



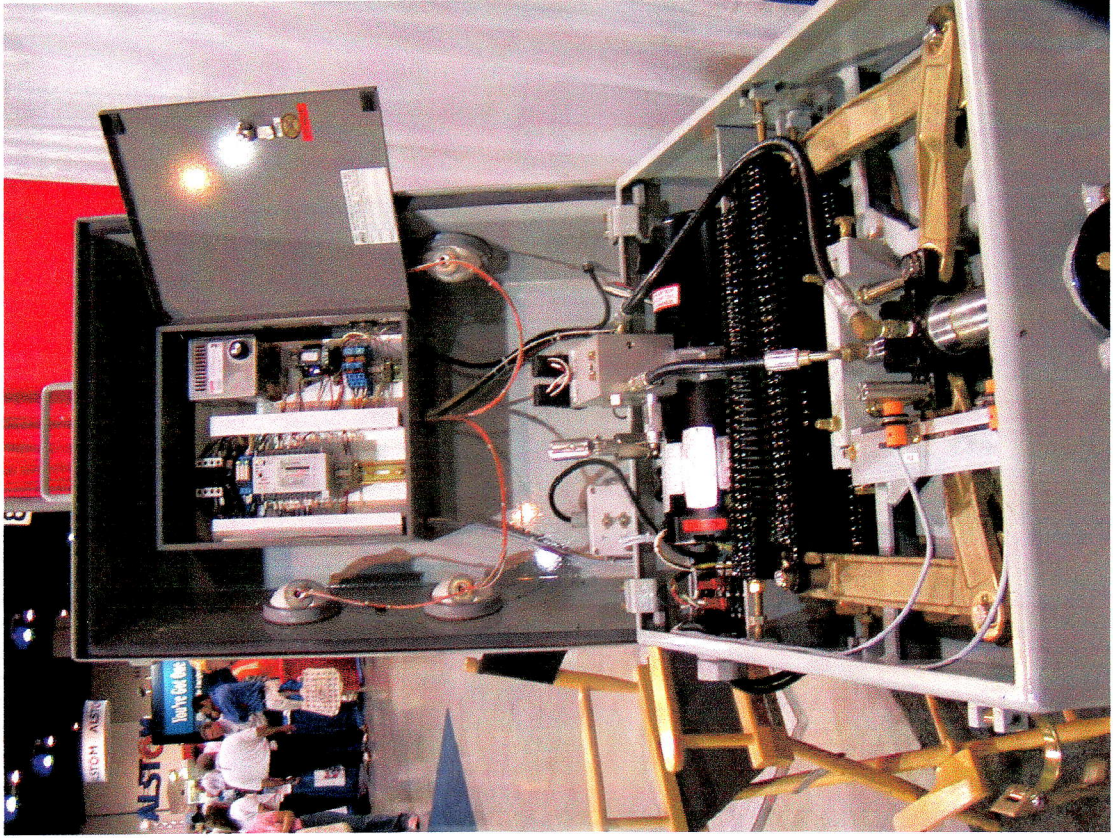
WESTERN-CULLEN-HAYES, Inc.

Western-Cullen-Hayes, Inc.

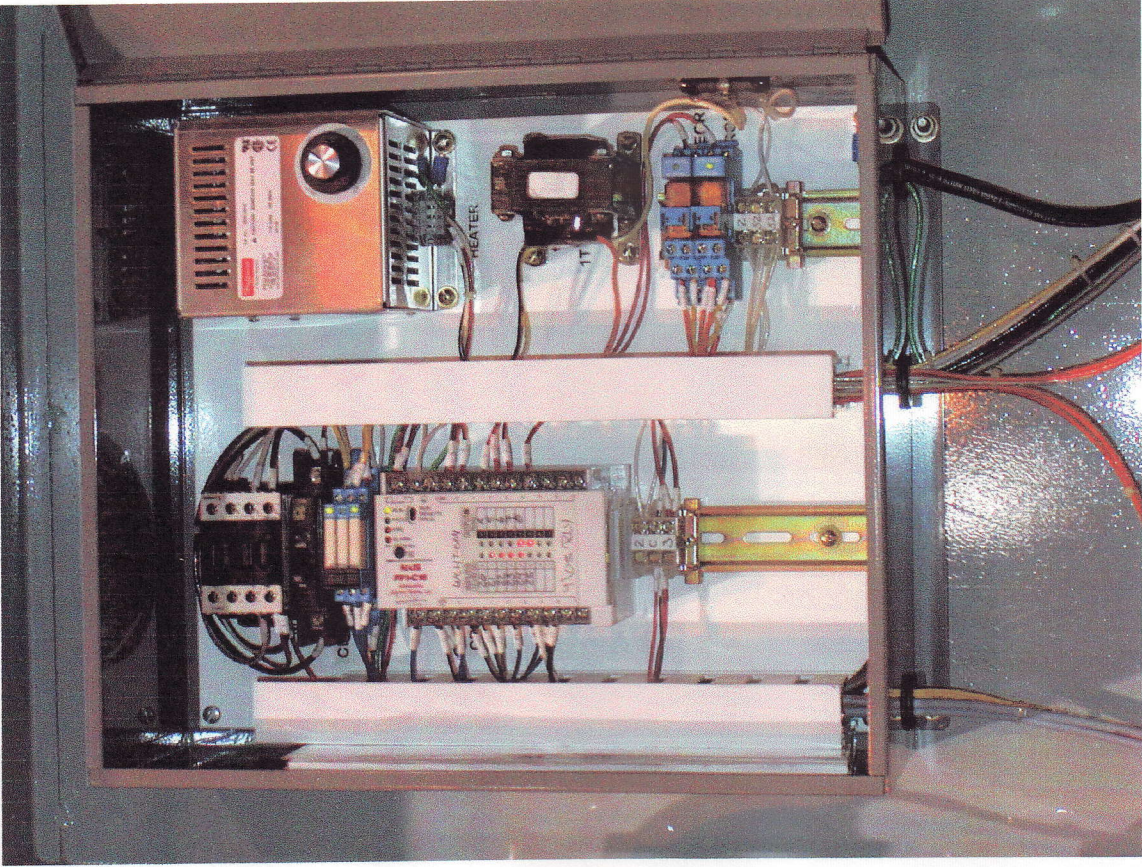
Model WCHT-72

Electro/Hydraulic Switch Machine

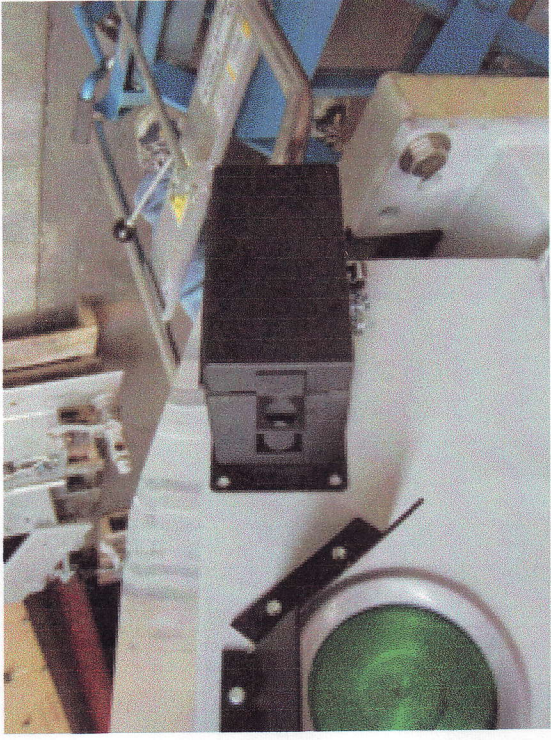
Installation and Operation Manual



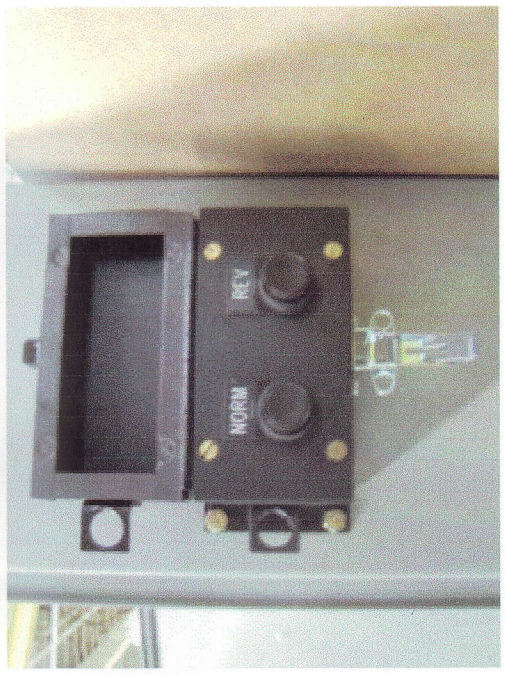
WCHT WITH SIDELIGHTS



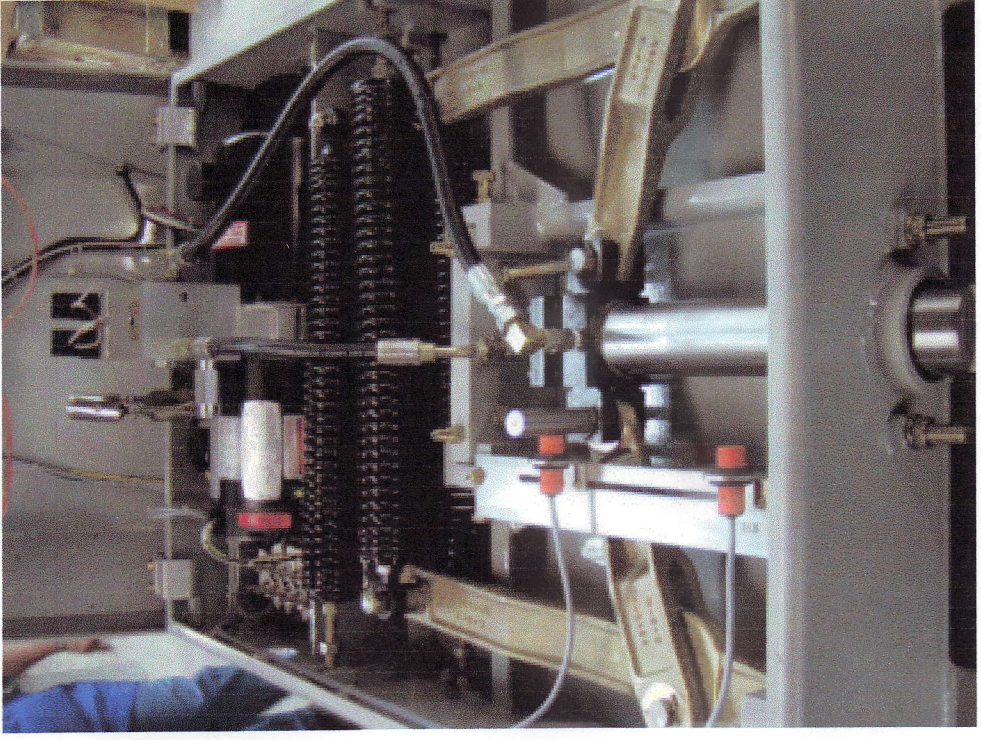
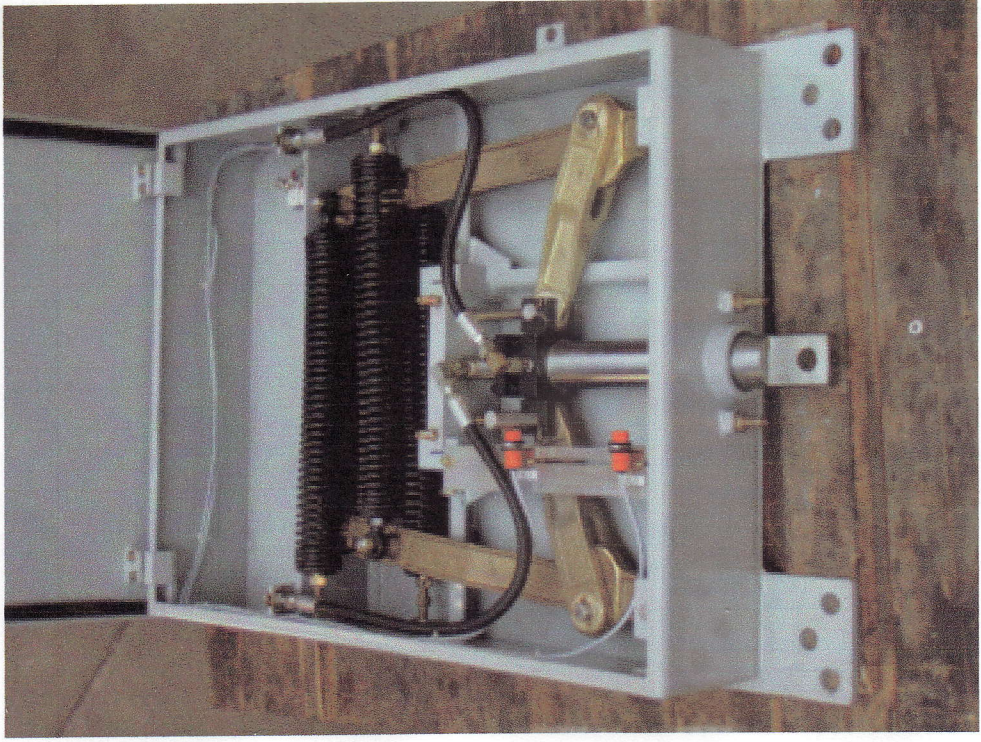
WCHT CONTROL ENCLOSURE



PUSHBUTTON BOX MOUNTED



PUSHBUTTON BOX



INTERNAL VIEW, WCHT SWITCH MACHINE

**WCHT-72 SWITCH MACHINE POWER
REQUIREMENT SPECIFICATIONS.**

VOLTAGE: 120 VAC. (NOT 115 OR 110)

MOTOR FULL LOAD AMPS: 19 AMPS.

