OPERATION INSTRUCTION

MK84 SERIES
AUTOMATIC CNC ROLL GRINDER

华辰装备 HIECISE

1 SAFETY ALERTS

Please read this instruction carefully and make sure to follow suit, including:

1. ★NOTE: DON'T OPERATE WITHOUT ADEQUTE TRAINING;
2. ★NO STANDING WITHIN 20 METERS OF GRINDING WHEEL ROTATION SURFACE DIRECTION DURING RUNNING;
3. ★DRSS PROPERLY, WEAR GOGGLES, HELMET, WORK SHOES, NO LOOSE CLOTHES AND JELLWERIES;
4. ★DOUBE CHECK EACH TIME ABOUT MAX&MIN DIAMETER, STARTING POINT, ROLL BODY LENTH ETC.;
5. ★DON'T COLLIDE THE ROLL WITH ANY PARTS OF GRINDER DURING LOADING AND UNLOADING;
6. ★WHEN OPERTORING ON MEASURING ARMS, USE【**RESET**】TO BE READY TO STOP THEIR MOVEMENTS IMMEDIATELY FOR SAFTETY;
7. Caution slippery floor;
8. Always be wary of any abnormal phenomenon, sound etc. during running;
9. Press on the emergency button which can be found in every operation panel in case of emergency to stop the machine;
10. Please turn the grinder off by key between using; please turn off power before long stop.

★ VILATION OF SATETY ALERTS MAY LEADS TO: A: MACHINE DAMAGE; B: WORK PIECE DAMAGE; C: PERSONEEL INJURY, EAVE DEATH.

2 NOTES BEFORE OPERATION

1. SWITCH BETWEEN CHINESE AND ENGLISH: (1) “MENU”; (2) “SETUP”.
2. ★BEFORE AUTOMATIC GRINDING, IT IS A MUST TO PRESS ON THE “HOMING” BUTTON TO RETURN ALL THE SERVO AXIS TO REFERENCE POINTS. IF PRESS A SECOND TIME, HEADSTOCK WOULD TURN FOR A SECOND.
3. Unitary system in this system is “mm”;
4. Two major packages in the HMI are Hiecise programming(to input roll parameter, curve, and technique) and Hiecise processing(to grind and measure, manually or automatically).
5. For better grinding precision, it’s recommended to calibrate the reference disc for measurement after “Homing”.
6. For higher precision, it’s advisable to dress the wheel before grinding. For new wheel, do the balance check again after dressing.
7. A complete roll file include name, roll data, curve, and grinding technics etc.
8. A complete automatic grinding process includes measure before grind, roll alignment, wheel automatic approach, processing and measure after grinding.
9. Other auxiliary functions includes wheel dressing, chock tilting, headstock faceplate extension, faceplate automatic alignment, headstock inching, softlanding up & down, tailstock control, online measure.

3 PREPARATIONS-WORKING ENVIRONMENT

1. Remove objects that may impede operation;
2. Clear the site of irrelevant personnel;
3. Check liquid level in hydraulic, lubrication and coolant system;
4. Make sure that all the safety equipment and protection are ready for operation.

3 PREPARATIONS-GRINDER STANDBY

Clear all the problems after checking. Report timely if problems can't be solved by stuff at site. Don't start unless all the problems are cleared. List of checking items are as follows:

1. Use suitable steady rests and pads (clean pads surface, scrape it if needed to make sure of good fitting between roll and pad surface);
2. (Execute u1 homing if there is an U1 axis, see "8 Action Element- U1 Homing");
3. Calibrate centerline among headstock, steady rests, tailstock with test roll (by adjusting pads or scraping pads, see "8 Action Element – Centerline Calibration");
4. Check lubrication oil level, including spindle lubrication station, carriage lubrication, pads lubrication, coolant etc.;
5. Clean the coolant debris recycle box;
6. The machine won't work with electrical cabinet open, please make sure the electrical cabinet is shut.

3 PREPARATIONS-START

1. Confirm about the status of UPS switch. Start UPS first (UPS switch is on ups device inside electrical cabinet);
2. Close electrical cabinet and lock it;
3. Turn on the UPS power switch (outside of electrical cabinet, front door);
4. Turn on the main power switch(outside of electrical cabinet, front door);
5. Once power is on, the HMI will start;
6. Be alert to any fault alarms in the HMI;
7. Deal with any fault before proceeding;
8. Press on the “reset” and “fault reset” button;
9. Turn on the machine by rotating the key to “on”;
10. Press on “Homing” button, wait till adjustment finish. U, X1, X, Z axis will return to set reference points one by one.
11. It is recommended to dry run wheel for 20-30 minutes before grinding for good thermo stability of machine and smooth lubrication (to empty air completely).

4 START & SHUT DOWN AFTER EMERGENCY STOP

In case of emergency, the grinder can be shut down with pressing on an emergency button, (time-delay -within 1-30 seconds-is editable), then execute the following steps:

1. Turn off the key on the control panel to shut the machine down completely;
2. Find out the problem and causes, solve the problem;
3. If restart is needed, rotate the emergency button;
4. Turn on main power switch. (Caution: turn the main power switch to “off” and turn it to “on”);
5. See “3 Preparation – Start” for the following steps to start.

4 START & SHUT DOWN AFTER EMERGENCY STOP

Firstly, please shut down the grinder completely through the key on control panel.

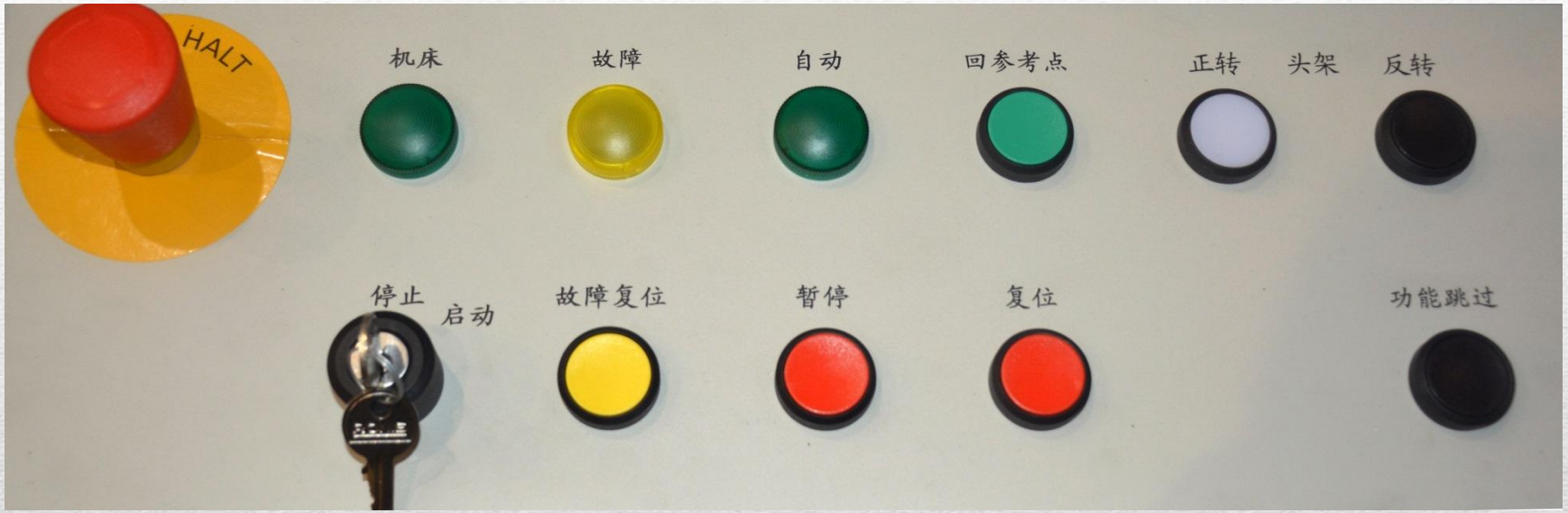
The main power swith will be between【off】and【on】.

If need to start system right away (if power supply become stable again), then please swith the main power switch firstly to【off】than to【on】.

Follow the steps in “ 3 Preparation – Start ”.

If the system needs to be shut down for a long time, switch the main power switch to【off】, and then turn off UPS power supply and UPS itself step by step.

5 OPERATION PANEL - MAIN PANEL



After starting the machine by turning on the key, return all the axis to reference point by pressing on the “Homing” button.

Note: the operation panel is for reference only.

·【Emergency stop】: press in case of emergency, rotate to reset;

·【Start/stop】: key to start and stop the machine;

·【On】: machine is on (green);

·【Fault reset】: fault reset, to clear PLC fault alarm display;

·【Fault】: light is on for slight fault; light flashes for serious faults;

·【Halt】: stop the carriage movement in manual operation;

·【Automatic】: automatic running (green);

·【Reset】: NC reset, press it for the following actions:

1. All the actions stop except for the lubrication pump and ventilator(★ ★ this can be used to stop at any time the movement of measuring arms to protect them form damaging);

2. Automatic procedure stops;

3. All the NC fault display will be cleared (reset).

·【Homing】: return all the servo axis to their reference points.

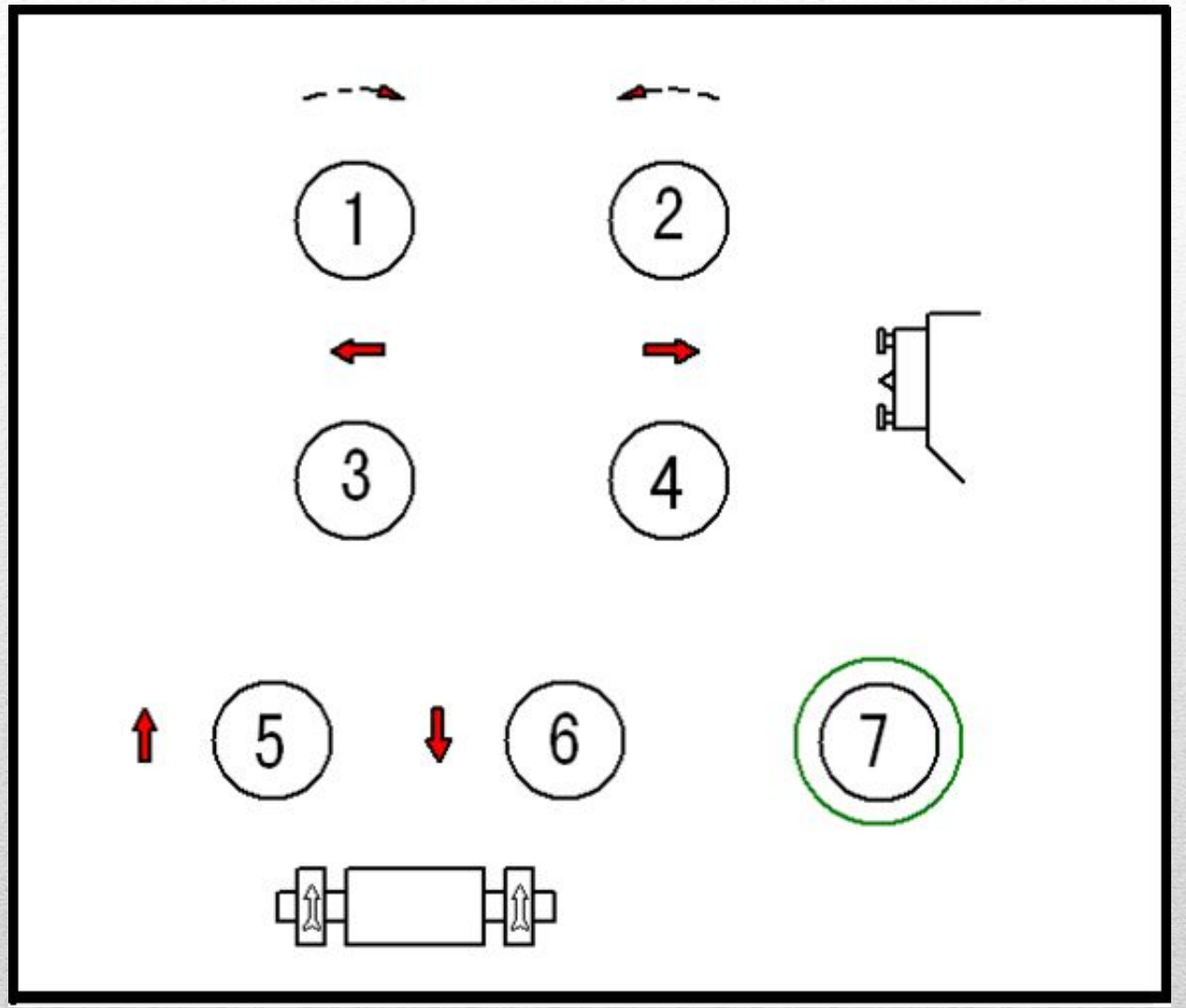
·【Function skip】: also called【function trigger】, with the same function as the middle button on the hand held control box. With functions as follows:

1. Change the direction of the carriage movement;
2. End ahead of time the automatic approach of grinding wheel in automatic mode;
3. End the carriage movement to tailstock after automatic cycling;
4. Triger the automatic grinding when approaching the grinding wheel to rolll manually.

Explanation:

1. Faceplate clockwise inching.
2. Faceplate counter-clockwise inching.
3. Faceplate extension inching.
4. Faceplate retraction inching.
5. Softlanding up.
6. Softlanding down.
7. Emergency stop.

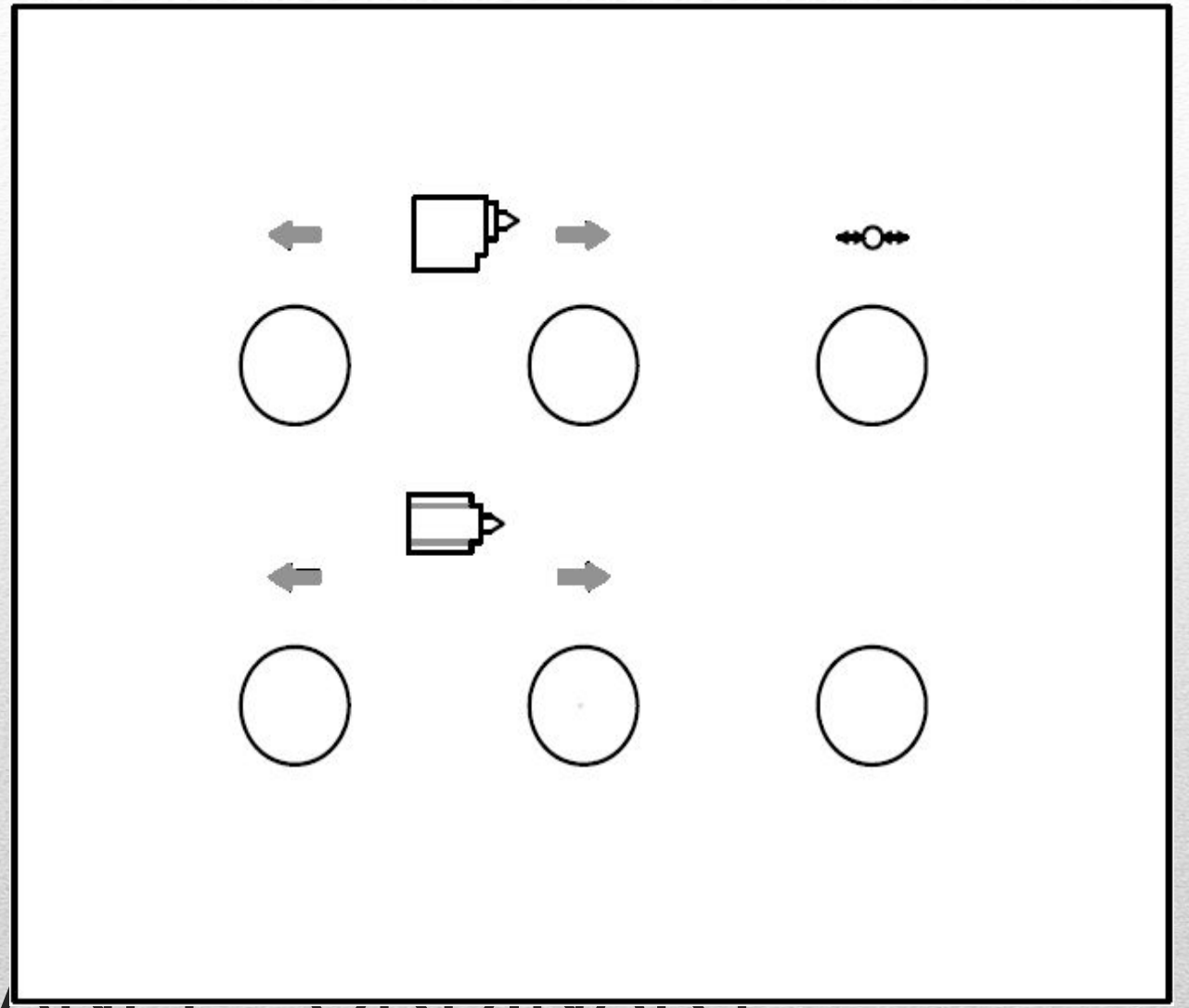
Note: Illustration shown on the right is of standard configuration.



5 OPERATION PANEL - HEADSTOCK

Explanation:

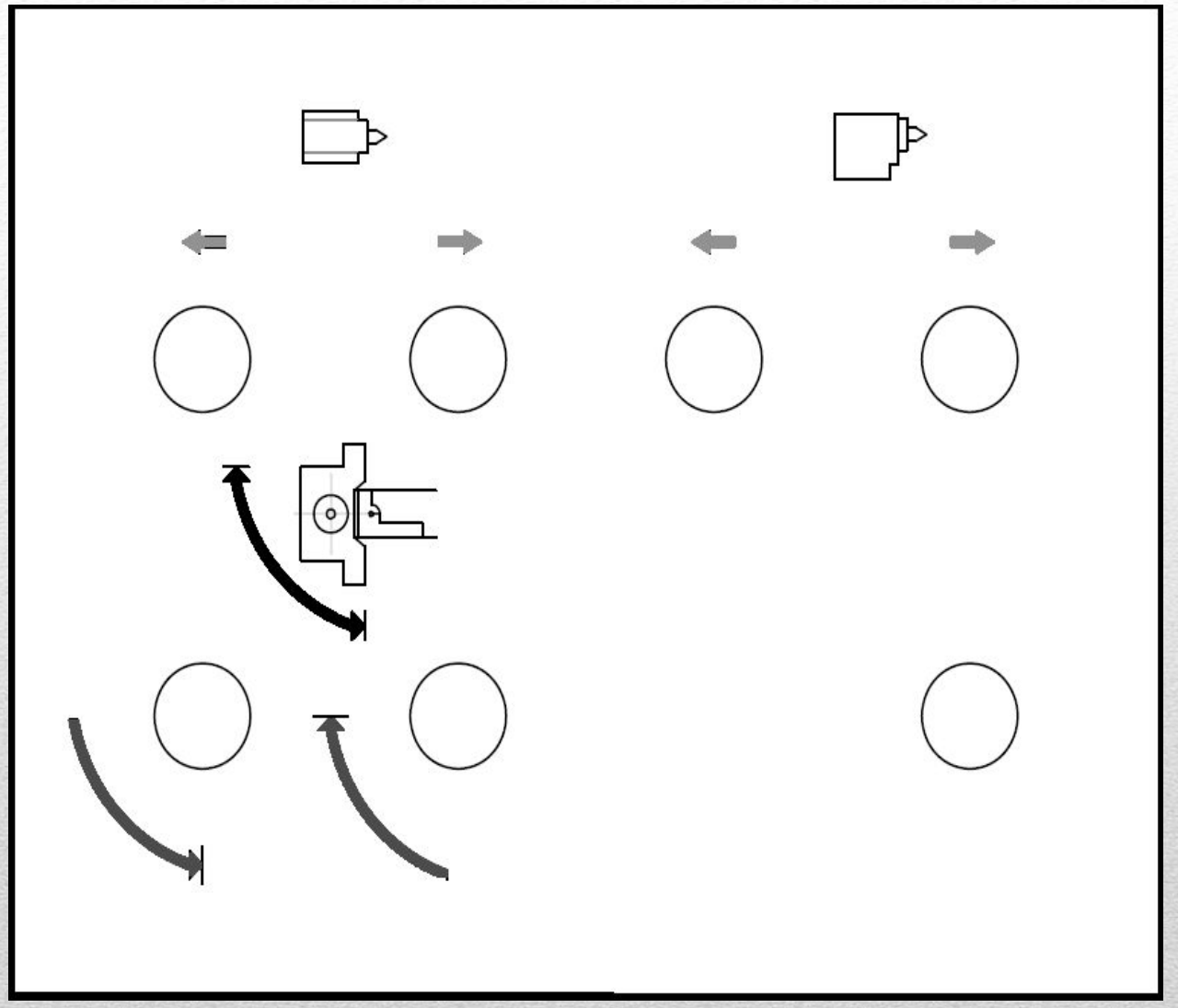
1. Quill inch forward.
2. Quill inch backward.
3. Tailstock forward.
4. Tailstock backward.
5. Emergency stop.



5 OPERATION PANEL - ORDINARY TAILSTOCK

Explanation:

1. Quill inch forward.
2. Quill inch backward.
3. Tailstock forward.
4. Tailstock backward.
5. Emergency stop.
6. Tailstock clamp\release buttion and indication.
7. Chock tilting.
8. Chock tilting reset.
9. Emergency stop.

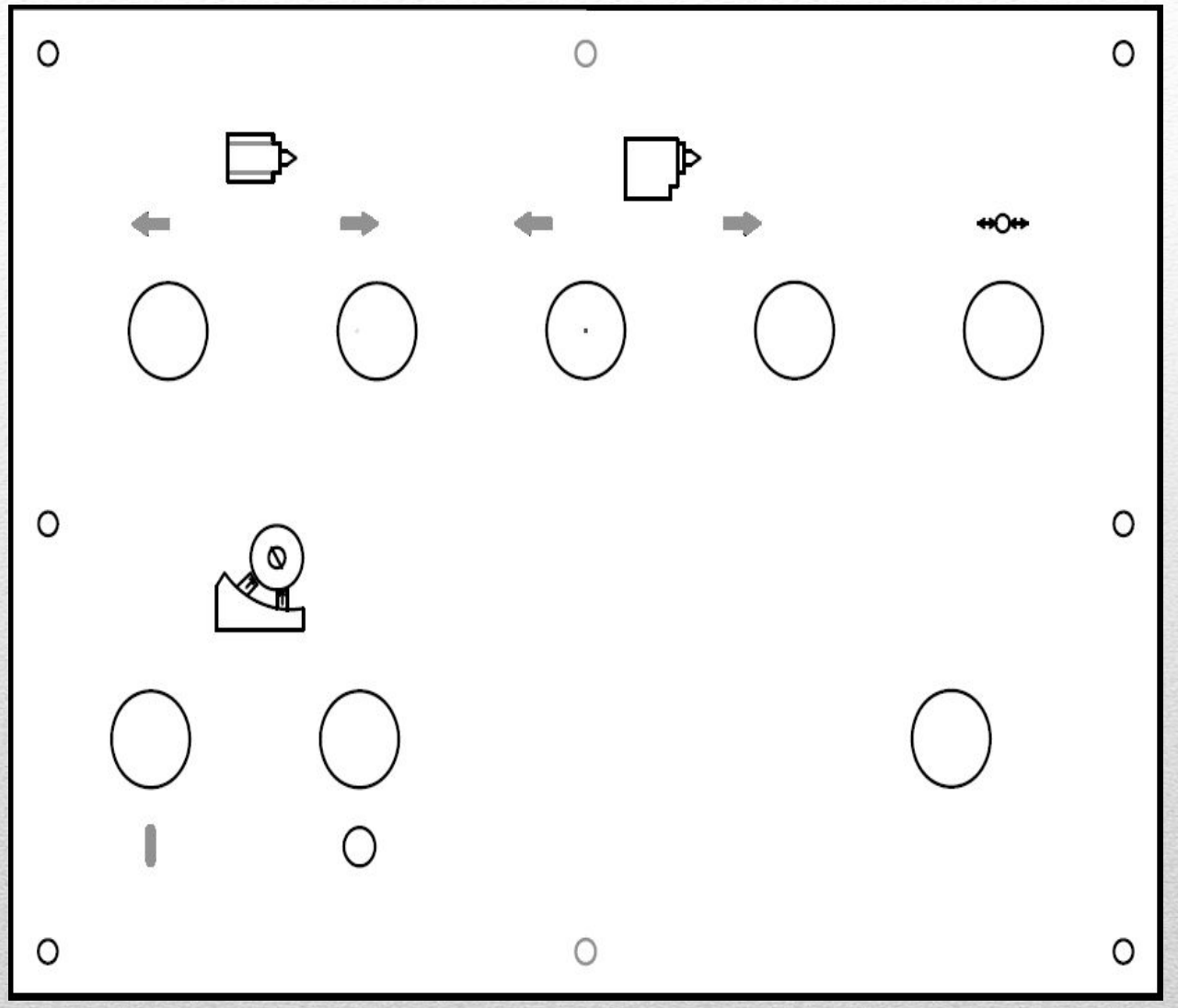


5 OPERATION PANEL - TAILSTOCK WITH CHOCK TILTING

5 OPERATION PANEL – TAILSTOCK WITH STATIC STEADY RESTS

Explanation:

1. Quill inch forward.
2. Quill inch backward.
3. Tailstock forward.
4. Tailstock backward.
5. Tailstock clamp\release buttion and indication.
6. Steady rests lubrication start.
7. Steady rests lubrication stop.
8. Emergency stop.



Selection button:

X (grinding carriage); Y(U1/U/V adjustment); Z(carriage); 4(X1 measuring carriage); 5(headstock inching).

Buttons below are for the choosing between forward and backward direction.

Note: to inch forward X axis, press on left and right key at the same time.

Multiplying power switch:×1= 1μ/grid ;×10= 10μ /grid ;×100= 100μ /grid. 0 gear or ×1000 gear means inching mode.

6 HAND HELD C[illegible] INSTRUCTION

Note:

Improper handling of the control box may leads to its damage.

Correct positioning: clutch it to the right side of the control panel gently, don’t dangle.

It is recommended to list this as spares just in case of need.

6 HAND HELD BOX CONTROL - NOTES

7 PREPARATION - WORKPIECE STANDBY (HARPOON TYPE CHOCK TILTING)

1. Press on【U1 homing】, see “8 Action Element – U1 Homing”.
2. Make sure that faceplate and tailstock quill are in their retracted positions (if equipped with certain functions).
3. Make sure to retract tailstock to a safe position to avoid interference, if there is a harpoon type chock tilting device.
4. Cool the work piece to room temperature. (Use coolant if necessary).
5. Jack up soft-landing (if there is soft-landing).
6. Lower the soft-landing to place the work piece on the pads.
7. Inch out (gently) the faceplate to support roll(if equipped with this function).
8. Inch out tailstock quill to support roll (if there is no chock tilting).
9. (If there is a harpoon chock tilter)make sure tilter don’t collide with chock, move tailstok forward to hold chock with harpoon, press on【chock tilt】.
10. Press on “quill inch forward” to support roll in case of harpoon tilter.

7 PREPARATION - WORK PIECE STANDBY (ROD TYPE CHOCK TILTING)

1. Press on【U1 homing】, see “8 Action Element – U1 homing”.
2. Make sure that faceplate and tailstock quill are in their retracted positions (if equipped with certain functions).
3. Make sure to retract tailstock to a safe position to avoid interference.
4. Cool the work piece to room temperature. (Use coolant if necessary).
5. Jack up soft-landing (if there is soft-landing).
6. Lower the soft-landing to place the work piece on the pads.
7. Inch out (gently) the faceplate to support roll(if equipped with this function).
8. Inch out tailstock quill to support roll (if there is no chock tilting).
9. (If there is a rod chock tilter) press on “ chock tilting” to rotate the chock. The cylinder under it will sit up and support the chock for weight relief.
10. In this case, tailstock is not needed during grinding.

8 BASIC PARAMETER STANDARD PROCEDURE

★ NOMALLY, THESE PARAMETERS DON'T NEED MODIFICATIONS.

