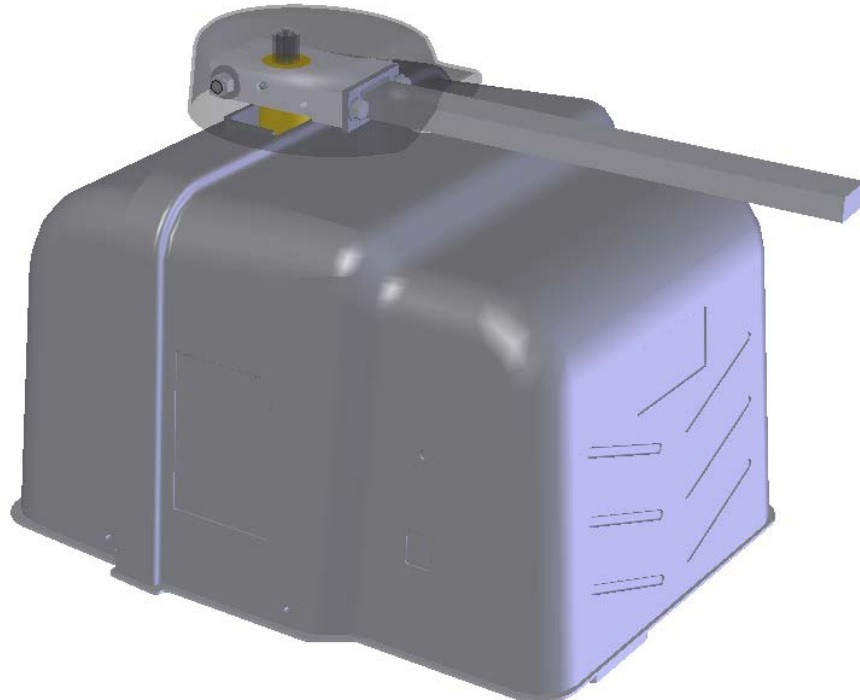


FSW 900

Swing Gate Operator



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IMPORTANT SAFETY INFORMATION

Important Safety Instructions

WARNING - TO REDUCE THE RISK OF SEVERE INJURY OR DEATH:

- READ AND FOLLOW ALL INSTRUCTIONS.
- Never let children operate or play with the gate controls. Keep remote controls away from children.
- Always keep people and objects away from the gate. **NO ONE SHOULD CROSS THE PATH OF A MOVING GATE.**
- Test the gate operator monthly. The gate **MUST** reverse on contact with a rigid object or when an object activates a non-contact sensor. If necessary, adjust the force or the limit of travel and then retest the gate operator. Failure to properly adjust and retest the gate operator can increase the risk of injury or death.
- Use the manual release mechanism only when the gate is not moving.
- **KEEP GATE PROPERLY MAINTAINED.** Have a qualified service person make repairs to gate hardware.
- The entrance is for vehicles only. Pedestrians must use a separate entrance.
- **SAVE THESE INSTRUCTIONS.**

Important Installation Instructions

1. Install the gate operator only when the following conditions have been met:
 - The operator is appropriate for the type and usage class of the gate.
 - All openings of a horizontal slide gate have been guarded or screened from the bottom of the gate to a minimum of 4 feet (1.25 m) above the ground to prevent a 2.25 inch (55 mm) diameter sphere from passing through openings anywhere in the gate or through that portion of the adjacent fence that the gate covers when in the open position.
 - All exposed pinch points are eliminated or guarded.
 - Guarding is supplied for exposed rollers.
2. The operator is intended for installation on gates used by vehicles only. Pedestrians must be provided with a separate access opening.
3. To reduce the risk of entrapment when opening and closing, the gate must be installed in a location that allows adequate clearance between the gate and adjacent structures. Swinging gates shall not open outward into public access areas.
4. Before installing the gate operator, ensure that the gate has been properly installed and that it swings freely in both directions. Do not over-tighten the operator clutch or pressure relief valve to compensate for a damaged gate.
5. User controls must be installed at least 6 feet (1.83 m) away from any moving part of the gate and located where the user is prevented from reaching over, under, around or through the gate to operate the controls. Controls located outdoors or those that are easily accessible shall have security features to prevent unauthorized use.
6. The Stop and/or Reset buttons must be located within line-of-sight of the gate. Activation of the reset control shall not cause the operator to start.
7. All warning signs and placards must be installed and easily seen within visible proximity of the gate. A minimum of one warning sign shall be installed on each side of the gate.

Important Installation Instructions (continued)

8. For gate operators that utilize a non-contact sensor (photo beam or the like):
 - See instructions on the placement of non-contact sensors for each type of application.
 - Exercise care to reduce the risk of nuisance tripping, such as when a vehicle trips the sensor while the gate is still moving.
 - Locate one or more non-contact sensors where the risk of entrapment or obstruction exists, such as at the reachable perimeter of a moving gate or barrier.
 - Use only FAAC "Photobeam" photoelectric eyes to comply with UL325.
9. For gate operators that utilize a contact sensor (edge sensor or similar):
 - Locate one or more contact sensors where the risk of entrapment or obstruction exists, such as at the leading edge, trailing edge, and post mounted both inside and outside of a vehicular horizontal slide gate
 - Locate one or more contact sensors at the bottom edge of a vehicular vertical lift gate.
 - Locate one or more contact sensors at the bottom edge of a vertical barrier (arm).
 - Locate one or more contact sensors at the pinch point of a vehicular vertical pivot gate.
 - Locate hard-wired contact sensors and wiring so that communication between sensor and gate operator is not subjected to mechanical damage.
 - Locate wireless contact sensors, such as those that transmit radio frequency (RF) signals, where the transmission of signals are not obstructed or impeded by building structures, natural landscaping or similar hindrances. Wireless contact sensors shall function under their intended end-use conditions.
 - Use only FAAC XS 55 edge sensors with with CN 60 E controller.



General Safety Precautions

Gate Construction

Vehicular gates should be constructed and installed in accordance with ASTM F2200: Standard Specification for Automated Vehicular Gate Construction.

For more information, contact ASTM at: www.astm.org

Installation

- If you have any questions or concerns regarding the safety of the gate operating system, do not install the operator and consult the manufacturer.
- The condition of the gate structure itself directly affects the reliability and safety of the gate operator.
- Only qualified personnel should install this equipment. Failure to meet this requirement could cause severe injury and/or death, for which the manufacturer cannot be held responsible.
- The installer must provide a main power switch that meets all applicable safety regulations.
- It is extremely unsafe to compensate for a damaged gate by increasing hydraulic pressure.
- Install devices such as reversing edges and photo beams to provide better protection for personal property and pedestrians. Install reversing devices that are appropriate to the gate design and application.
- Before applying electrical power, ensure that voltage requirements of the equipment correspond to the supply voltage. Refer to the label on your gate operator system.

Usage

- Use this equipment only in the capacity for which it was designed. Any use other than that stated should be considered improper and therefore dangerous.
- The manufacturer cannot be held responsible for damage caused by improper, erroneous or unreasonable use.
- If a gate system component malfunctions, disconnect the main power before attempting to repair it.
- Do not impede the movement of the gate, you may injure yourself or damage the gate system as a result.
- This equipment may reach high thermal temperatures during normal operation, therefore use caution when touching the external housing of the gate operator.
- Use the manual release mechanism according to the procedures presented in this manual.
- Before performing any cleaning or maintenance operations, disconnect power to the equipment.
- All cleaning, maintenance or repair work must be performed by qualified personnel.

UL325 Gate Operator Classifications

RESIDENTIAL VEHICULAR GATE OPERATOR CLASS I

A vehicular gate operator system intended for use in a single family dwelling, garage or associated parking area.

COMMERCIAL / GENERAL ACCESS VEHICULAR GATE OPERATOR CLASS II

A vehicular gate operator system intended for use in commercial locations or buildings such as multi-family housing units (five or more single family units), hotels, parking garages, retail stores or other buildings that service the general public.

INDUSTRIAL / LIMITED ACCESS VEHICULAR GATE OPERATOR CLASS III

A vehicular gate operator system intended for use in industrial locations or buildings such as factories, loading docks or other locations not intended to service the general public.

RESTRICTED ACCESS VEHICULAR GATE OPERATOR CLASS IV

A vehicular gate operator system intended for use in guarded industrial locations or buildings such as airport security areas or other restricted access locations that do not service the general public, and in which unauthorized access is prevented via supervision by security personnel.

Installing the Warning Signs

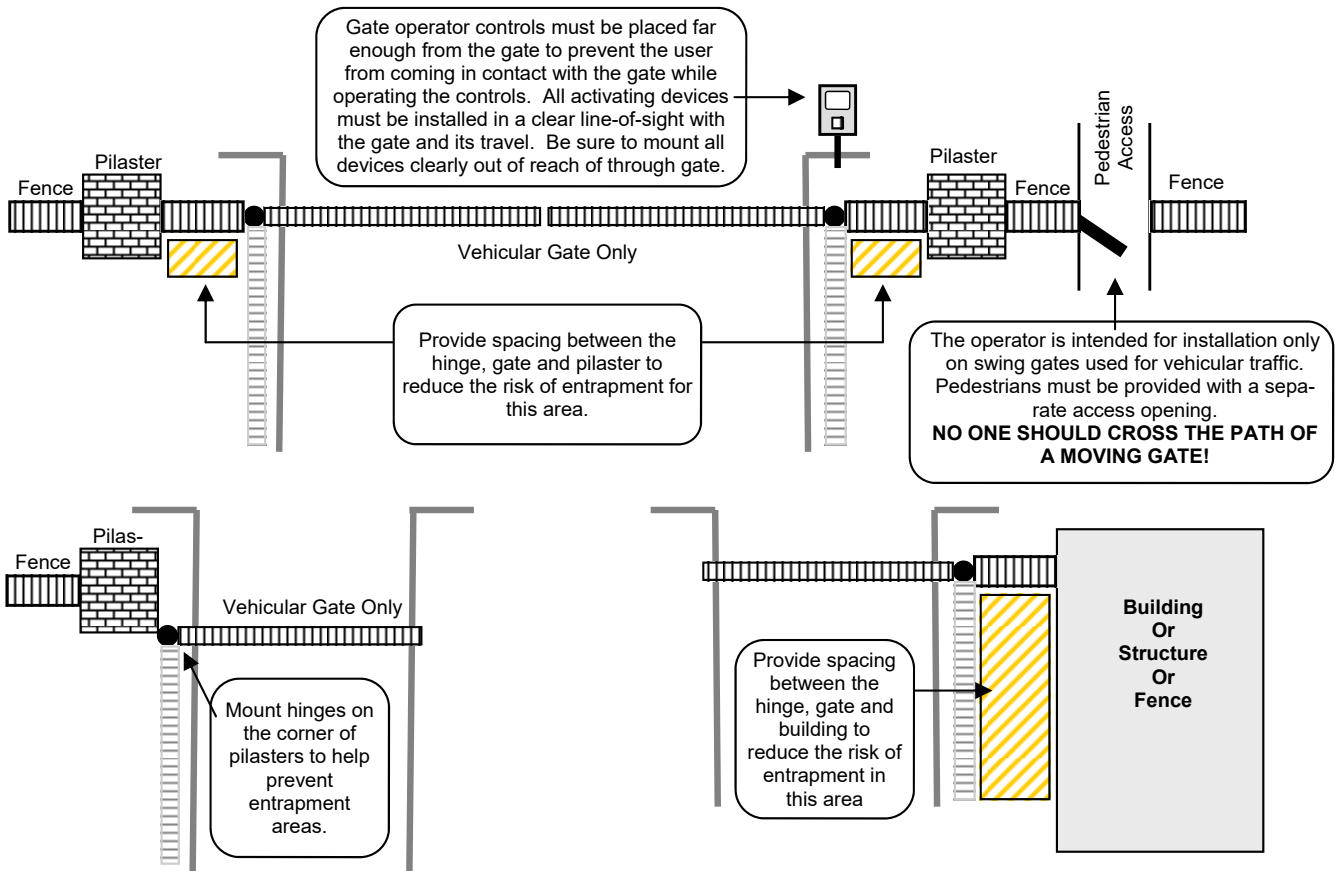
This FAAC gate operator is supplied with two warning signs to alert people that a possible hazard exists and that appropriate actions should be taken to avoid the hazard or to reduce exposure to it.

Permanently install one warning sign on each side of the gate so they are fully visible to traffic and pedestrians.

Use appropriate hardware such as metal screws (not supplied) to permanently install each warning sign.



Restrictions and Warnings



Precautions

<p>DO NOT allow children to play near, on or with the gate, gate operator, or any of its controls.</p>	<p>DO NOT allow pedestrian use of the vehicular gate. No one should cross the path of a moving gate!</p>	<p>DO NOT mount the gate operator to a gate longer than 40 feet. Maximum gate length = 40 feet.</p>
<p>DO NOT mount operating devices accessible through the gate or in between the gate and wall.</p>	<p>DO NOT mount the gate operator to a gate heavier than 1000 lbs. Maximum gate weight = 1000 lbs.</p>	<p>DO NOT mount the gate operator on uphill or downhill applications. Do not allow gate to free swing.</p>

Entrapment Protection

Internal Entrapment Prevention:

This vehicular gate operator is equipped with an inherent (Type A) entrapment sensing device. The system will sense an obstruction in both the open and close cycles, and will reverse the direction of the gate travel upon encountering an obstruction. If the system detects a second obstruction before reaching the full open or close limit after the initial reversal, a warning alarm will activate and the operator will require a reset before resuming normal operation. This is called a "Hard Shutdown". Please read and follow the "Shutdown Conditions" section of this manual for more directions.

