BECT832/840/940-SSO V4.0/4.1
Screwdriver Controller Operation Manual

CAUTION - Please read, understand, and follow all operating and safety instructions in this manual before using the BECT832/840/940-SSO controller.

This controller is designed for use exclusively with the following Delta Regis Brushless Electric Screwdrivers:

BECT832-SSO-V4.0/4.1:   CESL810-812(P/S), CESL823-824(F/P/S)
BECT840-SSO-V4.0/4.1:   CESL810-812(P/S), CESL823-824(F/P/S), 827-829(P/F/PF/S)
BECT940-SSO-V4.0/4.1:   CESL(T)835-875(P)M, CESL(T)885-895(P)M, CESP(T)824, 828-830, 835-865(F/U), CESL(T)935-955(P/F/PF), CESLT835-875(M/F)/RA(H/S)

Do not attempt to use these controller with any other tools.

If you have any questions or concerns, please contact us at:

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Important - Installation and Safety

Warning - Failure to understand and follow proper installation guidelines, safety requirements, and operating instructions may result in malfunction, component damage, property damage, shock hazard, fire hazard, injury or death.

1. Please read and understand the operation manual and follow all safety and operation instructions.
2. Place the controller in a suitable dry, indoor location. Do not use this controller in damp, wet or high temperature environments. Do not use in the presence of flammable liquids or gases.
3. Ensure that the controller has proper ventilation. Do not expose the controller to areas subject to airborne contaminants (eg. dust, metal filings).
4. Use only a properly grounded electrical outlet of the correct supply voltage to power the screwdriver controller. Ensure that the supply outlet is overload protected and of sufficient amperage capacity.
5. Use only the correct plug for the controller and outlet. Hold the plug of the power cord when connecting or disconnecting. Do not pull on the cable.
6. Do not expose the cable or controller to oil, chemicals, or heat. Ensure that the cable is routed and used in such a manner as to not be subject to sharp objects that may abrade or cut the cable.
7. Locate the controller in a suitable, safe location on a steady surface. Do not place in a high location where there may be a risk of it falling. Secure the controller in position to prevent possible movement caused by pulling on the power or tool cables.
8. Do not cover the controller or stack any objects on top of or near the controller. Ensure that adequate clearance and ventilation is provided around the perimeter of the controller.
9. The BECT832/840/940(N)-SSO Controllers are for use exclusively with Delta Regis brand screwdrivers as specified on page 3. Use of these controllers with any other tool may result in malfunction, damage, or injury.
10. In the event that the controller is overloaded beyond the maximum current rating, an internal fuse will disrupt power. Should the controller stop functioning, or exhibit abnormal or intermittent operation, please discontinue use immediately and send the controller to an authorized service centre for troubleshooting and repair.
11. Excessive duty cycle will cause the tool and/or controller to overheat. If this occurs, discontinue use until cooled down and reduce cycle rate. As a general rule, do not exceed 10-15 screws/minute.
12. The brushless screwdrivers incorporate a protection circuit which stops the electric screwdriver if the tool is switched from forward to reverse while running. Should this happen, the operator must release the tool trigger and restart the fastening cycle.
13. Turn the main power switch off when the controller is not being used. Unplug the controller if it is not being used on a regular basis.
14. Do not attempt to disassemble or repair the screwdriver or controller. Repairs should only be performed by qualified technicians properly trained in the safe operation, troubleshooting, and repair of these devices. Please consult Delta Regis for the location of the nearest service depot.
15. Use only the factory specified Delta Regis brand replacement parts and accessories with these tools and controllers.
16. Any damage to the tool and/or controller resulting from misuse, abuse, or failure to follow these guidelines will void the limited product warranty.

Grounding - This controller (and AC power cord) is equipped with a 3-prong electrical receptacle/plug with ground pin. The controller must be connected to a properly grounded AC electrical outlet. Do not attempt to use this controller without a properly functioning ground connection. Never connect a live circuit to the ground pin or internal yellow-green ground wire.

Model Numbers	BECT832-SSO-V4.0/4.1; BECT840-SSO-V4.0/4.1; BECT940-SSO-V4.0/4.1
Input	100-240V AC, 50/60Hz, ~1.2A (BECT832-SSO-V4.0/4.1) 100-240V AC, 50/60Hz, ~6.3A (BECT840-SSO-V4.0/4.1) 115-230V AC, 50/60Hz, ~6.3A (BECT940(N)-SSO-V4.0/4.1)
Output	32 / 24 VDC, 60W (BECT832-SSO-V4.0/4.1) 40 / 32 / 24 VDC, 220W (BECT840-SSO-V4.0/4.1) 40 / 32 / 24 VDC, 360W (BECT940-SSO-V4.0/4.1)
Speeds	Hi / Lo (switch selectable)

Applicable Screwdriver Models	
BECT832-SSO-V4.0/4.1	• CESL810-812(P/S), CESL823-824(F/P/S)
BECT840-SSO-V4.0/4.1	• CESL810-812(P/S), CESL823-824(F/P/S), 827-829(P/F/PF/S)
BECT940-SSO-V4.0/4.1	All BECT840-SSO compatible models plus • CESL(T)835-875(P)M, CESL(T)885-895(P)M, • CESP(T)824, 828-830(F/U), 835-865(U), • CESL(T)935-955(P/F/PF), CESLT835-875(M/F)/RA(H/S)

Slow Start Function	Selectable ON / OFF
Slow Start Time Adjustment	0–9.9 seconds
Slow Start Speed Adjustment	~30–100% of rated speed
Count Method (selectable)	Count up to total / count down from total
Count Setting Range (rundowns/batch)	1–99

Time Window Settings	
Minimum acceptable rundown time	0.00–9.90 seconds (0.01 sec increments)
Maximum acceptable rundown time	0.0–9.9 seconds (0.1 sec increments)

Audible Alarm Settings (selectable)	
'On' sounds when	Good / No Good / Batch Complete
'OF' sounds when	No Good Only
'FF' sounds when	Batch Complete / No Good
'EF' sounds when	Good / Batch Complete

Input Connections	Remote Start, Remote Reverse, Disable Tool, External Confirm, Enable Batch, External Clear
Output Connections	Rundown OK, Rundown NG, Batch Complete

Dimensions (L x W x H)	200 x 130 x 100 mm (BECT832-SSO-V4.0/4.1) 248 x 130 x 100 mm (BECT840/940-SSO-V4.0/4.1)
Weight	1.5 kg (BECT832-SSO-V4.0/4.1) 2.4 kg (BECT840/940-SSO-V4.0/4.1)
Approvals	CE/RoHS/ETL
Included Accessories	3M Sheilded Cable, AC power cord, Key set for program lock, Terminal strip, User manual

