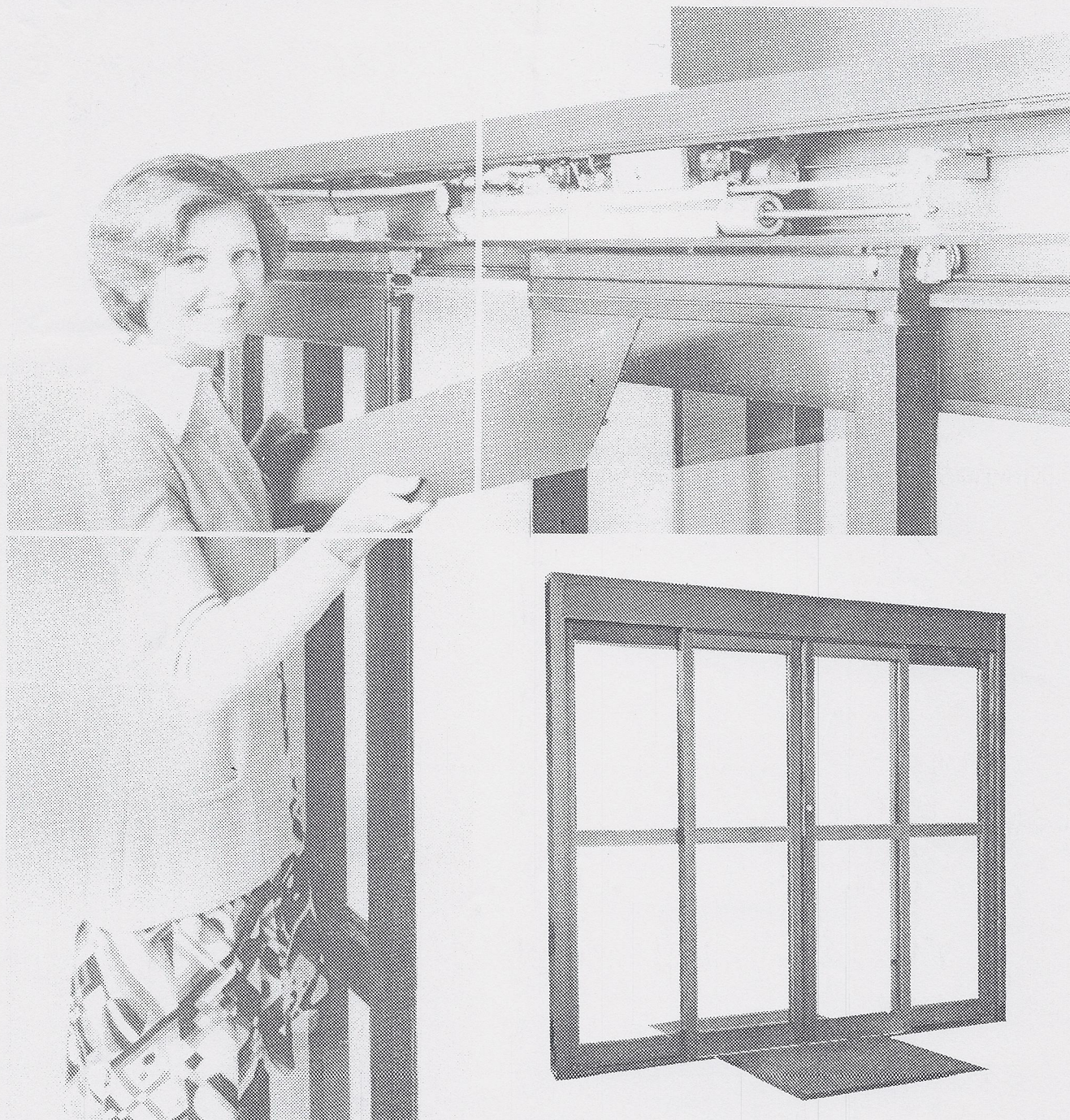


operation and maintenance

Series 1000 (S-3A) pneumatic automatic sliding door operator.

