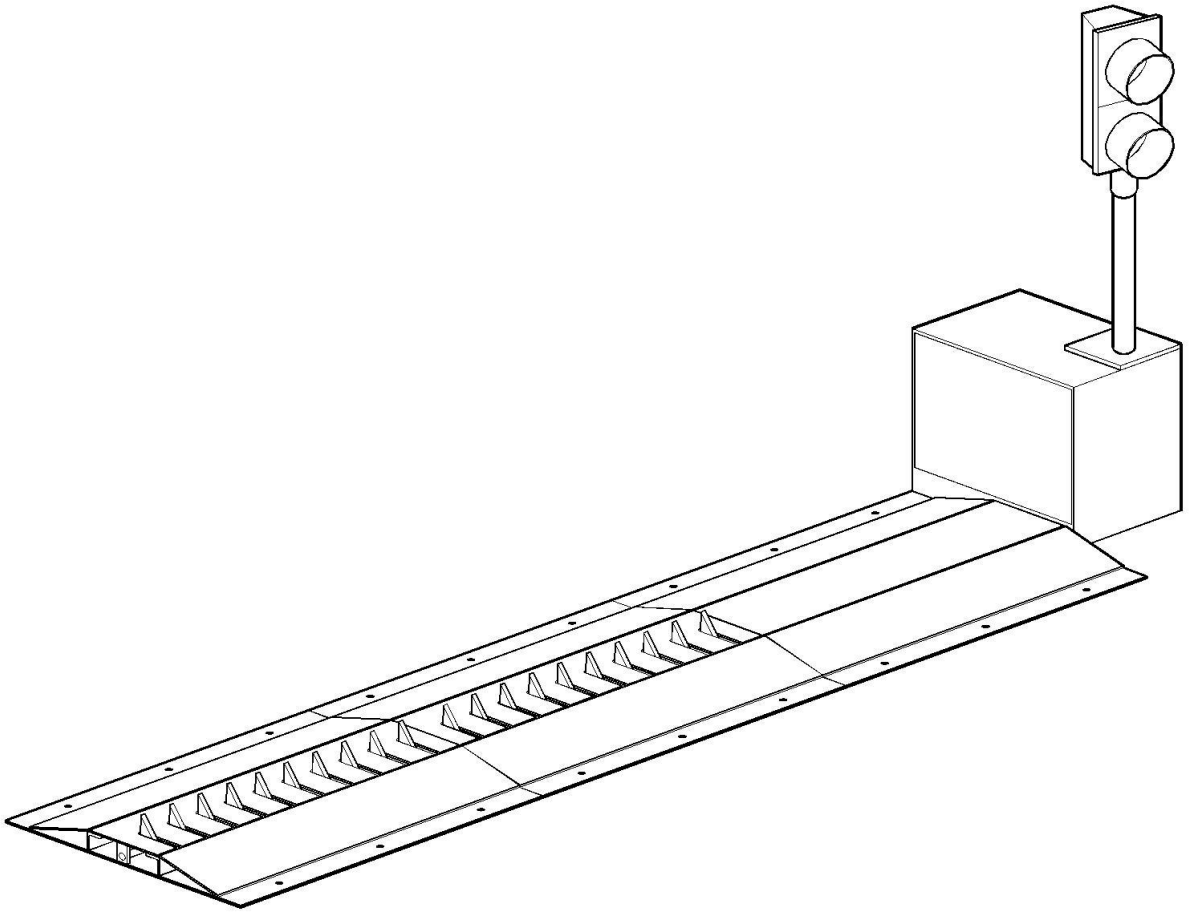
- **INSTALLATION**
- **OPERATION**
- **TROUBLE SHOOTING**
- **WARRANTY**



SABRE TOOTH ®

DOCUMENT A2072

WARRANTY AND LIMITATION OF LIABILITY

Delta Scientific Corporation warrants that during the first ninety (90) days after delivery, the Products will be free from defect in material and workmanship. Delta's sole obligation under this warranty shall be to repair (or at Delta's option, to replace), FOB: Valencia, California, any defective product, without charge to Buyer, provided that, (a). Buyer gives Delta written notice of any such claimed defect within such period of ninety (90) days, (b). The Products, if installed, were installed by a Delta authorized installer, (c). The Products have not been altered, subjected to misuse, negligence or accident, or used with parts not authorized by Delta, and (d). The Products have been maintained in accordance with the instructions provided. NO OTHER WARRANTY IS EXPRESSED AND NONE SHALL BE IMPLIED, INCLUDING WITHOUT LIMITATION THE WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR USE OR FOR A PARTICULAR PURPOSE. THE FOREGOING STATES DELTA'S ENTIRE LIABILITY WITH RESPECT TO THE PRODUCTS. IN NO EVENT SHALL DELTA BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHICH RESULT FROM THE USE BY BUYER OR ANY OTHER PARTY, OF THE PRODUCTS, AND IN NO EVENT SHALL DELTA'S LIABILITY EXCEED THE AMOUNTS PAID BY BUYER FOR THE PRODUCTS HEREUNDER.

