



Cobalt™ Panel Mount Controller

Operations Manual



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OVERVIEW

The Cobalt Controller is designed for a rollforming machine. The following features make it the ideal choice your rollformer:

- Open-collector thermally protected outputs interface directly to solenoid valves
- Full color display
- Touch-screen for quick and easy batch programming
- Multiple batch programming
- Program additional batches while the line is running
- Graphics along with text for intuitive setup
- Select from many English and Imperial units
- Touch screen push buttons to start the hydraulics, manual shear, and jog the roll former
- Inputs for uncoiler ready, hydraulics ready, and vfd ready
- Set up Wizards for easy installation
- Auto-Calculating and updating the stopping time for the tightest tolerance
- Quick-Correct™ for a one-touch quick length correction

STATUS SCREEN

This screen is used to program batches and select the desired one to run. At the top of the screen, the line speed and length of material beyond the shear are displayed.

0 FPM					0.000 in	
#	QTY	DONE	LENGTH			
1	20	0	120.000 in	®	▲	
2	15	0	144.000 in	®	▲	
3	15	0	168.000 in	®	▶	
4	50	0	108.000 in	®	▼	
5	10	0	132.000 in	®	▼	

#	Batch Number (50 batches total)
QTY	Quantity (Number of pieces to Make.)
DONE	Number of pieces completed
LENTGTH	Length of pieces. (Length may be entered in a number of units. See configuration for details)
® ®	Status of the batch, Ready, Next, Work, and Done.
Config 	Goes to the configuration screen for entering setups.
Correction 	Brings up Quick Correct™ for length.
Set Next 	Selects the batch to run next.

▲	To top of list
▲	To previous page
▶	To Next batch
▼	To next page
▼	To bottom of list

EDITING BATCH DATA

The controller has 50 batches in which you can enter a quantity and length. Double-touching a batch brings up a keypad allowing you to edit the data. After entering the data on the length field, you will automatically be transitioned to the next batch.

#	QTY	DONE	LENGTH	
1	20	0	120.000 in	®

Keypad buttons: 1, 2, 3, ↑, ESC, 4, 5, 6, ↓, 7, 8, 9, 1X↵, ., 0, ENTER, DONE.

#	Batch Number, 1—50 can be entered.	3	Keys to enter numeric data
QTY	Quantity (Number of pieces to make. Upon programming a new quantity, the number completed for this batch is reset to zero).	6	
DONE	Number of pieces already completed. This number automatically increments when the shear fires. This value is reset to zero when a new quantity is programmed.	↑	Move to previous batch
LENGTH	The desired length of the part. A number of different units are available. See configuration data for details.	↓	Move to next batch
		1X↵	Backspace
		DONE	Exit edit mode
		ENTER	Accept the entered data
		ESC	Abort the edit

CORRECTION SCREEN


Press the Correction soft key and the two keys will change to Correction +/- . When the + key is pressed the length will increase by the amount programmed into the setup parameter Length +/- Correction Adjust. In the example below, 0.063" is programmed in. The – key will shorten the part by this amount. As you press the key multiple times, quickly after one another, the value will increase/decrease by this value. Pressing the + key twice will increase the length by 0.125".


0 FPM		0.000 in	
#	QTY	DONE	LENGTH
1	20	0	120.000 in ®
2	15	0	144.000 in ®
3	15	0	168.000 in ®
			108.000 in ®
			132.000 in ®



Part Length Correction

Correcting: 0.063 in

Part: 120.000 in

Correction


Correction


<div style="border: 1px solid gray; padding: 5px; text-align: center;"> Correction  </div>	Increases the length by the value in the setups.
<div style="border: 1px solid gray; padding: 5px; text-align: center;"> Correction  </div>	Decreases the length by the value in the setups.

CONFIGURATION SCREEN

This screen is used to configure the controller to fit a particular machine or desired method of operation.