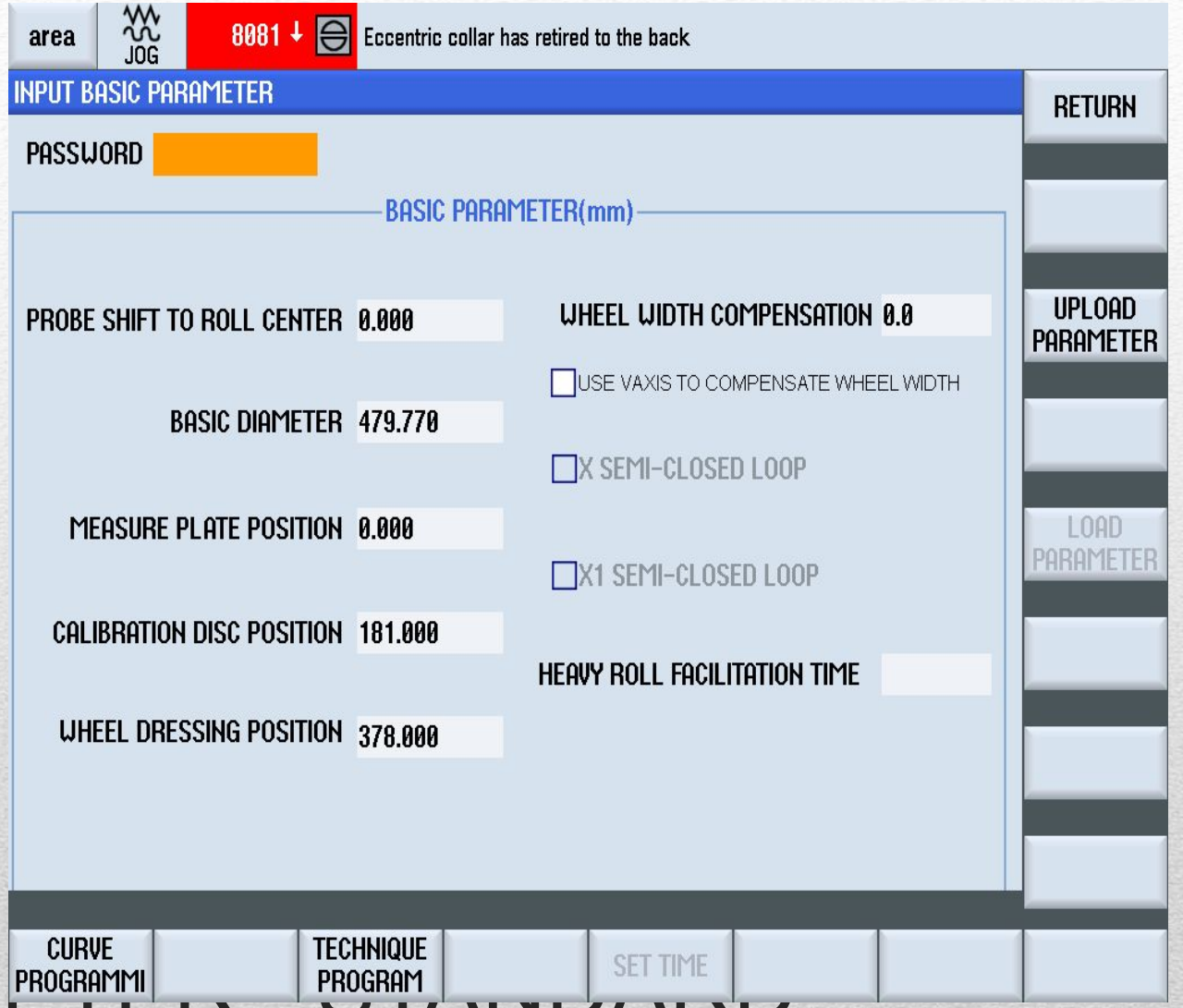
If otherwise, follow this:

In programming page, press "programming" softkey to enter.

Enter authorization password;

Use【tab】to locate the cursor, input value and press "input" to confirm.

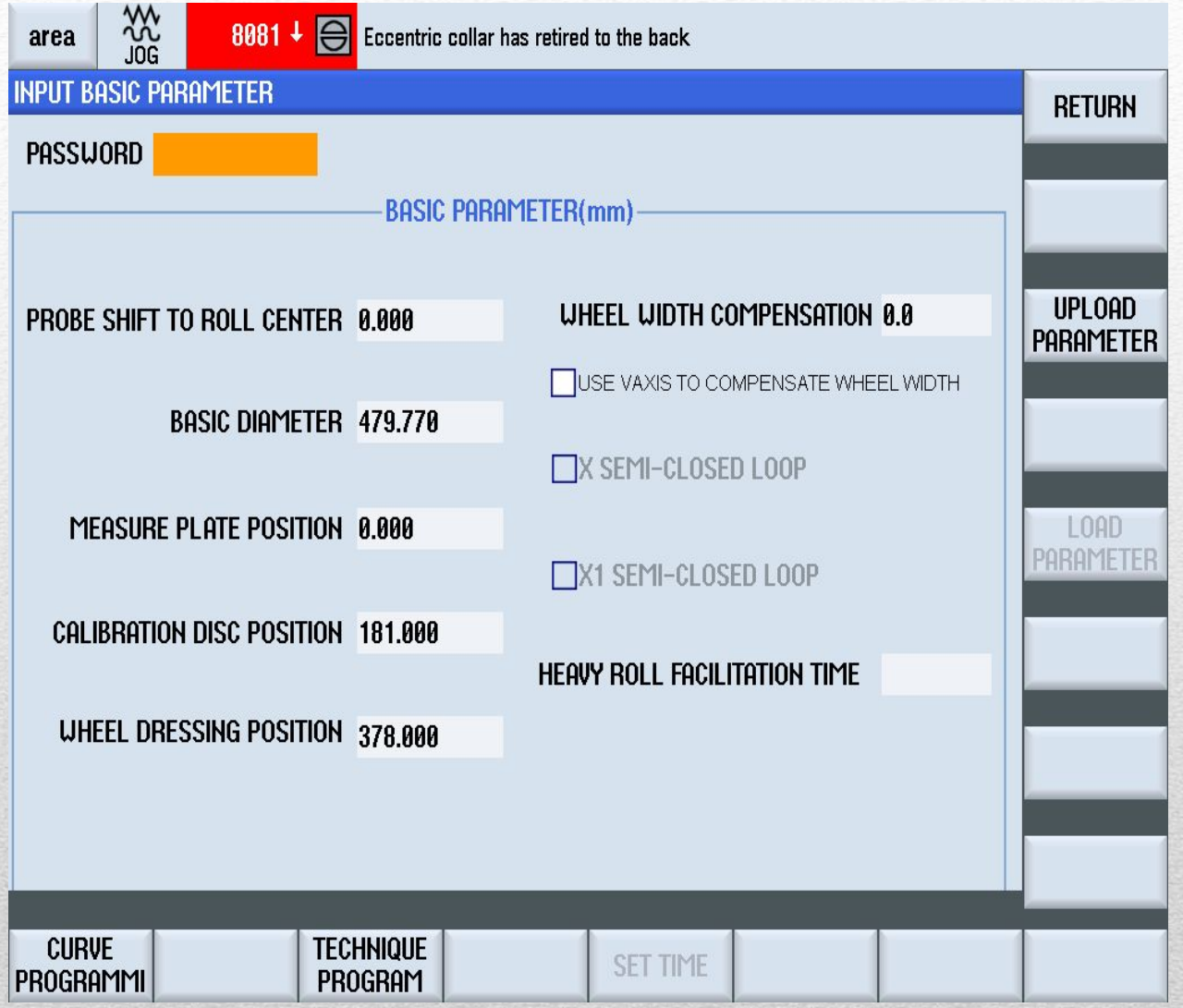
Press【download data】softkey to send it to NC, press "input", then press【upload data】to save.



8 BASIC PARAMETER - EXAMPLE

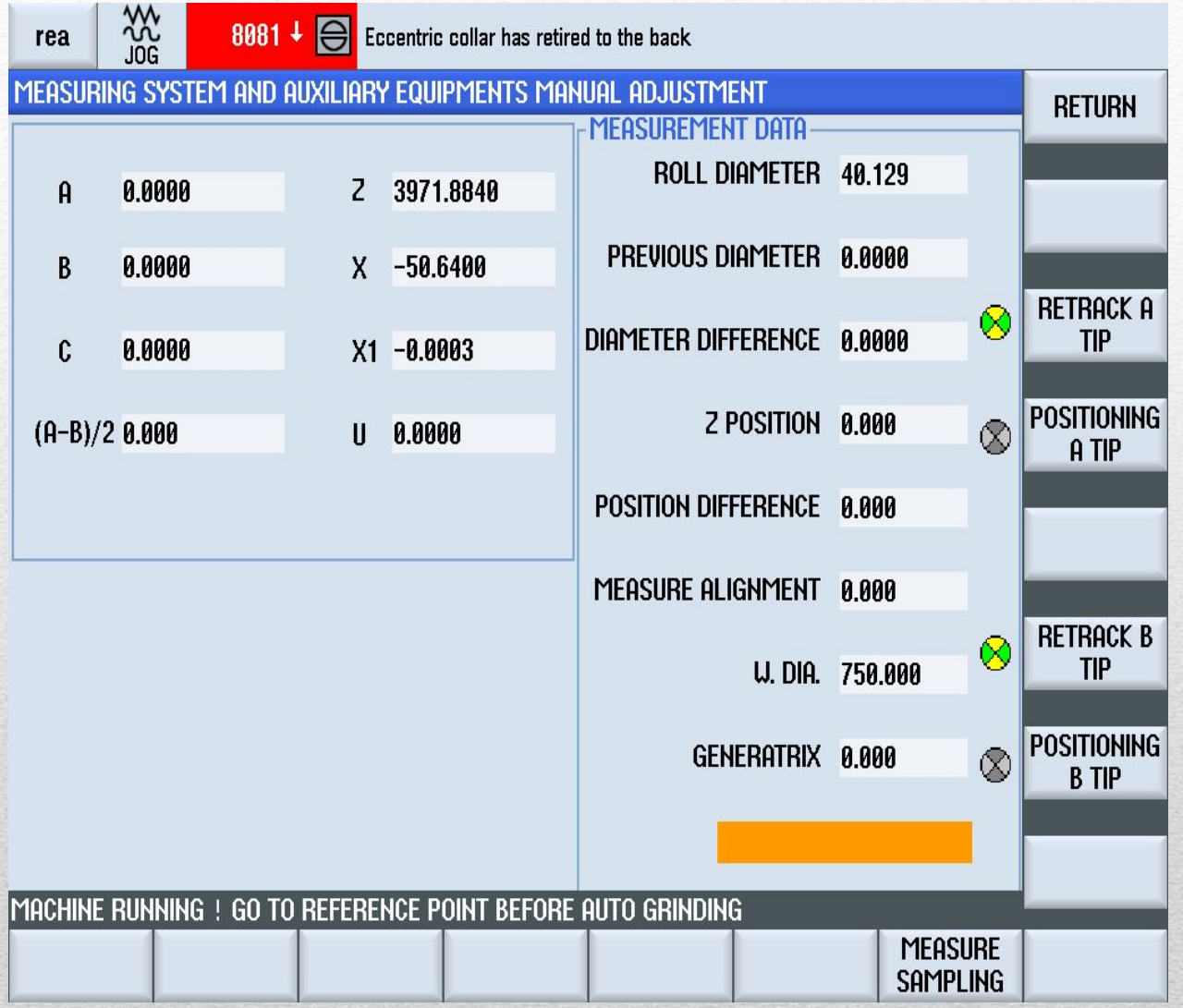
★ After entering correct password, press【set time】softkey, input correct values, press【input】to confirm.

Press【download data】softkey to send it to NC. Then press【upload data】to save.



Before loading roll, press【U1 homing】(only if equipped with this device).

After homing, light on【U1 homing】will be on to mark that it is done.



9 ACTION ELEMENT - U1 AXIS HOMING

Use【put down arms】and【retract arms】softkey to operate manually.

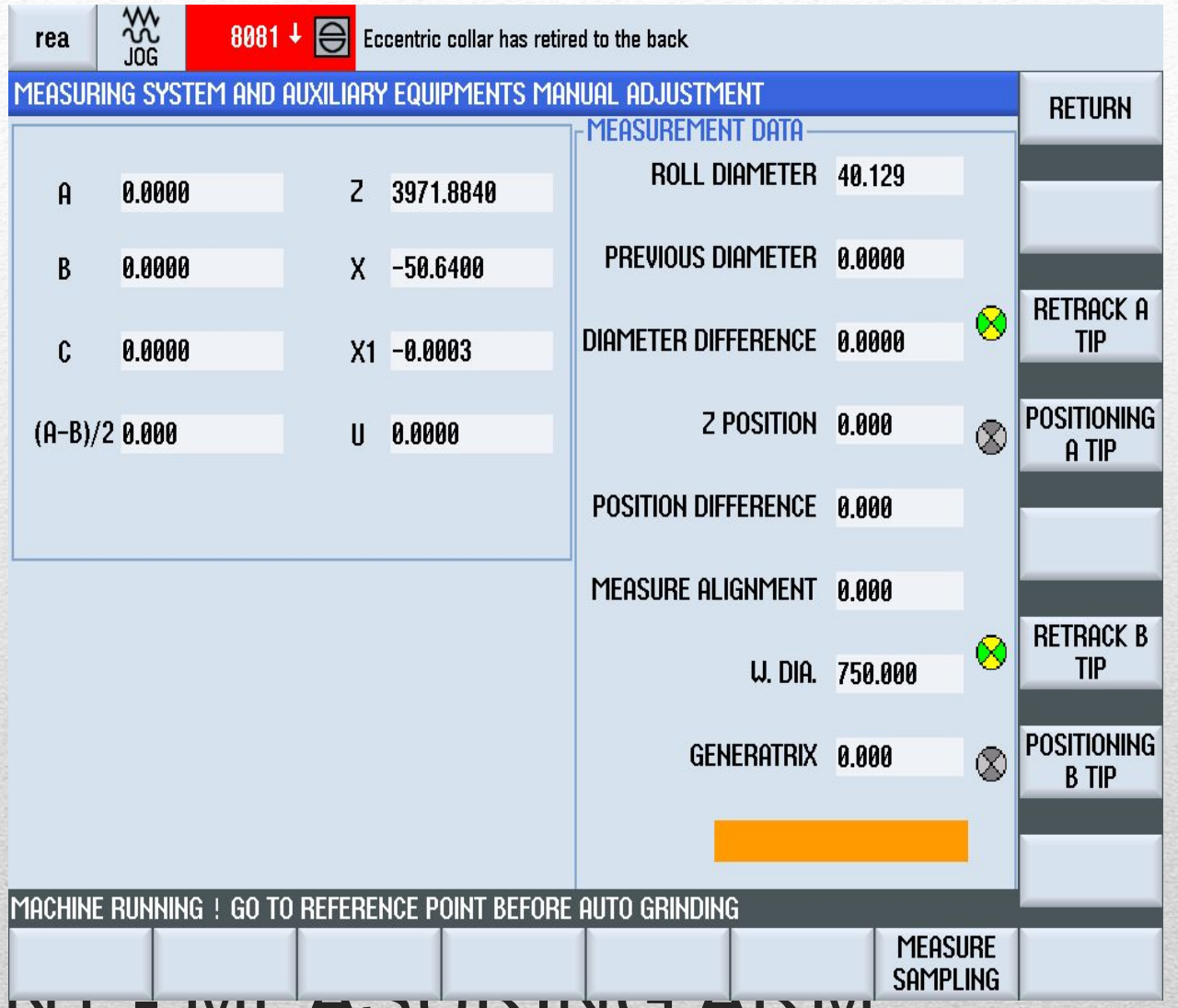
Retract X1 axis through control box to contact arm a to touch roll surface until the readings of “a” is around 3 mm.

Observe “A” Value to judge about the rotation center.

Combing Z axis movement(in low speed), by observing “A” value to observe generatrix (roll alignment precision).

★ NOTE!

Before operation, please make sure that the movement of measuring arm don’t interfare with anything.

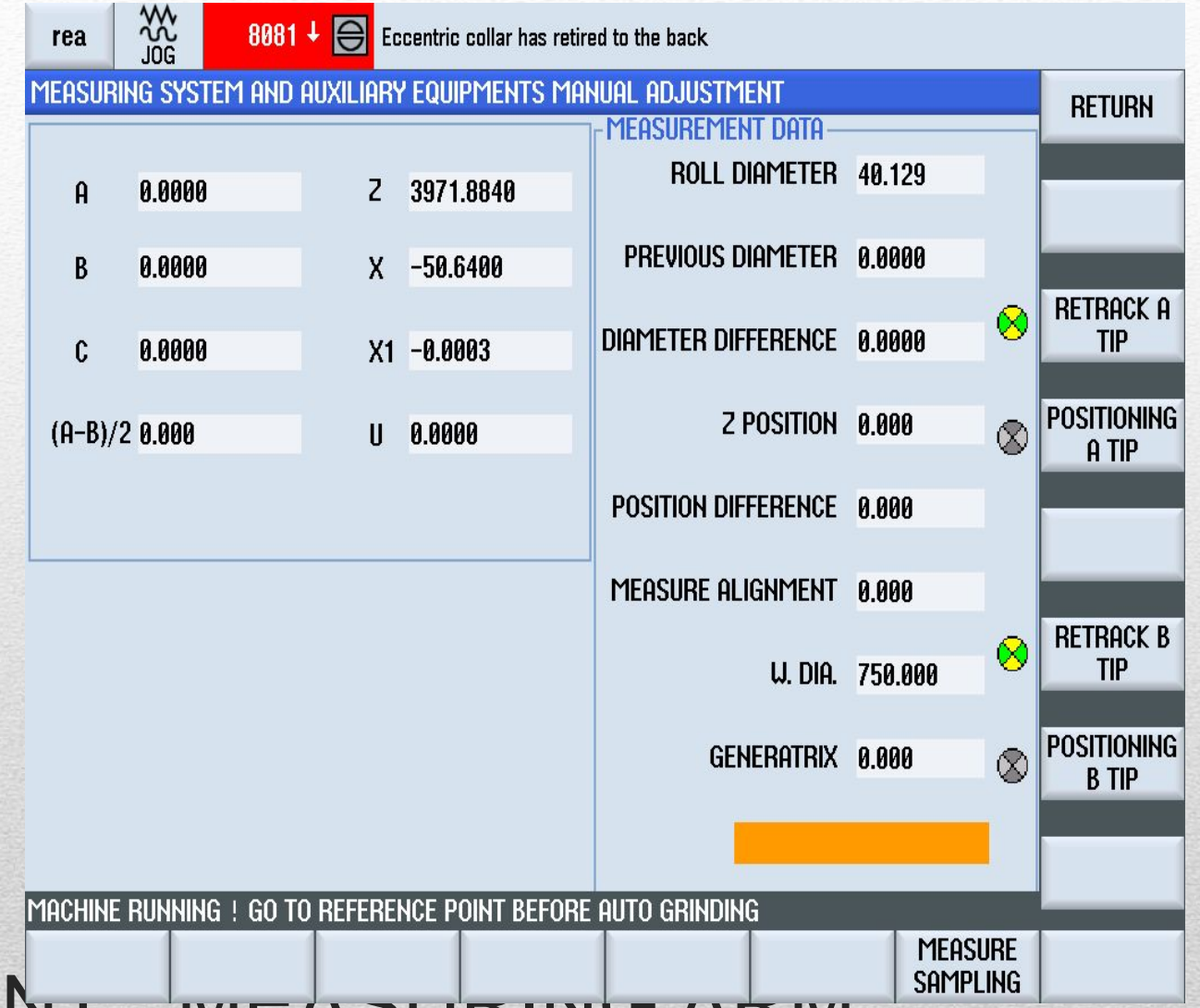


Roll diameter, diameter difference, roll shape error etc. can be measured manually to further measuring roll alignment error.

Move measuring carriage to the part needing measuring, put down arms (caution the safety!), Move X and X1 axis to contact measuring tips B and A with roll surface separately, press【measure sampling】softkey.

Combing movement of z axis, measuring different places to measure the diameter difference, roll alignment error etc.

If the roll alignment error is above zero, then move the certain part of the roll inward manually; vice verse.



PREPARATIONS - GRINDER STANDBY - CENTERLINE

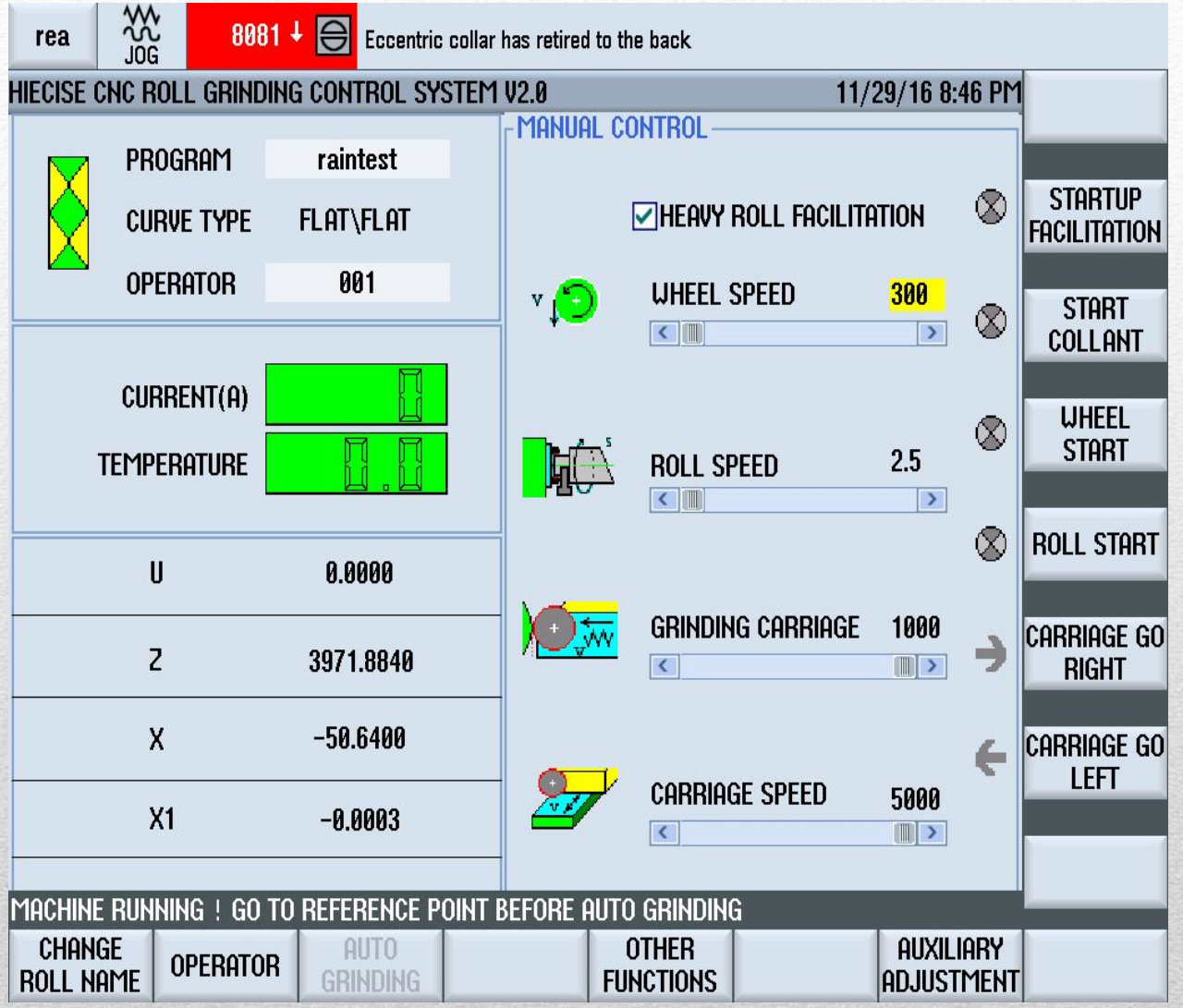
1. Measure the generatrix of roll to get a general idea on roll alignment(cross-sectional and vertical);
2. Place a dial gauge near headstock side's roll neck to measure the rotation center;
3. Adjust rotation center through pads based on measuring result;
4. Place a dial gauge near tailstock side's roll neck to further measure rotation center;
5. Repeat the measuring on headstock and tailstock side to calibrate center;
6. Measuring arms can also be used to measuring the rotation center;
7. Adjust roll generatrix with help of measuring system;
8. Repeat measurement with centimeter to adjust roll upper centerlines, generatrix to calibrate rotation centerline of headstock, tailstock, steady rests.

The starting page of Hiecise processing is the jog mode grinding page.

In this page, use button and control box to start/stop grinding wheel, work piece, and carriage; set speed of grinding wheel/work piece/carriage;

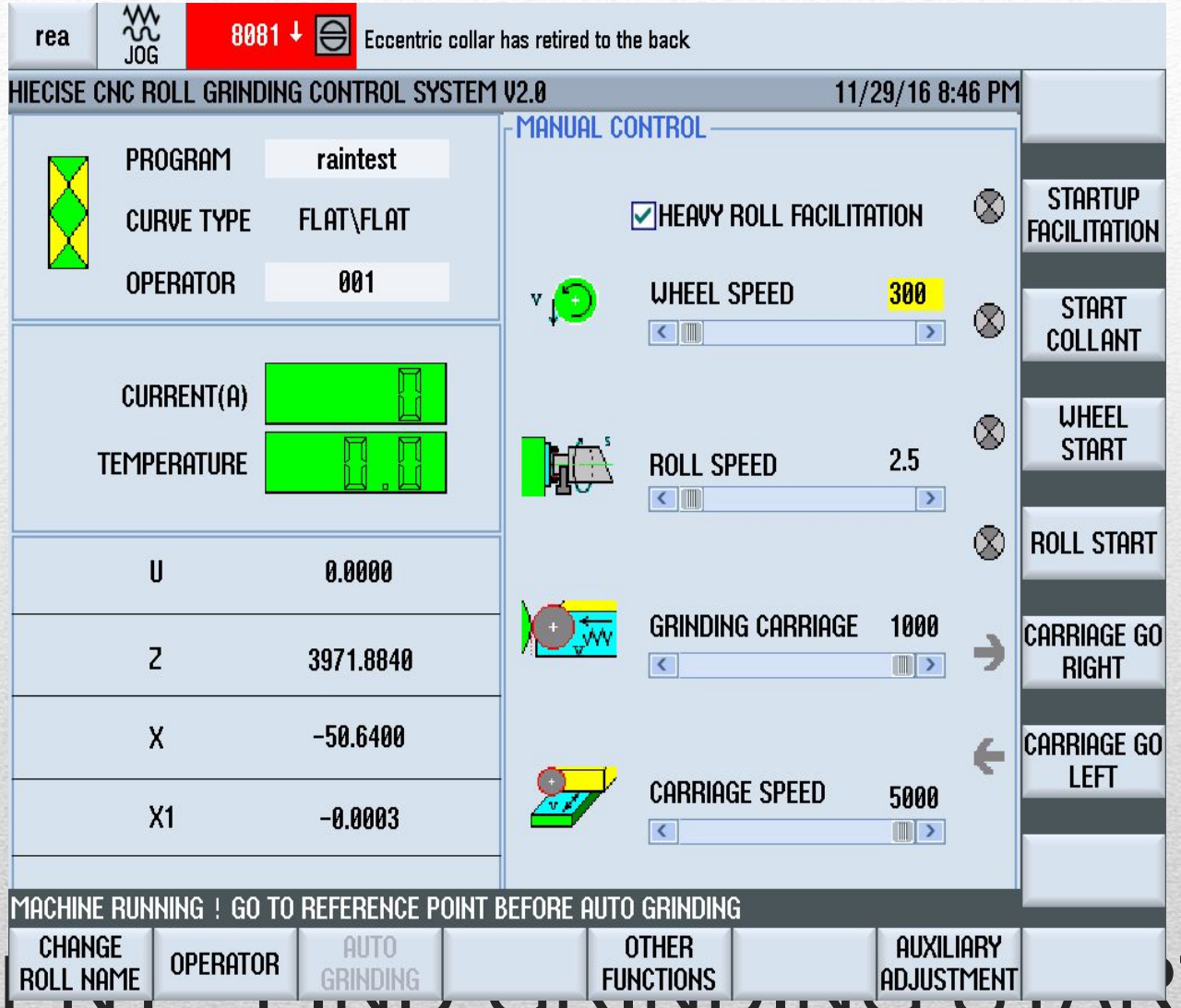
In this page, operator can observe the power of grinding wheel motor, and position of each axis.

★ The start of major components will be subject to confirmation before execution.



8 ACTION ELEMENT - START/STOP OF GRINDING WHEEL, HEADSTOCK, CARRIAGE

Put down measuring arm B, move Z axis to headstock side roll surface. Adjust Z axis and X axis to engage measuring probe with roll body end. Record the Z axis reading (rounded to two decimals or more) as the grinding start point.

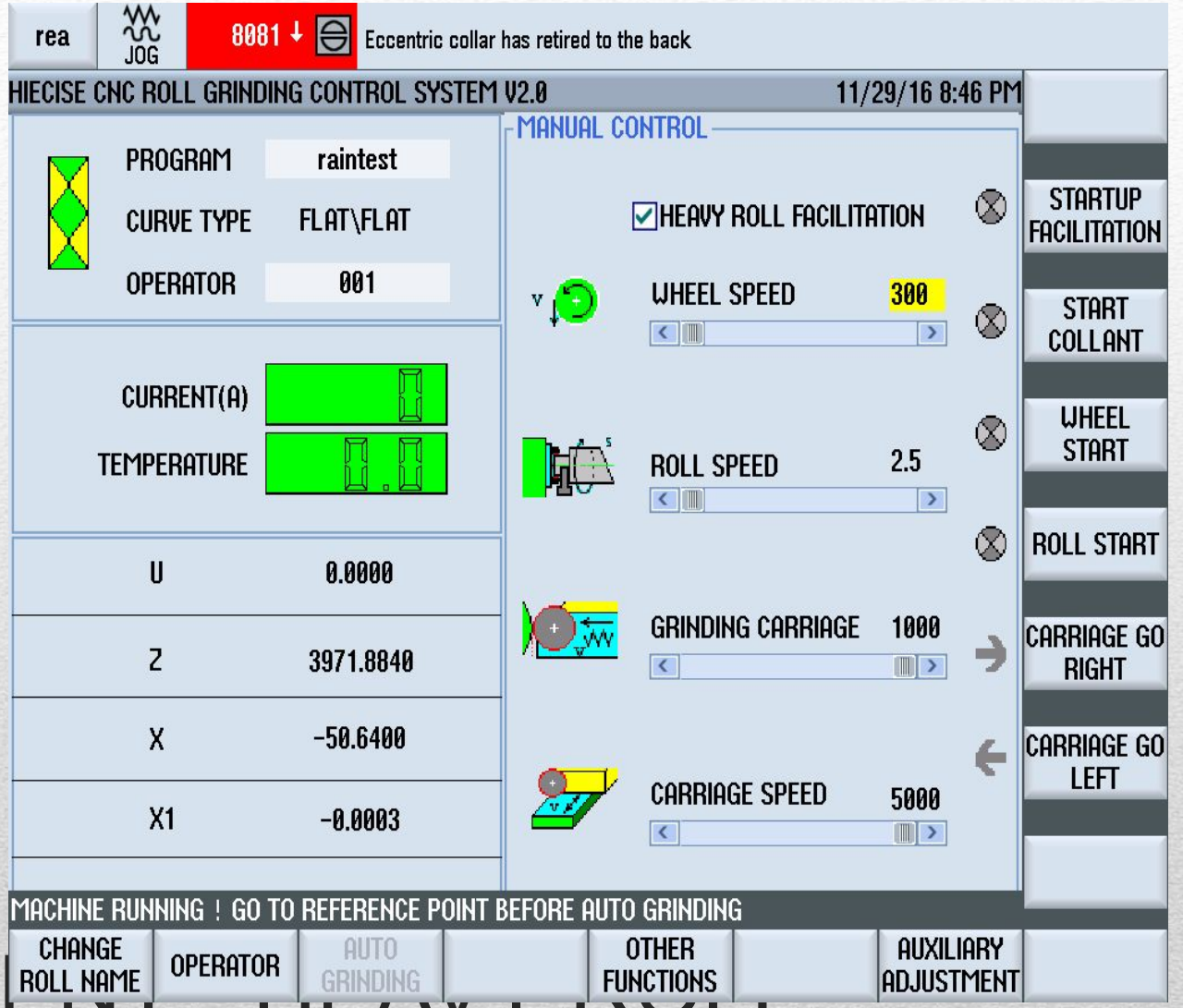


8 ACTION ELEMENT - FIND GRINDING START POINT

In this page, operator can choose to rotate the roll with or without heavy roll startup facilitation(if the device is equipped).