DISCLAIMER

Please note - careful consideration must be devoted to the selection, placement and design of a Barricade installation. Just as in the case of any Barricade system, perimeter security device or security gate that blocks a roadway or drive, care must be taken to ensure that approaching vehicles as well as pedestrians are fully aware of the Barricades and their operation. Proper illumination, clearly worded warning signs, auxiliary devices such as semaphore gates, stop-go signal lights, audible warning devices, speed bumps, flashing lights, beacons, etc. should be considered. Delta has information available on many such auxiliary safety equipment not specifically listed herein. It is strongly recommended that an architect and/or a traffic and/or safety engineer be consulted prior to installation of a Barricade system. Delta will offer all possible assistance in designing the operating equipment, controls and the overall system, but we are not qualified, nor do we purport to offer either traffic or safety engineering information.

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MTC31 Installation Instructions

Components

1) Motor Control Cabinet
2) Drive Shaft Tunnel
3) Control Modules (number of units depends on length ordered)
4) Stop/Go Signal Light (optional)

Visual Indications

Good visual signals, signs, etc. and either a standard barrier gate or signal lights should be used in conjunction with the MTC31 to indicate the teeth position. For driver and vehicle safety the unit should not be operated without these added safety provisions.

Stop/Go Signal Lights

The Delta Stop/Go Signal Light (Catalog Item 1-MPL-10) is post mounted to the MTC31 motor drive box at the customer desired height above grade. It displays a **RED** light at all times when the MTC31 teeth are fully or partially up. The same limit switch that turns the drive motor off in the down position switches the signal light from **RED** to **GREEN**. The light returns to **RED** the instant the teeth start in the up direction. These lights are standard 8 inch diameter traffic signals mounted in high impact resistant polycarbonate plastic bodies.

Synchronized Barrier Gate Arm

The Delta Barrier Gate Arm (Catalog Item 2-AG812-1) can be synchronized to the MTC31 to provide full barrier arm protection except for when the teeth are fully lowered. Standard modes of operation provide for the arm being parallel to the roadway until the teeth are fully lowered, the teeth down signal raising the barrier arm to the full up and clear position. On reset, the barrier arm is lowered to the full down position where upon that signal the teeth are again raised to the up and guard position.

Alternately, for applications where it is desired to eliminate any possibility of tailgaters violating the gate, the synchronizing circuit can allow the barrier arm to again remain in the down position until the teeth are fully lowered, but at reset, the teeth and the arm simultaneously go to the guard position.

The Barrier Gate is mounted adjacent to the MTC31. The standard arm lengths are from 8 to 12 feet. Wood or alternately aluminum arms are available.

Site preparation

It is important that the job site be prepared so that the mounting surface is flat and free of ridges. Studs can be preset or drilled on installation.

MINIMUM MOUNTING BOLT SIZE SHOULD BE 1/2"

Pre-installation Layout

Each of the three basic components are pre-drilled to allow bolting directly to the slab (**Reference Drawing D02821)**. The system has been pre-assembled and cycle tested at the factory to insure good performance. Before final disassembly, each component was steel stamped according to handing (right or left), position relative to the motor cabinet, and system number. For example a unit stamped:

3R1

Indicates a right hand, first section of system number 3. The section should be laid out in the correct order on the site making sure the steel identity numbers match. **Each set of teeth and the drive shaft tunnels are stamped and must be in the indicated order (the higher the number, the further away from the drive box).**

Remove the top plates and lay aside. After you are sure of the order and location, move each component into place **starting with the module most distant from the motor cabinet.** Be sure that the teeth and drive shafts are aligned and fully inserted. There are overlapping tabs on each section, which once aligned should match the threaded holes on the next section. When aligned, there should be approximately 1/4" clearance between sections.

Mechanical Installation

Once the components are in place, **and before lagging down or pinning the couplings**, raise the teeth to the upright position and make a visual check of the alignment. The teeth should all be in line, this can be checked with a string line. Once aligned and checked, tighten the tie down bolts along the edge and the bolts on the inside tabs. The coupling pins can now be driven into the pre-drilled holes and lightly staked.

The connecting link from the gearbox to the drive shaft crank arm can now be attached. The spacer is placed **between** the connecting link and the crank arm. The high tensile strength bolt should be pulled tight with the self-locking hex-nut (about 35-40 ft-lbs.). The set screw in the drive shaft collar adjacent to the crank arm should now be tightened. Check belt tension (1/2" of slack maximum).

Electrical Installation

The unit is now ready for electrical hook-up (Reference Drawing B04783). Before operating under power, the motor should be run through the cycle by hand to make sure there are no interference or obvious problems. After the crank through, the top plates can be bolted into place. **The direction of the slots must allow for free retraction of the teeth**. No adjustment of the limit switch or connecting link should be necessary.

See Page 9 for the operating modes available with the B04782 circuit.