MOTOR INRUSH CURRENT AT

STARTUP: 50 AMPS.

**ELECTRICAL RELAYS: 120 VAC, 12 OR
24 VDC +/- 10%.**

**VOLTAGE MUST NOT DROP
BELOW 110 VAC DURING INRUSH.**

**IF YOUR POWER SUPPLY SYSTEM IS
NOT CAPABLE OF SUPPLYING
ADEQUATE POWER, DO NOT INSTALL
THIS MACHINE UNTIL YOUR SYSTEM IS
CORRECTED.**

**MACHINE MALFUNCTION OR
COMPONENT DAMAGE WILL OCCUR
DUE TO LACK OF SUFFICIENT POWER.**



WESTERN-CULLEN-HAYES, Inc.

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CONTROL DEVICE LEGEND AND STANDARD SEQUENCE OF POWER OPERATION FOR WESTERN-CULLEN-HAYES, INC. WCHT-72 SERIES ELECTRO-HYDRAULIC SWITCH MACHINES

CONTROL DEVICE LEGEND

INPUT DEVICES:

<u>INPUT SYMBOL</u>	<u>DESCRIPTION</u>	<u>OPERATION</u>
0	ELS Extend Limit (Proximity) Switch	Detect Ram Extended.
1	RLS Retract Limit (Proximity) Switch	Detect Ram Retracted.
2	DLS Door Limit (Reed) Switch	Disable operation when manual pump handle is removed or placed in lockout position.
NOTE: On newer units ELS and RLS are proximity sensors and DLS is a magnetic reed switch.		
3	TCR Track Circuit Repeater Relay	Disable operation when train is present and enable restore circuits when train is present.
4	ECCR Extend Command Relay	Repeats momentary or maintained extend command.
5	RCCR Retract Command Relay	Repeats momentary or maintained retract command.
6	Jump to processor terminal C to disable obstruction circuits.	
7	Jump to processor terminal C to disable restore after trailing circuits.	

OUTPUT DEVICES:

<u>OUTPUT SYMBOL</u>	<u>DESCRIPTION</u>	<u>OPERATION</u>
200	M Motor Contactor	Starts motor.
201	2SOL Extend/Retract Solenoid	Energizes upon extend and retract operations.
202	1SOL Extend Solenoid	Energizes upon extend operations.
203	ECR Extend Indication Relay	Energizes extended ram indication relay.
204	RCR Retract Indication Relay	Energizes retracted ram indication relay.
205	DLS output	Energized whenever Door Limit Switch is engaged.

STANDARD SEQUENCE OF POWER OPERATION
FOR WCHT-72 SWITCH MACHINES
WITH MICRO 1 PROCESSOR WITH PROGRAM WCHT004
OR NAIS PROCESSOR WITH PROGRAM WCHT004.

Operational Preconditions:

If a track circuit is used, the circuit must be clear and TCR energized for the unit to respond to a command.

If a track circuit is not used, terminals 3 and 9 must be jumped together at the terminal strip, input 3 on, for the unit to respond to a command.

NOTE: Restore features will not operate if a track circuit is not employed.

The manual operation handle must be in it's holder and activating DLS limit switch for the unit to respond to a command.

For units equipped with DLS magnetic reed switch, one of the three magnets in the handle must be facing the switch.

Starting with ram in the retracted position:

Upon Power up:
Unit at rest, ECR, RCR off, indication dark.

Normal operation, TCR on, track clear:

Momentary or maintained extend command at ECCR:

M, 1SOL, 2SOL on, RCR off, ram travels to the extend position. Once the ram moves to the extend position, and ELS is activated, the ram continues to drive until an elapsed time of .5 seconds has elapsed. M, 1SOL, 2SOL off, ECR on.

Momentary or maintained retract command at RCCR:

M, 2SOL on, ECR off, ram travels to the retract position. Once the ram moves to the retract position, and RLS is activated, the ram continues to drive until an elapsed time of .5 seconds has elapsed. M, 2SOL off, RCR on.

NOTE: Once a commanded operation is activated, the operation will conclude even if TCR turns off during the operation.

Reverse upon obstruction operation:

If an obstruction prevents the ram from traveling from home to the commanded position within a time of 5.0 seconds, the circuit will reverse and return the ram to the home position, home position indicator relay on. If an additional obstruction occurs which prevents the ram from returning to the home position within a time of 5.0 seconds, the unit shuts down, indication ECR, RCR relays off.

If either of these conditions occur, the obstruction must be removed and a new command must be given to ECCR or RCCR to return to normal operation.

NOTE: Once a reverse upon obstruction operation is activated, the operation will conclude even if TCR turns off during the operation.

NOTE: If jumper has been installed between terminals C and 6 on the CPU, the obstruction circuit is inoperable.

Normal Operation, TCR off, train present:

Restore After Trailing Operation, TCR off, train present:

Command is received at ECCR or RCCR, and TCR turns off, command is internally set. If the motion of the train causes the ram to travel to the full opposite of the commanded position, the trailing move is internally set and the appropriate position indication relay turns on. When train clears circuit, TCR turns on, and after a 3.5 second time has elapsed, the ram will automatically travel to the last commanded position, and the appropriate position indication relay turns on. The unit then operates as described under Normal Operation, TCR on, track clear.

This operation will execute in the same direction as many times as the sequence occurs.

NOTE: This restore sequence will only occur if the trailing motion has moved the ram to the full opposite position and has activated the limit switch. If the trailing motion has not moved the ram to the opposite position, RCR and ECR off, unit at rest until a command is received at ECCR or RCCR.

NOTE: If jumper has been installed between terminals C and 7 on the CPU, the restore circuit is inoperable.

NOTE: If a track circuit is not used, and terminals 3 and 9 are jumped together at the terminal strip, the restore circuit is inoperable.

Fault Modes: Machine and/or indication shut down:

If an out of sequence condition occurs, the unit will go to rest and ECR and RCR will turn off indication. Out of sequence will occur due to both ELS and RLS inputs being present for any reason for any length of time. Out of sequence will occur due to both ECCR and RCCR commands being present for any reason for any length of time. Out of sequence will occur whenever power is removed and restored. Out of sequence may occur when curtain command and track circuit inputs combine and are sensed as a conflict to normal sequence. Once the unit rests, it is necessary to initiate a ECCR or RCCR command.

Certain external logic or control can cause fault conditions of the indication circuit. Contact the Western-Cullen-Hayes Control department if any unexpected indication fault conditions persist.

Power Lockout:

Units equipped with magnetic reed switch:

To prevent power operation, position the handle in it's holder so that no magnet is facing the switch. In this position the engraved side of the handle which reads "THIS SIDE UP FOR LOCKOUT" will be visible and facing up. Padlock in this position.

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October, 1993.

January, 1996, Revision A.

I DESCRIPTION

The Western-Cullen-Hayes-Tiefenbach Electro/Hydraulic Switch Machine, Model WCHT-72, is a compact weather tight machine designed to replace hand-throw switch stands.

The WCHT-72 is capable of operating effectively in most switching areas, such as car classification yards, receiving and departure yards, transit system yards, industrial facilities, and rail storage yards.

The WCHT-72 is completely trailable at any speed and can be controlled locally or from a remote location. For emergency operation or for maintenance purpose, an integral hydraulic hand pump is provided.

The operating stroke can be easily adjusted from 4-1/2 to 6 inches and the duty cycle is approximately 1 - 1.5 seconds, depending on the stroke.

Basic electrical controls are mounted in an enclosure located on the inside lid of the switch machine protected from all weather.

The hydraulic cylinder is used as the operating ram. A quad-coil spring package provides the necessary force to hold the switch point against the stock rail.

II SITE INSTALLATION PREPARATION

Cross ties should be new 7" x 9" A.R.E.A. grade five switch ties, sixteen feet long. The switch and rails should be in proper alignment.

The WCHT-72 will accommodate tie centers from 19 inches to 25 inches. Ties should be in good condition and level.

To facilitate installation of the WCHT-72 the ties should be turned on their side so the 9" dimension is now the height. The objective is to have the number one switch rod, switch connecting rod, and the switch machine operating ram on the same line and plane. Please refer to installation instructions for complete details and tie adzing instructions.

Ballast should be cleared and tamped to no higher than 4" below the top of the unadzed portion of the switch ties the machine is bolted to. This will insure smooth, unhindered operation of the switch. The site should be well drained and free of ballast contamination.

The WCHT-72 Switch Machine can be used with any A.R.E.A. style connecting rod and most industrial type rods. The operating ram of the WCHT-72 is machined for a 1" clevls and drilled for a 7/8" bolt or pin.

NOTE:

Actual switch layouts may vary according to individual railroad standards.

III MANUAL OPERATION

The WCHT-72 can be operated manually by by-passing the proper solenoid valves and operating the hand pump with the manual lever.

The solenoid valves are placed in the by-pass position by gently pressing on the red knurled knob on the valve and then rotating the knob counter-clockwise while releasing downward pressure on the knob. The knob will spring outwards to the by-pass position.

To place the valve back into the operate position, gently press down on the red knurled knob, and then rotate the knob clockwise. When downwards pressure is released, the knob will stay in position.

The manual pump lever is stored in a lockable holder on the rear face of the machine cover.

Manual operation with the cover closed.

A. Operate to extend position.

1. Remove manual pump lever from holder.
2. Open door.
3. Operate both solenoid valves 1SOL and 2SOL to the by-pass position.
4. Insert lever into pump socket and pump ram to position.
Pump until point is secure against stock rail.
5. Remove lever.
6. Return both solenoid valves, 1SOL and 2SOL to the operate position.
7. Close door and replace lever correctly.

B. Operate to retract position.

1. Remove manual pump lever from holder.
2. Open door.
3. Operate the left solenoid valve, 2 SOL, to the by-pass position.
4. Insert lever into pump socket and pump ram to position.
Pump until point is secure against stock rail.
5. Remove lever.
6. Return solenoid valve 2 SOL to the operate position.
7. Close door and replace lever correctly.

C. The ram can also be manually operated with the cover open.

1. Remove pump lever from holder.
2. Do not open the access door.
3. Open machine cover.
4. Rotate the manual pump socket so it faces the cable entrance side of the machine.
5. Perform steps 3 thru 6 in instructions A or B previously described.

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CAUTIONS:

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1. Do not attempt to operate the ram manually with any other lever than the lever stored on the machine. When the lever is removed, control operation is disabled. Operating the ram manually with control operation enabled could cause undesired results.

2. BE SURE TO ALWAYS RETURN THE SOLENOID VALVE TO THE OPERATE POSITION AND THE LEVER TO THE POWER POSITION.
If the valves are left in the by-pass position, the ram will not operate to the retract position on control command. If the lever is installed incorrectly, the machine will not operate.
See Lock-out Instructions.

