

Elliott offers a complete line of precision tube tools, including:



**tube
expanders**

- Boiler Expanders
- Heat Exchanger Expanders
- Condenser Expanders
- Refinery Expanders

**tube rolling motors
& torque controls**

- Electric
- Pneumatic

**tube
cleaners**

- Air & Water Driven Motors
(Internal/External Drives)
- Jiffy Guns
("Shoot-Thru" Devices)
- Roto-Jet
(Rotating Flex Shaft)

**additional
products**

- Tube and Joint Testers
- Tube Plugs
(High & Low Pressure)

**retubing
tools**

- Tube Gauges
- Tube Cutters
- Manual Tools
- Spear Type Tube Pullers
- Collet-Type Tube Pullers
- CYCLGRIP Tube Extractors
- Grooving Tools
- End-Prep Tools

**metal working
products**

- Back Chamfering Tools
- Carbide Roller Burnishing Tools
- Diamond Burnishing Tools
- Elliptical Deburring Tools
- Fine Boring Tools
- Internal Recessing Tools
- Magic Vise
- Mechanical Joining Tools
- Roller Burnishing Tools
- Single Blade Reamers

ELC110220 ELECTRONIC TORQUE CONTROLLER & ELECTRIC ROLLING MOTORS



Operating and Maintenance Instructions

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NOTES

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INTRODUCTION

Thank you for purchasing this Elliott product. The design and manufacture of this product, represents the highest standard of quality, value and durability. Elliott products have proven themselves in thousands of hours of trouble free field operation.

If this is your first Elliott purchase, welcome to our company; our products are our ambassadors. If this is a repeat purchase, you can rest assured that the same value you have received in the past will continue with all of your purchases, now and in the future.

We at Elliott would like you to be completely satisfied with this product and therefore recommend that this instruction manual be thoroughly read prior to use.

Your Elliott ELC110220 Torque Controller and Electric Rolling Motor has been designed and manufactured to the highest standards, using the latest in materials and technology. If the guidelines in this manual are followed, this product will provide many years of trouble free operation.

Elliott Tool Technologies Ltd shall not be liable for errors contained herein or for incidental or consequential damage in connection with the furnishing, performance, or use of this material.

