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INSTALLATION AND OPERATING
INSTRUCTIONS

for

Current Sensing Unit

HZF Hogs

Bulletin 23-30-13

INSTALLATION



The Montgomery Current Sensing Unit is designed to operate on 115 VAC only.



The Current Transformer provided is specifically sized to match the horsepower and voltage information furnished to the factory for this particular application.



Use of voltage other than 115VAC, use of an improper Current Transformer and/or improper Current Monitor settings will cause the Current Sensing Unit to not function properly and may cause severe damage to its components and/or equipment controlled by it.

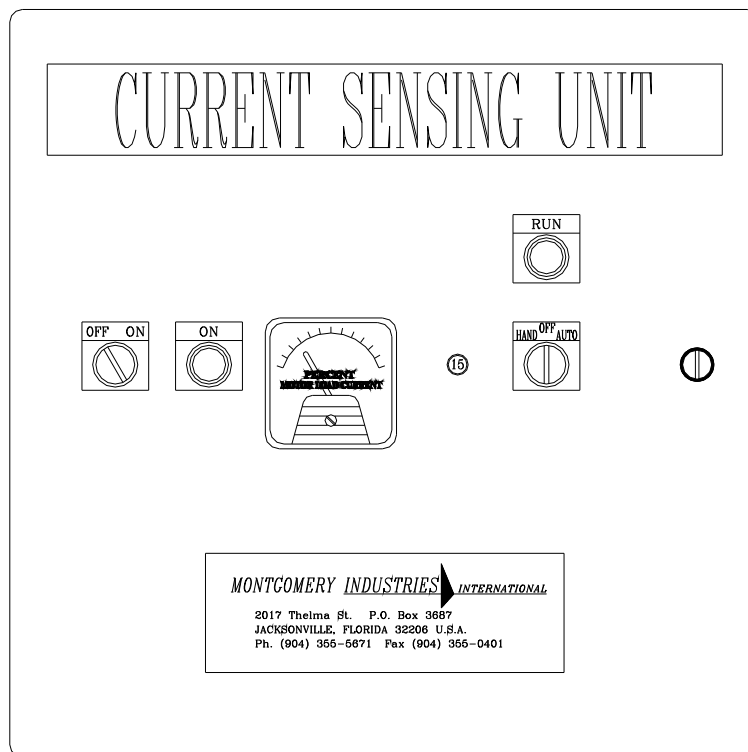
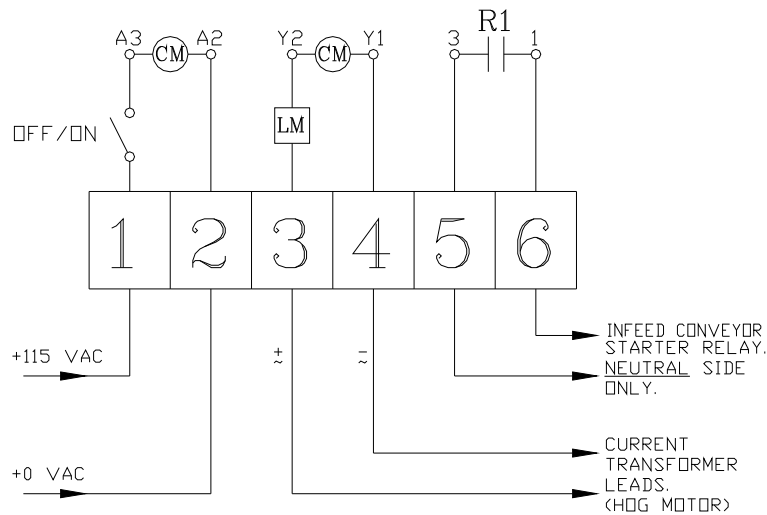


Figure 1

1. Mount the Current Sensing Unit at a convenient location. If located outdoors, protect unit against direct sun and driving rain or snow.
2. Make certain that the "OFF-ON" switch is in the "OFF" position and the "HAND/OFF/AUTO" switch is in the "OFF" position.
3. Connect a grounding wire to the grounding terminal connector mounted on the enclosure back panel.



TERMINAL STRIP WIRING

Figure 2

4. Interlock the Current Sensing Unit with the feed Conveyor.

Wire the neutral side of the "RUN" relay on the feed conveyor motor starter in series with terminals 5 and 6.