0 FPM
0.000 in

<div style="display: flex; justify-content: space-between; font-size: 10pt;"> HW: N/A FW: N/A Config TOTAL FOOTAGE N/A </div>		
9 Control Tolerance	0.500 in	<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: green; border: 1px solid green; margin-right: 5px;"></div> </div>
10 Press Dwell Down	0.100 s	<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: green; border: 1px solid green; margin-right: 5px;"></div> </div>
11 Press Dwell Up	0.000 s	<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: green; border: 1px solid green; margin-right: 5px;"></div> </div>
12 Slug Width	0.000 in	<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: green; border: 1px solid green; margin-right: 5px;"></div> </div>
13 Delay After Shear	0.00 s	<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: green; border: 1px solid green; margin-right: 5px;"></div> </div>

Exit

←

I/O

Len. Cal.

	Return to status screen.		To top of list
	Transition to Input/Output status screen.		To previous page
	Go to the length calibration screen.		
HW:xxxxxx	The hardware version of your controller.		To next page
FW:xxxxxx	The version of firmware installed in your controller.		To bottom of list
Total Footage	The life total for your controller.		Parameter is unlocked and value may be edited. See Digital I/O for info.
			Parameter is locked and value may NOT be edited. See Digital I/O for info.

CONFIGURATION PARAMETER DESCRIPTIONS

Parameter	Description	Lockable
1 Units of Measure	Determines the unit in which lengths are entered. You may choose between: <ul style="list-style-type: none"> • Decimal Inches • Decimal Feet • Feet Fractional Inches • Millimeters • Centimeters • Meters If you choose a metric unit, the units on all values will change to metric.	No
2 Encoder Resolution	Number of encoder counts per unit of travel. For example: 2,000 counts divided by 12 inch wheel equals 166.667 counts/inch.	Yes
3 Encoder 2 Resolution	For a second level. Number of encoder counts per unit of travel. For example: 2,000 counts divided by 12 inch wheel equals 166.667 counts/inch.	Yes
4 Material Encoder Direction	If the encoder wheel is turning forward but the controller is counting backwards, toggle this parameter.	Yes
5 Material Encoder Direction	For a second level. If the encoder wheel is turning forward but the controller is counting backwards, toggle this parameter.	Yes
6 Correction Factor	An adjustment percentage that fixes inaccuracies between the measured lengths and the actual length. This number may be calculated and entered by hand, or you can use the calibrated length screen to automatically adjust this number.	Yes
7 Correction Factor 2	For a second level. An adjustment percentage that fixes inaccuracies between the measured lengths and the actual length. This number may be calculated and entered by hand, or you can use the calibrated length screen to automatically adjust this number.	Yes
8 Length Correction +/- Adjust	This is the amount that the Correction +/- soft keys will adjust the length when pressed.	Yes
9 Control Tolerance	The material must stop within this value before firing the shear. If not, the machine will halt and an error message will be displayed indicating how far out of tolerance the piece is.	Yes
10 Press Dwell Down	Time that the shear-down output is turned on for a shear operation. The output will immediately turn off if the shear complete input	Yes

	turns on. If a zero is entered for this parameter, the shear-down output will remain on until the complete input turns on.	
11 Press Dwell Up	Time that the shear-up output is turned on for a shear operation. The output will immediately turn off if the shear complete input turns on. If a zero is entered for this parameter, the shear up output will remain on until the complete input turns on.	Yes
12 Slug Width	Amount of material removed with the shear die.	Yes
13 Delay After Shear	Time that the line will pause after a shear cycle before running the next part.	Yes
14 Batch Complete Dwell Time	Time the batch complete output is on after the batch is completed.	Yes
15 Halt Method	Determines when the line will halt when it has multiple batches programmed. Never, Piece, and Line	Yes
16 SmartCut Location	Distance prior to the shear that the line will stop and tell the operator to cut the coil free so that the line does not get queued up with coil. This is automatic tail out.	Yes
17 SmartCut Location 2	For a second level. Distance prior to the shear that the line will stop and tell the operator to cut the coil free so that the line does not get queued up with coil. This is automatic tail out.	Yes
18 Minimum Slow Distance	The controller will switch the material to a slow speed ahead of the target early, this distance, plus the calculated deceleration distance. The minimum slow distance is used to compensate for inaccuracies in predicted deceleration and to insure that the controller stops from a consistent speed. This value has no effect on a single speed line.	Yes
19 Deceleration Rate	The rate at which the controller expects the material to decelerate from fast to slow. This value has no effect on a single speed line.	Yes
20 Deceleration Rate 2	For a second level. The rate at which the controller expects the material to decelerate from fast to slow. This value has no effect on a single speed line.	Yes
21 Stopping Time	The time required for the material to stop after it is commanded to do so. The controller stops motion early by a distance equal to the current velocity times the stopping time. This parameter is automatically updated based upon the next parameter, Max Stop Time Change.	Yes
22 Stopping Time 2	For a second level. The time required for the material to stop after	Yes