External Entrapment Prevention:

Non-contact and/or contact sensors must be installed to provide external entrapment prevention in accordance with UL325 section 3.1. Use only UL325 compliant devices and low voltage (24V) devices. Carefully follow the installation manual for the UL325 device used for installation, usage, and maintenance.

Non-Contact Sensors (Photo Beams):

Non-contact sensors generally are photoelectric cells or like devices. For gate operators utilizing non-contact sensors: Refer to the diagram below for placement of non-contact sensors.

Use care to reduce the risk of nuisance tripping, such as when a vehicle trips the sensor while the gate is still moving.

One or more non-contact sensors shall be located where a risk of entrapment or obstruction exists, such as the perimeter reachable by a moving gate or barrier. Use caution when installing non-contact sensors since some devices only cover a select area. For example, a photo beam will not cover the full height of a gate/fence area. Refer to the diagram below.

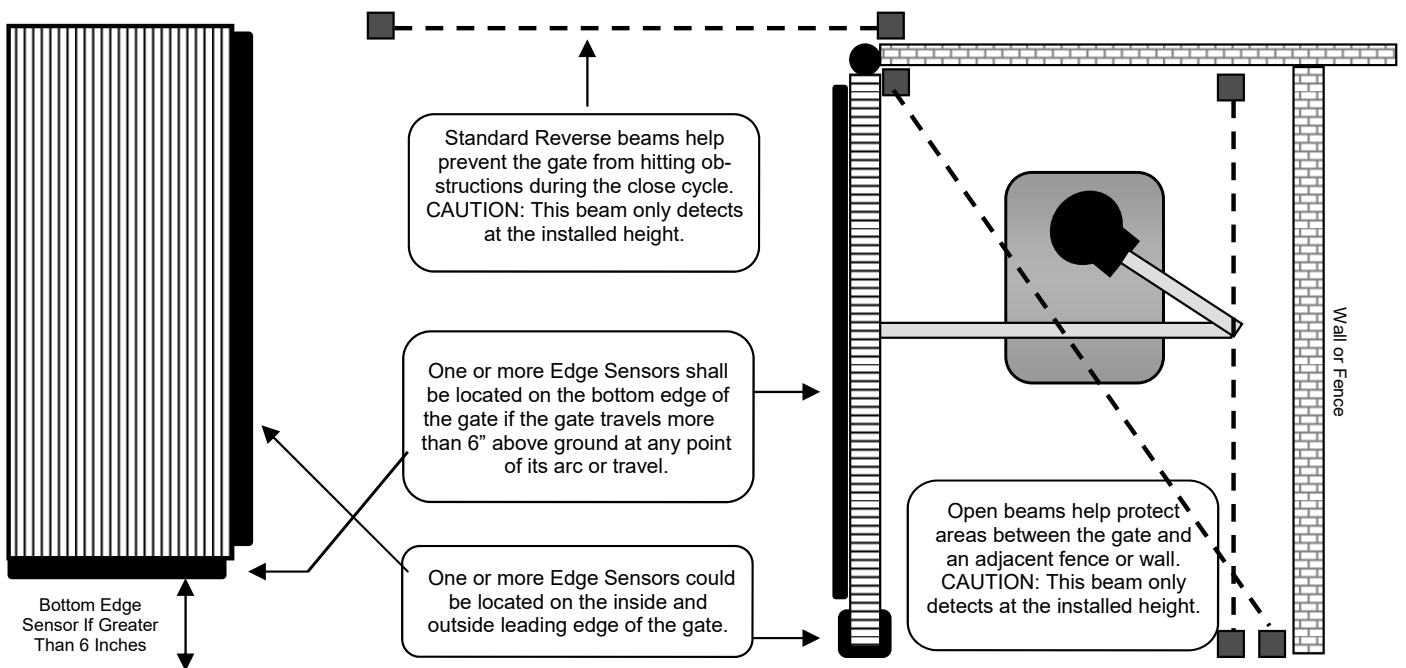
Contact Sensors (Edge Sensors):

Contact sensors generally are sensing edges or like devices. For gate operators utilizing contact sensors: Refer to the diagram below for placement of contact sensors.

One or more contact sensors shall be located where the risk of entrapment or obstruction exists, such the leading edge, trailing edge, and posts mounted inside and outside of the vehicular slide gate and motor.

Hardwired contact sensors shall be located and its wiring arranged so the communication between the sensor and the gate operator is not subject to any mechanical damage.

Wireless contact sensors such as ones that transmit radio frequency (RF) signals to the gate operator for entrapment prevention functions shall be located where the transmission of the signals are not obstructed or impeded by building structures, landscaping or similar obstructions. All wireless contact sensors shall function under the intended end-use conditions.

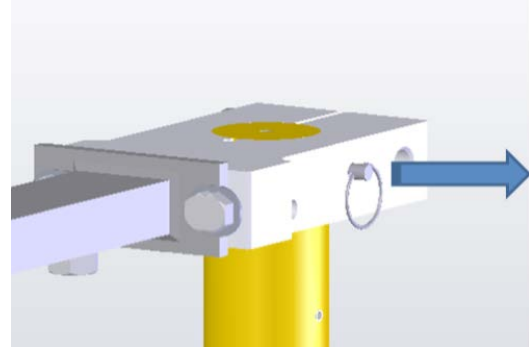
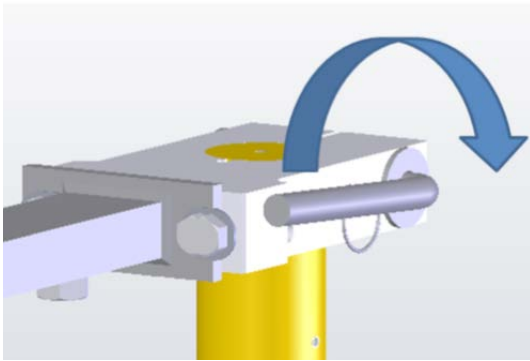


Manual Release

To manually release the gate operator:

TURN POWER OFF. Use the emergency release/shut off only when the gate is not moving. Make sure power for the gate operator is OFF by using the On/Off switch located inside the cover on the left side of the controller.

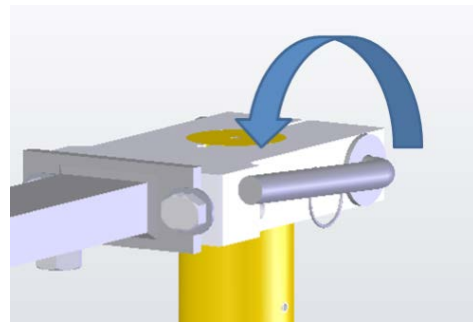
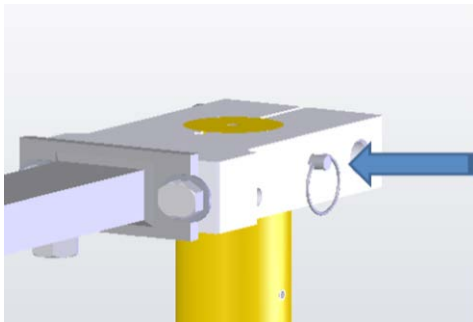
- Remove the top arm cap cover.
- Lift the Release Handle.
- Remove the Alignment Pin.
- Move the gate to the desired location



To reengage the gate operator:

Make sure power is OFF.

- Manually move the gate to align the arm with the output shaft and insert the Alignment Pin.
- Press the Release Handle down until tight. The release handle should be tightened so the arm connector does not slip on the output shaft during gate operation.
- Attach the top arm cap cover.
- Turn power on. Make sure the gate and all reversing devices are operating correctly.



Preinstallation Guidelines

Before starting any installation, consider the following guidelines:

- Install the gate system and gate in accordance with ASTM F220-02 Standard Specification for Automated Vehicular Gate Construction
- Install the gate system and gate in accordance with UL325 standards.
- Provide spacing between the gate and any structure such as a building, wall or fence to reduce the risk of entrapment in this area.
- Install over-travel stops at both ends of the gate rail or track to help prevent the gate from derailing
- Be sure the gate is properly installed and moves freely. Repair or replace worn or damaged gate hardware before installing the gate operator.
- Add safety devices such as warning signs, photo eyes, and reverse edges to help prevent injuries or death.
- Reduce all pinch points and protect all entrapment areas.
- If pedestrian traffic will be present, provide a separate pedestrian walk gate clear from the path of the automatic gate.
- Loops and loop detectors are required to help prevent the gate from closing on vehicles. Loops do not protect pedestrian traffic.
- Select the proper gate operator for the installation. Consider the usage, capacity, gate size, gate weight, and needed features and safety accessories.

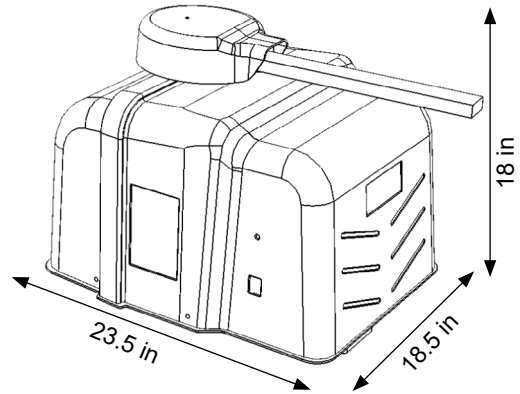
Model FSW 900 Swing Gate Operator

The FAAC Model FSW 900 is an electro-mechanical vehicular swing gate operator. The direct drive 24V motor allows for smooth start and stop operation, with easy to set limit switches. It has a built in battery backup system and 2 accessory power plugs. The standard articulated arm allows for an easy installation.

TECHNICAL SPECIFICATION

Gate Operator Specifications

Input voltage	120 VAC (+5% -5%)
Power	500 W
Current	5 A
Motor voltage	24 VDC
Motor power	0.67 hp (0.5 KW)
Leaf max weight	800 lb (363 Kg)
Leaf max length	18 ft (5.5 m)
AC accessory outlets	2 GFCI protected
AC accessory current	4 A
Gate speed	90° in approx 14 sec.
Gearbox	900:1 fail secure
Use frequency	75 cycles/h
Operating temperature	-4°F ÷ 131°F (-20°C ÷ +55°C)
Operator weight	125 lb (57 Kg)

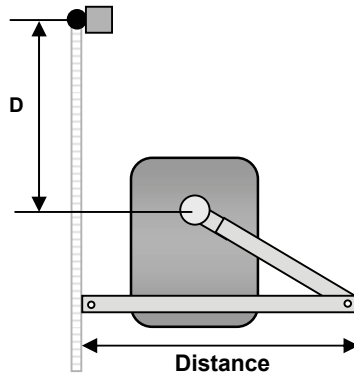
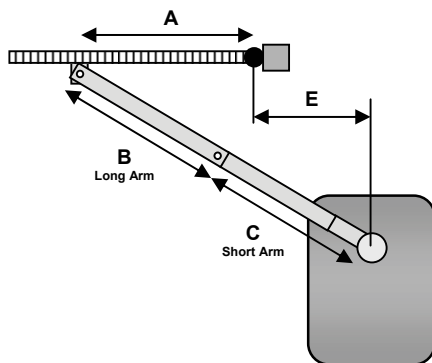


GATE OPERATOR INSTALLATION

Gate operator location:

Use the following steps to locate the standard position of the gate operator. The charts may be used for alternate locations.

1. D = 35" from hinge center straight back.
2. E = 11" from D to Operator Output Shaft.
3. DISTANCE = 45" from gate to wall.



A	B	C	D	E	Dist
46	35.5	29.5	35	11	45
46.75	35.5	33.5	42	11	37
46.75	37	31.5	40	11	41
47.25	37.25	30	37	11	45
47	35	29.5	32	11	45
42.5	33	26.5	28.5	11	41

Dimensions in inches

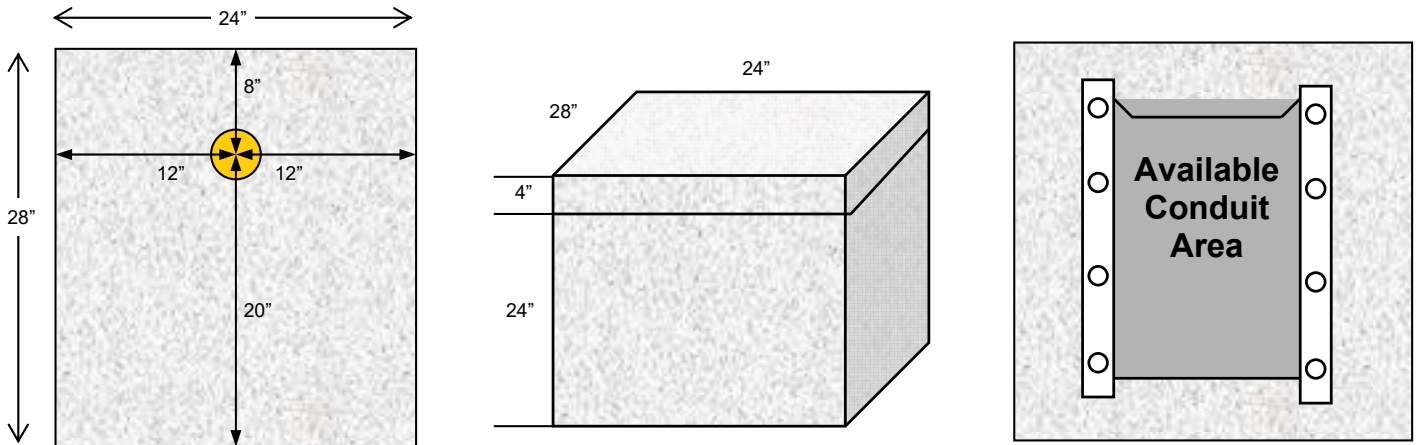
A	B	C	D	E	Dist
34.5	34.75	29.5	35	14	43
44	36.5	32.5	42	14	32
44	37	30.5	40	14	40
45	37	30.5	37	14	43
44.75	35.75	29.5	32	14	44
41	39	27.5	28.5	14	41

Dimensions in inches

Concrete Pad Size & Location:

The FSW900 vehicular gate operator is designed to be mounted on a concrete pad. Select a location for the gate operator to be installed. For pad location and size:

1. Determine the location for the operator to be installed. Determine the location of the output shaft as described above. Then determine the location of the concrete pad following the drawing below
2. Follow all local building codes to determine the required depth of the concrete pad. The average concrete pad should be 24" wide x 28" long x 24" deep. Extend the pad 4" above ground.
3. When the exact location of the operator can be predetermined, all conduits may be located in the concrete pad terminating directly under the operator. Extend each conduit a minimum of 1" above the level of the concrete pad. See the Conduit Location diagram below. It is suggested to install a minimum of four (4) conduits: (1) High Voltage Conduit, (1) Low Voltage Conduit, (1) Loop Lead Wire Conduit, (1) Accessory Conduit.
4. When the exact location of the operator can not be predetermined, bring all conduits up to one side and terminate in a Bell Box. Make connections to the operator using water-tight flex conduit.
5. Form the concrete pad and pour concrete. Allow the concrete to cure for 48 hours before removing forms and mounting the operator.
6. Do not place mounting bolts in the concrete while pouring. Bolts may drift in wet concrete making the operator location inaccurate.



