
# Highway 66
# Owner's Manual

First Edition
October 2003

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WORLDWIDE

***SERVICE***

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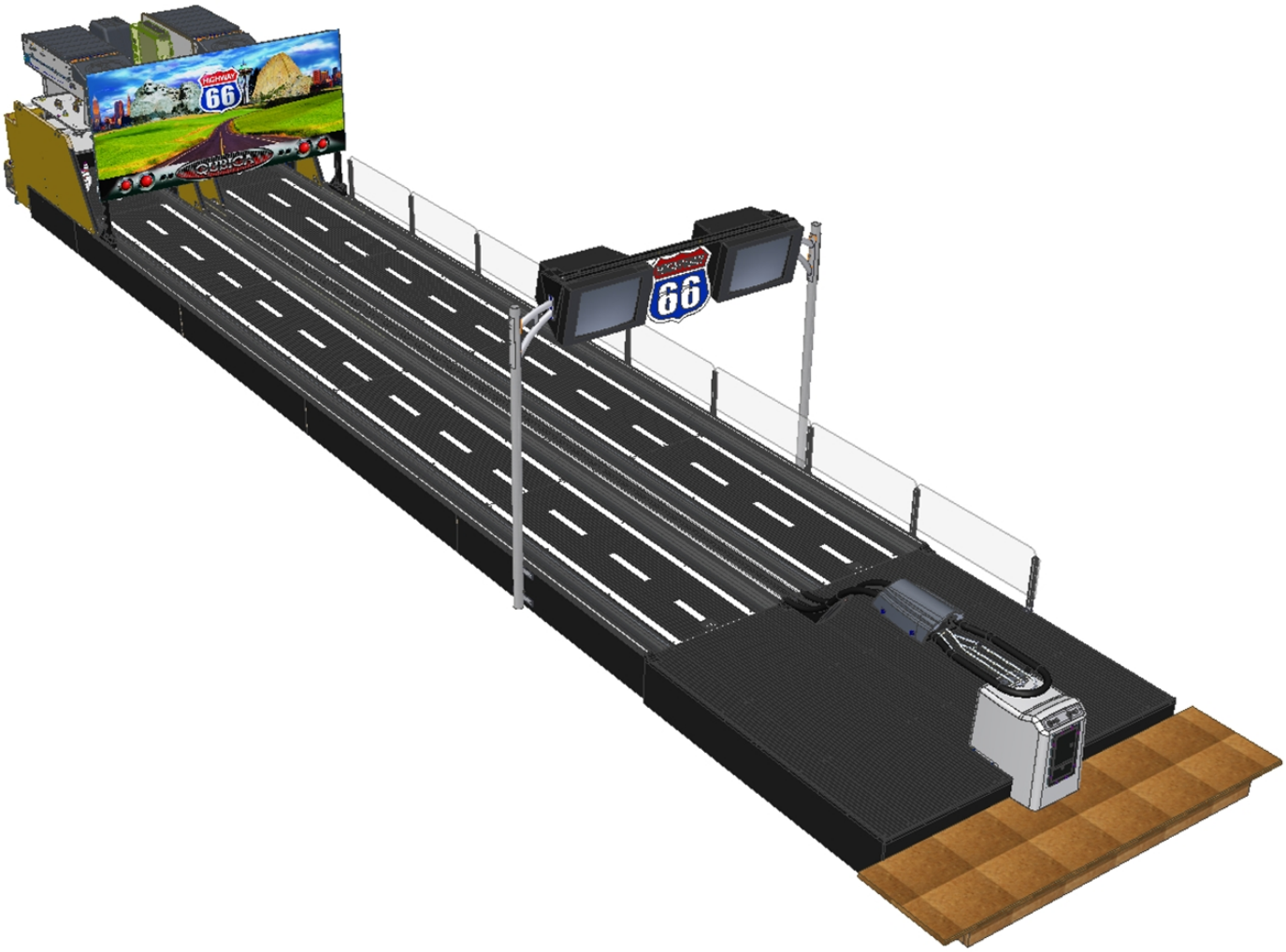
Z-PSM-HW66