	it is commanded to do so. The controller stops motion early by a distance equal to the current velocity times the stopping time. This parameter is automatically updated based upon the next parameter, Max Stop Time Change.	
23 Max Stopping Time Adjust	On each shear, the controller calculates what the additional stopping time should have been to make a perfect part. A percentage of that difference is added to the current stopping time. If that difference is greater than the value in this parameter, no adjustment is made. A small value in this parameter will prevent abnormal adjustments for items such as jam-ups.	Yes
24 Stacker Delay	Delay time for the stacker output to come on.	Yes
25 Stacker Dwell	Time that the stacker output remains on.	Yes
26 Touch Screen Sensitivity	An adjustment to control how hard you have to touch the touch-screen to read that a touch was performed. The new value takes effect after a power off and on.	Yes
27 Double-Touch Delay	An adjustment for the amount of time required between consecutive touches for the two separate touches to be considered a double touch. The new value takes effect after a power off and on.	Yes
28 Totals 1	Running material production totals. These totals can be reset or reinitialized at any time.	Yes
29 Totals 2		Yes

EDITING CONFIGURATION PARAMETERS

Double-touching a parameter brings up a keypad allowing you to edit the data. The keypad displayed works the same as it does for entering batch data.

DROP-DOWN LIST PARAMETERS

2 Units of Measure	Decimal Inches ▼
3 Halt Method	Decimal Inches
4 Encoder Resolution	Decimal Feet
5 Encoder Direction	Feet Fractional Inches
	Millimeters
	Centimeters
	Meters

To change the value, you touch the current value to drop down the list of options. Then you touch the new option. You may do this on the configuration screen directly or with the edit mode keypad up.

NUMERIC PARAMETERS

4 Encoder Resolution	500.000 cnt/in	
-----------------------------	-----------------------	---

To change numeric parameters, you must have first brought up the keypad by double-touching the parameter. Then press the appropriate buttons on the keypad to edit the numeric values. You must press ENTER for the value to be saved. Pressing ENTER will bring up the next parameter for editing. Pressing DONE or ESC will take you back to the configuration screen.

LENGTH CALIBRATION SCREEN

This screen is used to adjust the length-measurement-correction scaling.

0 FPM		0.000 in	
CALIBRATE PART LENGTH			
DESIRED	ACTUAL	OLD CF	NEW CF
120.000 in	120.000 in	0.000 %	0.000 %

1	2	3	↑	ESC
4	5	6	↓	
7	8	9	1X↗	
.	0	← ENTER	DONE	

Enter the desired length (the prompt will be the last part made). Enter the actual length that was measured. Data entry is done by the keypad in the same way in which batches are programmed. The New Correction Factor (CF) will be displayed based on the lengths entered.

The correction factor must be between 95% and 105%. If a value outside this range must be entered to achieve accurate lengths, check the encoder resolution value. New Correction Factor (CF) will be red in color if the value is outside the limits.

After pressing DONE, the new correction factor will take effect. If you press ESC, the change is aborted.

INPUT/OUTPUT SCREEN

This screen shows a real-time status of the controller's digital inputs and outputs. This is often useful for troubleshooting purposes.




