HySecurity

Simple. Reliable. Secure.®

HTG 316

Relay Manual

DISCLAIMER

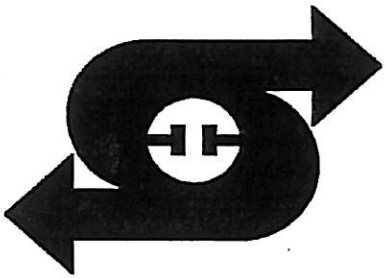
HySecurity relay-controlled hydraulic gate operators do not meet current UL 325 Safety Standards and that HySecurity recommends decommission and replacement of all manufacturers' relay-controlled operators with modern Smart Touch™ based operators, which fully comply with UL 325 safety standards. By downloading and using this document you acknowledge that HySecurity no longer provides parts or technical support for those older operators.

Note

HySecurity accepts no responsibility, implied or expressed, for claims arising from continued use of pre-2001 relay-controlled operators.

Hy-Security Gate Operators

HTG 316 BARRIER ARM GATE OPERATORS



Manufactured by:

Hy-Security Gate Operators

Designers and Manufacturers of Hydraulic Equipment
408 North 35th Street
Seattle, Washington 98103
1(800)321-9947, 1(206)632-0538
FAX 1(206)632-1314

CONDENSED SELLING POINTS FOR DEALERS

HEAVY DUTY ARM GATE HTG 316

1. Heavy wall construction - 10 ga. plate.
2. Rust proofed weathertight enclosure.
3. 1 1/4" steel shaft and bearings.
4. Adjustable hydraulic brake for smooth operation.
5. Hydraulic valving insures safe smooth operation.
6. Standard industrial hydraulic and electrical components.
7. All parts easily accessible by removable top and door.
8. Instantly reversible.
9. Continuous operation - no limit on cycles per hour.
10. Enclosure is heated as standard equipment.
11. Self locking - cannot be forced open.
12. Low maintenance.

HT28/JULY 18, 1989

FAX: 206-632-1314 1-800-321-9947
408 North 35th Street P. O. Box 31532 Seattle, Washington 98103 (206) 632-0538

HTG 316 HYDRAULIC BARRIER ARM GATE OPERATOR
(condensed specification)

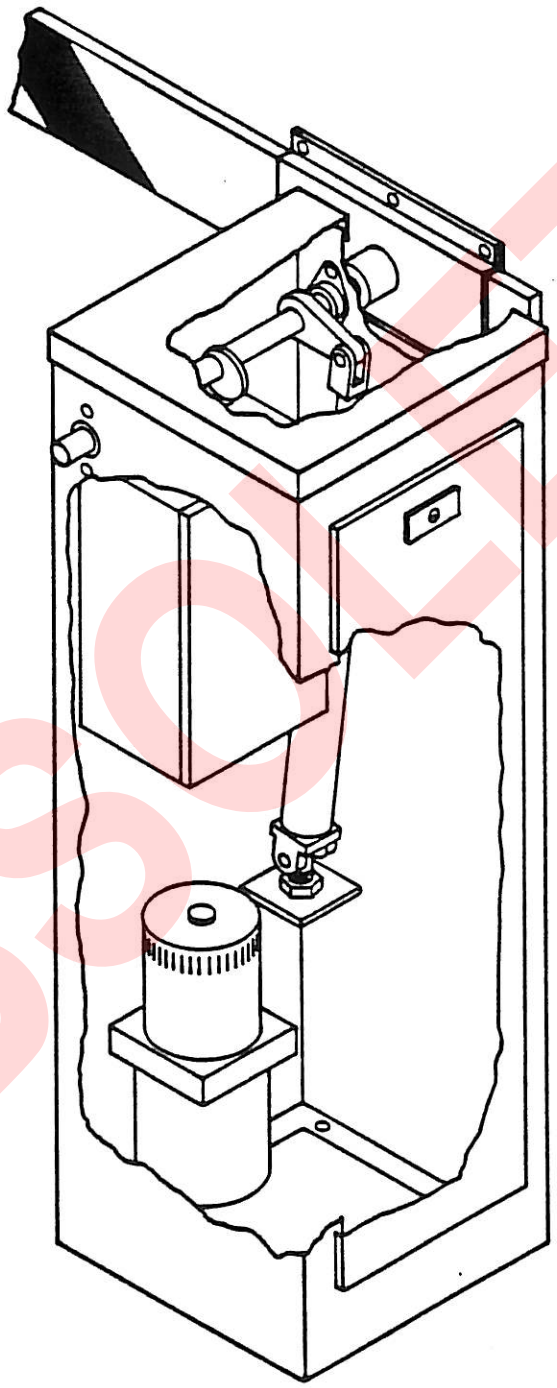
The operator shall use a hydraulic pump and cylinder to rotate a crank arm and 1 1/4 inch drive shaft, supported on flange mounted bearings. Motor shall be minimum 1/3 h.p. Operation of all functions, starting, stopping and reversing, shall be done hydraulically. The operator shall be capable of operating up to a single 16' wooden arm without counterweight or springs. No brakes, gears, belts or chains shall be used. The operator shall be capable of continuous duty without the use of counterweight or counterbalancing springs. Limits shall be cam actuated from main drive shaft.

Electric panel shall be wired to accept all standard controls and shall employ only U.L. labeled components. No printed circuits shall be allowed.

Operator housing shall be constructed of 10 ga. steel plate, powder painted, and shall have full access to working parts by hinged door and removable panels.

HT27/JULY 18, 1989

FAX: 206-632-1314 1-800-321-9947
408 North 35th Street P. O. Box 31532 Seattle, Washington 98103 (206) 632-0538



Hy-Security Gate Operators	PO Box 31532 Seattle, Washington 98103 Phone: 1-800-321-8947
HTG 316	
	HT 17

INSTALLATION AND MAINTENANCE INSTRUCTIONS FOR HTG 316 BARRIER ARM OPERATOR

1. PERMANENT WIRING shall be employed. Run conduit directly into the electrical enclosure. Connect the power wires at the left end of the terminal strip, to the terminals labelled L1 and N.

   NOTE 1: Proper grounding is required. The grounding point located inside of the electrical enclosure.

   NOTE 2: Before servicing the operator be certain to turn off the power by pushing the disconnect switch to "off."

2. BUTTON STATION OPERATION: Be sure opening is clear before closing gate. Place enclosed placard adjacent to button station and within sight of gate opening.

   AUTOMATIC OPERATION: Reversing device shall be used.

   Place enclosed notice adjacent to gate opening. Attach safety edge to leading edge of gate according to manufacturers specification. Other safety devices, such as vehicle detectors may be used to allow for safe automatic operation.

3. Mount operator using 1/2" x 6" or longer anchor bolts.

4. Connect power to the operator. Use 12 ga. wire minimum, a larger wire size may be required if the conduit run to the power panel is more than 100 feet. Connect the power wires at the left end of the terminal strip, to the terminals labelled L1 and N.

5. Bolt arm(s) to operator placing the provided plate on the outside of the wood.

6. Remove the shipping plug on the pump and replace with the vented cap attached to the pump.

7. Test operator using the supplied push button station. If the operator was supplied with a vehicle detector, be aware that it must be connected and tuned to a loop before normal gate operation is possible.

8. After correct operation is verified, connect extra control accessories as may be required for the job.

HT29*6/89 BDN

HTG 316 ADJUSTMENTS

1. The limit switches are preset, but if further adjustments are necessary, use an Allen wrench to adjust the cam collars on the drive shaft. The limit switches are accessed by removing the cover from the top of the operator.

2. Most units will not need any counterweight for the arm. If your operator was supplied without counterweight, skip this instruction, and proceed to step three. The size and position of the counterweight is selected and adjusted at the factory to match the original barrier arm. If any substantial change is made to the arm, such as addition of signs, lights, or other material, the counterweight may have to be adjusted for the operator to function smoothly. Disconnect the hydraulic cylinder from the crank arm by pulling the retaining clip and removing the clevis pin at the top of the cylinder. The arm should appear to weigh about 15-25 pounds when lifting from a position approximately ten feet distant from the pivot shaft. If the force needed to lift the arm is not within this range, adjust the counterweight for the correct balance. This adjustment must be completed before adjustment of the brake valve, described in step three.

3. The deceleration of the arm, on closure, is regulated by a hydraulic brake valve. The brake valve is silver in color and is located on the right sidewall of the operator. The brake valve allows the gate to smoothly stop, without bouncing, when the close limit switch is tripped. Its function is dependent on correct adjustment of the counterweight, described in step two, and the close limit switch being adjusted to trip approximately 10 degrees before the arm is level. If adjustment is necessary, loosen the 9/16" lock nut and adjust the brake valve, with an allen wrench, in one-tenth turn increments (counterclockwise for more rapid deceleration). The adjustment also allows the arm to close smoothly rather than being overaccelerated by gravity, and will prevent drifting if the arm is stopped in mid travel. Be certain to verify that the close limit switch is adjusted to trip about 10 degrees before the arm is level, then adjust the brake valve to smoothly bring the arm to rest in a level position. Tighten the 9/16" lock nut on the brake valve when complete.

