

Service Instructions

The Conductor Controls

- Conductor DC28-A, Enclosed Unit
- CH28-A, Open Chasis Unit



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Important

This service manual is provided to assist in the operation and maintenance of your Syntron Material Handling equipment.

Requests for additional manuals or replacement parts should be directed to:

Syntron Material Handling LLC
Saltillo, MS 38866-6814
Phone: 662-869-5711 / 800-356-4898
Fax: 662-869-7401
Email: info@syntronmh.com
Web: www.SyntronMH.com

Please be sure to include the following information when ordering replacement parts:

1. Machine model name
2. Factory order number
3. Quantity of parts required
4. Syntron Material Handling part number (from manual)
5. Description of part
6. Shipping instructions

Syntron Material Handling reserves the right to alter at any time, without notice and without liability or other obligations on its part, materials, equipment specifications, and models. Syntron Material Handling also reserves the right to discontinue the manufacture of models, parts, and components thereof.

Your satisfaction is very important to us. Please direct any comments, questions, or concerns to our Marketing Communications Department.

SAFETY INSTRUCTIONS

The purpose of safety symbols is to attract your attention to possible danger. Safety symbols, and their explanations, deserve careful attention and understanding. The safety warnings do not by themselves eliminate any danger. The instructions or warnings they give are not substitutes for proper safety procedures.

SYMBOL

MEANING



NOTE

Safety Alert Symbol: Indicates **DANGER, WARNING, or CAUTION.** Attention is required in order to avoid serious personal injury. This symbol may also be used in conjunction with other symbols or pictographs. Notes advise you of information or instructions vital to the operation or maintenance of the equipment.

IMPORTANT SAFETY INFORMATION

READ ALL INSTRUCTIONS BEFORE OPERATING

- Upon receipt, unpack and inspect the unit for damages that may have occurred during shipment. If damage is found, contact the shipping carrier and Syntron Material Handling immediately.
- Read instructions carefully. Be familiar with the controls and proper use of the unit.
- Do not operate the unit when tired, ill or under the influence of alcohol, drugs or medication.

Product safety labels must remain highly visible on the equipment. Establish a regular schedule to check visibility. If you need to replace safety labels, contact Syntron Material Handling, Material Handling Solutions for an additional supply free of charge.

The instructions and data in this instruction manual are vital to the proper installation and operation of this equipment. In order to avoid delays due to faulty installation or operation, please see that these instructions are read by the persons who will install, operate and maintain this equipment.

NOTE: Supporting information, such as drawings, may be attached to the manual. The information contained therein takes precedence over corresponding information printed in this manual.

INTRODUCTION

The Conductor™ Controls provide flexible and concise solid-state power control for inductive and resistive loads below control current rating. They are used with Syntron® electromagnetic vibratory equipment including light-duty feeders and electromagnetic type bin vibrators.

The standard Conductor Control features adjustable soft-start, UL and cUL rating, 50/60 Hz operation, and selectable full/half-wave operation. Conductor Controls also feature minimum and maximum operation windowing adjustments (permitting greater linearity for specific applications).

The control board contains a manual potentiometer for controlling output from the vibrating equipment. If desired, the Conductor Control is field selectable to accept a 4-20mA DC signal for feed control or for two rate of feed. A 0-5 volt DC external signal may also be used with modifications. See “Setup Procedure” for additional information on these features.

INSPECTION AND LONG-TERM STORAGE

Upon receipt, unpack and inspect the control for any damage that may have occurred during shipment. If damage is found, contact the shipping carrier and Syntron Material Handling immediately.

If the control must be stored for an extended period of time, it must be stored indoors in its original shipping container, in an area safe from water damage. Plug all openings in the control box to prevent dirt, rodents, and insects from entering. Syntron Material Handling advises placing a corrosive preventive inside the control box. Be careful not to drop the control because the impact could damage components.

INSTALLATION

While installing the control, be careful to maintain its NEMA or IP rating integrity. Power supply voltage and frequency requirements are designated on the control nameplate. If remote mounting is necessary, the control should be installed close to the equipment where it is easily accessible and within sight of the operator. Installation on a wall in a vibration-free location is recommended. Ambient temperature should not exceed 105°F (40°C).



WARNING: The power supply voltage and frequency must match the requirements indicated on the nameplate.