LOCK-OUT PUMP LEVER INSTRUCTIONS:

The pump lever also serves as the means to lock out the machine from power operation.

One side of the lever has a slot machined into it. When the slot covers the door limit switch, the switch and the power operation of the machine is disabled. With the lever installed with the slot covering the switch, a padlock can be installed to lock-out power operation.

For normal operation, the slot must not cover the door limit switch.

BE SURE THE SLOT IS NOT COVERING THE DOOR LIMIT SWITCH WHEN PLACING THE MACHINE TO THE NORMAL (POWER) MODE.

BE SURE THE SLOT DOES NOT COVER THE DOOR LIMIT SWITCH AFTER HAND OPERATION OF THE POINTS UNLESS YOU DESIRE TO LOCK-OUT THE SWITCH.

BE SURE THE SLOT IS COVERING THE DOOR LIMIT SWITCH AND A PADLOCK IS INSTALLED IF THE SWITCH IS TO BE LOCKED-OUT FROM POWER OPERATION.

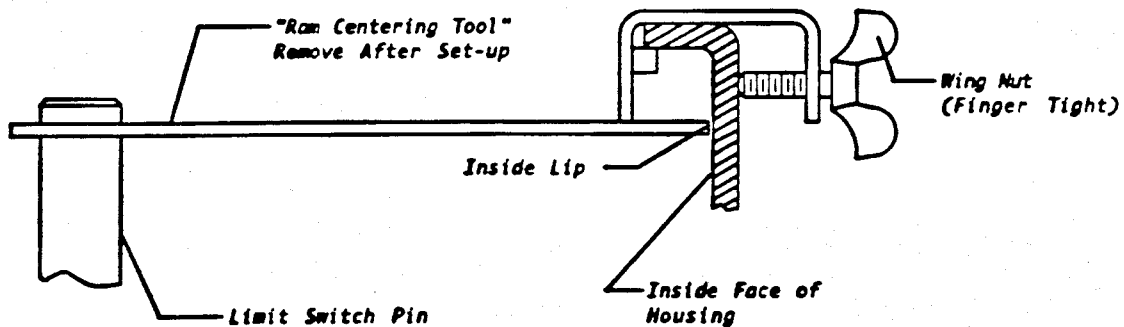
IV INSTALLATION INSTRUCTIONS

Before proceeding, be sure you have read and understand section III, Manual Operation

Move the switch points to the center position. Take a measurement from each point to the head of the nearest stock rail. Be sure the measurements are equal.

Adjust the connecting rod to the center of the range of adjustment. Connect this rod to the head rod.

Place the machine on the ties. Remove the manual pump handle from its holder. Open the machine cover. Slip the ram centering locking tool onto the front lip of the machine. Slowly pump the ram into a position so that the hole in the end of the ram centering tool slips over the limit switch activating pin. Continue pumping until the inside lip of the ram centering tool contacts the inside face of the housing. Lightly hand tighten the tool wing nut. Do not remove the ram centering tool. Carefully close the cover, which will then rest on the ram centering tool.



Position the machine on the ties so the center lines of the hole in the connecting rod and the operating ram line up, and align so that the switch rod, connecting rod and the operating ram are on the same line. If required, relocate the number one switch rod so that the connecting rod attaching point is centered between the ties. If using a basket type connecting rod, relocate the number one switch rod so the connecting rod is centered between the ties.

If using an offset connecting rod or straight rod with connecting point lowering adaptors:

Attach the connecting rod to the operating ram. Position the machine so the switch rod, connecting rod and the operating ram are on the same line and plane.

Using the holes in the mounting feet located nearest the center of the tie as a guide, drill four 7/8" dia. holes through the tie. Insert four 7/8" dia. bolts of suitable length and secure with lockwashers and nuts, or other suitable securing device as desired. Secure connecting rod bolt or pin.

If using straight rod and adzed ties:

Mark a line on the ties 2 to 3 inches toward the rail side of the front mounting feet. Remove the machine from the ties. The ties will now need to be adzed to a depth of approximately 3-1/2 to 4 inches from the marked line to the end of the ties. After adzing replace the machine on the ties.

Attach the connecting rod to the operating ram. Position the machine so the switch rod, connecting rod and the operating ram are on the same line and plane.

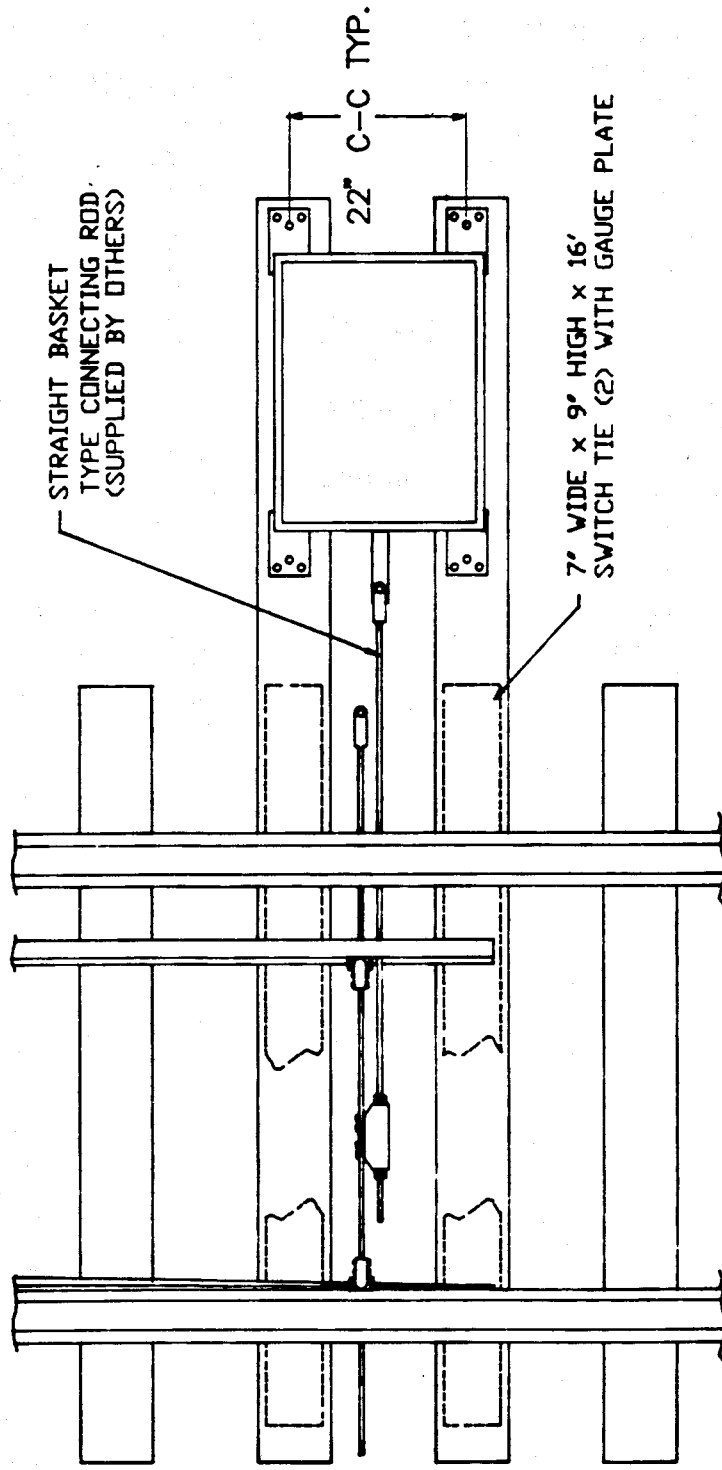
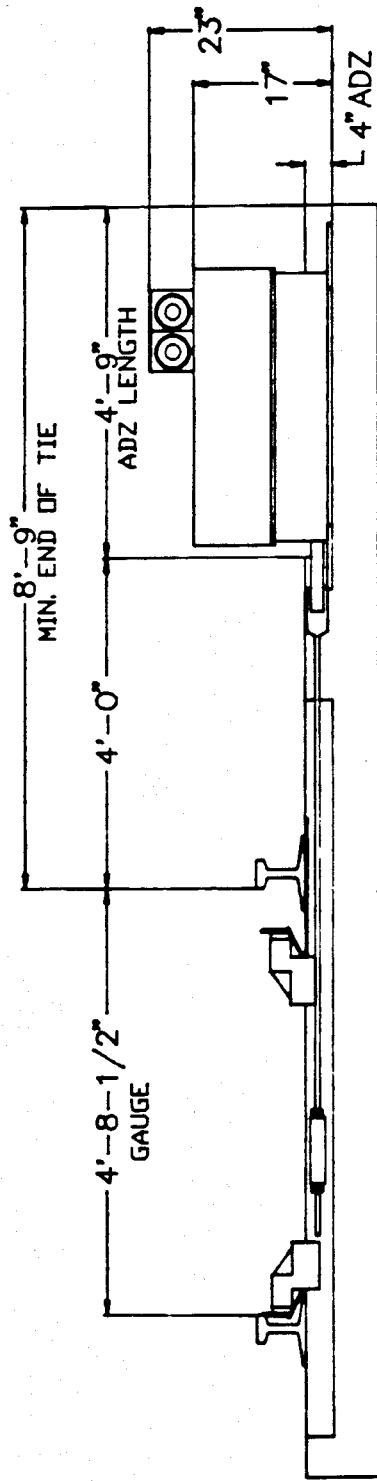
Using the holes in the mounting feet located nearest the center of the tie as a guide, drill four 7/8" dia. holes through the tie. Insert four 7/8" dia. bolts of suitable length and secure with lockwashers and nuts, or other suitable securing device as desired. Secure connecting rod bolt or pin.

Be sure all personnel are clear of the switch. Open cover. Remove ram centering tool.