Gate Operator Bolt Down:

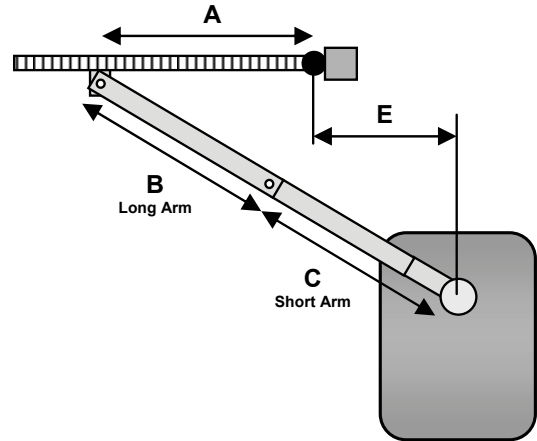
To align the operator to the gate and bolt it down:

1. Remove the gate operator cover and place the operator on the concrete pad. Position the operator as determined in "Gate Operator Location. Make sure the gate and operator are parallel and level with each other.
2. Mark the mounting holes and remove the operator. Drill the mounting holes to the required depth and diameter for the sleeve anchors being used. It is recommended to use 3/8" x 4" sleeve anchors. The use of sleeve anchors allows greater flexibility and makes the installation and alignment much easier.
3. Clean the mounting holes and install the sleeves. Position the operator over the anchors. Recheck to make sure the gate and operator are parallel and level with each other. Tighten the anchor bolts to securely hold the operator.

Measure and Weld The Gate Arm

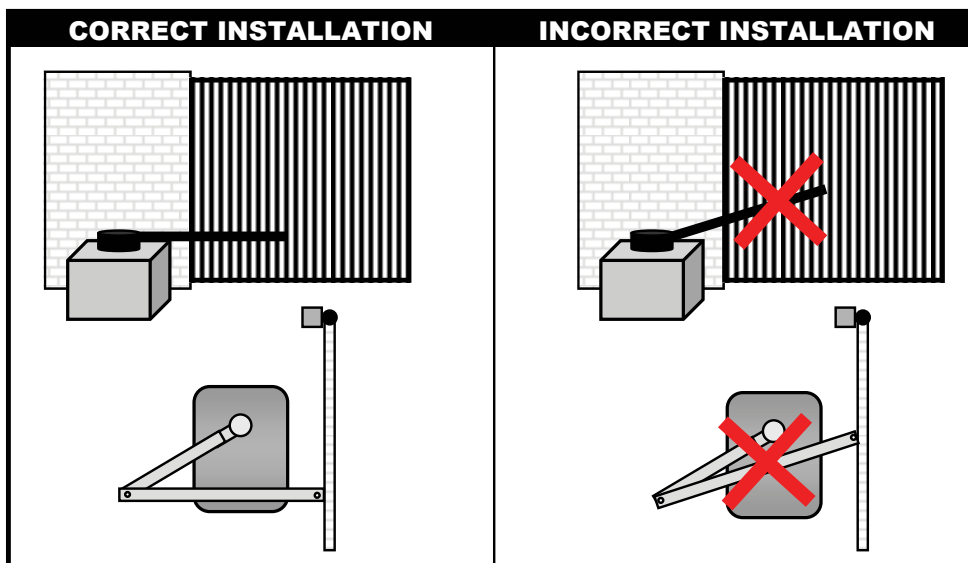
To determine the arm length in a standard location:

1. Make sure the Arm, Operator, and gate are level with each other.
2. A = Measure 46" from gate hinge out on gate.
3. B = Measure 35.5" for Long Arm length.
4. C = Measure 29.5" for Short Arm length.
5. Use the "Gate Operator Location Charts" for optional dimensions.
6. Mark all points and remove arm before welding.
7. With the arm disconnected, weld the arm, arm bars and brackets.



Connecting the Gate Arm

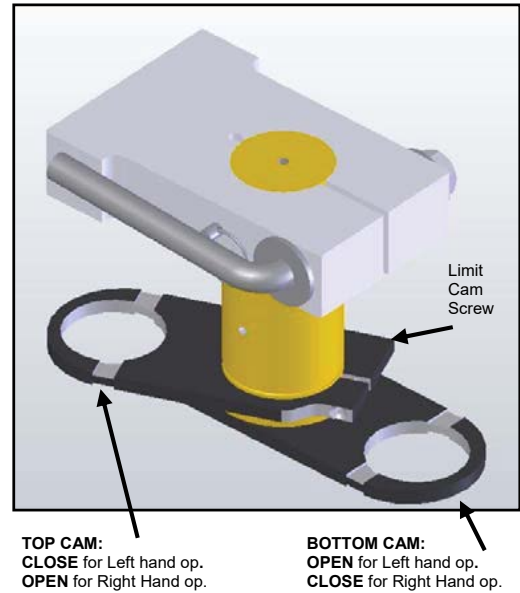
1. Make sure the power switch is OFF before connecting the arm assembly.
2. Place the Arm Connector over Output Shaft.
3. Manually move the gate to align the arm with the Output Shaft and insert the Alignment Pin.
4. Move the Release Handle down to tighten. The release handle should be tightened so the arm connector does not slip on the output shaft during gate operation.
5. The Release Handle Nut Plate may be removed to adjust the Release Handle position if needed. Reconnect the plate when adjusted.
6. Attach the top Arm Cap Cover.



Limit Switch Setup

The gate operator uses a limit switch assembly to adjust the distance of travel. These adjustments should be made before power is supplied to the operator. To adjust the distance of travel using the limits:

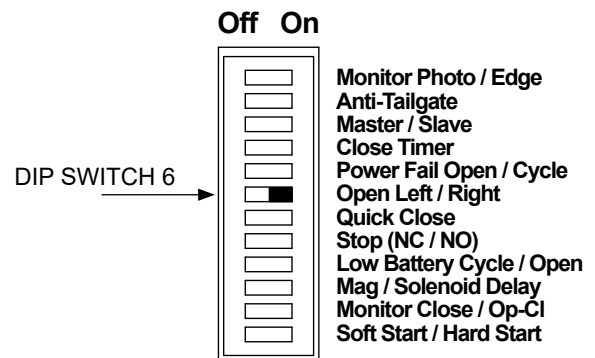
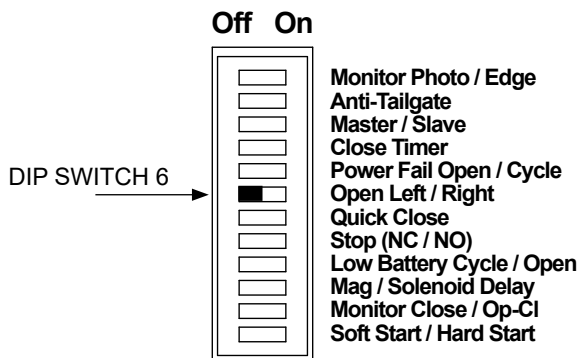
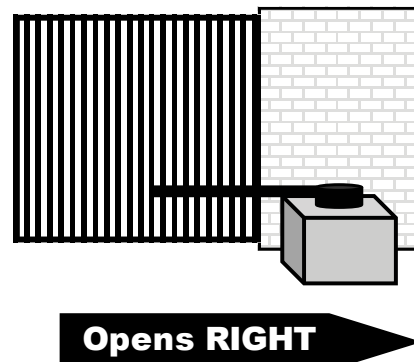
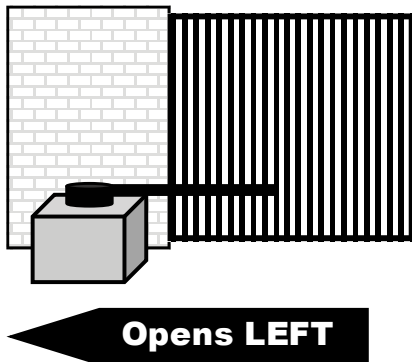
1. Turn power OFF! Use the power switch on the side to assure AC and Battery power are both OFF.
2. Manually move the gate fully to the right. Push the limit guide plate down and roll the top limit nut until it activates the top limit switch. The switch will click when activated.
3. Manually move the gate to the left. Push the limit guide plate down and roll the bottom limit nut until it activates the bottom limit switch. The switch will click when activated.
4. Release the limit guide plate and make sure it is engaged in the slots of each limit nut.
5. Readjust the limit nuts as necessary to fine tune the full-open and full-closed positions.



Gate Operator Direction

The gate operator uses a DIP switch setting to determine the open and close direction. To set the Open/Close direction:

1. Turn power OFF! Use the power switch on the side to assure AC and Battery power are both OFF.
2. Standing inside the gate looking at the gate operator, determine if the gate opens to the LEFT or RIGHT.
3. If the gate opens to the LEFT, move DIP SWITCH 6 to the Left.
4. If the gate opens to the RIGHT, move DIP SWITCH 6 to the Right.



ELECTRICAL INSTALLATION

Power Switch Location

The gate operator uses a built-in power switch to control power to the operator and controller. This switch should be turned OFF during installation and service. Failure to use this switch can result in unexpected gate movement. Please note:

1. The switch is located on the LEFT side of the control box.
2. DOWN position = OFF. UP position = ON.
3. This switch must be used to turn OFF AC and battery power. Only disconnecting AC power still allows battery power to the operator, controller, and accessories.
4. Turn OFF until the installation is complete.

AC Power Guidelines

Under normal conditions, the gate operator will use a single phase AC power line to operate the gate, charge the batteries, and power gate accessories. Use the following guidelines when installing the AC power:

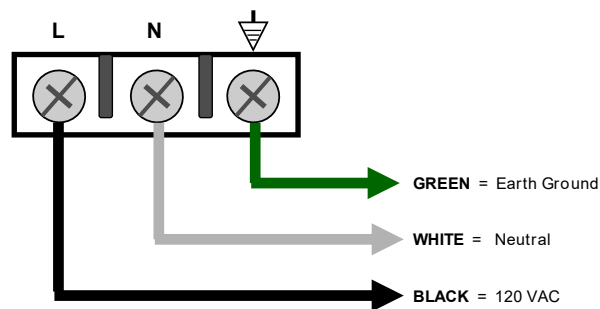
1. Check the local wiring codes in all cases and follow all local building codes. Wiring and hookup should be performed by a qualified electrician/installer only.
2. AC power should be supplied from a circuit breaker panel and must have its own dedicated circuit breaker. This supply must include a green ground conductor.
3. Only use UL approved 14 AWG or larger 600 Volt Insulated Wire. Use the following chart to determine the AC wire size. This information is for suggested use only - Check your local codes before installation.
4. Properly ground the gate operator to minimize or prevent damage from power surges and/or lightning. Use a grounding rod if necessary. A surge suppresser is recommended for additional protection.

Wire Size (AWG)	Distance (feet)
14	250
12	400
10	650
8	1000

AC Power Connection

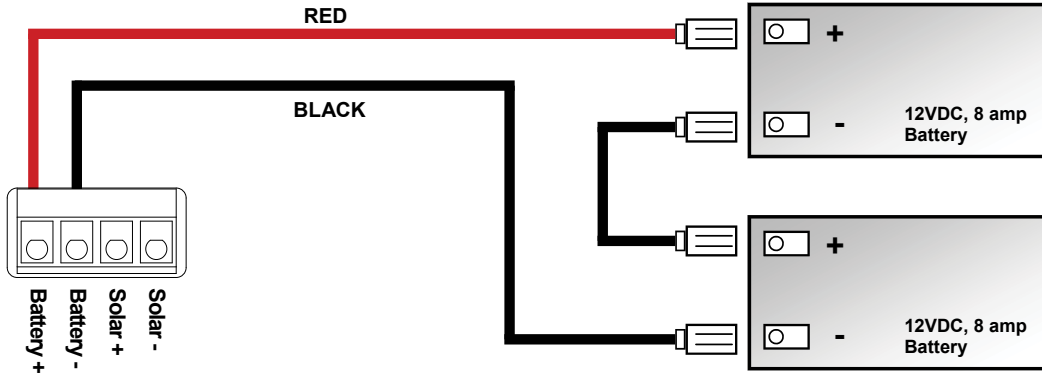
To connect AC power to the gate operator:

1. Turn the circuit breaker for the AC gate operator power OFF before connecting the AC input wires.
2. Turn the Power Switch OFF located on the left side of the controller before connecting the AC input wires.
3. Connect the AC input wires to the AC terminal located on the bottom/center of the control box. See diagram below.
4. Batteries must be installed after the AC power is on. See Battery Power Connection.