WARNING: The electrical power supply to the Syntron supplied control must be made through a customer-supplied safety disconnect switch mounted next to the control. All installation wiring must adhere to local electrical codes.



WARNING: The control must be properly grounded.



CAUTION: Follow the wiring diagram furnished with the control when making electrical connections.



CAUTION: A fuse (maximum of 8 amps) must be installed between the power supply and the printed circuit board connection. Syntron Material Handling recommends a “Fast Acting” type fuse.

OPERATION



WARNING: The control cover must be closed and secured while the control is in operation.

If the control needs to be adapted to the feeder or vibrator, follow the setup procedure below.



WARNING: Disconnect and lock out the power supply at the safety disconnect switch before performing any maintenance or operation adjustments.

SETUP PROCEDURE

(Refer to the wiring diagram while performing the setup procedure.)

1. Set the “main” control pot (connected to 3 prong plug terminal) to 0 percent.
(NOTE: A 0-5VDC Analog input signal may be applied in place of the “main control pot at H1. The 0-5VDC input is transformer isolated from the power line.)
2. Set the DIP SWITCH (S1) to “60” for “half-wave” or see S1 chart for other selections:

S1: OUTPUT FREQUENCY SELECTION (vpm = vibrations per min.)	
RC Operation – Set S1 to ‘60’ 50 Hz: 3000 vpm 60 Hz: 3600 vpm	AC Operation – Set S1 to ‘120’ 50 Hz: 6000 vpm 60 Hz: 7200 vpm
For 40, 30 or 60 reverse pulse settings, see “Program Feature Descriptions” within this manual.	

3. Make the power, load, and (if required) DC input connections to their respective locations, as shown in the wiring diagram.
4. Apply power to the control at the safety disconnect switch, and then turn the control power on.
5. For optimal performance of your feeder, make the following trimmer pot adjustments (located on the printed circuit board).

MAX:	<p style="text-align: center;"><u>MAXIMUM FEEDER OUTPUT</u></p> <p style="text-align: center;">Set the main control pot to its maximum setting.</p> <p>With the proper size screwdriver, adjust the ‘MAX’ trimmer pot until the desired feeder stroke is achieved without exceeding the rated feeder current. Adjust the “main” control pot from 0 to 100 percent to verify the ‘MAX’ trimmer pot setting.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Fully Counter Clockwise:</td> <td style="width: 50%;">Minimum Feeder Output</td> </tr> <tr> <td>Fully Clockwise:</td> <td>Maximum Feeder Output</td> </tr> </table> <p style="text-align: center;">(Factory Default: Fully Clockwise)</p>	Fully Counter Clockwise:	Minimum Feeder Output	Fully Clockwise:	Maximum Feeder Output
Fully Counter Clockwise:	Minimum Feeder Output				
Fully Clockwise:	Maximum Feeder Output				
MIN:	<p style="text-align: center;"><u>MINIMUM FEEDER OUTPUT</u></p> <p>With the vibratory feeder nearly empty, turn the “main” control pot to “1” and adjust the MIN trim pot to just below the slowest speed that provides the proper feed rate. The MIN trim pot also serves as the “low speed” trim pot for 2-speed operation. See “S1 Programming Chart” for feature selection details.</p>				
SOFT:	<p style="text-align: center;"><u>FEEDER RAMP-UP TIME</u></p> <p>With the proper size screwdriver, adjust the ‘SOFT’ trimmer pot to the desired output ramp-up time, from 0-10 seconds at the start-up of the feeder.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Fully Counter Clockwise:</td> <td style="width: 50%;">0 second ramp-up time</td> </tr> <tr> <td>Fully Clockwise:</td> <td>10 second ramp-up time</td> </tr> </table> <p style="text-align: center;">(Factory Default: Fully Counter Clockwise)</p>	Fully Counter Clockwise:	0 second ramp-up time	Fully Clockwise:	10 second ramp-up time
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Fully Clockwise:	10 second ramp-up time				

6. The **REMOTE SPEED CONTROL FEATURE** is automatically turned on whenever a 4-20 mA signal is applied to the control. To return to the main control pot, remove the 4-20 mA signal by turning it off or switching open the circuit. The 4-20 mA input is isolated from the power line. The “S1 Programming Chart” shows how to change to 0-20mA speed control instead of the default of 4-20mA.
(Note: When 4-20mA signal falls below 4 mA, the speed reverts back to the “main” control pot.)
7. **REMOTE OFF/ON CONTROL** Low voltage DC can be used to turn the control **ON** and **OFF**. Move jumper "J1" from terminal 7 to terminal 5 (terminal 6 remains the same). Then connect the positive signal (+5 to 30VDC @ 10mA) to terminal 12 and the negative to terminal 11 of TB2. The control will now turn **ON** when the DC signal is present at terminals 11 and 12 of TB2.