In order to prevent voltage feedback if more than one device is wired to terminals 5 and 6, the neutral side of the feed conveyor motor starter relay must be used.

Additional components may be added to this series circuit as long as the relay coil voltages are compatible.

5. The donut shaped Current Transformer converts the Hog Drive Motor amperage load into a 0.5A to 5.0A Feedback Signal.



Verify that the appropriate Current Transformer (CT) is provided based on the horsepower and operating voltage of the Hog Drive Motor.

<u>Transformer</u>	<u>Ratio</u>	<u>Motor Full Load</u>	<u>CT FLA</u>	<u>Hog Motor</u>	<u>Voltage</u>
163-10100	100:5	65A	3.25A	50 HP	460V
		77A	3.85A	60 HP	460V
163-10150	150:5	96A	3.20A	75 HP	460V
163-10200	200:5	124A	3.10A	100 HP	460V
		130A	3.25A	50 HP	230V
163-10250	250:5	154A	3.08A	60 HP	230V
		156A	3.12A	125 HP	460V
163-10300	300:5	180A	3.00A	150 HP	460V
		192A	3.20A	75 HP	230V
163-10400	400:5	240A	3.00A	200 HP	460V
		248A	3.10A	100 HP	230V
163-10500	500:5	300A	3.00A	250 HP	460V
		312A	3.12A	125 HP	230V
		360A	3.60A	300 HP	460V
		360A	3.60A	150 HP	230V
		480A	4.80A	200 HP	230V

Prior to placing the Current Sensing Unit into full operation, the Feedback Signal will have to be verified and the Current Monitor adjusted in order to adjust its relay responses to field conditions (see *PROGRAMMING / FIELD ADJUSTMENTS*).

- Place the Current Transformer furnished with the unit over one of the power leads to the hog motor. Connect the two leads from the current transformer to terminals 3 and 4.



The Current Transformer provided is specifically sized to match the horsepower and voltage information furnished to the factory for this particular application.



Use of voltage other than 115VAC, use of an improper Current Transformer and/or improper Current Monitor settings will cause the Current Sensing Unit to not function properly and may cause severe damage to its components and/or equipment controlled by it.

7. Start the hog motor. When the motor is up to speed, verify that the deflection of the needle on the "LOAD METER" is correct.

If the deflection of the needle is not correct, shut down the Hog Drive Motor. Once power is disconnected to the Hog Drive Motor, reverse the current transformer leads at terminals 3 and 4. Start the Hog Drive Motor and verify that the needle is deflecting properly on the "LOAD METER" as the Hog Drive Motor comes up to speed.

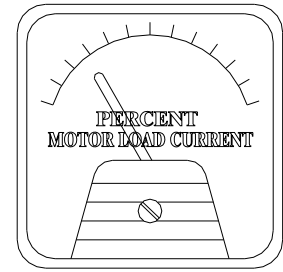


Figure 3

8. Once the Hog Drive Motor has reached normal operating speed, use an ammeter to determine the amount of amps drawn by the Hog Drive Motor with no material entering the hog.

Divide the amps shown on the meter by the full load amps of the Hog Drive Motor to determine the percent of motor load current. Adjust the "LOAD METER" to reflect the correct percentage using the adjusting screw on the face of the "LOAD METER".

9. Connect the power wire from a 115 VAC power source to terminal number 1 on the terminal strip and connect the neutral wire to terminal number 2 on the terminal strip.
10. *Optional* - The Current Sensing Unit may be interlocked with discharge equipment so that the feed conveyor will not operate unless the discharge equipment has been turned on.



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In order to interlock the Current Sensing Unit with discharge equipment, use a spare set of normally open contacts on the discharge equipment starter relay. Use this set of contacts as the 115 VAC power source to terminal number 1 on the terminal strip and connect a neutral wire to terminal number 2 on the terminal strip.

11. Turn the "OFF/ON" switch to the "ON" position. The green "ON" light on the cover of the enclosure should illuminate.

- The Current Monitor is located inside the control panel. Make sure that the green light illuminates when the Current Sensing Unit control panel is on.

Steps #12 through #19 are a component and wiring check only.

Prior to placing the Current Sensing Unit into full operation, you will need to verify the Feedback Signal and adjust the Current Monitor in order to align its relay responses to field conditions.

