

BGG Series CNC Pecan Cracker Machine

Operation, Maintenance, HMI Parameter, and Service Manual

Covered Models	Machine Type
BGG-4 / BGG-13 / BGG-26	CNC pecan cracking machine

1. Scope and Intended Use

The BGG Series CNC Pecan Cracker Machine is designed for controlled cracking of pecans. Pecans are fed into indexed positioning pockets and carried under the cracking head rows. The machine uses an automatic feeding track, a main drive with an indexing carrier, nut positioning/holding mechanisms, and motor-driven cracking heads with adjustable speed, delay, and stroke settings.

- Applicable product range: pecans approximately Ø15-Ø35 mm. The opening and cracking depth can be adjusted according to product size and customer requirements.
- Typical applications: standalone cracking station or integration into a pecan processing line.
- Models covered: BGG-4, BGG-13, and BGG-26.

2. Model Specifications

Model	Heads	Overall Size (inches)	Net Weight (lbs)	Rated Capacity	Rated Power	Rated Voltage
BGG-4	4	33.86 x 23.63 x 43.31	286.6	6,000-8,400 nuts/hr, approx. 150 - 200 lb/hr	0.5 kW	AC 110 V
BGG-13	13	44.89 x 43.31 x 55.12	837.8	30,000-35,000 nuts/hr, approx. 400 - 500 lb/hr	1.5 kW	AC 110 V
BGG-26	26	51.97 x 49.61 x 56.30	1247.8	56,000-65,000 nuts/hr, approx. 750 - 1000 lb/hr	4.0 kW	AC 110 V

Note: Actual capacity depends on nut size, moisture, feeding consistency, sorting quality, and operator setup.

3. Power, Environment, and Construction

Item	Requirement / Description
Power supply	AC 220 V single-phase power. Protective grounding is required.
Cable recommendation	For BGG-13 reference configuration: 3 x 1.5 mm ² supply cable or equivalent local-code-compliant cable. Confirm final cable size for BGG-4 and BGG-26 based on full-load current and local electrical code.
Drive Motor Configuration	Cracking Head Motor: 3.5 N·m Main Drive Motor: 20 N·m Feeding Motor: 16 N·m
Operating temperature	0-40 °C ambient temperature.
Compressed air / water	No air supply and no water supply required for the base machine.
Main material	Food-contact and main structural areas are made from food-grade 304 stainless steel, except special moving/wear components.
Core components	Stepper motors, stepper drives, control system, screw mechanisms, cracking head molds, guide rails, sensors, feeding system, and main drive and indexing carrier system.
Warranty reference	One year or 3,000 operating hours for covered components, subject to final sales agreement and normal-use conditions.

4. Safety Instructions

- Only trained operators should operate or adjust the machine.
- Never touch cracking heads, chains, rotating shafts, feed tracks, or other moving parts while the machine is powered or running.
- Before cleaning, lubrication, mold work, or mechanical adjustment, stop the machine and disconnect power according to the plant lockout/tagout procedure.
- Do not bypass guards, sensors, alarms, or electrical protection devices.
- Do not change protected HMI parameters unless instructed by CNC or an authorized service engineer.
- Keep hands, tools, clothing, and loose objects away from the cracking area and feeding track.
- Use protective grounding. Electrical work must be performed by qualified personnel only.

5. Machine Overview

Based on the machine photos, pecans are guided from the feed area into indexed positioning pockets. The main drive moves the pockets in sequence under the cracking head rows. The nut positioning/holding area stabilizes the pecans during the cracking cycle, while the motor-driven cracking heads move downward to crack the shell.



Overall machine exterior reference



Cracking head and indexed nut positioning pockets



Feeding track and indexed carrier view

Main Assembly	Function
Feeding system	Feeds nuts into the machine at the selected feeding speed.
Main drive and indexing carrier system	Indexes the nut position for repeatable nut holding and cracking.
Nut positioning/holding mechanism	Holds the nut in position before the cracking head cracks the shell.
Cracking head assembly	Moves down to crack the shell. Cracking depth and stroke are adjustable.
HMI touch screen	Displays operation pages, manual controls, parameter settings, speed settings.
Physical Start / Stop buttons	Start and stop machine operation.
Physical Up / Down adjustment buttons	Adjust the general nut cracking level/depth from the front panel.

6. Start-up and Shutdown

6.1 Start-up

- Confirm the machine is clean and free of loose tools, shells, or foreign materials.
- Connect the power plug / aviation connector securely.
- Turn on the main air breaker / circuit breaker located on the side of the machine.
- Wait for the HMI and controller to power up.
- Press the green Start button on the control panel to start the machine.