S1 Programming Chart			
Program Description	S1 Switch Positions		
	SW3	SW4	SW5
Standard Program	0	0	0
0-20mA option	0	1	0
2-Speed Operation	1	0	1
30/40 Pulse Operation	0	1	1

PROGRAMMING: It is possible to run a desired program instead of the "standard program" by using the correct S1 DIP switch combination. The different program variations and their descriptions are listed below under PROGRAM FEATURE DESCRIPTIONS:

STATUS LEDs:

RUN: Indicates the board is functional and all input conditions are met.

DIRECT: N/A

INTERLOCK: N/A

EXTERNAL: N/A

PROGRAM FEATURE DESCRIPTIONS:

“0-20mA option”: A 4-20mA or 0-20mA signal from a PLC can be used to remotely vary the output of the control instead of the Main Control Dial. The “S1 Programming Chart”: shows how to change to the 0-20mA speed control instead of using the default of 4-20mA. Note: When the 0-20mA signal is at 0mA, the 0mA signal is ignored and the main Control dial is used to control the output. The mA signal is applied to terminals TB2-8 (-) & 9 (+).

“Two-Speed Pot (2 R/F) operation”: For the two-speed operation, the Main Pot becomes the Normal speed pot, and the MIN trim pot becomes the Low speed pot. When this feature is used, the MIN trim pot no longer controls the minimum power level of the control. The control can be signaled by two different methods to switch between the Low and Normal speed pots. A “dry contact” is used to switch between low and normal speeds. Low speed is obtained when terminals TB2-5&6 are connected. Normal speed is used when both TB2-5&6 and TB2-6&7 are connected. The output is OFF when terminals TB2-5&6 are not connected.

Two-Speed Chart		
Description	TB2-5&6	TB2-6&7
Enable control w/Low Speed	Closed	Open
Enable control w/High Speed	Closed	Closed
Disable control	Open	

“60 Pulse Polarity Reversal”: Switch SW2 to “60REV”. Normally in the 60 Pulse (half-wave rectified) mode, the output voltage is turned on only during the bottom half of the sine wave. However with the 60 Pulse Polarity Reversal software feature, the top half of the sine wave is used instead of the bottom half.

Use this feature to reduce the apparent power when two or more feeders are connected to the same branch of an electrical power distribution circuit. For example, on a vibratory feeder system where each unit is set to 60 pulse mode, if there is one feeder at 1.5 Amps, one at 5 Amps, and one at 1 Amp, then the measured current of the branch would be 7.5 Amps. But if the 60 pulse waveform were reversed on the 5 amp feeder, then the apparent current of the branch would be reduced some because the current flows in both directions instead of only one. This would help the branch step down transformer to operate a little cooler and the measured wattage at the utility meter would also decrease. See the “Jumper Programming Chart” for programming details.

“30/40 Pulse operation” – 30 or 40 Pulse per second output: With 60 Hz input power; this option allows the control to produce frequencies of 30 or 40 PPS. (For 50 Hz input power, the frequencies are 25 or 33.3 PPS). A vibratory feeder that is converted to a lower pulse mode will require fewer springs.

The theory behind the “Low Pulse Rate” option is that the output of the control can be turned ON and OFF to simulate the desired low frequency waveform. Current flows through the vibratory feeder electromagnet coils during the ON time, and the coils are OFF the rest of the cycle. The output frequency depends on how long it takes to complete one ON and OFF cycle. To simulate the desired frequency, the output is turned on (ON time) for a series of 60 Hz pulses, and then it is turned off (OFF time) for the same amount of time.

Simulating 30 Hz or lower with Alternating Current (AC) instead of using Direct Current (DC) will decrease the amount of work that is done by the vibratory feeder coil, which will decrease the feed rate of the machine. This is because the output of the control provides AC, and not DC. DC provides more power than AC during the same amount of time. This is because Direct Current is flowing during the entire ON time; however Alternating Current isn't flowing as much of the time because it periodically goes to 0 amps. The coil size and the coil gap determine the maximum current draw of the vibratory feeder system. When sizing a distribution transformer for this control, the transformer will need to be oversized.