Controller Overview

Front Face of Controller

SCREWDRIVER HI/LO SPEED SELECTOR
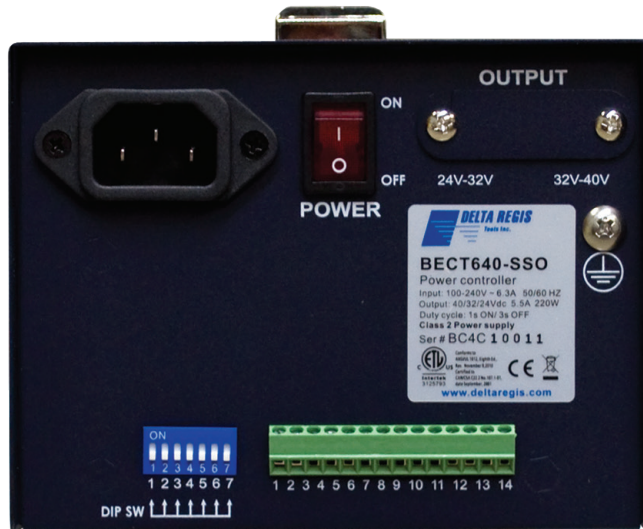
PROGRAM FUNCTION KEY LOCK

SCREWDRIVER CABLE CONNECTOR

KEYPAD AND INDICATORS FOR PROGRAMMING AND STATUS MONITORING

INPUT VOLTAGE SELECT SWITCH 110V OR 220V (TOP OF UNIT, BECT940-SSO ONLY)

AC INPUT CABLE RECEPTACLE AND MAIN POWER ON/OFF SWITCH

OUTPUT VOLTAGE SELECT SWITCH 24/32 OR 32/40 VDC (BECT840/940-SSO ONLY)

DIP SWITCH FOR SELECTING OPTIONAL FUNCTIONS

INPUT/OUTPUT CONNECTION TERMINAL BLOCK

Rear Panel of Controller

Getting Started

The BECT832-SSO is designed to work with 32VDC brushless screwdrivers. The BECT840/940-SSO is designed to work with both 32VDC and 40VDC brushless screwdrivers. In order to accomodate the series of tool being used, an OUTPUT voltage must be set via a covered selection switch on the rear face of the controller (840/940-SSO ONLY). Slightly loosen (do not remove) the two screws securing the OUTPUT cover in place. Pivot the cover down and move the slide switch left (24V–32V) for 32VDC brushless screwdrivers or right (32V–40V) for 40VDC brushless screwdrivers. Reposition and tighten the cover.

Connect the 6-pin cable of a compatible Delta Regis brushless screwdriver from the tool to the controller. Delta Regis 32VDC brushless tools plug directly into the BECT832-SSO controller connector. Delta Regis 40VDC brushless tools plug directly into the BECT840/940-SSO controller connector. When using 32VDC brushless tools with the BECT840/940-SSO, use of an adapter cable is required (DR96-40TO32V-WHIP). Ensure that the cable is installed in the proper orientation (spring guard at tool end) and that the connectors are seated properly with the fastening rings secured. On the BECT940-SSO, it is important to set the proper supply voltage on the input voltage select switch before the unit is plugged in to power.

Plug the controller into a properly grounded AC outlet. Turn ON the main power switch on the back of the controller. The audible alarm will beep, the RUN indicator LED (green) will light up, and the display panel will show the starting batch count value. One of the three output voltage LED indicators (24/32/40V) will be lit up (BECT840/940-SSO ONLY), indicating the controller's output voltage to the tool. Changing the speed selector switch from HI to LO will toggle between the two available speeds/voltages for that series of tool.

Keypad and Programming Basics

ON - CLEAR KEY
Pressing and holding the ON button for 5+ seconds will cause the display to go blank. In this mode the screwdriver will function at HI/LO speed, but there will be no other functionality (counting, slow start, etc). Pressing ON from this mode will restore the display and added functionality.
Other uses of ON/CLEAR are explained where required throughout this manual.
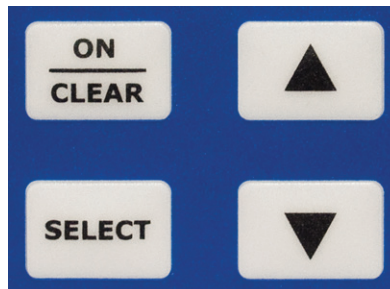
UP / DOWN ARROW KEYS
The UP and DOWN arrow keys are primarily used to make adjustments to numeric values when in the program edit mode.

Pressing both keys simultaneously cycles through the available sound options for the controller.

Other uses of the ARROW keys are explained where required throughout this manual.

SELECT KEY
The SELECT key is used primarily for entering the program editing mode and cycling through the available program settings.
Other uses of SELECT are explained where required throughout this manual.

SOFTWARE KEYPAD LOCK
Pressing SELECT + UP ARROW together will toggle the software keypad lock on/off. This lock limits functionality of the keypad (eg - no entering program edit mode).
'LC' will momentarily display, indicating locked. 'Un' will display indicating unlocked. ***It is highly recommened to Software Lock the unit once programming is complete to prevent an accidental factory reset.***

SEQUENCE LIST (SL)

There are 5 programmable screw fastening sequences (SL='U1' to 'U5') available. In many cases, only the first sequence (U1) will be needed. If the screwdriver is used to install a batch of fasteners with varying requirements, multiple sequences may be necessary. For example, if an assembly requires the installation of 4 screws, where 3 screws are short and 1 screw is long, the controller can be programmed with 2 unique sequences - a sequence for the short screws and one for the long screws. This would allow different time windows to be set-up for the two different screw lengths. Each sequence must be programmed separately, and numbered in the order that the screws will be installed (starting with Sequence U1). In this example, if the 3 short screws are to be installed first, enter the program for Sequence 'U1' with a batch quantity of 3 and time parameters for the short screw. Then repeat the program steps for Sequence 'U2' with a batch quantity of 1 and the time parameters for the long screw. Finally, program Sequence 'U3' with a batch quantity of '00' to signify that there are no further fasteners to install. (For multiple sequences, refer also to info on setting dip switch #6 on pg. 13).

BATCH COUNT SETTING (SC)

Enter the desired number of fasteners to be installed per batch. Depending on the setting of DIP switch #1, the display will either count down from the total batch value entered, or count up to the total batch value. The count will only increment (and indicate a 'GOOD' rundown) if the rundown cycle falls within the limits set by the min and max rundown time settings (see below). When all fasteners in the batch have been installed, the controller will indicate that the batch is complete and the count will reset for the next cycle.