Priority Direction

The priority direction is that flow of traffic, which is your primary goal to retain. The priority direction is set at the factory based upon the customers request. To check your priority direction the following procedure should be followed:

1) Lower the teeth.

2) With the teeth in the full down position, they will point **toward** a vehicle coming in the priority control direction.

3) With the teeth down and pointing toward you, the side that the drive box is on is the "handing" of the unit. (I.e., standing on the side of the unit with the teeth pointing at you in the down position and the drive box to your right, the unit is "Right Handed".)

If you wish to change the priority control direction with the unit already installed, consult the factory.

Limit Switch Adjustment

The limit switch cam is adjustable to allow for tooth travel adjustments.

> **CAUTION: Do NOT attempt to adjust the limit switches or cam with the power on. Power switch must be placed in the 'Off' position before adjustments are made.**

Review drawing D03254 and determine if your unit is 'left' or 'right' handed. Teeth should sweep approximately 90 degrees of travel. Proper adjustment places teeth in an almost vertical position when 'up' and safely under the top plate slots when 'down'.

1) To adjust the cam for more downward travel, pull the belt through by hand until the down limit switch just 'clicks'. Loosen the set screw on the cam and rotate slightly away from the limit switch. Tighten screw, turn Power switch 'On' and check by operating the Controller. Turn power 'Off' to re-adjust as necessary.

2) To adjust the cam for less downward travel, pull the belt through by hand until the down limit switch just 'clicks'. Loosen the set screw on the cam and rotate slightly further into the limit switch. Tighten screw, turn Power switch 'On' and check by operating the Controller. Turn power 'Off' to re-adjust as necessary.

Maintenance

Good maintenance is essential to the long life of your Delta MTC31 Motorized Traffic Controller. Long, trouble free operation is obtained by adhering to the following suggestions:

1) Check belt tension every 60 days to control belt wear.

2) Adjust limit switches (See section above) for proper tooth position.

CAUTION: Do NOT attempt to adjust the limit switches with the power on. Power switch must be placed in the 'Off' position before adjustments are made.

3) Service the gearbox annually by draining old oil and refilling with clean Texaco Vanguard oil or equivalent.

4) Check for debris and dirt accumulating under the road plates. Remove plates and clean as necessary.

5) Tighten all nuts, bolts, and screws on the Controller assembly every 60 days or as necessary.

6) Wash and wax the Controller cabinet exterior every 3 months or sooner to maintain the bright gloss finish of your Delta MTC31.

7) Wire brush any rusting areas and repaint as required.

Troubleshooting

If MTC31 Motorized Traffic Controller fails to move:

1) Check Controller power switch. Switch must be in the 'On' position.

2) Check thermal overload on motor. If overload is tripped reset by pushing trip button. If motor is hot let it cool before trying to reset.

CAUTION: Power switch should be in the 'Off' position when resetting the thermal trip to prevent hands from being in the caught in the drive belt pulleys if motor should happen to start on reset.

3) Check circuit breaker/disconnect feeding the Controller. Reset as necessary.

4) If there is power to the Controller (120/1/60) at terminal 1 (hot) and terminal 2 (neutral):

   a) Controller teeth should lower when motor relay 1CR is energized. Check than when vend device is calling for teeth to lower that there is voltage (120/1/60) between terminals 15 (hot) and 2 (neutral). If 1CR does not pull in when terminal 1 is jumped to terminal 15, relay 1CR is bad and needs replacing.

   b) When motor relay 1CR energizes, contact 1CR.3 closes and voltage is applied to the motor in the 'down' direction. The down limit switch normally closed contact is closed as the switch is not made. The motor drives the teeth to the down position, the down limit switch makes and removes power from the motor. With power off the circuit and the teeth up, continuity should be detected between terminals 6 and 7. Examine limit switch adjustment and/or contacts and adjust or replace as necessary. Continuity should **not** be detected between terminals 7 and 8 in this condition. Replace relay 1CR if continuity is detected between terminals 7 and 8.

   c) When motor relay 1CR is released, the motor drives the teeth to the up position. Contact 1CR.2 is closed and voltage flows through the normally closed contact of the up limit switch until switch is made, removing power from motor. With power off the circuit and the teeth down, continuity should be detected between terminals 12 and 9. Replace relay 1CR if necessary. Continuity should also be detected between terminals 9 and 10. Examine limit switch adjustment and/or contacts and adjust or replace as necessary.

Power Loss

The Delta MTC31 can be opened or closed in the event of a power outage by the following:

CAUTION: Power switch should be in the 'Off' position when manually operating the Controller to prevent hands from being in the caught in the drive belt pulleys if motor should happen to start if power is restored.

1) Manually pull the drive belt around until the teeth are in the desired position.

MTC31 Drawing Notes (B04783)

Standard Operating Modes

(1) Manually Controlled In and Out.

Switch or relay N.O. contact closes to lower teeth; same contact opens to raise teeth. Switch or relay contact between 12-15.

(2) ONE-WAY "PAY". (As built condition.)