4. Cylinder position adjustment is accomplished by the adjustable anchor at the hydraulic cylinder base. The cylinder should be fully extended when the arm is exactly level. If the anchor is positioned to hold the cylinder too low, the cylinder will run out of travel before the arm is fully closed. If the cylinder is set too high, the arm will not stop level to the roadway. The cylinder is intended to act as a physical stop to prevent the arm from sagging low.

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MAINTENANCE

1. All of the bearings in the HTG 316 are fully sealed. There is no lubrication required. Even in heavy use, long bearing service life is expected.

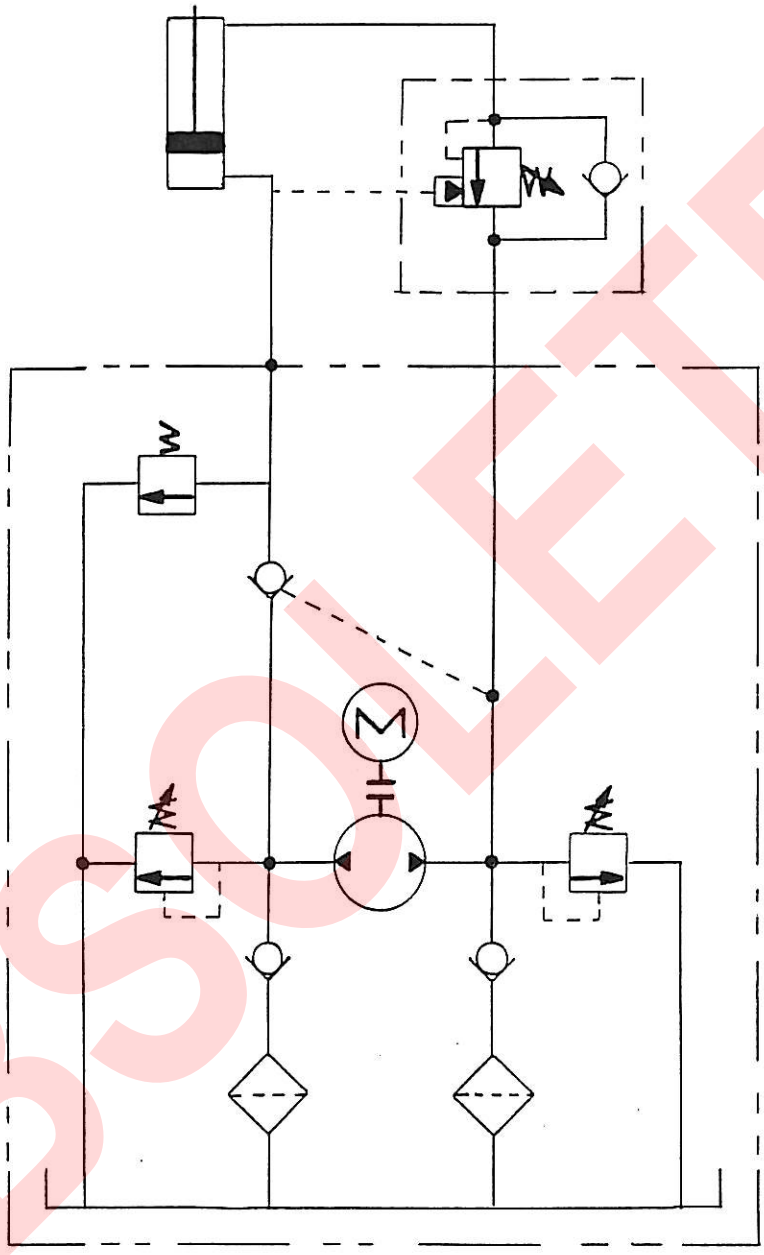
2. The electrical system needs no maintenance.

3. See the separate sheet for the Hydraulic System maintenance.

H T G 316 EMERGENCY OPENING

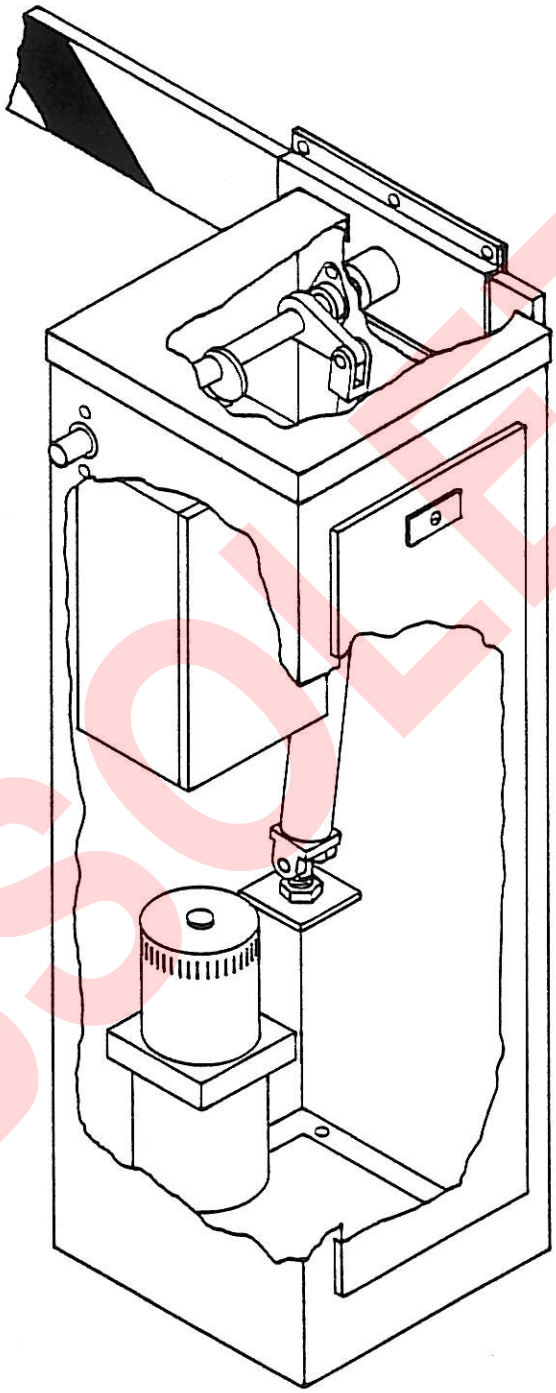
1. THERE IS NO MEANS TO DEFEAT THE HYDRAULIC LOCK THAT SECURES THE ARM FROM AN UNAUTHORIZED OPENING. IN THE EVENT OF A POWER FAILURE, BYPASS OF A SECURED GATE IS BEST ACHIEVED BY SIMPLY LOOSENING THE MOUNTING BOLTS AND REMOVING THE BARRIER ARM.

