervals

- $T_1$: 6 sec.
- $T_2$: 17.5 sec.
- $T_3$: 2.5 sec.
- $T_4$: 30 sec.
- $T_5$: 20 sec.
- $T_6$: 130 sec.
- $T_7$: 5 min.
- $T_8$: 5 sec.
- $T_9$: 22 min.
- $T_{10}$: 120 sec.
VII. ACCESSORIES

* NSP-25 Power supply extension cord (8 m) (26-1/4 ft.)

Insulating cloth cover
1 m (40 in.)

NSP-34
Plastic fuel tank (18 l) (4.8 gal.)

NSP-33
Plastic fuel tank (10 l) (2.6 gal.)

NSP-35
Copper fuel line
(φ4 mm or 5/32 in. O.D.)

NSP-805
In-line fuel filter
VIII. TEMPLATE FOR STANDARD INSTALLATION

NOTE: Read and understand "INSTALLATION AND OPERATION INSTRUCTIONS" before installation.

SAFETY TIPS

* Before making a hole in the mounting surface, make sure no electric wires or other obstructions are present.

* Make sure the outside area to which flue pipe will be is clear of objects.

USE OF TEMPLATE

1. Pin or tape template on mounting surface at desired location.
2. Use 100 — 105 mm (3-15/16 — 4-1/8 in.) diameter hole saw.
3. Refer to "INSTALLATION AND OPERATION INSTRUCTIONS" for complete installation.

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SCALE: 1/1

\[ \phi 128 \text{ mm} \]
\[ (\phi 5-1/32 \text{ in.}) \]

\[ \phi 100 - \phi 105 \text{ mm} \]
\[ (\phi 3-15/16 - \phi 4-1/8 \text{ in.}) \]

\[ 4 \times \phi 3.5 \text{ mm} (\phi 9/64 \text{ in.}) \]