Press【startup facilitation】, the light will be on and roll will be started with heave roll startup facilitation.

Press again the button, the light will be off.



8 ACTION ELEMENT - HEAVY ROLL STARTUP

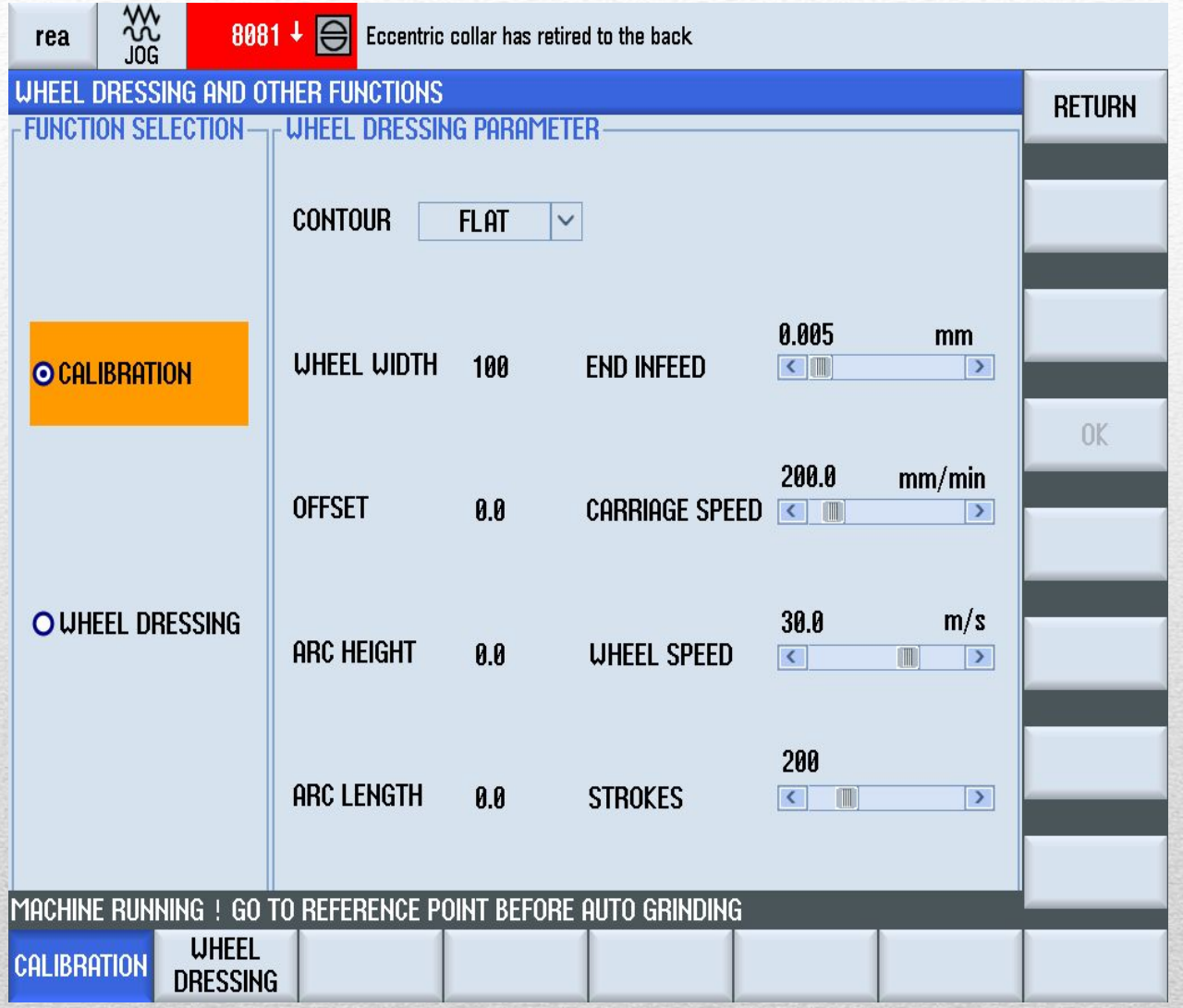
8 ACTION ELEMENT - CALIBRATION

After each changing of measuring tips, calibration has to be done.

★ Note: before calibration, make sure that within 1200 mm (!!)ahead of tailstock, there is no objects to interfare with measuring arms (for example, steady rests).

In starting pages, press【other functions】softkey to enter interface, then choose【calibration】, then press【ok】to enter.

After entering the pages, press【start】softkey to run the procedure automatically.



Press【wheel dressing】softkey, use【tab】to modify parameters, press【ok】to confirm.

The types of curves are availiable for wheel dressing: flat, full, chamfer.

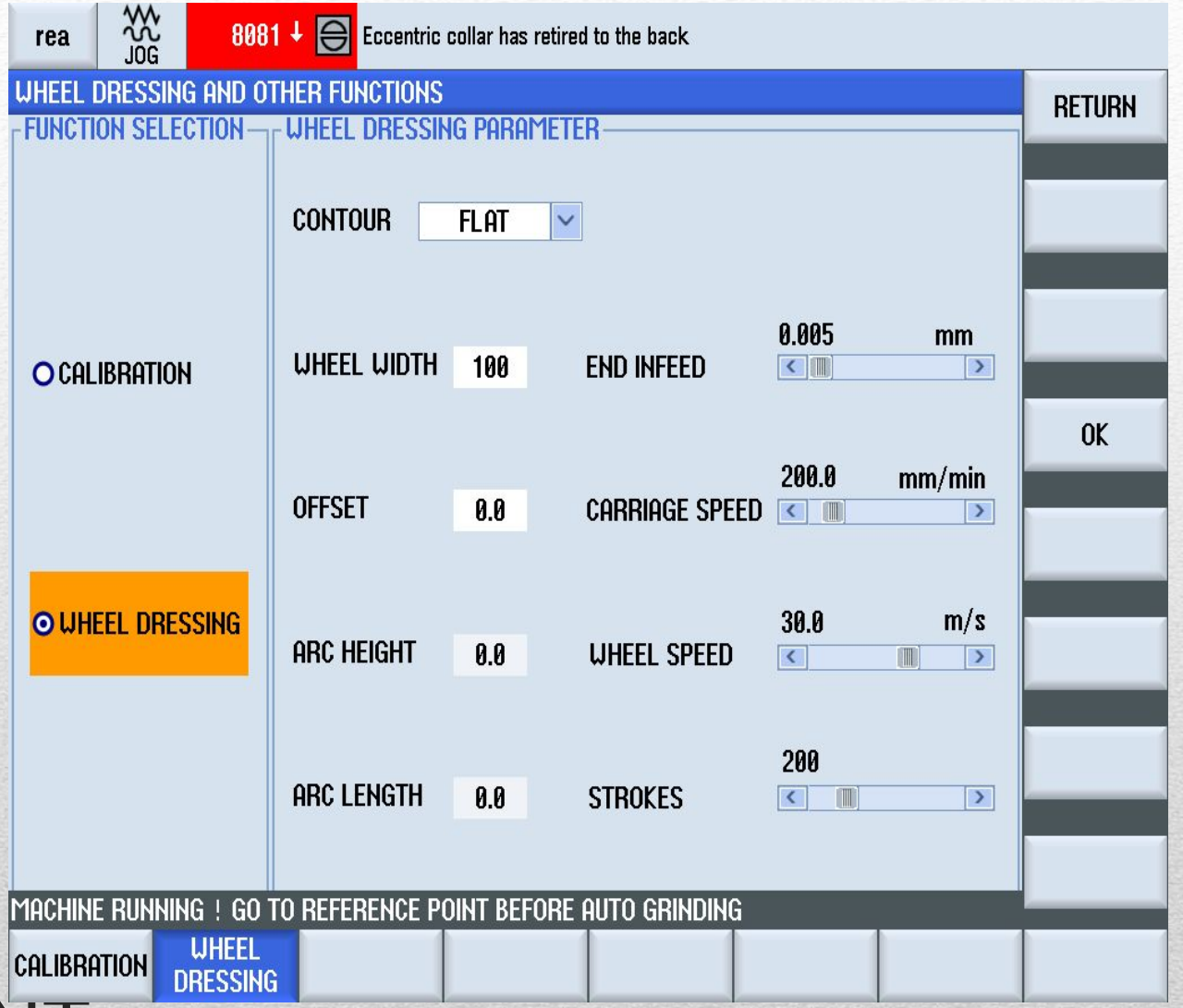
"Flat": set grinding wheel width, end feed, carriage speed, wheel linear velocity, cycles.

"Full": set grinding wheel width, arc convexity, end feed, carriage speed, wheel linear velocity, cycles.

"Chamfer": set grinding wheel width, arc chamfer convexity, end feed, carriage speed, wheel linear velocity, cycles.

★ For the spiral marks, we recommend to dress wheel into full or chamfer type.

★ Default parameter is also available if no modification is done.



8 ACTION ELEMENT - DRESSING WHEEL – PARAMETER MODFICATION

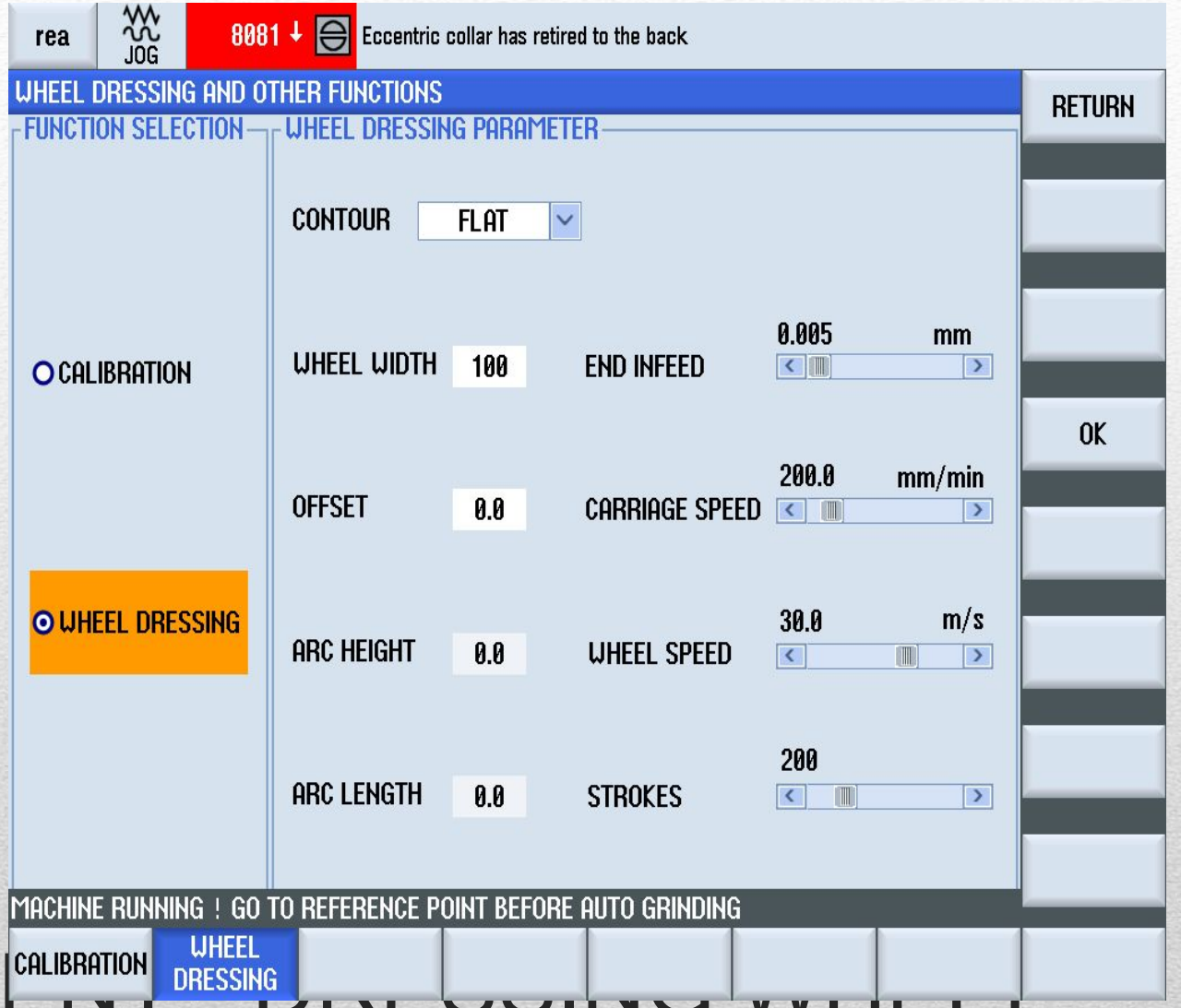
After modifying parameters, press【start】, use X axis to contact grinding wheel slightly with dressing pen. Turn on the coolant, then press【function trigger】to start the dressing.

During dressing, operator can modify the parameters including cycles, and speed multiplying power.

As there is only one step for the dressing, then skipping the step means ending the dressing.

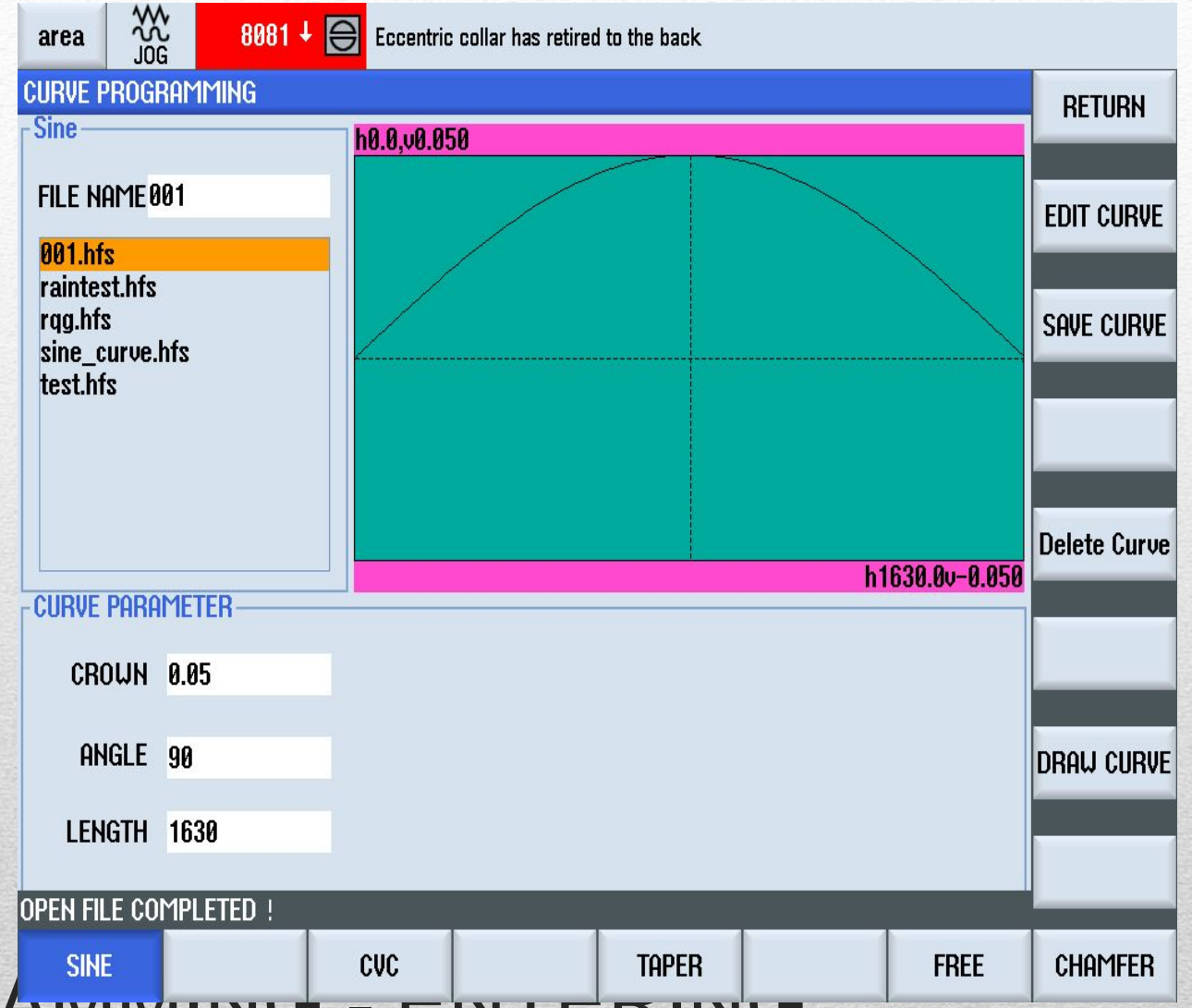
During dressing, it is also possible to compensate on feeding of grinding wheel.

Different roughness of grinding wheel surface can be achieved by modifying carriage speed, grinding wheel linear velocity and periodical feeding.



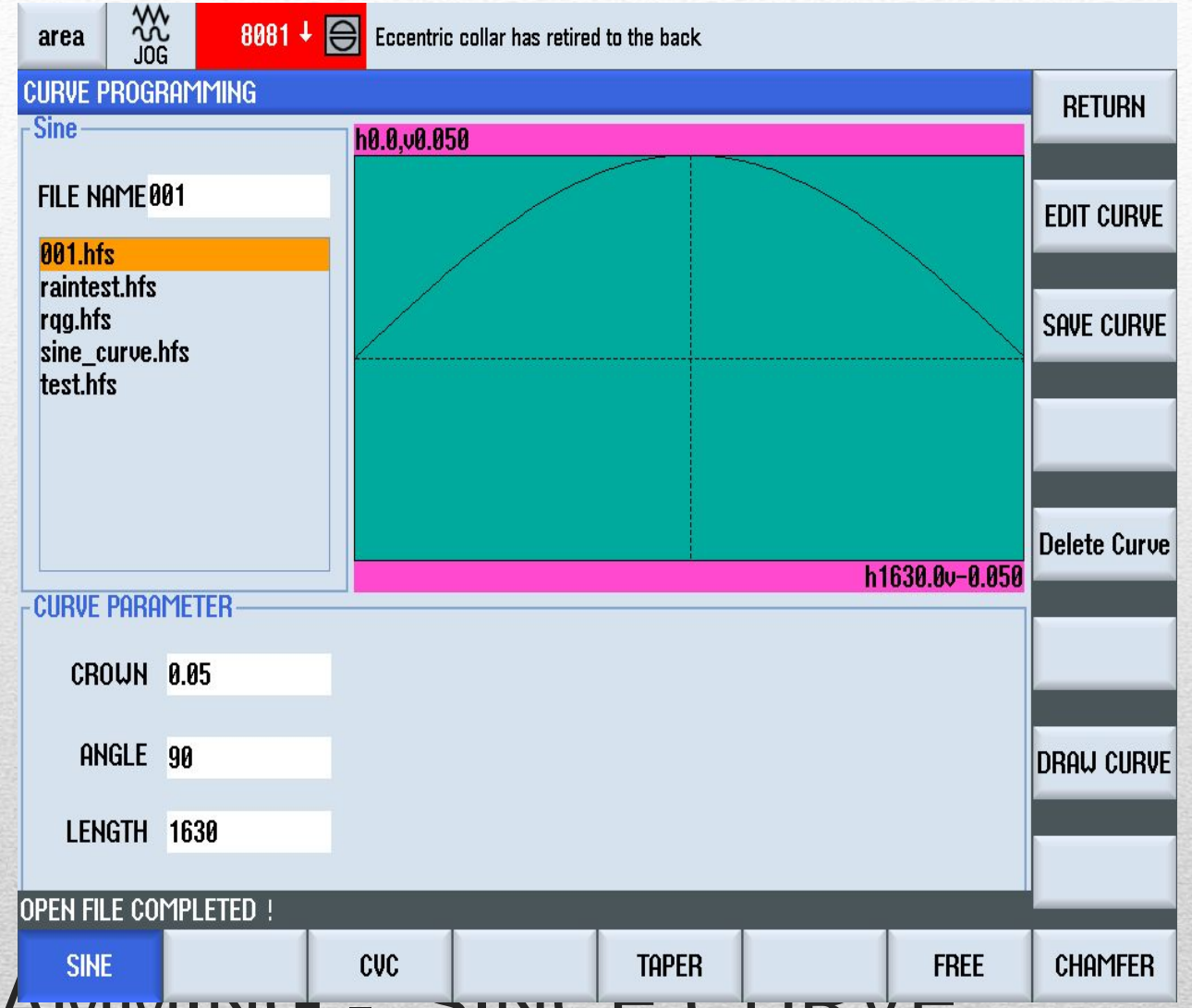
Entering basic parameter input page, press【programming】then press【curve programming】softkey to enter into curve programming page.

Standard curve include: sine, cvc, taper, free, chamfer.

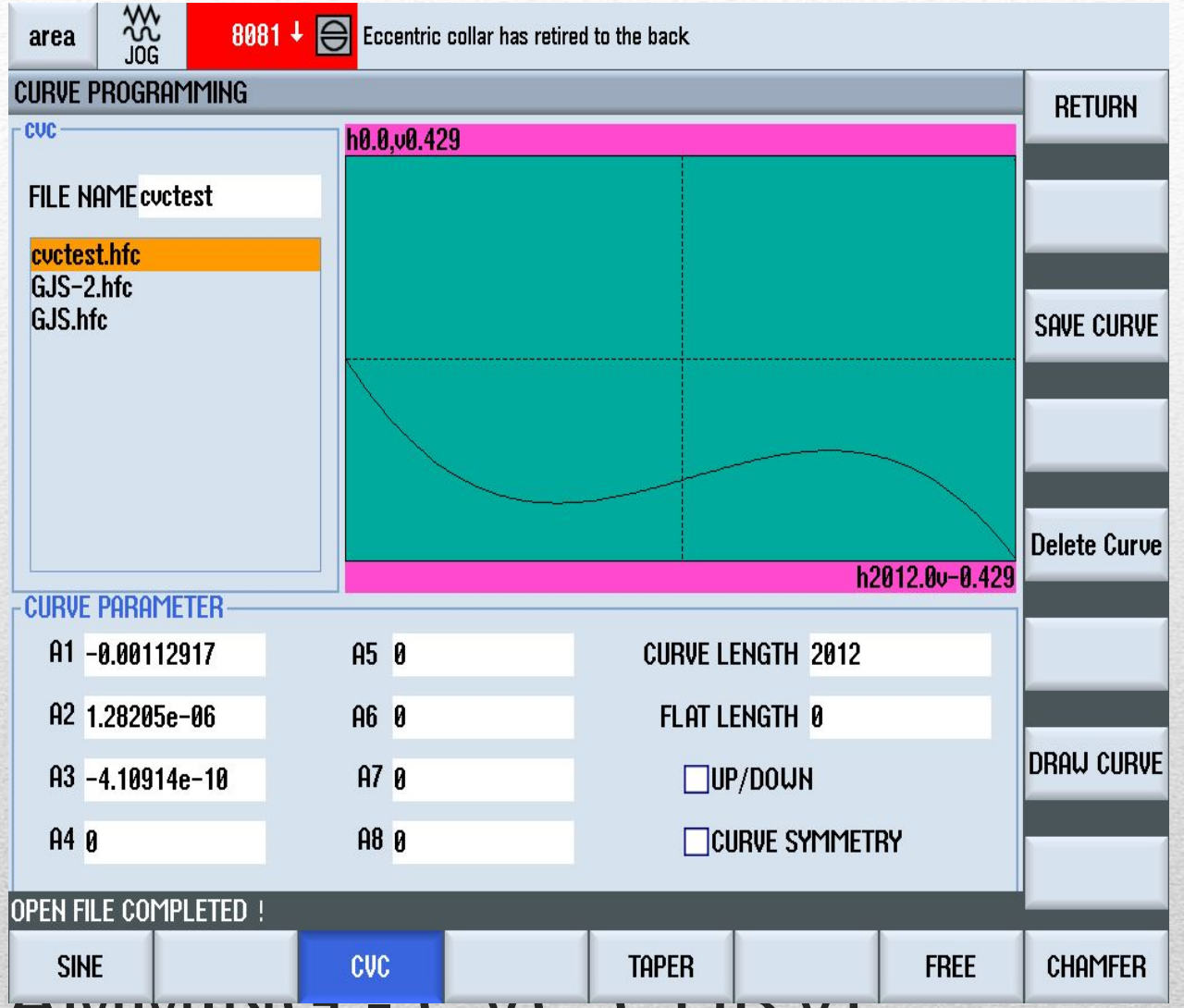


9 CURVE PROGRAMMING - ENTERING INTERFACE

Press【sine】softkey, input curve name in【curve name】, use【tab】to input “crown”(please note about the capacity range); “angle”(1°～90°); curve length(please note about the capacity range).



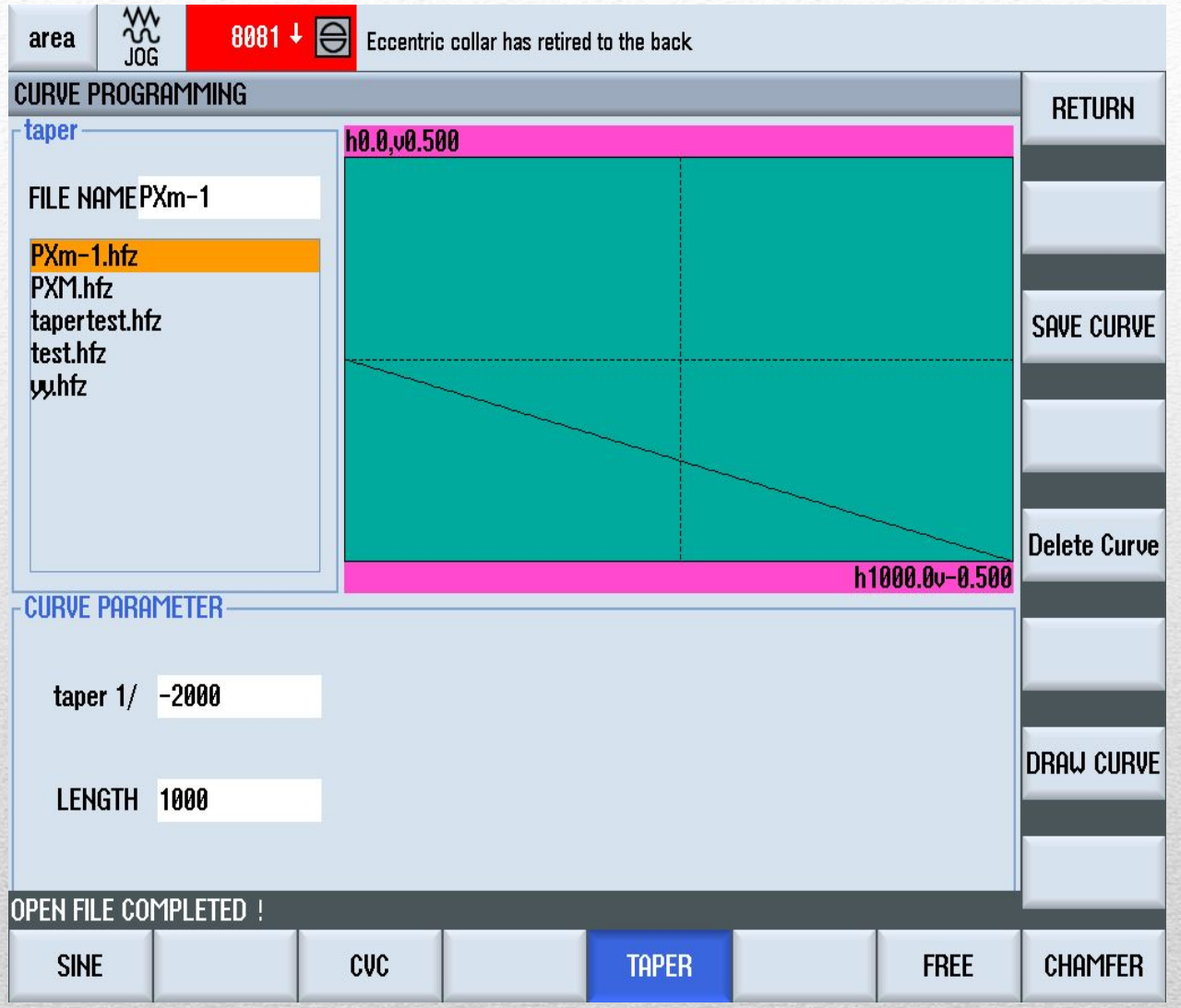
Press【CVC】softkey, input curve name in【curve name】, use【tab】to move cursor to input “a1”,“a2” “a3”values; curve length(please note about the capacity range).