0 FPM
0.000 in

Digital Inputs		Digital Outputs	
<input checked="" type="radio"/> 1	Output-Enable	<input type="radio"/> 1	Run
<input type="radio"/> 2	Run	<input type="radio"/> 2	Mill Fast
<input type="radio"/> 3	Jog Mill Fwd	<input type="radio"/> 3	Mill Slow
<input type="radio"/> 4	Jog Mill Rev	<input type="radio"/> 4	Mill Reverse
<input type="radio"/> 5	Manual Shear	<input type="radio"/> 5	Press 1
<input type="radio"/> 6	Press 1 Complete	<input type="radio"/> 6	Press 1 Aux.
<input type="radio"/> 7	Setups Lockout	<input type="radio"/> 8	Mill Jogging
<input type="radio"/> 8	Encoder Select	<input type="radio"/> 11	Batch Complete
<input type="radio"/> 9	Rollformer Ready	<input type="radio"/> 12	Stacker Drop
<input type="radio"/> 10	Hydraulics Ready		
<input type="radio"/> 11	Uncoiler ready		

Exit

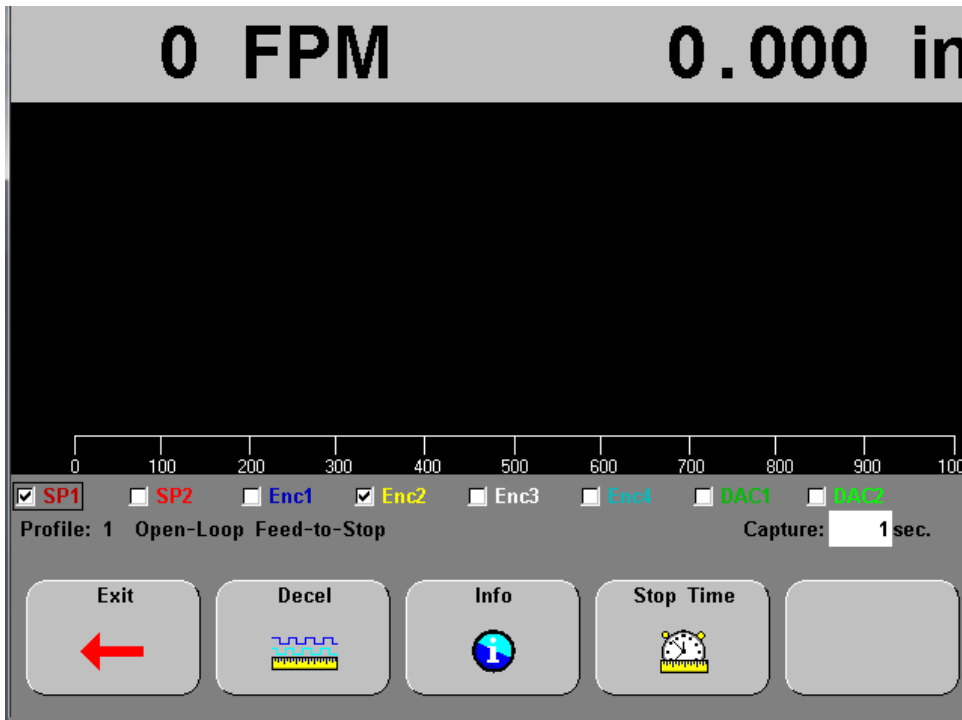
Calibrate





Wizards

<div>Exit</div> 	Exit and return to configuration screen.
<div>Calibrate</div> 	Calibrate the Touch Screen.
<div>Wizards</div> 	Enter the Wizards screen to help setup the machine.

WIZARD SCREEN

This screen is used when setting up the Cobalt for the specific machine. The Wizards are step-by-step instructions on setting up the various parameters.



<div>Exit</div> 	Exit and return to configuration screen.
<div>Decel</div> 	Press to enter into Deceleration Wizard calculator.
<div>Info</div> 	Press to get information on the Wizards.
<div>Stop Time</div> 	Press to enter into Stopping Time Wizard calculator.