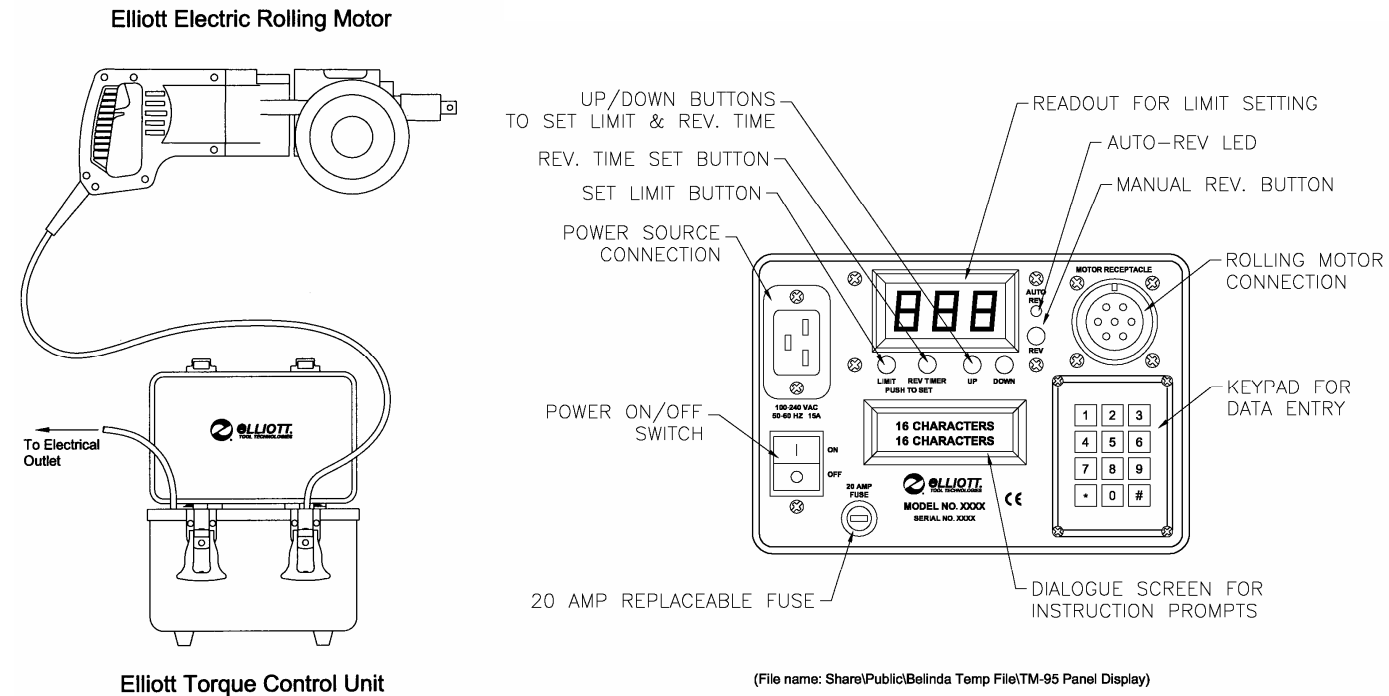
TOOL FUNCTION

NOTES

The Elliott electronic torque controller is designed to provide accurate and repeatable tube to tube sheet expansions on heat exchangers, condensers and boilers with a minimum of operator effort and inspection requirements.

The electronic torque controller works with a range of electric rolling motors, both manual and automatic reverse, to suit different tube sizes. The torque controller is adjustable for expanding torque and will automatically stop the motor when selected torque is reached.

The torque controller will operate both Automatic Reverse and Manual Reverse electric rolling motors selected and with 110V or 220V single phase supply.