 **Horton Automatics**
A Division of the
Overhead Door Corporation



Maintenance check list

1. door shut

(Refer to Drawing #1) Normal when mats (switch) are unoccupied. Opening (A) and closing (D) solenoid valves prevent air pressure from entering cylinder C-5 (V). When electrical power is off, the door may be moved manually with no restrictions because air in the cylinder moves freely through the exhaust ports of the opening and closing solenoid valves.

2. opening

(Refer to Drawing #2) Actuation by any type switch (N) (Simulated on drawing as foot stepping on mat) causes the master control unit C-160 (K) to switch, setting the time delay and allowing electrical current to pass to the opening solenoid valve (A) and to the checking switch (F). The pressurized air (blue) enters the cylinder pushing the piston rod and door panel open. Opening speed is determined by a combination of the operating air pressure, indicated on air gauge (X) and the volume of air regulated by the opening adjustment screw (L). As the piston moves, the nonpressurized exhaust air (cross-hatched blue) flows through the open ports of the closing solenoid valve (D) and the checking solenoid valve (C) and out the plastic muffler (W). Note that the actuator lever of the checking switch (F) still rides on the

actuator rod (S).

NOTE: Horton fluidic (non-electric) switches utilize air only in actuating sensor. Increased air pressure causes electric contact in sensor to close, actuating control switch C-160.

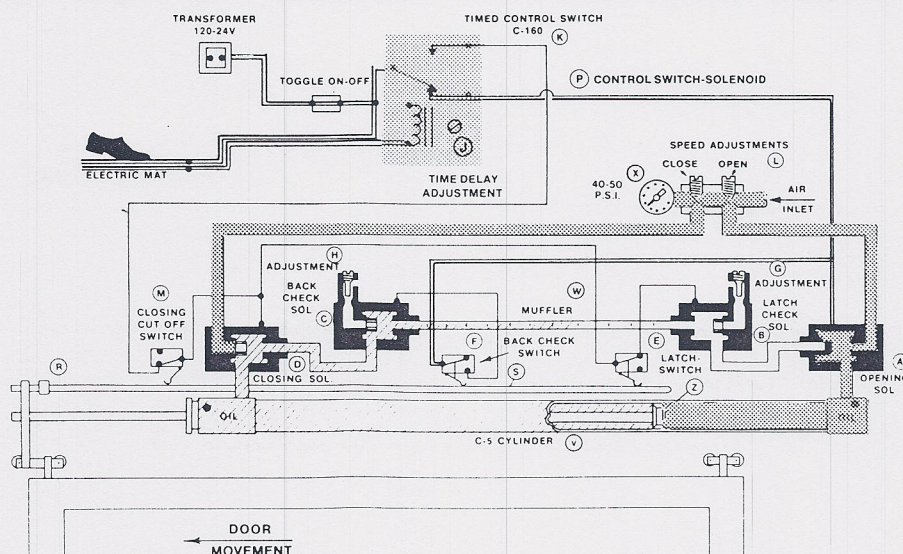
Servicing Hints:

A. Failure to Start Open:

1. Lack of air pressure. Pressure gauge in unit must read approximately 40-48 PSI. During operation it should not rise above 50 PSI nor fall below 30 PSI.
2. Lack of 24 volt current. With current on, push door open manually. If you have current you will hear a click as closing solenoid is actuated (RE: Drawing #1 Switch (M)). If no click occurs, check power cord plugs, 24 volt transformer, optional swing out cut off switch (RE: 2-A5 below), etc.
3. Failure in switch circuit. If operating power is indicated by the click (RE: 2-A2) insert push button switch into mat plug socket (C52) in C-160 and depress button. If the door now functions, then look for loss of electrical contact in the mat (switch) or wiring to the mat. (Fluidic mat sensor could be the problem). If the door does not function, replace C-160.
4. Check for physical binding of

door. A severe piston cup leak can be the cause. Air will be heard coming out of check solenoid (C).

5. If manual adjacent swing-out door (SO) is not in place and closed, the sliding vent will not open. However, (SO-X units) will go closed if power is turned on in open position. The switch arm which protrudes through the header behind the swing-out vent lockrail must be depressed before the door will operate. SO-SX units die in place when sidelite is opened. See #7 below. This switch is connected by plug to the operator. Be sure it is plugged in.
6. Some doors are equipped with cut-off switch on sliding panel (SX). Be sure circuit is complete.
7. Swing pocket covers for P/SP-SX doors. O/SO-SX and SO-SX units have a magnetic cut-off switch to cut power to the unit when the panel (SO or SP) swings out. Therefore, the panel must be closed for the door to operate. The switch in the header is in the 24V power line. It is located between C-160 and the cut-off toggle (T). This switch may be bypassed for checking by unplugging switch from C-160 plug and connecting C-160 direct to cut-off toggle



DRAWING NO. 2 - OPENING

switch.