HT31*6/89 BDN



Hy-Security Gate Operators

SCALE:	APPROVED BY: B. D.	DRAWN BY S.C.
DATE: 7/89		REVISED
HTG 316		
HYDRAULIC CIRCUIT		DRAWING NUMBER HY-OIL-1



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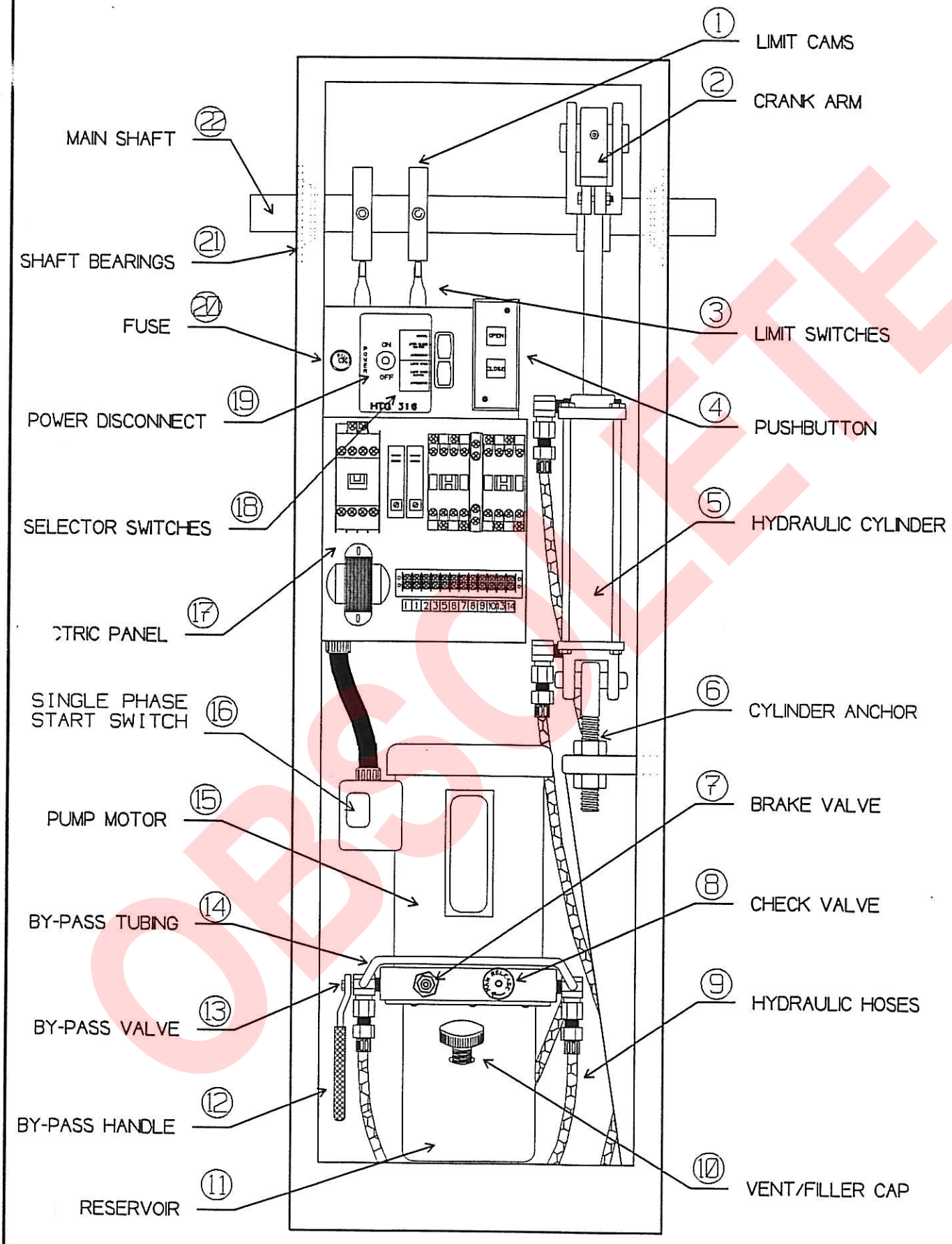
HTG 316		
		HT 17



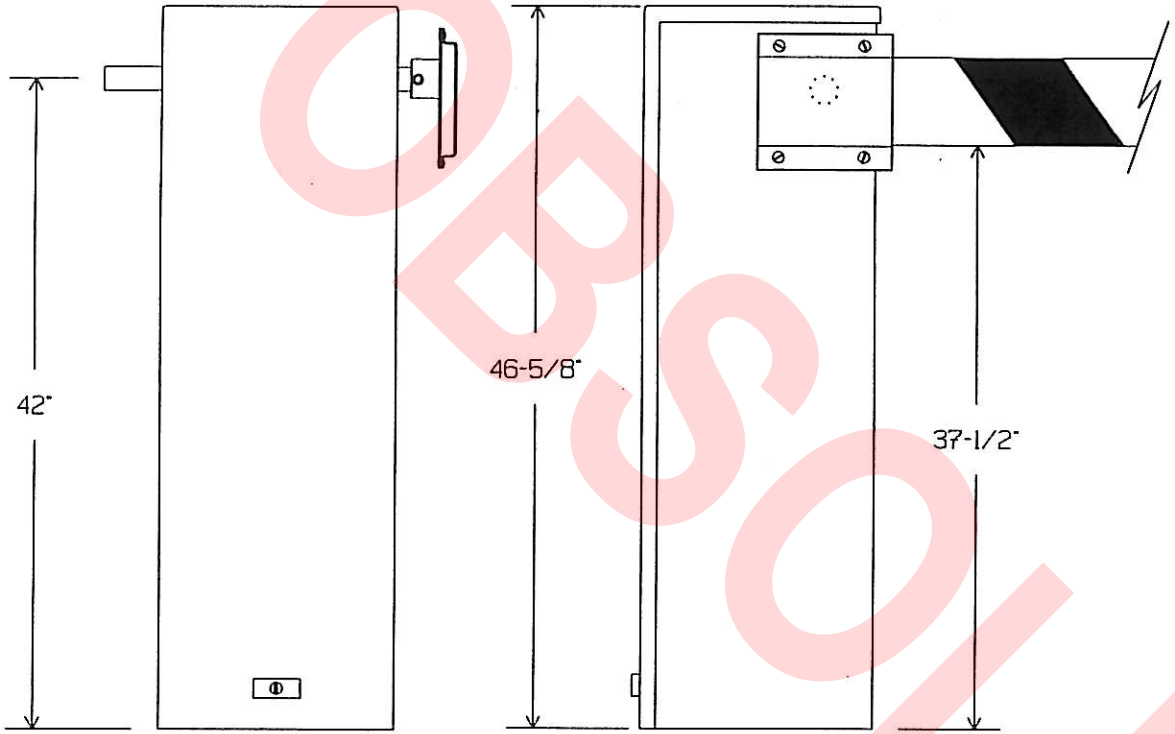
OBSOLETE

316EL2

HTG 316. BARRIER ARM COMPONENTS

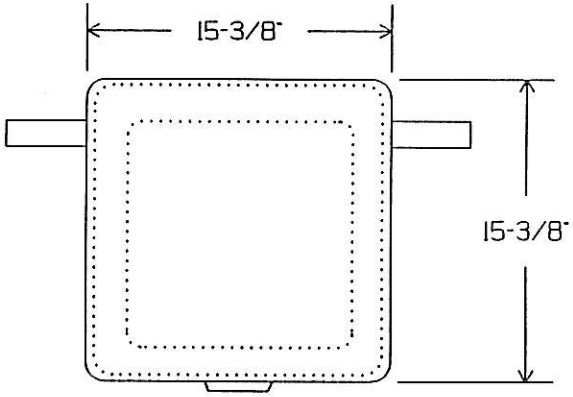
DATE 2/21/91 | REV 2/28/91 | DWG HT 32

HY-SECURITY GATE OPERATORS

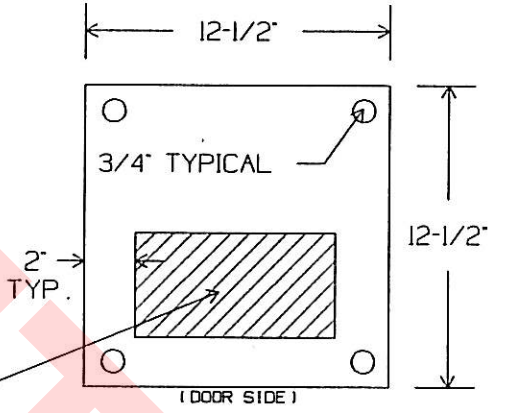


FRONT ELEVATION

SIDE ELEVATION



PLAN VIEW
DOOR SIDE
(COVER IN PLACE)



BOLT SPACING
12-1/2" TYPICAL

(SINGLE WOOD ARM SHOWN)

HY-SECURITY GATE OPERATORS

HTG 316 BARRIER ARM OPERATOR

HTG316

DATE 5/16/91	REV 2/12/92	DWG HT 18

Hy-Security Gate Operators, Seattle, Washington
1(800)321-9947, 1(206)632-0538, FAX 1(206)632-1314
Designers and Manufacturers of Hydraulic Equipment

Installation Instructions
HTG 316 Barrier Arm Operator

1. **Permanent Wiring Shall Be Employed.** Run wire in conduit through bottom knock-out access and directily into the electrical enclosure. Connect the power wires to the terminals labelled "L1" and "N" at the left end of the terminal strip.

Note 1: Proper grounding is required and grounding wire is located in the disconnect switch area.
Note 2: Before servicing or opening electrical panel, turn off power by pushing the disconnect switch to the **"OFF"** position.

2. **Button Station Operation:** Be sure gate opening is clear before closing gate. Place the enclosed placard adjacent to the button station and within sight of the gate opening.

Automatic Operation: Reversing device must be used in this mode. Place the enclosed notice adjacent to the gate opening. Attach safety edge to the leading edge of gate arm according to manufacturers specification. Other safety devices such as vehicle detectors may be used to allow for safe automatic operation.

3. Mount operator using anchor bolts 1/2" x 6" or longer.

4. Connect power to the operator. Use 12 ga. wire minimum, (a larger wire size may be required if the conduit run to the power panel is more than 100 feet). Connect the power wires at the left end of the terminal strip. These go on terminals labelled "L1" and "L2" (and to "L3" if machine is three phase).

5. Bolt arms to the operator placing the plate that is provided on the outside of the wood. Install the cross bracing provided, as required.

6. Remove the shipping plug on the pump and replace it with the vented cap attached to the pump.

7. Test the operator using the pushbutton station supplied. If the operator was supplied with a vehicle detector, be aware that it must be connected and tuned to a loop before normal gate operation is possible.

