



ESS MKII- A00175

Electronic Speed Switch

Operation Manual

Product name: ESS MkII Manual
Part number: A00175

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Installation

The following installation instructions refer to *Drawing 3 – Electronic Speed Switch Block Diagram*.

1. Power Supply

The ESS MkII Module requires a 110/240V AC supply. The required voltage is specified when the module is ordered. The required connections for the AC supply are as follows:

- C30 – Active
- C32 - Neutral

An earth wire from the earth terminal on the base should be connected to the panel's main earth.

1.1. Start Initiated

An initiate or start signal consisting of a set of voltage free N/O contacts should be connected across terminals A22 & A24. After the *Start Initiated* signal is detected by the ESS MkII an internal timer is started. This timer is used to allow the Belt to develop full speed before the Belt Slip Detection circuitry is enabled. This timer has a time period of 0 to 35 seconds and is set by the potentiometer (C7) as shown on Drawing 1.

NB. The Start Initiated signal should be removed before the Belt stops or the ESS MkII will generate a pulse head failure trip. This will require the ESS MkII to be reset before the next start can be performed.

1.2. Reset

A reset pushbutton may be connected across terminals A18 & A20. This pushbutton must be N/O. A reset facility is provided on the front of the ESS MkII and also on the ESS MkII's remote display. Therefore, this reset pushbutton needs only be connected if the ESS MkII is inaccessible and no remote display is installed.

1.3. CR – Control Relay

The CR is energised when the *Start Initiated* signal is detected. The relay contacts may be used in the Belt Starter's circuitry to verify that ESS MkII is monitoring Belt Slip. A set of NO contacts is provided for the CR, these are located at terminals C26 & C28.

1.4. LR – Latching Relay

The LR is energised when a trip condition is detected by the ESS MkII. A trip condition can be either a Belt Slippage or loss of pulses from either of the Electronic Sensing Heads (ESH). A set of changeover contacts are provided for the LR, these are located at terminals C8 (common), C10 (NC) & C12 (NO).

1.5. SR – Speed Relay

The SR relay is energised when the pulses from the Electronic Sensing Heads (ESH) indicate that the Belt is travelling at a speed greater than 85% of its maximum speed. A set of changeover contacts are provided for the SR, these are located at terminals C22 (common), C24 (N/C) & C20 (N/O).

1.6. BR – Braking Relay

The BR relay is energised when the pulses from the Electronic Sensing Heads (ESH) indicate that the Belt is travelling at a speed less than 15% of its maximum speed. A set of changeover contacts are provided for the BR, these are located at terminals C18 (common), C14 (N/C) & C16 (N/O).

1.7. ESH – Electronic Sensing Heads

The ESS MkII requires the ESH's (ferrous proximity sensor) to provide pulses at a frequency of 10Hz to 20Hz, or 600 to 1200 pulses per minute at the conveyors full speed.

Mild steel targets can be as small as 30mm and should protrude 25mm from the drum, shaft or roller. Nominal sensor to target range is 10mm if the target is 30mm or larger in diameter. The sensor range is affected by the target diameter, target thickness, target to background clearance.

The ESH sensors work equally as well counting holes as counting MS discs. The holes should be at least 50mm in diameter and be clear of any backing metal by 15mm.

- **Single Head Operation**

If the ESS MkII is to be operated with only one ESH then the ESH should be connected to *Sensing Head 1*. The connections to the ESH should be:

Sensing Head 1

A4 – Vcc (Brn)

A6 – Signal (Blk)

A8 – 0V (Blu)

NB.a link should be connected between A6 & A12 for single head operation.

- **Dual Head Operation**

If the ESS MkII is to be operated with two ESH's then the connections to the ESH's should be:

Sensing Head 1 (Idler)

A4 – Vcc (Brn)

A6 – Signal (Blk)

A8 – 0V (Blu)

Sensing Head 2 (Driven Roll)

A10 – Vcc (Brn)

A12 – Signal (Blk)

A14 – 0V (Blu)

2. Setup Procedure

This procedure should be followed each time an ESS MkII is commissioned or replaced. The following procedure, refer to *Drawing 1 – Electronic Speed Switch Front Panel* and *Drawing 2 Twin PCB Control Card*.

2.1. Select Single or Dual Head Operation

Before either Single or Dual Head operation is selected the current setting of the ESS MkII should be determined. When the belt is stationary switch C12 to select Head 2. If this reads 100% then the ESS MkII is configured for Single Head operation. If the ESS MkII is not setup for the correct number of pulse heads then remove the front cover. Drawing 2 shows the twin PCB control card. Item 1 on this drawing is used to select either Single or Dual Head operation. Use this switch to select either Single or Dual Head operation as specified in Drawing 2.

NB. the factory setting of the ESS MkII is Dual Head Operation.

2.2. Select the Percentage Slip

To setup the percentage slip the front cover of the ESS MkII must be removed. There are two DIL switches located on the twin PCB control card as illustrated in Drawing 2. The DIL switch labeled item 4 is used to select the Underspeed Slip percentage whilst the DIL switch labeled item 5 is used to select the Overspeed Slip percentage. It is possible to select a different percentage for Underspeed and Overspeed. The table below sets out the settings for the DIL switches:

Switch	Slip Percentage
1	5%
2	10%
3	15%
4	20%

After the required slip percentages are set, replace the front cover of the ESS MkII.