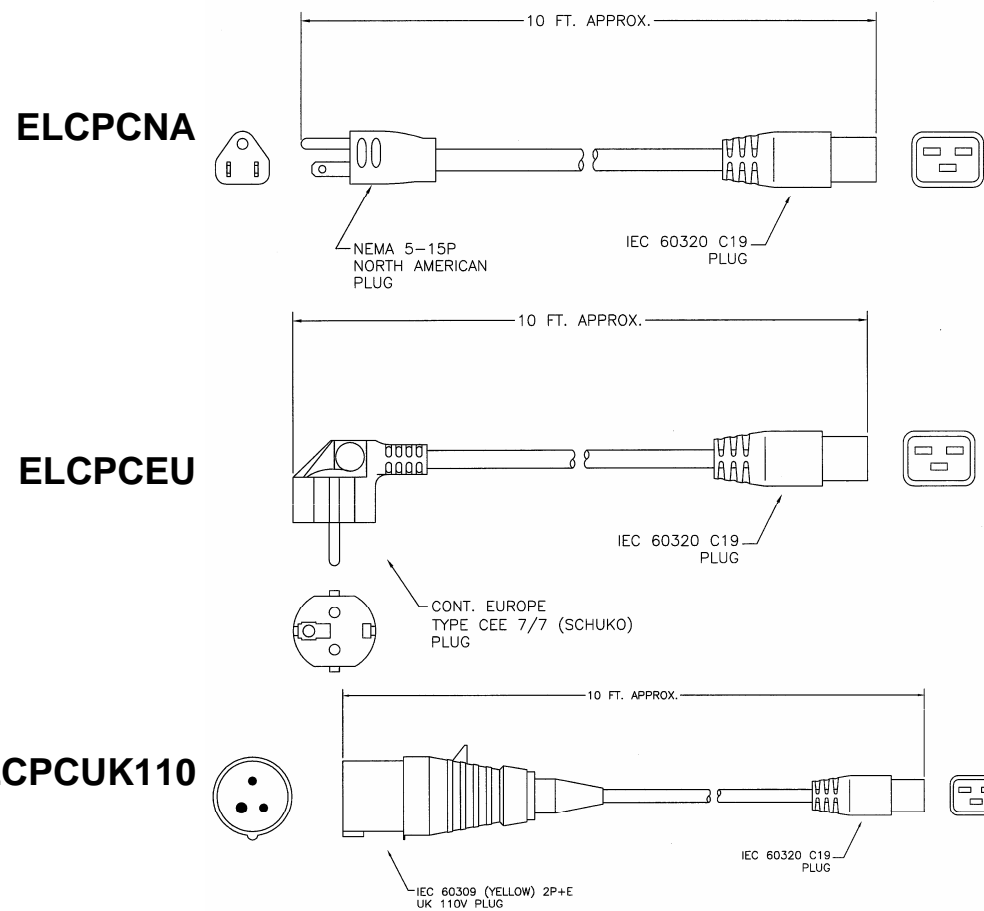
SAFETY INSTRUCTIONS

CAUTION - When using electric tools, certain safety precautions are required to reduce the risk of electrical shock and personal injury.

MAKE SURE ALL OPERATORS READ AND UNDERSTAND THESE INSTRUCTIONS BEFORE USING THESE TOOLS

- Do not operate any motor over its rated amperage. Operating over the rated amperage will cause damage to the motor and / or torque control unit. (Refer to Chart A, page 3).
- Approved protective devices are to be utilized to protect the operator's eyes, ears, hands, feet, etc.
- Do not allow loose clothing to contact the equipment while in use.
- Do not expose tools to moisture or use in a wet or damp environment.
- Before use, inspect all power cords and plugs. Have any damaged items repaired by an authorized repair facility. Never unplug the tool by yanking on the power cord. Pull on the plug rather than the cord to reduce the risk of damage.
- Do not operate tools that have damaged power switches. Have any damaged power switches repaired by an authorized repair facility before using.
- To avoid electrical shock, make sure the power receptacle is properly grounded.
- Unplug all power cords before attaching or removing any accessories, or before performing any tool inspection.

POWER CORD



ADAPTER CORD

To adapt preexisting electric motors for use with ELC110220 Electronic Torque Controller: Each cord measures approximately 12" [305mm] long.

(Note: Adapter cord will not allow a manual reverse motor to be used as an auto-reverse motor.)

Motor Plug Type	Motor Type	Adapter Cord No.
No. Amer. 110V	Manual Reverse	ELCACNA
No. Amer. 110V	*Auto Reverse	ELCACNAR
Cont. Europe 220V	Manual Reverse	ELCACEU
Cont. Europe 220V	*Auto Reverse	ELCACEUR
U. K. 110V	Manual Reverse	ELCACUK110

*Elliott Tool Auto-reversing motors with 5-pin connector only.

(Note: Adapters for other plug types may be provided upon request. Consult the factory.)

MAINTENANCE INSTRUCTIONS

Before use, examine the general condition of the equipment. Inspect switches, receptacles, and the power cords. Check for loose or broken parts that may affect the safe operation of this equipment. If abnormal noise or vibration occur, turn the equipment off immediately and contact your nearest authorized repair facility.

CAUTION — Electronic equipment should only be repaired, serviced, and checked by qualified repairmen. Repairs carried out improperly can place the operator at serious risk.

Keep all air vents and receptacles free from dirt or debris. Use only mild soap and a damp cloth to clean the equipment since some solvents are harmful to the components.

CAUTION — Never use flammable solvents around electric powered equipment. Never use excessive water to clean the equipment, or submerge in any liquid.

CHART A						
Grounded tools require a three wire extension cord. Double insulated tools can use either a two or three wire extension cord. As the distance from the supply outlet increases, you must use a heavier gauge extension cord. Using extension cords with inadequately sized wire causes a serious drop in voltage, resulting in loss of power and possible tool damage. Refer to the chart at the right to determine the required minimum wire size.	Recommended Minimum Wire Gauge for Extension Cords					
	Nameplate Amperes	Extension Cord Length				
		25'	50'	75'	100'	150'
0 - 5	16	16	16	14	12	12
5.1 - 8	16	16	14	12	10	-
8.1 - 12	14	14	12	10	-	-
12.1 - 15	12	12	10	10	-	-
15.1 - 20	10	10	10	-	-	-

SETUP INSTRUCTIONS

To operate an ELLIOTT electric rolling motor with the ELLIOTT electronic torque controller, the following steps should be followed:

Be sure the torque controller power switch is in the “off” position. Connect the female end of the power cord to the power receptacle on the controller. The male end of the power cord should be connected to a properly grounded, mating power supply receptacle in the work area.