If, after a good rundown, the operator runs the screwdriver in reverse, the batch count value will decrement by a count of one (based on the assumption that the operator is removing the last installed fastener).

The batch count can be reset to begin a new batch by pressing the ON/CLEAR key.

END OF BATCH / OK ALL SIGNAL OUTPUT RESET TIME (Rt)

When a rundown batch is completed, the controller provides a visual indication (count = '00') and audible indication (depending on audible settings) that the batch is complete, followed by a reset of the display count for the beginning of the next batch. The END OF BATCH RESET TIME value determines how long these indicators will stay on before the batch count resets. Please note that the screwdriver cannot be operated during this reset time period.

OK SIGNAL OUTPUT RESET TIME (Ot)

Allows OK to stay illuminated for a specified amount of time (0.0 - 9.9 sec) (0.0 holds signal until next start)

SLOW START TIME (RC) and SLOW START SPEED (SP)

Please refer to the section entitled 'Screwdriver Speed Adjustments' for further information on the Slow Start function.

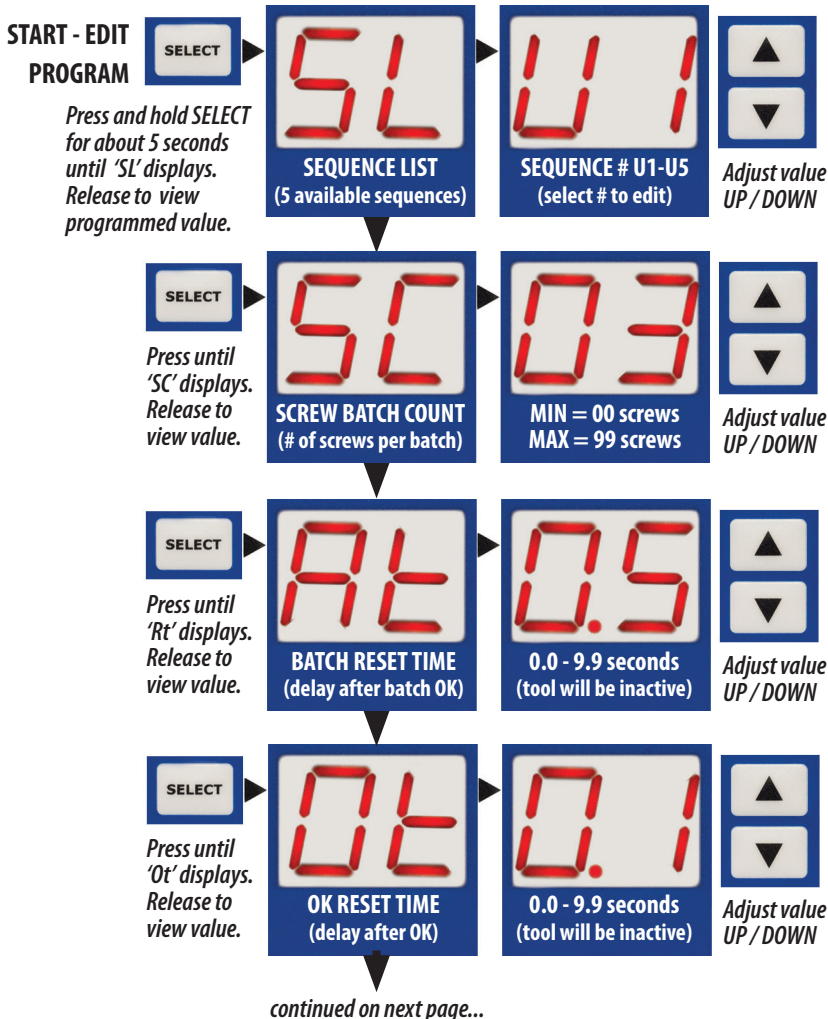## MAXIMUM AND MINIMUM RUNDOWN TIME SETTINGS (Ht, Lt)

The controller determines whether a fastener rundown is deemed GOOD (OK) or NO GOOD (NG) by comparing the actual time taken for the rundown cycle to a time window programmed by the user. For example, a cross threaded screw will cause the screwdriver to shut-off too early (before min time) and a stripped screw will cause the driver to run too long (beyond max time).

NO GOOD (NG) ◄——— GOOD (OK) ———► NO GOOD (NG) ——► Time (seconds)

Cycle Start ———— MIN Time ———— MAX Time
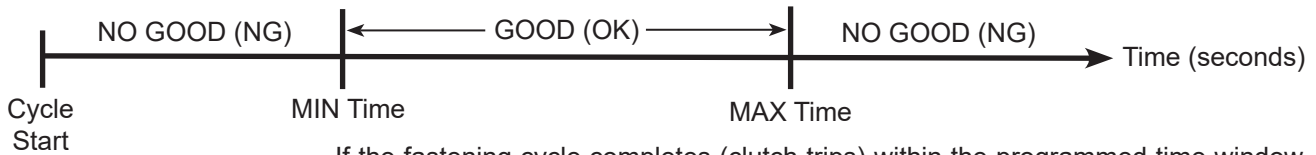
If the fastening cycle completes (clutch trips) within the programmed time window, the rundown cycle will be accepted as GOOD (OK) and the batch count will increment.

RECONFIRM TIME (LL)

If the assembly process requires that the operator has the ability to 'double-hit' the fastener (release and retrigger the screwdriver on a fastener that has just been installed), a reconfirm time can be programmed into the control. During this time period (which immediately follows the completion of the rundown), the operator is able to re-trigger the tool without causing a No Good (NG) error signal to be generated. Slow start time (RC) must be set to a value of '0.0' for this function to be available, so that the tool has full power to run the re-hit cycle.

START - EDIT PROGRAM

SELECT ►

Press and hold SELECT for about 5 seconds until 'SL' displays. Release to view programmed value.

SL
SEQUENCE LIST
(5 available sequences)
►
U1
SEQUENCE # U1-U5
(select # to edit)
▲ ▼
Adjust value UP / DOWN

SELECT ►

Press until 'SC' displays. Release to view value.

SC
SCREW BATCH COUNT
(# of screws per batch)
►
03
MIN = 00 screws
MAX = 99 screws
▲ ▼
Adjust value UP / DOWN

SELECT ►

Press until 'Rt' displays. Release to view value.

Rt
BATCH RESET TIME
(delay after batch OK)
►
0.5
0.0 - 9.9 seconds
(tool will be inactive)
▲ ▼
Adjust value UP / DOWN

SELECT ►

Press until 'Ot' displays. Release to view value.

Ot
OK RESET TIME
(delay after OK)
►
0.1
0.0 - 9.9 seconds
(tool will be inactive)
▲ ▼
Adjust value UP / DOWN

continued on next page...