(see *PROGRAMMING / FIELD ADJUSTMENTS*)

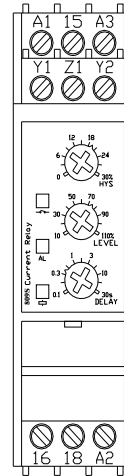


Figure 4

- The function of the Current Monitor is set at the factory via a series of DIP switches.

To access the DIP switches, open the plastic cover using a screwdriver as shown.



Do not open the DIP-switches cover if the Power Supply is ON

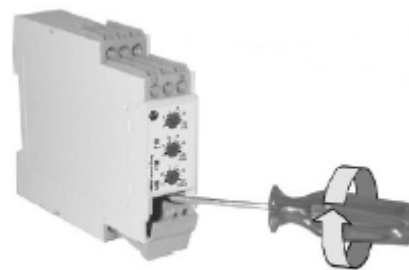


Figure 5

- SW1 should be set to ON.
SW1 selects the status of the relay: normally de-energized (relay ON in alarm condition) or energized (relay OFF in alarm condition).
- SW2 should be set to ON.
SW2 selects the power-ON delay (inhibit of the alarm at the power-ON): 6s or 1s.
- SW3 should be set to ON.
SW3 selects the contact input function: latch or inhibit alarm via Z1 (not used).
- SW4 should be set to ON.
SW4 selects the function: over-current or under-current.

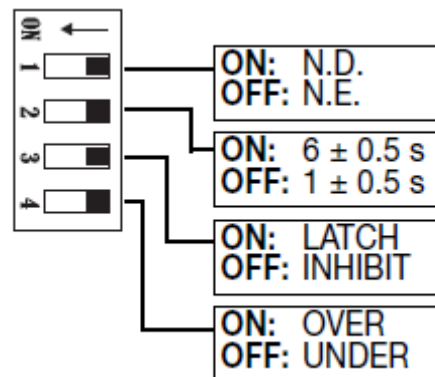


Figure 6

- Turn the "**HAND/OFF/AUTO**" switch to the "**OFF**" position.
- Turn on power to the feed conveyor motor and starter. The conveyor should not start. If it does, the "**RUN**" relay on the starter was not properly wired to terminals 5 and 6.

16. Turn the "**HAND/OFF/AUTO**" switch to the "**HAND**" position. This places the Current Sensing Unit in the "**MANUAL**" mode. The feed conveyor should now start and the green "**RUN**" indicating light should come on.
17. Turn the "**HAND/OFF/AUTO**" switch to the "**OFF**" position. The feed conveyor should stop.
18. Turn the "**HAND/OFF/AUTO**" switch to the "**AUTO**" position. The feed conveyor should start and the green "**RUN**" indicating light should come on.
19. Using an insulated probe or wire, provide power to Terminal 18 on the Current Monitor (via terminal A3 on the Current Monitor or Terminal 1 on the Terminal Strip) to simulate a high motor current condition.

The feed conveyor should stop and the green "**RUN**" indicating light should turn off. Remove the probe or wire. The feed conveyor should start and the green "**RUN**" indicating light should come on.

20. The Current Sensing Unit is now ready for Programming / Field Adjustments.

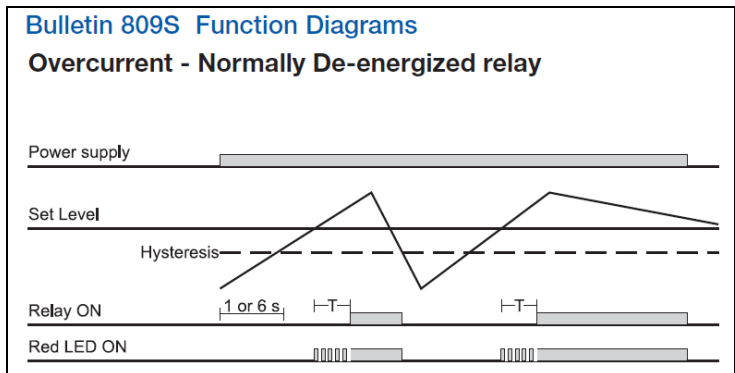
PROGRAMMING / FIELD ADJUSTMENTS

For optimum performance, adjust the relay settings on the Current Monitor to reflect the Hog Drive Motor's response to actual operating conditions.

Measure actual operating conditions by connecting an ammeter to the Hog Drive Motor and then observing how much current is flowing.