IMPORTANT - Make sure the electrical current supplied is single phase. Based on “end of cord” connection, the Elliott torque controller will automatically detect the voltage being supplied to the unit. The Elliott torque controller will operate with either 110 or 220 volts AC SINGLE PHASE.

CAUTION – Ensure the rolling motor being used is compatible with the electric current being supplied within the work area. Do not use a rolling motor that has a different voltage rating than the voltage being used.

CAUTION – If using an extension cord, avoid excessive lengths and/or undersized wire gauge cords. Both can cause the equipment to operate incorrectly. (Refer to Chart A, Page 3)

1. Connect the plug on the Elliott electric rolling motor power cord to the motor receptacle of the torque control. This is a special multi-pin plug, which allows the electronic torque controller to properly interface with the electric rolling motor. Other manufacturers’ motors can be used with the Elliott electric torque control in manual reverse mode by using an adapter cord available from Elliott.
2. Turn the torque control power switch to the “on” position. The reference readout should show a 3-digit reading and the language display should illuminate. This confirms that you have power to the torque control.

NOTE – When using an auto-reverse motor, the auto-reverse electric rolling motor light will illuminate on the control panel when the torque control is turned on. If this lamp is not illuminated when an auto-reversing motor is connected see the “Troubleshooting” section of this manual.

3. (See the “Elliott Electronic Torque Controller Programming” section).
4. Follow the screen prompts on the Elliott electric torque controller and select your response using the keypad located on the face of the controller. Questions are answered by using the appropriate numeric response. The # key is used as an “enter” key for some screens and advances the display to the next question. To go back one entry use the * key. Each time the * key is depressed it will take the display screen back one screen display. (Note: This feature will only work during the steps for calculating the target rolled ID. Once the Percent of Wall Reduction is entered, this calculation is “locked in” and you cannot return to the previous screen. Controller must be turned off and then back on to restart dialogue screen.)
5. Always connect the tube expander to the motor via a quick-change chuck or a socket.
6. We recommend using an Elliott tube gage to accurately verify the rolled ID of the tube.

IMPORTANT — The reference readout should be recorded at this point, since this number represents the relative torque level on the motor at free speed, with no external load.

ALL REFERENCE SETTINGS MUST BE HIGHER THAN THIS BASE LINE READOUT FOR THE MOTOR TO OPERATE.

6. Connect the tube expander to the motor via a quick change chuck or a socket.
7. **IMPORTANT** — Determine the required expansion rate by referencing the wall reduction formula shown in the “Reference Section” of this manual.
8. Set the reference setting of the torque control 100 points (50 points for 220 volts motor) higher than the base line readout (step 5) and expand the first tube.
9. Measure the rolled I.D. with an ELLIOTT tube gage (See Fig. 1) to confirm the amount of expansion achieved. Adjust the reference setting by 25 points (10 points for 220 volt units), either up or down as required, and roll a second tube. Continue this pattern until the actual rolled I.D. is near the calculated rolled I.D. The reference setting should then be adjusted in 5 point (2 points for 220 volt units) increments to fine tune the rolled I.D.
10. After achieving the proper rolled I.D. for approximately 10 tubes, go back and re-roll the first trial tubes that were under rolled. **IMPORTANT** — **Do not roll the same tube several times when establishing the proper control setting. The tube will work harden and not reflect an accurate torque requirement.**

[End of Manual Set-Up Dialogue Screen Prompts]

A wide selection of 110V and 220V electric rolling motors are available from Elliott Tool Technologies for use with the ELC110220 Electronic Torque Controller. For the proper motor to suit your needs, contact your Elliott Tool sales or factory rep, consult the Elliott Tool catalog, or go to the Elliott Tool website www.elliott-tool.com.

Manual Set-Up

This selection provides step-by-step prompts for manual input of Limit settings.)

Operation

1. Select Language Choice:

Display

English 1
Español 2

2. Retrieve Last Setting:

Enter [1] for **Yes** to retrieve previous settings prior to the controller being shut off.