6.2 Shutdown

- Press the red Stop button on the control panel.
- Wait until all machine movement fully stops.
- Turn off the side air breaker / circuit breaker.
- If the machine will not be used for an extended period, disconnect the power plug.

7. Basic Cracking Depth Adjustment

The front panel has physical Up and Down arrow buttons for general cracking depth adjustment:

Button	Effect
Down arrow	Increases the cracking level / makes the cracking action deeper.
Up arrow	Decreases the cracking level / makes the cracking action lighter.

Adjustment method: test a small quantity of pecans, inspect cracking quality, then adjust one small step at a time. Avoid excessive cracking depth, which can damage kernels or overload moving parts.

8. HMI Operation Pages

The HMI screens may show Chinese or English depending on software version. In this manual, customer-facing labels are written in English.

8.1 Home Screen

Screen Item	Meaning / Use
Production Batch Number	Displays or identifies the current production batch.
Welcome to CNC Pecan Cracker Machine	Machine welcome/title area.
Patent Number	Patent information field if used.
Cracking Level	Displays the current cracking level/depth reference.
Start	Start machine operation.
Stop	Stop machine operation.
Adjust Settings	Opens the function selection page after password access when required.

8.2 Function Selection Screen

Button	Function
Manual Operation	Enter manual jog/test pages for motors and actuators. Use only when the machine is stopped and safe.
Parameter Settings	Open protected process parameters such as press speed, nut holding speed, stroke, delays, feeding speed, and return speed.
Acceleration/Deceleration Settings	Open acceleration/deceleration parameter pages. Some HMI versions may show this as a separate menu.
Return	Return to the previous screen.

8.3 Password and Parameter Adjustment Procedure

Service access password: 888, then press ENT. This password is used to access protected parameter setting pages. It should be shared only with trained operators, maintenance personnel, or authorized CNC service personnel.

- From the Home screen, press Adjust Settings / Select Function.
- When the numeric keypad appears, enter the service password 888 and press ENT.
- Select Parameter Setting or Speed Setting.
- Tap the value box for the parameter to be changed.
- The numeric keypad will open. Enter the new value. The HMI may display Max and Min limits at the top of the keypad.
- Press ENT to save the value.
- After adjustment, press Return / Previous Page as needed, then test the machine using a small sample quantity.
- Record every parameter change in the maintenance log.

8.4 Manual Operation Pages

Manual Operation is used for service testing and troubleshooting. The machine should be stopped before entering manual mode. Keep all body parts away from moving mechanisms.

Page / Control	Available Controls
Manual Operation 1	Group 1-6 Motor Down / Up; Feeding Motor; Main Drive Motor; Manual; Automatic; Next Page; Return.
Manual Operation 2	Group 7-11 Motor Down / Up; Manual; Automatic; Return.

For BGG-4 and BGG-13/BGG-26, the number of active motor groups shown or used may vary according to machine configuration. Do not jog any group unless the area is clear and the corresponding mechanism is installed and safe.

9. HMI Parameter Reference - Screen Values from Provided Files

Use these as a commissioning reference. Final values should be confirmed after testing actual product.

9.1 Parameter Setting 1

Parameter	Displayed Value	Meaning / Adjustment Guidance
Cracking Head Moving Speed	65	Speed for cracking head positioning/movement. Higher value increases movement speed; excessive value may cause vibration or impact.
Nut Holding Speed	15	Speed of the nut positioning/holding action.
Cracking Head Downstroke Speed	15	Speed when the cracking head moves down to crack the nut.
Cracking Head Travel Stroke	14	Cracking head positioning stroke/travel range.
Nut Holding Stroke	7	Travel used by the nut positioning/holding mechanism.
Cracking Stroke	2.8	Cracking stroke/depth. Increase carefully if shells are not opening; decrease if kernels are damaged.

9.2 Parameter Setting 2

Parameter	Displayed Value	Meaning / Adjustment Guidance
Return Delay	20	Delay before return action.
Nut Holding Delay	30	Time delay for nut holding before cracking.
Cracking Delay	20	Time delay during/after cracking action.
Main Drive Working Speed	23	Working speed of the main drive and indexing carrier system.
Feeding Working Speed	30	Working speed of the feeding system.
Return Speed	60	Return speed after the cracking action.

9.3 Parameter Setting 3

Parameter	Displayed Value	Meaning / Adjustment Guidance
Feeding Homing Speed	2000	Speed used when the feeding system returns to zero/home.
Main Drive Homing Speed	2000	Speed used when the main shaft returns to zero/home.
Cracking Head Timeout Alarm	8	Alarm delay for cracking head timeout or delayed return.
XLL	35.0	Reserved calibration / limit parameter. Adjust only with CNC authorization.
BLL	9.0	Reserved calibration / limit parameter. Adjust only with CNC authorization.
FLL	45.0	Reserved calibration / limit parameter. Adjust only with CNC authorization.
ZLL	85.0	Reserved calibration / limit parameter. Adjust only with CNC authorization.