9 CURVE PROGRAMMING - CVC CURVE PROGRAMMING

Press【taper】softkey, input curve name in【curve name】, use【tab】to move cursor to input the denominator of the taper(please input value above zero if it is headstock side taper, input value below zero if it is taper tailstock side taper);

Use【tab】softkey to move the cursor to input the curve length (please note about the capacity range).



1. Press “Taper” soft key, input curve name in【Curve name】column.
2. Input Z axis incremental value

Use【Tab】to focus on【 Z axis incremental 】, put in value required (with default value as 10 mm). Modify by【Tab】or【↑】【↓】, press input to confirm to input U target value.

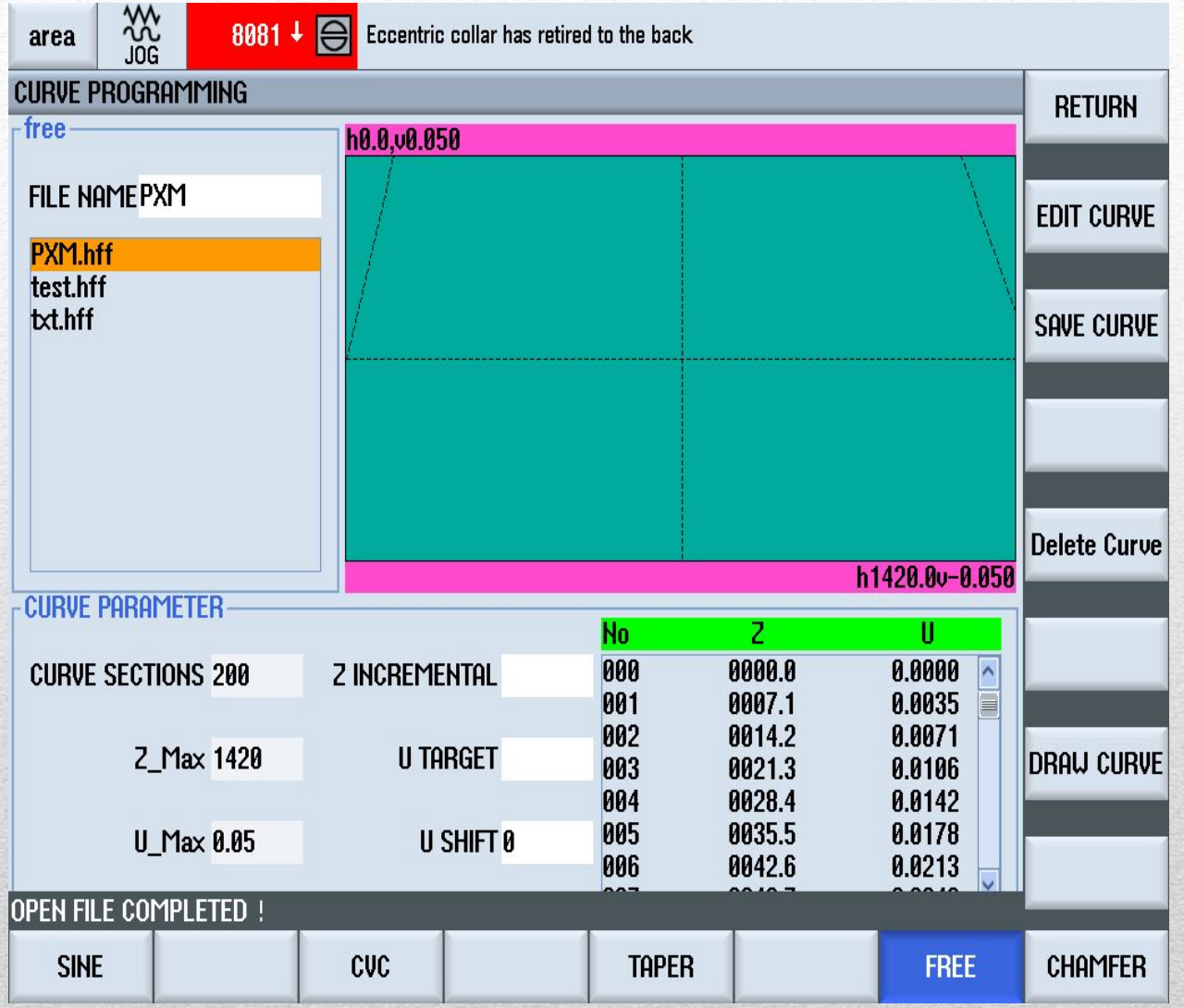
2. Put in U axis target value point by point

Modify by【Tab】or【↑】【↓】, press input to confirm . After each input, the number of points will be added automatically. Put in the rest of points as abve.

3. Save

More points means more precision, therefore at least 10 points are recommended to depict a curve. Press【Save】to prevent losing data.

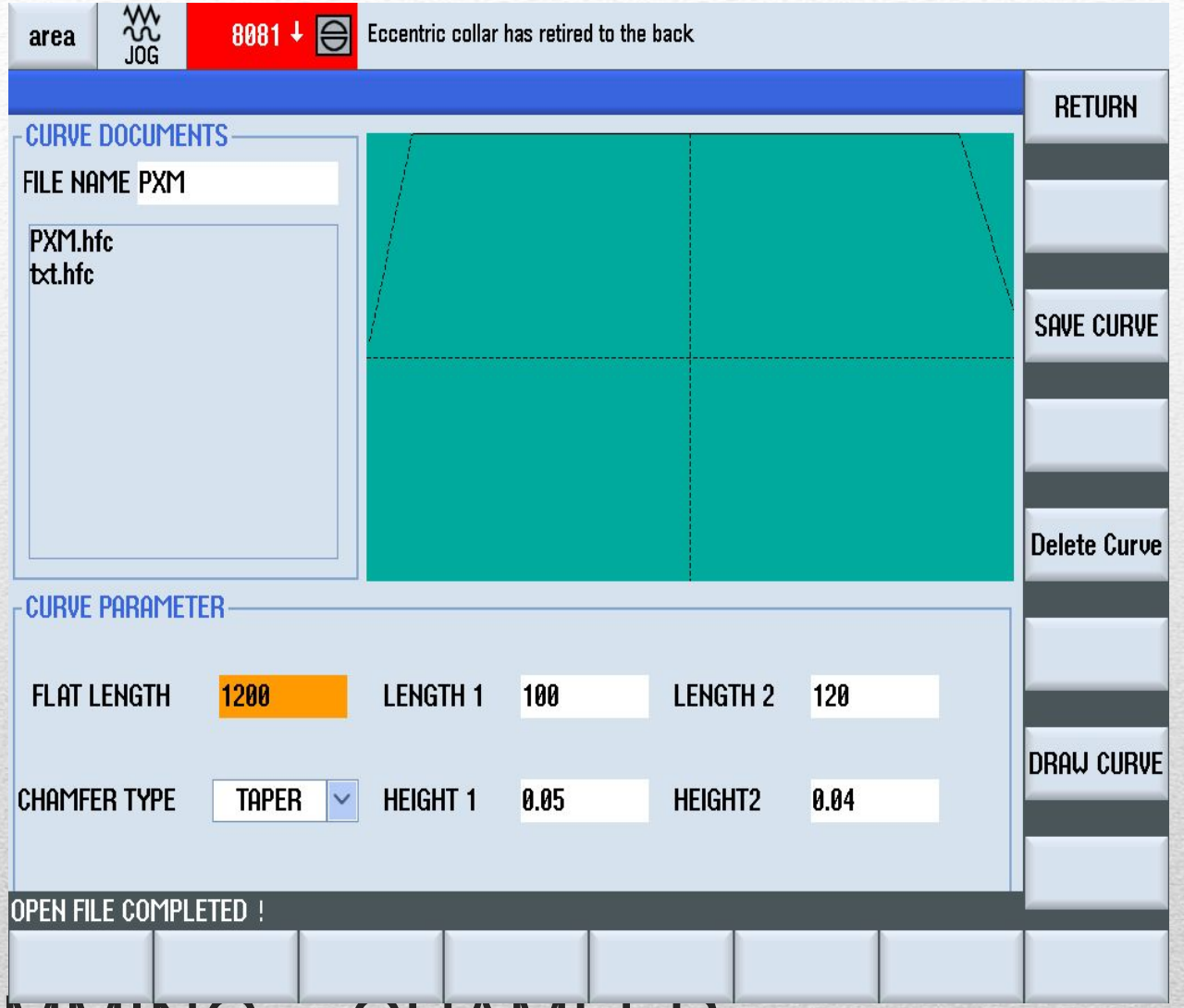
★ Files will be lost if not saved.



9 CURVE PROGRAMMING - FREE CURVE PROGRAMMING

Press【Chamfer】, use【Tab】to focus on different parameters and input different values as required.

(Note: Chamfer length 1 and 2 shall be the same and chamfer height 1 and 2 shall be the same.)

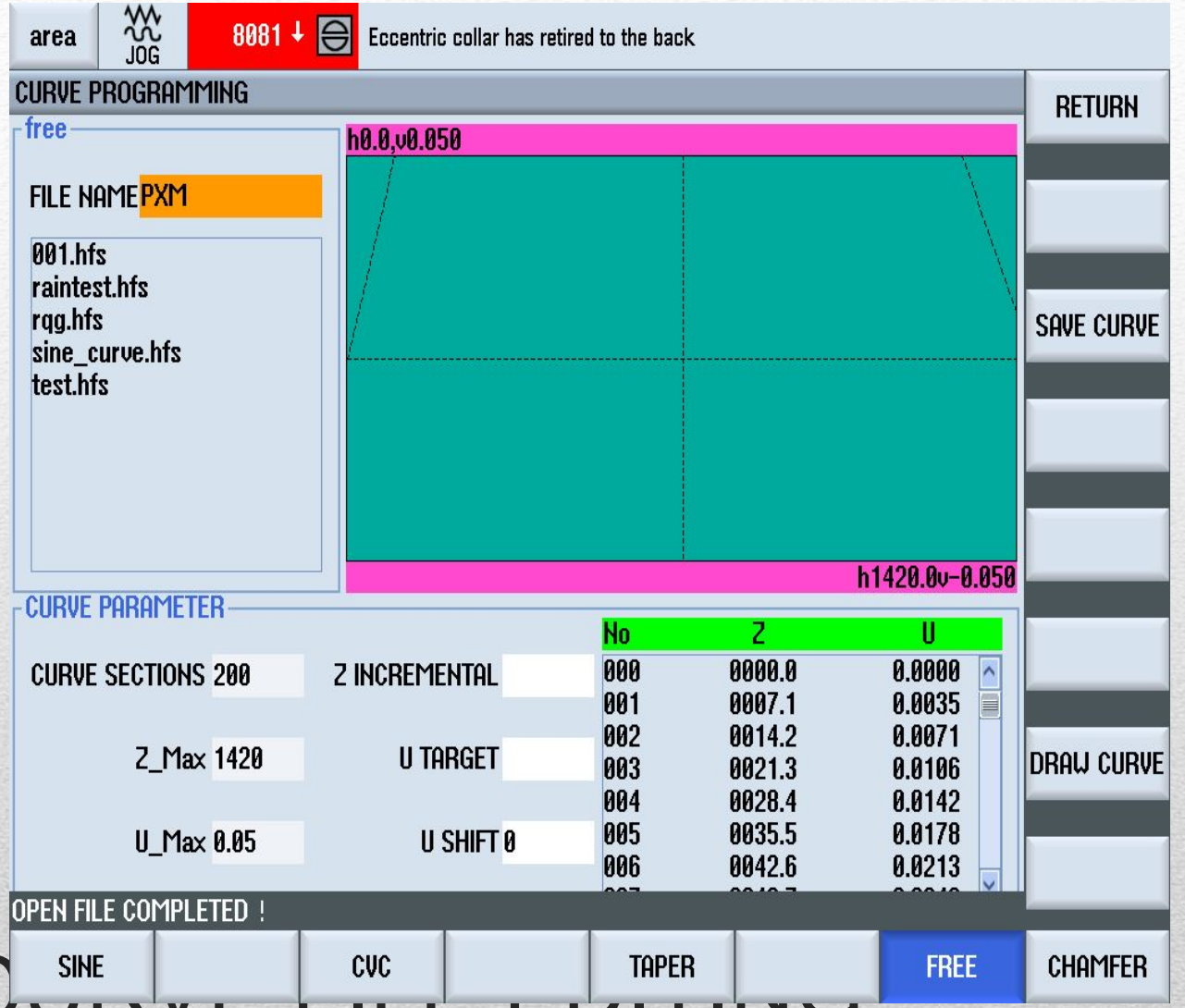


Editing operation include: open, save, delete.

Sine curve as an example:

1. Open

Press【Sine】soft key, choose file, press INPUT to open. After that, parameters and name will be displayed.

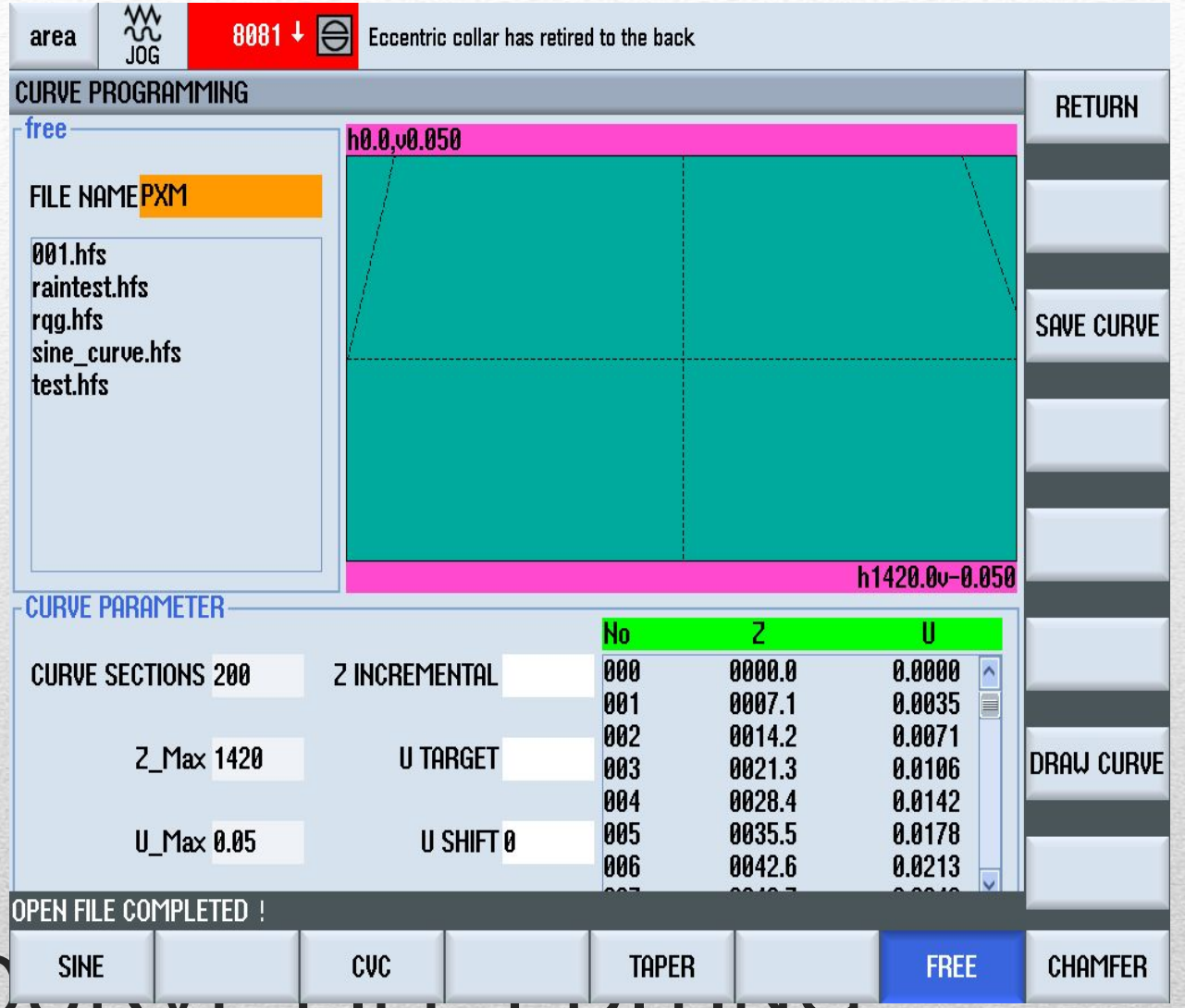


10 STANDARD CURVE FILE EDITING

OPEN

2. Save

Press【Sine】soft key, put in name (less than 8 letters recommended), then press【Save】soft key.



10 STANDARD CURVE FILE EDITING SAVE

10 STANDARD CURVE FILE EDITING

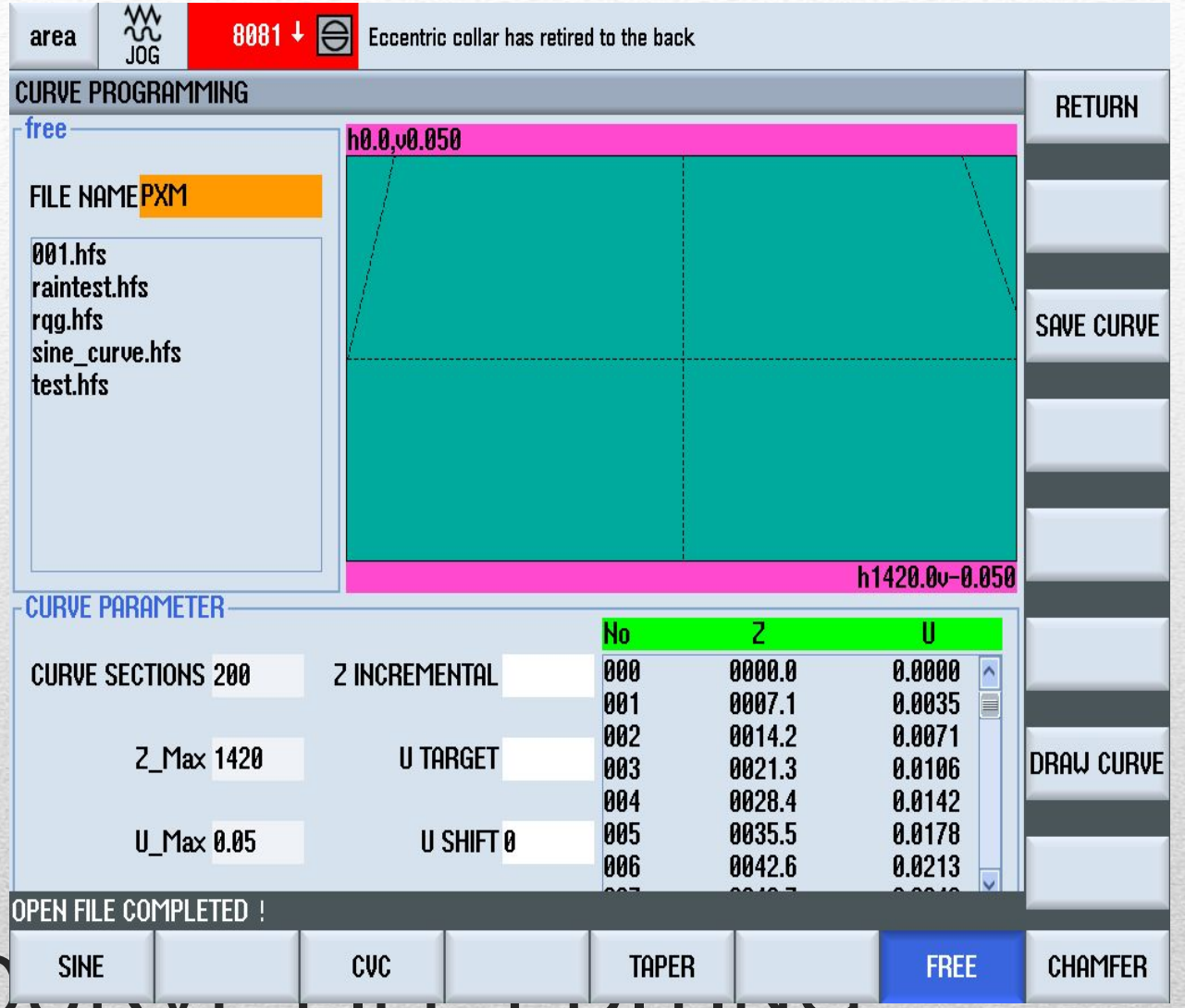
DELETE

3. Delete

First press【Sine】soft key, then choose the file to be deleted, then press【Delete curve】soft key, the curve will be deleted after confirmation.

★ Note: Only after input the correct password then the input will be executed.

Editing to other curves are all alike.



11 FREE CURVE FILE EDITING (MODIFY CURVE DATA)

Method to modify:

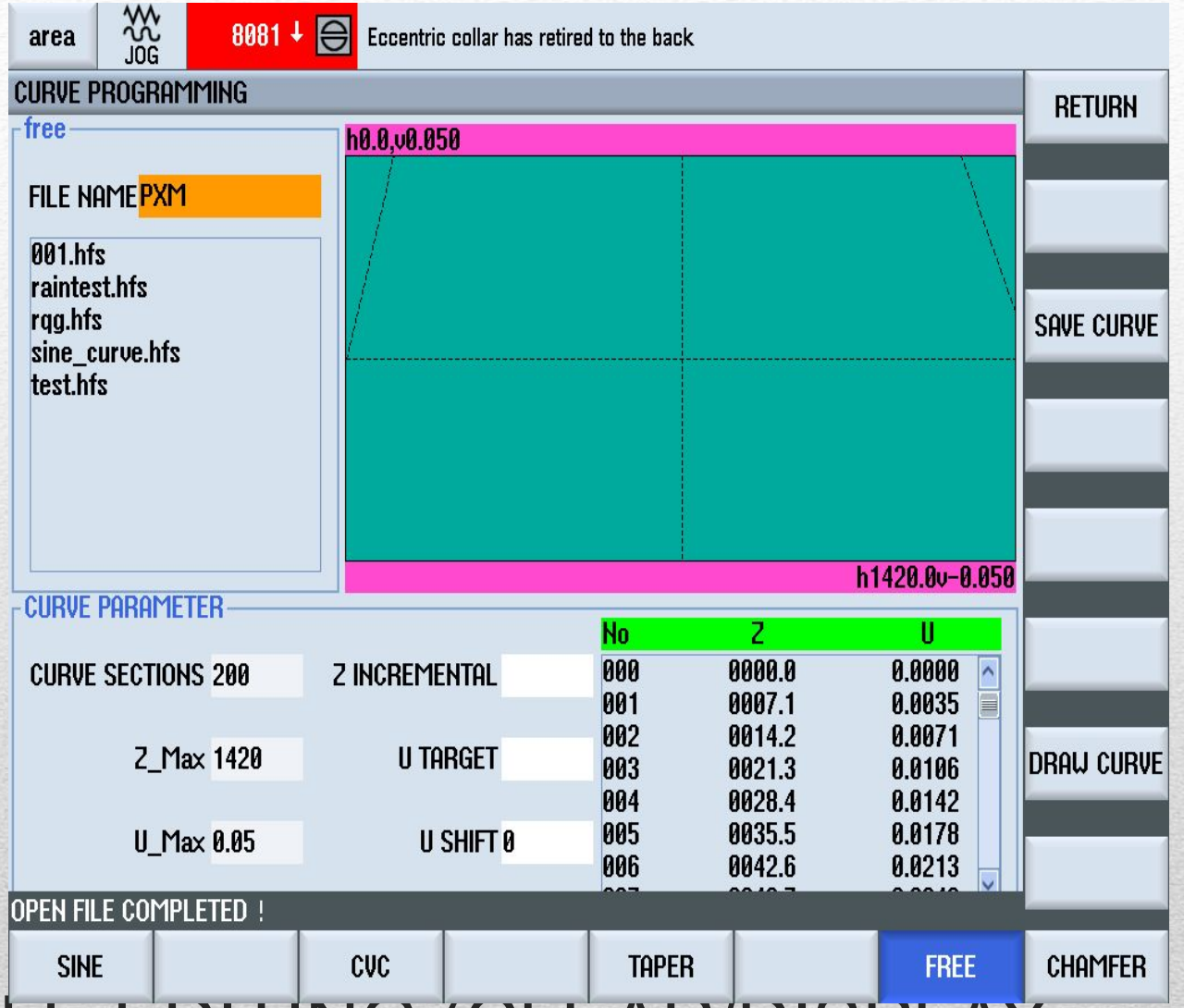
Press【Tab】softkey to focus on the column needs modification, use【Tab】or【↑】【↓】to modify.

★ Save after modification.

Clear data:

Press【Clear data】soft key will clear all the data input, including the curve graphic display.

Press【Draw curve】to display the curve graphically.



11 FREE CURVE FILE EDITING (CLEAR/DISPLAY CURVE DATA)

Press【Technique Programming】.

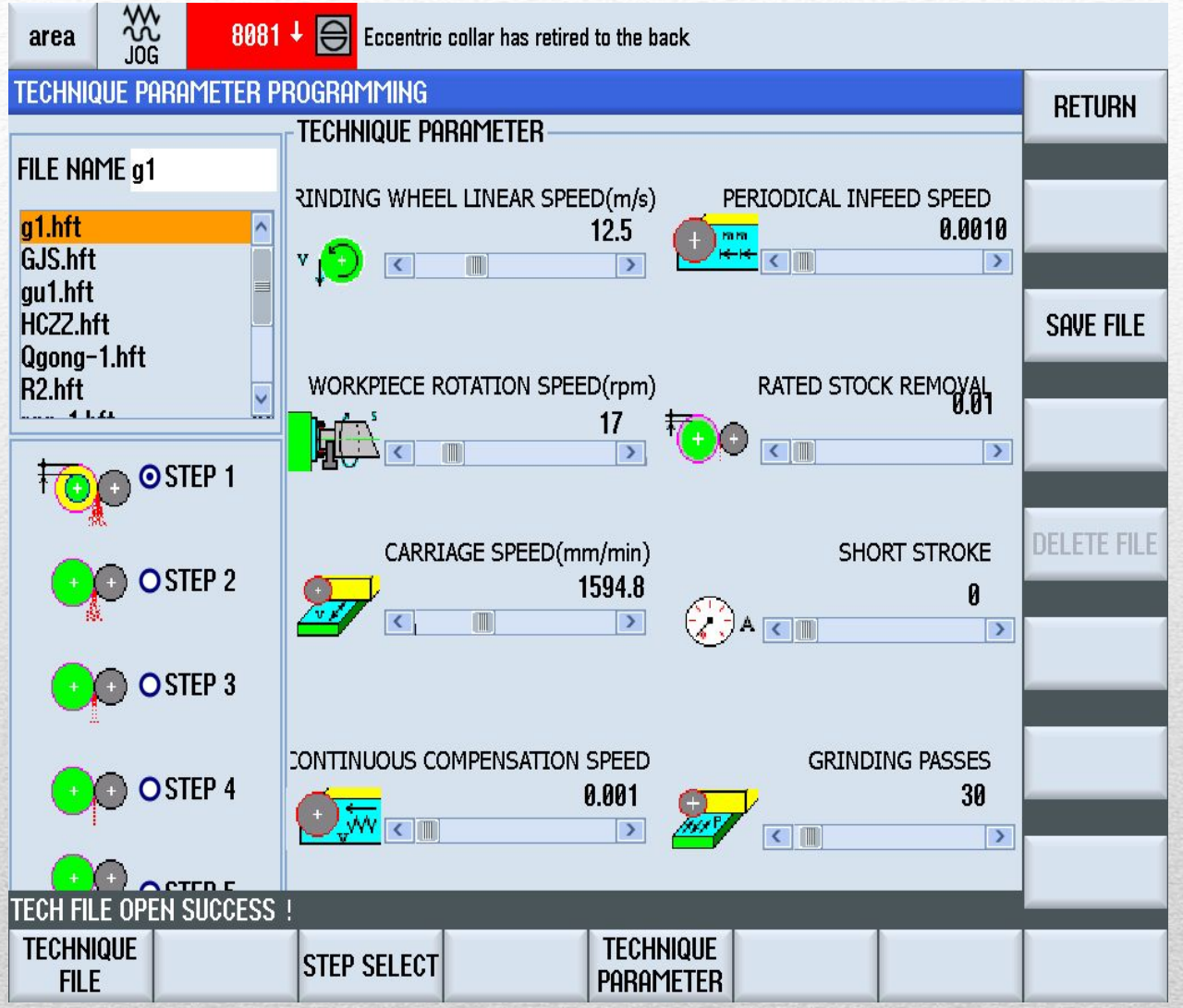
Choose steps:

All the technique files(unlimited number) will be stored into five (1-5) steps.

Usually, operator would grind according to the following steps: step 1 as rough grinding, step 2 as semi-fine grinding, step 3 as fine grinding , step 4 as polish grinding and step 5 as chamfering or wheel dressing(chamfering is the default procedure for step 5).

Grinding parameters : Please see as shown in the next page.

Use【Technique Step】to change to other steps for programming.