Retrieve Last
Setting? Y1 N2

If previous mode was Automated:

The program will return to Automated mode and retrieve the limit setting, target ID, and last roll cycle count. [Reset Roll Cycle Counter?] screen will appear. If you wish to continue from the previous count, press [2] for **No**. If you want to reset the the counter to 0, press [1] for **Yes**. (Note: This screen will only appear if the previous mode was Automated.) Once an entry has been made, the operator can continue rolling.

Reset Roll Cycle
Counter? Y1 N2

If previous mode was Assisted:

The program will return to Assisted mode and retrieve previous target ID and limit setting. Once these settings have been retrieved, the operator can continue rolling.

If previous mode was Manual:

The program will return to Manual mode and retrieve the limit setting. Once this setting has been retrieved, the operator can continue rolling.

To start a new program:

Enter [2] for **No** and proceed to the Operating Mode Selection screen.

3. Operating Mode Selection:

(Three screens will cycle in 3-second intervals until a selection is made.)

1=Automated Set-Up

2=Assisted Set-Up

3=Manual Set-Up

(# entry is **NOT** required for this step)

Automated Set-Up
1

Assisted Set-Up
2

Manual Set-Up
3

Keypad will be locked out while in the “Manual” mode and display screens will not be activated. Use the Manual setting buttons on the face of the Torque Control to set Limit Settings.

4. Set the reference Torque Limit Setting to five, zero, zero (500) by depressing and holding the “Limit” button on the Torque Control Faceplate and pushing the “Up or Down” buttons will advance or retract the Limit Switch numbers.

5. Depress the trigger of the electric tube rolling motor and allow the motor to run, without load, for approximately 1 minute. This will allow the motor to “warm up”, reducing the amp draw.

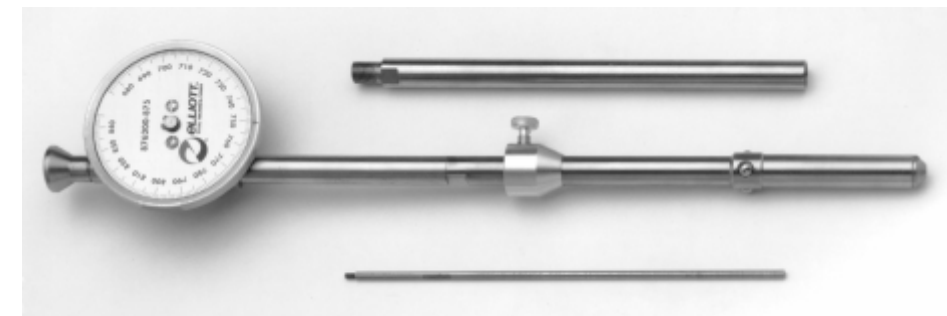
ROLLING MOTOR OPERATING INSTRUCTIONS

ROLLING MOTOR – MANUAL REVERSE MODELS

When rolling a tube, the following process should be followed:

1. The rolling motor must be set to forward rotation on manual reversing models using the manual selector switch on the motor. Forward rotation is CLOCKWISE.
2. Set the desired operation mode of the electronic torque controller. (See the “Elliott Electronic Torque Controller Programming” section.)
3. Lubricate and insert the tube expander into the tube to be rolled. Connect the tube expander to the rolling motor by means of a drive coupling or a quick disconnect coupling
4. Depress and hold the trigger of the rolling motor to start the rolling process.
5. As the tube is expanded, the reference readout number will increase. Once the reference readout matches the reference setting, the torque controller automatically stops the rolling motor.
6. To continue, the electronic torque controller must be reset by releasing the motor trigger.
7. To remove the tube expander from the tube, the rolling motor must be operated in reverse. Select reverse on the rotation direction switch and depress the motor trigger to reverse.
8. Tapper style rolling motors require that the motor be manually pulled away from the tube sheet to allow the spindle to move into the reverse position. Depress the motor trigger to reverse.
9. Reset the electric rolling motor to forward rotation and repeat steps 3 thru 7 to continue expanding additional tubes.

