

PROTMDUCTION CASTER

Operating and Maintenance Instructions

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J. F. JELENKO & CO. has
prototype-certificated this
equipment to the FCC as complying
with Part 18 of its rules.

SPECIFICATIONS

Overall Dimensions: 37.2"H x 18.1"W x 24.0"D
(94.5 cm H x 46.0 cm W x 61.0 cm D)

Net Weight (Unpackaged): 352.7 lbs. (160 Kg)

Operating Frequency: 1750 KHz \pm 50 KHz

High Frequency Output: 2 KW

Power Requirements: 220V 50/60 Hz. 23 Amperes



Argon Gas Requirements: 5 liters per minute

Cooling Method: Forced Air

SUPPLIED ACCESSORIES

- Dust Cap
- Set of two Quartz Sticks
- Contact Cleaner
- Argon Gas Supply Hose (8 feet)
- Set of six Ring Cradles (40 mm-90 mm)
- End Plate
- Electrical Supply Cord (8 feet)
- Two Ceramic Crucibles
- Vacuum Tube

INSTALLATION

ELECTRICAL

The PROduction CASTER requires a direct connection to a 220 volt, single-phase, power source capable of supplying 23 amperes. This connection should be made by a licensed electrical contractor and should comply with all local and national electrical codes:

IMPORTANT NOTE: Prior to connecting the casting machine to an electrical power source, the Vacuum Tube must be installed as outlined on page 9.