Momentary pushbutton, etc.* to lower teeth; momentary pushbutton or loop detector to raise teeth. Lower switch or other N.O. contact between 12-15. (This switch may be wired in series with a loop detector presence signal so that a vehicle must be present before lower signal can be given.) Switch or loop detector N.C.(presence) contact between 14-15 for UP command. Loop must be at least one car length from teeth. Alternate circuit (5) allows closer loop.

(3) ONE-WAY "FREE".

Same as (Mode 2) except lower command is by loop detector.

(4) TWO-WAY; "FREE" ONE DIRECTION, "PAY" IN OPPOSITE DIRECTION.

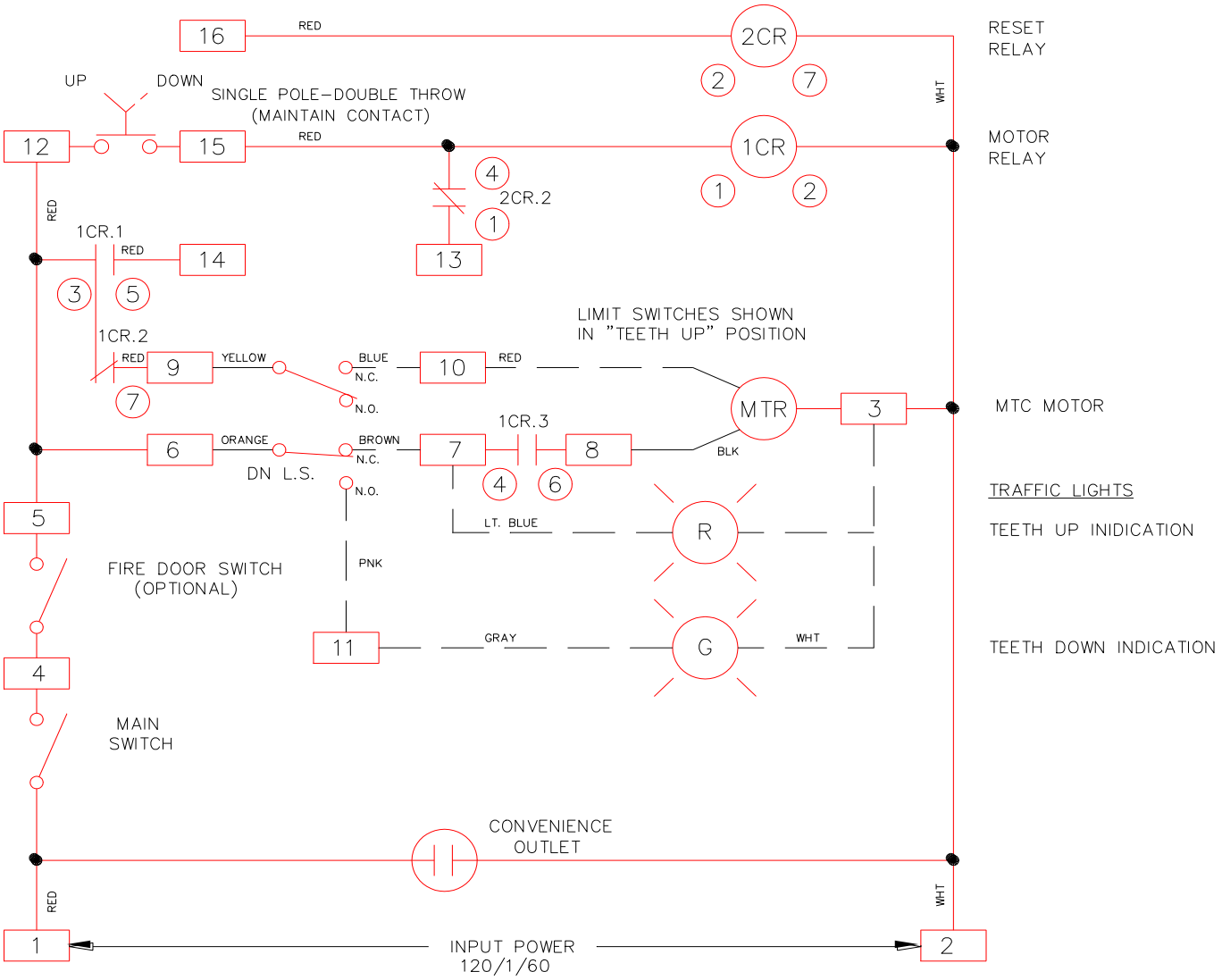
"Free" side loop detector N.O. (presence) contact between 12-15. "Pay" side loop detector N.O. (presence) contact between 14-15. Card reader, etc* between 12-14. Loops must be close enough to the teeth such that vehicle will "bridge" over them.

(5) ALTERNATE; UP COMMAND BY N.O. SWITCH OR CONTACT.