B. Opening Too Slow:

1. The C-72 activator cam (R) must deactuate closing cut-off switch (M) and release air from previous closing. If it does not, unit must first exhaust this air before starting to open. Adjust by sliding the C-72 cam down rod until the switch functions at completely closed.
2. Oil cylinder at oiler screws with 10w30 motor oil. Be sure unit is turned off. Use about 10 drops in each hole. Move door vent back and forth several times before turning on power. Also oil actuator rod (S). (Do not oil actuator rod on units that are equipped with reversers or touch switch on door and utilize rod as traverse electrical connection.
3. Increase open air volume at C-42A (L), open adjustment screw first, if not fast enough, raise air pressure up to 48 PSI. Pressure should not drop while door is moving more than 10-15 PSI from rest pressure. At no time should it fall below 30 PSI.
4. Back check switch (F) must click when rod passes from under it. (See drawing #3) If it does not, then the back check solenoid valve is on all during the open-

ing. (Rebend switch arm to proper setting.)

5. Physical binding may restrict door's speed or piston cup (Z) may be leaking. To check, actuate door and hold door, keeping it from moving. If leaking, air will be heard escaping through check solenoid valve (C).

C. Opening Too Fast

1. Reduce volume of air at opening and adjustment screw C-42A (L) and/or reduce air pressure.

3. back check

(Refer to Drawing #3) Actuates when door is approximately 10"-12" from full open. As door has progressed open, the actuating rod (S) passes from under the back check switch (F) closing the circuit to the back check solenoid valve (C). Exhaust air is forced through the adjustable orifice (H) which gently brakes the door to a stop at full open. Check screw C-123 (H) adjusts this braking force.

Servicing Hints:

A. Failure To Back Check:

1. Adjust at check screw C-123 (H) — tighten.
2. If check screw (H) does not have the desired effect, listen for click as switch actuating rod C-43 (S), runs out from under the lever arm on back check switch

(F), Bend lever arm until it switches properly.

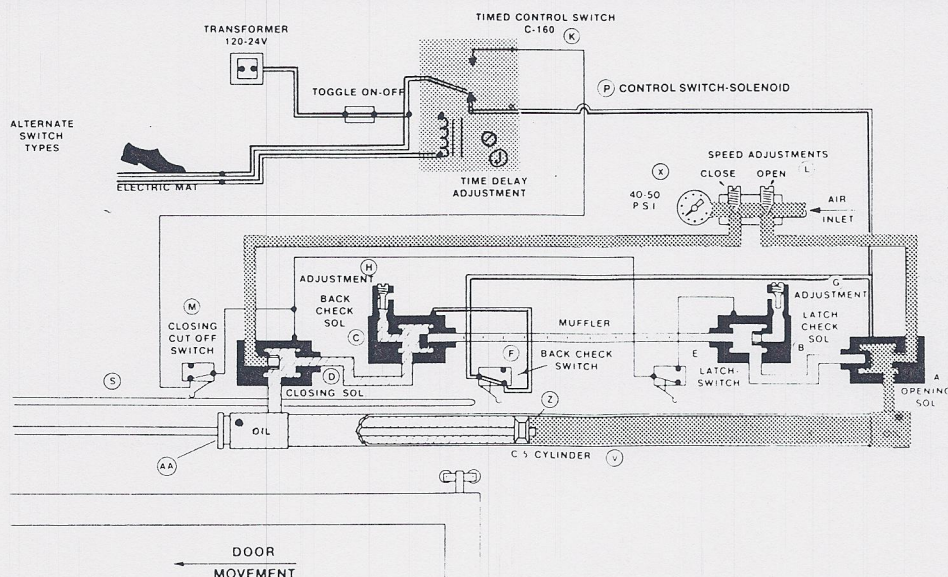
3. If the switching under 2 above is accomplished and still the unit does not brake, there is an air leak in the exhaust air piping or around the piston rod packing gland (A-A) C-201. To check for air leak, step off mat allowing door to start closing, stop and hold door from closing, if system has leaks air can be heard escaping. Isolate leak and correct by replacing packing.
4. Reduce opening speed at screw C-42A in speed adjustment valve (L).