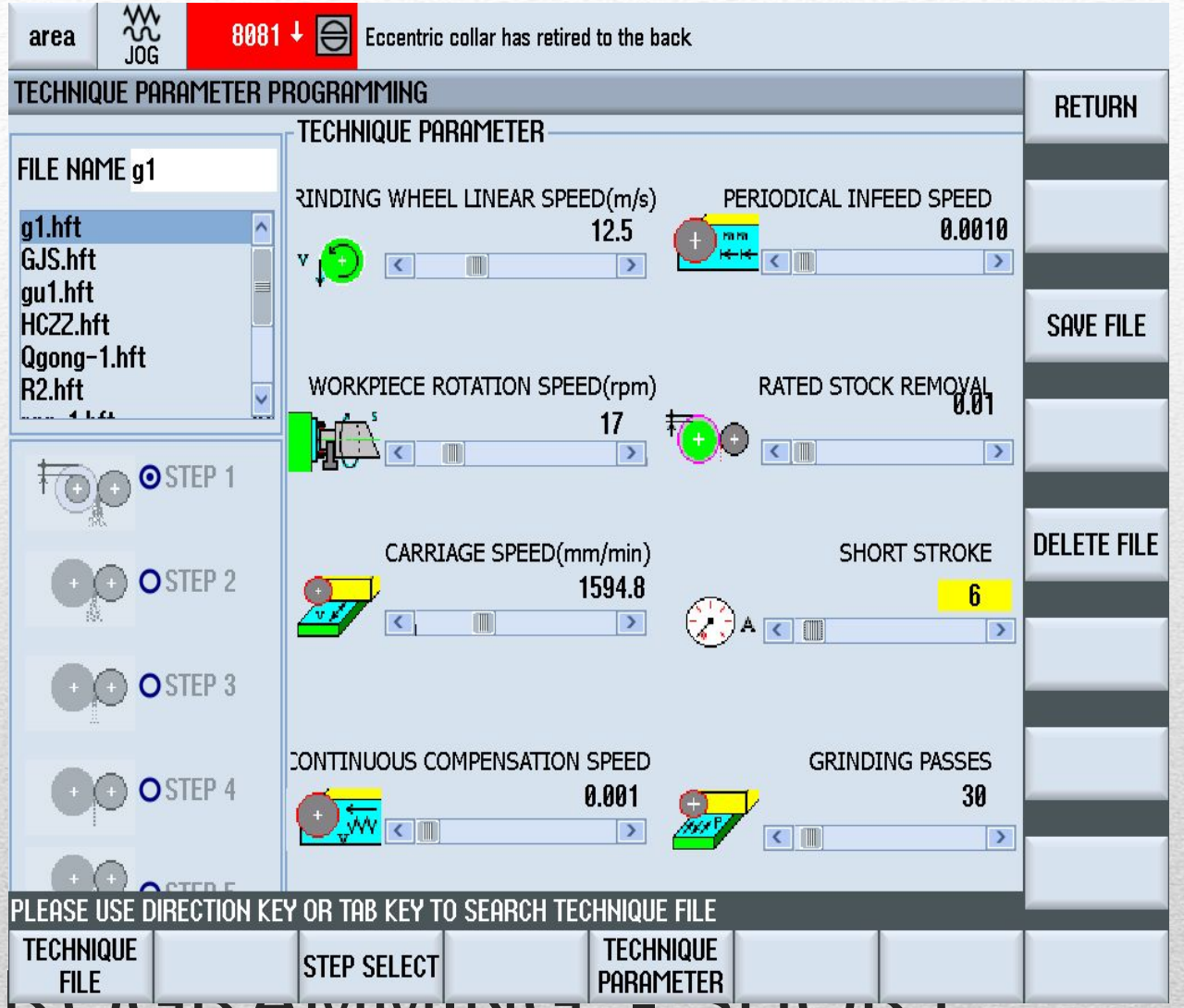
Parameter	Rough grinding	Semi-fine grinding	Fine grinding	Polish grinding
Grinding wheel speed (m/s)	40	40	35	35
Headstock rotation (rpm)	35	38	40	40
Carriage speed (mm/min)	2300	1200	800	400
Continuous fedding (mm/min)	0.05	0.002	0	0
Periodical feeding (mm/min)	0.005	0.002	0.002	0
Cycle	10	4	2	2
Grinding wheel specification	GC 46 J B 24 (Saint Gobain)			

- IMPROPER PARAMETER INPUT WILL LEAD TO FAILURE OF ROLL FILE SAVING.

12 TECHNIQUE PROGRAMMING - GRINDING PARAMETERS (EXAMPLE)

If short stroke (adaptive grinding) is needed, cycles of short stroke should be need.

Adaptive Grinding is designed based on fact that abrasion in middle part of rolls is more than that of the two ends. During grinding, the two ends (up to one third of the total length) are firstly grinded with the set amount of cycles. After completion of grinding cycles, the full roll surface grinding begins automatically.



12 TECHNIQUE PROGRAMMING - SHORT STROKE

Press【Technique file】soft key to edit files(similar to curve file editing).

☆ input technique data

In each technique file, use【Tab】or【↑】【↓】to input different parameters.

Save after inputting data.

☆ Delete technique date

After opening files, press【Delete technique file】. The technique files will be deleted after confirmation.

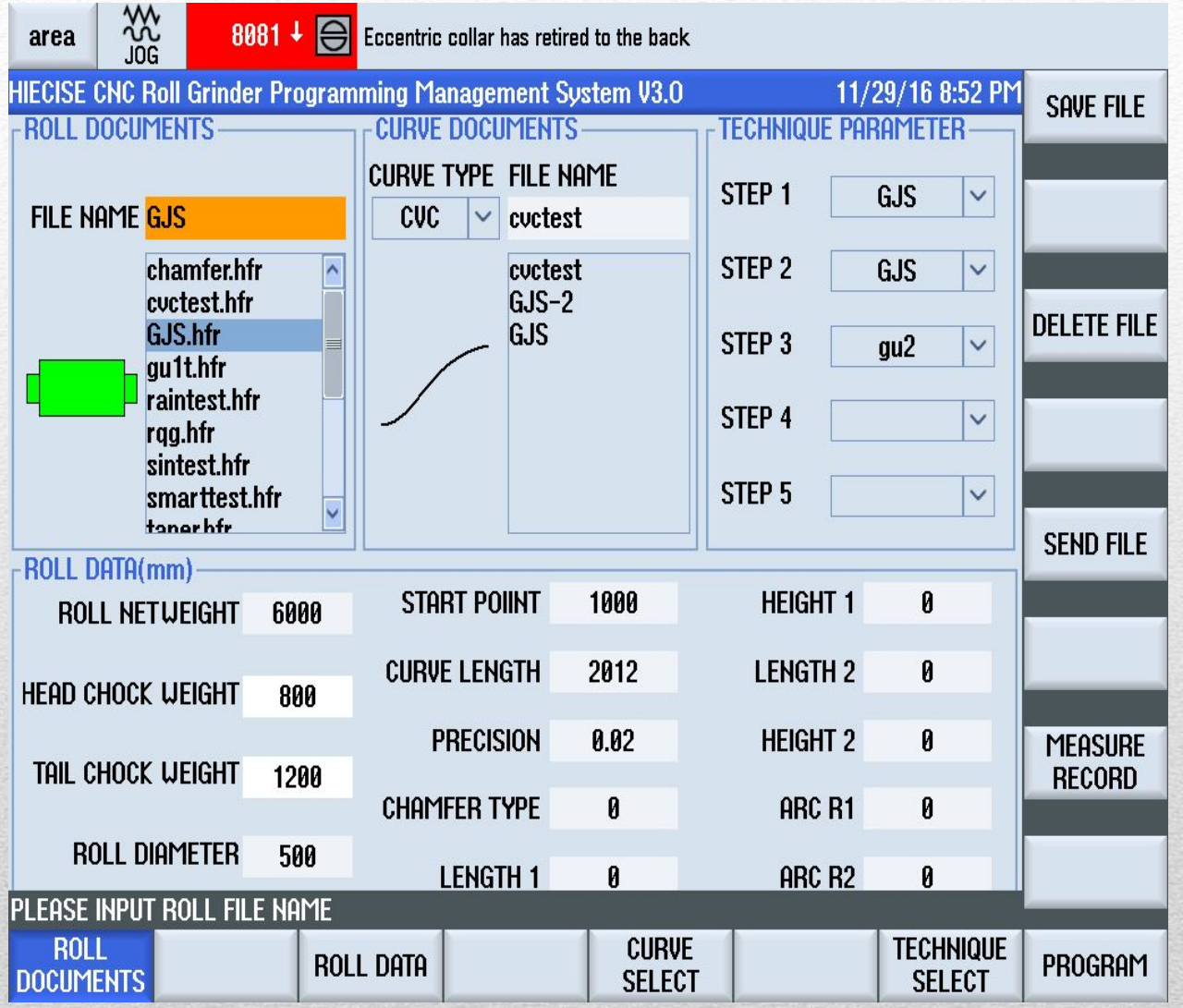
★ Note!【 Delete technique file 】soft key will only be valid after inputting correct password.

Roll file programming is the initial page after entering programming procedure.

All the steps, techniques etc. will all be included into roll files.

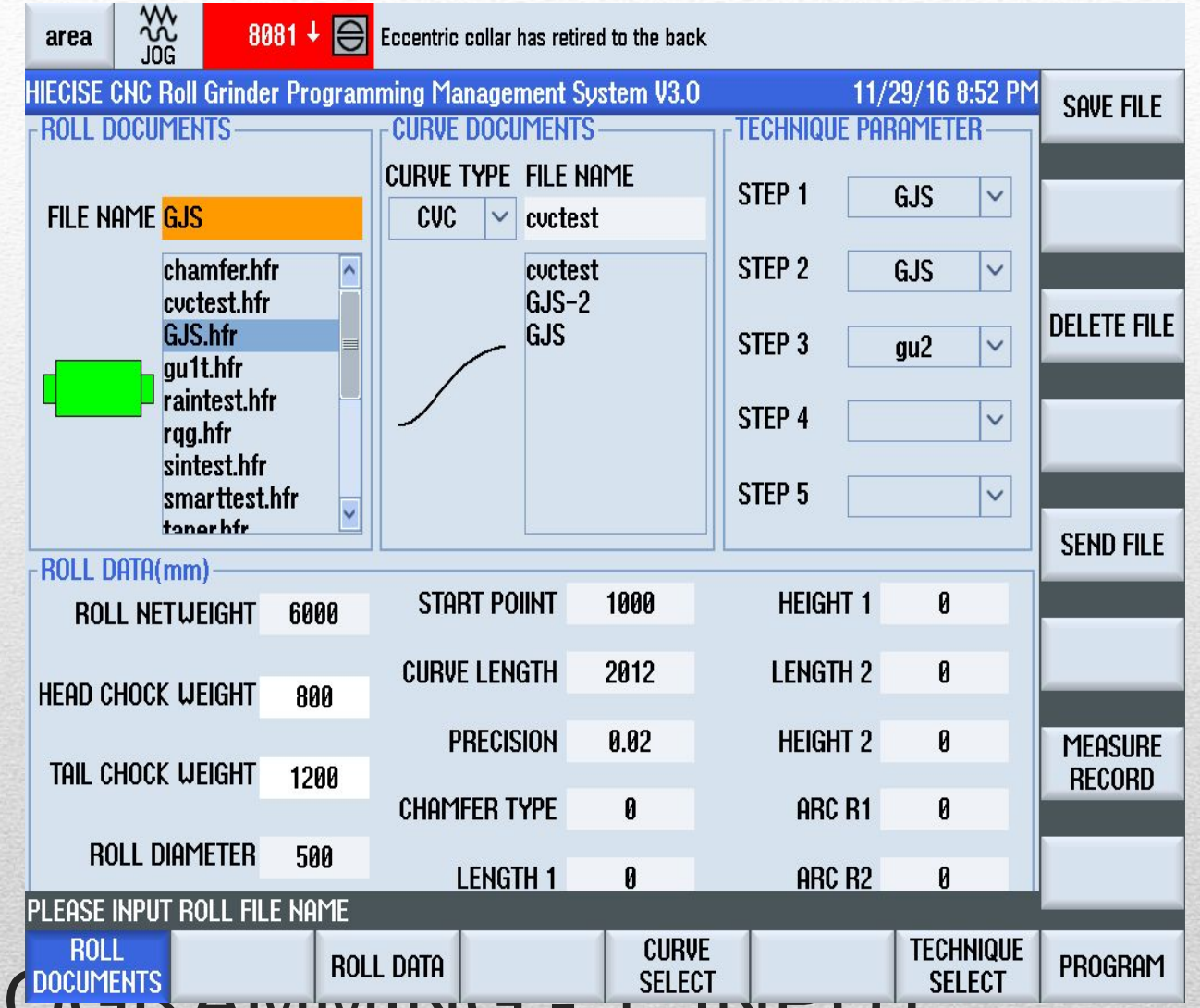
To programming a roll file in the following procedure:

1. Put in roll name→
2. Select curve→
3. Put in roll data→
4. Select technique.



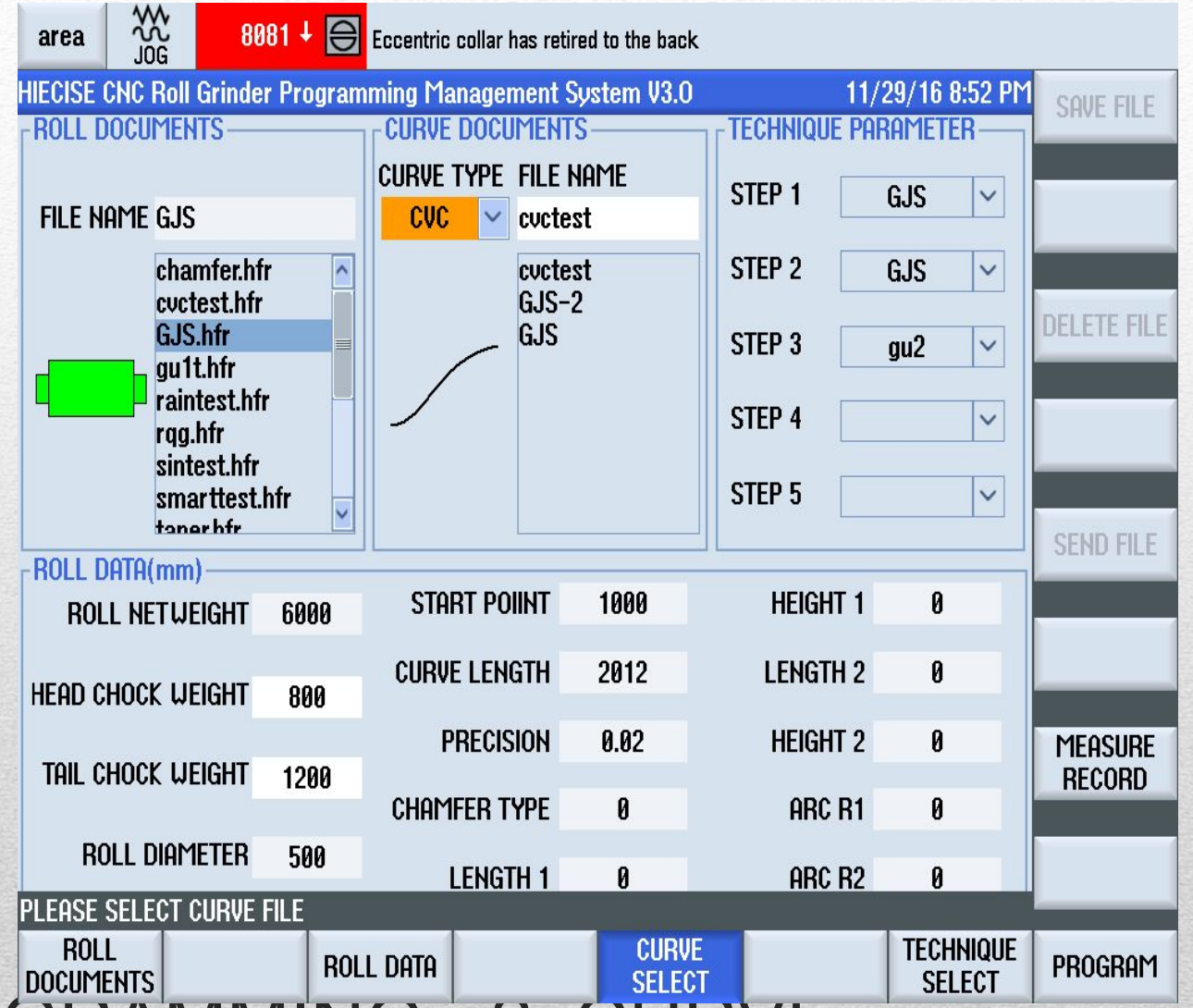
13 ROLL FILE PROGRAMMING

1. Press【Roll file】soft key, use【Tab】to switch focus to roll name column and input roll name.



13 ROLL FILE PROGRAMMING - 1. INPUT ROLL NAME

2. Press【Select curve】soft key, use【↑】【↓】to choose curve type. Use【↑】【↓】to choose the curve name and press INPUT to confirm. And curve can be viewed graphically.



13 ROLL FILE PROGRAMMING - 3. INPUT ROLL DATA

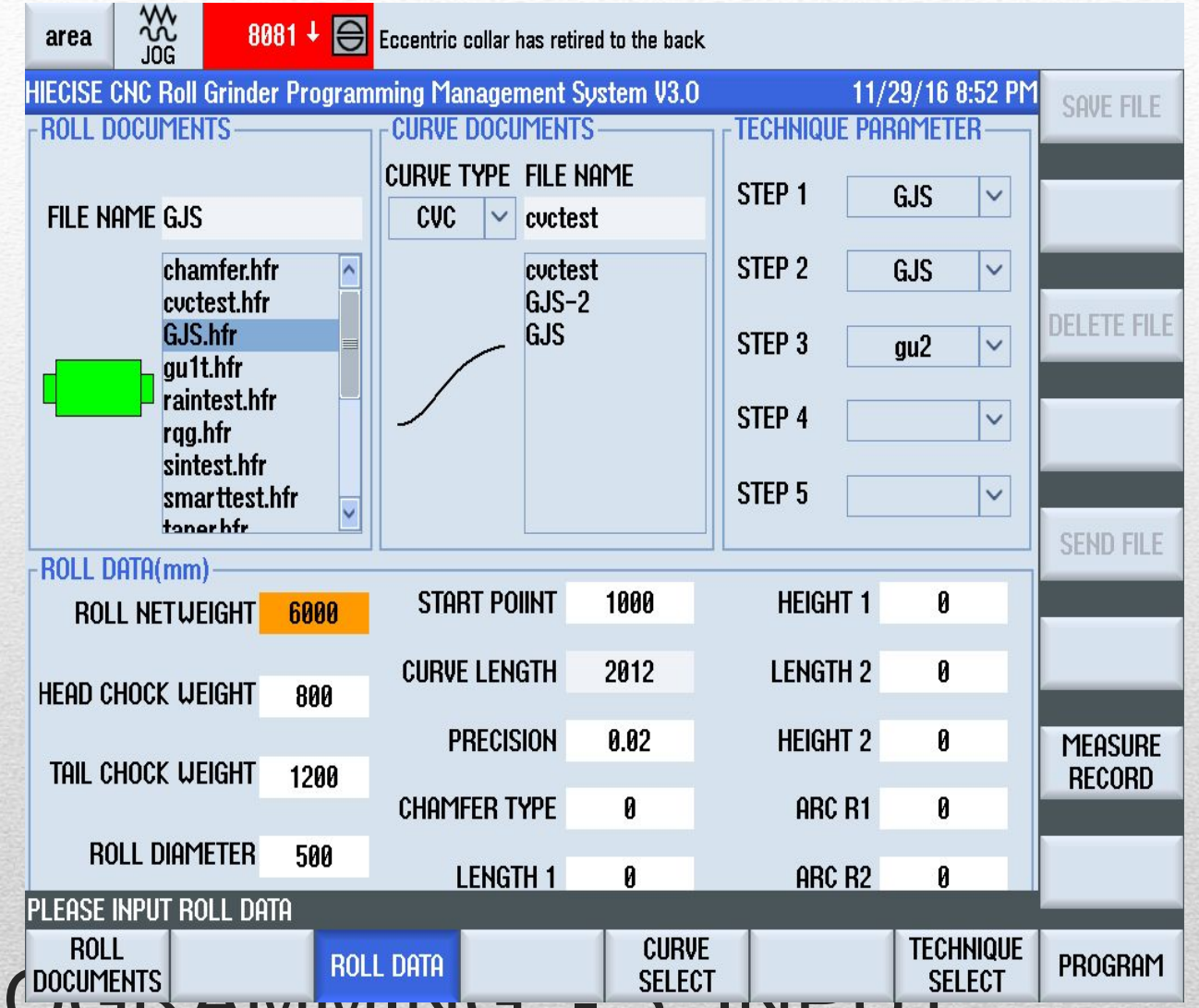
3. Press【roll data】, input each item, which are:

1. Start point coordinate(grind wheel centerline position to mark the headstock side roll body end, see previous instruction).
2. Roll length/curve length

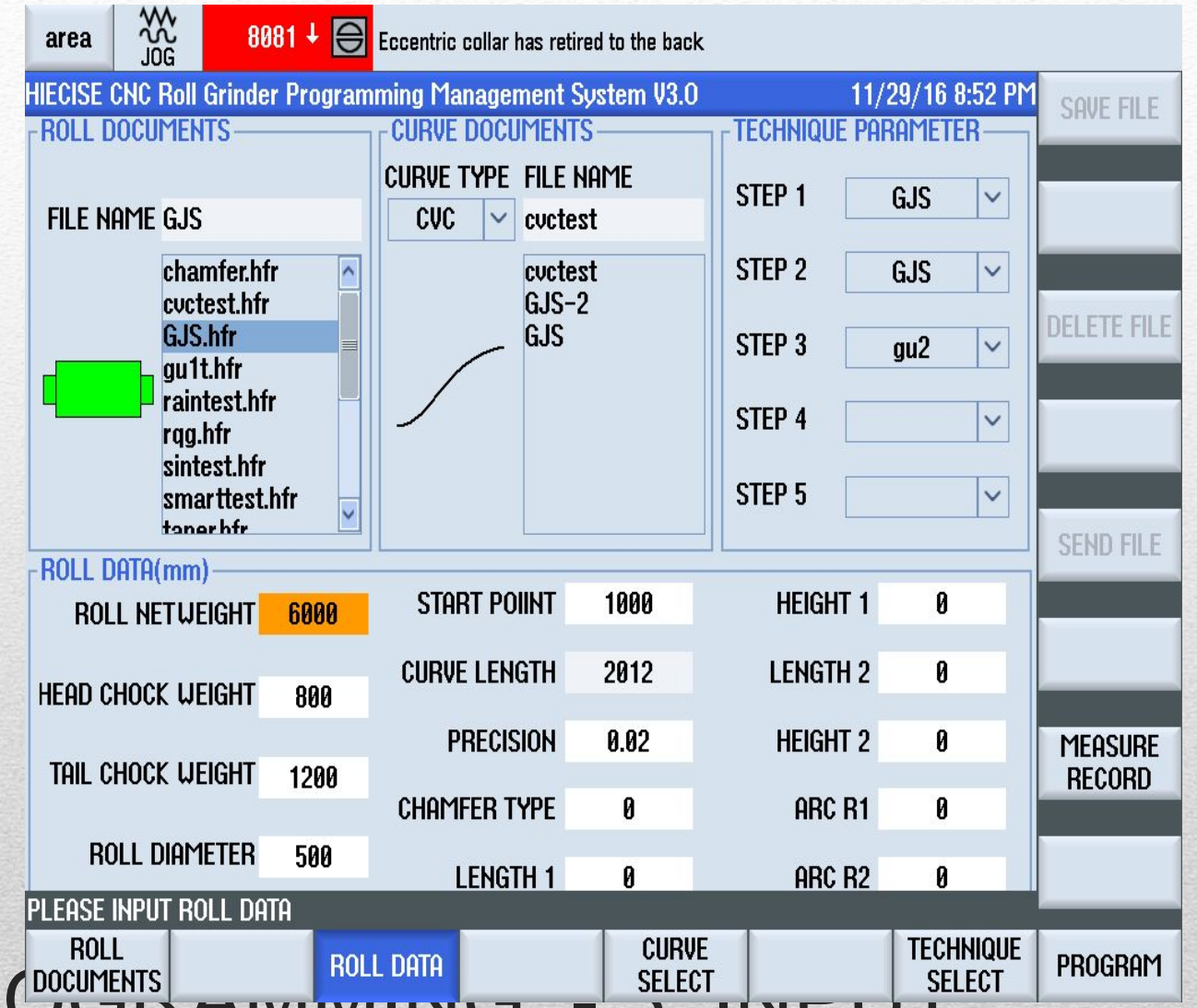
Note:

In case of flat curve, roll length must be input; curve length will be automatically determined with other curves.

Chamfer type: 0-taper; 1-arc type; 2-double arc; Taper chamfer can be one or two section (input length and height accordingly). Arc chamfer will only need to input length 1 and height 1; double arc needs length 1, height 1, length 2, height 2, arc 1 and arc 2.

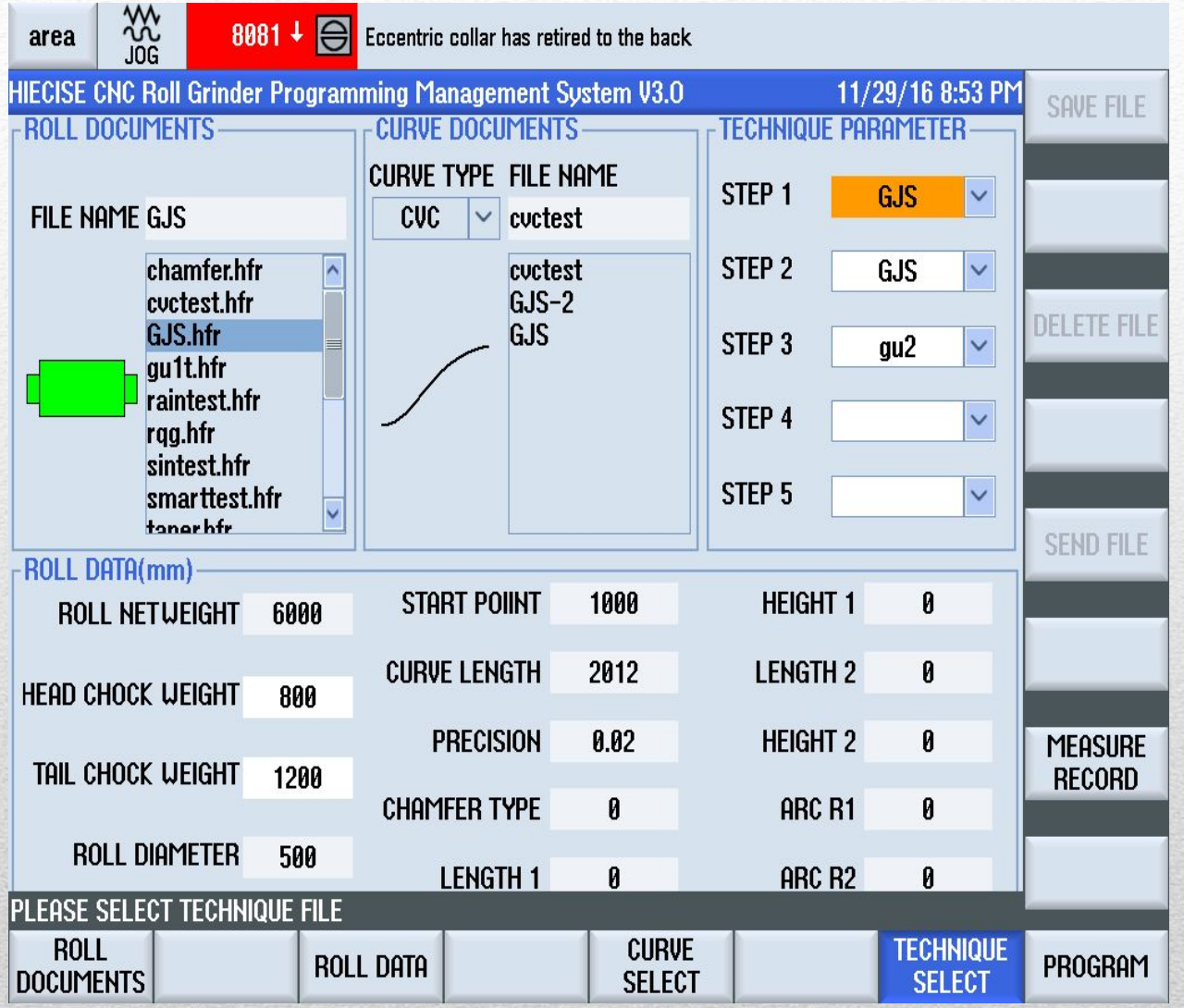


3. Roll diameter. Specially notice: value input must be larger than real value(min 50 mm).
4. Curve permissible error(curve precision)
5. Chamfer length and height and chamfer type; headstock side chamfer length and height; tailstock side chamfer length and height.
6. For with chock grinding, remember to input roll net weight, head side chock weight, tail side chock weight.



13 ROLL FILE PROGRAMMING - 3. INPUT ROLL DATA

4. Press【Technique select】, use【↑】【↓】to choose step, then press【SELECT】to choose technique file, press INPUT to confirm. Choose for other steps according as above. Finishing this, the programming would be completed. Please save after finishing.



☆ Save roll: Press【Save roll】and confirm.

☆ Open roll program (file):

Press【Roll file】, choose and open by INPUT.

☆ Delete roll programming:

Press【Roll file】, choose and delete after confirmation.

★ Note!【 Delete roll】soft key will only be valid after inputting correct password.