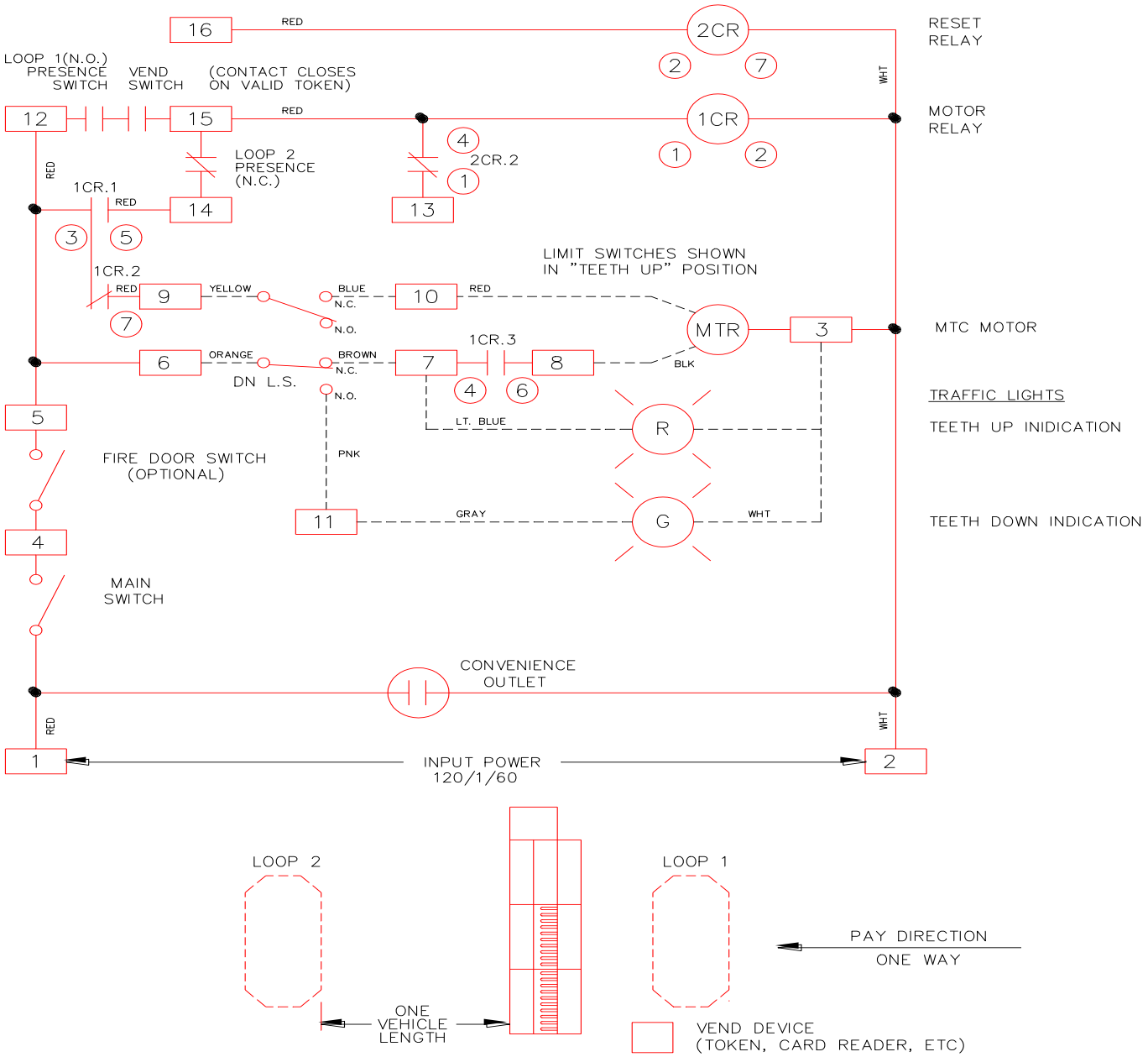
When applied with the normally open contact of the "pulse on departure (exit)" relay of most loop detectors, allows the exit loop of (Mode 2) to be nearer the teeth. This is useful any time only a N.O. contact is available for teeth UP command. Shunt (jumper bar), between terminals 13-14. Down switch or other N.O. contact between 12-15. Loop detector "pulse on departure" N.O. contacts between 12-16.

*Etc: Card reader, ticket spitter, loop detector, radio control
or coin/token taker.