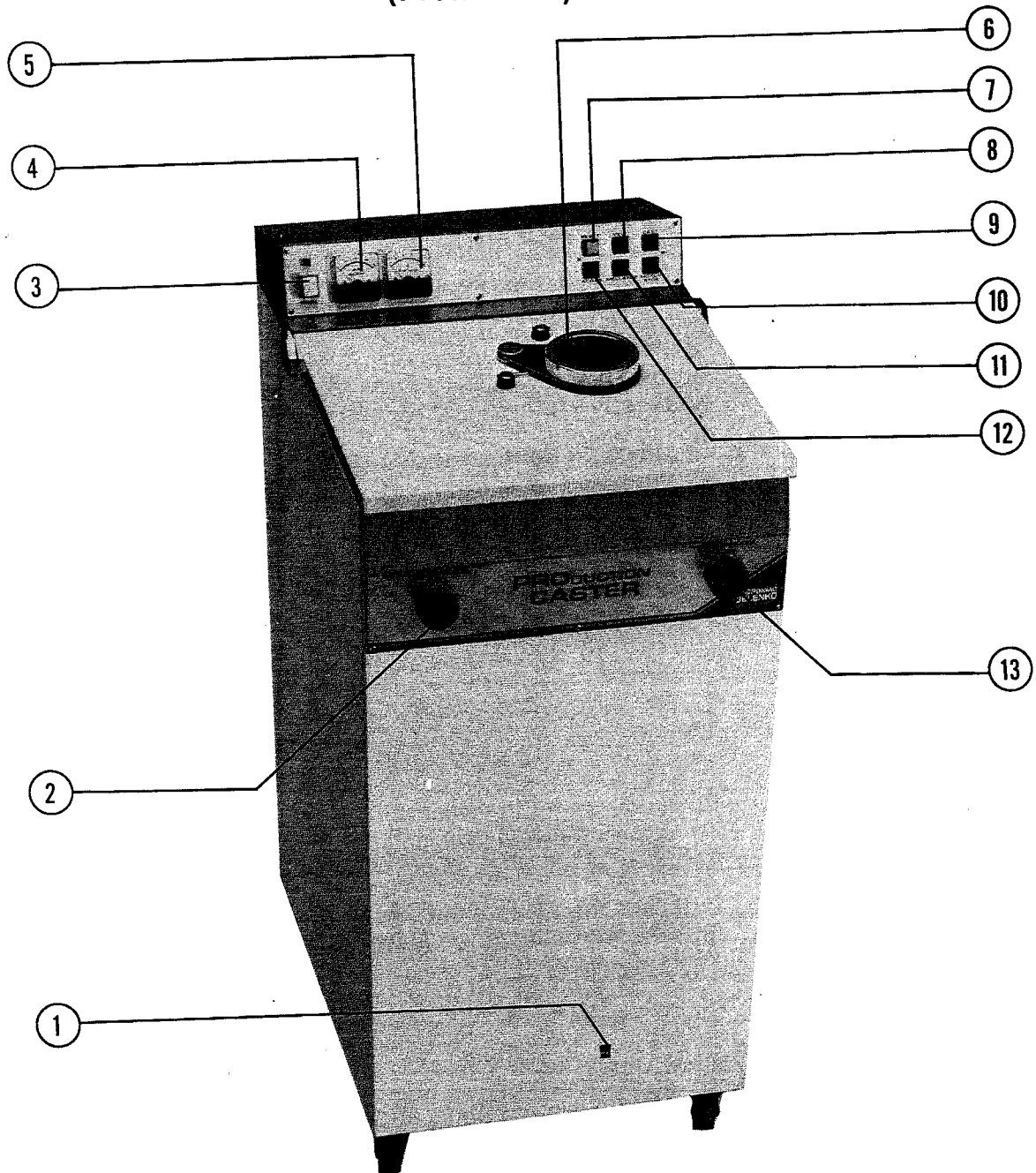
MECHANICAL

The PROduction CASTER is mounted on casters and requires no physical mounting or installation. The unit should be placed on a flooring surface which is both sturdy and flat. At least eight (8) inches (20.3cm) of air space should be provided on all sides of the casting machine.

The connection of an argon gas tank (not required for operation) should be performed in the following manner:

1. Locate the Argon Gas Hose (supplied with machine) and connect the end of the hose with the female fitting to the Argon Gas Connector (Fig. 15, Page 7) at the rear of the casting machine.
2. Connect the free end of the hose to the outlet end of a flow-adjustment valve (not supplied) capable of regulating gas flow at a rate of five (5) liters per minute.
3. Connect the inlet of the flow-adjustment valve to the argon gas tank.
4. With the casting machine lid closed, press the Main Power switch to ON, set the HF Power Regulator control to zero (0), depress the Reset, Ar. Gas and Melt switches and adjust the flow-adjustment valve for a gas flow of five (5) liters per minute.
5. Depress the Ar. Gas, Melt Stop and Reset switches. Your PROduction CASTER has now been prepared for operation with argon gas.

PRODUCTION CASTER (Front View)



1. Circuit Breaker
2. HF Power Regulator Control
3. Main Power Switch
4. Grid Current Meter
5. Plate Current Meter
6. Viewing Window

7. Reset Switch
8. Melt Switch
9. Cast Switch
10. Motor Stop Switch
11. Melt Stop Switch
12. Argon Gas Switch
13. Torque Regulator Control

OPERATING CONTROLS

CIRCUIT BREAKER (1): A safety device designed to prevent damage to the casting machine in the event of a short circuit. If the Circuit Breaker has been "tripped," the large black button will be extended and must be depressed to be reset. To manually switch the Circuit Breaker to OFF, the red button must be depressed. The Circuit Breaker may also be used to disconnect electrical power from the casting machine in the event of an emergency.

HF POWER REGULATOR (2): Determines the amount of high-frequency energy which is delivered to the Heating Coil, and therefore the rate of alloy heating. The HF Power Regulator knob is rotated clockwise to increase the rate of alloy heating and counter-clockwise to reduce the heating rate. For a given quantity of alloy, higher-numbered settings for this control will result in faster alloy heating; while lower-numbered settings will result in slower alloy heating. The HF Power Regulator knob should be initially set according to the recommendations listed below and adjusted as required according to the quantity of alloy being cast.

Control Setting	Recommended Use
0	OFF
1 through 3	Gold Alloy, Palladium Alloy, Ceramic Alloy (alloys with melting temperatures from 1475°-2200°F/800°-1200°C).
4 through 6	Nickel-Chromium Alloy, Chrome-Cobalt Alloy, Titanium Alloy (alloys with melting temperatures from 2200°-3275°F/1200°-1800°C).
7	NOT USED

MAIN POWER SWITCH (3): Turns the power to the casting machine ON or OFF. When this switch is in the ON position, the power indicator lamp above the switch will light.

GRID CURRENT METER (4): Indicates the amount of current, in milliamperes, which is flowing through the Grid portion of the Vacuum Tube. The reading on this meter will vary with the setting of the HF Power Regulator control.