Fig 1



ROLLING MOTOR OPERATING INSTRUCTIONS

(Continued)

ROLLING MOTOR – AUTO REVERSE MODELS

When rolling a tube, the following process should be followed:

1. Set the desired operation mode of the electronic torque controller. (See the “Elliott Electronic Torque Controller Programming” section.)
2. Lubricate and insert the tube expander into the tube to be rolled. Connect the tube expander to the rolling motor by means of a drive coupling or a quick disconnect coupling.
3. Depress and hold the trigger of the rolling motor to start the rolling process.
4. As the tube is expanded the reference readout number will increase. Once the reference readout matches the reference setting, the torque control automatically stops the rolling motor. **DO NOT RELEASE THE TRIGGER SWITCH!**
5. The motor will automatically reverse after a brief pause.
6. Reverse time can be adjusted from 0.5 – 3 seconds to suit operation, using the reverse timer selector on the Torque controller. Lighter rolling pressure will usually require a higher dwell time, allowing the motor to stop before reversing.
7. Reset the electric motor by releasing and depressing the trigger as required and repeat steps 2 thru 4 to continue expanding additional tubes.

NOTE: If the operator stops the rolling operation before reaching the preset limit, to reverse the motor to remove the expander from the tube, press the “reverse” button on the front of the panel. This will allow the motor to reverse the next time the trigger is pressed. After releasing the trigger, the motor and the torque controller will return back to normal operation. The motor should remain depressed during the rolling operation & not released until after the motor has reversed and shut off.

3. Operating Mode Selection:
(Three screens will cycle in 3-second intervals until a selection is made.)

1=Automated Set-Up

2=Assisted Set-Up

3=Manual Set-Up

([#] entry is NOT required for this step)

Automated Set-Up
1

Assisted Set-Up
2

Manual Set-Up
3

Inch 1
Metric 2

4. Select Unit of Measure: (Inch shown for examples)
Inch – “in” will be fixed in screen lower right corner with 3-place decimal displayed to the left.
(ie: 0.000in)
Metric – “mm” will be fixed in screen lower right hand corner with 2-place decimal displayed to the left.
(ie: 00.00mm)
([#] entry is **NOT** required for this step)

5. Enter Tube Sheet Hole ID (Example = .760”):
Enter ID (number) + depress [#] to enter.

Enter Sheet Hole
ID + # 0.760in

6. Enter Tube OD (Example = .750”):
Enter Tube OD (number) + depress [#] to enter.

Enter Tube
OD + # 0.750in

7. Enter Tube ID (Example = .620”):
Enter Tube ID (number) + depress [#] to enter.

Enter Tube
ID + # 0.620in

8. Enter Percentage of Wall Reduction (10% shown for example):
 (“%” symbol will be fixed screen lower right corner with percent in whole number to the left. Percent will be revised to decimal for calculations.)
Enter % (number) + depress [#] to enter.

Wall Reduction
Enter % + # 10%

9. Target Rolled ID:
(Screen will be displayed continuously in this mode)
The Target Rolled ID display is the ideal tube ID based on the dimensions loaded into the memory during set up.

Target Rolled ID
0.643

10. After achieving the proper target I.D., go back and re-roll the first trial tubes that were under rolled. **IMPORTANT** — Do not roll the same tube several times when establishing the proper control setting. The tube will work harden and not reflect an accurate torque requirement.

(End of Assisted Set-up Dialogue Screen Prompts)

Number of subtraction points will be determined by:

- (1) The power source 110V or 220V?
- (2) Motor baseline 120 or less?
- (3) Motor baseline above 120?

- 15. After achieving the target rolled I.D., go back and re-roll the first trial tubes that were under-rolled. **IMPORTANT** — Do not roll the same tube several times when establishing the proper control setting. The tube will work harden and not reflect an accurate torque requirement.
- 16. While in the Automated Mode, and if a number was entered for roll cycles (see step5), the operator will be prompted with the **[ID Under?]** and the **[ID Over?]** screen after completion of each roll cycle number. If “N” is the answer for both of these screens, control will return to previous mode and operator can continue rolling at current settings. If “Y” is the answer for either of these screen prompts, then steps 9 thru 12 will continue until a new Target ID is achieved. If 0 was entered for the number of roll cycles in step 5, this prompt will not appear.