Operation: See the “Jumper Programming Chart” for programming details.

30/40 Pulse mode selection:

For the 40 Hz operation, select 120 on the 60/120 dip switch. For the 30 Hz operation, select 60 on the 60/120 dip switch.

During the initial operation of the control on the machine it is important to monitor the temperature of the coils on the vibratory feeder. If the coils become too hot to touch, the coil current is too high. Decrease the MAX pot setting and re-apply power after the coils have cooled. Overheating the coils will eventually cause them to short circuit and fail.



CAUTION: Do not make any alterations to the control without first contacting Syntron Material Handling Service Department. Unauthorized alterations will void the warranty. SYNTRON will not assume responsibility for damage that may occur due to **unauthorized alterations to the control. Any alterations will void the UL and cUL rating of the control.**

MAINTENANCE



WARNING: Disconnect and lock out the power supply at the safety disconnect switch before performing any maintenance work.

The only maintenance required is that the control be kept reasonably clean.

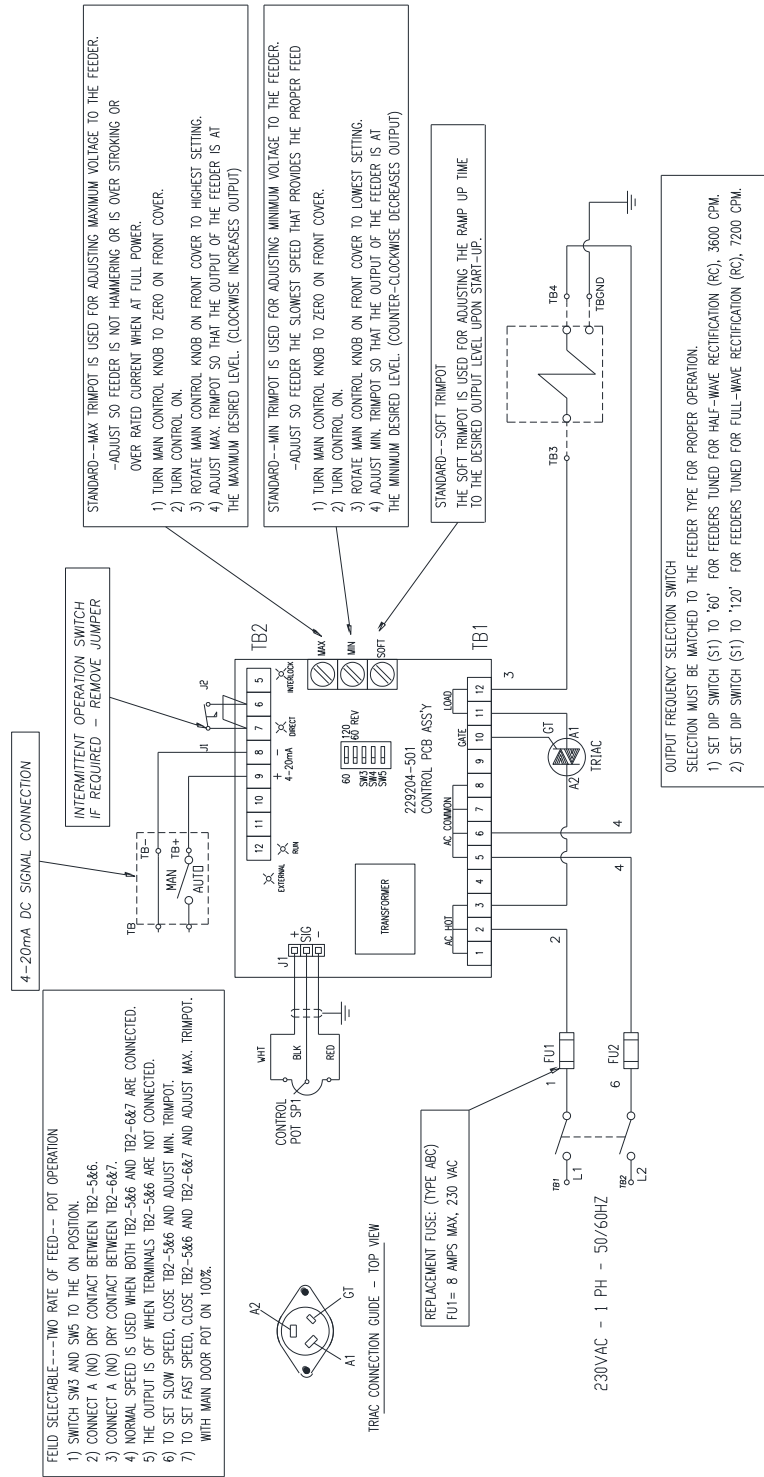