The objective is to prevent the Hog Drive Motor from exceeding its Full Load Amps by controlling the feed of material into the Hog while also avoiding repeated stopping and starting of the feed conveyor.

The Set Level is the amperage level on the Hog Drive Motor (converted to a 0.5A to 5.0A Feedback Signal) at which the Current Sensing Unit signals the feed conveyor to stop.



The Set Level must be set below the Full Load Amps of the Hog Drive Motor because the hog may continue to pull in material that it has started to process, even after the feed conveyor stops. If the hog continues to pull in material, the load on the Hog Drive Motor will continue to increase until material is processed through the screen.

For thinner and longer scrap, a Full Load Amp condition must be anticipated further in advance by adjusting the Set Value to a lower percentage of Full Load Amps. Thicker and shorter scrap tends to stop feeding once the feed conveyor stops. Determining the optimum Set Value will require field observation and fine tuning.

Once the actuation value has been reached, the Hysteresis Value determines how far below the Set Value the Amperage Level on the Hog Drive Motor must fall (converted to a 0.5A to 5.0A Feedback Signal) before the Current Sensing Unit will restart the feed conveyor.

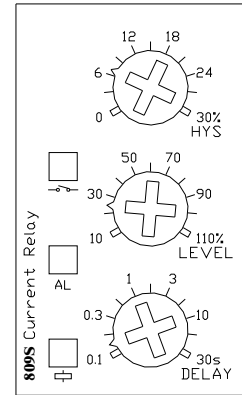
The smaller the screen holes, the easier it will be to load the Hog Drive Motor and the longer it will take the Hog to clear the cutting chamber. Small screen holes will tend to require a larger Hysteresis Value in order to reach a safe condition under which to resume feeding material to the Hog. Determining the optimum Hysteresis Value will require field observation and fine tuning.

21. Adjust the settings on the Current Monitor.

The initial values for the LEVEL setting are calculated by converting the Full Load Amps (FLA) of the hog motor to an equivalent 0.5A to 5.0A Feedback Signal (CT FLA) based on the turn ratio of the Current Transformer (CT).

The motor load threshold (approximately 75% FLA) at which the feed conveyor should pause is then converted to an equivalent LEVEL setting for the Current Monitor input range (1A – 10A).

The Hysteresis is set (at approximately 8%) so that the feed conveyor resumes when the hog motor load drops to approximately 50% FLA.



The percentage LEVEL reading on the Current Monitor is NOT equivalent to the percentage full load amps of the hog motor.



An improper LEVEL setting will cause the Current Sensing Unit to not function properly and may cause severe damage to equipment controlled by it.

HYS	Hysteresis	(set to approximately 8%)
LEVEL	Set Level	(see table below)
DELAY	Time Delay	(set to approximately 0.1 seconds)

Note:
 CT = Current Transformer
 FLA = Full Load Amps

Table 2

Transformer	Ratio	FLA	Hog Motor	Voltage	[Pause] 75% FLA	CT Signal	LEVEL	[Resume] 50% FLA
163-10100	100:5	65A	50 HP	460V	48.8A	2.44A	24%	33A
		77A	60 HP	460V	57.8A	2.89A	29%	39A
163-10150	150:5	96A	75 HP	460V	72.0A	2.40A	24%	48A
163-10200	200:5	124A	100 HP	460V	93.0A	2.33A	23%	62A
		130A	50 HP	230V	97.5A	2.44A	24%	65A
163-10250	250:5	154A	60 HP	230V	115.5A	2.31A	23%	77A
		156A	125 HP	460V	117.0A	2.34A	23%	78A
163-10300	300:5	180A	150 HP	460V	135.0A	2.25A	23%	90A
		192A	75 HP	230V	144.0A	2.40A	24%	96A
163-10400	400:5	240A	200 HP	460V	180.0A	2.25A	23%	120A
		248A	100 HP	230V	186.0A	2.33A	23%	124A
163-10500	500:5	300A	250 HP	460V	225.0A	2.25A	23%	150A
		312A	125 HP	230V	234.0A	2.34A	23%	156A
		360A	300 HP	460V	270.0A	2.70A	27%	180A
		360A	150 HP	230V	270.0A	2.70A	27%	180A
		480A	200 HP	230V	360.0A	3.60A	36%	240A

- 22. Using an ammeter, check the load on the Hog Motor and the signal from the Current Transformer to verify that the Feedback Signal is the proper ratio (*reference Tables 1 and 2*).
- 23. The SET LEVEL is initially adjusted at the factory to stop the feed conveyor when the Hog Drive Motor reaches approximately 75% of Full Load Amps.