[End of Automated Set-Up Dialogue Screen Prompts]

Assisted Set-Up

This selection provides step-by-step prompts for calculating a target rolled ID. Limit settings must be entered manually.)

<u>Operation</u>	<u>Display</u>
1. Select Language Choice: (# entry is NOT required for this step)	English 1 Espanol 2
2. Retrieve Last Setting: Enter [1] for Yes to retrieve previous settings prior to the controller being shut off. <u>If previous mode was Automated:</u> The program will return to Automated mode and retrieve the limit setting, target ID, and last roll cycle count. [Reset Roll Cycle Counter?] screen will appear. If you wish to continue from the previous count, press [2] for No. If you want to reset the the counter to 0, press [1] for Yes. (Note: This screen will only appear if the previous mode was Automated.) Once an entry has been made, the operator can continue rolling. <u>If previous mode was Assisted:</u> The program will return to Assisted mode and retrieve previous target ID and limit setting. Once these settings have been retrieved, the operator can continue rolling. <u>If previous mode was Manual:</u> The program will return to Manual mode and retrieve the limit setting. Once this setting has been retrieved, the operator can continue rolling.	Retrieve Last Setting? Y1 N2

Elliott Electronic Torque Controller Programming

(Note: If an incorrect entry is entered, push the * key to return to the previous prompt. See note after Step 9 for additional information about this feature.)

There are three (3) operational modes of the electronic torque controller.

- 1. **Automated Set-Up:** Selecting this mode enables the operator to access the key pad and screen prompts for all of the automated commands the electronic torque controller offers. This operator will input Tube Sheet ID, Tube OD, Tube ID and percentage of wall reduction required. The on board processors will display the Target ID and automatically “step” the rolling motor to enable the Target ID to be achieved. After the Target ID is achieved a built in counter will stop the rolling process after 100 tubes to allow the operator to check the last rolled tube to verify the rolling process is within the expansion parameters.
- 2. **Assisted Set-Up:** Selecting this option will allow the operator to enter the Tube Sheet ID, Tube OD, Tube ID and the percentage of wall reduction required, to allow the electronic torque controller to display the target ID. The electronic torque limit settings must be entered manually.
- 3. **Manual Set-Up:** Allows the operator full manual control for setting the torque limits of the electronic torque control. Display screens are not functional.

Automated Set-Up

This selection provides step-by-step prompts for calculating a target rolled ID & automatically setting the limits for the rolling motor shut-off values.

<u>Operation</u>	<u>Display</u>
1. Select Language Choice: (# entry is NOT required for this step)	English 1 Espanol 2
2. Retrieve Last Setting: Enter [1] for Yes to retrieve previous settings prior to the controller being shut off. <u>If previous mode was Automated:</u> The program will return to Automated mode and retrieve the limit setting, target ID, and last roll cycle count. [Reset Roll Cycle Counter?] screen will appear. If you wish to continue from the previous count, press [2] for No . If you want to reset the the counter to 0, press [1] for Yes . (Note: This screen will only appear if the previous mode was Automated.) Once an entry has been made, the operator can continue rolling. <u>If previous mode was Assisted:</u> The program will return to Assisted mode and retrieve previous target ID and limit setting. Once these settings have been retrieved, the operator can continue rolling. <u>If previous mode was Manual:</u> The program will return to Manual mode and retrieve the limit setting. Once this setting has been retrieved, the operator can continue rolling.	Retrieve Last Setting? Y1 N2
	Reset Roll Cycle Counter? Y1 N2

To start a new program:

Enter [2] for **No** and proceed to the Operating Mode Selection screen.

3. Operating Mode Selection:

(Three screens will cycle in 3-second intervals until a selection is made.)

1=Automated Set-Up

2=Assisted Set-Up

3=Manual Set-Up

(# entry is **NOT** required for this step)

**Automated Set-Up
1**

**Assisted Set-Up
2**

**Manual Set-Up
3**

4. Select Unit of Measure: (Inch shown for examples)

Inch – “in” will be fixed in screen lower right corner with 3-place decimal displayed to the left.