Battery Power Connection

If AC power is connected, the system does not need the batteries to function. However, the batteries must be connected for the Power Fail Battery Backup features to operate. When AC power is active, the batteries will charge until fully charged. Once the batteries have fully charged, the system will stop charging. Charging is automatic when AC power is available. The system should be prewired with the batteries. If not, to connect batteries to the system as showed below.



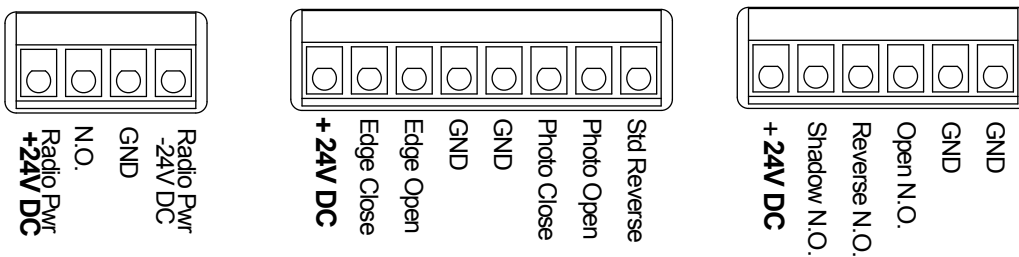
NOTE: The batteries should be tested regularly for proper battery backup operation. They should be replaced each year or as needed.

Accessory Power

Two plug-in power plugs are located on the back of the controller. These plugs are for low voltage accessories and are separately fused. Low voltage, low current draw transformers may be plugged into these outlets for accessory power. **DO NOT USE THESE POWER OUTLETS FOR INSTALLATION OR SERVICE TOOLS.** Each plug supplies 110 VAC when AC power is active to the gate operator. If AC is not available, the power plugs will not supply power. Accessories requiring power during battery backup modes should use the 24 VDC located on the controller terminals.



Additional accessory power may be found on the controller terminals. The controller terminals supply 24 VDC for accessories. This power is available during AC and battery power modes. When AC power is active, accessories will be supplied 24 VDC without a power draw on the batteries. When the battery backup mode is active, accessories will be supplied 24 VDC from the batteries. If the battery power mode is used frequently, consider the current draw of the accessories. The lower the current draw, the longer the battery power supply will last. Additional 24 VDC for accessories may be found on the Radio Terminal, Edge/Photo Terminal, and External Loop Terminal. A connection between 24V DC+ and GND will supply power.

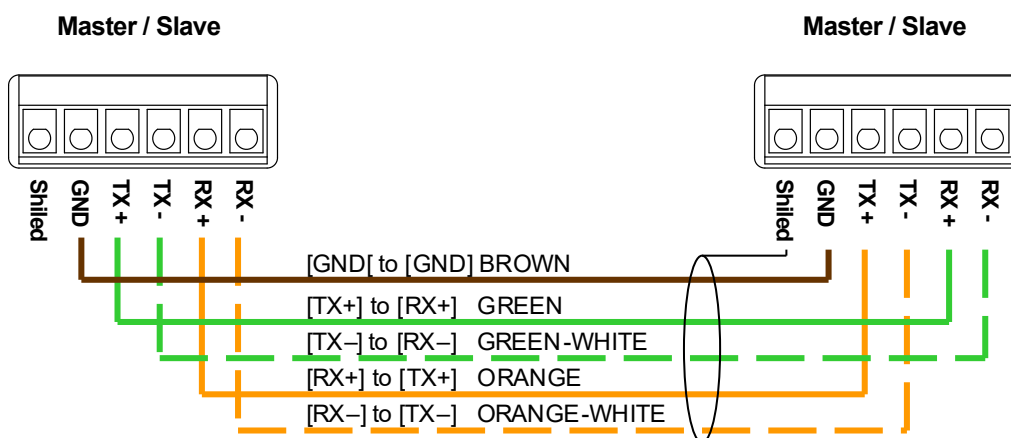


Master/Slave Connection

The operator can be used in a Master-Slave configuration to control the two leafs of a bi-parting gate. That can be done with a wired or wireless connection. The wired connection should be the default choice if there is a way to bring a cable across the gate opening. If that's impractical you can use the wireless connection accessory WMS100 to establish the communication between Master and Slave. In the latter case you need to make sure there is no metal blocking the line of sight between the two operators, for example a metal gate with no openings.

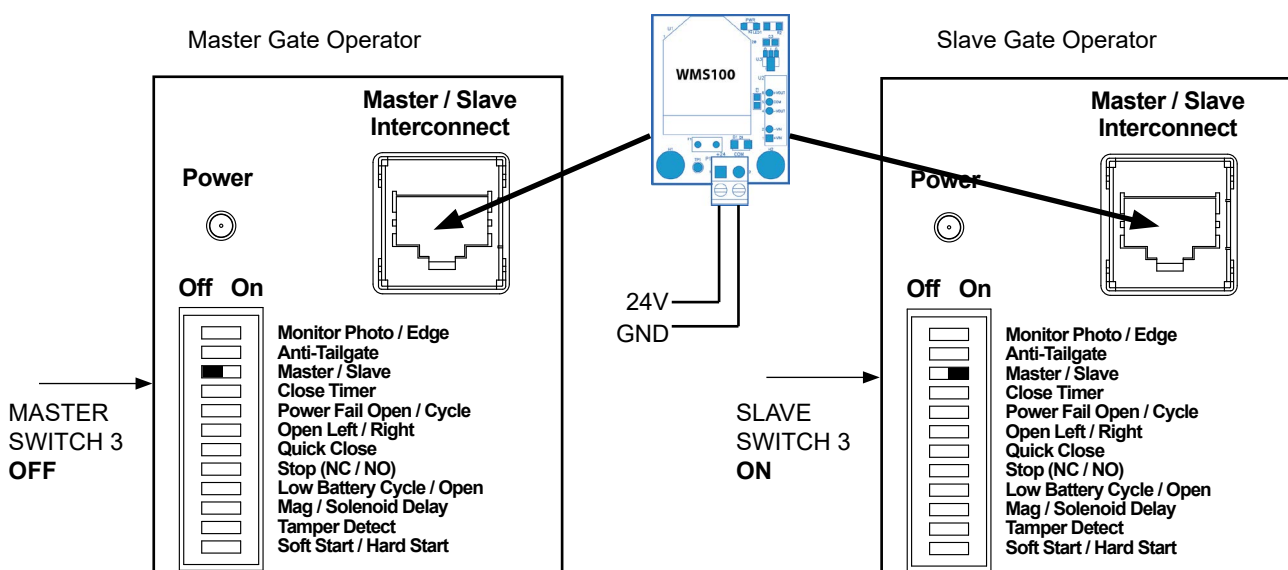
To connect two operators together:

1. Determine which operator is the Master and which operator is the slave. **All external devices such as loop detectors and safety devices must be wired directly to the Master unit.** If one gate travels farther than the other the gate that travels farther must be the Master
2. Turn Slave Operator DIP Switch 3 to ON = SLAVE
3. Turn Master Operator DIP Switch 3 to OFF = MASTER
4. **WIRED CONNECTION:** in a separate conduit, run a 6-conductor cable (twisted pairs) between the Master operator and the Slave operator. Make the connections on the Master/Slave Terminal Block following the schematic below. (Recommended Wire: Outdoor Rated CAT 5 Cable. If shielded make sure the shield is connected on one side only)



ALTERNATIVE:

4. **WIRELESS CONNECTION:** Plug one WMS100 board on the RJ45 connector on the top left of the Master control board and one on the Slave. Wire the 24V power to it from one of the accessory terminal blocks.



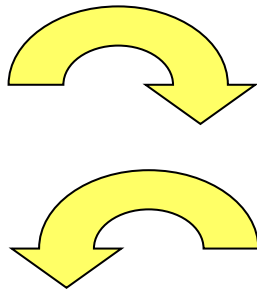
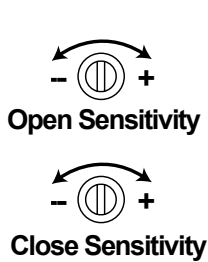
5. Power up the operators and verify that the SLAVE LEDs are blinking

GATE OPERATOR ADJUSTMENTS

Reverse Sensitivity Adjustment

The gate operator is equipped with an inherent (Type A) entrapment sensing system. The sensor detects obstructions in both the open and close path of the gate. There is an OPEN SENSITIVITY Adjustment and a CLOSE SENSITIVITY Adjustment. To adjust the sensitivity:

1. Activate the gate to open.
2. While the gate is running open, slowly rotate the OPEN SENSITIVITY adjustment clockwise to INCREASE the sensitivity until the gate stops in mid-travel.
3. Gently rotate the OPEN SENSITIVITY adjustment counter-clockwise 1/8 turn to DECREASE the sensitivity.
4. Activate the gate to close.
5. While the gate is running closed, slowly rotate the CLOSE SENSITIVITY adjustment clockwise to INCREASE the sensitivity until the gate stops in mid-travel.
6. Gently rotate the CLOSE SENSITIVITY adjustment counter-clockwise 1/8 turn to DECREASE the sensitivity.
7. Operate the gate a few times to be sure it fully cycles without stopping.
8. Place an immobile object in the open path of the gate to stop the gate while in travel. The gate should stop and enter a Soft Shutdown upon striking the object.
9. Place an immobile object in the closed path of the gate to stop the gate while in travel. The gate should stop and enter a Soft Shutdown upon striking the object.
10. Repeat steps 2 - 6 until the correct sensitivity adjustment is found.



Clockwise Turn
INCREASE Sensitivity
(Reverse the gate more easily)

Counter-Clockwise Turn
DECREASE Sensitivity
(Reverse the gate less easily)

CAUTION:
Gently rotate each adjustment. Turning the adjustment POT too hard will break the adjustment.



For the Reverse Sensor to function correctly, the gate must be properly installed and work freely in both directions. Repair or replace worn hardware. DO NOT use sensitivity to compensate for a gate in need of service.

Reverse Sensitivity Shutdown

Upon a first obstruction, the reverse sensor will:

1. Stop the gate and reverse it approximately two (2) inches.
2. Disable the Timer To Close Feature until the gate operator receives a new command = Soft Shutdown.
3. Any standard input can reactivate the gate and return it to normal operation.

Upon a second consecutive obstruction before the gate reaches either limit, the reverse sensor will:

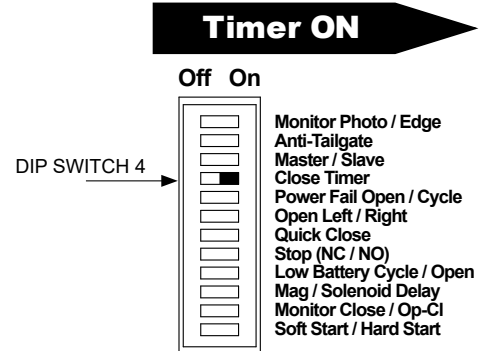
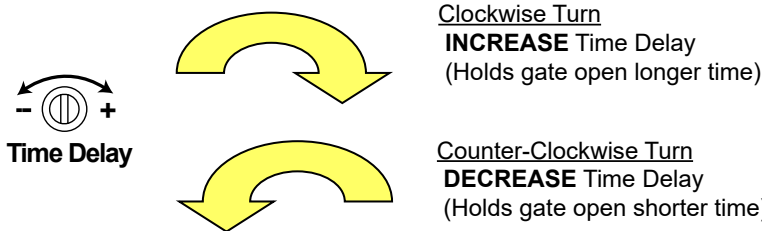
1. Stop the gate.
2. Disable the gate operator = Hard Shut Down.
3. Sound the audio alarm for five (5) minutes or until the operator has been reset.
4. Only resetting the operator will reactivate the gate and return it to normal operation.
5. To reset the operator in a Hard Shut Down situation: Press the Reset button on the left side of the controller, activate the Reset input or turn the power switch OFF and back ON.
6. Verify proper operation of gate and components

Close Time Delay Adjustment

The gate operator is equipped with a built-in automatic timer to close feature. This feature should be set to the OFF position until proper safety and reverse devices have been installed. **CAUTION:** Turning on the Close Time Delay without proper safety and reverse devices can cause serious injury, death, and property damage. The Close Time Delay can be set to from 1 to 90 seconds. When active, the Close Time Delay will hold the gate open until the internal timer has timed out and then allows the gate to close.

To turn OFF/ON and adjust the Close Time Delay:

1. To turn OFF the Close Time Delay, move DIP SWITCH 4 to the Left.
2. To turn ON the Close Time Delay, move DIP SWITCH 4 to the Right.
3. Turn power Off and back On to reset DIP Switch settings.
4. Rotate the TIME DELAY adjustment clockwise to INCREASE the delay.
5. Rotate the TIME DELAY adjustment counter-clockwise to DECREASE the delay.