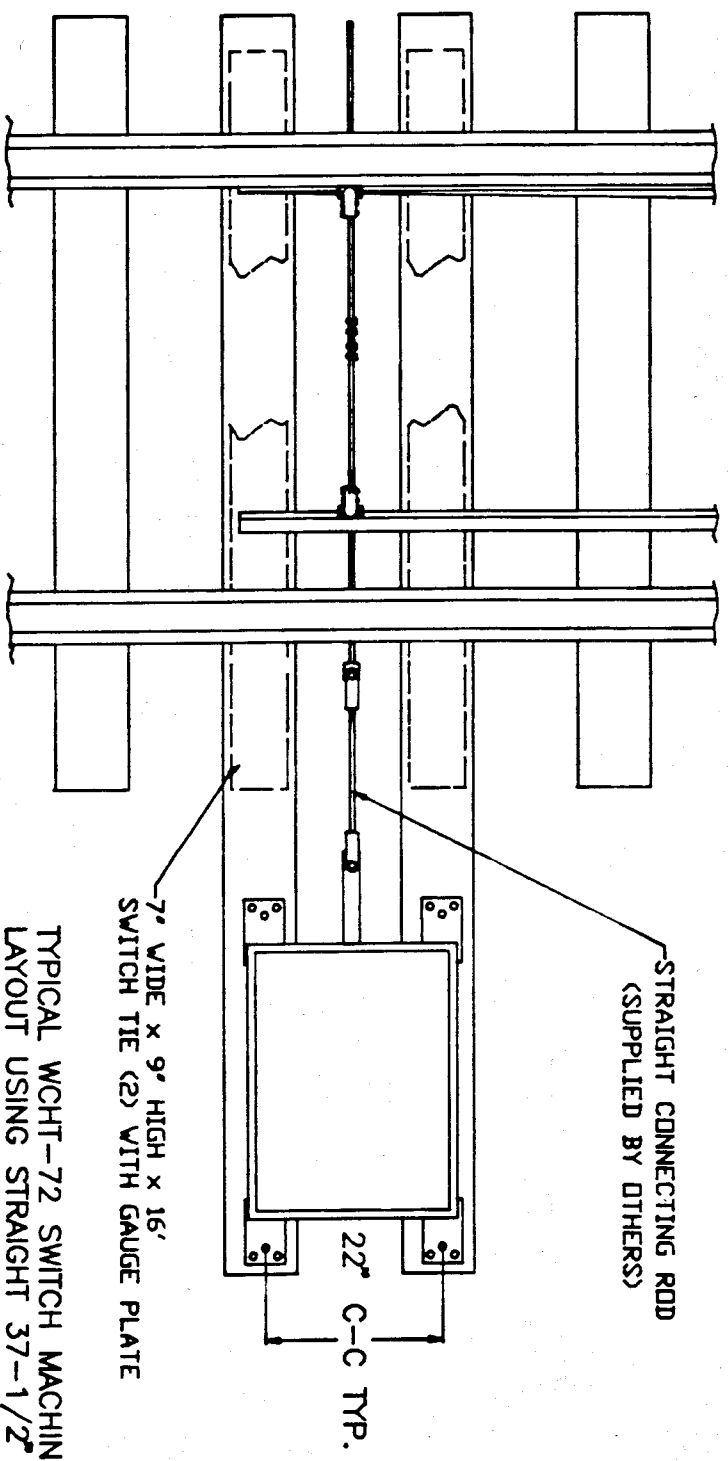
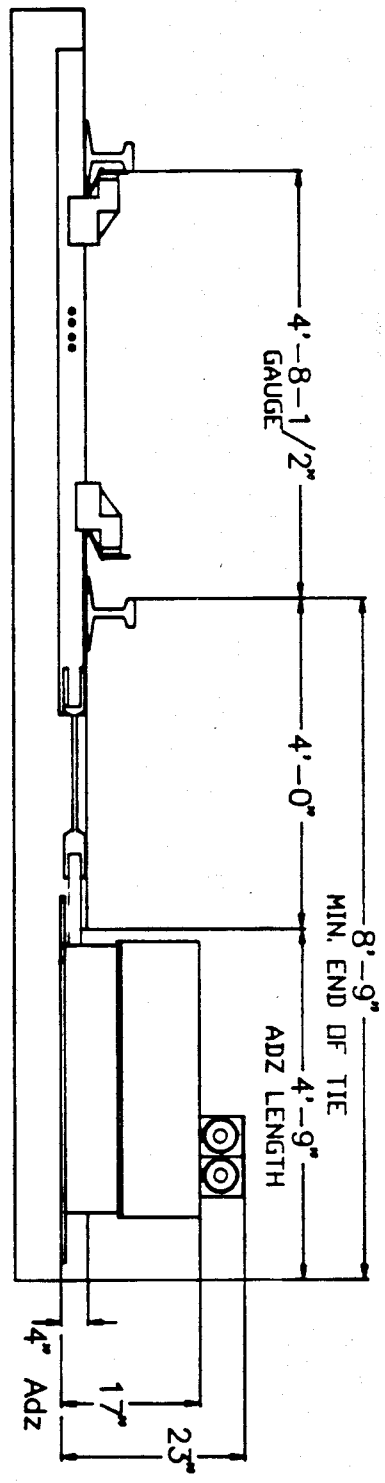
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CAUTION: The ram MAY operate to either position automatically when the ram centering tool is removed.

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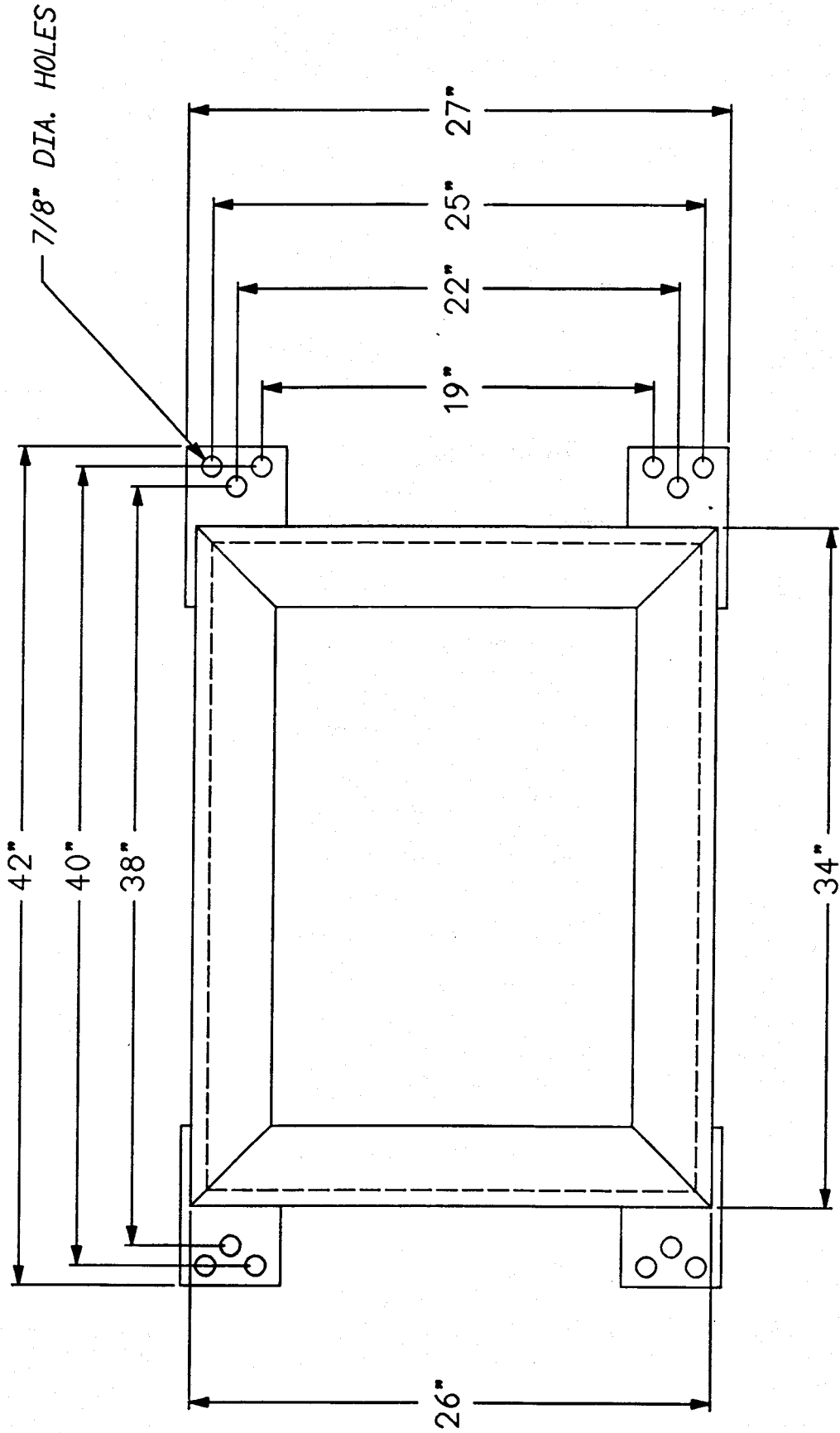
TYPICAL WCHT-72 SWITCH MACHINE LAYOUT
 USING BASKET TYPE CONNECTING ROD



7' WIDE x 9' HIGH x 16' SWITCH TIE (2) WITH GAUGE PLATE

TYPICAL WCHT-72 SWITCH MACHINE LAYOUT USING STRAIGHT 37-1/2" ROD.

FILE NO. MAC
WCHT-70-FP



WESTERN-CULLEN-HAYES, INC.

2700 W. 36TH PLACE, CHICAGO, IL 60632
312-254-9600 FAX: 312-254-1110

TITLE:
TYPICAL DIMENSIONAL FOOTPRINT FOR
WCHT-70 SERIES SWITCH MACHINE

DRAWN BY: AB	DATE: 1/18/93	ECO: 6642	REV:	DATE:	PAGE: 1 OF 1	PART NO: WCHT-70-FP	SERIAL #:	REV:
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V ELECTRICAL

POWER SERVICE REQUIREMENTS

The power service requirements are 115 VAC, 60 HZ, 25 AMP.
Motor full load amperage is 18.
Supply 25 Amp ground fault circuit breaker for each machine.

ELECTRICAL CONNECTIONS

Refer to proper electrical diagram for your application.

NOTE:

Customer to furnish field disconnecting safety switch with fusing or breaker as required 25 amp minimum.

If using a track circuit, remove jumper from terminals 3 and 9 and connect two wire leads from the circuit relay. The supplied relay contact should be open when a train is in the circuit area.

CONTROL COMPONENTS

The basic control enclosure devices include:

- * 25 amp circuit breaker.
- * Programmable logic controller, which performs all control logic.
- * Motor operation contactor.
- * Control input relays, one for extend and one for retract control. Relays supplied to operate at 115 VAC, 12VDC or 24 VDC. Refer to proper control diagram for your application.
- * Track interlocking circuit input relay.
- * Position indication relays.
- * 200 Watt heater/thermostat unit.

OPTIONAL: 115 VAC primary, 10 VAC secondary, 4 AMP transformer for position indication lamps.

SEQUENCE OF OPERATION

The ram will operate any time a control input relay is momentarily or positively energized. This can be accomplished by a selector switch, 2 pushbuttons, lever controls, single control relay or combination normal/reverse relays.

If an obstruction impedes the movement of the switch points, the ram will reverse the switch points to the starting position after a four second delay. If a secondary obstruction occurs, a second time delay is activated. If switch point remain gapped, the motor will shut down and a dark signal will be displayed. After obstruction is removed, operate the control device to cycle the points to a position.

CAUTION:

Spring pressure will be present on the switch points. Use caution when clearing an obstruction.

When the track circuit is fouled, the following control sequence is operational:

If the switch points gap more than 1/4" while the train is on the points, the motor and pump will turn on for a 1 second time period to place the switch points back into proper position.

The machine controller retains the last position command. If the switch is trailed, the switch points will return to the last command position 3.5 seconds after the track circuit clears.

NOTE:

A track circuit clear signal must be present for 3.5 seconds before the logic controller will accept the clear signal. This time delay resets any time voltage is removed from the circuit input relay.

If the door limit switch (DLS) is de-activated, all controls become disabled.

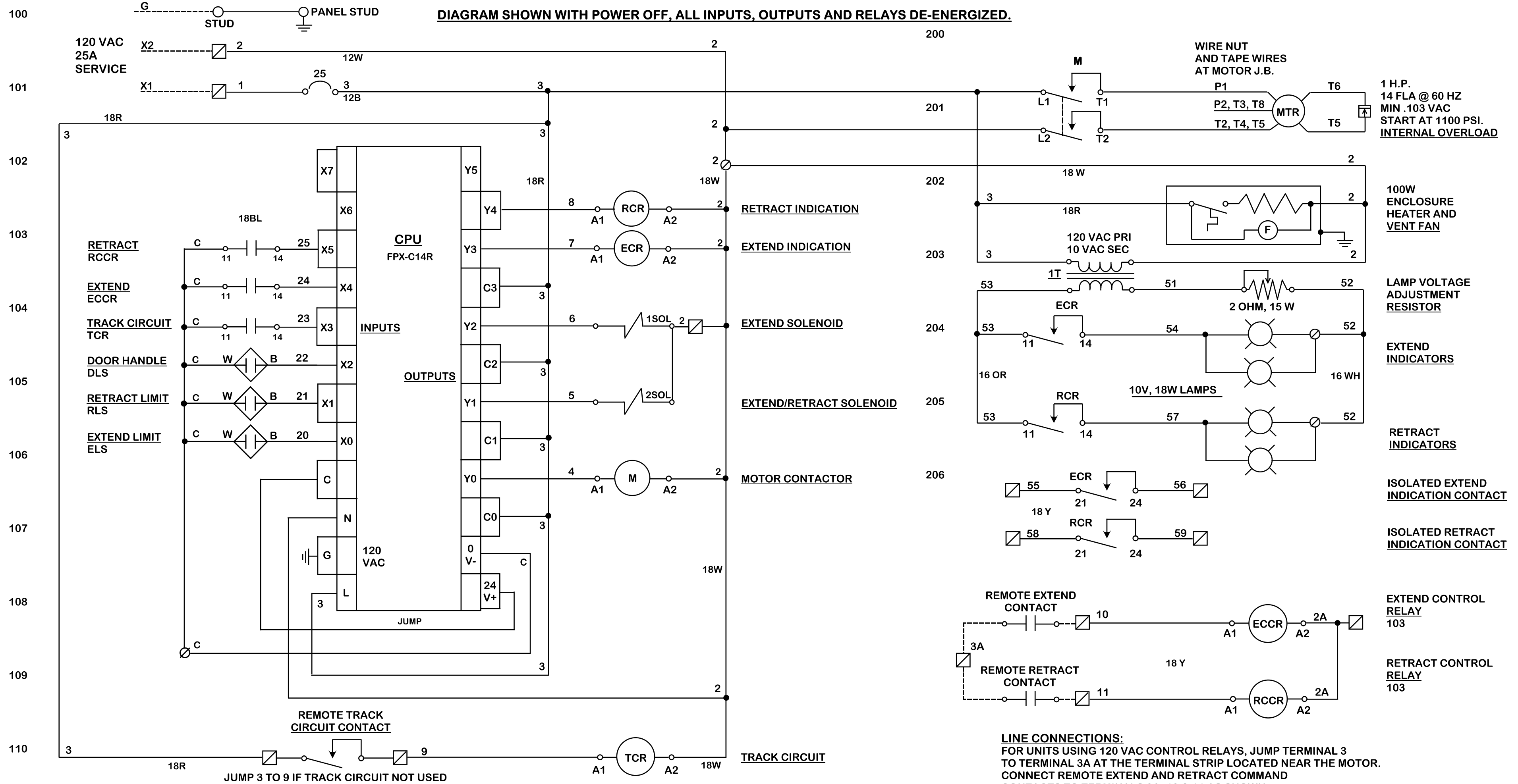
Control will not operate if the track circuit, wired to points 3 and 9, becomes open.