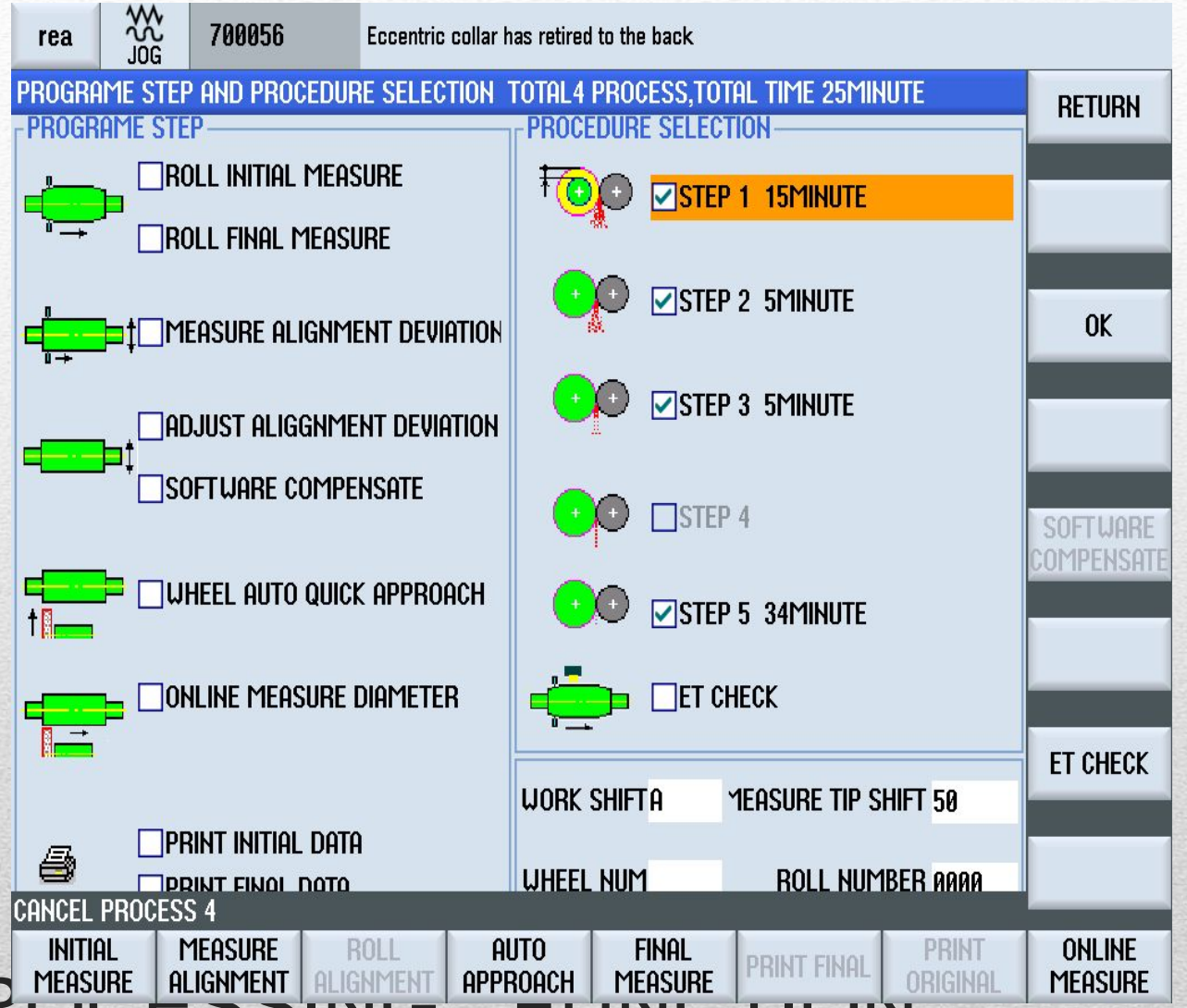
☆ load(transfer) roll program

Before grinding, roll program should be transferred.

First, press【Roll file】, choose and open file, and press【Send file】and confirm. For the next grinding, if the roll is the same, Sending is not needed again.

☆ Back to main interface, press the button “Operator” to input or change operator, press【INPUT】to confirm, press【Auto grinding】to enter into automatic grinding interface.

The initial interface of automatic grinding is “Step choosing”， in which 10 items are there to be chosen. Press related soft key to choose(with the mark of【√】)and cancel choice.



★ Pre-measure: diameter, roll shape and alignment error; also chose software compensation here too.

★ Alignment precision: to measure alignment error.

★ Roll alignment: with U1 axis.

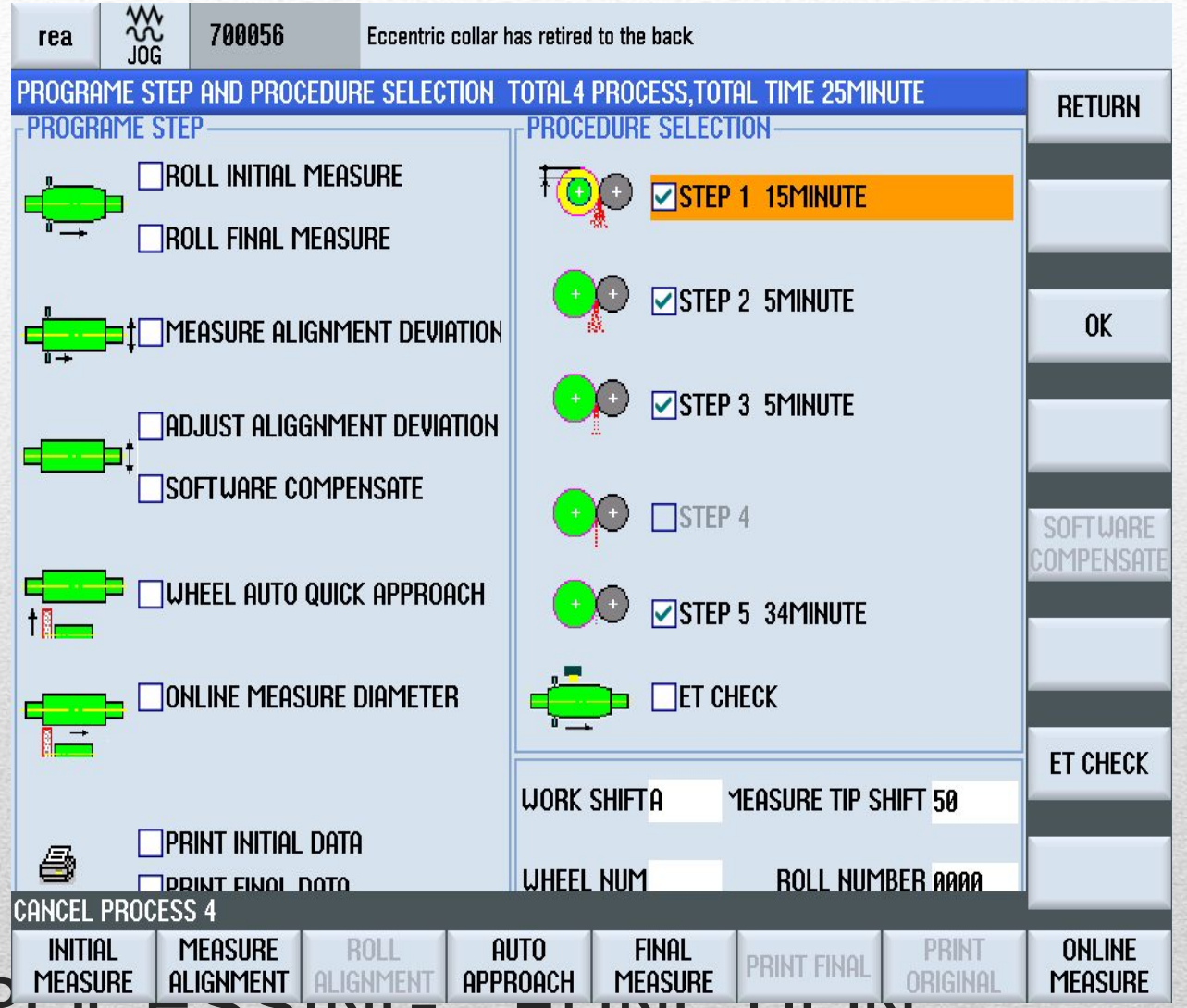
★ Automatic approach: Important!!! Don't use this with new wheel and roll.

★ Post-measure: diameter, roll shape and alignment error to determine whether to continue grinding.

★ Print pre-measure data: for comparison.

★ Print post-measure data: for comparison. ★ Software compensation:

★ Online measuring: B measuring arm will be putting down during grinding.



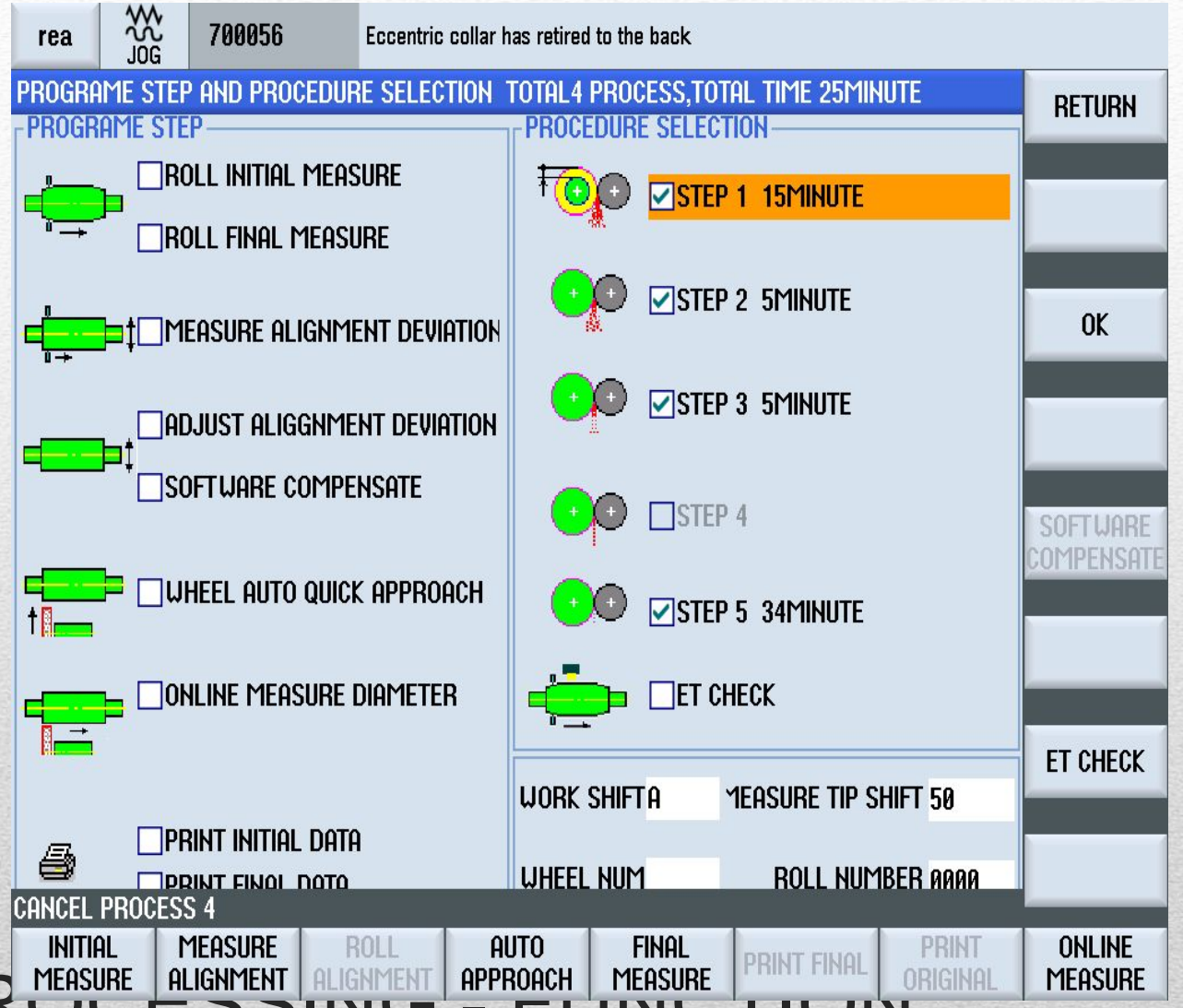
14 AUTOMATIC PROCESSING - FUNCTION OPTIONING

Grinding steps can also be opted before grinding.

Use【↑】【↓】to switch focus, press【Space】to choose. Time will be calculated and displayed automatically.

Step 1-4: grinding; step 5: chamfer.

If all the 5 steps are cancelled, when chosen, only measuring will be executed (if flaw detection is not opted either).



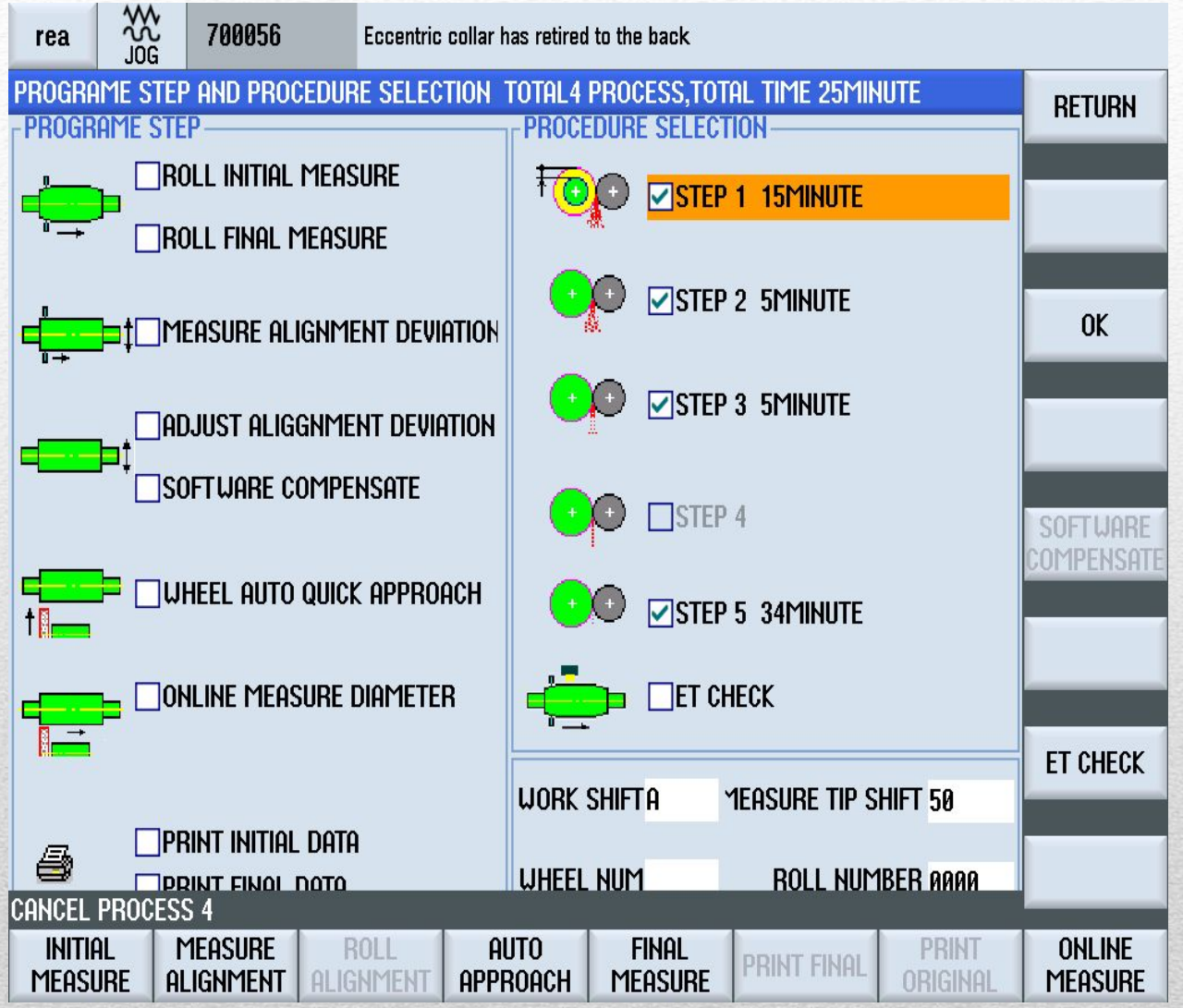
14 AUTOMATIC PROCESSING - FUNCTION OPTIONING

★ Automatic approach:

Don’t use this with new grinding wheel and new rolls.

★ Online measuring:

This function can be chosen here by “Online measure” softkey. However, it will only be executed after press on “Start measure” during grinding.

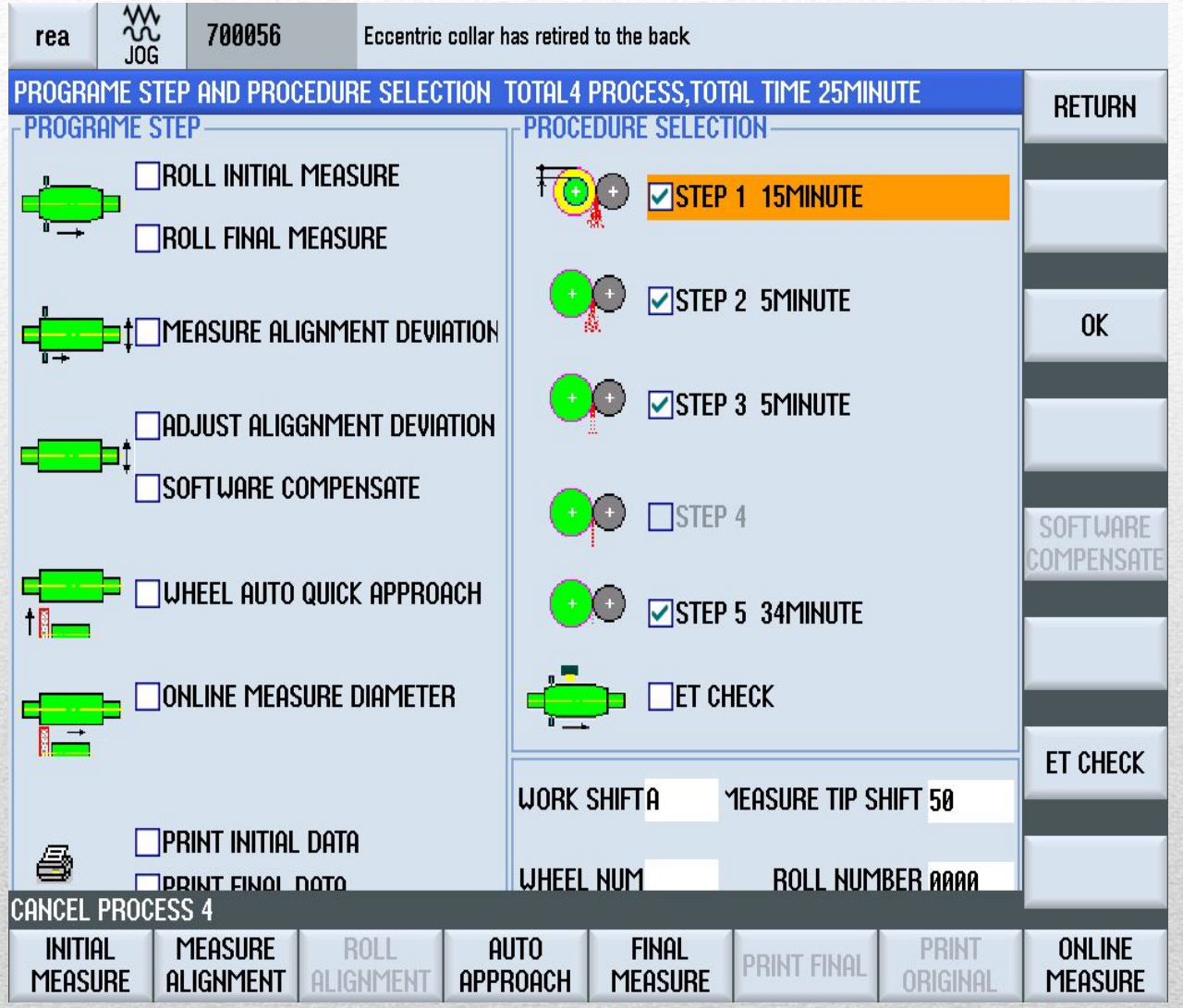


Only choosing step 5 means chamfering without other procedures.

Flaw detection is not in the programming and can only be chosen before entering automatic grinding page.

If flaw detection is chosen, then, all the five steps will be cancelled automatically. Entering Automatic grinding means flaw detection.

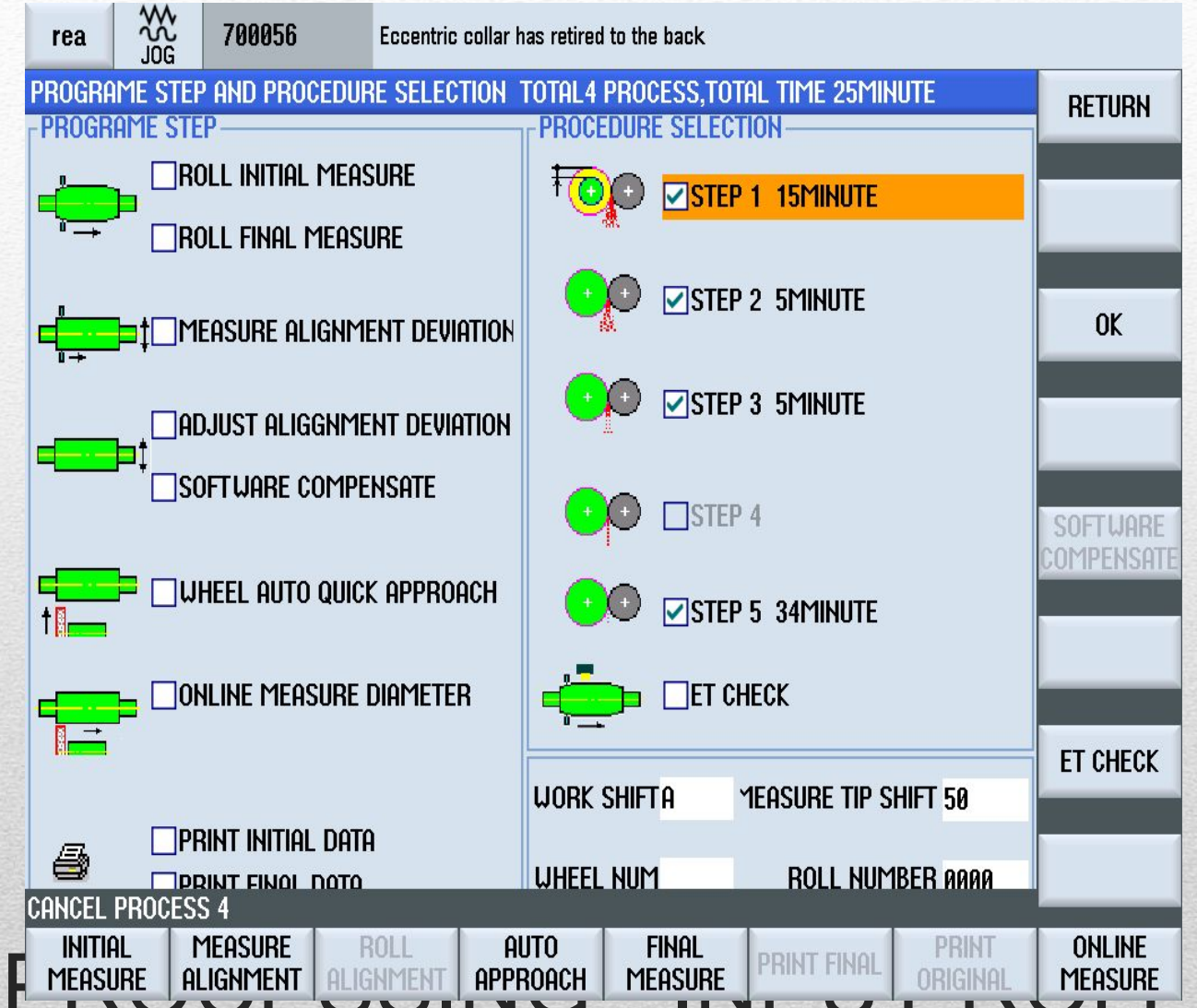
Roll information must be input before the flaw detection start. Refer to flaw detection manual for more detailed instruction.



14 AUTOMATIC PROCESSING - FLAW DETECTION

Firstly, press【Tab】to switch focus to roll name, press【Input】to confirm.

The roll measuring record will be saved with the name input.

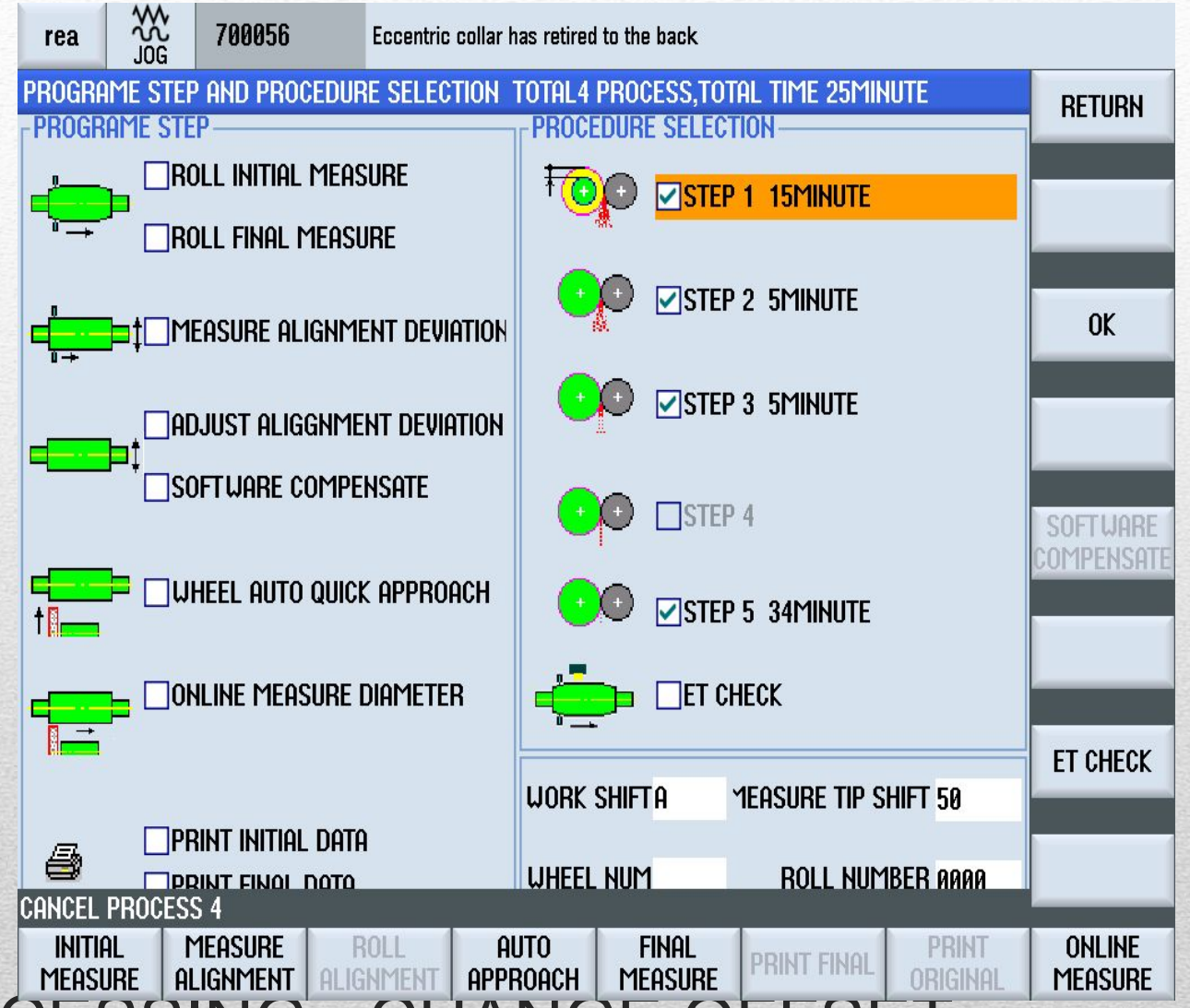


14 AUTOMATIC PROCESSING - INPUT ROLL NO.

Press【Tab】to focus on【Offset】, press【Input】to confirm. Allowable offset range: 50 mm-500 mm.

Note and alert!

After programming roll file, loading data is required. Without loading, the roll information (diameter, start point, roll length) will not be updated and that will lead to serious damage to equipment and causing major accidents.

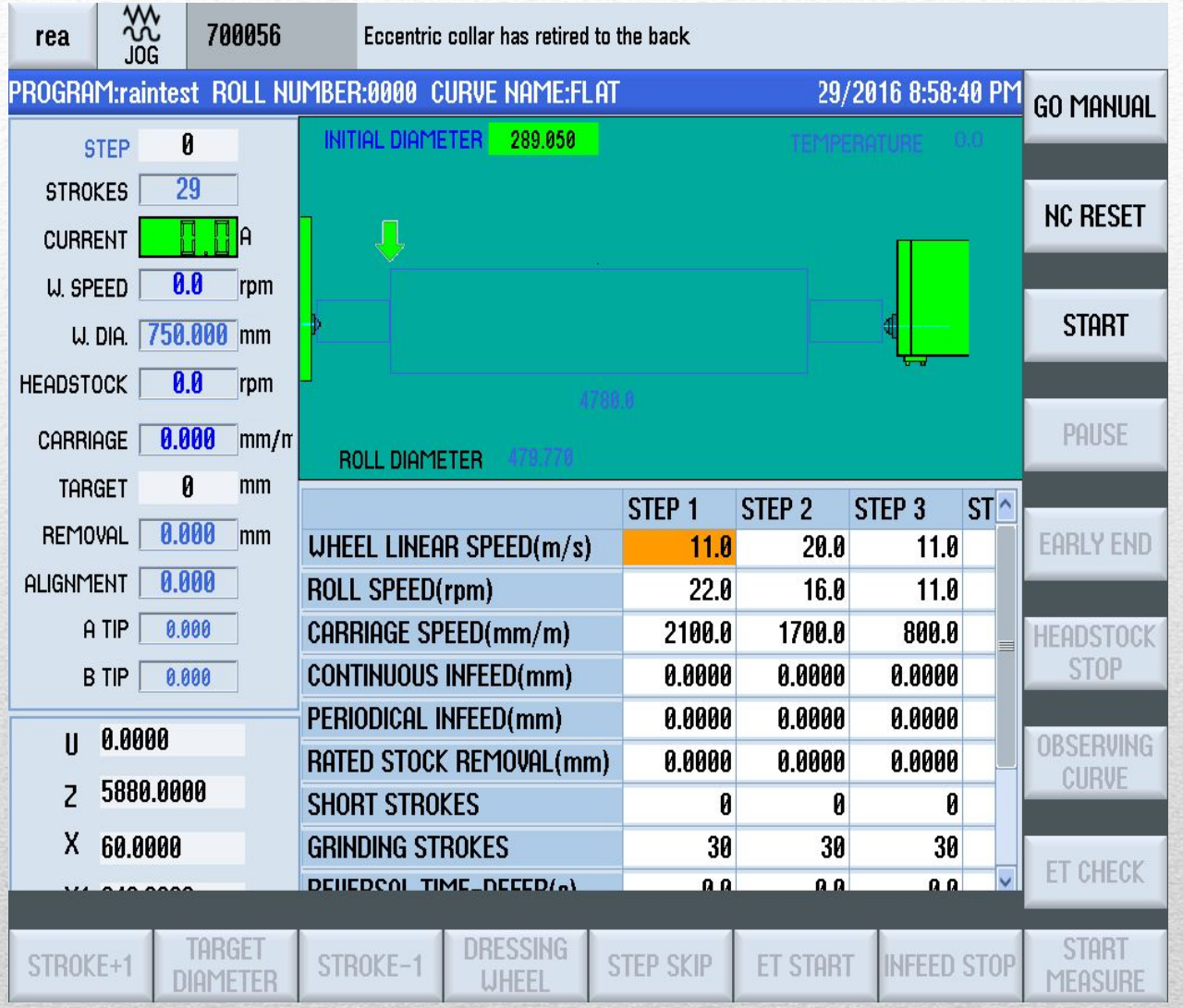


14 AUTOMATIC PROCESSING - CHANGE OFFSET AMOUNT

Make sure roll has been placed correctly.