POWER / INPUTS / OUTPUTS CONNECTIONS

Pin	Function	Signals
CONNECTOR X1		
1	IN 1	Output Enable
2	IN 2	Run
3	IN 3	Jog Mill Forward
4	IN 4	Jog Mill Reverse
5	IN 5	Manual Shear
6	IN 6	Shear Complete
7	IN 7	Setups Lockout
8	IN 8	Encoder Select
9	IN 9	Rollformer Ready
10	IN 10	Hydraulics Ready
11	IN 11	Uncoiler Ready
12	IN 12	
13	GND CPU	
14	+12 -24V CPU	
CONNECTOR X2		
1	+12 -24V I/O	
2	GND I/O	
3	OUT 1	Run
4	OUT 2	Mill Fast
5	OUT 3	Mill Slow
6	OUT 4	Mill Reverse
7	OUT 5	Press 1
8	OUT 6	Press 1 Aux
9	OUT 7	
10	OUT 8	Mill Jogging
11	OUT 9	
12	OUT 10	
13	OUT 11	Batch Complete
14	OUT 12	Stacker Drop

‡ If ON, you cannot edit lockable parameters. See “Lockable” column for “Configuration Screen Parameter Descriptions” on Configuration Screen page. Touch Screen Calibration is also locked when this input is on.

Digital Outputs are Open-collector. They are sinking, meaning they take a load to ground when turning it on.

Digital inputs are sourcing, meaning you must pull them to ground to turn them on.

ENCODER CONNECTIONS

Pin	Function
CONNECTOR X3	
1	ENC +5V
2	GND
3	2B+
4	2B-
5	2A+
6	2A-
7	SHIELD
8	1B+
9	1B-
10	1A+
11	1A-
12	SHIELD
13	ANG 1+
14	ANG 1-

Encoder signals are expected to be RS422 compatible. The Cobalt's interface is equivalent to a 26LS33 receiver.

UPGRADING FIRMWARE

1. Copy the "Autorun.s19" and "Cobalt.S19" files from Beck Automation onto a Compact Flash (CF) card into a folder named "BA1400." The compact flash card must be formatted as FAT and not FAT32.
2. Insert the CF card into the cobalt controller.
3. Power on the controller.
4. A progress bar will appear as the controller loads and programs the new applications.
5. When programming is complete, the screen will turn green and wait.
6. Turn off the controller.
7. Remove the CF Card.
8. Turn on the controller.
9. Verify the application-build date by going to the CONFIGURATION SCREEN and looking in version in the blue title bar.

SETTING THE TOTAL FOOTAGE COUNTER

The "TOTAL FOOTAGE" meter is a counter that keeps track of the total number of feet that have been run through the machine. Every time a shear occurs--either running or a manual shear--the distance past the shear is added to this value. Dashes or parentheses should be used where I've shown two hyphens.