WARNING: Do not use water or a damp cloth for cleaning. Clean, dry compressed air is recommended.

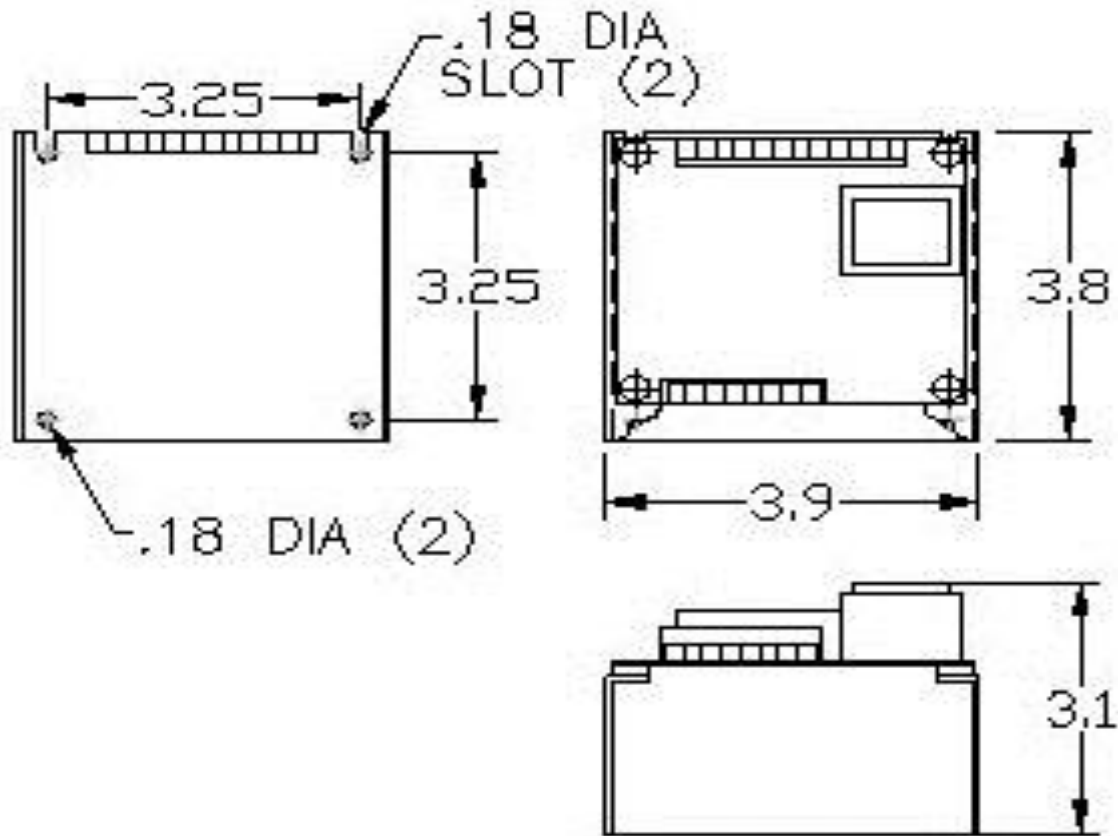
TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
No output from control	Brief utility power interruption	Turn control off for 5 seconds, then restart; if problem persists, call Syntron Material Handling.
	No AC line voltage	Establish input power
	No AC voltage on TB1	Check fuse and switch
	Contacts or jumper missing at TB2 between 6 and 7	Close contacts or install jumper
	60/120 switch (S1) in wrong position	Change switch position
	MAX pot turned full counter-clockwise	Turn pot clockwise
Feeder hums or does not move parts	60/120 switch (S1) in wrong	Change switch position
	Triac is shorted (RC)	Replace triac
Maximum output with no main pot control	Brief utility power interruption	Turn control off for 5 seconds, then restart; if problem persists, call Syntron Material Handling.
	Triac is shorted (RC)	Replace triac
Output speed won't change or changes erratic	MAX trim pot incorrectly adjusted	Adjust correctly
	Pot cable is unplugged	Connect pot cable
	Lack of shielded cable for "main" control pot	Ensure shielded cable is run separate from main conduit. (Never run shielded cable with AC power lines.)
	Damaged main pot	Replace main pot