B. Too Much Back Check:

1. Adjust at C-123 check adjustment screw (H). NOTE: In bi-parting unit of less than 2½ feet in width, one check switch works both solenoids.
2. The unit may need oiling. RE: Section 2, B-2.
3. If operator stalls at back check position and continues to leak air, repair or replace interior piston cups (Z). Check Section 2, B-5.

4. closing

(Refer to Drawing #4) When actuating switch is open (unoccupied), the solid state timer (J) (lapse of time determined by setting of timer screw)



DRAWING NO. 3—BACK CHECK

switches the circuit at (P) from the opening solenoid valve (A) to the closing solenoid valve (D) and check switch (E). Pressurized air flows into the other end of the cylinder causing the door to begin to close while exhaust air flows out through the opening solenoid valve (A) and latch check solenoid valve (B).

Servicing Hints:

A. Failure To Start Closed:

1. The control solenoid (P) should release as soon as mat or switch is released. Opening air pressure should have been heard exhausting. If it does, proceed to number 2 below; if it does not, unplug mat plug (C52) from left side of unit and the door should close. This indicates a short in the electric mat or mat wiring. Optional reverser or touch switches can cause the same effect and they may be disconnected at the small single pin plug coming out of the mat plug. Horton fluidic (non-electric) mat does not short, but static pressure might continue signal. To correct, disconnect sensor tubing connector to establish normal pressure, then reconnect.
2. Assuming the control switch is operative, listen for click of closing valve opening (D). Be sure

there is sufficient air pressure (not less than 40 or more than 48). Then check door for mechanical binding, usually at bottom guide roller.

3. Be sure cut-off switch (M) has not cut off the door. The arm on this switch should not raise far enough to click until the C-72 actuator cam (R) runs under it.
4. C-160(K) may need replacing.
5. Refer to B-5 below and correct.
6. Perform following: Oil operator (RE: Section 2, B-2), check tightness of the piston rod and the packing gland should not leak. If it is leaking, the C-201 cartridge (A-A) should be replaced. Lack of lubricant or misalignment may cause undue wear to these packing glands. Correct.
7. Speed adjustment setting (L) may be too tight.

B. Failure To Close Completely:

1. Check for obstructions or binding of door.
2. Increase operating air pressure or closing speed (L).
3. Adjust checking speed (G) on latch checking solenoid valve (B).
4. Oil operator (RE: Section 2, B-2)
5. A leak in internal piston cups (Z) C-200 will cause door to fail to close completely and may

even cause it to creep back open. Replace with new cups.

6. C-72 cam (R) may need adjusting.

C. Closing Too Slow:

1. Check manual operation. Door must move without binding.
2. Check operating air pressure and closing speed screw C42A (L).
3. Check possible malfunction of checking mechanism latch switch (E) and solenoid (B).

D. Closing Too Fast:

1. Adjust operating air pressure and/or closing speed (L).
2. Check latching action. Adjust latch check valve (G) for better braking.