Notes and Guidelines:

Programming Mode Locks
To view or edit the sequences, the KEY LOCK must be unlocked and the software lock (toggled by pressing SELECT+UP simultaneously) must also be unlocked (Un). If the lock is on when you attempt to enter programming an LC will be displayed.

(Rt) Batch Reset Time
At batch completion, the screwdriver will not operate for the length of the batch reset time setting.

(Ot) OK Reset Time (Not shown)
After each OK rundown, the OK LED and output signal will remain on for the length of the OK reset time setting. 0.0 will hold the LED and output signal until the trigger is depressed for the next rundown.

SELECT
Press until 'RC' displays. Release to view value.

SLOW START TIME
(length of slow start)

0.0 - 9.9 seconds
(set < rundown time)

Adjust value UP / DOWN

(RC) Slow Start Time
The slow start time must be less than the time required to install the screw. The tool must switch to full speed before the clutch activates for shut-off.

SELECT
Press until 'SP' displays. Release to view value.

SLOW START SPEED
(percent of run speed)

L1 (slow) - L9 (fast)
L0 = slow start off

Adjust value UP / DOWN

(SP) Slow Start Speed
Slow start speed is adjustable in steps from lowest (L1 ~ 30% of full spd) to highest (L9 ~ 85% of full spd). L0 equals 100% of run speed or slow start off.

SELECT
Press until 'Ht' displays. Release to view value.

HIGH TIME SETTING
(max. rundown time)

0.0 - 9.9 seconds
(cycle NG if time > Ht)

Adjust value UP / DOWN

(Ht) High Time and (Lt) Low Time
The Ht and Lt settings establish a time window for OK/NG evaluation of a fastener rundown. Low Time (Lt) must be set to a value lower than High Time (Ht) during programming or an error (Er) will occur. **Ht value must be > Lt.**
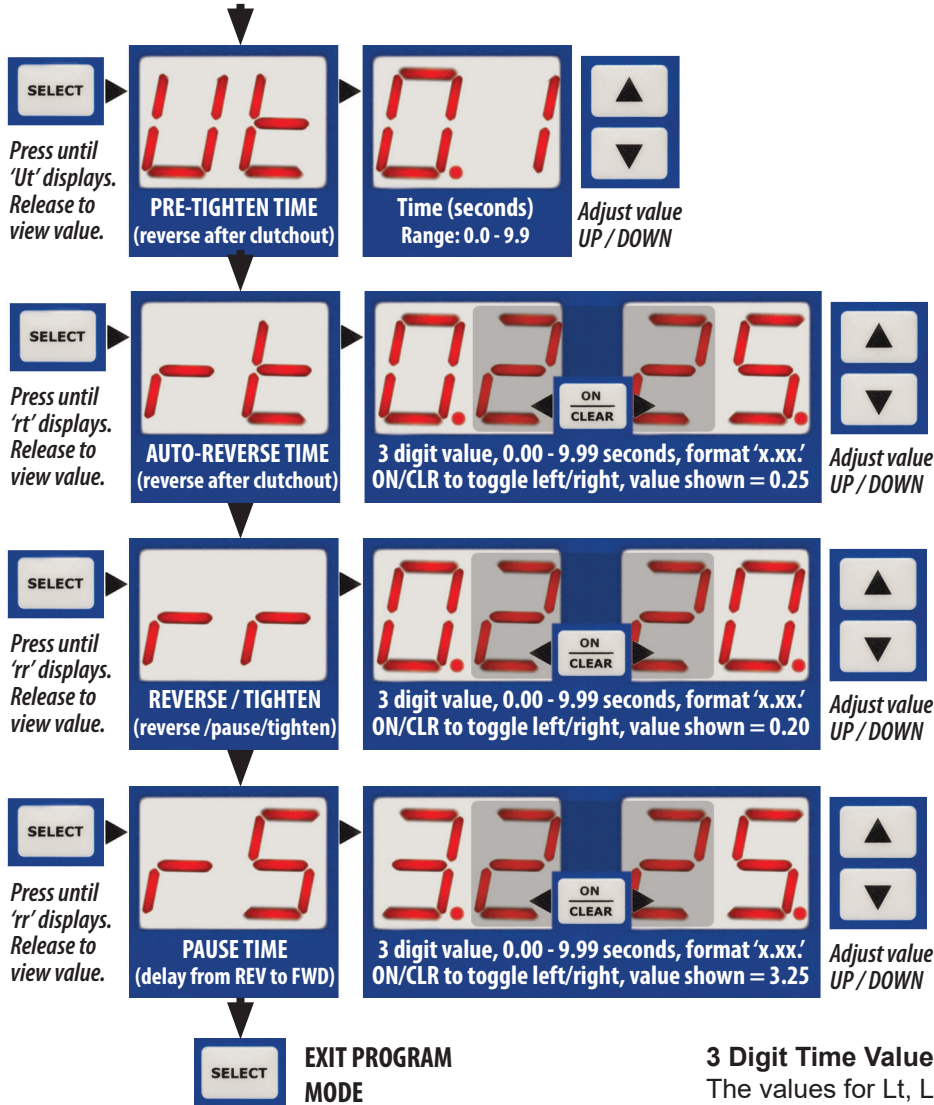
SELECT
Press until 'Lt' displays. Release to view value.

LOW TIME SETTING
(min. rundown time)

3 digit value, 0.00 - 9.99 seconds, format 'x.xx.'
ON/CLR to toggle left/right, value shown = 1.25

Adjust value UP / DOWN

SELECT
Press until 'LL' displays. Release to view value.

RE-HIT SCREW TIME
(re-hit after tightening)

3 digit value, 0.00 - 9.99 seconds, format 'x.xx.'
ON/CLR to toggle left/right, value shown = 0.50

Adjust value UP / DOWN

(LL) Re-Hit Screw Time
Programming of the (LL) value is only available if Slow Start Time (RC) is set to 0.0 (slow start off). The re-hit function can't be used in conjunction with slow start.

SELECT
Press until 'nS' displays. Release to view value.

DISABLE ON 'NG'
(confirm to continue)

n = no (off)
y = yes (must confirm)

Toggle value

(nS) Disable Screwdriver on 'NG'
If 'nS' is set to y (yes), the screwdriver will be disabled after a no good (NG) rundown. The operator must confirm by pressing the SELECT key, or an external confirm signal must be input through the I/O. (applies to forward cw rotation only).

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SELECT

Press until 'Ut' displays. Release to view value.

PRE-TIGHTEN TIME
(reverse after clutchout)

Time (seconds)
Range: 0.0 - 9.9

▲ ▼

Adjust value UP / DOWN

SELECT

Press until 'rt' displays. Release to view value.