WIRING DIAGRAM

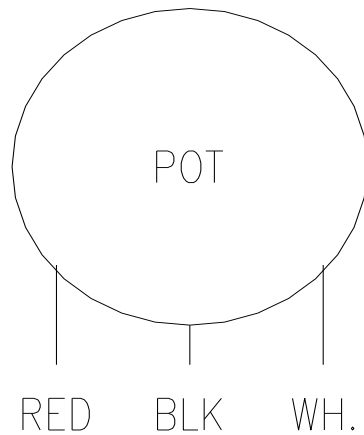


CHASSIS DIMENSIONS



Follow drawing below to solder “main” pot to shielded cable.

POT SHOWN FROM BACK SIDE



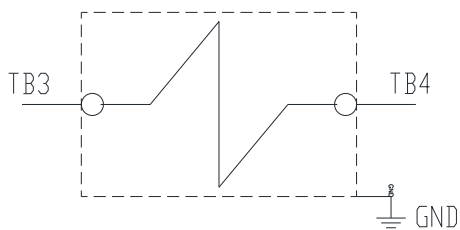
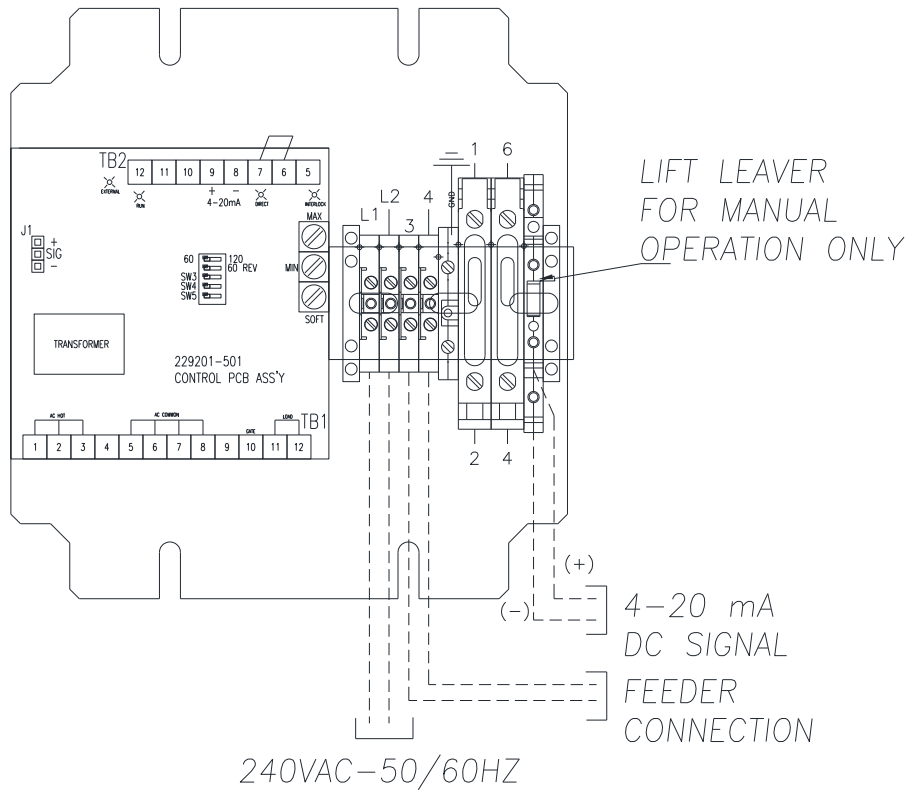
PARTS

DESCRIPTION	PART NUMBER
Potentiometer 100K *	0318X053
230V PC Board Assembly with Triac*	229204-501
Triac	0046X102
Line Switch 20A *	0051X813
Fuse 8A *	0174X136
Warning Label	125694
Warning Label	128494
Shielded cable w/board connector	0202X223