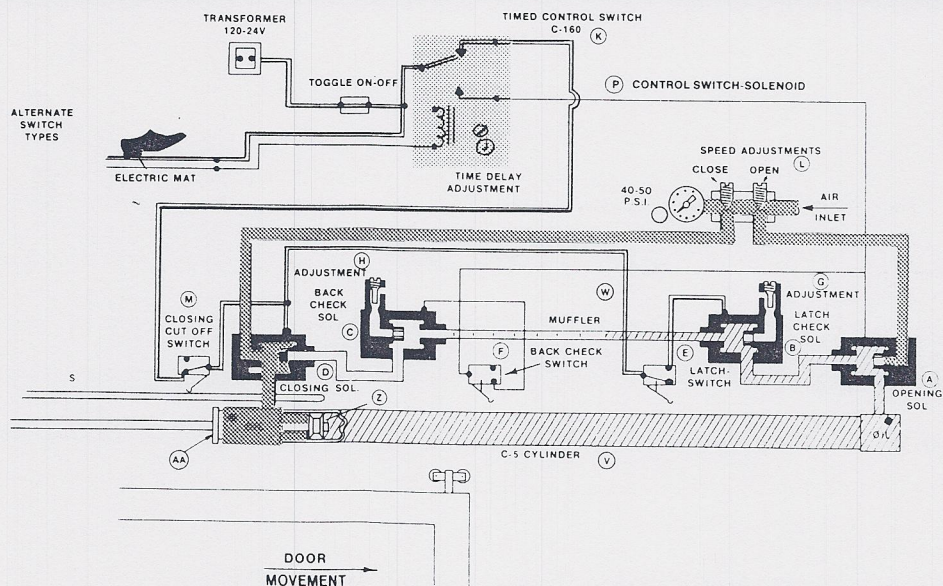
5. latching

(Last few inches of closing, refer to drawing #5) As door progresses closed, latch check switch (E) is actuated by actuating rod (S) completing circuit to the latch check solenoid (B). When this valve closes, exhaust air is forced through the adjustable orifice (G) which gently brakes the door into a full closed position. Check screw C-123 (G) adjust this braking force.

Servicing Hints:

A. Latching Action Too Slow:

1. Open (counter clockwise) latch check-speed screw C-123 (G)



DRAWING NO. 4 - CLOSING

- on checking solenoid valve (B).
2. Check manual operation. Door must move without binding.
3. Refer to Section 4, B-5.

B. Latching Action Too Fast:

1. Close (clockwise) check-speed screw (G) on checking solenoid valve (B).

C. Failure To Check:

1. Be sure latch checking switch (E) is working properly. An audible "click" should occur when end of actuator rod moves under lever.
2. Adjust check-speed screw (G) on check solenoid valve (B).
3. Check for air leaks in tubing and connections.
4. Check for malfunction in latch check solenoid (B).

6. completely closed

(Refer to Diagram #1) When door has completely closed the actuator cam (R) on the C-43 actuator rod lifts the arm on the closing cut-off switch (M) and breaks the circuit to the closing solenoid valve (D) and the latch check solenoid valve (B). All air in the cylinder is exhausted through the exhaust system (an audible hissing sound is characteristic.) If cut-off switch is not adjusted and air is not released from cylinder, the next opening cycle will be sluggish.

The cut-off switch (M) is also used

to control optional equipment. If the unit has a heater, it cuts it on. Units with reversers...this switch cuts off the reverser.

NOTE: Door will immediately reverse at any point of closing cycle if mat or switch is actuated (assumes position number 2)

7. adjusting the operator:

A. Check for physical binding of the door; with the operator cut off, manually operate the door. If you determine there is some resistance, locate point of friction. It will either be in the operator or in the sliding door panel. It may be necessary to disconnect the operator from the door by removing the two 1/4" hex head bolts (C22). The bind may be a result of misalignment at this connection. Move door slowly to check for bind. Oiling the operator at this point or adjusting the door height will solve the majority of the problem. (Lack of oil may have deteriorated cups and packing glands, making replacement of same necessary...only on old doors, not new installations.)

B. Turn on air pressure. An air regulator must be properly installed in supply line. Follow instructions included with regulator. Be sure not to install in reverse. Check for leaks. Operating pressure is ap-