AUTO-REVERSE TIME
(reverse after clutchout)

3 digit value, 0.00 - 9.99 seconds, format 'x.xx.'
ON/CLR to toggle left/right, value shown = 0.25

ON CLEAR

▲ ▼

Adjust value UP / DOWN

SELECT

Press until 'rr' displays. Release to view value.

REVERSE / TIGHTEN
(reverse /pause/tighten)

3 digit value, 0.00 - 9.99 seconds, format 'x.xx.'
ON/CLR to toggle left/right, value shown = 0.20

ON CLEAR

▲ ▼

Adjust value UP / DOWN

SELECT

Press until 'rr' displays. Release to view value.

PAUSE TIME
(delay from REV to FWD)

3 digit value, 0.00 - 9.99 seconds, format 'x.xx.'
ON/CLR to toggle left/right, value shown = 3.25

ON CLEAR

▲ ▼

Adjust value UP / DOWN

SELECT **EXIT PROGRAM MODE**

The final option displayed will be depend on the settings of 'Rc', 'LL' and 'rt'. Once the final value is adjusted, press SELECT to return to normal operation.

(Ut) Pre-Tighten Time (Not shown)
Entering a value greather than 0.0 for pre-tighten time will cause the driver to stop and provide an OK signal (0.0 - 9.9 sec). If the driver stops before the preset time has elapsed, a NG error will occur.

(rt) Auto-Reverse Time
Entering a value greater than 0.00 for auto-reverse time will cause the driver to reverse after the clutch trips for the preset amount of time. 'LL' must be set to 0.00 for the 'rt' function to be available.
(rr) and (rS)
Reverse / Pause / Tighten
Entering a value greater than 0.00 for 'rr' will start the cycle with a timed reverse ('rr' value), followed by a delay ('rS' value), then forward until the clutch activates.
Note:
- FWD/REV switch must be in REV position for the function to work.
- 'LL' and 'rt' must equal 0.00 for the 'rr' function to be available.

3 Digit Time Values
The values for Lt, LL, rt, rr, and rS are 3-digit time values in seconds, with a format of **x.xx**.
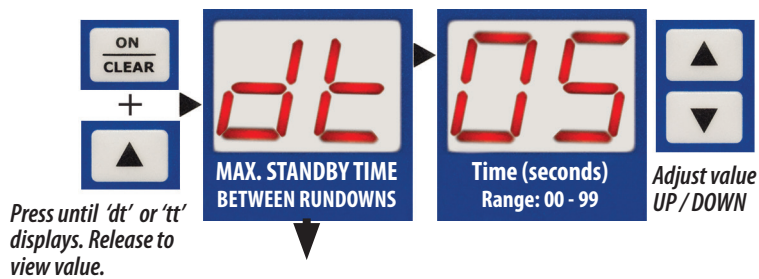To view/edit the entered value, toggle left and right using the 'ON/CLEAR' button. The position of the decimal point on the screen indicates whether you are viewing the 'ones' and 'tenths' digits, or the 'tenths' and 'hundredths' digits respectively.
Note that the 'tenths' digit appears on both screens.

Optional 'dt' and 'tt' Cycle Time Alarms, other misc options

Two optional alarms are provided to alert the operator if too much time is being taken to run the screws into the assembly. The 'dt' Standby Time Alarm can be set in 1 second intervals. It is the allowable time to run each screw cycle. If, during the batch, the screwdriver remains idle for a time exceeding the 'dt' value, an audible alarm will sound and the display will flash 'dt' until the driver is triggered for the next cycle. (Note: depending on other program settings, the operator may need to press 'S' to continue driving screws if 'dt' is flashing in the display.)

The 'tt' Total Batch Time Alarm can be set in 1 minute intervals. If the batch is not completed within the 'tt' time setting, an alarm will sound and the display will flash 'tt' until the operator runs the driver and completes the batch. Only one of the two optional alarms can be selected for use.

MAX. STANDBY TIME BETWEEN RUNDOWNS — **Time (seconds)** Range: 00 - 99 — *Adjust value UP / DOWN*

Press until 'dt' or 'tt' displays. Release to view value.

Press 'SELECT' to exit setting of 'dt' value..

If 'dt' value is greater than '00', the display will skip the 'tt' option and prompt for the 'Sr' setting.

If 'dt' = 00, the display will prompt for input of a 'tt' value.

MAX. TOTAL BATCH TIME WARNING — **Time (minutes)** Range: 00 - 99 — *Adjust value UP / DOWN*
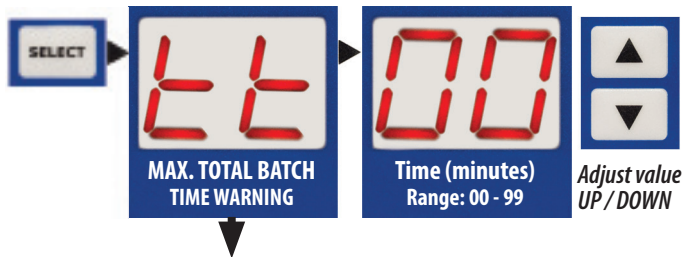
Press 'SELECT' to exit setting of 'tt' value. Display will prompt for Sr setting

n = no
**y = yes** — *Toggle value*

The 'Sr' value is valid when the controller is set to run multiple sequences (DIP SW6 On) and the batch enable input (DIP SW2 On, or DIP SW 2 & 4 On) is being used to confirm the batch start via an external switch.

If 'Sr' is set to the default value of 'n' (no), the controller will require an external enable input at the beginning of the first sequence U1 only.
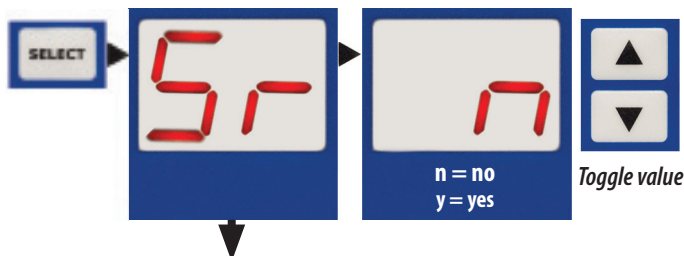
If 'Sr' is set to 'y' (yes), the controller will require an enable input at the beginning of each sequence (eg. U1, U2, and U3 will all require an enable if 3 sequences are running sequentially).
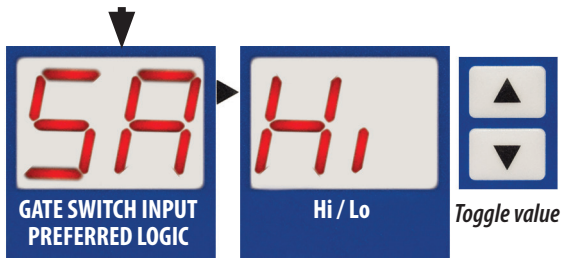
Press 'SELECT' to exit setting of 'Sr' value. Display will prompt for 'Gr' setting