INTERLOCKING RECOMMENDATIONS

It is highly recommended that a system device for safety interlocking be utilized within the area of the track switch to prevent accidental operation of the switch points while a train occupies the switch.

This system could be accomplished by means of a track circuit, track loop circuit, or by a train wheel sensor based track clear system. Contact W-C-H for system information for your application.

DIAGRAM SHOWN WITH POWER OFF, ALL INPUTS, OUTPUTS AND RELAYS DE-ENERGIZED.

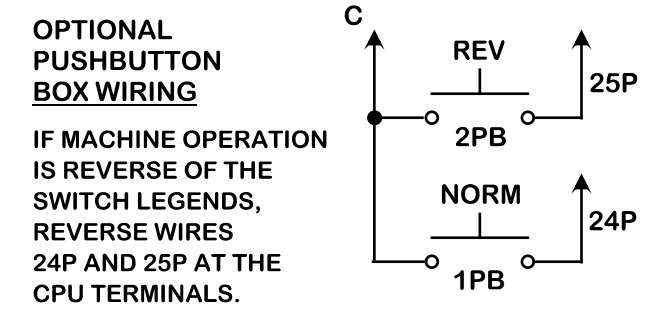


LINE CONNECTIONS:
FOR UNITS USING 120 VAC CONTROL RELAYS, JUMP TERMINAL 3 TO TERMINAL 3A AT THE TERMINAL STRIP LOCATED NEAR THE MOTOR. CONNECT REMOTE EXTEND AND RETRACT COMMAND CONTACTS TO TERMINALS 3A, 10 & 11 AS SHOWN.

FOR UNITS USING DC RELAYS, CONNECT POSITIVE DC VOLTAGE TO THE REMOTE EXTEND AND RETRACT COMMAND CONTACTS AS WELL AS TERMINAL 3A.

NEUTRAL CONNECTIONS:
FOR UNITS USING 120 VAC CONTROL RELAYS, JUMP TERMINAL 2A TO TERMINAL 2 AT THE TERMINAL STRIP LOCATED NEAR THE MOTOR.

FOR UNITS USING DC RELAYS, CONNECT DC NEGATIVE TO TERMINAL 2A.



**REVISION "G" CHANGES
EFFECTIVE AS OF 8/5/2010
FOR UNITS BEGINNING WITH
SERIAL NUMBER 72-1004.**

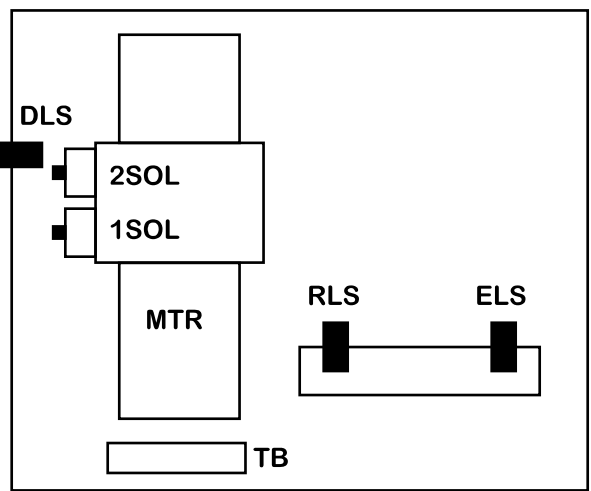
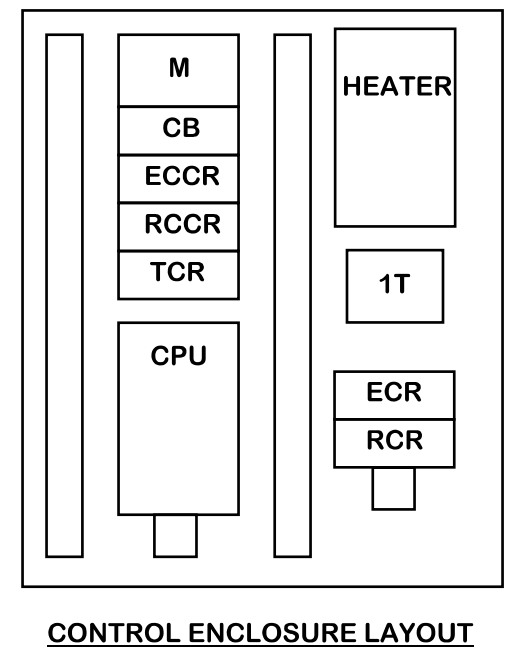
WESTERN-CULLEN-HAYES, INC.
2700 W. 36TH PLACE, CHICAGO, IL 60632
773-254-9600 FAX: 773-254-1110

TITLE: **CONTROL ENCLOSURE FOR
WCHT-72 SWITCH MACHINE
WITH SIDE MOUNTED
INDICATOR LIGHTS**
PART NO: 70-0152-F REV:

ELECTRICAL COMPONENT BILL OF MATERIAL		
SYMBOL	DESCRIPTION	PART NUMBER
M	CONTACTOR	50-3052
CB	25A, CIRCUIT BREAKER	50-3054
ECCR, RCCR	1 POLE RELAY INTERFACE MODULE (SPECIFY RELAY COIL VOLTAGE)	120 VAC - 50-3312, 12 VDC - 50-3312-12
TCR	2 POLE RELAY INTERFACE MODULE	120 VAC - 50-3305
ECR, RCR	PROGRAMMABLE CONTROLLER	50-3400
CPU	100W HEATER	50-0072
HEATER	LAMP TRANSFORMER	50-3120
1T	LAMP RESISTOR	50-3135
1R	120 VAC SOLENOID COIL	70-0650-10-2
1,2SOL	PROXIMITY SWITCH	70-0305-P
ELS, RLS	REED SENSOR	50-3059
DLS	PUSHBUTTON SWITCH	50-0241
1,2PB		

- LEGEND**
- ☐ = CONNECTION AT TERMINAL STRIP
 - = TERMINAL CONNECTION IN CONTROL ENCLOSURE
 - = CONNECTION AT ELECTRICAL DEVICE
 - = FIELD WIRING

DRAWN BY:	DATE:	ECO:	REV:		
LC	7/30/10	9483	G		1 OF 1

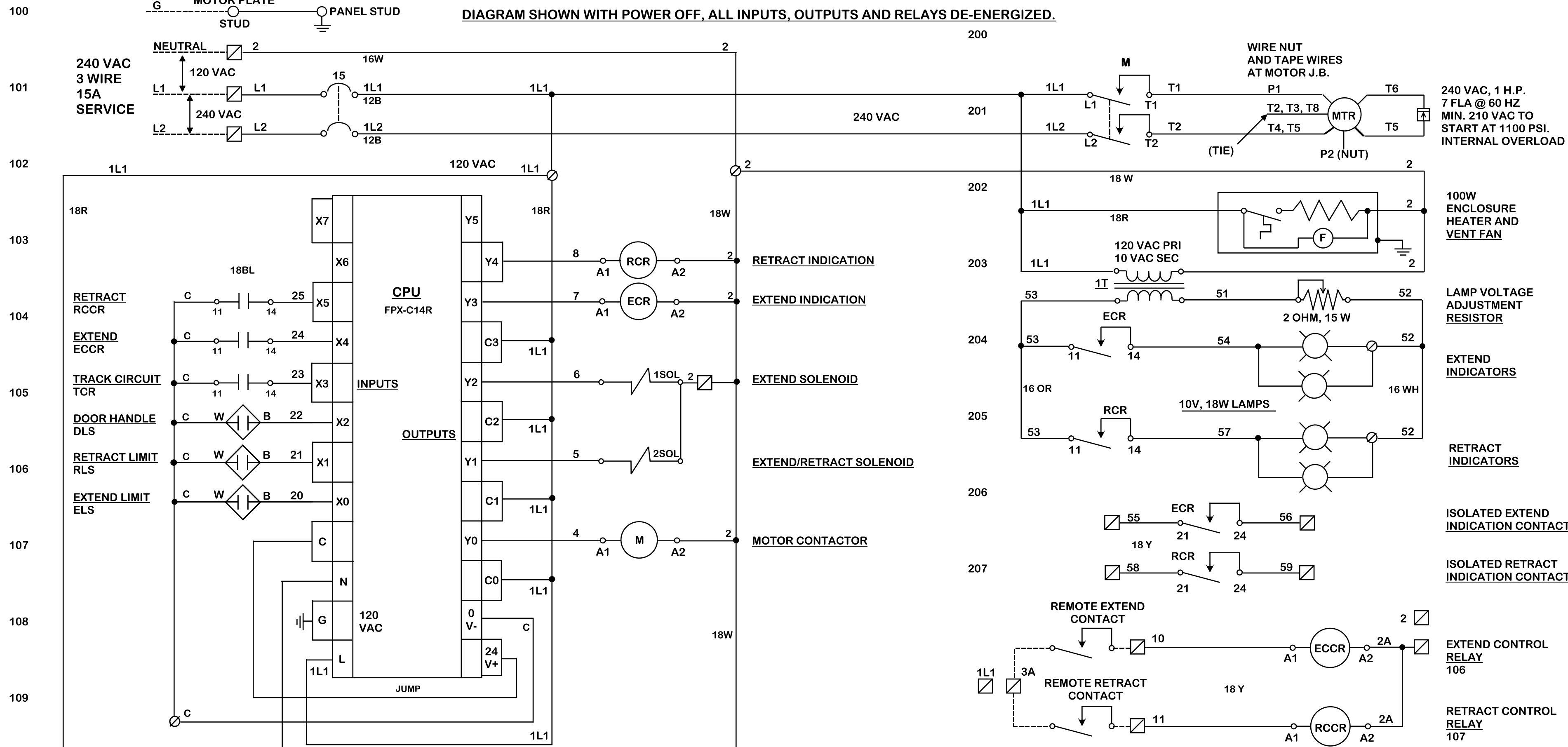


TB LAYOUT

X2	2A	3	3A	55	56	SP
X1	9	10	11	58	59	SP

111
112
113
114

DIAGRAM SHOWN WITH POWER OFF, ALL INPUTS, OUTPUTS AND RELAYS DE-ENERGIZED.



LINE CONNECTIONS:
 FOR UNITS USING 120 VAC CONTROL RELAYS, JUMP TERMINAL 3A TO TERMINAL 1L1 AT THE TERMINAL STRIP LOCATED NEAR THE MOTOR. CONNECT REMOTE EXTEND AND RETRACT COMMAND CONTACTS TO TERMINALS 3A, 10 & 11 AS SHOWN.

FOR UNITS USING DC RELAYS, CONNECT POSITIVE DC VOLTAGE TO THE REMOTE EXTEND AND RETRACT COMMAND CONTACTS TO TERMINALS 10 & 11 AS SHOWN. DO NOT CONNECT ANY WIRES OR JUMPERS TO TERMINAL 3A.

