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I. **Safe operation specifications**

1. Please read the manual carefully before starting on the machine.

2. Please check and confirm there is no block and foreign impurity in the feed inlet.
   
   After that, take the next operation

3. Confirm the heating temperature reaches up to 280-350 °C (degrees celcius).
   
   The temperature can be judged by the color of the Briquettes

**Then START the main engine**

4. After starting the machine, put a small amount of raw material into the inlet hopper.
   
   Wait until the first briquettes are extruded, then feed raw material continuously to start normal production.

5. Pay attention to the voltage and electric current meter during production.
   
   Avoid Over-load operation.

6. The outlet of the finished briquettes should be acing a wall. Make sure no person is standing right in front of the outlet, so as to avoid accidents.

7. Keep the electrical cabinet clean and tidy. Avoid circuit damage caused by water or by dampness.

8. Strictly prohibit putting hard objects into the hopper i.e. Stones, iron, nails in wood e.t.c

9. Check the screw propeller after 24 Hours of continuous production to see if there is abrasion.

   Do prompt maintenance if you spot abrasion. Do the maintenance after 72 hours of discontinuous production.

10. Please do not put hands in the feed inlet or the outlet of finished briquettes so as to avoid personal injury.

11. Stop & Check the machine immediately you detect any abnormal condition during production.
II . **Use and Features**

This machine is the main equipment used to make fuel Briquettes by using the waste material of coconut shells, bamboo, dry bark and branches, walnut shell rice husk, peanut shell, cotton straw, maize cob, sugarcane bagasse e.t.c.

The raw material needs to be crushed to the required size < 3mm. It also needs to be dried to the required moisture content of less than < 5%

The machine adopts the principle of gearbox driven screw propelling, making the lignin and cellulose in woody material to combine due to extrusion under high temperature and pressure.

III . **Technical Parameters**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>POWER (KW)</th>
<th>OUTPUT (kg/h)</th>
<th>DIAMETER (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GST-III</td>
<td>22+3 X 3</td>
<td>200-250</td>
<td>60-90</td>
</tr>
<tr>
<td>GST-II</td>
<td>11+1.5 ×3</td>
<td>120-150</td>
<td>30-50</td>
</tr>
<tr>
<td>GST-I</td>
<td>15+1.5 X 3</td>
<td>120-150</td>
<td>30-50</td>
</tr>
</tbody>
</table>
IV. Installation principle

Structure profile (I)-BODY


Structure profile (II)- Electric Control Panel
1. Before installing the propeller, measure the length as shown in figure A above. 
   (From the outer cross section of the spline housing to the outer cross section of bushing)

2. Measure the length as figure B shows above (From the outer cross section of the wear sleeve in the forming cylinder to the frontal area of the screw propeller end)

3. The data measured as figure A is more than or equal to the data (2mm) measured as figure B.

4. If the data measured as figure A is 2mm more than the one measured as figure B, please add a washer in the frontal area at the propeller end. 
   (The thickness of washer is taken in the increasing data as standard)

5. If the data measured as figure A is less than the one measured as figure B, use an angle grinder to grind the propeller (at the wear sleeve) the length of about 3-4 spirals in front of the propeller)

6. Assemble the screw propeller after the data matches.

7. Please obey the above rules when changing the screw propeller forming cylinder and wear sleeve.
INSTALLATION & TRIAL RUN

1. Place the main machine in the production area steadily.

2. Install the electric control cabinet to the connection of the main machines and connect the power line to the motor and the heating part.

3. Confirm all are connected well, then connect to the main power cable.

4. When the power is on, please check and confirm that the voltmeter is working well, then start the machine without load. (Check the normal-reverse rotation. (Green light means normal rotation.)

5. Start and run the machine for 2-3 minutes without feeding raw material. If there is no abnormal phenomenon, run the machine according to the instructions below. If there is any abnormal phenomenon, please stop the machine at once, inspect the machine carefully, and solve the problem before running it again without loading.

6. Set the thermometer to temperature 280°C-350°C. Only when the temperature reaches the set temperature, can you start the machine and go into normal operation.

7. To avoid the abnormal phenomenon first feed a small amount of raw material until qualified / proper briquettes are produced. Then gradually increase the amounts of raw material. Confirm there is no abnormal phenomenon during the 30 minute continuous run. After this, you can go into normal production.

8. Please clear up the inlet hopper before stopping the machine. Run machine in reverse for 1 minute to make the material in the screw propeller come out to avoid blockage of the forming cylinder before the next production shift.
V. EQUIPMENT MAINTENANCE & SERVICING

1. Keep the equipment clean and tidy.

2. Strictly obey the safe operation instructions to prolong the serving life of the equipment.

3. After the continuous running of 24 hours, the screw propeller should be checked and maintained in time.

4. Check the gear box whether it is lack of oil in regular time (This point only for the equipment installed with gear box).

VI. ATTENTIONS

1. Check and confirm there is no other impurity blocked in the machine before starting it.

2. Don’t start the machine until the heating temperature is 20-30 °C degrees higher than the temperature used in normal briquette production.