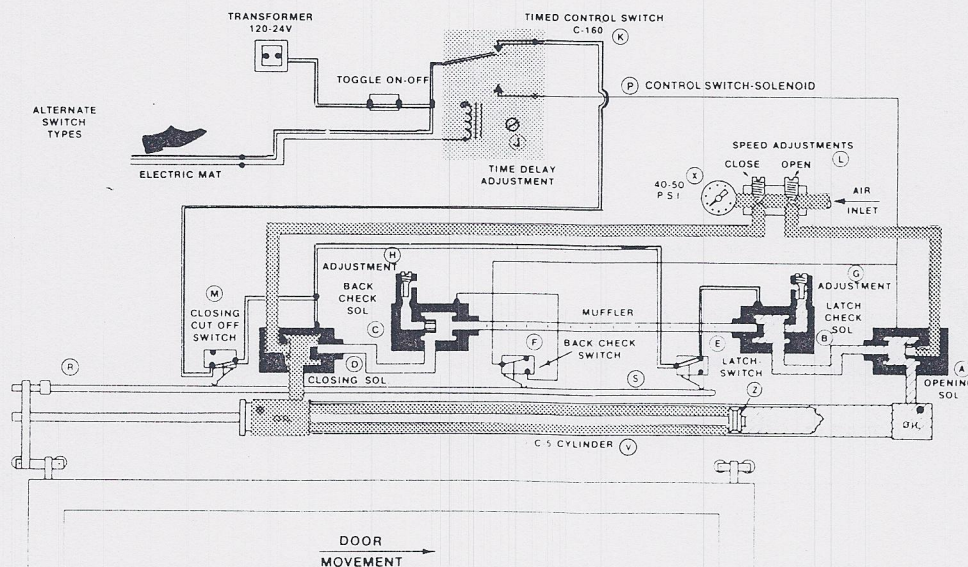
proximately 40-48 PSI. Adjust to accommodate door size. Operator is equipped with a pressure release valve (C165) that relieves pressure in the operator when air pressure is above 50 PSI. Automatic control on compressor unit should be set to "cut-in" at 80 pounds. "Cut out" setting should be a 100 PSI.

NOTE: Operator must have one transformer per operator.

C. Turn on toggle switch in header. Actuate by mat or switch. Adjust the aluminum actuating collar (C-72) on the 1/4" switch activating rod so that the cut off switch (C-32) cuts off power to the door approximately 1/8" to 1/4" from completely closed. Listen for click if tested manually, or for air exhaust if operated under power. When reversing switches are used, improper adjustment will cause door to re-open during closing cycle. This is important to satisfactory operation.

D. Set operation speed as follows: (The back check and latch check may or may not need adjusting.)

E. Opening speed: Adjust at volume screw C-42 in C-41 valve block. The opening speed screw is the one nearest the strike rail side of the valve block. Turn screw clockwise to slow, counter-clockwise to



DRAWING NO. 5 - LATCH CHECK

increase speed. NOTE: If speed is insufficient, it may be necessary to increase air pressure slightly.

- F. Back check (last few inches of opening): Adjust at C-123 (H) screw in latch check solenoid. Door should be adjusted to pause at about 2" to 3" from full open, then go ahead and open against bumper.
- G. Closing speed: Adjust at volume screw (C-42) in block (C-41) Turn screw clockwise to slow. Counter-clockwise to increase speed.
- H. Latch speed (last few inches of closing): Adjust at C-123 (G) screw. Check switches are adjustable to suit job conditions.
- I. Door closed: Close cut-off switch (M) should be resting on cam (R). The closing air pressure should exhaust setting the operator at rest.

Checking Electrical Operation of C-160 Master Control (K)

To check:

1. 24 AC Volt Power Source — Remove

C-160 and place one probe of a volt meter into the C-160 socket at pin 2 and the other probe into pin 7. Voltage should read 24-27 volts A.C.

2. Actuating Circuit — With power on and C-160 (K) in place, insert jumper wire into both pins of the plug on the left end (C-52) of the C-160. If door does not open, C-160 may be defective. If door does go open, there is a break in the actuating circuit line or mat.

Remove operator

To Remove Unit From Header remove access plate, disconnect air supply line C-53, mat plug C-52, and power line C-57, cut off switch C-54R. Disconnect operator from door bracket by removing bolts C-22. The removal of two screws C-100, (accessible from the under side of the head section) will allow the entire unit to slip out through access panel.

Preventative maintenance

Air Compressor Maintenance: Water

should be drained from air tank and low points in air line at least once a month. Proper oil level should be maintained and belt should be kept tight. (See instructions that come with the compressor for proper procedure.)

Oil Operators every two months. Insert oil (10w30 motor oil) in two oil ports (one at each end of cylinder) and oil directly on piston rod, cleaning it as you do.