NEUTRAL CONNECTIONS:
 FOR UNITS USING 120 VAC CONTROL RELAYS, JUMP TERMINAL 2A TO TERMINAL 2 AT THE TERMINAL STRIP LOCATED NEAR THE MOTOR.

FOR UNITS USING DC RELAYS, CONNECT DC NEGATIVE TO TERMINAL 2A.

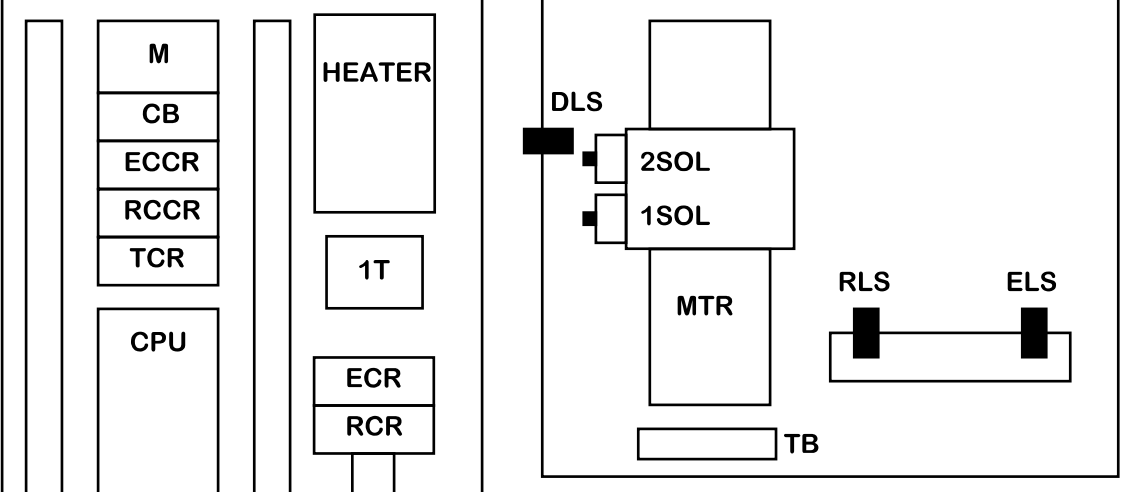
- LEGEND**
- ☐ = CONNECTION AT TERMINAL STRIP
 - = TERMINAL CONNECTION IN CONTROL ENCLOSURE
 - = CONNECTION AT ELECTRICAL DEVICE
 - = FIELD WIRING

REVISION "A" CHANGES
 EFFECTIVE AS OF 8/18/2010
 FOR UNITS BEGINNING WITH
 SERIAL NUMBER 72-1004.

WESTERN-CULLEN-HAYES, INC
 2700 W. 36TH PLACE, CHICAGO, IL 60632
 773-254-9600 FAX: 773-254-1110

TITLE: 240 VAC, 3 POWER WIRE CONTROL ENCLOSURE FOR WCHT-72 SWITCH MACHINE WITH INDICATOR LIGHTS
 PART NO: 70-0152-240 REV:

ELECTRICAL COMPONENT BILL OF MATERIAL		
SYMBOL	DESCRIPTION	PART NUMBER
M	CONTACTOR	50-3052
CB	25A, CIRCUIT BREAKER	50-3054
ECCR, RCCR	1 POLE RELAY INTERFACE MODULE (SPECIFY RELAY COIL VOLTAGE)	120 VAC - 50-3312, 12 VDC - 50-3312-12
TCR	2 POLE RELAY INTERFACE MODULE	120 VAC - 50-3305
CPU	PROGRAMMABLE CONTROLLER	50-3400
HEATER	100W HEATER	50-0072
1T	LAMP TRANSFORMER	50-3120
1R	LAMP RESISTOR	50-3135
1,2SOL	120 VAC SOLENOID COIL	70-0650-10-2
ELS, RLS	PROXIMITY SWITCH	70-0305-P
DLS	REED SENSOR	50-3059
1,2PB	PUSHBUTTON SWITCH	50-0241



L2	2	2A	55	56	58	59	SP
L1	3A	1L1	9	10	11	SP	SP

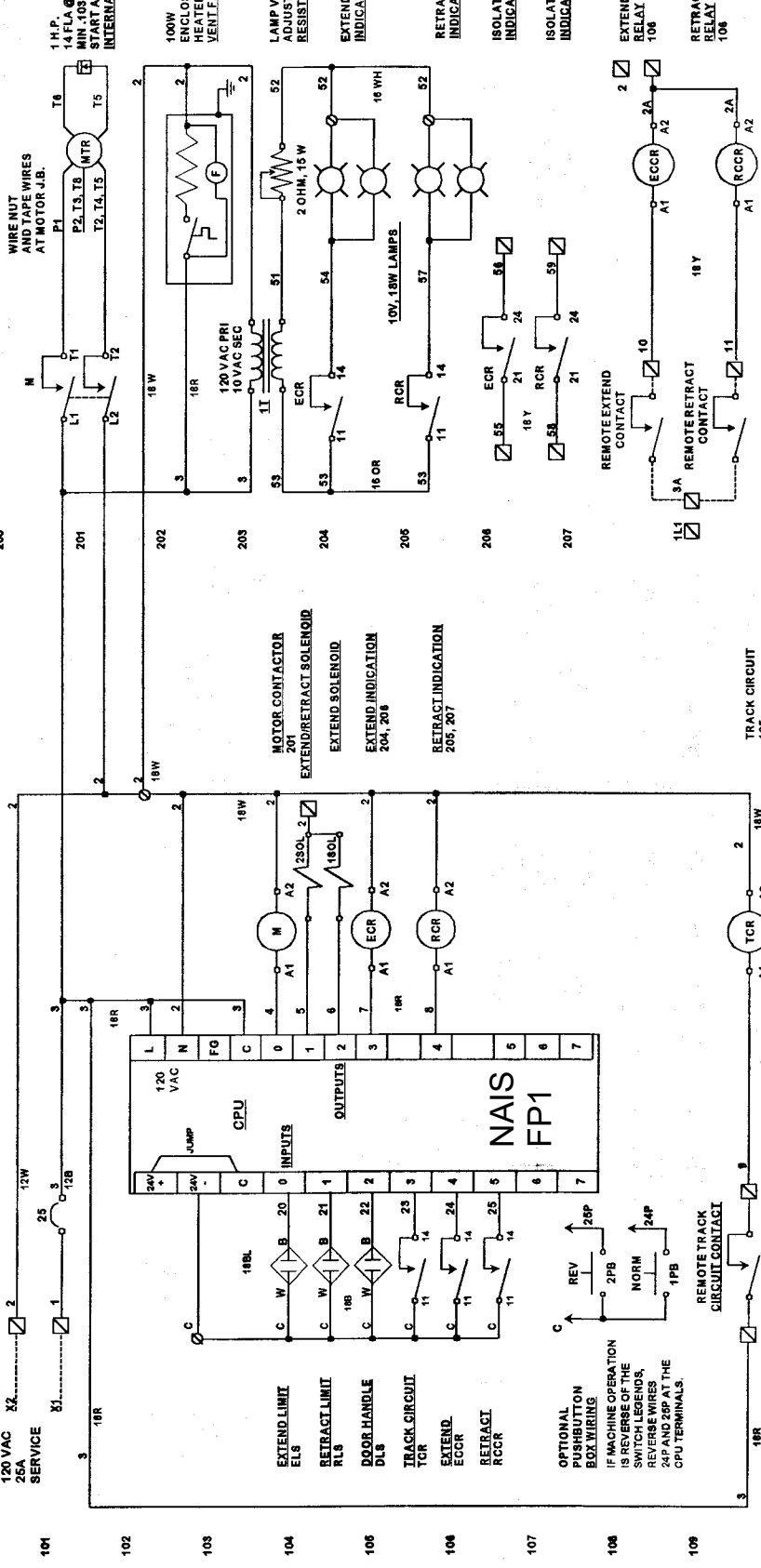
TB LAYOUT AT MOTOR PLATE

DRAWN BY: LC DATE: 8/18/2010 ECO: 9483-A REV:
 DRAWN BY: RLY DATE: 6/29/2005 ECO: 9112 REV:
 1 OF 1

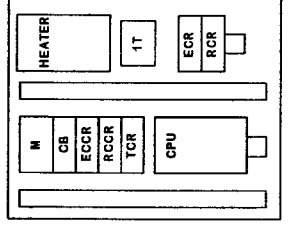
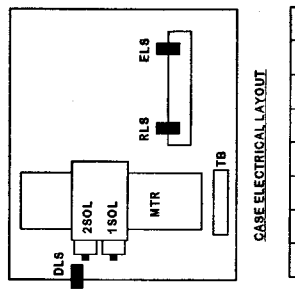
DIAGRAM SHOWN WITH POWER OFF. ALL INPUTS, OUTPUTS AND RELAYS DE-ENERGIZED.

200

101



SYMBOL	DESCRIPTION	PART NUMBER
M	MOTOR	50-3052
CB	CIRCUIT BREAKER	50-3054
ECCR, RCR	1 POLE RELAY INTERFACE MODULE (SPECIFY RELAY COIL VOLTAGE)	120 VAC - 50-3512, 12 VDC - 50-3512-12
ECR, RCR	2 POLE RELAY INTERFACE MODULE	50-3300
CPU	PROGRAMMABLE CONTROLLER	50-3300
HEATER	100W HEATER	50-3120
1R	LAMP RESISTOR	50-3120
EL, RLS	120VAC SOLENOID COIL	70-0450-10-2
DLS	PROXIMITY SWITCH	50-3059
1, 2PB	PUSHBUTTON SWITCH	50-0241



LINE CONNECTIONS:
FOR UNITS USING 120VAC CONTROL RELAYS, JUMP TERMINAL 3 TO TERMINAL 2 AT THE TERMINAL STRIP LOCATED NEAR THE MOTOR. CONNECT TERMINALS 8A, 10 & 11 AS SHOWN.

FOR UNITS USING DC RELAYS, CONNECT POSITIVE DC VOLTAGE TO THE REMOTE EXTEND AND RETRACT COMMAND CONTACTS TO TERMINALS 10 & 11 AS SHOWN.

NEUTRAL CONNECTIONS:
FOR UNITS USING 120VAC CONTROL RELAYS, JUMP TERMINAL 2A TO TERMINAL 2 AT THE TERMINAL STRIP LOCATED NEAR THE MOTOR.

FOR UNITS USING DC RELAYS, CONNECT DC NEGATIVE TO TERMINAL 2A.

WESTERN-CULLEN-HAYES, INC.
2700 W. 34TH PLACE, CHICAGO, IL 60632
773-254-8600

TITLE:
CONTROL ENCLOSURE FOR WCHT-72 SWITCH MACHINE WITH INDICATOR LIGHTS

PART NO: 70-0162-F REV: A

DRAWN BY: RLY	DATE: 9/10/2005	ECO: 9112	REV: A
DRAWN BY: RLY	DATE: 9/10/2004	ECO: 9025	REV: A

LEGEND

- ☐ = CONNECTION AT TERMINAL STRIP
- = TERMINAL CONNECTION IN CONTROL ENCLOSURE
- = CONNECTION AT ELECTRICAL DEVICE
- = FIELD WIRING