n = no
y = yes
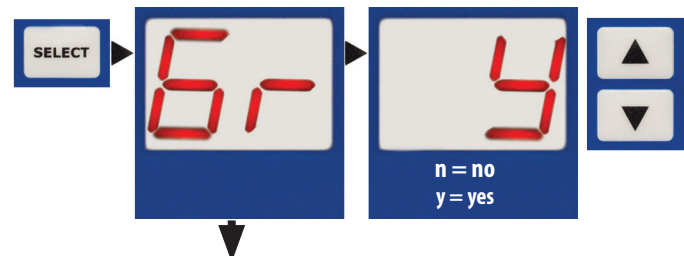
When an error occurs, 'y' = error condition is normal. When DIP SW 2 OFF error occurs, user must 'CONFIRM' to disable

SA

GATE SWITCH INPUT
PREFERRED LOGIC

Hi

Hi / Lo

▲
▼

Toggle value

When using a single gate switch (DIP SW2 On) to enable the batch start, option 'SA' allows the choice of switching with either of the following:

Hi = use a normally closed contact, momentarily open to enable
Lo = use a normally open contact, momentarily close to enable

Press 'SELECT' to return to normal operating mode. Count value is displayed.

Screwdriver Speed Adjustments

The controller provides two speed control options for the tool - HI/LO running speed and optional slow start. A running speed of HI or LO may be selected via the rocker switch on the front face of the controller. Please refer to the screwdriver catalog specifications for the tool's free speed RPM at the HI and LO settings.

The controller also has a selectable slow start option. This option can be helpful in engaging screw threads properly to avoid cross-threading. The slow start is intended for initiating the fastener rundown only - the slow start time must be limited so that the tool switches to full speed before the fastener completes its rundown.

There are two separate variables for setting up the slow start function - time and speed. Set the slow start time by entering the desired slow start time value (0.0–9.9 sec) for function 'RC' during the programming sequence. Set the slow start speed by selecting a value for function 'SP'. You can choose between values of L1-L9 (30% ~ 85% of screwdriver free speed rpm) or L0 (100%). Exit the program mode and engage the start (trigger or push) mechanism on the screwdriver to check settings. Repeat until the desired result is achieved.
Refer to the programming flow chart (pg. 7) for further details on entering parameters.

Audible Alarm Settings / OK and NG Lights

Along with the two digit count display, the controller also provides visual and audible indication of rundown OK, rundown NG, and batch complete.

The OK (green) and NG (red) lamps indicate whether the rundown was GOOD or NO GOOD. If the rundown is within the set parameters, the OK lamp will light up at the end of the rundown cycle. If the rundown is no good, the NG lamp will light at the end of the rundown. When the fastening batch is completed, the batch count value will display '00' and then reset after a time delay determined by the value programmed into the END OF BATCH RESET TIMER.

To suit individual user preferences, four variations of the audible alert are available. When active, the audible alert provides a single short beep for rundown OK, a single long beep for batch complete, three short beeps for rundown NG (below MIN time setting) and continuous short beeps until the trigger is released for rundown NG (above MAX time setting).

The four selectable settings are:

ON	*sounds when...*	OK / NG / Batch Complete
OF	*sounds when...*	NG
FF	*sounds when...*	NG / Batch Complete
EF	*sounds when...*	OK / Batch Complete

Press the UP & DOWN arrow keys simultaneously to choose the next available audible alarm setting.

To change the audible alert setting, with the controller in operating mode (not in programming mode), press the UP and DOWN arrow keys simultaneously. The controller will loop to the next available audible setting and show the new current audible setting value in the display.
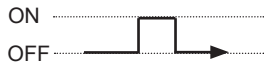
Input / Output Connector

An input/output connector is provided on the back face of the controller for interfacing signals with external equipment.

V+
DC voltage (+24VDC, 200mA max) available if required to power external circuits
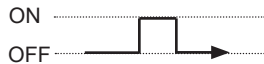
OK
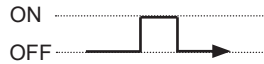Closes an output contact when an acceptable (GOOD) rundown cycle is completed

NG
Closes an output contact when an unacceptable (NG) rundown cycle occurs

**OK ALL**
Closes an output contact when the batch is completed

COM
Common (0VDC) - used when wiring in external input switches, or in conjunction with V+ supply

ENABLE
Input for external switch(es) verifying that the driver can be enabled to begin a new batch. *The use of external switches is dependent on DIP Switch Settings. Please see next page.*
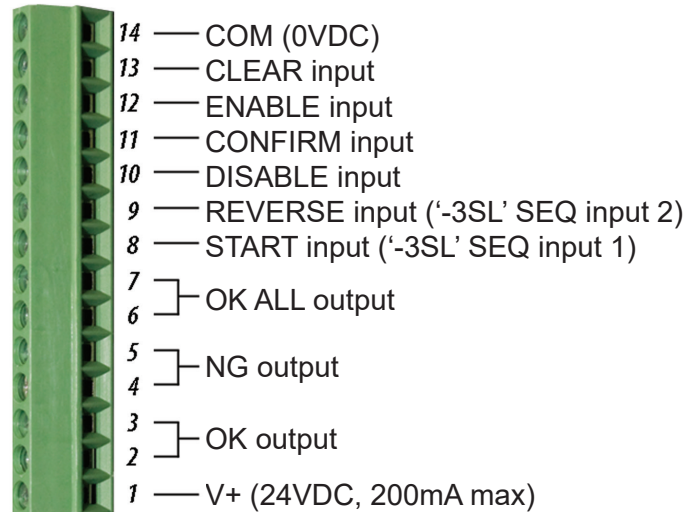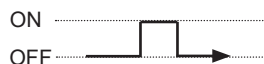
**CLEAR**
Input for external resetting of the batch count
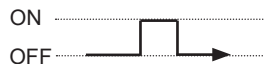
CONFIRM
Input for external confirmation that the process can continue *(see DIP SW3 description)*

14 —— COM (0VDC)
13 —— CLEAR input
12 —— ENABLE input
11 —— CONFIRM input
10 —— DISABLE input
9 —— REVERSE input ('-3SL' SEQ input 2)
8 —— START input ('-3SL' SEQ input 1)
7 / 6 — OK ALL output
5 / 4 — NG output
3 / 2 — OK output
1 —— V+ (24VDC, 200mA max)

DISABLE
Input to externally disable the screwdriver between rundowns as required by the process.
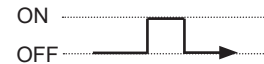
START and REVERSE
The reverse input works in conjunction with the start input. Providing a START input signal will remotely start the screwdriver; providing a REVERSE input signal prior to the START input will start the tool in reverse. This does not apply to '-3SL' models (see pg. 14 for details).