8. After correct operation is verified, connect extra control accessories as may be required for the job.

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Field Adjustments
HTG 316 Barrier Arm Operator

After mounting the operator in it's proper position on the pad near the roadway, take time to assure that it is plumb and square. Once this is accomplished, the operational adjustments can begin. The HTG 316 gate operator is pre-adjusted at the factory to perform correctly with the barrier arm shipped. If the arm length or weight is changed, it will be necessary to re-adjust the operator to perform correctly. To properly adjust all operational aspects of the HTG 316, be certain to perform the following adjustments in the sequence listed. The position that the arm stops is adjustable, it is not intended that the speed of operation be adjusted in the field. The speed is adjusted at the factory and is fixed, not adjustable.

1. The arm leveling adjustment is accomplished by adjusting the anchor at the base of the hydraulic cylinder. The cylinder must be fully extended when the arm is exactly in the desired horizontal position. By hand, physically pull the arm downward until the maximum cylinder travel is reached. If the anchor is positioned to hold the cylinder too low, the cylinder will run out of travel before the arm reaches the desired position. If the cylinder is set too high, the arm will stop below the desired position. The cylinder is intended to act as a physical stop to prevent the arm from stopping below the intended position. Disconnect the bottom end of the cylinder from the anchor pad then adjust the threaded rod upward to lower the arm or down to raise the arm. Be sure to firmly tighten the locking nut when through adjusting. To tighten this nut with the proper torque, this should be done with a minimum 16" wrench. ***Do not attempt to level the arm in any other manner.***

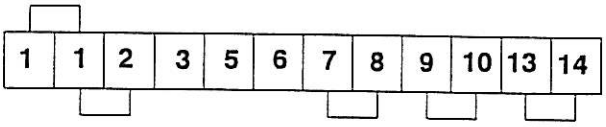
2. For the arm to stop smoothly coming down, the close limit switch must trip approximately five degrees before the arm is fully closed. The open limit switch is set to trip when the arm is vertical. If adjustments to the limit switches are necessary, use an Allen wrench to adjust the cam collars on the drive shaft.

3. The closing speed of the barrier arm is decelerated to prevent instant stops. Deceleration is regulated by the silver colored brake valve, which is located on the face of the pump unit, near the oil breather cap. If any sustantial change is made to the arm, such as the addition or subtraction of signs, lights or other material, the hydraulic brake valve must be adjusted for the operator to function smoothly.

4. The brake valve allows the gate to smoothly stop, without bouncing, when the close limit switch is tripped. It's function is dependent on the correct adjustment of the close limit switch described in step two. If adjustment is necessary, loosen the 9/16" lock nut and adjust the brake valve with an Allen wrench. Adjust this valve in one-tenth turn increments (counterclockwise for more rapid stopping). The adjustment also allows the arm to close smoothly rather than being over-accelerated by gravity, and will prevent drifting if the arm is stopped in mid travel. Tighten the 9/16" lock nut on the brake valve when adjustments are completed.

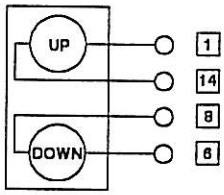
Call toll free (800) 321-9947 for factory assistance.

HTG 316 ACCESSORY CONNECTION

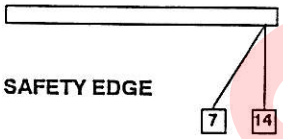


CONNECT LINE POWER TO LOOSE WIRES MARKED FOR ONE OF THE FOLLOWING VOLTAGES:

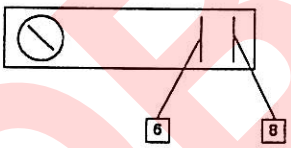
120/208/240 1 PHASE
208/240/480 3 PHASE



PUSH BUTTON CONTROL STATION
*NOTE: STOP BUTTON CONTROL CANNOT BE USED ON THE HTG 316

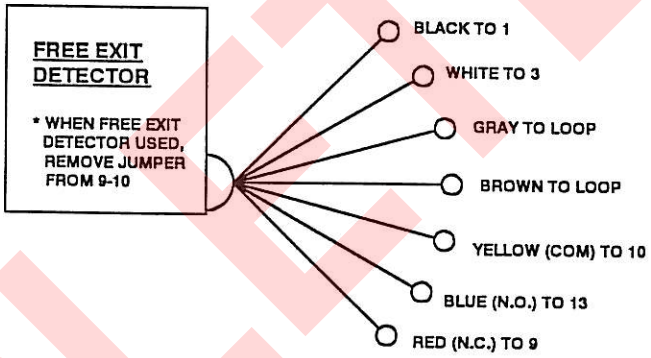


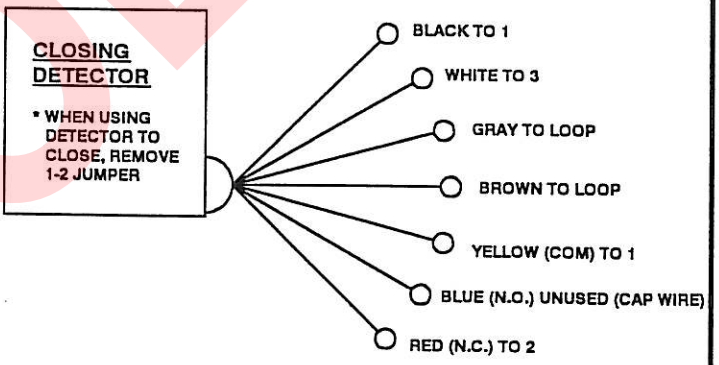
CLOSE TIMER

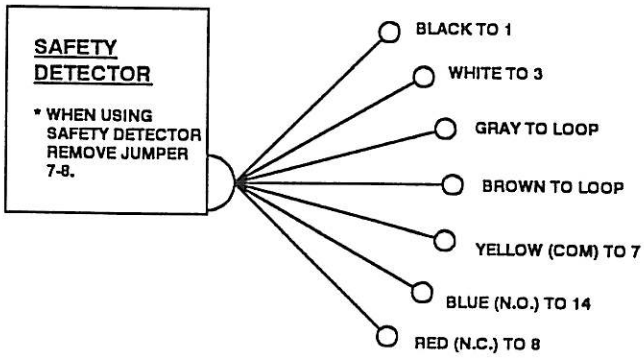


NOTES:

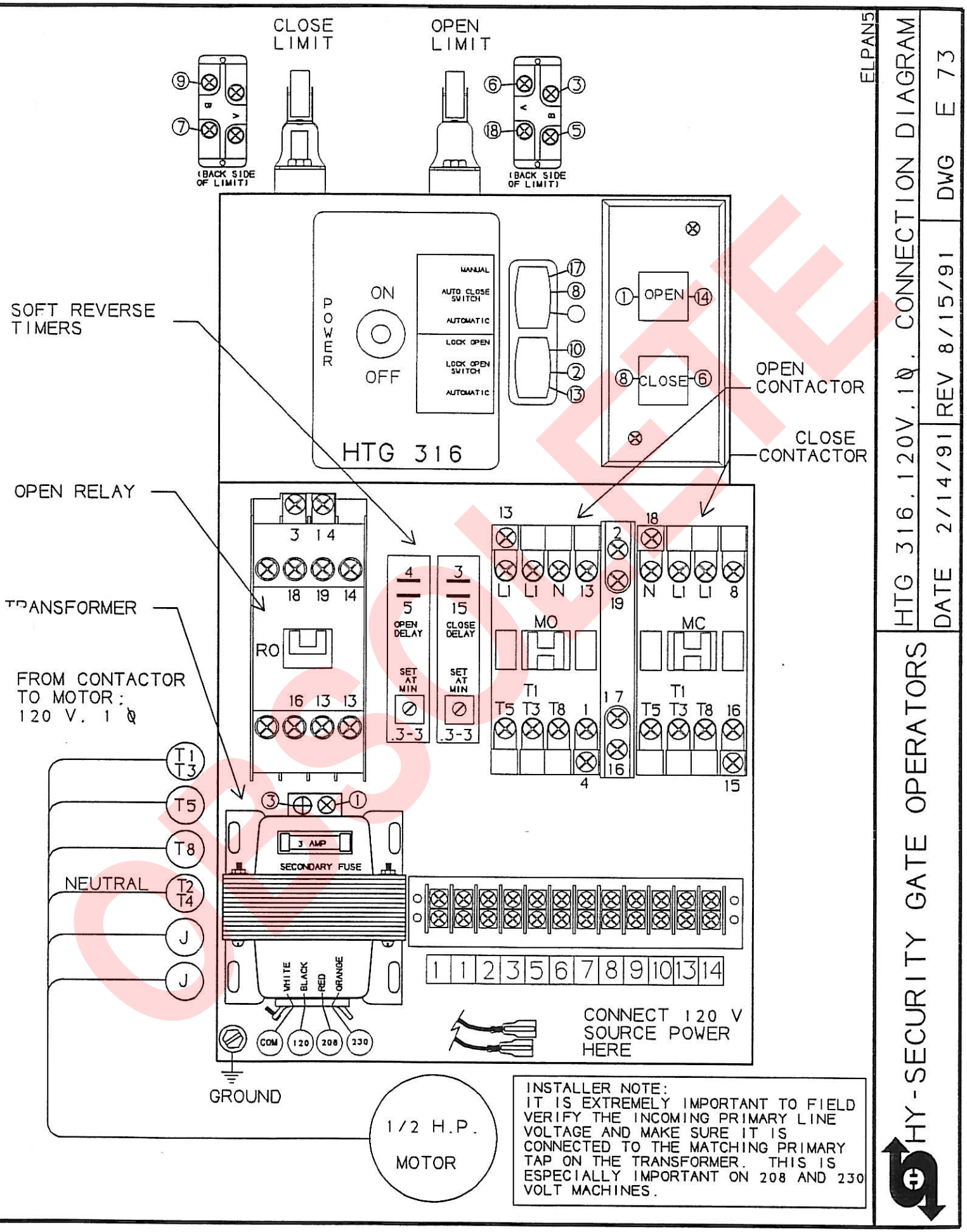
1. CONTROL CIRCUIT IS 24 VAC.
2. CONTROL FUSE IS BUSS MDL-2.
3. ENGAGE AUTO CLOSE SWITCH FOR AUTOMATIC CLOSURE. USE WITH CLOSING DETECTOR OR FREE DETECTOR, WIRED FOR NON-LATCH OPERATION.
4. REMOVE JUMPER 13-14 TO CREATE NON-LATCHING FREE DETECTOR.
5. GATE CANNOT CLOSE UNLESS THE LOCK OPEN/ AUTO CLOSE SWITCH IS IN THE AUTO POSITION.