This SET LEVEL anticipates that the Hog Drive Motor load will continue to climb for a short period of time even after the conveyor has stopped, because the hog will attempt to finish processing whatever material it has begun to pull into the cutting chamber.

If field conditions warrant a higher level, the SET LEVEL can be increased. However, it is recommended to adjustments be made with extreme caution.

Increasing the SET LEVEL may reduce the starts and stops of the feed conveyor but will also increase the chance that the Hog Motor will exceed its Full Load Amps under a surge load.

- 24. The TIME DELAY is initially adjusted at the factory to 0.1 seconds in order to provide maximum sensitivity so that the conveyor will stop as soon as the Hog Drive Motor amperage Feedback Signal reaches the SET LEVEL.

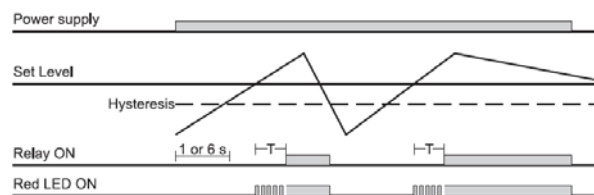
If field conditions warrant less sensitivity, the TIME DELAY can be increased. However, it is recommended that this value be kept to a minimum.

Increasing the TIME DELAY may reduce the starts and stops of the feed conveyor but may also increase the chance that the Hog Drive Motor will exceed its Full Load Amps under a surge load.

- 25. The optimum SET LEVEL will require a trial-and-error approach based on field operating conditions and will likely vary from one installation to another.

The optimum TIME DELAY will require a trial-and-error approach based on field operating conditions and will likely vary from one installation to another.

Bulletin 809S Function Diagrams
Overcurrent - Normally De-energized relay



Using an ammeter, verify that the Current Monitor settings do not allow the Hog Motor to exceed its rated Full Load Amps.



Sustained operation of an electric motor above its rated Full Load Amps can overheat the motor and cause permanent damage.

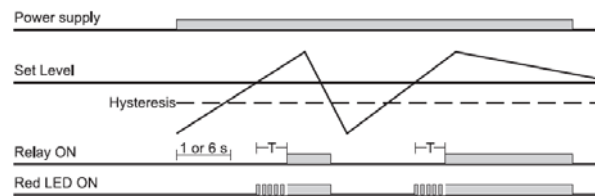
- 26. The HYSTERESIS sets the difference between the SET LEVEL and the value to which the Hog Drive Motor feedback signal must fall after the SET LEVEL has been reached before the feed conveyor restarts.

The HYSTERESIS is adjusted at the factory to approximately 8% (0.8A below the Set Level of the feedback signal from the Current Transformer) in order to restart the feed conveyor when the Hog Drive Motor falls back to approximately 50% of Full Load Amps.

- 27. The optimum HYSTERESIS will require a trial-and-error approach based on field operating conditions and will likely vary from one installation to another.

Verify that the HYSTERESIS setting allows the Hog to clear material from the cutting chamber and that the motor load drops before the feed conveyor restarts.