Output Terminals
OUTPUT TERMINALS 2 thru 7
Connection pairs 2/3, 4/5 and 6/7 are dry relay contact outputs (AC/DC 40V, 250mA max).

Input Terminals
INPUT TERMINALS 8 thru 13, COM 14
Connect an external switch between COM (terminal 14) and the input terminal (8–13). Use a separate switch contact for each required input. Closing the contact will activate the input. DO NOT SUPPLY POWER TO INPUTS.

DIP Switch Settings

There is a 7-position DIP Switch mounted in the rear face of the controller, next to the I/O Connector. The controller is shipped from the factory with all switches in the OFF (down) position. Please refer to the following guide to select the proper switch positions to suit your specific application.
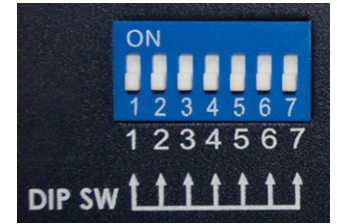
SW 1 - Counting Method
Determines whether the controller counts up from zero to the programmed batch value, or counts down from the batch value to zero. OFF = Count Down, ON = Count Up

SW 2 - External Switch (GATE Input)
If the process requires that an external input signal be present (at the GATE input) to allow the screwdriver to enable to start a new batch, then SW2 must be in the ON position. When SW2 is OFF, the external GATE input signal is not required. Refer to the diagrams below (SW 4 description) for further details on input signals and signal logic.

SW 3 - Manual or External Confirm to Reset Batch
With SW3 in the OFF position, the controller automatically resets to begin a new counting batch after completion of the previous batch. Placing SW3 in the ON position will require the operator to press the SELECT button (or require an external CONFIRM input) at the end of each batch before the controller will reset to run a new batch. Upon batch completion, the display will flash 'C3' and the screwdriver will be disabled until the SELECT button is pressed (or a CONFIRM signal is input).

SW 4 - Multiple External Switch Inputs (GATE Input)
In some instances, it may be desireable to interface two external input switches wired in parallel to the GATE input. As an example, one switch might be triggered by a finished part leaving the assembly station while the other is triggered by a new part entering the station. With SW4 in the OFF position (and SW2 ON), one external switch signal is required to enable the screwdriver. With SW4 in the ON position (and SW2 ON), two external switch signals are required to enable the driver.

1 External Signal at GATE Input
(DIP SW2 on / SW4 off)
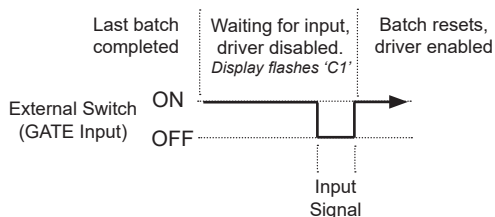
2 External Signals at GATE Input
(DIP SW2 on / SW4 on)
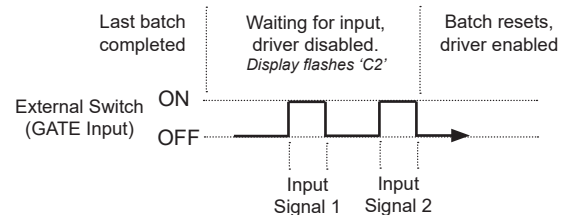
SW 5 - Evaluate Rundown Time

When SW 5 is moved to the ON position, the controller enters a rundown evaluation mode, which can assist in determining proper time window settings to program for the application. The operator will be allowed to run multiple rundown cycles (as many as desired) and the display will show the actual cycle time for each rundown. Certain program parameters must be entered after SW 5 is turned on, before the actual testing can start. Please keep in mind that the fastener rundown time will change if any adjustments are made to running speed (Hi/Lo), slow start speed, or slow start time. It is important that these adjustments are finalized before using this rundown evaluation procedure.

The test sequence is as follows: *(Note: The parameter setup portion of this test follows the standard programming flow chart outlined earlier in the manual.)*

1. Move DIP SW5 to the ON position.
2. The display flashes a value (eg. U1) - this value is the sequence number (SL) that the controller will use for setup of the rundown parameters. If you wish to use a different sequence number, use the UP/DN arrow keys to change.
3. Press SELECT. 'SC' will show in the display, followed by a value. Adjust the value to the desired 'batch count setting' for your application.
4. Press SELECT. 'Rt' will show in the display, followed by a value. Adjust the value to the desired 'end of batch reset time' for your application.
5. Press SELECT. 'RC' will show in the display, followed by a value. Adjust the value to the desired 'slow start time' for your application.
6. Press SELECT. 'SP' will show in the display, followed by a value. Select a value for the desired slow start speed (L0-L9). Refer to pg 8 for further details on speed settings.
7. Press SELECT. The display shows '0.0'. The tool is now ready to run tests. Use the screwdriver to rundown the fastener on the application. The display will count up time in 0.1 second increments until the cycle completes. Once complete, the cycle time will show in the display. Repeat the rundown as many times as desired.
8. Move SW5 to the OFF position. The controller will program the last recorded rundown time as the sequence's Max. Acceptable Rundown Time (Ht) value. The controller returns to normal operation mode and displays the batch count value.
9. Enter the Programming Mode (press and hold SELECT for 5 sec) to review/verify the settings and make any final adjustments to the time window values. *Please refer to the programming flow chart for further details on settings and values.*

SW 6 - Multiple Rundown Sequences

With SW6 in the OFF position, the controller will run only the current program sequence to complete the batch - it will not step to the next programmed sequence.

If you have multiple sequences programmed which you wish to run sequentially (*see Sequence Number (SL) on the programming page*), setting SW6 to ON will cause the controller to step through the programmed sequences in order until they have all been completed. A batch complete signal will be output once all sequences have completed, and the controller will loop back to the start of sequence SL=U1 to start the next batch. Note - if the controller encounters a sequence with a screw batch count (SC) set as zero, the controller identifies this as the end of the sequences and will loop back to the beginning to start a new batch.

SW 7 - Decrement Count on Reverse (see pg. 14 for -3SL version)

Following an OK rundown, if the operator switches the tool into REV and activates the trigger, the count will decrement. With SW 7 OFF, the count will decrement by one screw. With SW 7 ON, the count will decrement for each trigger activation in reverse (until the start count value has been reached).