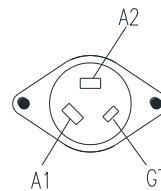
***Recommended Spare Parts**

BOX LAYOUT

CONTROL AUTOMATICALLY SWITCHES TO DC SIGNAL WHEN A 4mA OR GREATER SIGNAL IS PRESENT

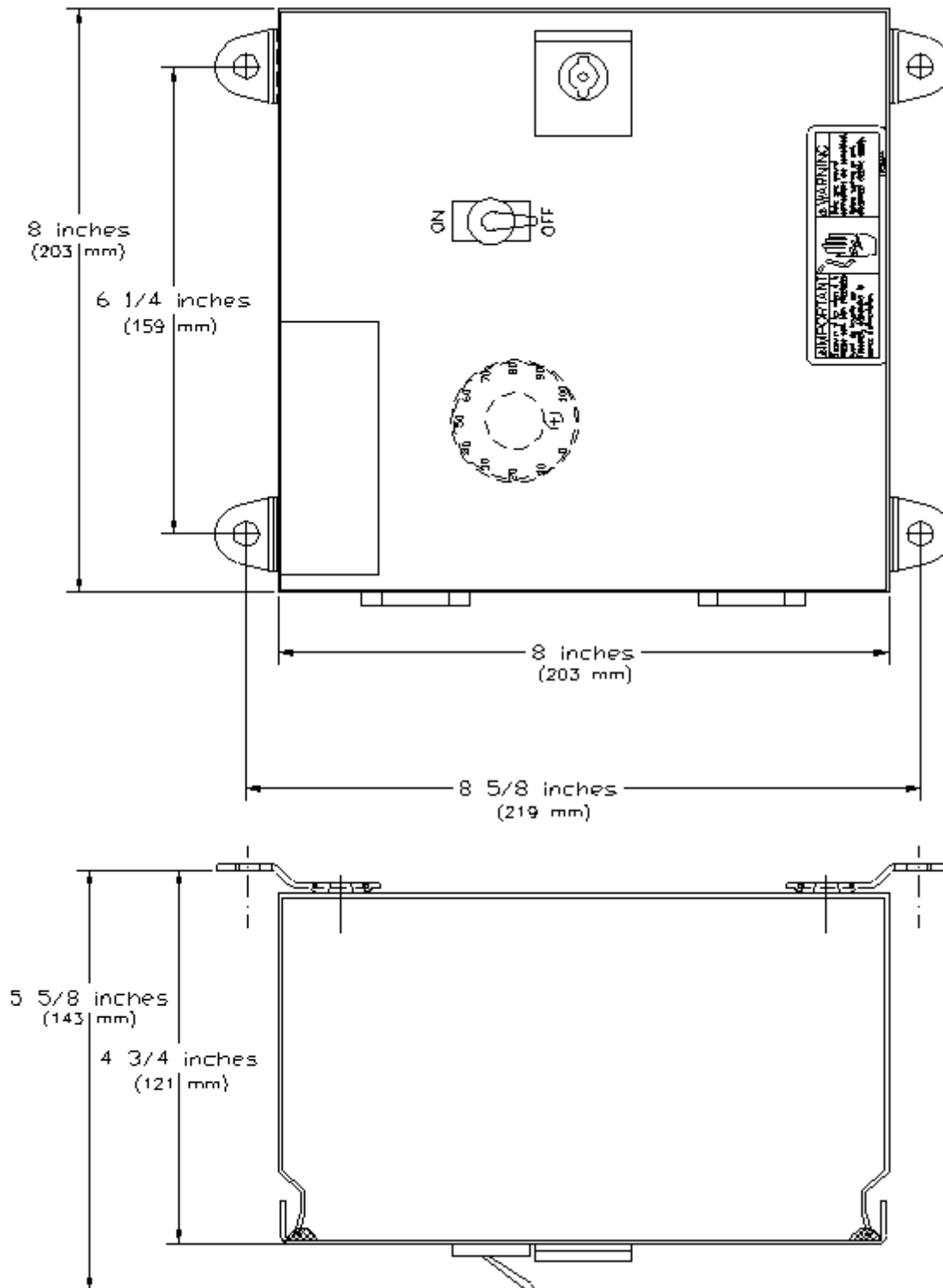


VIBRATOR



TRIAC CONNECTION GUIDE - TOP VIEW

BOX DIMENSIONS



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