Choose correct programs, and that the programs have been loaded.

After finishing programming and step chosing, press【OK】to enter into automatic grinding page.



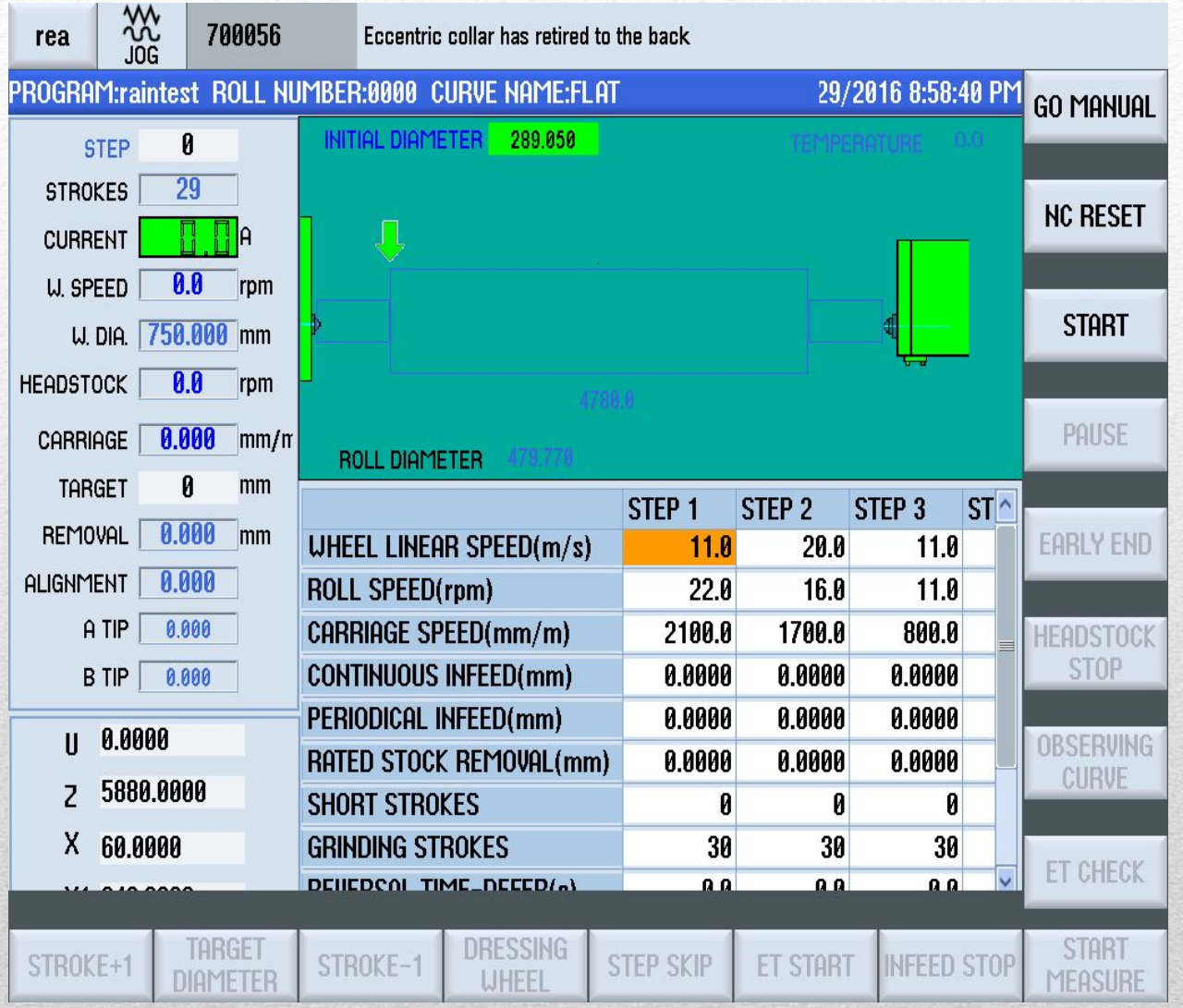
14 AUTOMATIC PROCESSING - START

Press【Start】to begin.

During the automatic approaching to roll, operator can chose to press on the【Function trigger】(black button) to end the approaching and enter grinding phase.

During grinding, operator can chose to press on the【Function trigger】to change direction prematurely.

After finishing, the grinding wheel carriage will retreat and carriage will move to tailstock side for the next roll.

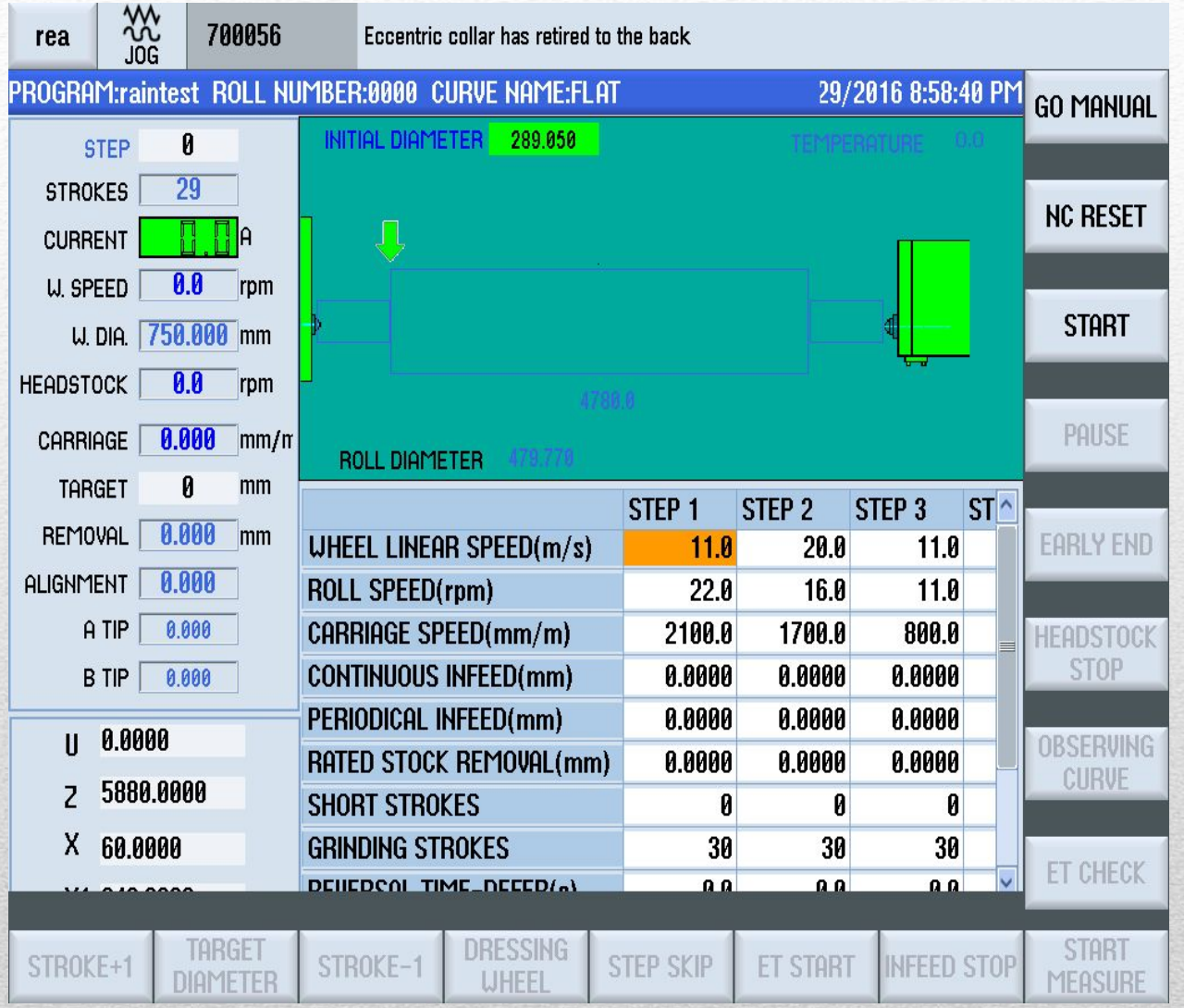


14 AUTOMATIC PROCESSING - EXECUTION

Halting

Press【Halt】and confirm. Grinding wheel will retreat and work piece stops running.

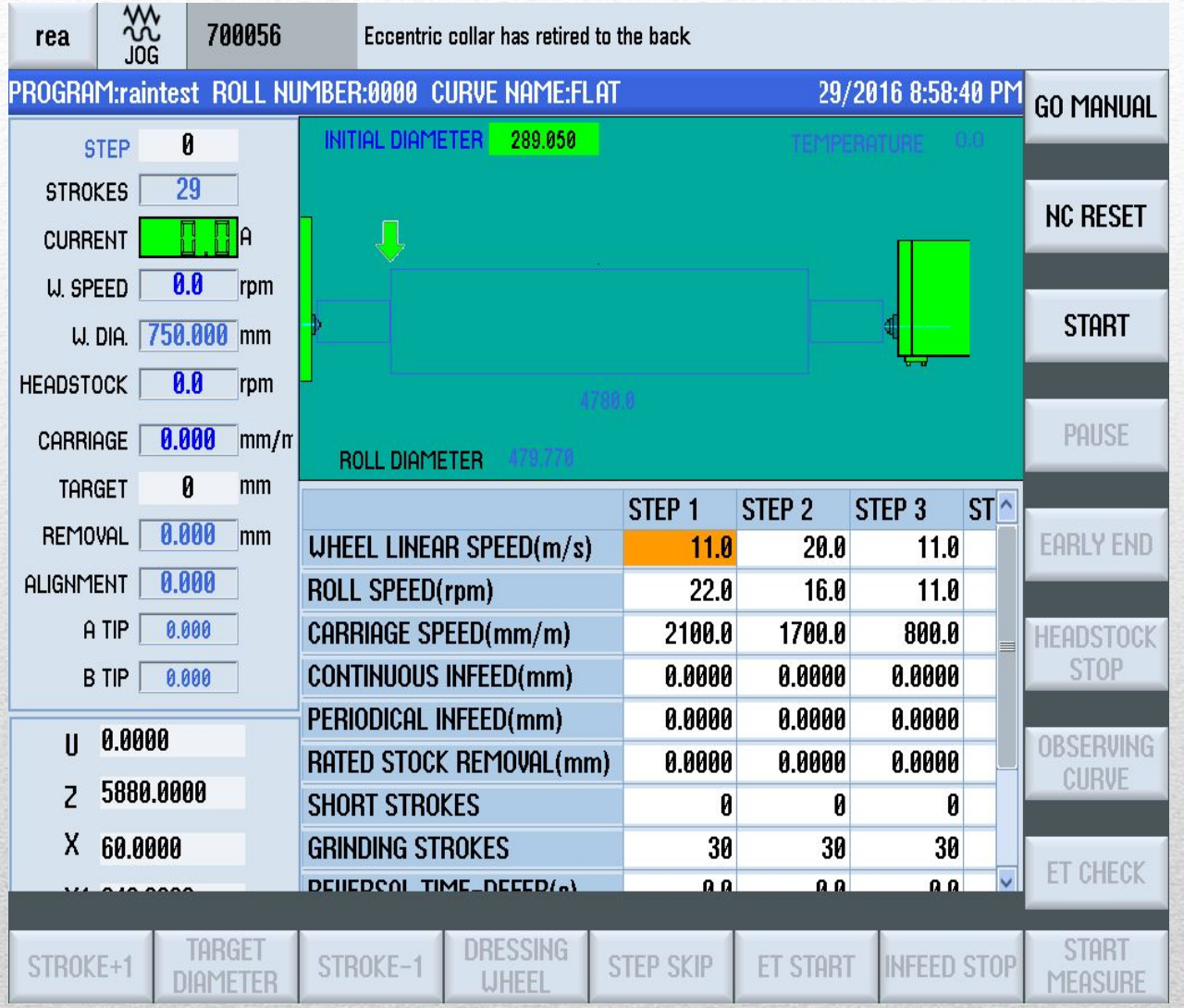
Press【workpiece stop】and【workpiece start】to stop and start workpiece roation.



14 AUTOMATIC PROCESSING - HALT

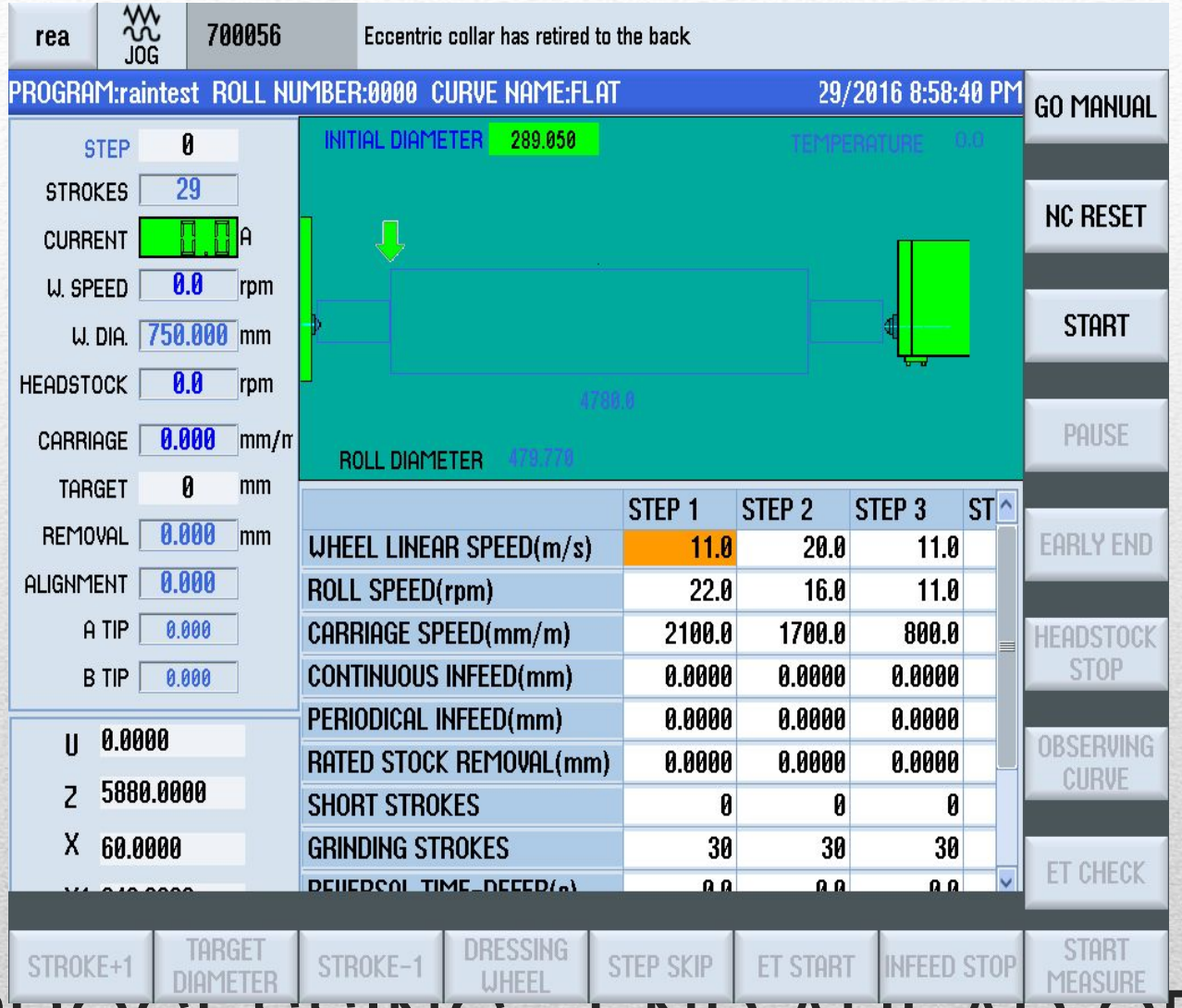
Press【NC reset】OR【reset】, after confirmation, all procedures will be stopped.

This usually is used after faults.



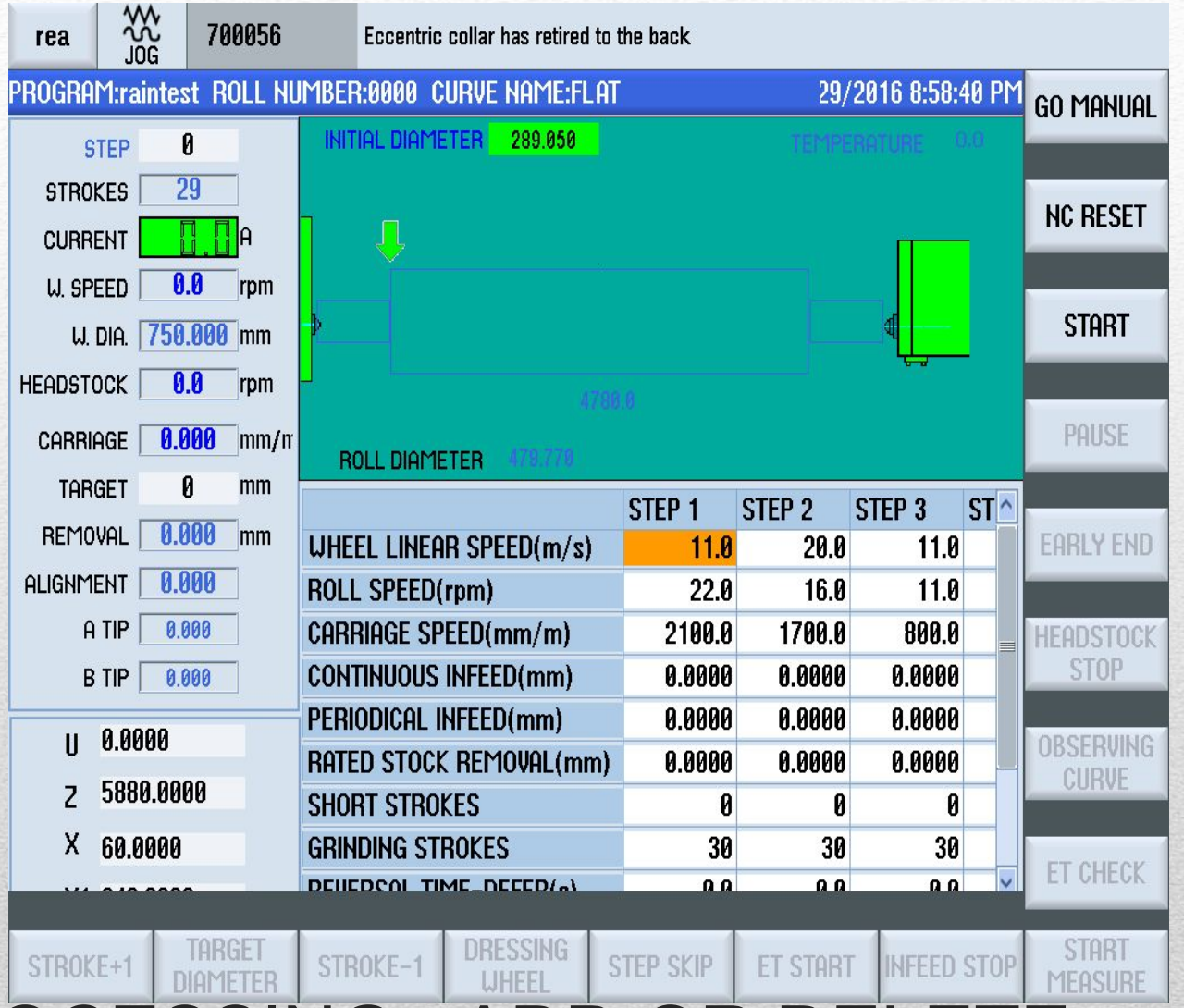
14 AUTOMATIC PROCESSING - END

Press【End ahead of time】, after confirmation, the current grinding stages will be terminated in next carriage reversing point and next step will be executed if there is any steps.



14 AUTOMATIC PROCESSING - END AHEAD OF TIME

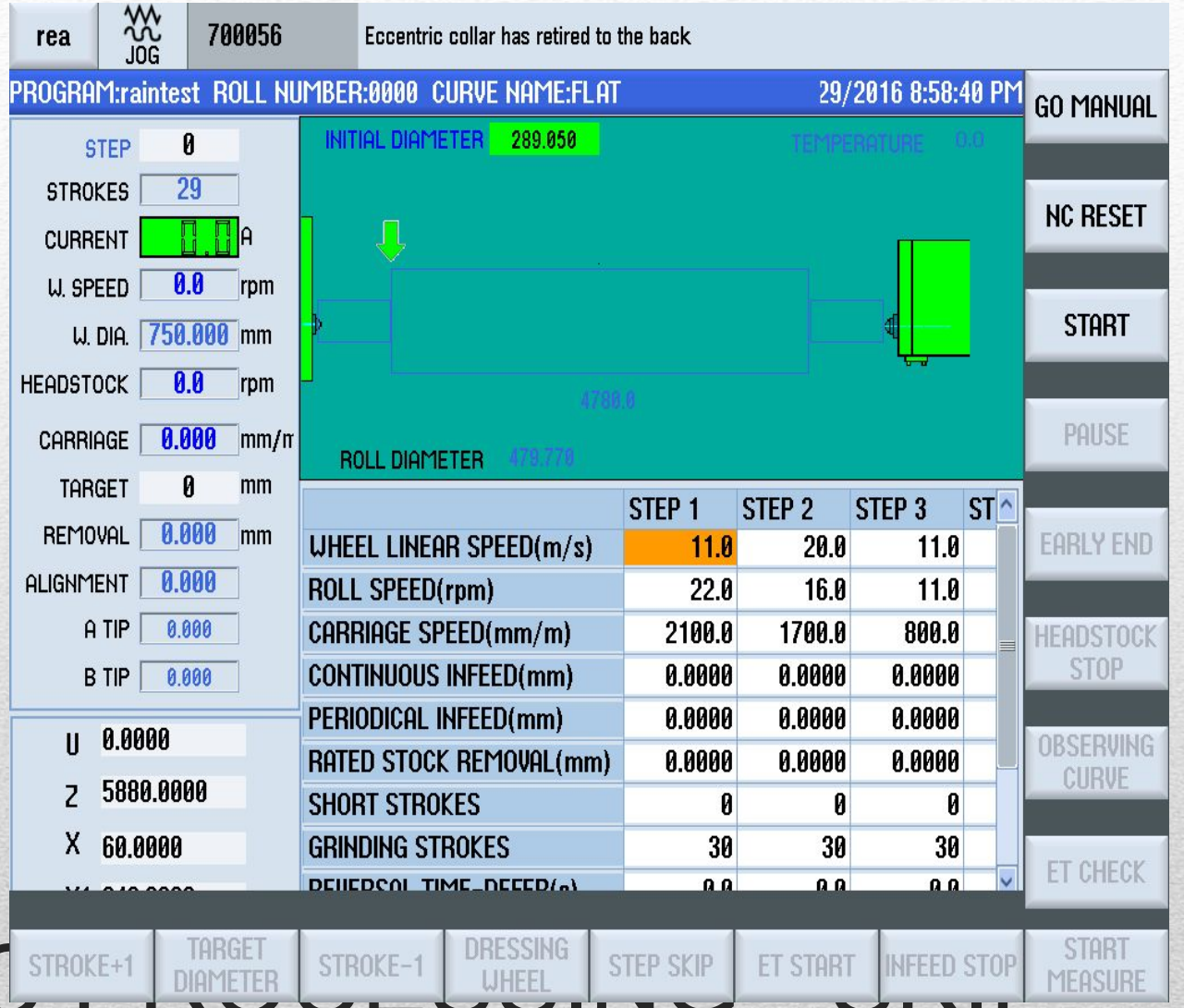
Operator can adds grinding cycle during grinding by【cycle + 1】and【cycle - 1】.



14 AUTOMATIC PROCESSING - ADD OR DELETE STROKE

Press【skip step】and confirm, the remaining cycles in the current steps will be reduced to 1, which means when the carriage passes the next reversing point, next step will start.

Before “skipping step” become valid,【cycle + 1】can still be used to add cycles to the current grinding step.

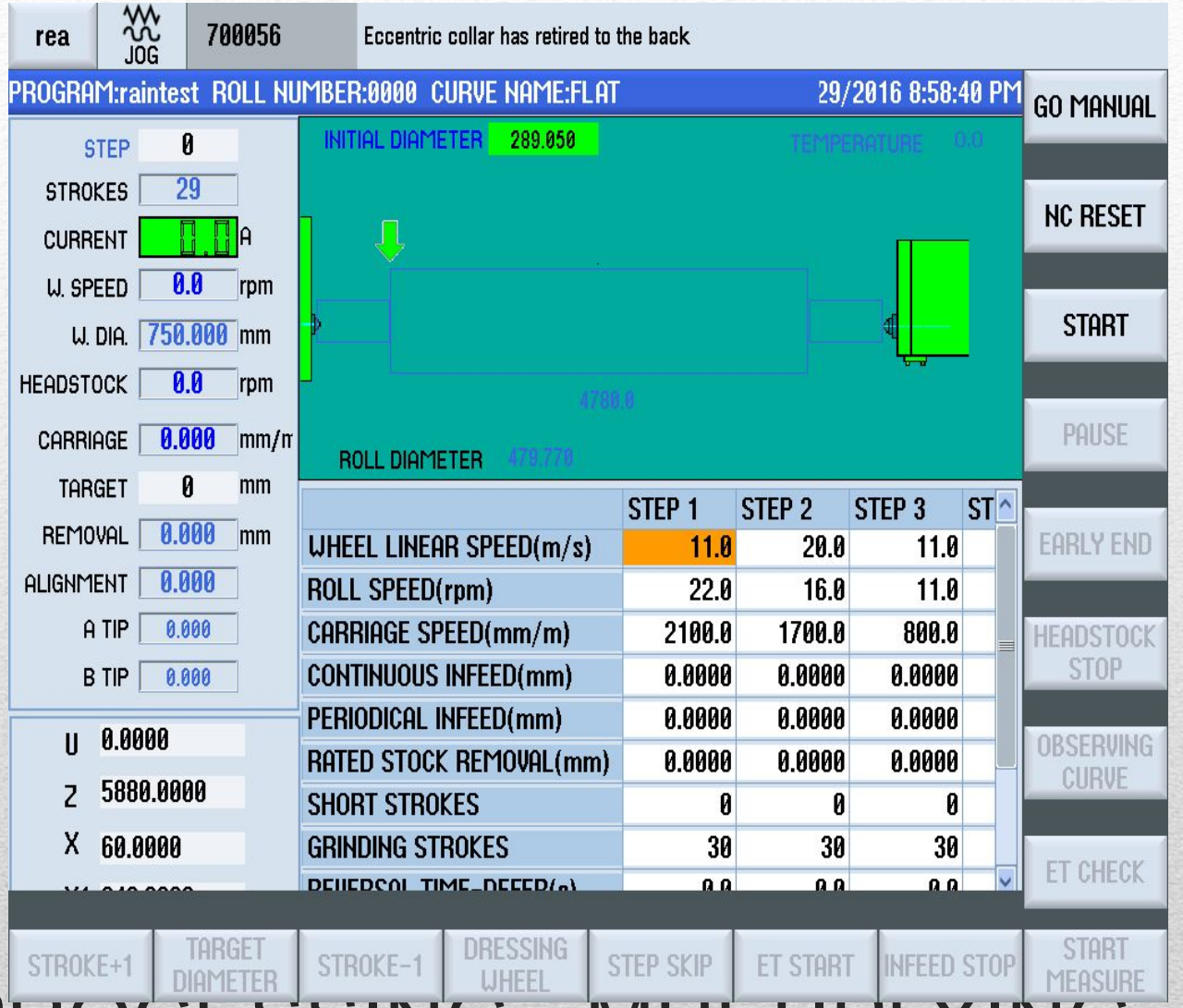


14 AUTOMATIC PROCESSING - MULTIPLYING POWER

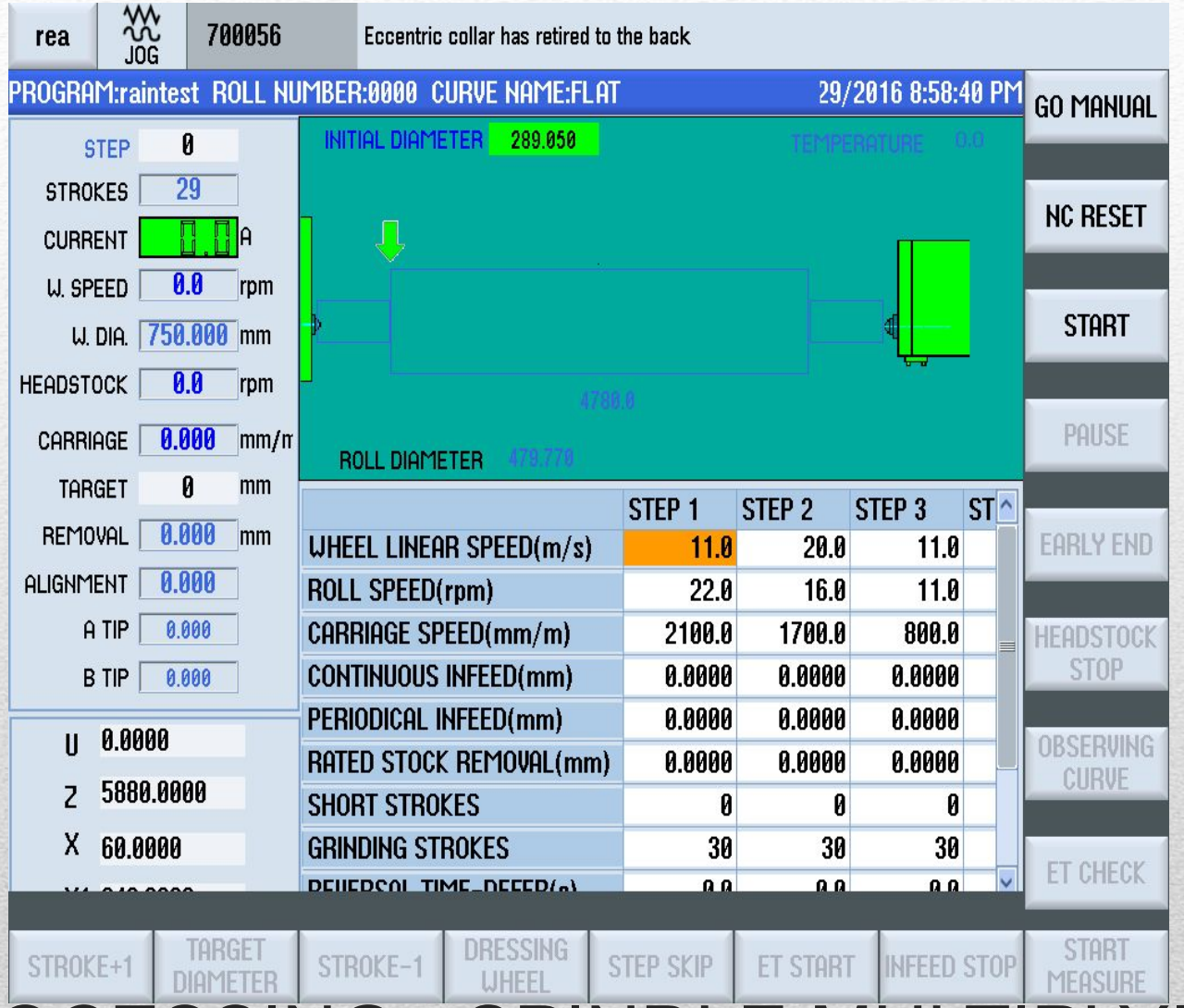
During automatic grinding, operator can change the multiplying power of carriage movement and continuous compensation within range:20%-100%. (Firstly use【Tab】to focus and use page key or【↑】【↓】to adjust.