CASE ELECTRICAL LAYOUT		TB LAYOUT	
X2	2A	3A	56
X1	9	10	58
		11	59
		58	8P
		59	8P

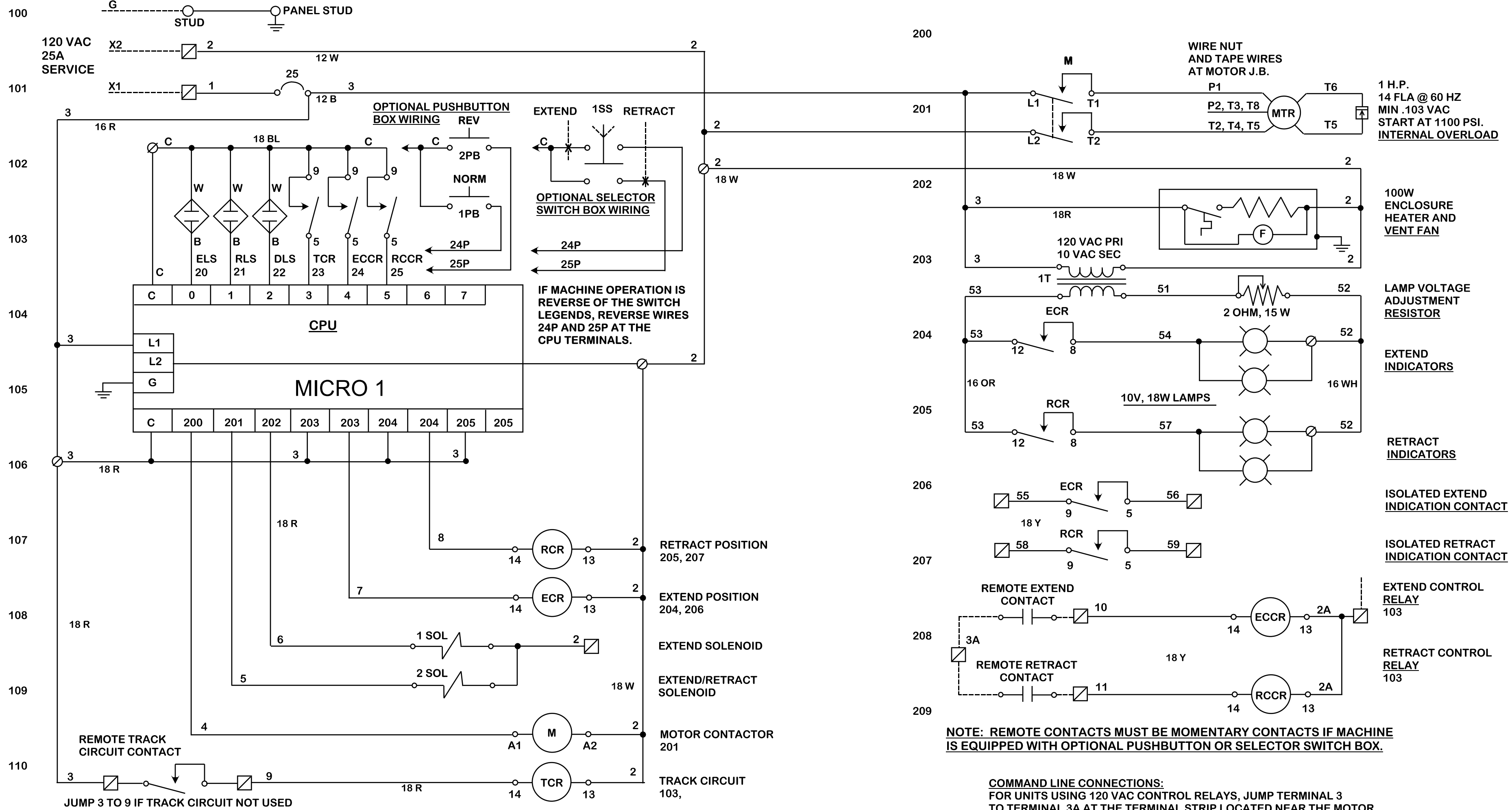


DIAGRAM SHOWN WITH POWER OFF. ALL INPUTS, OUTPUTS AND RELAYS DE-ENERGIZED.

NOTE: REMOTE CONTACTS MUST BE MOMENTARY CONTACTS IF MACHINE IS EQUIPPED WITH OPTIONAL PUSHBUTTON OR SELECTOR SWITCH BOX.

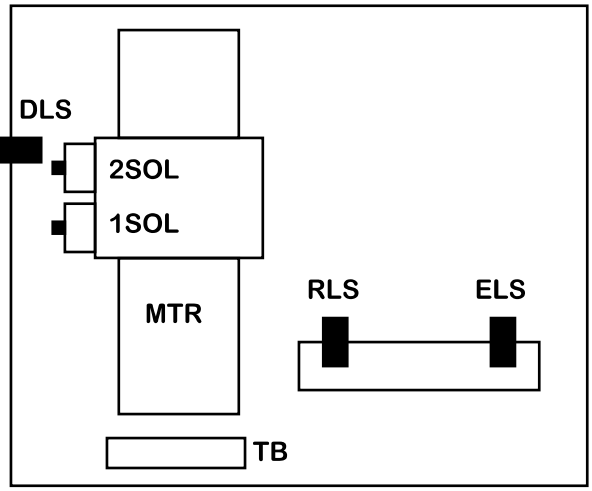
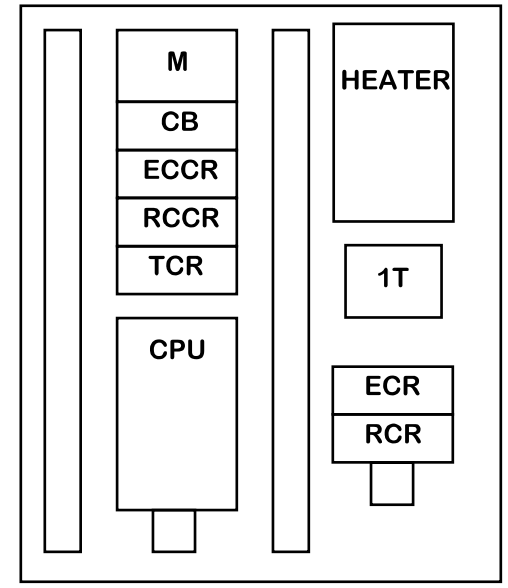
COMMAND LINE CONNECTIONS:
FOR UNITS USING 120 VAC CONTROL RELAYS, JUMP TERMINAL 3 TO TERMINAL 3A AT THE TERMINAL STRIP LOCATED NEAR THE MOTOR. CONNECT REMOTE EXTEND AND RETRACT COMMAND CONTACTS TO TERMINALS 3A, 10 & 11 AS SHOWN.

FOR UNITS USING DC RELAYS, CONNECT POSITIVE DC VOLTAGE TO THE REMOTE EXTEND AND RETRACT COMMAND CONTACTS AND TERMINALS 10 & 11 AS SHOWN. DO NOT CONNECT ANY WIRES OR JUMPERS TO TERMINAL 3A.

COMMAND NEUTRAL CONNECTIONS:
FOR UNITS USING 120 VAC CONTROL RELAYS, JUMP TERMINAL 2A TO TERMINAL 2 AT THE TERMINAL STRIP LOCATED NEAR THE MOTOR.

FOR UNITS USING DC RELAYS, CONNECT DC NEGATIVE TO TERMINAL 2A ONLY.

- LEGEND
- ☐ = CONNECTION AT TERMINAL STRIP
 - = TERMINAL CONNECTION IN CONTROL ENCLOSURE
 - = CONNECTION AT ELECTRICAL DEVICE
 - = FIELD WIRING AS REQUIRED



TB LAYOUT

X2	2A	3	3A	55	56	SP
X1	9	10	11	58	59	SP

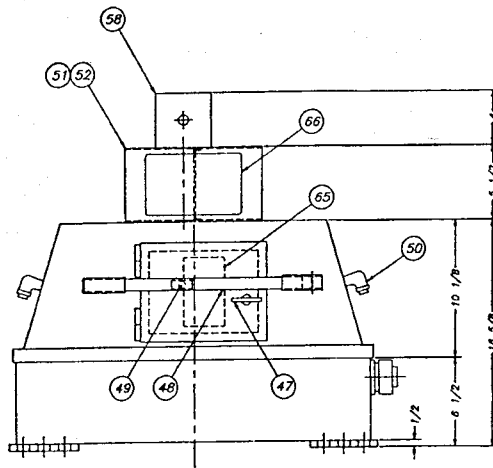
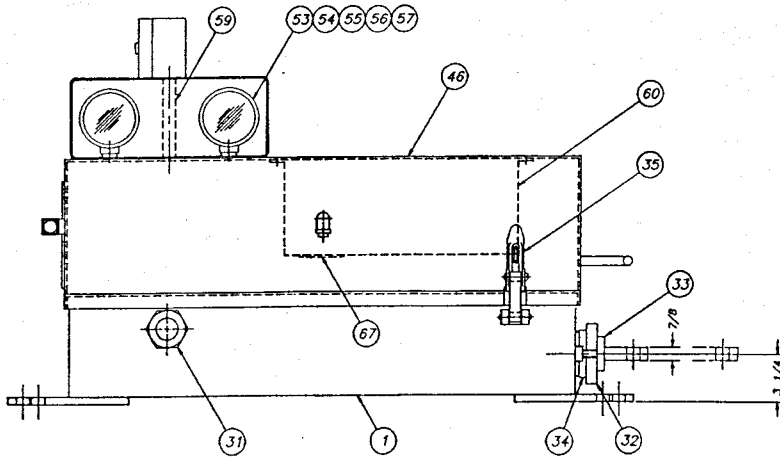
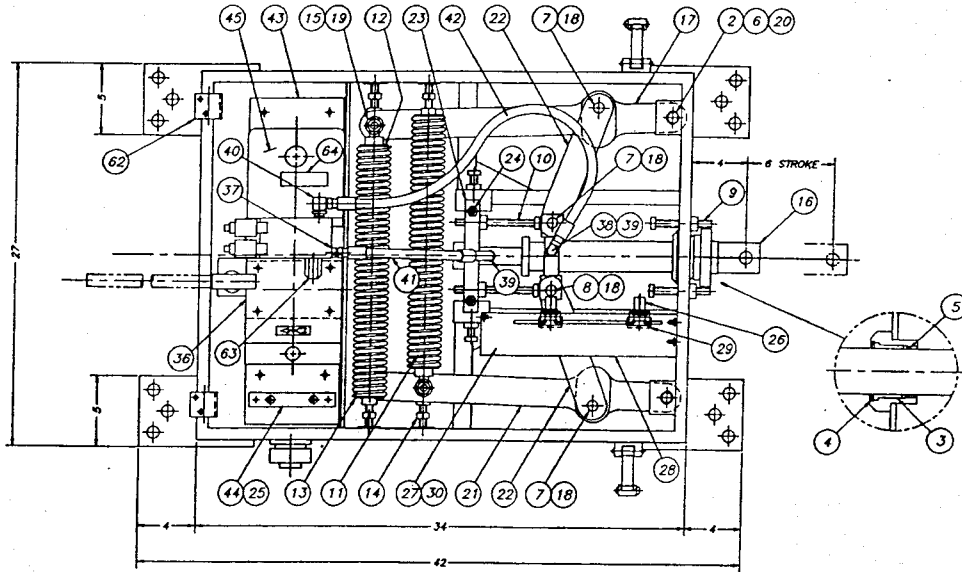
ELECTRICAL COMPONENT BILL OF MATERIAL		
SYMBOL	DESCRIPTION	PART NUMBER
M	CONTACTOR	50-3052
CB	25A, CIRCUIT BREAKER	50-3054
ECCR, ECCR	1 POLE RELAY	50-3012
TCR	(SPECIFY RELAY COIL VOLTAGE)	
ECR, RCR	2 POLE RELAY	50-3005
CPU	PROGRAMMABLE CONTROLLER	50-3100
HEATER	100W HEATER	50-0072
1T	LAMP TRANSFORMER	50-3120
1R	LAMP RESISTOR	50-3135
1,2SOL	120VAC SOLENOID COIL	70-0650-10-2
ELS, RLS	PROXIMITY SWITCH	70-0305-P
DLS	REED SENSOR	50-3059
1SS	3 POSITION SELECTOR SWITCH	50-0229
	N.O. CONTACT	50-0230
1,2PB	PUSHBUTTON SWITCH	50-0241

FOR UNITS WITH SERIAL NUMBER SER-01000 AND HIGHER. FOR UNITS SER-00125 AND LOWER, USE DIAGRAM 70-0152, REV. D.

WESTERN-CULLEN-HAYES, INC.
2700 W. 36TH PLACE, CHICAGO, IL 60632
773-254-9600 FAX: 773-254-1110

TITLE:
CONTROL ENCLOSURE FOR WCHT-72 SWITCH MACHINE WITH INDICATOR LIGHTS

DRAWN BY: RLY	DATE: 1/11/01	ECO: 8590	REV: E	SHEET 2 FOR ASSY USE ONLY	PART NO: 70-0152	REV: E
DRAWN BY: RLY	DATE: 7/26/93	ECO: 6749		1 OF 2		



WESTERN-CULLEN-HAYES, INC.