Sequence Selection Inputs (-3SL Version Controllers Only)

The optional '-3SL Version' of the controller has two input terminals (8 and 9) which allow selection of one of the first three programmed sequences (U1 through U3). The input is activated (logic state '1') by connecting the appropriate input terminal (8 and/or 9) to the COM terminal (14) through a dry switch contact.

The input logic is as follows:

Logic State*		Resulting Action
Input 9	Input 8	
0	0	No sequence selection, use the current sequence
0	1	Select Sequence 'U1'
1	0	Select Sequence 'U2'
1	1	Select Sequence 'U3'

* Logic state is '0' when the input terminal (8 or 9) is not connected to COM (terminal 14), logic state is '1' when connected to the COM terminal.

Other notes regarding sequence selection:

1. Sequence select '00' signifies that sequence selection is turned off. The controller will remain in the last selected sequence. If the sequence input is changed to '00' in the middle of the batch cycle, the controller will maintain its value in the batch count and wait for the operator to complete the batch. With the input at '00', the active sequence number can be changed using the programming buttons if desired.
2. Sequence input changes can only be made while the screwdriver is idle. While in the programming mode (using the keypad to change settings), any attempt to change the sequence remotely through the inputs will not occur until the user exits the setting mode.
3. When switching between sequences, the screwdriver will be disabled for a 1 second interval. During this time, the buzzer will sound and both the OK and NG outputs will turn on together to acknowledge the change. The display will show the new sequence number, followed by the starting batch count value. After the 1 second sequence change, the screwdriver will be ready to operate (depending on the conditions of the enable and disable inputs).
4. If the sequence is changed part way through the batch count (eg. from U1 to U2; U1 has a batch count of 5 and only 3 screws have been installed), the change will take place immediately even though the operator did not finish the batch. The count will reset to the starting value for the new U2 sequence that has been selected. This is also the case (immediate change regardless of batch count value) when changing from a sequence input of '00' (off) to U1, U2 or U3.
5. DIP SW6 on the controller, when in the ON position, normally activates continuous stepping of the program through multiple sequences. In the '-3SL VERSION' of the controller, DIP SW6 will only be functional if the input value for the sequence selection inputs is '00' (off).
6. Following an OK rundown, if the operator switches the tool into REV and activates the trigger, the DIP SW 7 setting determines how reversing the screwdriver affects the batch count. With SW 7 OFF, the count will decrement by one screw. With SW 7 ON, the count will not decrement when the driver is run in reverse.

During operation of the counting controller and screwdriver, the LED display may indicate an error code. These codes indicate a fault that was encountered during the operation of the tool/controller.

Code	Indicates	Error Description	Possible Cause / Solution
E4	High Temperature Protection	Screwdriver has stopped because the operating temperature is too high.	- excessive duty cycle; allow tool/controller to cool down and re-test at lower duty cycle - internal issue; send for evaluation/service
E5	Stall Protection	Screwdriver has stopped because the motor stalled abnormally.	- prevailing torque (eg. soft joint, thread cutting) is causing the tool's motor to slow down and stall before reaching final torque; evaluate suitability of tool for the application - internal damage to gearing, clutch, or lack of lubrication is affecting motor's ability to complete the rundown; inspect gearing and clutch
E7	FWD/REV Switch Error	Controller detected a change in the position of the FWD/REV switch while the tool was running.	- FWD/REV Button was moved by the operator during rundown - switch PCB improperly positioned in tool housing or magnetic switching element has failed
E8	Brake Error	Controller detected an abnormal brake (clutch) signal before the tool was started.	- clutch is stuck at the top of the clutch ramp, possibly caused by operator releasing trigger too early in anticipation of shut-off. Turn off power to the driver, put a 1/4" hex key in the output shaft and turn the output shaft to reset the clutch - you will here a click when it resets. Ensure that operators are instructed to hold the trigger until the tool clicks over the clutch and shuts off. - internal push rod mechanism for clutch shut-off is sticking or of incorrect length. Send tool for evaluation/service.
PC	Power Change	An error or change in the tool supply voltage has been detected.	- Hi/Lo speed switch position was changed with the key lock turned ON. Lock must be off to change speed setting. - voltage setting incorrect for screwdriver being used. (eg. 40V setting selected for a 32V driver) - very soft joint causing power drop during rundown - faulty tool cable/connection; test with a new cable.

Display Codes

When waiting for operator or external input, the LED display will show one of a series of codes, depending on the DIP switch settings and the expected input. Further explanation is provide below.
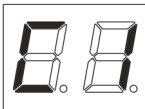
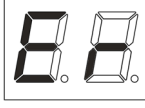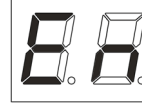| Code	Description
E1	**Waiting for input from a single external switch connected to GATE input.** DIP Settings - SW2(On), SW3(Off), SW4(Off)
E4	**Waiting for input from 1 external switch and manual SELECT/CONFIRM.** DIP Settings - SW2(On), SW3(On), SW4(Off)
E2	**Waiting for input from two external switches connected to GATE input.** DIP Settings - SW2(On), SW3(Off), SW4(On)
E5	**Waiting for input from 2 external switches & manual SELECT/CONFIRM.** DIP Settings - SW2(On), SW3(On), SW4(On)
E3	**Waiting for operator to press SELECT/CONFIRM to verify batch reset.** DIP Settings - SW2(Off), SW3(On), SW4(Off)
EE	**Waiting for operator to press CLEAR.**
Er	**Error detected during input of confirmation signal. Press SELECT/CONFIRM again to acknowledge.**
En	**Incorrect set-up during programming mode.** Example 'Lt (min time) value entered is > Ht (max time) value'.

Service

The BECT832/840/940-SSO Controllers are not user serviceable. Any repairs must be performed by a Delta Regis authorized service center. Please consult Delta Regis Tools for further information and the location of the nearest authorized service center.
Repairs to brushless DC screwdrivers must be performed by trained personnel, knowledgeable and qualified in the repair of DC electric screwdrivers. Use only genuine Delta Regis parts when servicing these products.
Do not attempt to modify the tools or controllers.

Warranty

The BECT832/840/940-SSO Controller is warranted for one year from the date of purchase against defects in material and workmanship. This warranty does not cover damage due to transportation, abuse, misuse, or improper service. Our sole remedy is to repair or replace (at our discretion) any unit found to be defective due to defects in material or workmanship. It is the responsibility of the user to return any product thought to be defective, freight prepaid, to our warehouse for inspection and evaluation.

There is no warranty of merchantability or fitness of purpose. In no event will Delta Regis Tools, Inc. be liable for business interruptions, loss of profits, harm, injury, damage, personal injury, cost of delay, or any other special, indirect, incidental, or consequential losses, costs, or damages.