HIGHWAY
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# List of Procedures

# IMPORTANT SAFETY INSTRUCTIONS

## Warning

***TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.***

***HIGH VOLTAGE IS PRESENT IN THE PINSETTER POWER BOX. THE MAIN CIRCUIT BREAKERS MUST ALWAYS BE SHUT OFF OR THE TWIST LOCK PLUG DISCONNECTED PRIOR TO REMOVING THE POWER BOX COVER.***

***THIS APPLIANCE IS EQUIPPED WITH MORE THAN ONE POWER SOURCE. DISCONNECT ALL POWER SOURCES BEFORE SERVICING.***

***TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.***

***HIGH VOLTAGE IS PRESENT IN THE PINSETTER POWER BOX. THE MAINS CIRCUIT BREAKER MUST ALWAYS BE SHUT OFF OR THE TWIST LOCK PLUG DISCONNECTED PRIOR TO REMOVING THE POWER BOX COVER.***

***THIS APPLIANCE MUST BE POSITIONED SUCH THAT THE MAINS SUPPLY CORD CONNECTOR IS ACCESSIBLE AFTER INSTALLATION.***

***BEFORE DISCARDING THIS APPLIANCE, THE BATTERY MUST BE REMOVED AND DISPOSED OF SAFELY. DISCONNECT THE POWER SUPPLY CORD BEFORE REMOVING THE BATTERY.***

***MAINS SUPPLY WIRING TO THIS APPLIANCE IS TO BE DRESSED AWAY FROM THIS APPLIANCE.***

***THE AC SUPPLY CORD TO THE BALL RETURN MOTOR IS TO BE DRESSED AWAY FROM THE APPLIANCE, THE BALL RETURN MOTOR AND ANY MOVING PARTS OF THE BALL RETURN ASSEMBLY.***

***IF THE SUPPLY CORD IS DAMAGED, IT MUST BE REPLACED BY A QUALIFIED PERSON IN ORDER TO AVOID HAZARDS.***

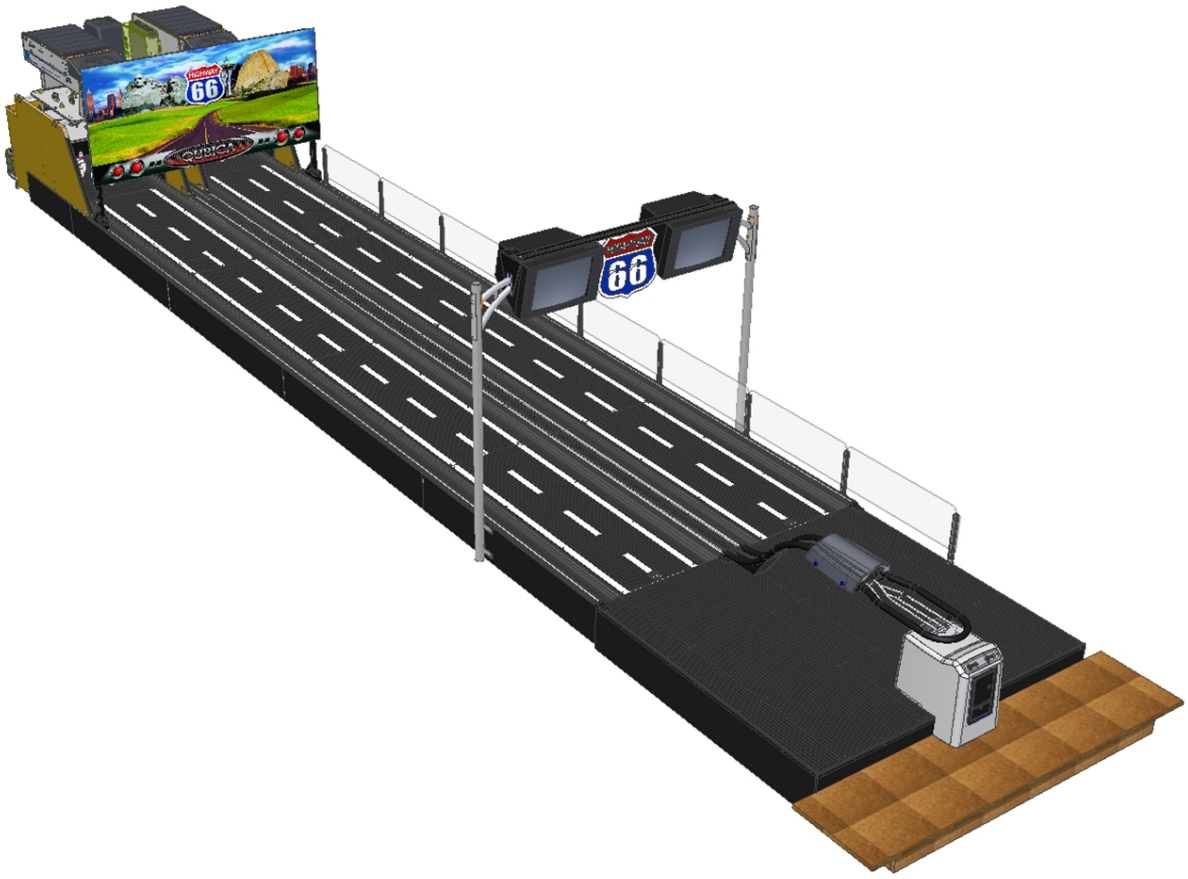
***THIS APPLIANCE IS NOT SUITABLE FOR OUTDOOR USE.***