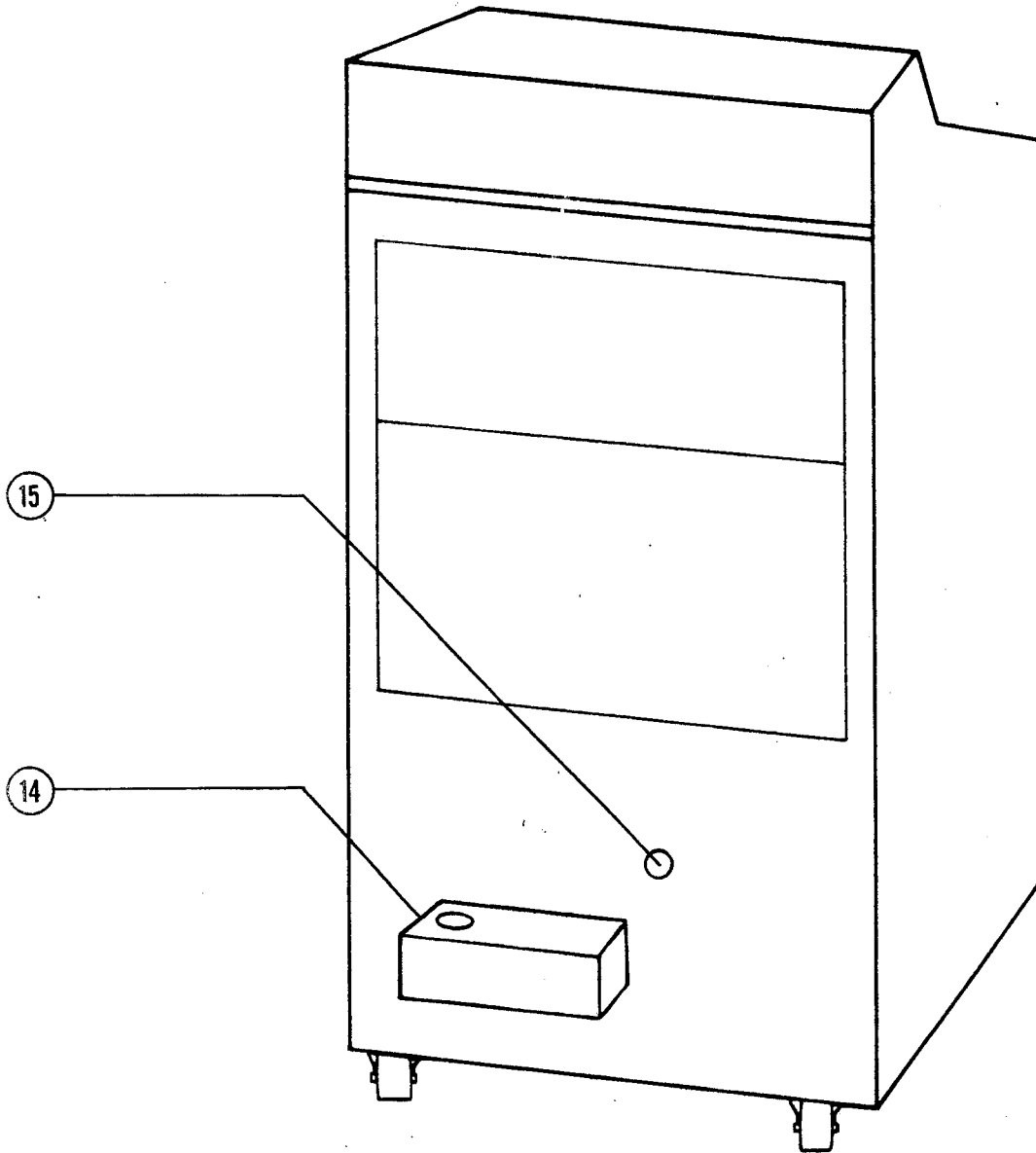
PLATE CURRENT METER (5): Indicates the amount of current, in amperes, which is flowing through the Plate portion of Vacuum Tube. The reading on this meter will vary with the setting of the HF Power Regulator control.