CAUTION: Gently rotate each adjustment. Turning the adjustment POT too hard will break the adjustment.

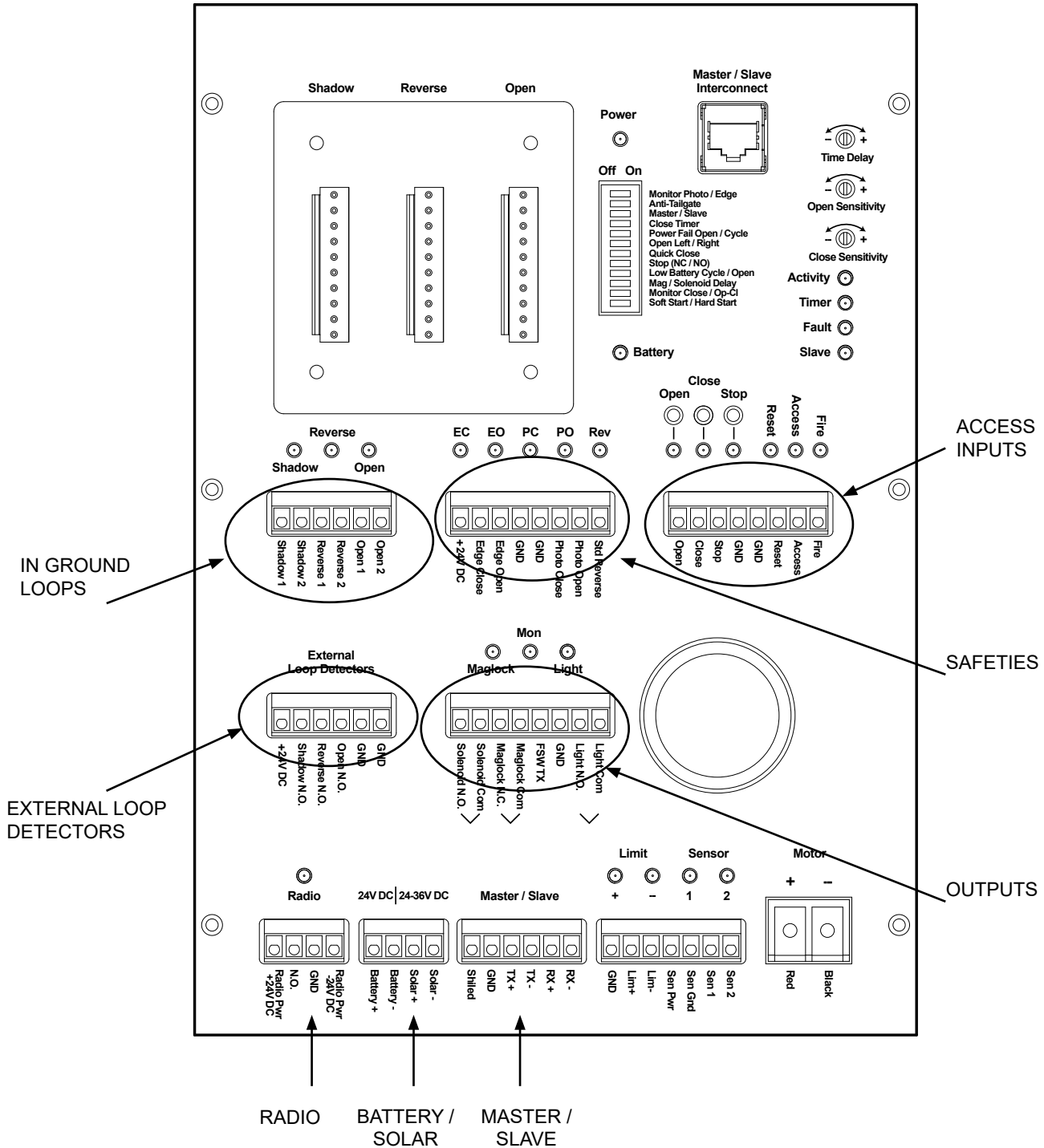
DIP Switch Settings

The DIP Switches located on the top right face of the controller are used to set several different functions. This list gives a brief description. Please review each individual section in this manual for more detail.

Switch	Function	Description
1	Monitor Photo / Edge	OFF: The Photo safety inputs are monitored ON: The Edge safety inputs are monitored
2	Anti-Tailgate	OFF: Gate opens and closes normally. Reverse loop reverses the gate all the way ON: Uses loops to control vehicles individually. Reverse loop stops the gate
3	Master / Slave	OFF: Operator is set as a Master ON: Operator is set as a Slave
4	Close Timer	OFF: Time Delay Close feature is inactive. Command to open, command to close. ON: Time Delay Close feature is active. Gate opens, times out, closes.
5	Power Fail Cycle / Open	OFF: During power failure, gate will cycle using BBU until batteries are too low to function. ON: During power failure, gate will open and remain open until AC power is restored.
6	Open Left / Right	OFF: Opens the gate Left. (Standing inside looking out at operator) ON: Opens the gate Right. (Standing inside looking out at operator)
7	Quick Close	OFF: Gate opens and closes normal ON: Gate opens until loops reverse and shadow loops are cleared. Then gate closes even if it did not reach full open position
8	Stop (NO / NC)	OFF: Allows a NO Stop Switch to be used. ON: Allows a NC Stop Switch to be used. Stop Switch must be installed for this setting to be ON
9	Battery Cycle	OFF: Cycles gate until batteries are too low and stops. Switch 5 must be OFF ON: Cycles gate until batteries are too low and then opens gate. Switch 5 must be OFF
10	Mag / Solenoid Delay	OFF: No delay - opens gate immediately ON: Delays 2 seconds before activating gate. Allows time for Maglock to discharge
11	Monitor Close / Op-CI	OFF: The Close safety inputs only are monitored ON: The Close and Open safety inputs are monitored
12	Hard Start	OFF: Normal Soft Start, Soft Stop mode. ON: Operator starts with 40% motor power for more starting torque. Normal start = 5% motor power

ACCESSORY CONNECTIONS

Overview



Photocell sensor connections

To comply with the UL325 standard monitored safety inputs must be used to protect every entrapment zone. An entrapment zone is defined as a location or point of contact where a person can be entrapped between the moving gate and a rigid object. The operator has inputs for entrapment protection photo sensors in the opening and closing direction. These sensors can be monitored for their presence and correct operation at the beginning of each cycle.

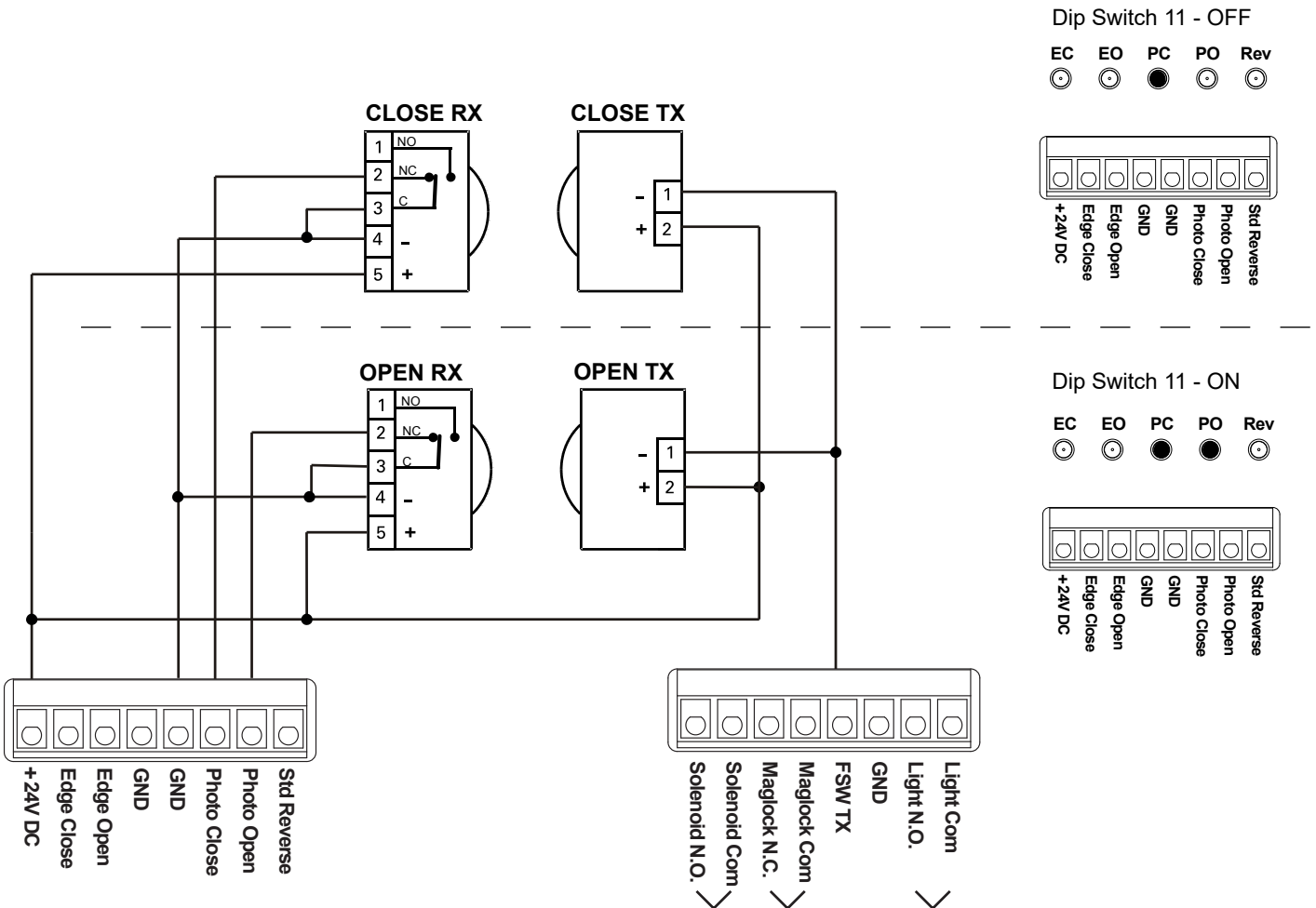
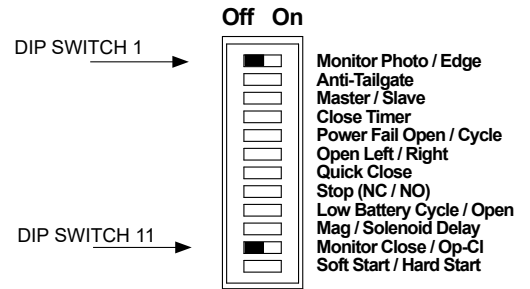
To enable monitoring of the Photocell inputs set Dip Switch 1 OFF. To monitor only the Close input Set Dip Switch 11 OFF, to monitor both Close and Open inputs set Dip Switch 11 ON. When an input is monitored the corresponding photocell must be connected otherwise the operator will not start. To verify the input is wired properly the corresponding LED must be lit, see figure below.

Photo Close safety input: **The Input is only active during close cycle.**

1. An input during the close cycle will stop the gate and reverse it to the full open position. If the Close Timer option is ON it will be restarted when the input clears.
2. If the Open safety input is active before reaching the full open position, the gate will stop. When the input is cleared, the gate will continue to reverse open.

Photo Open safety input: **The Input is only active during open cycle.**

1. An input during open cycle will stop the gate and initiate a short reverse
2. The gate will remain stopped until the input is cleared.
3. When the input is cleared, the gate will continue to open.



NOTE: Dip Switch 1 and 11 change affected inputs to Normally Closed. If there is a fault on the monitored sensor the corresponding LED will not be lit, or it will not blink at the beginning of each cycle.

Edge sensor connections

To comply with UL regulations monitored safety inputs must be used to protect every entrapment zone. An entrapment zone is defined as a location or point of contact where a person can be entrapped between the moving gate and a rigid object. The operator has inputs for entrapment protection edge sensors in the opening and closing direction. Use FAAC CN 60 E edge sensor controller and the schematic below for proper monitoring. The sensors can be monitored for their presence and correct operation at the beginning of each cycle.