Bulletin 809S Function Diagrams
Overcurrent - Normally De-energized relay



OPERATING INSTRUCTIONS



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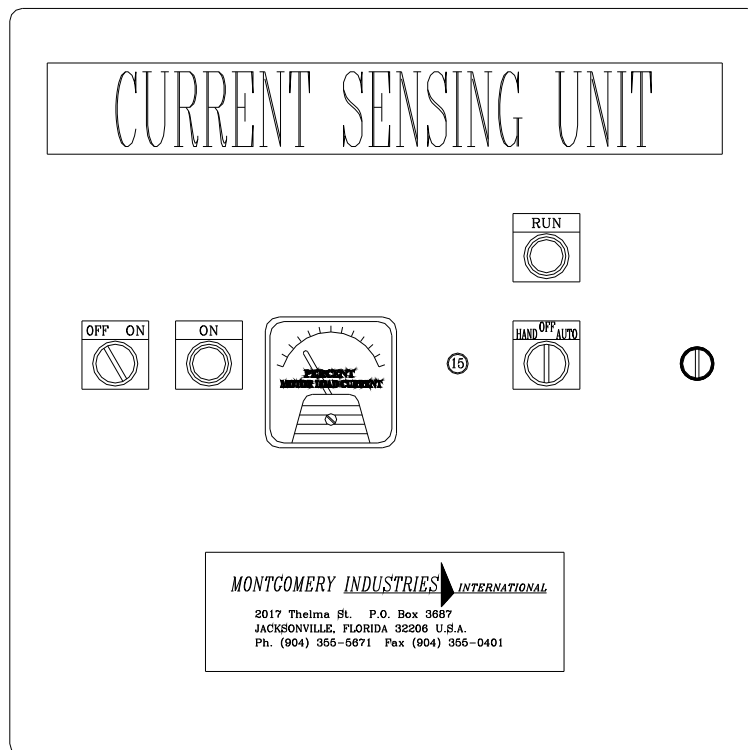


Figure 1

1. Turn the hog motor on and wait for the hog motor to get up to operating speed.
2. Turn on the power to the feed conveyor motor and starter.
3. Turn the "OFF/ON" switch to the "ON" position. The green "ON" indicating light should illuminate.
4. Turn the "HAND/OFF/AUTO" switch to the "AUTO" position. The feed conveyor should start to operate and the green "RUN" indicating light should illuminate.

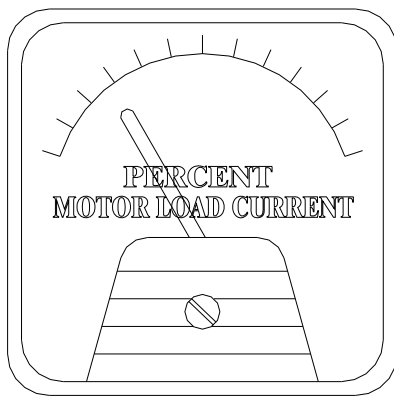


Figure 3

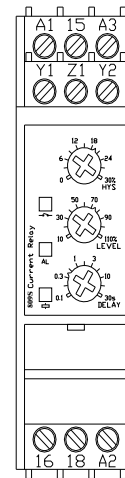


Figure 4

5. Monitor the "LOAD METER" (Figure 3) on the face of the panel to determine at what percent of the Hog Drive Motor Full Load Amps the feed conveyor stops.

The Current Monitor (Figure 4) has been adjusted at the factory to stop the feed conveyor when the Hog Drive Motor reaches approximately 75% of Full Load Amps.

This level anticipates that the Hog Drive Motor load will continue to climb for a short period of time even after the conveyor has stopped because the hog will attempt to finish processing whatever material it has begun to pull into the cutting chamber.