NB.

1. Only one switch on the DIL switch should be selected for Underspeed.(item 4)
2. Only one switch on the DIL switch should be selected for overspeed. (item 5)
3. All ESS MkII's supplied before 1999 have the percentage slip set at 20%
4. As of the 1/1/1999 all ESS MkII's will be supplied with the percentage slip set for 10% to comply with AS1755.
5. **Calibrate** ESS MkII.

2.3. Single Head Operation

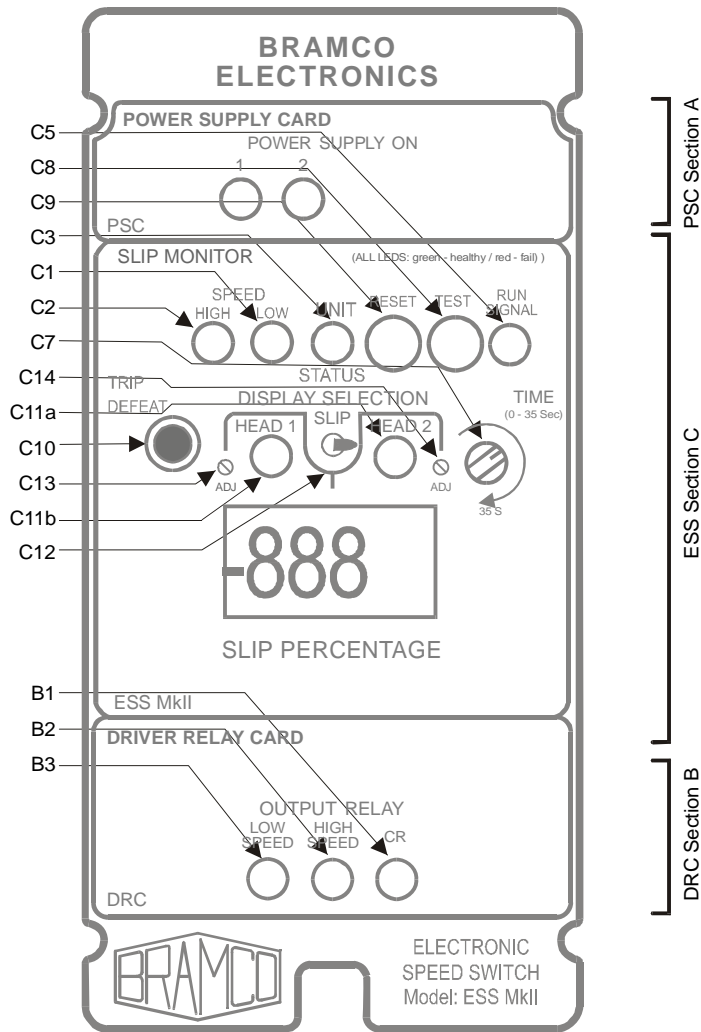
- (a) Start the conveyor whilst holding the *Trip Defeat* pushbutton (C10) located on the front of the ESS MkII. This pushbutton should be held in during the entire calibration procedure.
- (b) When the Belt is running at full speed without any slippage, operate the toggle switch (C12) to select *Head 1*.
- (c) Using a small screw driver adjust the potentiometer (C13) until the LED display reads 100%.
- (d) Return the toggle switch (C12) to the centre position.
- (e) Release the *Trip Defeat* pushbutton.
- (f) Adjust the potentiometer (C7) to the required time period to allow the Belt to reach full speed. This potentiometer may be adjusted to give a time period between 0 and 35 seconds.

NB. To operate with a single sensing head, the ESS MkII must be configured for single sensing head mode. See the Installation section of the manual for configuration details.

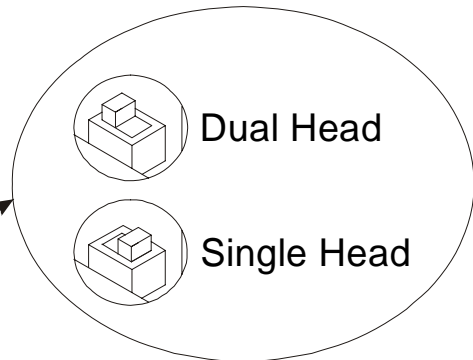
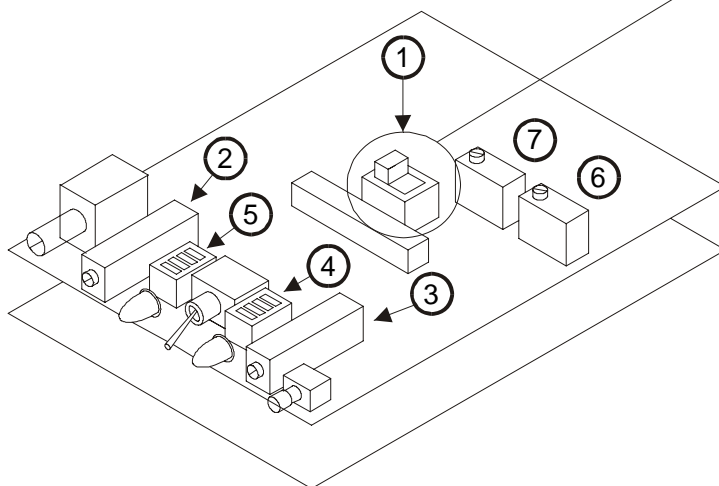
2.4. Dual Head Operation