VIEWING WINDOW (6): A moveable filtered glass to be used when observing the alloy during the melting process. The filtered window may be moved out of position to expose the opening in the casting machine lid for the purpose of stirring or probing the alloy during the melting process.
Note: Only a Quartz Stick (supplied with the unit) may be used. The filtered glass should always be used when observing the alloy during melting. Glass has Dual Filters.

- RESET SWITCH (7):** This switch resets the casting machine circuitry and must be depressed at the beginning of the casting procedure, prior to operating either the Melt or Cast switches. An internal lamp will light once this switch has been depressed.
- MELT SWITCH (8):** When depressed, the Heating Coil will be energized to begin the melting portion of the casting cycle. An internal lamp will light once this switch has been depressed, indicating the melting cycle is in progress.
- CAST SWITCH (9):** When depressed, the Casting Arm will start spinning, forcing the molten alloy into the casting ring. An internal lamp will light, indicating the Casting Arm Motor has been activated.
- MOTOR STOP SWITCH (10):** When depressed, power to the Casting Arm Motor is turned OFF and the Casting Arm will slow to a complete stop. An internal lamp will light, indicating electrical power to the Casting Arm Motor has been turned OFF.
- MELT STOP SWITCH (11):** When depressed, the melting portion of the casting cycle will stop. An internal lamp will then light, indicating the melting cycle has been stopped.
- AR. GAS SWITCH (12):** Once this switch has been depressed, argon gas will begin to flow from the Argon Gas Nozzle into the crucible (if an argon gas tank has been connected to the casting machine). To stop the flow of argon gas into the crucible, the switch must be depressed to be released. An internal lamp will light when this switch is in the ON position.
- TORQUE REGULATOR (13):** Determines the initial rotational speed of the Casting Arm, depending upon the form of casting and type of alloy being used. The Torque Regulator knob is rotated clockwise to increase the initial speed of the Casting Arm and counter-clockwise to reduce the initial speed of the Casting Arm. Note that higher-numbered settings for this control will result in faster initial arm rotation; while lower-numbered settings will result in slower initial rotation. The Torque Regulator knob should be initially set according to the recommendations listed below and adjusted as required in accordance with the castability of the restoration and weight of the ring.

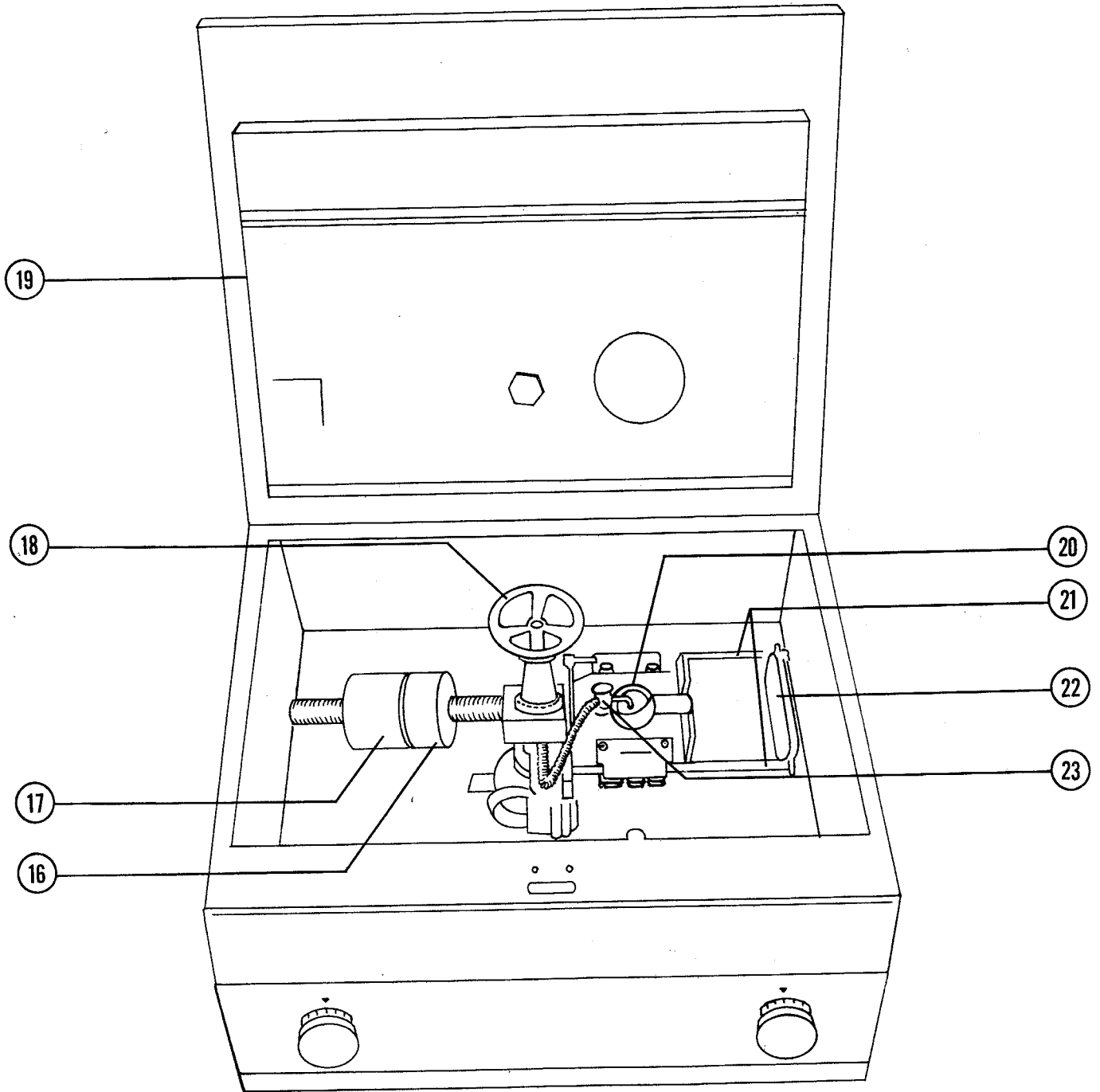
Control Setting	Recommended Use
0	OFF
1 through 3	Gold Alloy, Palladium Alloy, Ceramic Alloy (alloys with melting temperatures from 1475°-2200°F/ 800°-1200°C).
4 through 6	Nickel-Chromium Alloy, Chrome-Cobalt Alloy, Titanium Alloy (alloys with melting temperatures from 2200°-3275°F/1200°-1800°C).
7	NOT USED