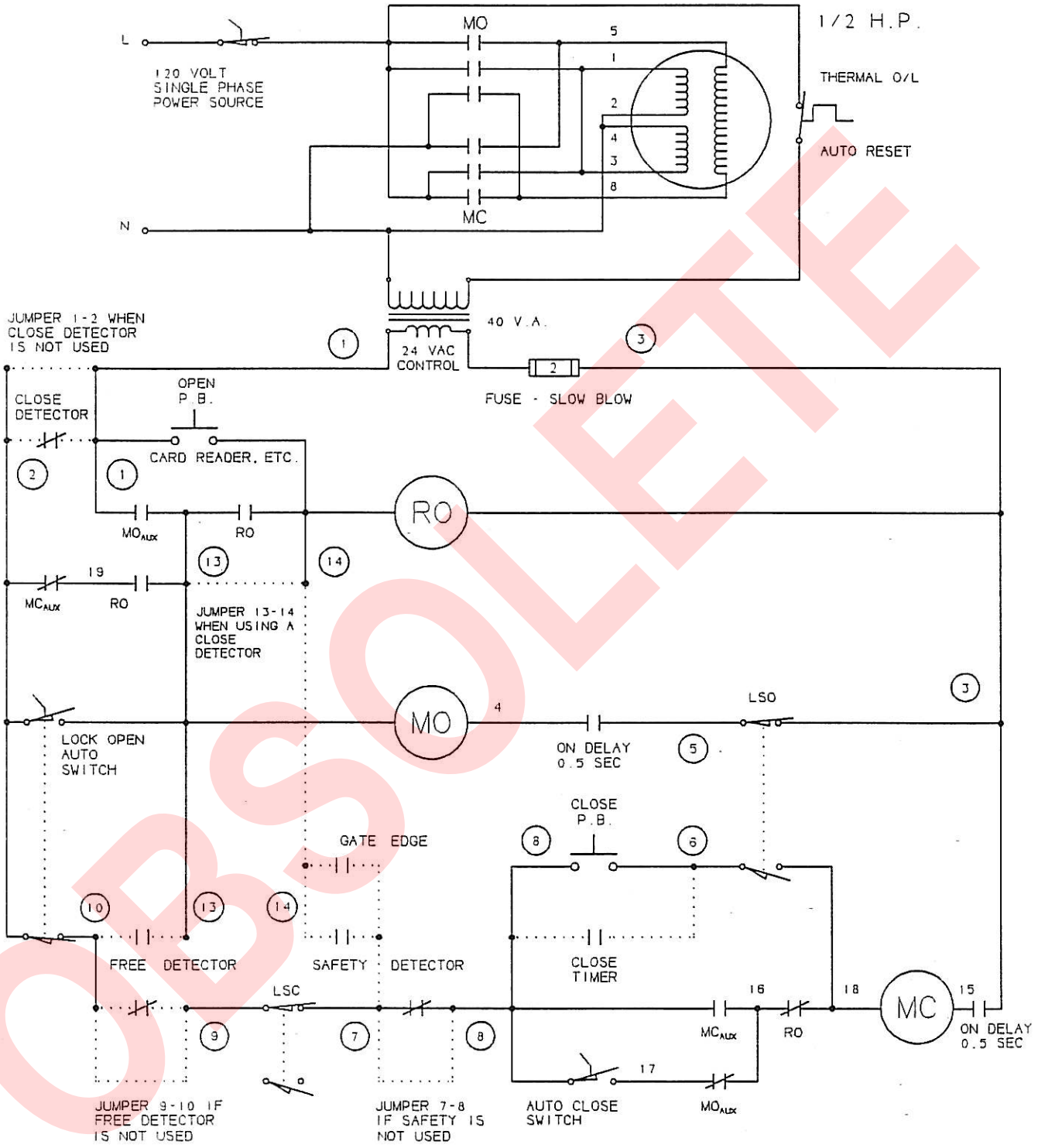






HTG 316 ARM GATE 24 VOLT CONTROL CIRCUIT OPTIONS


CLOSE LIMIT
OPEN LIMIT
(BACK SIDE OF LIMIT)
(BACK SIDE OF LIMIT)
SOFT REVERSE TIMERS
OPEN RELAY
TRANSFORMER
FROM CONTACTOR TO MOTOR: 120 V. 1 Ø
NEUTRAL
GROUND
POWER
ON
OFF
MANUAL
AUTO CLOSE SWITCH
AUTOMATIC
LOCK OPEN
LOCK OPEN SWITCH
AUTOMATIC
HTG 316
OPEN
CLOSE
OPEN CONTACTOR
CLOSE CONTACTOR
RO
OPEN DELAY
CLOSE DELAY
SET AT MIN
.3-3
MO
MC
3 AMP
SECONDARY FUSE
WHITE
BLACK
RED
ORANGE
COM
120
208
230
CONNECT 120 V SOURCE POWER HERE
1/2 H.P. MOTOR
INSTALLER NOTE:
IT IS EXTREMELY IMPORTANT TO FIELD VERIFY THE INCOMING PRIMARY LINE VOLTAGE AND MAKE SURE IT IS CONNECTED TO THE MATCHING PRIMARY TAP ON THE TRANSFORMER. THIS IS ESPECIALLY IMPORTANT ON 208 AND 230 VOLT MACHINES.
ELPAN5
HTG 316, 120V. 1Ø. CONNECTION DIAGRAM
DATE 2/14/91
REV 8/15/91
DWG E 73
HY-SECURITY GATE OPERATORS