2700 W. 36TH PLACE CHICAGO, IL. 60632
 (773) 254-9600 FAX (773) 254-1110

Model WCHT-72 Parts List

ITEM	PART NO.	DESCRIPTION
1	70-0400	Machine Case
2	70-0428	Front Pivot Bushing
3	70-0407	Ram Bushing
4	70-0409	Snap Ring
5	70-0410	Wiping Seal
6	70-0411	Front Arm Pivot Pin
7	70-0412	Pivot Pin
8	70-0413	Pivot Pin
9	70-0423	Front Travel Stop Bolt
10	70-0424	Rear Travel Stop Bolt
11	70-0417	Spring
12	70-0418	Eye Bolt Spring Holder
13	70-0419	Adj Bolt Spring Holder
14	70-0421-1	Spring Adj Screw Assy
15	70-0426	Eye Bolt
16	70-0431	Hydraulic Cylinder
17	70-0432-2L	Left Lever Arm
18	70-0435	Lever Arm Swivel Bearing
19	70-0414	Shoulder Bolt
20	70-0434	Half Dog Set Screw
21	70-0432-2R	Right Lever Arm
22	70-0433-2	Short Lever Arm
23	70-0404	Cylinder Mtg Block
24	70-0422	Set Screw
25	70-0160	Limit Switch Wire Harness (Not Shown)
25	70-0160-P	Proximity Switch Wire Harness (Not Shown)
26	70-0305	Travel Limit Switch (Not Shown)
26	70-0305-P	Proximity Switch
27	70-0307	Limit Switch Plate Heater (Not Shown)
28	70-0430	Limit Switch Mtg. Plate (Not Shown)
28	70-0430-P	Proximity Switch Mtg. Plt.
29	70-0306	Limit Switch Nut Plate (Not Shown)
29	70-0306-P	Proximity Switch Nut Plt.
30	70-0308	Heater Clamp (Not Shown)
31	ST-150	Straight Connector
32	70-0441	Ram Boot

ITEM	PART NO.	DESCRIPTION
33	400-03-00	Boot Clamp
34	400-03-01	Boot Clamp
35	1265-40	Hasp
36	70-0650	Hydraulic Power Pack
37	70-0600	Straight Adapter
38	70-0613	90 Deg Swivel Adapter
39	70-0617	Straight Adapter
40	70-0601	90 Deg Adapter
41	70-0444	Short Hose Assy
42	70-0445	Long Hose Assy
43	70-0429	Motor Mtg Plate
44	70-0161	Terminal Stand
45	70-0651	Hyd. Fluid (Not Shown)
46	70-0121	Machine Cover
47	70-1020	Door Latch
48	70-0440	Limit Switch Pump Handle
48	70-0440-M	Reed Switch Pump Handle
49	50-3058-1	Limit Switch
49	50-3059	Reed Switch
50	1143-16-A	Ventilator Assy
51	70-0181	Shade W/Local Switch
52	70-0182	Shade W/O Local Switch
53	70-0170	Amber Light Assy
54	70-0171	Green Light Assy
55	70-0172	Red Light Assy
56	70-0173	Blue Light Assy
57	70-0174	Rubber Washer
58	70-0183-1	Local Switch Enclosure
59	70-0180-1	Pipe Riser
60	70-0152	Control Enclosure With Light Transformer
60	70-0153	Control Enclosure W/O Light Transformer
61	60-3072	Centering Tool (Not Shown)
62	70-0437	Hinge Bracket
63	70-0650-HB	Relief Valve & Block (As Equipped)
64	70-0650-N1	Fluid Label
65	70-0650-N2	Pump Label
66	70-0650-N3	Pump Label
67	70-0650-N4	Lube Label

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VI ADJUSTMENTS

LIMIT OR PROXIMITY POSITION SWITCH ADJUSTMENT

Apply power to the switch machine.

Be sure track circuit is clear, or Jumper is in place between terminals 3 and 9.

Using the manual pump, operate the switch points to the normal position. Insert a track gap gage at the reverse position stock rail. Operate the switch points to the reverse position.

Loosen the reverse limit/proximity switch screws. Move the switch to a position that just turns off the position indicator light. If limit switch equipped, move the switch arm apx. 1/4" back against the limit switch pin, then tighten the switch. If proximity switch equipped, tighten in position.

Repeat the procedure for the switch in normal position.

RAM STOP ADJUSTMENT

If using solid rod:

If proper procedure was used to install rod and machine, this adjustment should not be necessary.

Operate switch to the retract position. Loosen lock nuts on the two stop bolts. Adjust the bolts to a position 3/8" to 1/2" away from the lever arm. Secure lock nuts.

Operate to the extend position and repeat procedure.

If using basket rod:

DO NOT ADJUST STOP BOLTS.

With ram in the retracted position, and the switch point contacting the near rail, adjust rod nuts on the near far side of the basket. This will force the ram away from the rear stop bolts. Continue to adjust until a gap 3/8" to 1/2" exists between the head of the rear stop bolts and the contact surface. Place the ram in the extended position and the switch point contacting the far rail. Adjust the rod nut on the near side of the basket until the 3/8" to 1/2" gap exists between the front stop bolts and the contact surface.

Cycle the machine three times.

Recheck stop bolt gap and re-adjust if required. When adjustment is complete, there should be a 3/8" to 1/2" gap at the front and rear stop bolts, as well as 3/8" to 5/8" travel of the connecting rod within the basket.

SPRING TENSION AND HYDRAULIC PRESSURE ADJUSTMENT

Spring tension is factory set for approximately 1200 lbs. of switch point holding force. Hydraulic pressure is factory set is not field adjustable.

Contact Western-Cullen-Hayes Engineering Department if it is determined that spring tension or hydraulic pressure needs field adjustment.

VII HYDRAULIC SYSTEM

SYSTEM DESCRIPTION

The hydraulic system consists of an electric motor, hydraulic pump/reservoir, two electro-mechanical spool valves, pressure relief valves, check valves, hydraulic cylinder and an integral manual pump for emergency and maintenance operation.

To extend or retract the hydraulic cylinder, hydraulic fluid flows from the pump through the directional valve to the proper cylinder port and check valves.

FLUID SPECIFICATIONS

The hydraulic fluid is a mineral based fluid which is capable of operating over a wide temperature range, is nongumming, noncorrosive and highly resistant to oxidation. This fluid is dyed red for identification and leak detection purposes. (Former MIL-H-5606A specification.)

The following listed aviation fluids are required to provide proper operation of the system.

MANUFACTURERS FLUID SPECIFICATIONS

PRODUCT	SPECIFIC GRAVITY	POUR POINT	FLASH POINT	SUS @	SUS @	CST @	CST @
				100F/ 38C	210F/ 99C	104F/ 40C	212F/ 100C
MOBIL AERO HFA	30	-75F -59C	200F 93C	79	45	14	5.6
SHELL AERO FLUID 4	31.7	-75F -59C	215F 102C			CST @ -40F/ -40C	CST @ 130F/ 54C
						380	10.4

DO NOT USE ANY FLUID OTHER THAN THOSE LISTED OR A FLUID WHICH HAS THE SAME SPECIFICATIONS AS THOSE LISTED.

FLUID MAINTENANCE

1. The system fluid capacity with the ram in the retracted position is 2.7 liters (2.85 quarts or 92 fl. ozs.).
2. Fluid level measurement must be taken with the ram in the retracted position.
3. Manufacturer of fluid recommends complete system fluid replacement every 5 years.

4. Check fluid level and condition yearly. Additional checks may be required by customer maintenance procedure or as environmental conditions dictate.

=====

CAUTION: Do not overfill the reservoir. The lower line on the
===== dipstick is the full mark.

VIII LUBRICATION REQUIREMENTS

Service Lubrication Requirements:

The WCHT-72 Switch Machine requires minimal lubrication. Pivot pins are installed with teflon coated bushings and are self lubricating.

A light coating of lubricant should be maintained on the outer (large) hydraulic cylinder and the mechanical pads on both sides of the lever mechanic arms at yearly intervals.

Keep the surface of the inner (small) cylinder clean and free of dirt, oils or grease.

DO NOT PLACE ANY LUBRICANT ON THE (SMALL) INNER RAM CYLINDER.

Remove old grease and dirt before applying new lubricant. Do not over lubricate or allow lubricant or dirt to build-up.

KEEP IT CLEAN!

LUBRICANT RECOMMENDATION: TYPE NLGI No. 2 Multi-Purpose
Industrial Grease or equal.

Additional lubrications may be required by customers maintenance procedures or as environmental conditions dictate.



WESTERN-CULLEN-HAYES, Inc.

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WCHT-72 SWITCH MACHINE FIELD CHECK-OUT PROCEDURES

After installation is complete, wiring connected and 1/4" point gap set per procedures in the Installation Manual, turn off the circuit breaker in the machine control enclosure and perform the following tests:

1. Turn power on at circuit breaker. Indication should be dark.
2. Apply extend command. Ram should extend in less than 2 seconds.
3. Apply retract command. Ram should retract in less than 2 seconds.
(Observe that the motor will continue to operate for apx. 1/2 second after the ram has reached the end of stroke during these tests.)
4. Operate the ram to the retracted position. Place an obstruction in the open point and operate the machine. The ram will extend until the obstruction blocks the path of travel. The motor will run for apx. 3-4 seconds and then the ram will reverse to the retracted position. Indication should match ram position.
5. Repeat step 4, but when the ram begins to extend, drop an obstruction in the opposite point. The ram will extend until the obstruction blocks the path of travel. The ram will then reverse and be blocked from returning to the retracted position. After an additional 3-4 second time, the motor will shut off, the points will be gapped by the two obstructions and indication should be dark.

When complete, remove the first obstruction and operate the ram to the extended position, then remove the second obstruction and operate to the retracted position. Repeat tests 4 & 5 but start with the ram in the extended position. Be sure to carefully remove all obstructions when tests are complete.

6. If equipped with a track circuit:
 - a. Drop track circuit and repeat tests 2 & 3. The machine should not throw. Clear track circuit.
 - b. Apply extend command and drop track circuit before ram reaches extend position. Ram should continue to power until operation is complete. Clear track circuit. Repeat test starting with ram in extend position. Clear track circuit.
 - c. Repeat tests 4 & 5, but drop track circuit before points reach first obstruction. In all cases, the cycle should complete even though the track circuit is down. When complete, clear track circuit.
 - d. Perform restore after trailing test.
 1. Apply extend command.
 2. Drop track circuit.
 3. **Safely and Carefully use a bar or a track jack to force the points to a trailed position.**
 4. **Remove bar or jack.** Clear track circuit. After a 3-1/2 second delay, the ram should motor to the extended position, which was the original commanded position.
 5. Apply retract command. Repeat steps 6.d.1 thru 4 to test the operation in reverse. The only difference in the procedure is to start with the ram in the retract position.

7. With the ram sitting in the retracted position, pass a piece of metal in front of the extend proximity switch. The indication should go and stay dark. Apply extend command. Proper indication lights. With ram sitting in the extend position, pass a piece of metal in front of the retract proximity switch. The indication should go and stay dark. Apply retract command, proper indication lights.
8. Perform motor run on test:
 - a. Apply retract command.
 - b. Mark position of both proximity switch brackets on the proximity switch mounting plate.
 - c. Loosen extend proximity switch bracket screws.
 - d. Apply extend command. Just as the ram reaches the extend proximity switch, swiftly move the proximity switch in the opposite (retract) direction. The ram should continue to the extended position and the motor will continue to run for apx. 15 seconds. When the time has elapsed, the motor will shut down and indication will go and stay dark.
 - e. Replace proximity switch at position previously marked and loosely tighten screws.
 - f. Repeat steps 8.a thru e but start with apply extend command and loosen retract proximity switch bracket screws.

IT WILL BE NECESSARY TO RE-ADJUST THE PROXIMITY SWITCHES FOR 1/4" GAP AFTER COMPLETION OF THIS TEST.

9. Apply an extend command. After the ram extends, apply a retract command. Ram should be retracted and indication lit. With a bar, pry open the points more than 1/4". Indication should go dark. Remove bar and close points. Indication should re-light. Apply extend command and repeat test in the extend position.
10. Close cover. Remove manual pump handle from it's holder. Apply command. Machine should not operate. Machine indication should remain lit. In some instances, depending on your operating system, remote indication should go dark or out of correspondence.
11. Open access door. Following instruction label on the machine, manually operate the ram in both positions. **Be sure to return the solenoid valves to the normal position.** Close door and replace handle into it's holder

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