(ie: 0.000in)

Metric – “mm” will be fixed in screen lower right hand corner with 2-place decimal displayed to the left.

(ie: 00.00mm)

(# entry is **NOT** required for this step)

**Inch 1
Metric 2**

5. To set the number of rolling cycles that is to occur prior to being prompted by the dialogue screen recheck the tube ID, enter a number on the keypad then press [#]. To bypass this function, enter number 0 then [#]. Maximum number that can be entered will be 99999.

(Note: If the operator is using a manual reversing motor, they should enter twice the number that would be entered if they were using an auto-reversing motor.)

**Enter No. Roll
Cycles + #**

6. Enter Tube Sheet Hole ID (Example = .760”):

Enter ID (number) + depress [#] to enter.

**Enter Sheet Hole
ID + # 0.760in**

7. Enter Tube OD (Example = .750”):

Enter Tube OD (number) + depress [#] to enter.

**Enter Tube
OD + # 0.750in**

8. Enter Tube ID (Example = .620”):

Enter Tube ID (number) + depress [#] to enter.

**Enter Tube
ID + # 0.620in**

9. Enter Percent of Wall Reduction (10% shown for example):

(“%” symbol will be fixed in screen lower right corner with percent in whole number to the left.)

Enter % (number) + depress [#] to enter.

**Wall Reduction
Enter % + # 10%**

(Note: * Key, for returning to previous dialogue screens, is only active to Step 9. To correct an incorrect entry after Step 9, a complete restart will be required.

10. Automatic initial limit (motor base line) setting:

Operator runs the motor (w/o expander) for a full 15 seconds.

If motor is stopped prematurely the dialogue screen will prompt the operator to run the motor again. During this cycle, the display screen will show a seconds of time countdown.

At the end of the cycle, the controller will shut the motor off automatically. This initial motor value, plus a predetermined value will be displayed and stored as the torque limit starting number.

**Run Motor w/o
Expander [00]**

11. First trial expansion.

The operator will expand an actual tube & measure the rolled ID. (This screen will be displayed during tube rolling operation.)

**Roll Next Tube &
Measure ID**

12. Target Rolled ID:

(Screen will be displayed for 3 seconds then display

[ID Under?] screen.)

The Target Rolled ID display is the ideal tube ID based on the dimensions loaded into the memory during set up.

Target Rolled ID 0.643

13. Rolled ID measurement check **[ID Under?]**:

The operator is prompted with the question ID Under? This

question is to be answered after the operator takes a measurement of the rolled ID and if the answer is “Y”, a predetermined number of points will be added to the trip-out

setting & the operator is prompted **[Roll Next Tube & Measure ID]**. If the answer is “N” a predetermined number

of points will be subtracted from the torque controller setting. Steps 9 thru 11 will be repeated until “N” is answered to

[ID Under?]. If operator answers “N”, screen prompt **[ID Over?]** will be displayed. Target ID is displayed in lower right corner of

display upon completion of the first rolling operation. No. of add-on points will be determined by:

(1) Power source 110V or 220V?

(2) Motor baseline 120 or less?

(3) Motor baseline above 120?

**ID Under?
Y1 N2 0.643**

14. Rolled ID measurement check **[ID Over]**:

The operator is prompted with the question ID Over?

If the operator answers “Y” a predetermined number of points will be subtracted from the trip-out setting & the

operator is then prompted **[Roll Next Tube & Measure ID]**.

Steps 9 thru 11 will be repeated until “N” is answered to

[ID Under?]. If operator has answered “N” to both screen prompts, the target ID has been achieved and

[Target Achieved] screen is displayed with the actual Target ID displayed in the lower right corner of the

dialogue screen. The Torque Controller will then lock-out limit setting buttons. Operator must go into “Manual” mode

of operation (by turning the controller off and then back on) to engage the limit setting buttons. The Target ID is displayed

continuously in lower right corner of the display. If the operator answers “Y” to **[ID Under?]** after the first roll and

then answers “Y” to **[ID Over?]** after the second roll, the number of points will be half the previous added amount.

(This screen will remain displayed while the controller is in the “Automated” mode to remind the operator of his

target ID.)

**ID Over?
Y1 N2 0.643**

Target Achieved 0.643