3. Strictly prohibit feeding too much raw material to avoid overloading of the machine.

4. Strictly prohibit feeding the unsuitable or other hard raw material into the machine to avoid damaging the forming cylinder or the screw press.

5. Stop the machine at once if the screw propeller stops rotating during the operation. Run the machine in REVERSE to clear out any raw material stuck inside the forming cylinder then start the engine again according to the above instructions.

6. The briquette outlet MUST be directed to the wall. Persons are STRICTLY forbidden from standing in front of the machines outlet to avoid personal injury in case material shoots out.

7. Cut off the power supply after stopping the machine to avoid any accidents.
## VII. FAILURE ANALYSIS & SOLUTIONS

<table>
<thead>
<tr>
<th>No</th>
<th>Phenomenon</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power indicator doesn’t light</td>
<td>(1) Power indicator is not connected&lt;br&gt;(2) Indicator is spoiled</td>
<td>(1) Connect power line.&lt;br&gt;(2) Change new indicator.</td>
</tr>
<tr>
<td>2</td>
<td>Motor can not be started.</td>
<td>(1) Control Button is spoilt&lt;br&gt;(2) Running with single phase power supply</td>
<td>(1) Change new button.&lt;br&gt;(2) Check and repair the power line.</td>
</tr>
<tr>
<td>3</td>
<td>When the heating temperature rises slowly or can hardly reach up to 350 °C</td>
<td>(1) Power voltage is too low.&lt;br&gt;(2) The heating switch is spoilt.&lt;br&gt;(3) The sensor is spoilt&lt;br&gt;(4) Heating collar is spoilt</td>
<td>(1) Check the voltage.&lt;br&gt;(2) Change the switch.&lt;br&gt;(3) Change it according to need.&lt;br&gt;(4) Change the heating collar.</td>
</tr>
<tr>
<td>4</td>
<td>Motor is hot.</td>
<td>(1) Overloaded running&lt;br&gt;(2) Two-phase running.&lt;br&gt;(3) Bearing is spoilt</td>
<td>(1) Avoid overloaded running.&lt;br&gt;2) Check and repair the power line&lt;br&gt;(3) Change the bearing according to different modes.</td>
</tr>
<tr>
<td>5</td>
<td>Briquettes can’t be produced</td>
<td>(1) The briquettes can’t be formed&lt;br&gt;(2) Heating temperature is too high or too low.&lt;br&gt;(3) The wear sleeve is worn out.&lt;br&gt;(4) Screw propeller is worn out.</td>
<td>(1) The material is too wet, dry it first.&lt;br&gt;(2) Set to correct temperature&lt;br&gt;(3) Change the wear sleeve.&lt;br&gt;(4) Undertake maintenance of screw propeller as per procedure specified.</td>
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</table>
Important warning:
Before connect the cables of lead-in line, you must take off the three rails-to-earth which are in the cable box of motor. Then connect six power supply cables with proper positions. Otherwise, client should be responsible for the result of mistake. (Warning: the six power supply cables must be connected with proper positions, otherwise, the motor won’t work. When the machine positive turn, the green light must be bright.)
(Appendix II) Maintenance of the Screw Propeller

After the machine running for 24 hours without stop, please check the screw propeller, if it is worn, detach and maintain it. The screw propeller needs to be maintained as any of the conditions below appear:

1) The production speed obviously decreases.
2) The moisture content of raw material and the setting temperature have met the requirements, but the machine is often blocked and it can hardly work well.
3) The briquettes can not be formed and they are separated into several pieces and are not able to join together.
4) The produced briquettes are with loose structure and low density.
5) The front spiral part of screw propeller is worn less than 4mm.
6) The internal diameter of the briquettes is less than 15mm.
7) The screw propeller is damaged by the stone, iron or other hard impurities getting into the screw propeller.

IX. Maintenance skills & attentions

(1) Preheat the front part of the screw propeller until the surface temperature reaches 350°C before repairing it.
(2) Use special welding material and AC welding machine, adjust the electric current to about 180-200A.
(3) When the screw propeller wears down, welding the wearing
parts by using the welding rod according to the wearing situations, after welding well, grind the surface of welding at once to avoid crack. (You can learn the degree of wear by comparing with the unused screw propeller that comes with the machine as spared one.)

(4) Compare the worn screw propeller with the unused one that comes with the machine, and grind it to the same angle as the unused one. (NOTE: Before completely mastering the screw propeller maintenance skill, please remember to keep an unused screw propeller as a standard reference.

(5) As is shown in the above picture, if the frontal part of the 105-millimeter length circumference wears down to around 6mm, you should repair the screw propeller. Preheat that part according to the instructions above, do surface welding at the 105mm-length circumference with J422 carbon welding rod. The thickness after welding should be 1-2mm thicker than the size shown in the above picture.
Then grind the welding surface to make it smooth.

(6) It is strictly forbidden to strike the repaired screw propeller so as to avoid damage to welding surface or other parts. It should be stored carefully for future use.