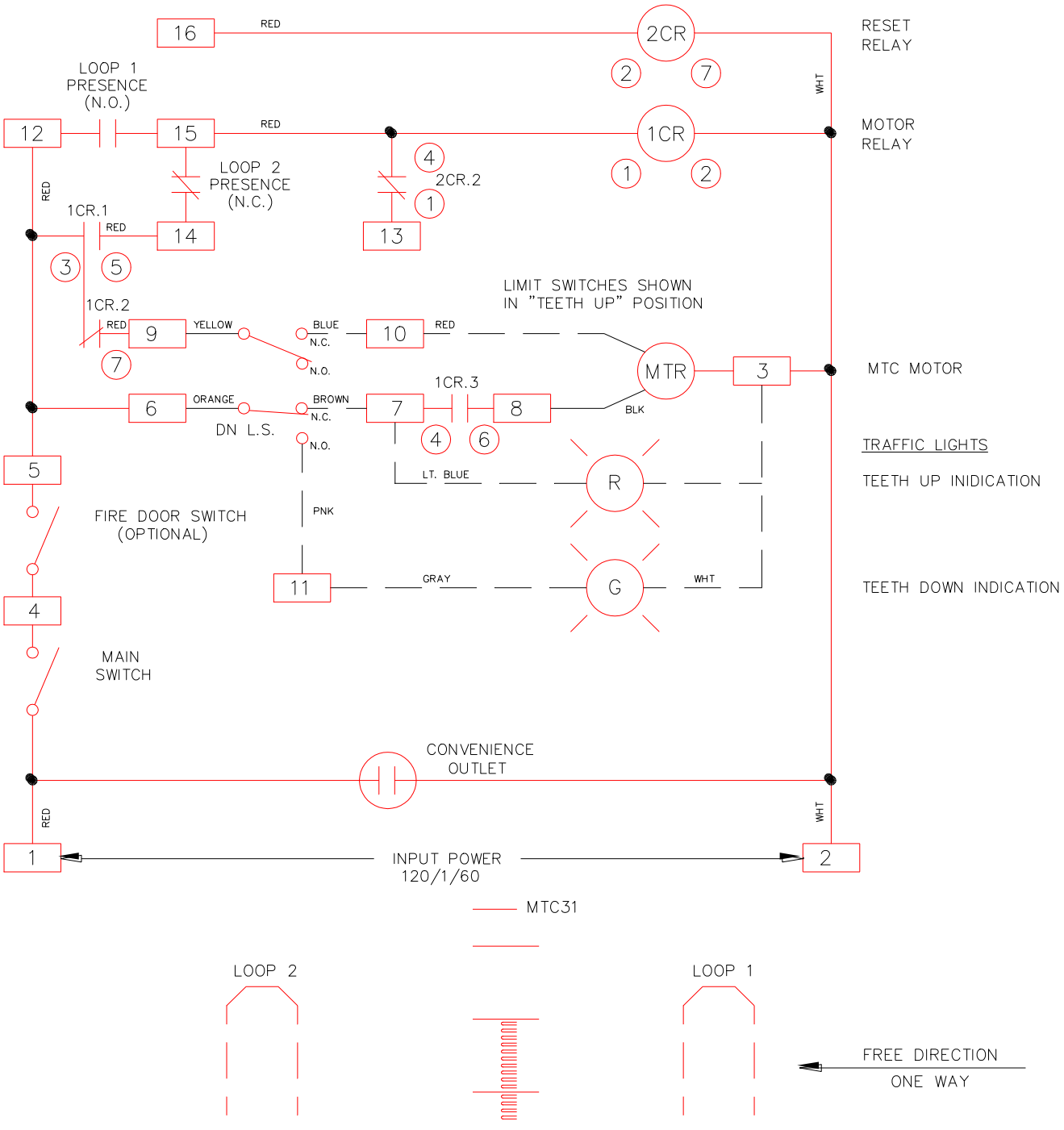
B04783-1


16
RED
2CR
RESET
RELAY
UP
DOWN
SINGLE POLE-DOUBLE THROW
(MAINTAIN CONTACT)
12
15
RED
1CR
MOTOR
RELAY
WHT
4
2CR.2
1
13
RED
1CR.1
RED
14
3
5
LIMIT SWITCHES SHOWN
IN "TEETH UP" POSITION
1CR.2
RED
9
YELLOW
BLUE
N.C.
N.O.
10
RED
MTR
3
MTC MOTOR
7
6
ORANGE
BROWN
N.C.
DN L.S.
N.O.
1CR.3
7
8
BLK
4
6
TRAFFIC LIGHTS
5
LT. BLUE
R
TEETH UP INIDICATION
FIRE DOOR SWITCH
(OPTIONAL)
PNK
11
GRAY
G
WHT
TEETH DOWN INDICATION
4
MAIN
SWITCH
CONVENIENCE
OUTLET
RED
WHT
1
INPUT POWER
120/1/60
2