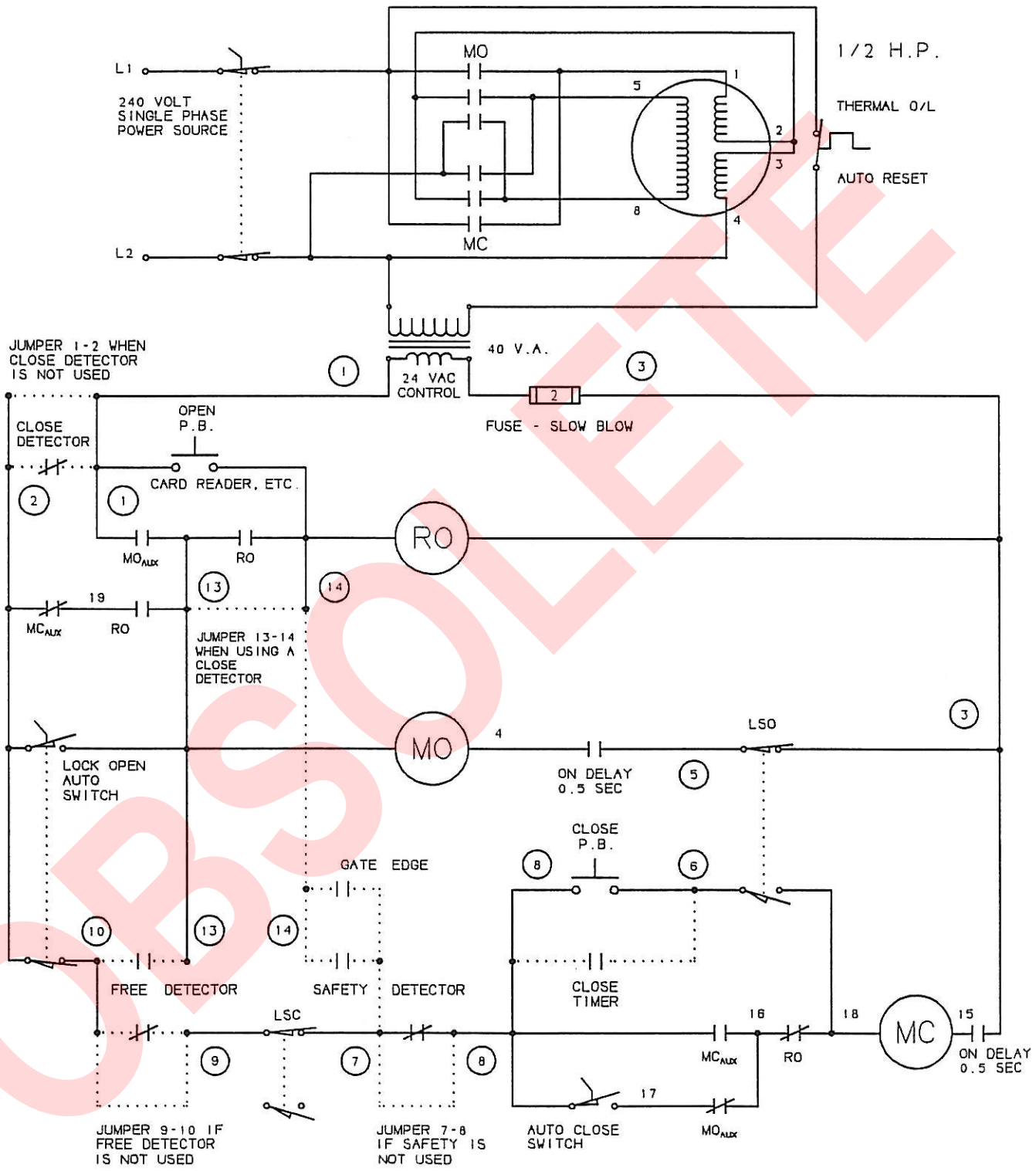
1. ENGAGE AUTO CLOSE SWITCH FOR AUTOMATIC CLOSURE. USE WITH CLOSING DETECTOR OR FREE DETECTOR. WIRED FOR NON-LATCH OPERATION.
2. REMOVE JUMPER 13-14 TO CREATE NON-LATCHING FREE DETECTOR.
3. GATE CANNOT CLOSE UNLESS THE LOCK OPEN/ AUTO CLOSE SWITCH IS IN AUTO POSITION.

Hy-Security Gate Operators

316CTRL

HTG 316 CONTROL - 1Ø-120

Date: 3/27/90 | Dwg # E 37



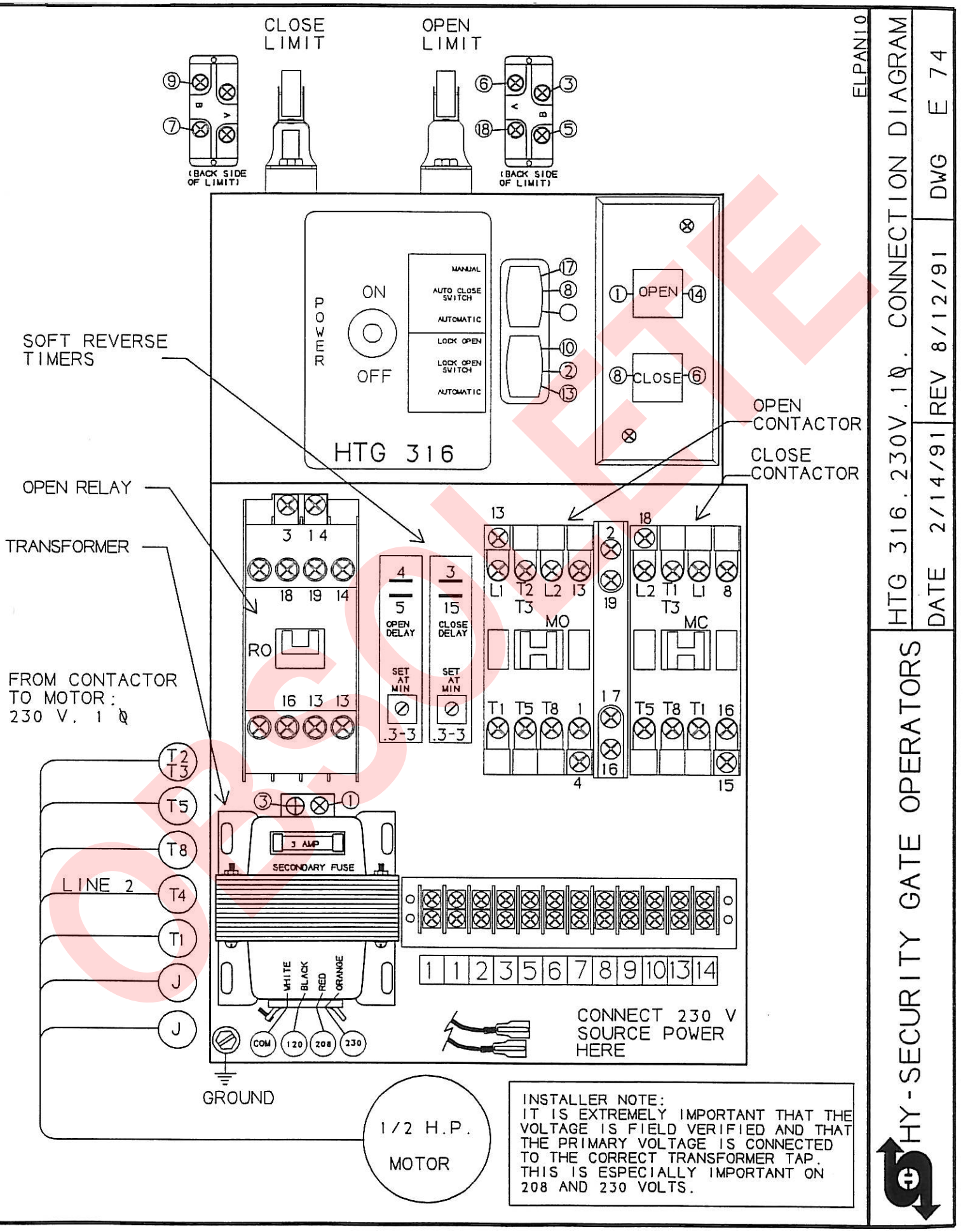
1. ENGAGE AUTO CLOSE SWITCH FOR AUTOMATIC CLOSURE. USE WITH CLOSING DETECTOR OR FREE DETECTOR. WIRED FOR NON-LATCH OPERATION.
2. REMOVE JUMPER 13-14 TO CREATE NON-LATCHING FREE DETECTOR.
3. GATE CANNOT CLOSE UNLESS THE LOCK OPEN/ AUTO CLOSE SWITCH IS IN AUTO POSITION.