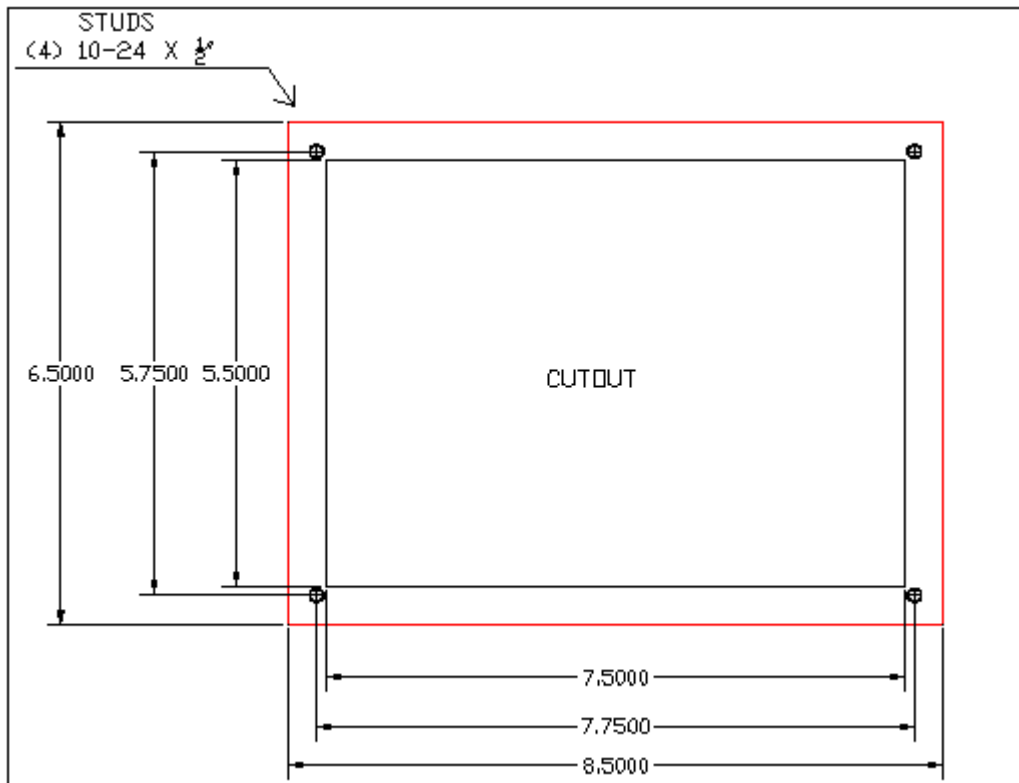
The only provision made available to change this meter is to use a specific program supplied by the manufacturer. This program can be put onto a compact flash card and inserted into the controller to set this value.

To set this meter, follow the procedure below:

1. Obtain the "AUTORUN.S19" & "SetMeterValue.txt" files for setting the "TOTAL FOOTAGE" meter.
Note: This "AUTORUN.S19" file for setting the footage meter IS NOT the same one that is used for updating the application code, even though the file names are the same. This is a special program and must be kept separate from the standard "AUTORUN.S19" file.
2. A directory named "BA1400" should be created on a compact flash card off of the root directory (if it doesn't already exist). Then copy the "AUTORUN.S19" and "SetMeterValue.txt" files to the "BA1400" directory.
3. The directory structure should look like this:
E:\BA1400 ('E' is the compact flash card drive letter. BA1400 is the directory name.)
AUTORUN.S19 (This file is contained in the BA1400 directory...)
SetMeterValue.txt (...and so is this one.)
4. The "SetMeterValue.txt" file is a standard text file that can be edited with notepad or other text editor. The numeric value in this file is the value that will be programmed into the "TOTAL FOOTAGE" meter. If you want the meter to be cleared to 0, simply edit the number in the file to a 0. If you want the meter to be 1024, simply edit the number in the file to 1024. Remember to save the file back to the compact flash card after editing.
5. With these files on the compact flash card, insert it into the controller and power on the controller. When the controller powers up, a progress bar will appear on the bottom of the controller's screen. If the meter was set successfully, the screen will turn GREEN and wait. If the meter was NOT set successfully, the screen will turn RED and remains static. Turn off the controller, remove the card, and power the controller back on.

MECHANICAL INFORMATION

The controller is designed to mount in an operator's panel. It does have a gasket between the touch screen and sheet metal which is water resistant.



PARAMETERS SHEET

PARAMETER	VALUE
1 Units of Measure	
2 Encoder Resolution	
3 Encoder 2 Resolution	
4 Material Encoder Direction	
5 Material Encoder Direction	
6 Correction Factor	
7 Correction Factor 2	
8 Length Correction +/- Adjust	
9 Control Tolerance	
10 Press Dwell Down	
11 Press Dwell Up	
12 Slug Width	
13 Delay After Shear	
14 Batch Complete Dwell Time	
15 Halt Method	
16 SmartCut Location	
17 SmartCut Location 2	
18 Minimum Slow Distance	
19 Deceleration Rate	
20 Deceleration Rate 2	
21 Stopping Time	
22 Stopping Time 2	
23 Max Stopping Time Adjust	
24 Stacker Delay	
25 Stacker Dwell	
26 Touch Screen Sensitivity	
27 Double-Touch Delay	
28 Totals 1	
29 Totals 2	