- (a) Start the conveyor whilst holding the *Trip Defeat* pushbutton (C10) located on the front of the ESS MkII. This pushbutton should be held in during the entire calibration procedure.
- (b) When the Belt is running at full speed without any slippage, operate the toggle switch (C12) to select *Head 1*.
- (c) Using a small screw driver adjust the potentiometer (C13) until the LED display reads 100%.
- (d) Operate the toggle switch (C12) to select *Head 2*.
- (e) Using a small screw driver adjust the potentiometer (C14) until the LED display reads 100%.
- (g) Return the toggle switch (C12) to the centre position.
- (f) Release the *Trip Defeat* pushbutton.
- (g) Adjust the potentiometer (C7) to the required time period to allow the Belt to reach full speed. This potentiometer may be adjusted to give a time period between 0 and 35 seconds.

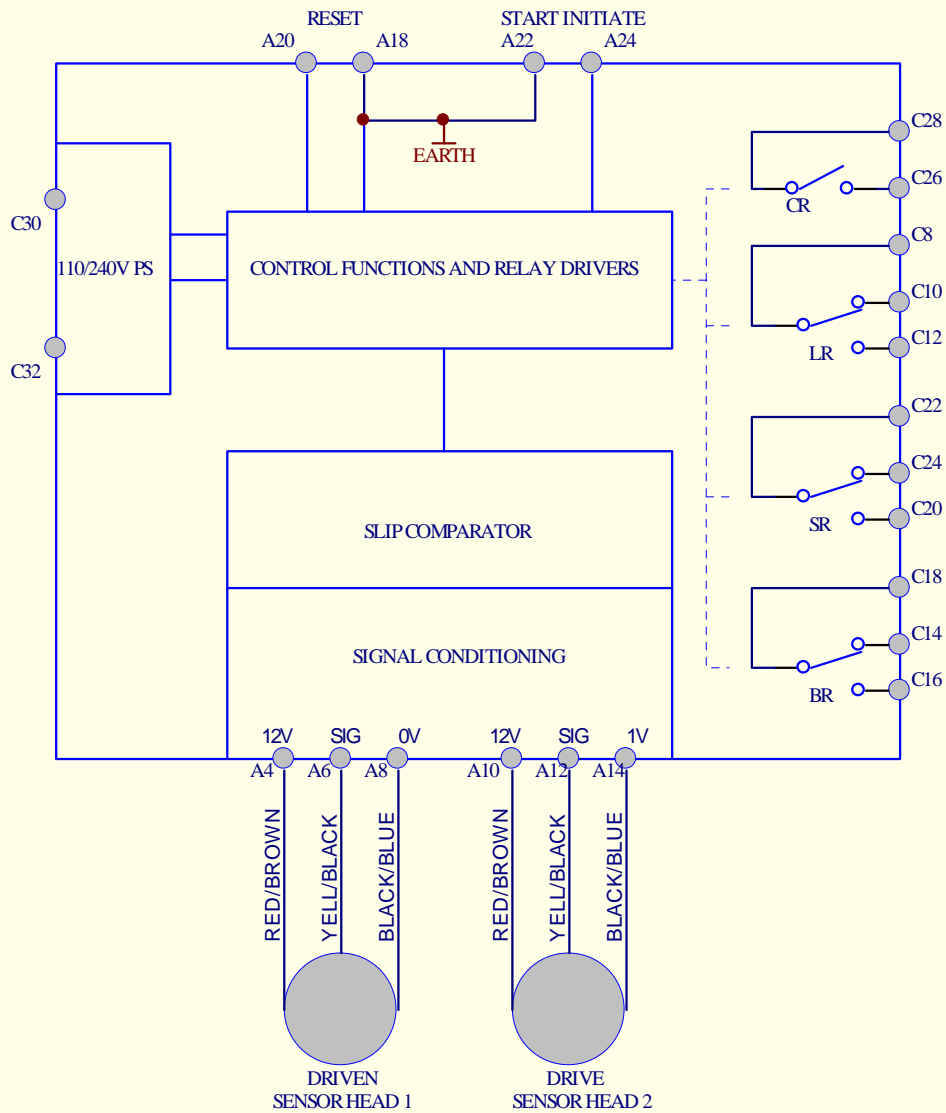
NB. To operate with two sensing heads, the ESS MkII must be configured for dual sensing head mode. See the Installation section of the manual for configuration details.



Drawing 1
Electronic Speed Switch Front Panel



Drawing 2
Twin PCB Control Card



ESS Mk2 BLOCK DIAGRAM
DRAWING 3