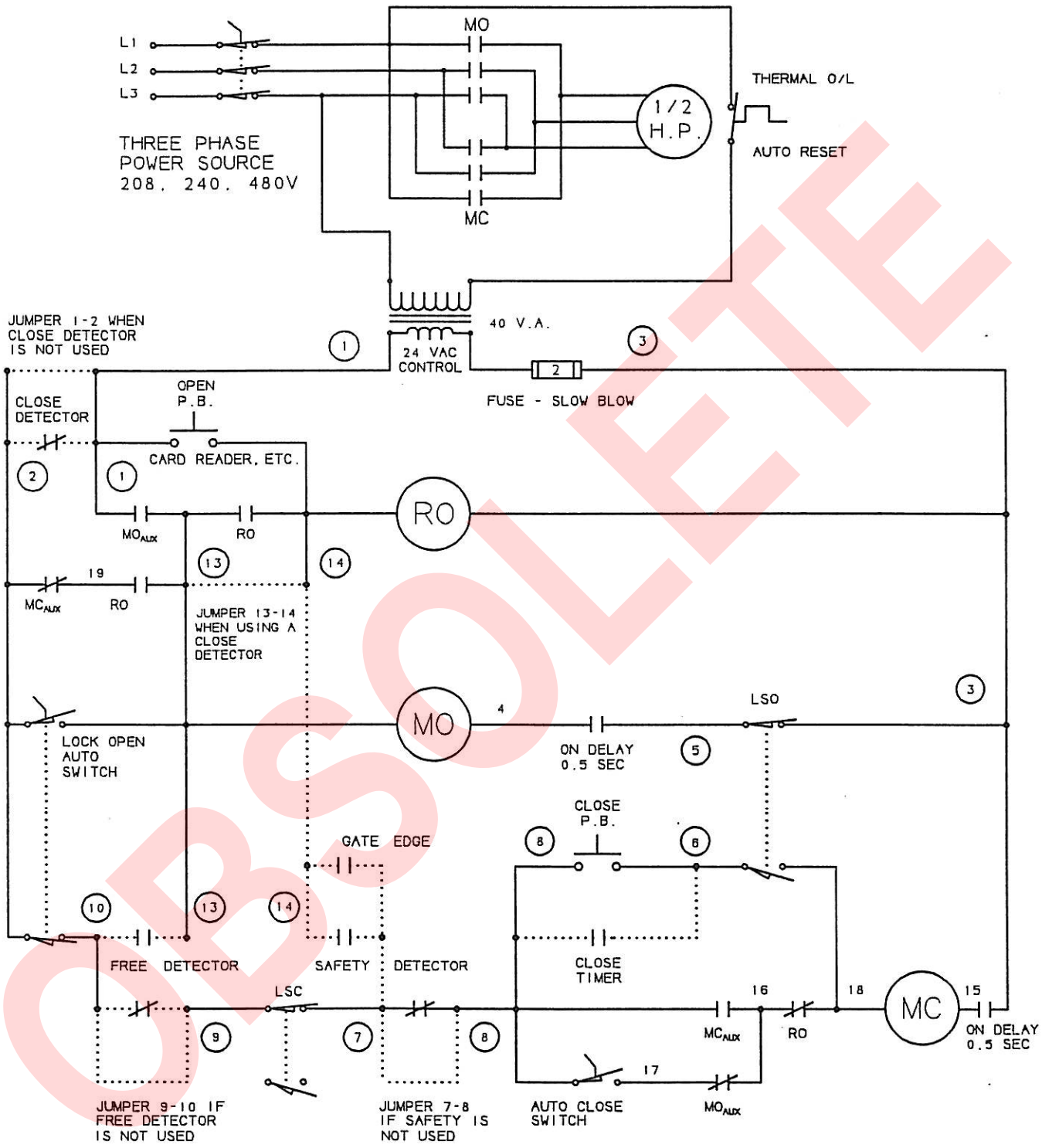
Hy-Security Gate Operators

316CTRL

HTG 316 CONTROL - 10-240

Date: 3/27/90 | Dwg # E 38


CLOSE LIMIT
OPEN LIMIT
(BACK SIDE OF LIMIT)
(BACK SIDE OF LIMIT)
ELPAN10
HTG 316. 230V. 1Ø. CONNECTION DIAGRAM
DATE 2/14/91 REV 8/12/91 DWG E 74
HY-SECURITY GATE OPERATORS
POWER
ON
OFF
MANUAL
AUTO CLOSE SWITCH
AUTOMATIC
LOCK OPEN
LOCK OPEN SWITCH
AUTOMATIC
OPEN
CLOSE
HTG 316
SOFT REVERSE TIMERS
OPEN CONTACTOR
CLOSE CONTACTOR
OPEN RELAY
TRANSFORMER
FROM CONTACTOR TO MOTOR: 230 V. 1 Ø
RO
OPEN DELAY
CLOSE DELAY
SET AT MIN
.3-3
MO
MC
T3
3 AMP
SECONDARY FUSE
LINE 2
T2/T3
T5
T8
T4
T1
J
J
WHITE
BLACK
RED
ORANGE
COM
120
208
230
GROUND
1/2 H.P. MOTOR
CONNECT 230 V SOURCE POWER HERE
INSTALLER NOTE:
IT IS EXTREMELY IMPORTANT THAT THE VOLTAGE IS FIELD VERIFIED AND THAT THE PRIMARY VOLTAGE IS CONNECTED TO THE CORRECT TRANSFORMER TAP. THIS IS ESPECIALLY IMPORTANT ON 208 AND 230 VOLTS.



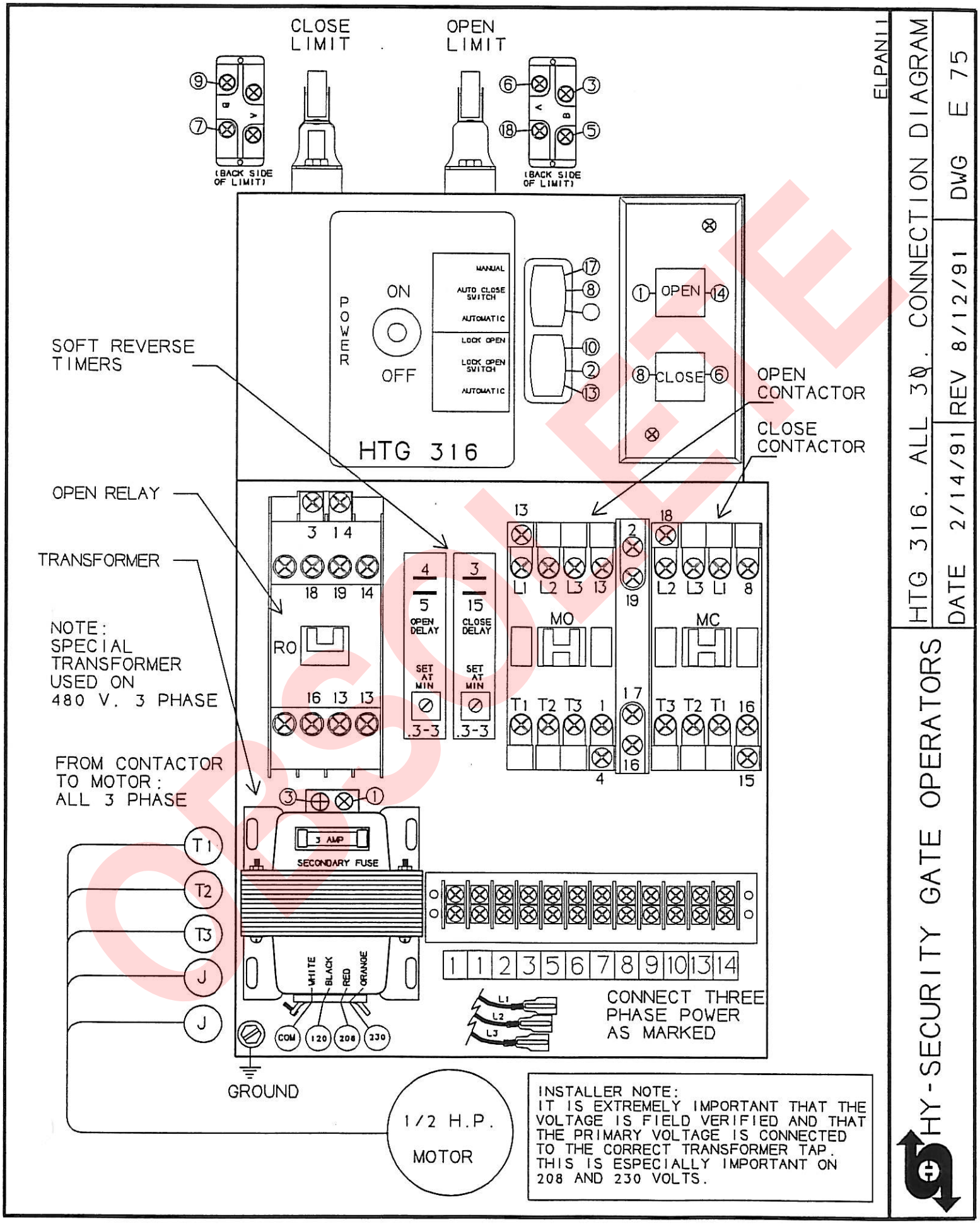
1. ENGAGE AUTO CLOSE SWITCH FOR AUTOMATIC CLOSURE. USE WITH CLOSING DETECTOR OR FREE DETECTOR. WIRED FOR NON-LATCH OPERATION.
2. REMOVE JUMPER 13-14 TO CREATE NON-LATCHING FREE DETECTOR.
3. GATE CANNOT CLOSE UNLESS THE LOCK OPEN/ AUTO CLOSE SWITCH IS IN AUTO POSITION.

Hy-Security Gate Operators

316CTRL

HTG 316 CONTROL - 30

Date: 3/27/90 | Dwg # E 39


CLOSE LIMIT
OPEN LIMIT
(BACK SIDE OF LIMIT)
(BACK SIDE OF LIMIT)
ELPAN11
HTG 316. ALL 30. CONNECTION DIAGRAM
DATE 2/14/91 REV 8/12/91 DWG E 75
HY-SECURITY GATE OPERATORS
OBSOLETE
POWER
ON
OFF
MANUAL
AUTO CLOSE SWITCH
AUTOMATIC
LOCK OPEN
LOCK OPEN SWITCH
AUTOMATIC
HTG 316
OPEN
CLOSE
OPEN CONTACTOR
CLOSE CONTACTOR
SOFT REVERSE TIMERS
OPEN RELAY
TRANSFORMER
NOTE: SPECIAL TRANSFORMER USED ON 480 V. 3 PHASE
FROM CONTACTOR TO MOTOR: ALL 3 PHASE
RO
OPEN DELAY
CLOSE DELAY
SET AT MIN
.3-3
MO
MC
3 AMP
SECONDARY FUSE
WHITE
BLACK
RED
ORANGE
COM
120
208
230
CONNECT THREE PHASE POWER AS MARKED
GROUND
1/2 H.P. MOTOR
INSTALLER NOTE:
IT IS EXTREMELY IMPORTANT THAT THE VOLTAGE IS FIELD VERIFIED AND THAT THE PRIMARY VOLTAGE IS CONNECTED TO THE CORRECT TRANSFORMER TAP. THIS IS ESPECIALLY IMPORTANT ON 208 AND 230 VOLTS.