9.4 Speed Setting / Acceleration- Deceleration Setting 1

Parameter	Displayed Value	Meaning / Adjustment Guidance
Downstroke Speed Parameter	1500	Speed parameter for downward movement stage.
Downstroke Acceleration Time	20	Acceleration time for downward movement.
Downstroke Deceleration Time	20	Deceleration time for downward movement.
Nut Holding Speed Parameter	8000	Speed parameter for nut holding action.
Nut Holding Acceleration Time	100	Acceleration time for nut holding.
Nut Holding Deceleration Time	50	Deceleration time for nut holding.

9.5 Speed Setting / Acceleration- Deceleration Setting 2

Parameter	Displayed Value	Meaning / Adjustment Guidance
Cracking Speed Parameter	8000	Speed parameter for cracking action.
Cracking Acceleration Time	100	Acceleration time for cracking.
Cracking Deceleration Time	20	Deceleration time for cracking.
Return Speed Parameter	15000	Speed parameter for return action.
Return Acceleration Time	50	Acceleration time for return action.
Return Deceleration Time	20	Deceleration time for return action.

10. Recommended Parameter Adjustment Logic

Observed Result	Likely Adjustment	Caution
Shell is not opened enough	Slightly increase Cracking Stroke or use the Down arrow to increase cracking level.	Increase in small steps only. Retest after each change.
Kernel damage is too high	Decrease Cracking Stroke or use the Up arrow to reduce cracking level.	Also confirm nut size sorting and moisture condition.
Machine movement is too harsh or noisy	Reduce related speed parameter or increase acceleration/deceleration time.	Do not reduce so much that the cycle becomes unstable.
Nuts are not held/positioned reliably	Review Nut Holding Stroke, Nut Holding Speed, and Nut Holding Delay.	Do not over-tighten the holding action, which may damage kernels before cracking.
Feed is inconsistent	Review Feeding Working Speed and feeding track cleanliness.	Clean shells and dust from track before increasing speed.
Cracking head timeout/alarm occurs	Check lubrication and sensor return status before changing alarm delay.	Do not hide mechanical problems by increasing alarm delay too much.

11. Routine Maintenance

Frequency	Maintenance Task
Every shift / Daily	Clean remaining shells, dust, and fragments from molds, cracking head area, feeding track, and surrounding surfaces. Check for abnormal noise, vibration, loose guards, or damaged cables.
Weekly	Inspect screw mechanisms, guide rails, chain/drive components, sensors, connectors, and fasteners for looseness, wear, or contamination.
Lubrication interval	Lubricate screw mechanisms and guide rails through the manual oiling points. Use clean No. 48 machine oil unless otherwise specified by CNC.
Every 10 days	Add approximately half a cup of white oil to the filter/lubrication cup if applicable to this machine configuration.
Monthly	Check electrical terminals and mechanical moving parts for wear, looseness, heat marks, or cable damage.

Important: Always stop the machine and follow lockout/tagout before cleaning, lubrication, electrical inspection, mold work, or mechanical adjustment.

12. Troubleshooting

Problem	Inspection / Cause	Corrective Action
Machine stops after several cycles	Check whether all cracking head motors have returned to the home/reset position. The sensor indicator above the cracking head should be ON when returned.	Clean and lubricate sticky cracking head groups. If one group cannot return reliably, stop operation and contact CNC.
Motor, drive, or sensor suspected fault	With the machine stopped, enter Manual Operation, switch to Manual, and test each motor up/down movement. Listen for abnormal blockage or missing movement.	If the motor cannot move up/down or sensor state is abnormal, contact CNC for motor/drive/sensor diagnosis and replacement guidance.
Low controller battery alarm	HMI indicates low battery or battery replacement required.	Keep the equipment powered and stopped. Do not turn off the right-side cabinet breaker. Open the PLC battery holder carefully with a small screwdriver, unplug the battery connector, and replace with the correct new battery. Electrical work should be performed by qualified personnel.

Poor cracking quality	Nut size, moisture, sorting consistency, cracking stroke, nut holding, and feeding can all affect results.	Test a small sample; adjust cracking level and cracking stroke gradually. Verify product preparation before aggressive parameter changes.
Unstable feeding	Shell debris, foreign materials, incorrect feeding speed, or track contamination.	Clean feeding track and reduce or optimize feeding speed.