PRODUCTION CASTER (Rear View)



- 14. Electrical Terminal Box
- 15. Argon Gas Connector

CASTING ARM ASSEMBLY (View with Casting Machine Lid Open)



- | | |
|--------------------------|-----------------------|
| 16. Balancer Locking Nut | 20. Crucible Receptor |
| 17. Arm Balancer | 21. Arm Rods |
| 18. Arm Locking Wheel | 22. Arm End Plate |
| 19. Casting Machine Lid | 23. Argon Gas Nozzle |

INSTALLATION OF THE VACUUM TUBE

Refer to the diagram and procedure outlined below when installing the Vacuum Tube.

1. Loosen and remove the screws located along the outside edge of the panel at the right-hand side of the casting machine.
2. Lift the panel away from the casting machine.
3. Loosen the thumbscrew on the Clamping Ring (B) and allow the ring to drop to the bottom of the Glass Tube Support.
4. Place the Power Tube, metal end first, into the Glass Tube Support. Rotate the tube so the terminal marked "P" faces the rear of the casting machine.
5. Using the two screws and nuts supplied with the Clamping Ring (B), secure the Power Tube to the ring. Tighten the thumbscrew on the Clamping Ring.
6. Connect the two braided wires, H1 and H2, to their respective terminals at the top of the Vacuum Tube. Be certain that the nuts on these terminals are tightened securely.
7. Connect the wire marked "P" to terminal "P" on the Vacuum Tube. Be certain that this connection is tightened securely.
8. Connect the wire marked "G" to terminal "G" on the Vacuum Tube. Be certain that this connection is tightened securely.
9. Replace the panel to the right-hand side of the casting machine and secure with the screws previously removed.
10. Test the PROduction CASTER for proper operation as outlined under "Initial Checkout."