Hy-Security Gate Operators, Seattle, Washington
1(800)321-9947, 1(206)632-0538, FAX 1(206)632-1314

LONG RANGE PUSHBUTTON CONTROL
(FOR HTG 316 ONLY)
CONNECTION DIAGRAM

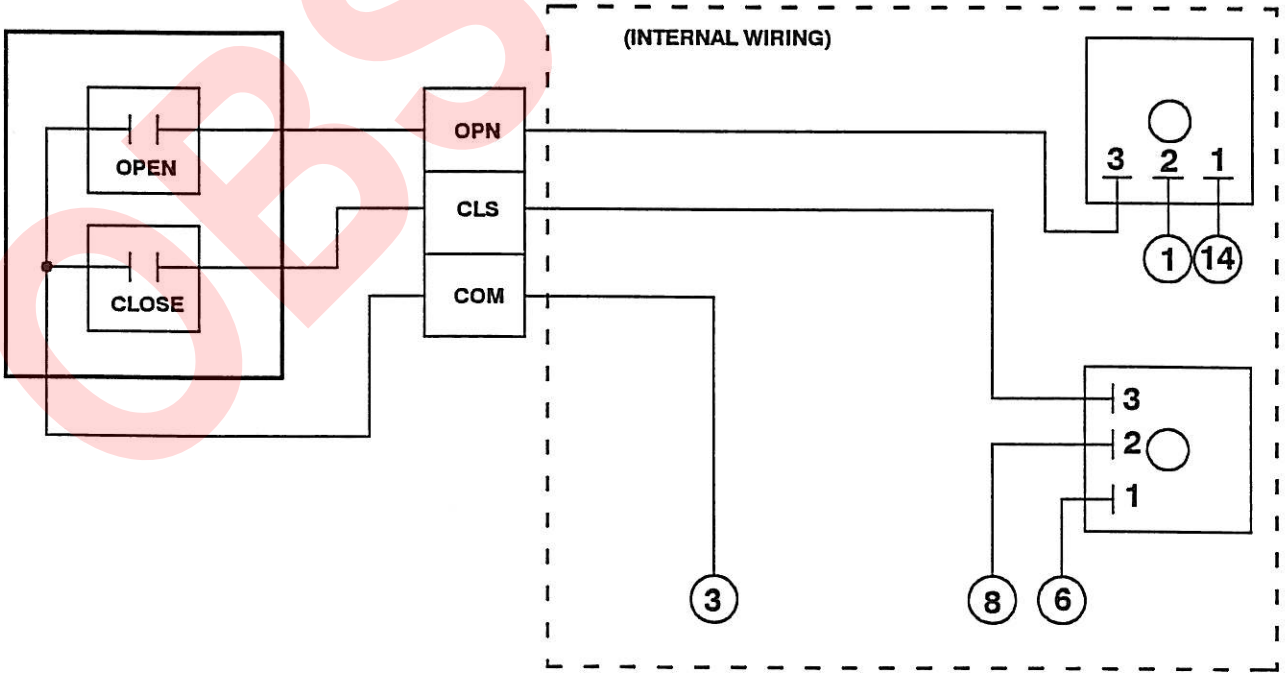
Voltage loss caused as a function of wire resistance times control amperage, limits pushbutton control wiring to the following schedule:

16 ga. wire= up to 150' maximum
14 ga. wire = up to 250' maximum
12 ga. wire = up to 400' maximum
10 ga. wire = up to 600' maximum

For applications requiring pushbutton controls from a long distance, or circuits of limited current, order the factory modification A EIIF 002 OC. The following schedule indicates the improved control range using this part number:

16 ga. wire = up to 22 miles
18 ga. wire = up to 13 miles
22 ga. wire = up to 5 miles
26 ga. wire = up to 2 miles

When option A EIIF 002 OC is used in conjuction with a pushbutton control, connect to the operator as shown below:



Hy-Security Gate Operators, Seattle, Washington
1(800)321-9947, 1(206)632-0538, FAX 1(206)632-1314
Manufacturers and Designers of Hydraulic Systems

ELECTRIC CONVERSION OF PRIMARY OPERATOR VOLTAGE

There are four steps required to convert the voltage of an operator within the same phase. These instructions do not apply to conversions from single phase to three phase or vice versa.

1. The overload must be changed to match the motor current at the new operating voltage. To do this, remove the overload device from the contactor by loosening the three screws T1, T2 and T3 on the contactor. Remove all the wires on the overload and replace them to exactly the same position on the new overload. Mount and tighten screws firmly. Be certain the new overload is adjusted to match the motor nameplate amps that correspond to the new voltage. Note that the existing overload has sufficient range to accommodate adjustment from 208 volts to 230 volts or vice versa.

2. The primary tap on the control transformer must be changed to the new voltage. This is accomplished by first reading the label on the top of the control transformer to determine which color primary lead corresponds to the new voltage to be used. Disconnect the existing primary lead (caution, do not disconnect the primary "common" lead) and reconnect the correct primary lead to the same location.

3. The power leads to the motor must be reconnected in the motor junction box to match the new voltage. You must remove the cover from the juction box on the electric motor. Reconnect the primary leads in the new configuration shown on the motor nameplate that matches the new voltage. Note this step does not need to be performed for conversion between 208 volts and 230 volts.

4. The operator must be re-labeled to indicate the new voltage. Apply new labels to the operator so that the correct primary voltage is indicated.

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Maintenance Instructions
HTG 316 Barrier Arm Operator

HTG 316 Maintenance

1. Mechanical:
The shaft bearings used in the HTG 316 are fully sealed. There is no lubrication required. Even in heavy use, long bearing service life is expected. The crank arm bearing does require lubrication at six month intervals. A grease fitting has been provided at the end of the crank arm for ease of lubrication.

2. Electrical Controls:
Before servicing, turn off power disconnect switch.
There is no required maintenance involved in the electrical system. If a malfunction occurs, check out by following the schematic drawing or call for factory assistance.

3. Hydraulic System:
See the separate sheet (HT40) for the hydraulic system maintenance.

HTG 316 Emergency Operation

1. In the event of a power failure, opening of a secured gate is best achieved by simply loosening the arm mounting bolts and removing the arm.

2. Optional hand valves can be factory installed to defeat the hydraulic lock that secures the arm from unauthorized opening. In the event of a power failure, opening a secured gate can be achieved with a **two** step process:

First, Turn the yellow handled valve on the hydraulic cylinder, one-quarter turn so that the handle is in a vertical position.

Second, turn the black knob at the center of the hydraulic pump until it is fully seated.

Having done the two steps above, lift the arm manually by starting at the tip of the arm and raising it overhead and "Hand 0ver Hand" the arm fully open as you slowly walk toward the operator housing. When you have the arm in the vertical position, be certain to close the yellow hand valve to prevent the arm from drifting down again.

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Hydraulic System Maintenance Instructions HTG 316 Barrier Arm Operator

1. Hydraulic System:

FLUID LEVEL. Under normal operating conditions, hydraulic systems do not consume oil. Before adding any oil, check the system thoroughly for leaks. The minimum oil level is three fourth's full. Do not fill more than one inch from the top of the tank. We recommend our UNIFLOW hydraulic oil, part number H 004. Most petroleum based hydraulic oil or automatic transmission fluid may be used although their performance in cold weather will be sluggish unless the operator is well heated. **DO NOT USE BRAKE FLUID!**

Slow operation in severe cold weather can be corrected by one or more of the following: 1. Verify that your reservoir has been filled with our UNIFLOW high performance oil, 2. Maintain some heat in the pump cabinet.

OIL CHANGE. Unlike gasoline engines, hydraulic systems do not foul the oil with combustion products, thus the oil changes do not need to be frequent. Heat is the main concern. If the unit is subjected to high use, especially if the climate is also very hot, consider changing the oil more frequently. In general use, we recommend draining the reservoir and replacing the oil at five or ten year intervals.

To drain the hydraulic oil, leave the arm in the closed position, and disconnect the hose that connects to the top of the hydraulic cylinder. Direct the open hose into a waste receptacle and start the gate in the open direction. All of the oil will come out within 15 seconds. Stop the pump immediately when the flow ceases. Reconnect the loose hose. Refill with new UNIFLOW hydraulic oil or use a substitute if performance in cold weather is not a question. Fill to within one inch from the top of the reservoir maximum.

LOOK FOR LEAKS: Occasionally there may be slight seeping at the fittings after some usage. Moderate tightening of the fittings will usually correct the problem. If leaking persists, replace "O" rings, fittings or hoses as required. No further leaks should occur

Call (800)321-9947 for factory assistance.