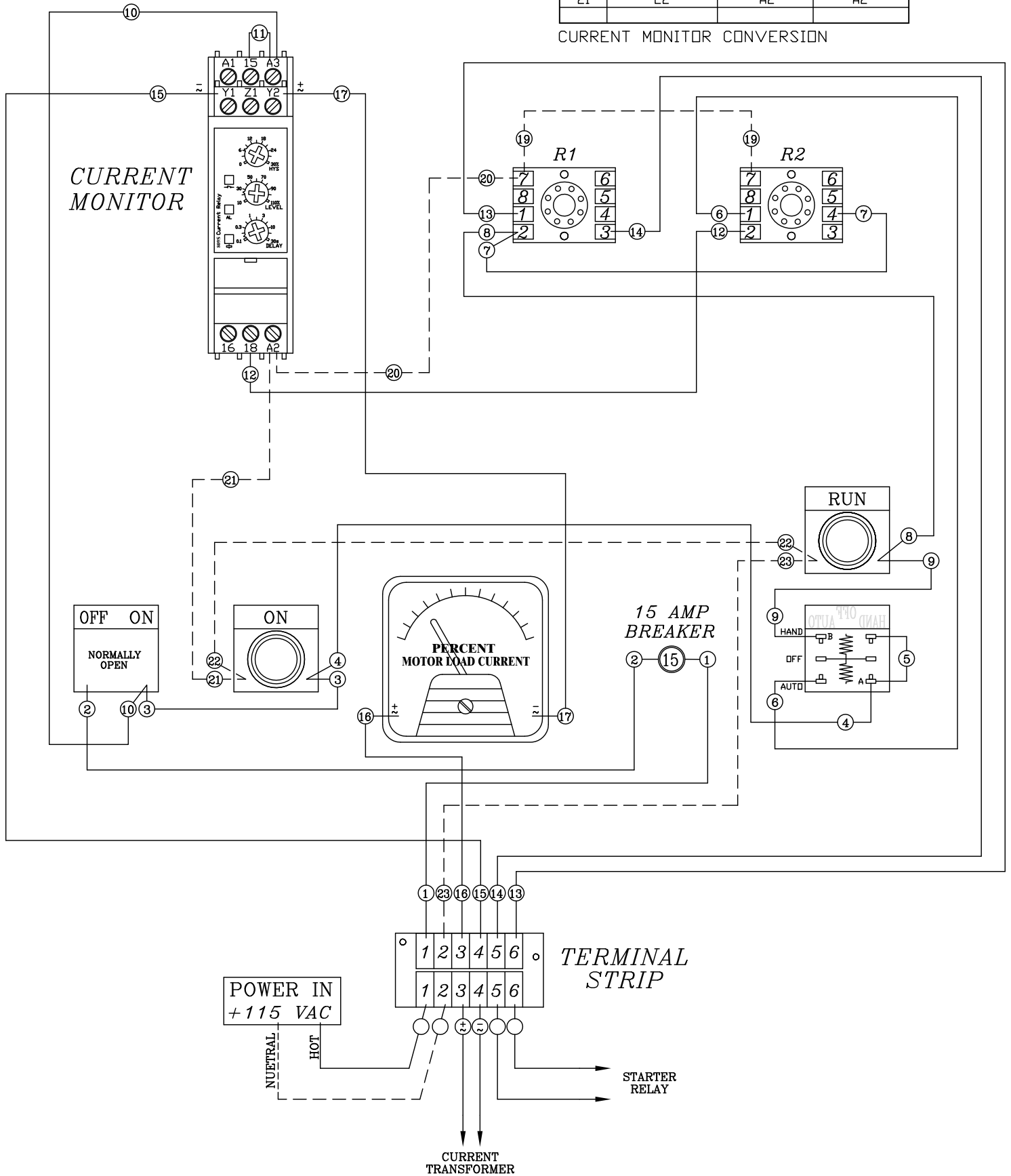
(see PROGRAMMING / FIELD ADJUSTMENTS)