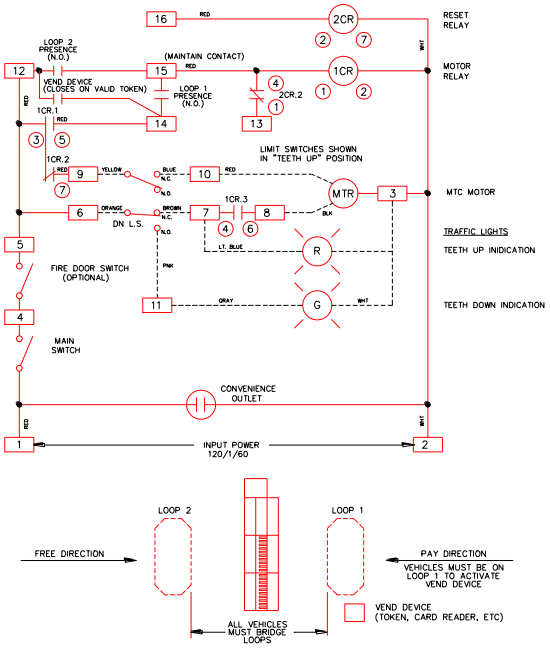
B04783-2


16
RED
2CR
RESET RELAY
LOOP 1(N.O.) PRESENCE SWITCH
VEND SWITCH
(CONTACT CLOSES ON VALID TOKEN)
12
15
RED
1CR
MOTOR RELAY
WHT
LOOP 2 PRESENCE (N.C.)
2CR.2
1CR.1
RED
14
13
LIMIT SWITCHES SHOWN IN "TEETH UP" POSITION
1CR.2
RED
9
YELLOW
BLUE
N.C.
N.O.
10
RED
MTR
3
MTC MOTOR
1CR.3
6
ORANGE
BROWN
N.C.
DN L.S.
N.O.
7
8
BLK
TRAFFIC LIGHTS
TEETH UP INIDICATION
5
LT. BLUE
R
FIRE DOOR SWITCH (OPTIONAL)
PNK
11
GRAY
G
WHT
TEETH DOWN INDICATION
4
MAIN SWITCH
CONVENIENCE OUTLET
RED
WHT
1
INPUT POWER 120/1/60
2
LOOP 2
LOOP 1
PAY DIRECTION
ONE WAY
ONE VEHICLE LENGTH
VEND DEVICE (TOKEN, CARD READER, ETC)

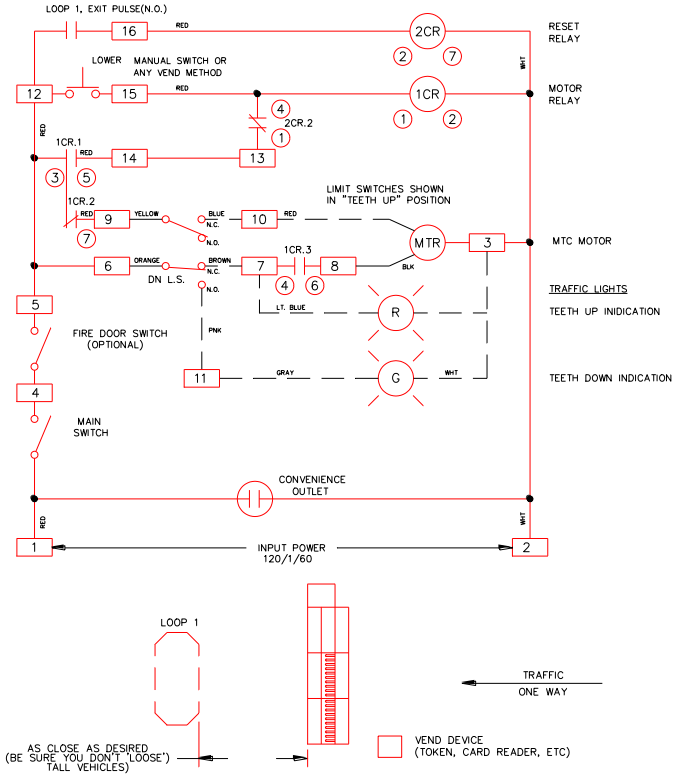
B04783-3


16
RED
2CR
RESET
RELAY
LOOP 1
PRESENCE
(N.O.)
WHT
12
15
RED
1CR
MOTOR
RELAY
LOOP 2
PRESENCE
(N.C.)
4
2CR.2
1
RED
1CR.1
RED
14
13
3
5
LIMIT SWITCHES SHOWN
IN "TEETH UP" POSITION
1CR.2
RED
9
YELLOW
BLUE
N.C.
10
RED
MTR
3
MTC MOTOR
7
N.O.
1CR.3
6
ORANGE
BROWN
N.C.
7
8
BLK
DN L.S.
4
6
N.O.
TRAFFIC LIGHTS
5
LT. BLUE
R
TEETH UP INIDICATION
FIRE DOOR SWITCH
(OPTIONAL)
PNK
11
GRAY
G
WHT
TEETH DOWN INDICATION
4
MAIN
SWITCH
CONVENIENCE
OUTLET
RED
WHT
1
INPUT POWER
120/1/60
2
MTC31
LOOP 2
LOOP 1
FREE DIRECTION
ONE WAY