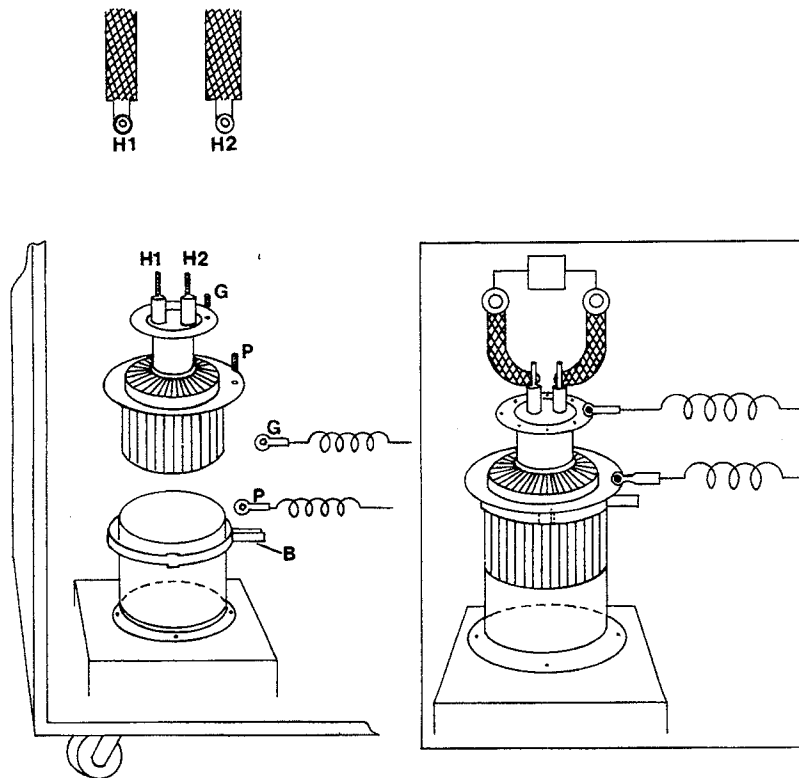


DIAGRAM ILLUSTRATES INSTALLATION AND CONNECTION OF VACUUM TUBE

INITIAL CHECKOUT

After installing the Vacuum Tube as outlined on page 9, the PROduction CASTER should be checked for proper operation, using the procedure outlined below. Castings should not be attempted without first performing this initial checkout procedure.

1. Press the Main Power Switch to ON. The indicator lamp above the switch should light and the Cooling Fan should begin to run.
2. Open the Casting Machine Lid and rotate the Casting Arm until the red mark on the Arm End Plate is aligned with the red mark on the right-hand edge of the casting machine cabinet.
3. Place a crucible into the Crucible Receptor, lift the Argon Gas Nozzle slightly and rotate the nozzle clockwise until it drops into position. No alloy is to be placed into the crucible at this time.
4. Close the Casting Machine Lid COMPLETELY and set both the Torque Regulator and HF Power Regulator controls to position number one (1).
5. Depress the Reset switch. The switch should become illuminated once depressed.
6. Depress the Ar. Gas switch. The switch should become illuminated once depressed.
NOTE: If an argon gas tank has not been connected to the casting machine, the Ar. Gas switch should be left in the OFF (not depressed) position.
7. Slide the View Window to the open position and depress the Melt switch. The Melt switch should become illuminated, and a flow of argon gas should be heard coming out of the Argon Gas Nozzle.
8. Observe the readings on both the Grid Current and Plate Current Meters. The Grid Current Meter should indicate approximately 70 milliamperes, and the Plate Current Meter should indicate approximately .35 amperes.
9. Depress the Melt Stop switch. The Melt Stop switch should become illuminated, and the illuminated Melt switch should turn OFF. Both the Grid Current and Plate Current Meters should indicate zero (0), and the flow of argon gas from the Argon Gas Nozzle should stop.
10. Depress the Cast switch. Both the Cast and Motor Stop switches should become illuminated, the illuminated Melt Stop switch should turn OFF, and the Casting Arm should begin to spin. The Casting Arm should continue to spin for approximately 30 seconds and then stop automatically. At this time, the illuminated Cast and Motor Stop switches will turn OFF.
11. If the Ar. Gas switch was placed in the ON position previously, depress the switch to place it in the OFF position.
12. Press the Main Power switch to the OFF position. This completes the Initial Checkout of the PROduction CASTER, and the unit is now ready for operation.

BALANCING THE CASTING ARM

It is recommended that the Casting Arm be balanced with the casting ring after the investment has set, prior to performing the burnout procedure.