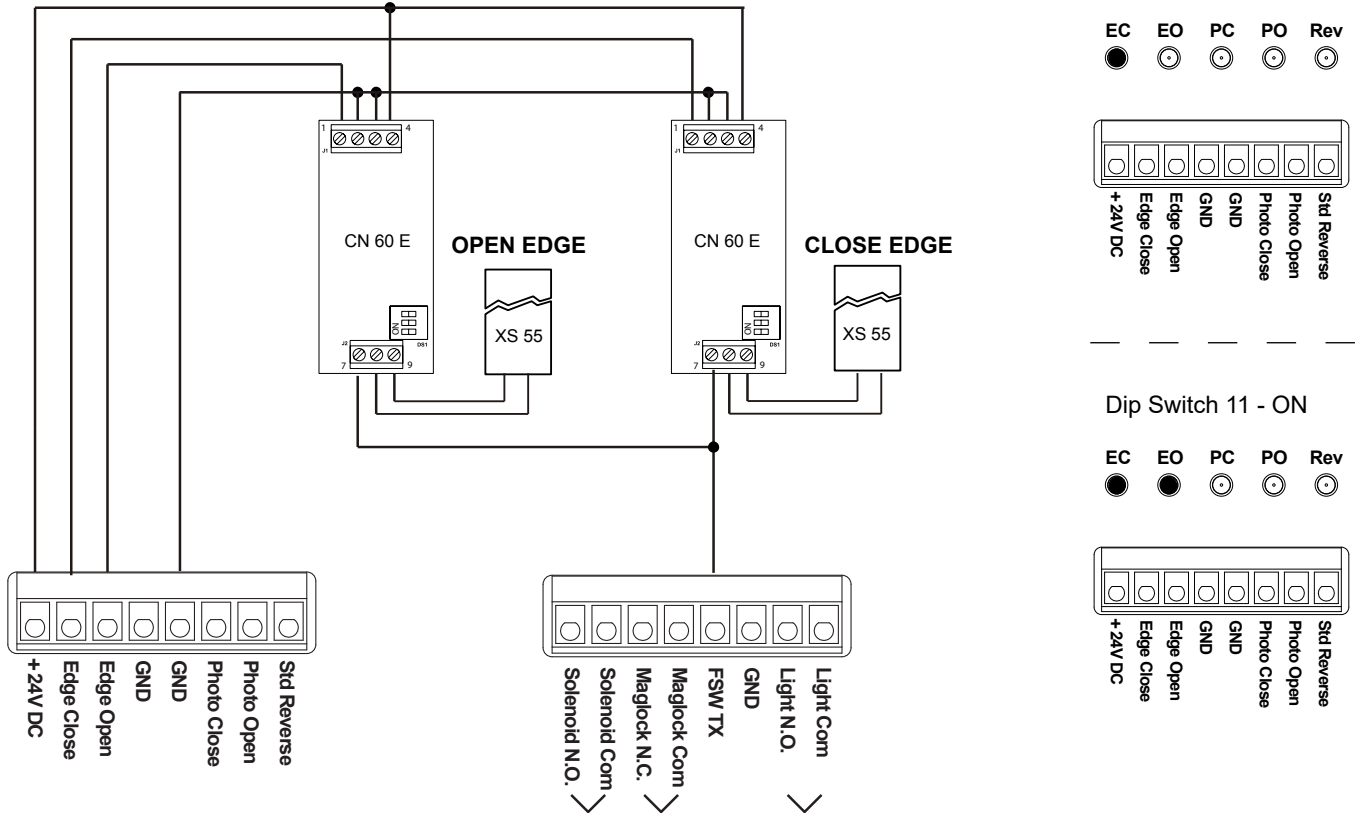
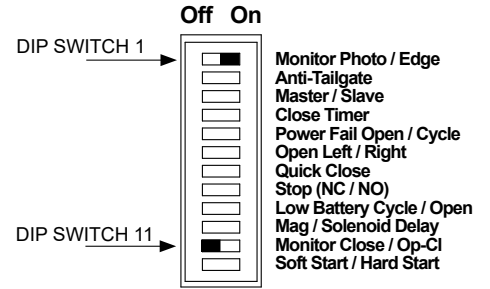
To enable monitoring of the the Edge inputs set Dip Switch 1 ON. To monitor only the Close input Set Dip Switch 11 OFF, to monitor both Close and Open input Set Dip Switch 11 ON. When an input is monitored the corresponding edge controller must be connected otherwise the operator will not start. To verify that the input is wired properly the corresponding LED must be lit, see figure below.

Edge Close safety input: **Input is only active during close cycle.**

1. An input during the close cycle will stop the gate and initiate a short reverse
2. When the edge close input is cleared the gate will remain in a stopped position until a renewed intended activation input is received (open, close, fire, access, radio). If the close timer option is ON it will be disabled until a full cycle completes.

Edge Open safety Input: **Input is only active during open cycle.**

1. An input during open cycle will stop the gate and initiate a short reverse
2. When the edge open input is cleared the gate will remain in a stopped position until a renewed intended activation input is received (open, close, fire, access, radio).



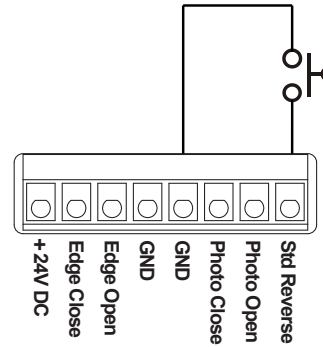
NOTE: Dip Switch 1 and 11 change affected inputs to Normally Closed. If there is a fault on the monitored sensor the corresponding LED will not be lit, or it will not blink at the beginning of each cycle.

Standard Reverse Connection

The Standard Reverse Terminal can be used to re-open a closing gate. This N.O. input behaves the same as a Reverse Loop. This connection should not be used for Safety Reverse Devices. Use Edge and Photo inputs for proper Safety connections.

Standard Reverse Input:

1. The input is inactive when gate is closed or in the open cycle
2. When the gate is open and Time Delay Close is ON, an input will reset the Time Delay Close
3. When the gate is open and Time Delay Close is OFF, an input will prevent the gate from closing
4. When gate is closing, an input will reverse the gate movement

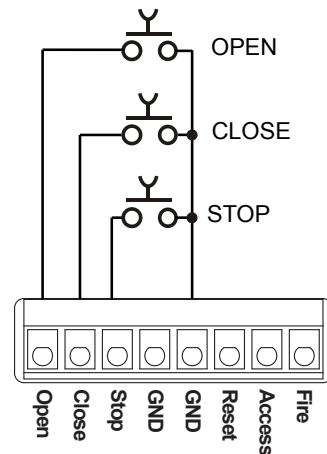


Open, Close, Stop Connections

The Open, Close, Stop Terminals are used to control the gate movement. The controller also has built-in button controls above each terminal for setup and testing.

Open, Close, Stop Input:

1. OPEN: An input to this N.O. terminal will start the gate in the opening direction
2. CLOSE: An input to this N.O. terminal will start the gate in the closing direction
3. STOP: An input to this N.O. terminal will stop the gate. If Dip Switch 8 is ON this input will be N.C.

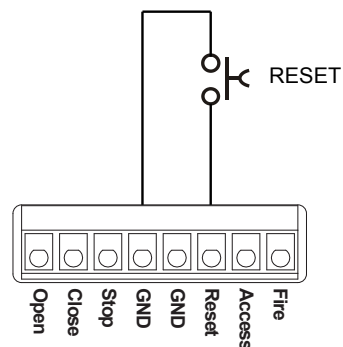


External Reset Connection

An external Reset Button may be connected to the Reset Terminal and used to reset the operator during Hard Shutdown situations. During a Hard Shutdown, the operator can only be reset through the reset input or reset button on the left side of the controller. The Reset Input can also be used during installation to reset the operator settings.

Reset Input:

1. Allows external input to reset gate operator during a Hard Shutdown.
2. Allows external input to reset operator settings during installation.



Access Control Connection

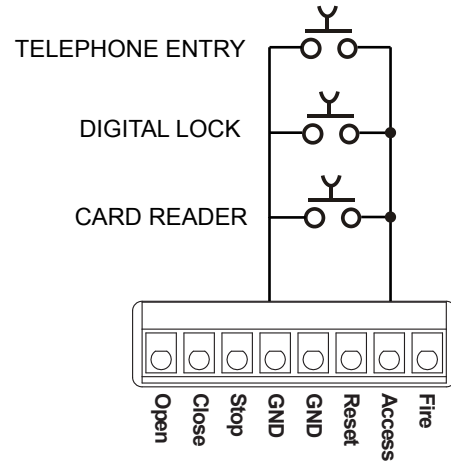
Access Control Devices such as Telephone Entry Systems, Digital Locks and Card Readers may be connected to the Access Input to control the gate operator. When an Access Device is active, the Access LED will light.

Access Input:

Allows external Access Control Devices to activate the gate.

1. If Close Time Delay is ON, the gate will open and remain open until the access device relay is released. Then the gate will time out and close.
2. If Close Time Delay is OFF and the gate is in closed or open position, the gate will travel in the opposite direction.
3. If Close Time Delay is OFF and the gate is in mid cycle, the gate will stop. The direction will not be changed until another valid input is made.

NOTE: Only connect devices that are in line of sight to this input. If the access device is not in line of sight, connect it to the radio input.



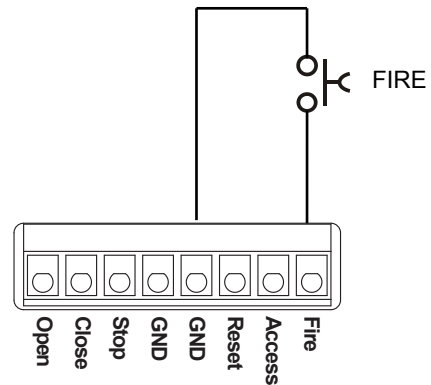
Fire Lock Connection

Fire Lock Controls such as Knox Locks and Fire Boxes may be connected to the Fire Input to control the gate operator. When a Fire Lock Control is active, the Fire LED will light.

Fire Input:

Allows Fire Lock Controls to activate the gate.

1. If Close Time Delay is ON, gate will open and remain open until the fire control relay is released. Then the gate will time out and close.
2. If Close Time Delay is OFF and the gate is in closed position, gate will open and remain open until an external input of any sort closes the gate.
3. If Close Time Delay is OFF and gate is in open position, gate will remain open until an external input is made. This prevents the Fire Input from closing the gate if in the open position.



NOTE: Consult your local Fire Department for proper building codes and Fire Lock requirements.

Radio Receiver Connections

Radio Controls may be connected to the Radio Inputs to control the gate operator. When a Radio Control is active, the Radio LED will light.

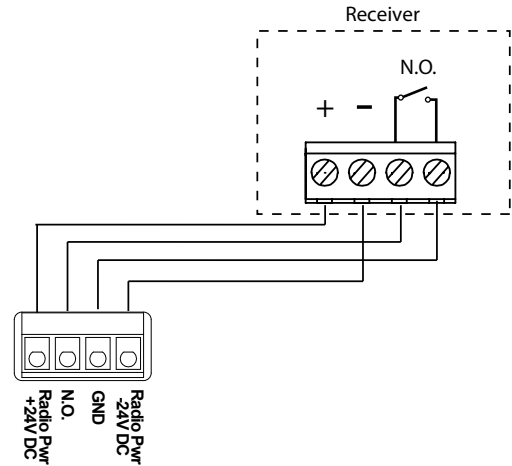
Radio Input:

Allows Radio Controls to activate the gate and provides 24VDC

Connecting Generic Radio Receivers:

Connect Radio Relay to RADIO N.O. and RADIO COMMON.

If the Radio Receiver uses 24VDC, connect Radio Power to RADIO PWR +24VDC and RADIO PWR -24VDC.



MagLock & Solenoid Lock Connections

Magnetic and Solenoid Locks may be connected to the controller and utilize a 2 second delay on open to help dissipate magnetic current or solenoid power for smoother openings.

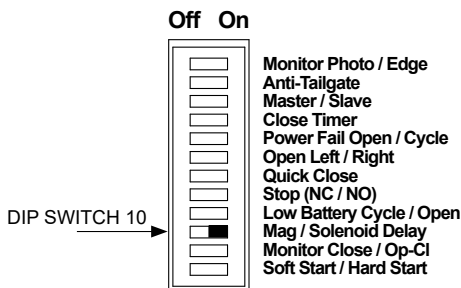
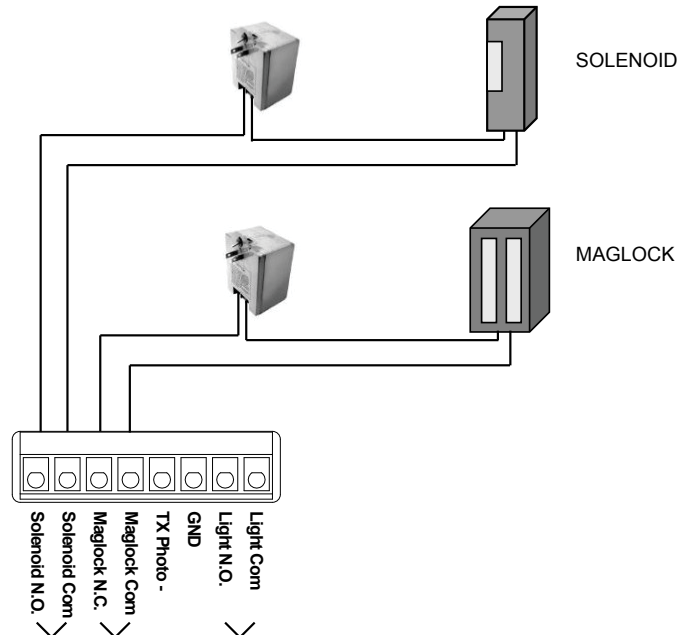
MagLock & Solenoid Inputs:

Allows Maglocks and Solenoid Locks to be connected to the gate operator with a 2 second delay to open.

Maglocks use a NC relay contact. Solenoid Locks use a NO contact. Power must be applied externally.

Connecting Solenoid & Maglocks:

1. Set Master and Slave DIP Switch 10 to ON.
2. Connect Solenoids to the external power supply and Solenoid Com and N.C. outputs following the schematic on the right
3. Connect Maglocks to the external power supply and Maglock Com and N.C. outputs following the schematic on the right



Warning Light connection

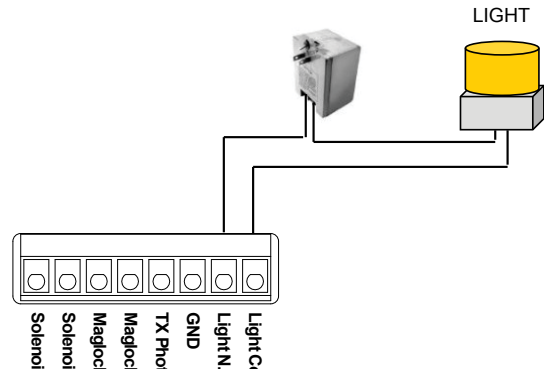
An external Warning Light may be connected to the gate operator. The light will be active while the gate is in motion both opening and closing

Warning light input:

Allows external Warning Light to be active during gate motion. This output is N.O. relay contacts. Power must be applied externally.