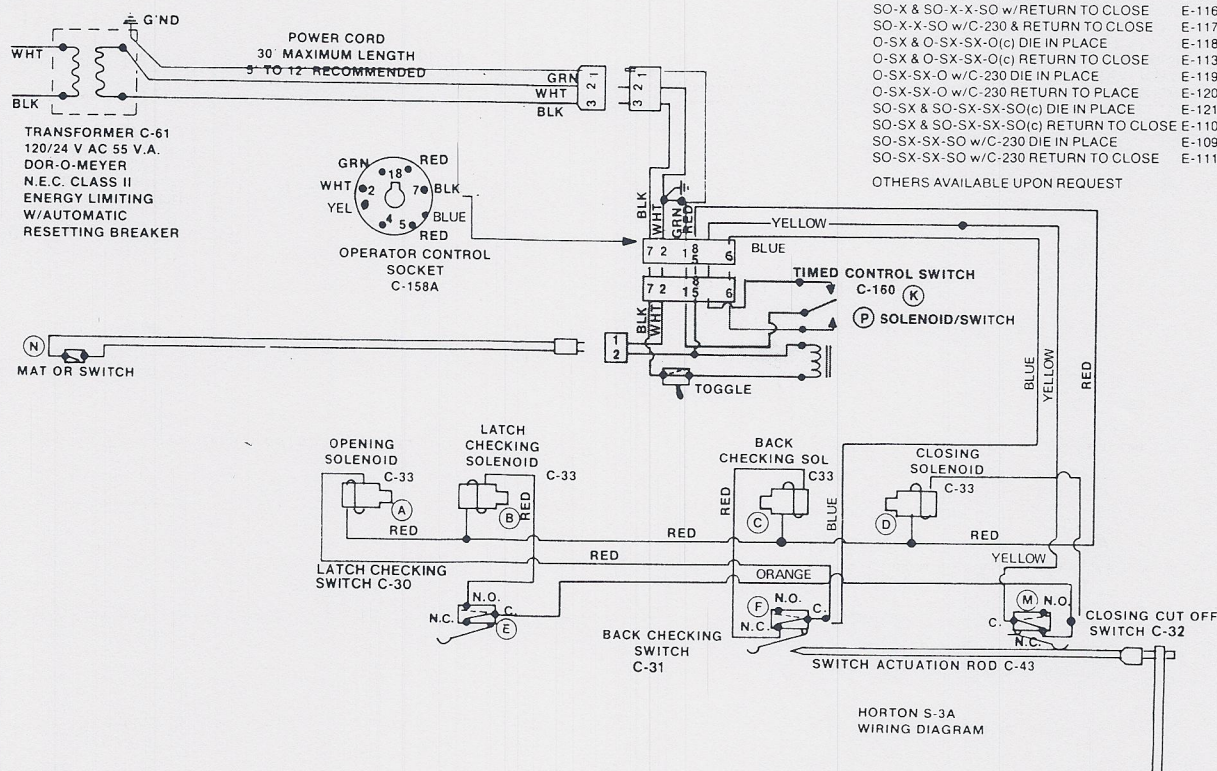
NOTES:

Models prior to July 1, 1969 will have only one check valve and switch.

Narrow O-X-X-O(c) Operators will have two check solenoids but only one common check switch.

Units manufactured between 1963 thru 1966. Repairs to the circuit board are made with a C160RS and an adaptor C-221 which plugs into the circuit board. Wiring on backside of circuit board must be in good order.

C-230 — two operators one common master control switch C-160.



Wiring Diagrams Available Upon Request

	DWG #
DUAL OPERATORS w/C-160-C-230	E-94
AUTOMATIC OUTSIDE MAT CUT OFF	E-114
SO-X & SO-X-X-SO w/RETURN TO CLOSE	E-116
SO-X-X-SO w/C-230 & RETURN TO CLOSE	E-117
O-SX & O-SX-SX-O(c) DIE IN PLACE	E-118
O-SX & O-SX-SX-O(c) RETURN TO CLOSE	E-113
O-SX-SX-O w/C-230 DIE IN PLACE	E-119
O-SX-SX-O w/C-230 RETURN TO PLACE	E-120
SO-SX & SO-SX-SX-SO(c) DIE IN PLACE	E-121
SO-SX & SO-SX-SX-SO(c) RETURN TO CLOSE	E-110
SO-SX-SX-SO w/C-230 DIE IN PLACE	E-109
SO-SX-SX-SO w/C-230 RETURN TO CLOSE	E-111

OTHERS AVAILABLE UPON REQUEST

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Form H-1