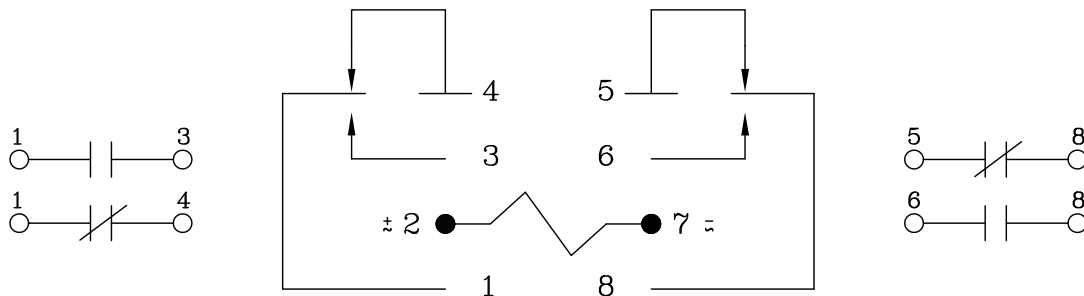
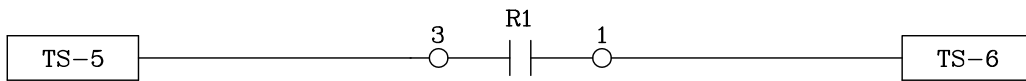
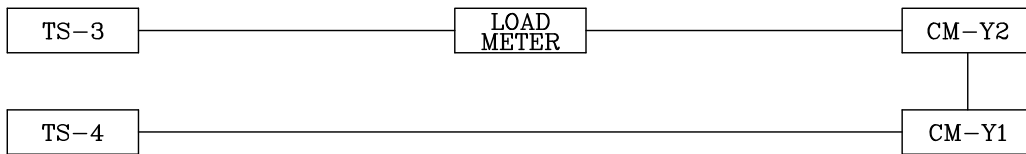
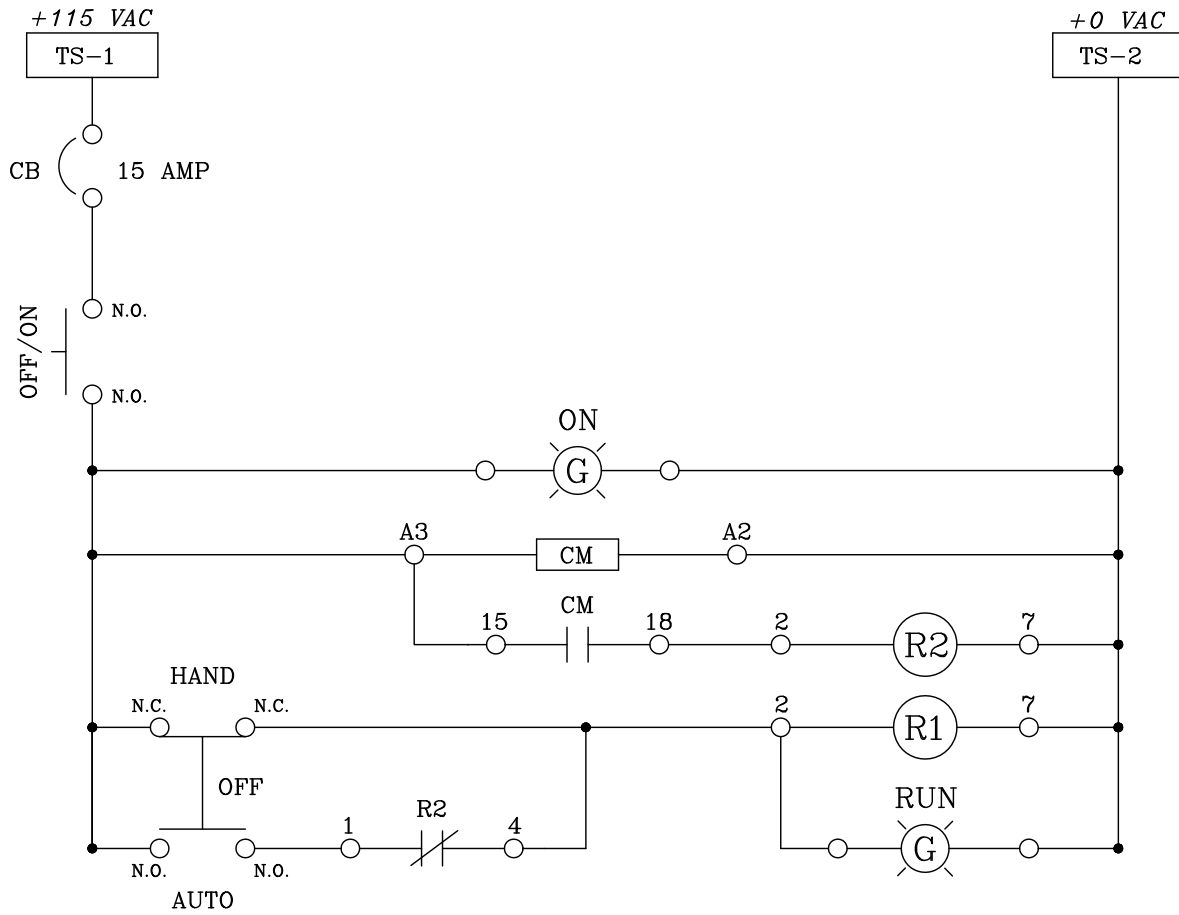
6. Just prior to shutting down the hog, the "OFF/ON" switch and the "HAND/OFF/AUTO" switch should be turned to the "OFF" position, so that the feed conveyor stops feeding material into the hog *before* the hog begins shutting down.

This sequence will allow the hog to process and clear whatever material it has already begun to pull into the cutting chamber.

	ANALOG	DIGITAL	
WIRE	809S-AB100A1	809S-E1D	809S-C1
10	L1	A1	A3
11	L1	A1	A3
11	C1	13	15
12	C2	14	18
15	X2	com	Y1
16	X1	In1	-
17	X2	com	Y2
18	X1	In1	-
20	L2	A2	A2
21	L2	A2	A2

CURRENT MONITOR CONVERSION





RELAYS
R1 & R2