Reducing multiplying power of carriage means automatic reducing of continuous compensation multiplying power.

Press【feed stop】, then wheel feeding will be stopped, press again to resume.



During automatic grinding, the multiplying power of spindle and headstock is also adjustable within scope of :50%-100%.

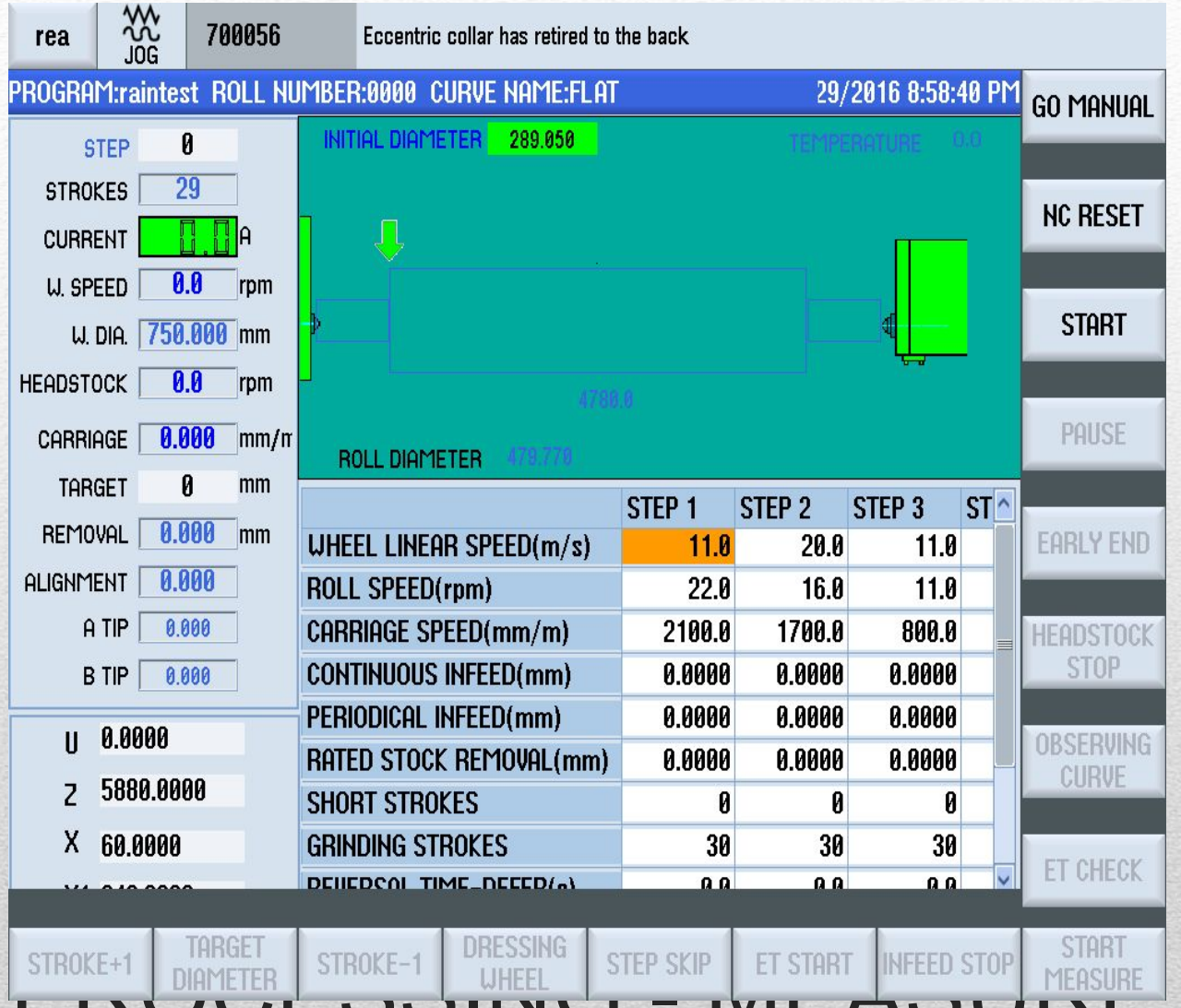


14 AUTOMATIC PROCESSING - SPINDLE MULTIPLYING POWER

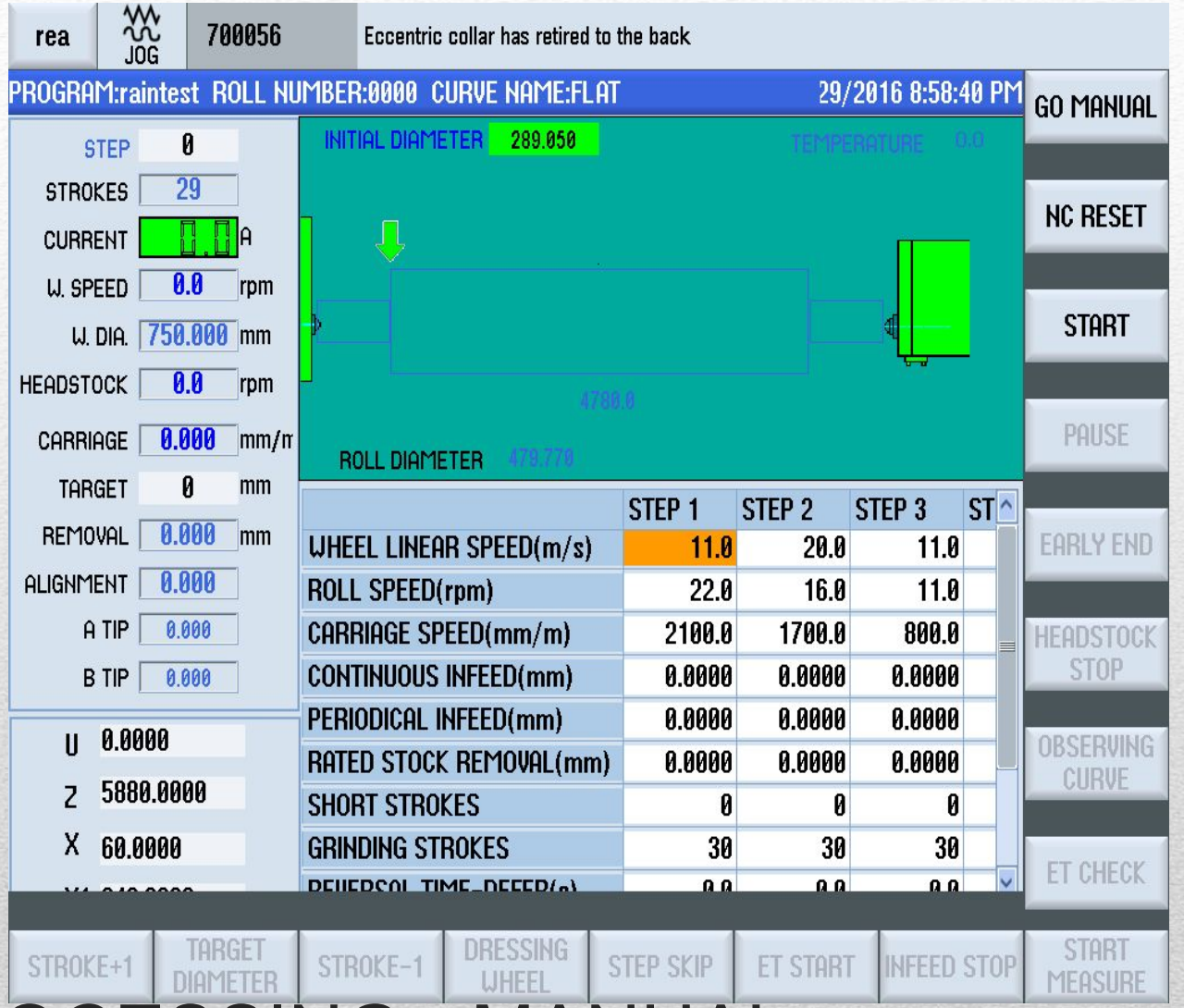
(Only for grinders that are equipped with X1 axis)

When grinding roll body, press【online measure】, grinding wheel diameter and stock removal will be measured automatically. Measuring arm B will be put down and engage with roll body when carriage is moving left-ward, the measure will be finished when approaches middle part.

The measuring results will be displayed immediately.



During automatic grinding, operator can adjust X axis feeding in a small scale to compensate.

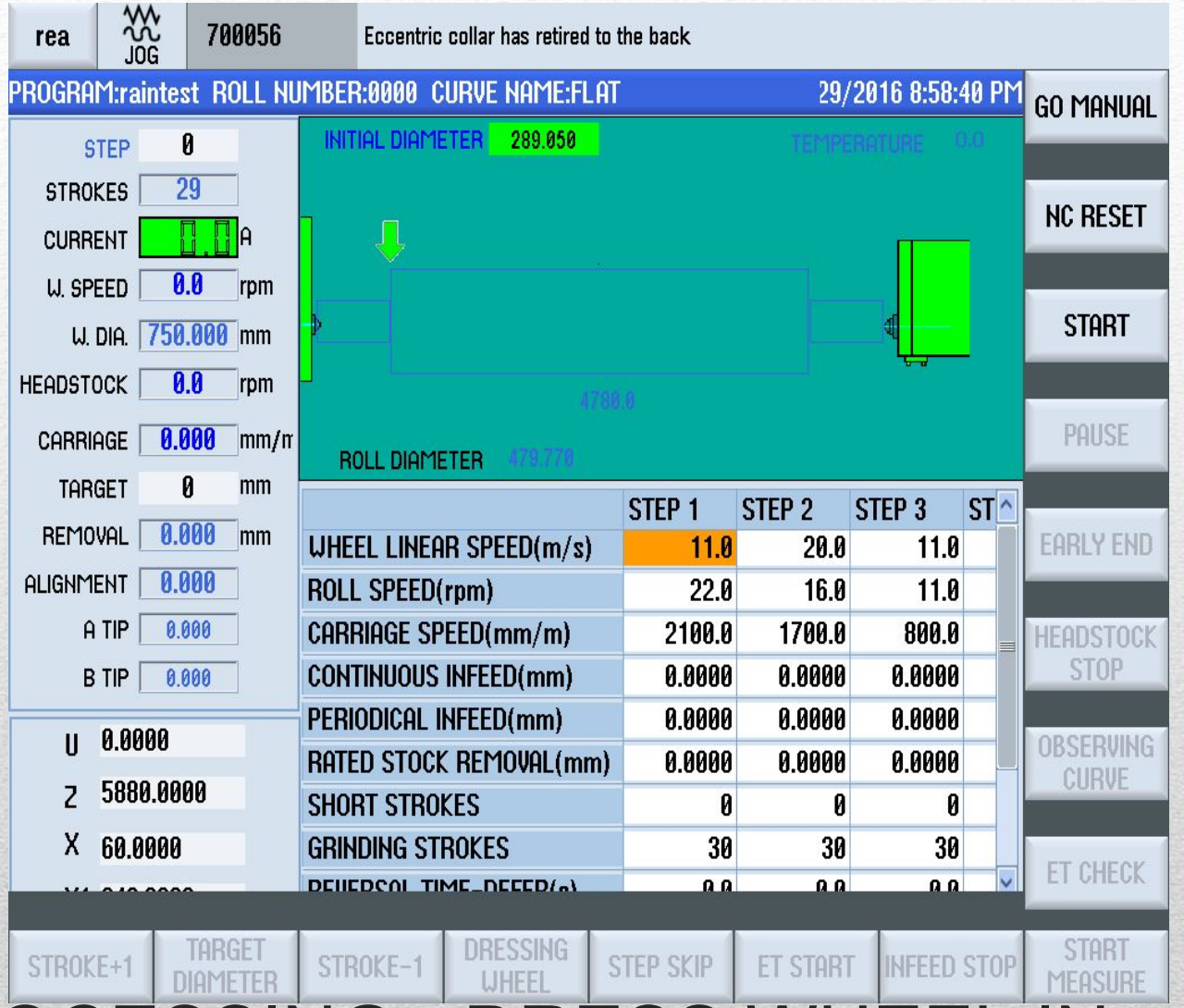


14 AUTOMATIC PROCESSING - MANUAL COMPENSATION

14 AUTOMATIC PROCESSING - DRESS WHEEL IN PROCESS

During grinding, press【dress wheel】to enter height (<1 mm, while “0” means flat, value over “0” means arc surface) in the prompt. After confirmation, the wheel dressing will start automatically. After dressing, carriage will move to roll end and wheel will approach and resume grinding.

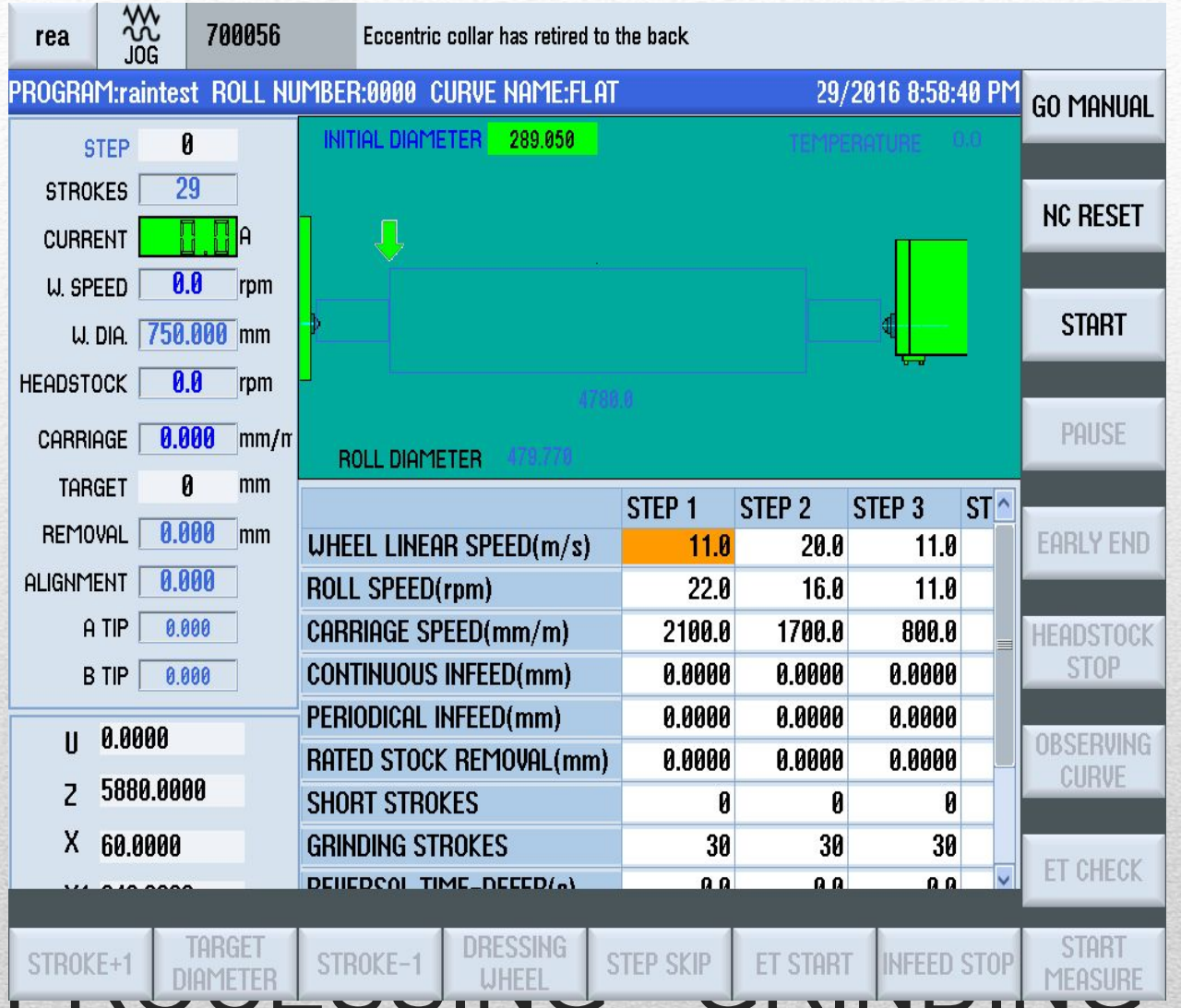
The wheel dressing can be ended ahead of time.



(Only for grinders without measuring system)

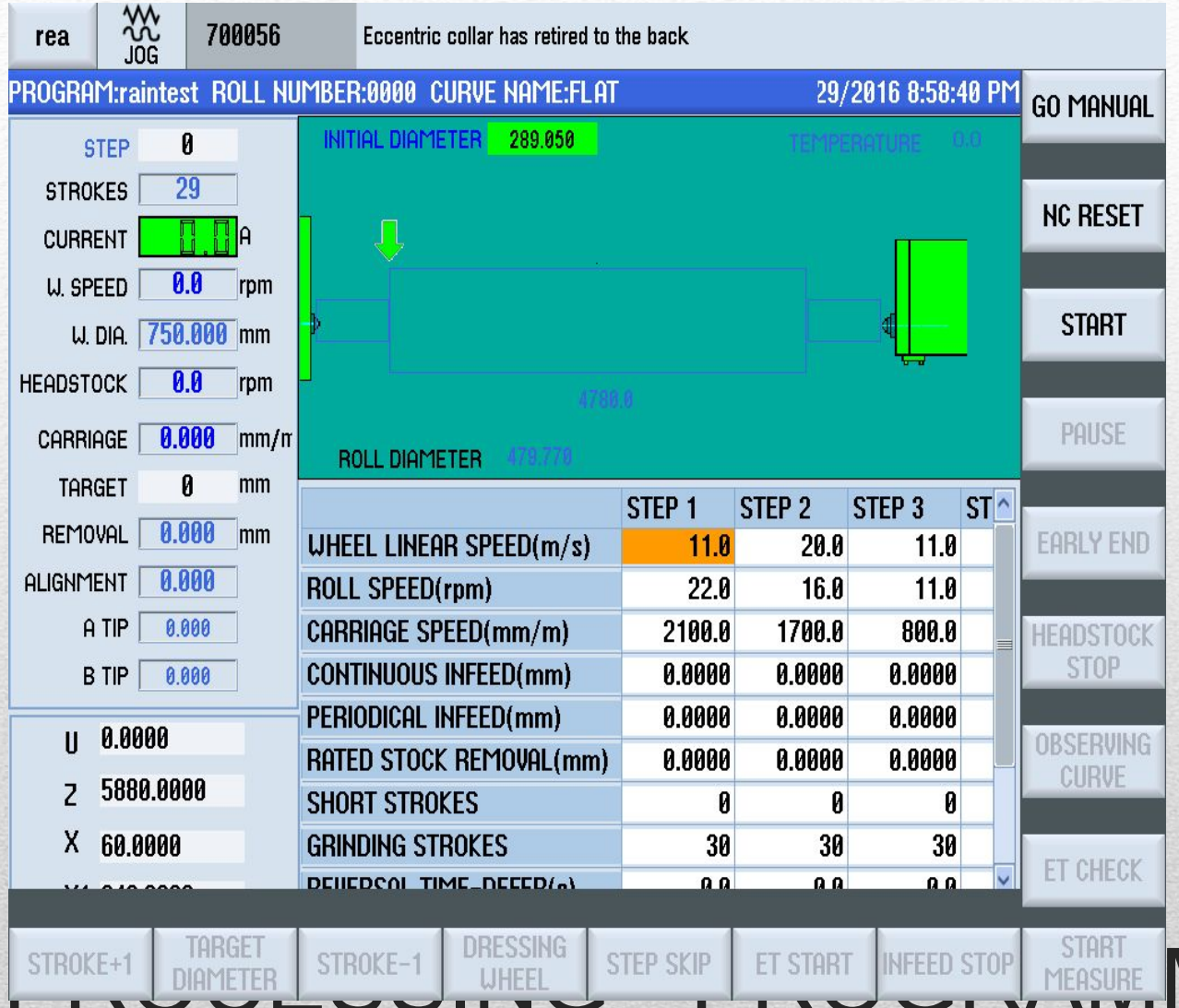
During grinding, press【grinding interruption】, after confirmation, the carriage will retreat 5 mm when it passes tailstock side reversing point, and then the carriage will move right-ward while moving to 200 mm away continuously from roll before stop. Meanwhile, headstock and coolant will stop. Operator can then observe or grinding manually (only if the grinder is not equipped with measuring system).

Press【function trigger】to resume automatic grinding.



After grinding, whether choosing or not, the diameter of the current grinding wheel will be measured.

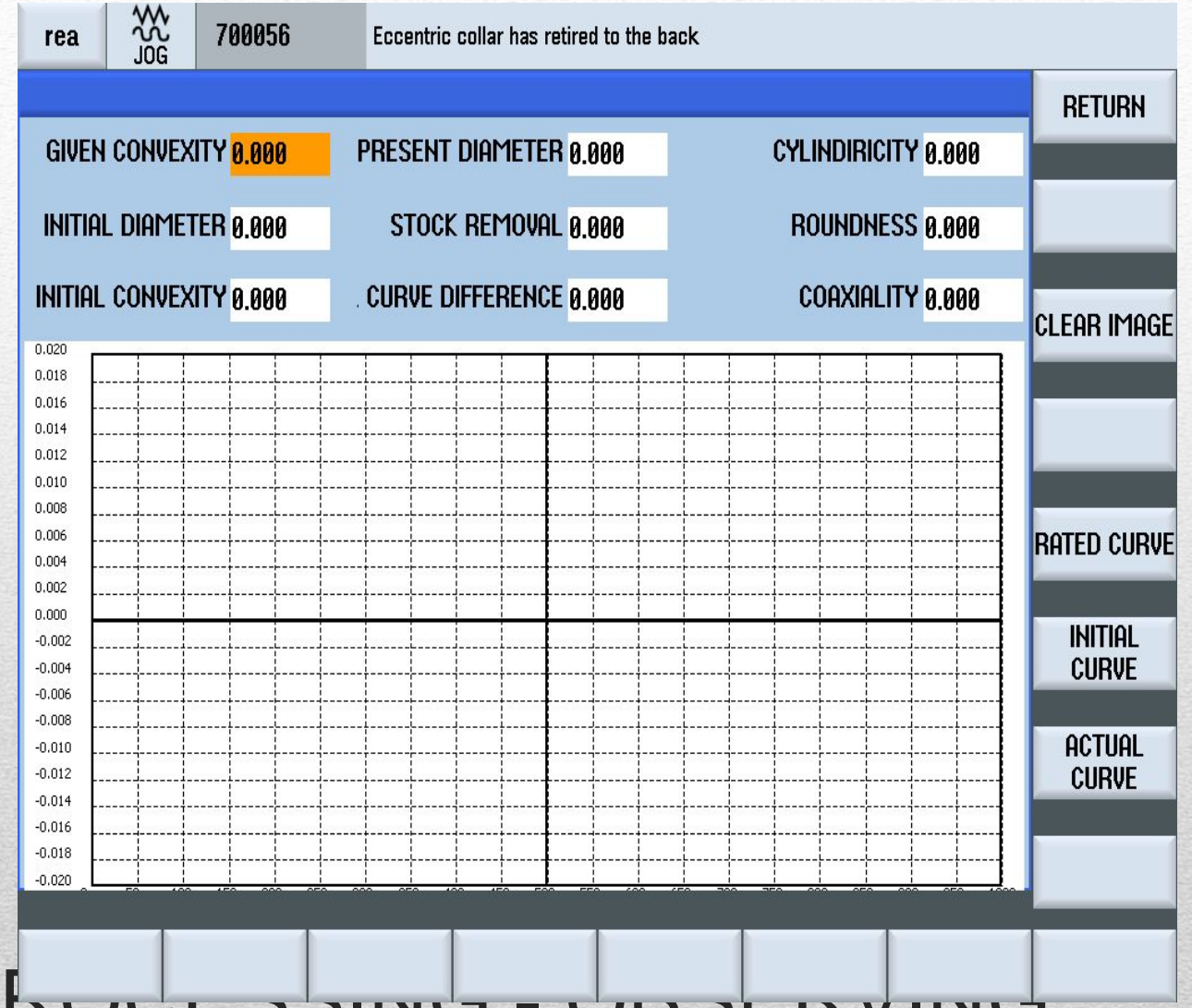
Three options will be given: continue grinding, save and end, eliminate mark and end. Choosing continue grinding means semi-fine grinding, and eliminate mark and en means polish grinding (4 cycles) before ending.



14 AUTOMATIC PROCESSING PROGRAM

END

Press【observe curve】to enter the page in which different curves(as per items on the right) can be displayed on the screen.



14 AUTOMATIC PROCESSING - OBSERVING CURVE

During automatic grinding, press【measure online】and confirm. Wheel will retreat 10 mm when passing left roll end next time, measuring arm A will be put down to measure. After measuring, the measuring results will be displayed and operator can choose whether to continue grinding. Choosing【no】measuring entering into measuring after grinding.

14 AUTOMATIC PROCESSING - MEASURE ONLINE

Firstly, activate the function by choosing the function on flaw detection interface, input roll information and press【confirm】button on flaw detection interface.

On grinder interface, press【flaw detection】and confirm. Wheel will retreat 10 mm when next time passing left roll end, and then measuring arm A will be put down to detect flaw and measure at the same time.

The process of flaw detection can be viewed online on the flaw detection screen. Please refer to the flaw detection manual for more details.

After this, operator can choose to continue grinding by confirming by “Y” and enter measuring procedure by “N”.

If the grinding current exceed the set amount for 5 second and more, grinder will shut down.

When end feed exceed 0.2 mm, continuous feed exceeds 0.5 mm, software protection will be in force and further end feed and continuous feed will not effective.

If the protection switches of the measuring arms is triggered, grinder will stop and alarms will be sent out.

In case of emergency, press on emergency stop button, and the grinder will be stopped and cut off from power supply.

14 AUTOMATIC PROCESSING - SAFETY PROTECTION

15 SHUTTING DOWN

1. Dry run grinding wheel for at least 5 minutes before shutting down grinder;
2. Note: Make sure that all the movement and rotation (motor) stop before shutting down grinder;
3. Turn the key to “off”;
4. Turn off grinder power;
5. Turn off UPS power.

★ Note:

1. There is a difference in shutting down grinder and turn off grinder. When turning off grinder, control system is still on, the reference position is still effective; while shutting down grinder means all the power of grinder is off and reference position will be lost.
2. Before shutting down the power supply, please make sure that the grinder is turned off.

17 AFTER SHUTTING DOWN

1. Record as required and hand over as required;
2. Clean the environment around grinder area in workshop;
3. Clean grinder, for example, make sure of the cleanness of grinding wheel bed cover.