B04783-4



B04783-5



PARTS LIST - MTC31 MOTORIZED TRAFFIC CONTROLLER

Spare Parts SCHEDULE C-1

MSP-01	Motor, 1/2 HP @ 115/1/60, (2464-08)
MSP-02	Motor, 1/2 HP @ 220/1/50, (2464-09)
MSP-03	Limit Switch & Cover, (2465-40)
MSP-04	Rod End Bearing-Rt Hand, 3/8"-24 w/3/8" Hole
MSP-05	Shaft Bearing Block (Pillow Block)
MSP-06	Bearing Block Bolt, Allen Hd 3/8"-16 x 1.75"
MSP-07	Triac & Resistor (Obsolete), (Special Order)
MSP-08	Relay (Obsolete), (2457-64), (Special Order)
MSP-09	Gate Arm Only (6 foot), (Old Style MTC Motor Box)
MSP-10	Connecting Rod, Less Rod Ends
MSP-11	Tooth Shaft (Std 3 foot Module)
MSP-12L/R	Tooth Crank Shaft, Specify Left or Right Hand (Std 3 foot Module)
MSP-13	Gear Box Crank Arm
MSP-14	1" ID Plain Steel Washer
MSP-15	Enclosure Door Lock Assembly
MSP-16	Drive Tunnel Road Plate (Std 3 foot Module)
MSP-17-X	Control Circuit (Specify Drawing Number)
MSP-18L/R	Tooth Module Road Plate, Specify LH or RH (Std 3 foot Module)
MSP-19	Control Relay, (2457-62)
MSP-20	Shunt Resistor, Wire Wd, 5 Watt, 220 Ohms
MSP-21	Reset Relay (2457-03)
MSP-21L/R	Drive Box Complete Assembly, Specify LH or RH
MSP-21FM	Drive Box Complete Assembly-Flush Mount-Specify LFM or RFM
MSP-22	Limit Switch Cam
MPS-23	Limit Switch Mounting Plate
MSP-24	Shaft Roll Pins, 3/8" x 1.5"
MSP-25	Module Attachment Bolt, 3/8-16 x .75" w/Washers
MSP-26	Top Plate Bolt, Flat Hd Socket 5/16-18 x .75"
MSP-27	Carriage Bolt/Washers/Nut, 5/16-18 x 1"
MSP-28	Gear Box, Winsmith 175 WT 60:1
MSP-29	Vee Belt, Dodge 4L240
MSP-30	Motor Sheave, A Belt 2" x 5/8"
MSP-31	Gear Box Sheave, A Belt 4" x 3/4"
MSP-32	Receptacle and Switch
MSP-33	Gaskets, Drive Box Covers

TERMS: NET 30 DAYS TO APPROVED ACCOUNTS
SHIPPING: F.O.B. VALENCIA, CALIFORNIA, USA
RETURNS: NO GOODS RETURNED EXCEPT ON WRITTEN APPROVAL

PARTS LIST - MTC31 MOTORIZED TRAFFIC CONTROLLER

Spare Parts SCHEDULE C-1

MSP-34	Strip Heater Element, 180 Watt @ 115/1/60 (2465-43)
MSP-35	Thermostat, Adjustable, 25 amp (2465-13)
MSP-36	Motor Drive Box Door
MSP-37	Motor Drive Box (Does Not Include Door)
MSP-38	Rod End Hardware - Bolt, Spacer, Washer & Nut
MSP-39	4" Diameter Gear Box Sheave with Crank Handle
MSP-40	Fire Marshal Access Door with Lock
MSP-41-12	12" Tunnel Shaft
MSP-41-18	18" Tunnel Shaft
MSP-41-24	24" Tunnel Shaft
MSP-41-35	36" Tunnel Shaft
MSP-42	Drive Box Cover Plate

Factory Options (Can Be Field Retrofitted)

MTC31-01	Additional Control Module (Std 3 foot) (Specify 01R or 01L)
MTC31-11	MTC/Gate Synchro Circuit (Internal Circuit)
MTC31-17	Additional Control Module, Flush Mount, 3 foot(Specify 17R or 17L)
MTC31-18	Tunnel, Surface Mount, 12 Inch Long
MTC31-19	Tunnel, Surface Mount, 18 Inch Long
MTC31-20	Tunnel, Surface Mount, 24 Inch Long
MTC31-21	Tunnel, Surface Mount, 36 Inch Long
MTC31-22	Tunnel, Flush Mount, 12 Inch Long
MTC31-23	Tunnel, Flush Mount, 18 Inch Long
MTC31-24	Tunnel, Flush Mount, 24 Inch Long
MTC31-25	Tunnel, Flush Mount, 36 Inch Long
MTC-26	Stop/Go Light Post, 24 Inch High Post With 6” Mounting Flange
MTC-27	Stop/Go Light Post, 36 Inch High Post With 6” Mounting Flange
MTC-28	Stop/Go Light Post, 48 Inch High Post With 6” Mounting Flange
MPL-10	Stop/Go Traffic Signal (8 Inch Lenses)
MPL-12	2 Button (Open/Close) Control Station
MPL-20	Stop/Go Light Back to Back Mounting Bracket
MPL-34	Back to Back Signal Mounting Bracket

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SHIPPING: F.O.B. VALENCIA, CALIFORNIA, USA
RETURNS: NO GOODS RETURNED EXCEPT ON WRITTEN APPROVAL