The Casting Arm may be balanced directly after the burnout procedure; however, adjustments must be made very rapidly to prevent the ring from cooling.

The following procedure should be followed for proper balancing of the Casting Arm:

1. Select a Ring Cradle equal in size to the casting ring and place the Ring Cradle across the two Arm Rods of the Casting Arm. The Ring Cradle should snap securely into position.
2. Place the invested casting ring on the Ring Cradle with the sprue end facing the crucible.
3. Place a crucible into the Crucible Receptor and slide the Crucible Receptor toward the casting ring until the crucible outlet is aligned with the casting ring.
4. Loosen the Arm Locking Wheel and Balancer Locking Nut. Rotate the Arm Balancer clockwise or counter-clockwise until the Casting Arm is well balanced.
5. Tighten the Balancer Locking Nut against the Arm Balancer to prevent movement of the Arm Balancer during the casting procedure.
6. Tighten the Arm Locking Wheel securely.

CASTING PROCEDURE

The procedure outlined below is recommended for making successful castings with your PROduction CASTER.

NOTE: Prior to following this procedure, the Casting Arm must be properly balanced as outlined under "Balancing the Casting Arm" on page 11.

1. Press the Main Power switch to ON. The indicator lamp above the switch will light and the Cooling Fan will begin to run.
2. Open the Casting Machine Lid and rotate the Casting Arm until the red mark on the Arm End Plate is aligned with the red mark on the right-hand edge of the casting machine cabinet. This alignment is necessary for proper operation of the casting machine.
3. Select a Ring Cradle equal in size to the casting ring being used and place the Ring Cradle across the two Arm Rods of the Casting Arm. The Ring Cradle should snap securely into position.
4. Place a crucible into the Crucible Receptor and load the crucible as densely as possible with the alloy being used for the casting. The quantity of alloy should not greatly exceed the quantity required for the restoration. NOTE: Use a carbon-lined crucible for precious alloys and a ceramic crucible for non-precious.
5. Set the HF Power and Torque Regulator controls at the positions recommended for the alloy being used (see pages 5 and 6).
6. If argon gas will be used during the melting process, lift the Argon Gas Nozzle slightly and rotate the nozzle clockwise until it drops into position. When argon gas is not being used, the nozzle should be positioned in its locked counter-clockwise position.
7. Remove the invested ring from the burnout furnace and place the ring, with the sprue end toward the crucible, into the Ring Cradle.
8. Immediately slide the Crucible Receptor toward the ring until the crucible outlet is aligned with the casting ring.

Check to make certain that the red marks on the right-hand edge of the casting machine and the Arm End Plate remain aligned.
9. Close the Casting Machine Lid COMPLETELY and depress the Reset switch. If argon gas is to be used, the Ar. Gas switch should be depressed.
10. Depress the Melt switch and observe the alloy being melted through the filtered Viewing Window.
11. Once the alloy becomes completely molten, the Cast switch should be depressed to complete the casting process. At this time the Cast and Motor Stop switches will light, the illuminated Reset and Melt switches will turn OFF, and the flow of argon gas will automatically stop (if in use).

The Casting Arm will continue to rotate for approximately 30 seconds, unless the Motor Stop switch is depressed to stop the Casting Arm sooner.
12. Once the Casting Arm has stopped spinning, the Casting Machine Lid may be opened and the casting ring removed.

- IMPORTANT NOTE:**
1. If the Casting Machine is used on a continuous basis, the Casting Machine Lid should be left open with the Main Power switch ON after every five (5) to six (6) castings to allow the Heating Coil to cool. This cooling process normally takes between three (3) to five (5) minutes.
 2. If an adjustment must be made to the position of the HF Power Regulator control during the melting cycle, the Melt Stop switch must first be depressed, the HF Power Regulator control adjusted as required, and the Melt switch depressed to resume the melting process. If the HF Power Regulator control is adjusted without stopping the melting cycle, damage to the Power Regulator circuitry may result.