Connecting External Warning Light:

Connect Warning Light to the external power supply and Light Com and N.C. outputs following the schematic on the right.



Solar panel connection

For applications where AC Power drops out on a regular basis, an optional Solar Panel may be installed to help keep the batteries charged.

NOTE: Solar and battery backup power are for limited operations and not intended for high traffic applications. Fully charged batteries can operate a gate from 5 - 100 times depending on the application. Heavy gates, not installed properly and with poor hardware are going to operate fewer times than light gates, level, with good hardware.

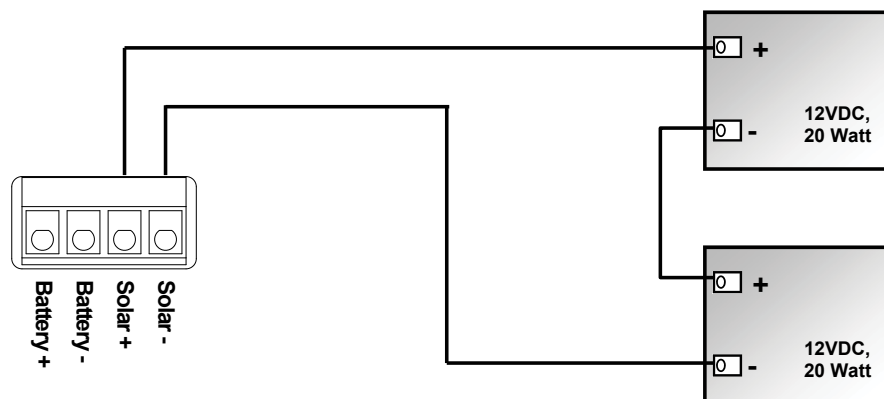
Solar Panel Inputs:

Allows an optional Solar Panel to be connected to the system for added charging.

The output is limited to sunlight, gate application, battery size, and Solar Panel output. To increase capacity, increase the size of each Solar Panel.

Connecting Solar Panels:

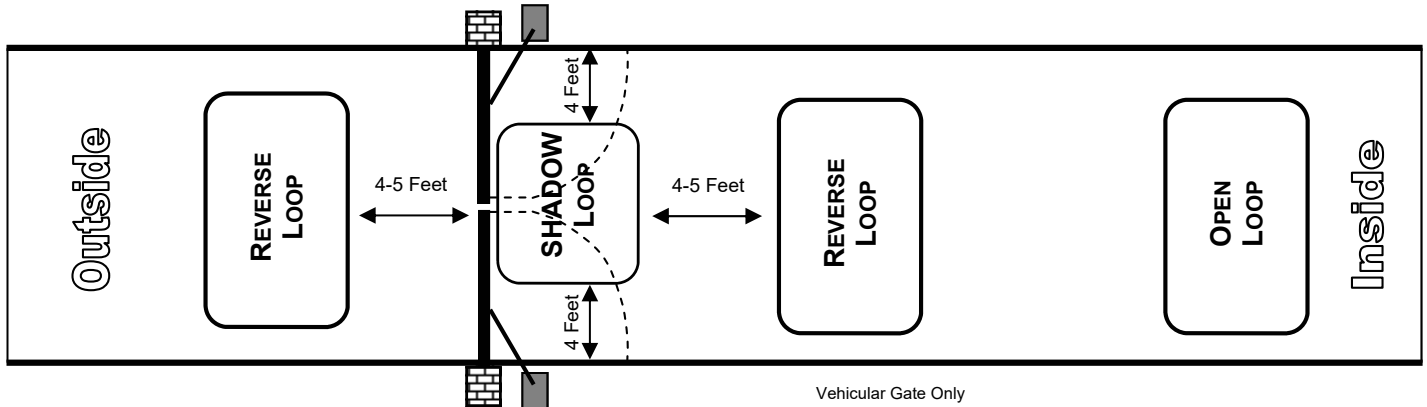
1. Use one 20 Watt, 24VDC Solar Panel OR two 20 Watt, 12VDC Solar Panels together in series.
2. Connect the Solar Panel positive to SOLAR +
3. Connect the Solar Panel negative to SOLAR -



LOOP & LOOP DETECTOR

Basic loop layout

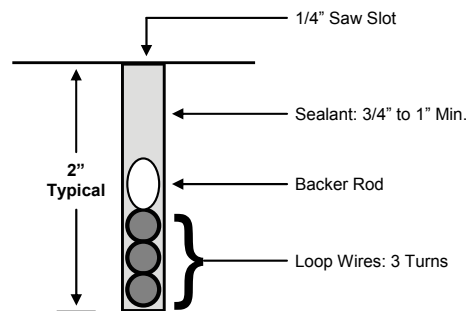
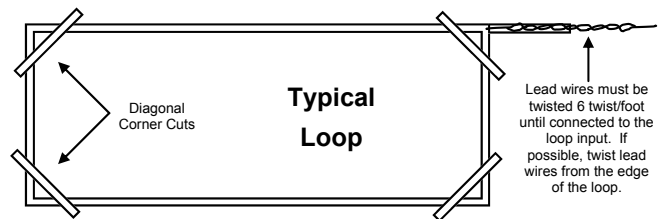
The following diagram shows a typical slide gate application for two-way traffic or exit traffic. For one-way entry traffic, the exit loop is not needed. (This diagram is a basic loop layout and does not show safety devices, pedestrian gate, fencing, etc. Refer to "IMPORTANT SAFETY INFORMATION" for gate details.)



Loop Installation Guidelines

Proper loop installation is a critical aspect of any gate application. An improperly installed loop may operate intermittently causing false triggers, holding the gate open, or allowing the gate to close on traffic. The following guidelines should be followed when installing loops:

- Determine proper location and size of each loop. Chalk out loops on the driveway:
 - Loops should be 4 - 5 feet back from the gate path. Loops any closer may cause false activation when the gate passes by.
 - Determine the size of the loop. Make the loop large enough so a vehicle must pass over the loop. The average loop is 4' x 8'. Consider the detection height.
 - Determine the detection height. The typical sensing height is 2/3 of the shortest leg. (Example: a 4' x 8' loop typically has a detection height of 2 1/2 feet.) To increase the detection height, increase the loop size.
- Cut loop slots in the driveway:
 - Loop slot should be 1 1/2" to 2" deep.
 - Loop slot should be 1/4" wide.
 - Cut diagonal corner slots to protect the wire insulation and keep the wire from changing directions quickly.
- Install loop wire:
 - Recommended Wire: 14 AGW to 18 AGW Stranded XLPE.
 - Starting at the gate operator, install the loop wire into the lead and loop slots. Use one continuous run of wire for the loop.
 - Install the appropriate number of turns as determined by total loop square footage. (Use attached chart)
 - Twist lead wires at least 6 turns per foot from the loop to the loop input. (Hint: Pull the lead wires tight from the corner of the loop and twist using a power drill.)
 - Route the lead wires to the edge of the driveway and into rigid conduit under ground. Seal this joint to protect the wires.
 - Press the loop wire to the bottom of the loop slot. Use Backer Rod (foam rubber) to protect and keep the loop wires from rising when the sealant is poured.
 - Seal the loop slots with a sealant. Make sure the sealant is able to sink to the bottom of the loop slot and completely encase the loop wire. The wire should not move when the sealant has set.



Loop Size (Sq. Feet)	Number Of Turns
6' to 12'	6
13' to 20'	5
21' to 60'	4
61' to 240'	3
241' & Up	2

Plug-in loop detector connections

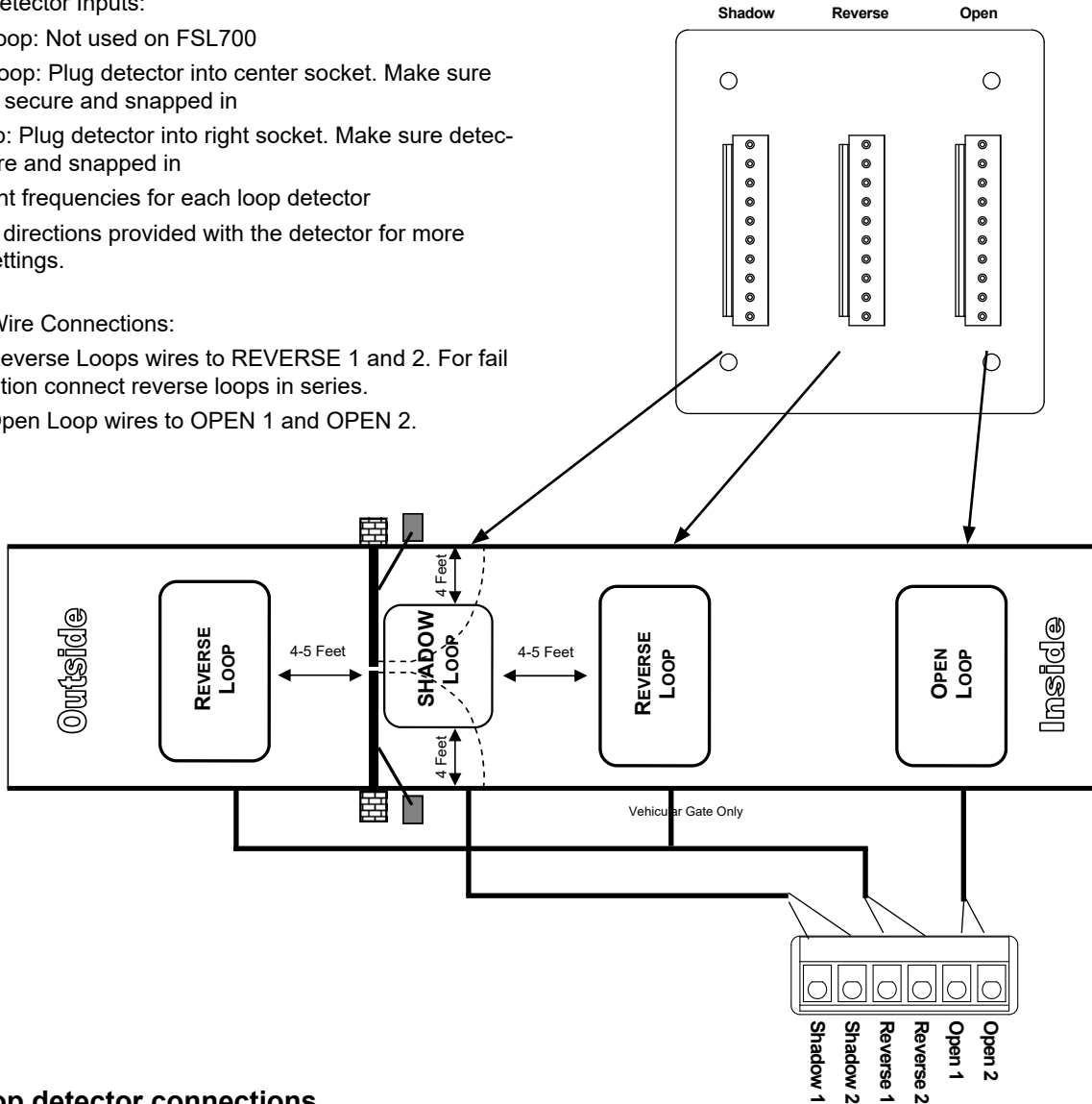
The gate operator may utilize standard 10 pins Plug-in Loop Detectors to simplify installation, save space and eliminate extra wiring. There are three plug-in terminals (Shadow, Reverse, Open) located on the gate controller. Detectors plugged into a specific socket will perform that function.

Plug-In Loop Detector Inputs:

1. Shadow Loop: Not used on FSL700
2. Reverse Loop: Plug detector into center socket. Make sure detector is secure and snapped in
3. Open Loop: Plug detector into right socket. Make sure detector is secure and snapped in
4. Set different frequencies for each loop detector
5. Follow the directions provided with the detector for more detailed settings.

Ground Loop Wire Connections:

1. Connect Reverse Loops wires to REVERSE 1 and 2. For fail safe operation connect reverse loops in series.
2. Connect Open Loop wires to OPEN 1 and OPEN 2.

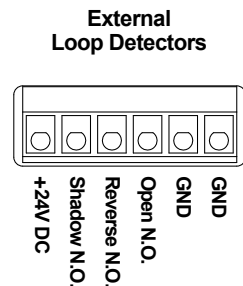


External loop detector connections

The gate operator may utilize external Loop Detectors. Refer to the manufacturer's instructions for detailed wiring.

External Loop Detector Inputs:

1. 24VDC is available to power external loop detectors. Connect 24VDC detector power to +24VDC and GND
2. Shadow Loop: Not used on FSL700.
3. Reverse Loop: Connect relay wires to REVERSE N.O. and GND
4. Open Loop: Connect relay wires to OPEN N.O. and GND
5. Set different frequencies for each loop detector.
6. Follow the directions provided by the external loop detector manufacturer for more detailed settings.



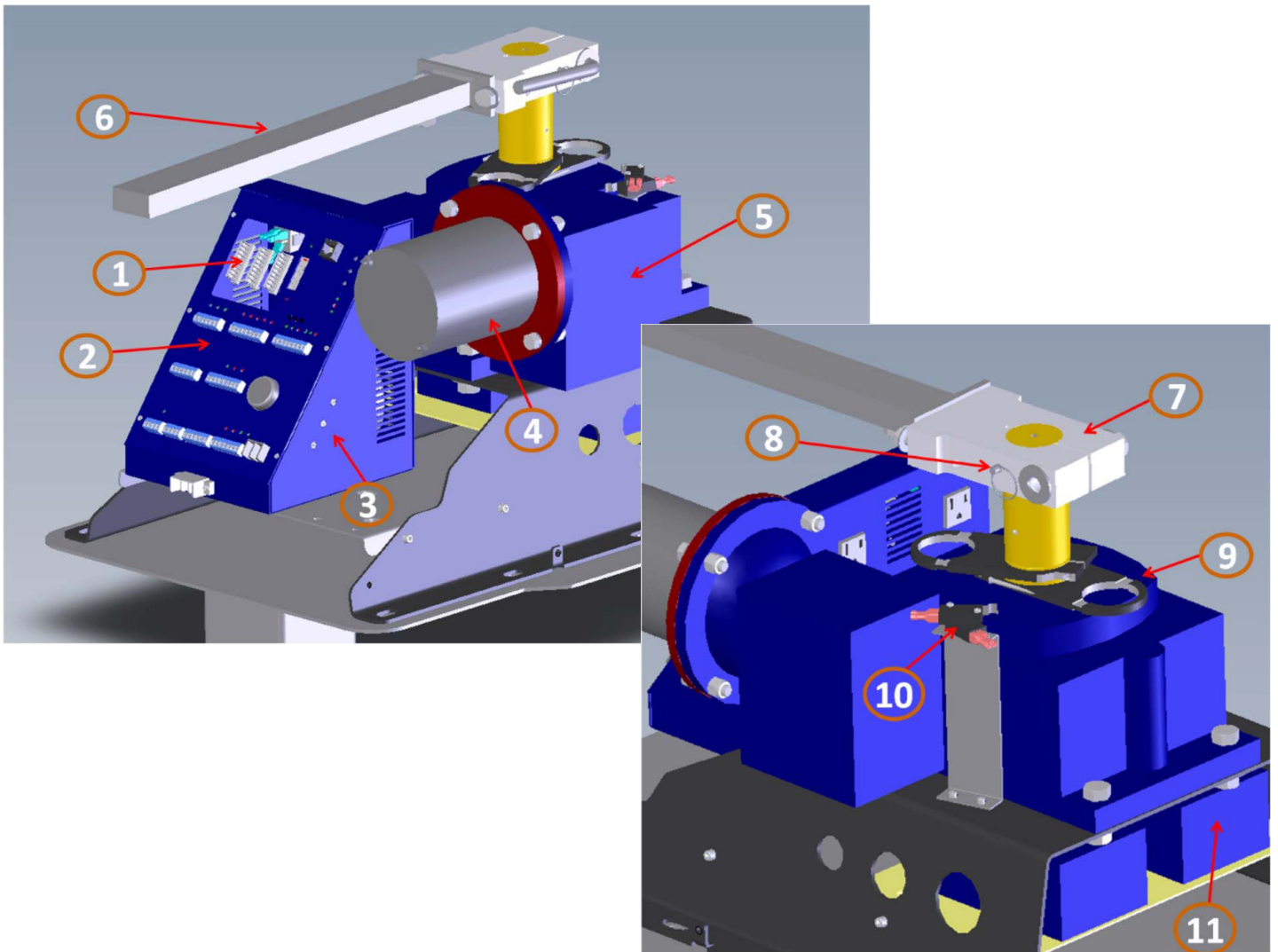
TROUBLESHOOTING TIPS

Fault Light Count

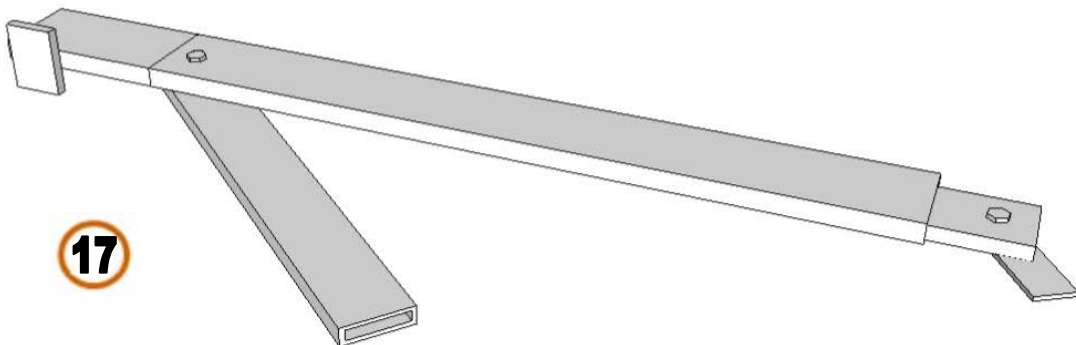
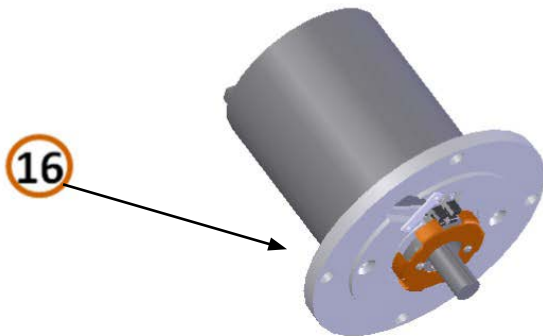
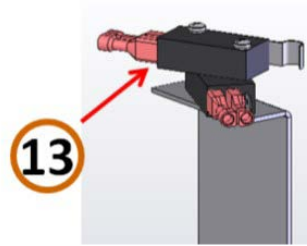
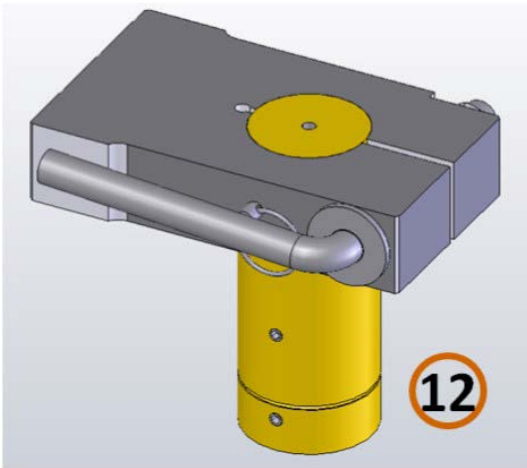
The gate operator control board has a Fault Light to help determine fault shutdowns. If the operator is not functioning properly, remove the cover and check the Fault Light for the operator Fault Status. Use the following chart to determine the Fault:

Number of Blinks	Fault Description	Cause & Action
1	Sensitivity/Current Overload: First Time	Operator detected an unexpected current overload while moving. Usually caused by the gate hitting an obstruction or tripping the sensitivity. This will put the operator in a Soft Shutdown. Make sure the sensitivity settings are set correctly. Too light of a setting will cause the gate to stop and fault. Make sure there are no external obstructions that are causing the gate to stop and shutdown.
2	Sensitivity/Current Overload: Second Time	Operator detected an unexpected current overload while moving a second time. Usually caused by the gate hitting an obstruction or tripping the sensitivity. This will put the operator in a Hard Shutdown. Make sure the sensitivity settings are set correctly. Too light of a setting will cause the gate to stop and fault. Make sure there are no external obstructions that are causing the gate to stop and shutdown.
3	Run Time Fault	Operator has run longer than normal. Usually caused by a bad limit or wiring fault Check the limit for normal operation. Make sure the limit wires Connections are tight .
4	Sensor Fault/Failure	Motor Sensors have failed. Usually caused by a bad sensor or loose sensor wire. Make sure the sensor wires are tight and well connected to the blue connector. While the operator is stopped, wiggle the Limit/Sensor connector. If the limit or sensor wires blink on and off, there is a loose connection. Start the operator, watch Sensor 1 and Sensor 2 at startup. They should both blink before turning solid. If only one blinks, then the non-blinking sensor is not being seen. Remove the motor from the gearbox. Both sensor lights should be on. Pass a flat screw driver between Sensor 1 and Sensor 2 on the motor plate. The Sensor LED on the control board should turn off and on as the screw driver passed through it. Make sure the sensor cup on the gearbox shaft is tight. A loose sensor cup will slip and cause the sensors to miss counts.
5	PCB Overheat Fault	Operator PCB has become too hot and caused a fault. Make sure the control board heat sink is secured to the side of the controller box to help dissipate excess heat. Determine if the operator has run excessively to cause an overheating problem. Possibly a defective heat sensor on the control board. Have board repaired.
6	Master Slave Fault	Master Slave communication has failed. Usually caused by a loose Master Slave wire or connector. A very strong lightning strike can sometimes cause damage to the master slave circuit on the control board. Make sure the master slave wires are connected correctly and tight. Unplug the master slave wire and set both operators as Masters. Test each operator independently to make sure there are no other problems or faults. After determining each operator runs by itself, reset the master slave settings and connect the master slave wire. If the problem continues, recheck wire and wire connections. Run a new wire on top of the driveway to test the master slave communication. This will determine if the underground wire is good or bad. Possible damage to the control board master slave components. Have boards repaired.

SPARE PARTS



Part	Part Number	Description
1	GC3100	Controller PCB with heat sink and faceplate assembly
	GC3200	Controller PCB with heat sink and faceplate assembly UL2016
2	GC-2002	Faceplate
	GC-2003	Faceplate UL2016
3	GC3000	Controller Assembly (No PCB, faceplate)
4	MOTOR-0500-24	Motor - 500W, 24VDC
5	SW-0020	Gearbox 900:1
6	SW-0004	Weld arm connector with 12 inch bar
7	SW-0003	Swing arm connector
8	SW-0011	Clutch alignment pin
9	SW-0010	Swing limit cam
10	SW-1000	Limit assembly kit
11	3540	Battery (single)



Part	Part Number	Description
12	SW-0001	Clutch assembly kit
13	SWITCH-0100	Limit switch
14	WIRE-1101SK	Sensors wire assembly with screws
15	AAA-0450	Sensor cup assembly
16	AAA-0402	Motor Adapter Plate
17	SW-0200	Swing arm assembly

LIMITED WARRANTY

To the original purchaser only:

FAAC International, Inc., warrants, for sixty (60) months from the date of invoice, the gate operator systems and other related systems and equipment manufactured by FAAC S.p.A. and distributed by FAAC International, Inc., to be free from defects in material and workmanship under normal use and service for which it was intended provided it has been properly installed and operated.

FAAC International, Inc.'s obligations under this warranty shall be limited to the repair or exchange of any part of parts manufactured by FAAC S.p.A. and distributed by FAAC International, Inc. Defective products must be returned to FAAC International, Inc., freight prepaid by purchaser, within the warranty period. Items returned will be repaired or replaced, at FAAC International, Inc.'s option, upon an examination of the product by FAAC International, Inc., which discloses, to the satisfaction of FAAC International, Inc., that the item is defective. FAAC International, Inc. will return the warranted item freight prepaid. The products manufactured by FAAC S.p.A. and distributed by FAAC International, Inc., are not warranted to meet the specific requirements, if any, of safety codes of any particular state, municipality, or other jurisdiction, and neither FAAC S.p.A. or FAAC International, Inc., assume any risk or liability whatsoever resulting from the use thereof, whether used singly or in combination with other machines or apparatus.

Any products and parts not manufactured by FAAC S.p.A. and distributed by FAAC International, Inc., will carry only the warranty, if any, of the manufacturer. This warranty shall not apply to any products or parts thereof which have been repaired or altered, without FAAC International, Inc.'s written consent, outside of FAAC International, Inc.'s workshop, or altered in any way so as, in the judgment of FAAC International, Inc., to affect adversely the stability or reliability of the product(s) or has been subject to misuse, negligence, or accident, or has not been operated in accordance with FAAC International, Inc.'s or FAAC S.p.A.'s instructions or has been operated under conditions more severe than, or otherwise exceeding, those set forth in the specifications for such product(s). Neither FAAC S.p.A. nor FAAC International, Inc., shall be liable for any loss or damage whatsoever resulting, directly or indirectly, from the use or loss of use of the product(s). Without limiting the

foregoing, this exclusion from liability embraces a purchaser's expenses for downtime or for making up downtime, damages for which the purchaser may be liable to other persons, damages to property, and injury to or death of any persons.

FAAC S.p.A. or FAAC International, Inc., neither assumes nor authorizes any person to assume for them any other liability in connection with the sale or use of the products of FAAC S.p.A. or FAAC International, Inc. The warranty herein above set forth shall not be deemed to cover maintenance parts, including, but not limited to, hydraulic oil, filters, or the like. No agreement to replace or repair shall constitute an admission by FAAC S.p.A. or FAAC International, Inc., of any legal responsibility to effect such replacement, to make such repair, or otherwise. This limited warranty extends only to wholesale customers who buy directly through FAAC International, Inc.'s normal distribution channels. FAAC International, Inc., does not warrant its products to end consumers.

Consumers must inquire from their selling dealer as to the nature and extent of that dealer's warranty, if any. This warranty is expressly in lieu of all other warranties expressed or implied including the warranties of merchantability and fitness for use. This warranty shall not apply to products or any part thereof which have been subject to accident, negligence, alteration, abuse, or misuse or if damage was due to improper installation or use of improper power source, or if damage was caused by fire, flood, lightning, electrical power surge, explosion, wind storm, hail, aircraft or vehicles, vandalism, riot or civil commotion, or acts of God.