SUGGESTIONS FOR SUCCESSFUL OPERATION OF YOUR PRODUCTION CASTER

1. The Casting Arm should be properly balanced for each ring size, prior to casting, as outlined under "Balancing the Casting Arm." Failure to balance the arm will result in excessive vibration and may cause premature wear of mechanical components as well as poor casting results.
2. The PROduction CASTER is equipped with a safety interlock switch, designed to protect the operator by preventing operation of the machine with the Casting Machine Lid open. The Lid must be completely closed for proper operation of the unit.
3. Should it become necessary to stir or probe the alloy during the melting stage, only a Quartz Stick (supplied with unit) should be used. At no time should a metal object be introduced into the crucible area while the casting machine is in operation. Insertion or removal of casting rings is to be done only with the unit OFF.
4. The red marks on the Casting Arm End Plate and right-hand edge of the cabinet must be aligned prior to depressing the Melt switch to make a casting.
5. If at any time it becomes necessary to stop the melting process, the Melt Stop switch should be depressed.
6. If the casting machine is operated on a continuous basis, the Casting Machine Lid should be left open with the Main Power switch ON after every five to six castings to allow the Heating Coil to cool. This cooling process normally takes between three to five minutes.
7. Whenever cleaning or servicing the PROduction CASTER in any manner, the main power source to the unit must be disconnected.
8. It is recommended that a separate crucible be used for each alloy being cast.

SYMPTOM AND CAUSE TABLE

SYMPTOM	CAUSE																
	No power to unit	Casting Machine circuit breaker "tripped" or defective	Defective Main Power Switch	Defective Reset Switch	Defective Reset Switch Lamp	Defective Melt Switch	Defective Melt Switch Lamp	Defective Cast Switch	Defective Cast Switch Lamp	Defective Power Relay	Casting Machine Lid not closed completely	Defective Safety Interlock Switch	Spillage of alloy adhered to Heating Coil	Defective Heating Coil	Defective Vacuum Tube	Defective Direct Current Smoothing Unit	Defective HF Generating Unit
Main Power switch depressed; Main Power Indicator not illuminated.	1	2	3														
Main Power switch depressed; Main Power indicator illuminated; Reset switch does not light when depressed.				2	1					3							
Main Power switch depressed; Main Power indicator illuminated; Reset switch depressed and illuminated; Melt switch does not light when depressed.						4	3			5	1	2					
Main Power switch depressed; Main Power indicator illuminated; Reset switch depressed and illuminated; Cast switch does not light when depressed.								4	3	5	1	2					
Main Power switch depressed; Main Power indicator illuminated; Reset switch depressed and illuminated; Grid current and Plate current meters deflect full scale when Melt switch is depressed.													1	3	2	4	5

PRODUCTION CASTER Renewal Parts List

Jelenko Product No.	Part Description
250278	Ceramic Crucible
250279	Carbon-Lined Crucible
360010	Main Power Switch
360011	Grid Current Meter
360012	Plate Current Meter
360013	Reset Switch Assembly
360014	Argon Gas Switch Assembly
360015	Melt Stop/Motor Stop Switch Assembly
360016	Melt/Cast Switch Assembly
360017	Switch Lamp
360018	View Glass (set of 3)
360019	View Window - Complete
-360020	HF Power Regulator/Torque Regulator Control
360021	Circuit Breaker
360022	Caster
360023	Casting Machine Lid - Complete
360024	Lid Locking Arm
360025	Arm Balancer
360026	Arm Balancer Locking Nut
360027	Locking Handle
360028	Casting Arm Rod
360029	Casting Arm End Plate
360030	Argon Gas Supply Tube and Spring
360031	Copper Ribbon
360032	Ball Catch for Lid
360033	Lid Microswitch
360034	Heating Coil Assembly
360035	Rotor
360036	Felt Cleaner
360037	Brush Complete
360038	HF Generating Unit - Complete
360039	D.C. Current Smoothing Unit - Complete
360040	Cooling Fan - Complete
360041	Noise Filter Unit - Complete
360042	Vacuum Tube Cooling Unit - Complete
360043	Vacuum Tube
360044	Vent Fan Unit - Complete
360045	Magnetic Switch - Type MUD-7
360046	Magnetic Switch - Type KC-25N
360047	Casting Arm Drive Belt
360048	Casting Arm Drive Motor - Complete
360049	Filament Transformer
360050	Main Power Transformer
360051	Power Relay - 3 Pole
360052	Power Relay - 2 Pole
360053	Argon Gas Valve
360054	Glass Tube Support
360055	Capacitor - 1000 PF
360056	Capacitor - 700 PF
360057	Grid Resistor