***THIS APPLIANCE IS NOT SUITABLE FOR INSTALLATION IN AN AREA WHERE A WATER JET COULD BE USED.***

***THIS APPLIANCE MUST NOT BE CLEANED USING A WATER JET.***

***IN ORDER TO AVOID A SHOCK OR FIRE HAZARD,IF REPLACEMENT OF ANY EXISTING POLYMERIC SCREWS IS REQUIRED, THEY MUST ONLY BE REPLACED BY THE SAME TYPE POLYMERIC SCREW AND MUST NOT BE REPLACED BY METAL SCREWS.***

# Introduction to Highway 66



Qubica Worldwide is proud to introduce you to your Highway 66 machine. This equipment was designed and manufactured by Qubica Worldwide and was sold to you through an authorized Qubica Worldwide representative. Qubica Worldwide is a leading manufacturer in bowling and entertainment products. We are proud to provide you with the finest products and equipment in the industry.

The Quality Control Department at Qubica Worldwide has taken very good care to ship you a product that was completely adjusted, tested and checked before shipment. Your Highway 66 machines are to be custom installed by a trained Qubica Worldwide authorized technician. He/she will provide you with recommended products for use with your Highway 66 and instruct you in the proper operating and maintenance techniques.

# What Makes up the Highway 66 System

The structure of the Highway 66 system is based on a wooden truss foundation with prefabricated lanes. The lane surface is of a hard-wearing synthetic material, designed to withstand the most extreme operating conditions and providing the operator with the minimum amount of maintenance.

Suspended above the Highway 66 lanes are the scoring display modules which control the display on each lane.

Located at the furthest end of the playing surface is the masking unit used to hide the machines. The graphic panels inserted into these units may vary from installation to installation and even lane to lane. With a multitude of graphic panels available, every decor has its match.

Located at the rear of the unit, behind the masking units, are the pinsetters which operate in conjunction with the coin mechanism; activated by the introduction of the correct amount of money.

**Note**

*The pinsetters are supplied to operate on 240 volts, 50/60 cycles, single phase. The electrical supply lines must conform to all electrical codes and it is the responsibility of the proprietor to supply power to all the electrical components necessary for the normal function of the pinsetters.*

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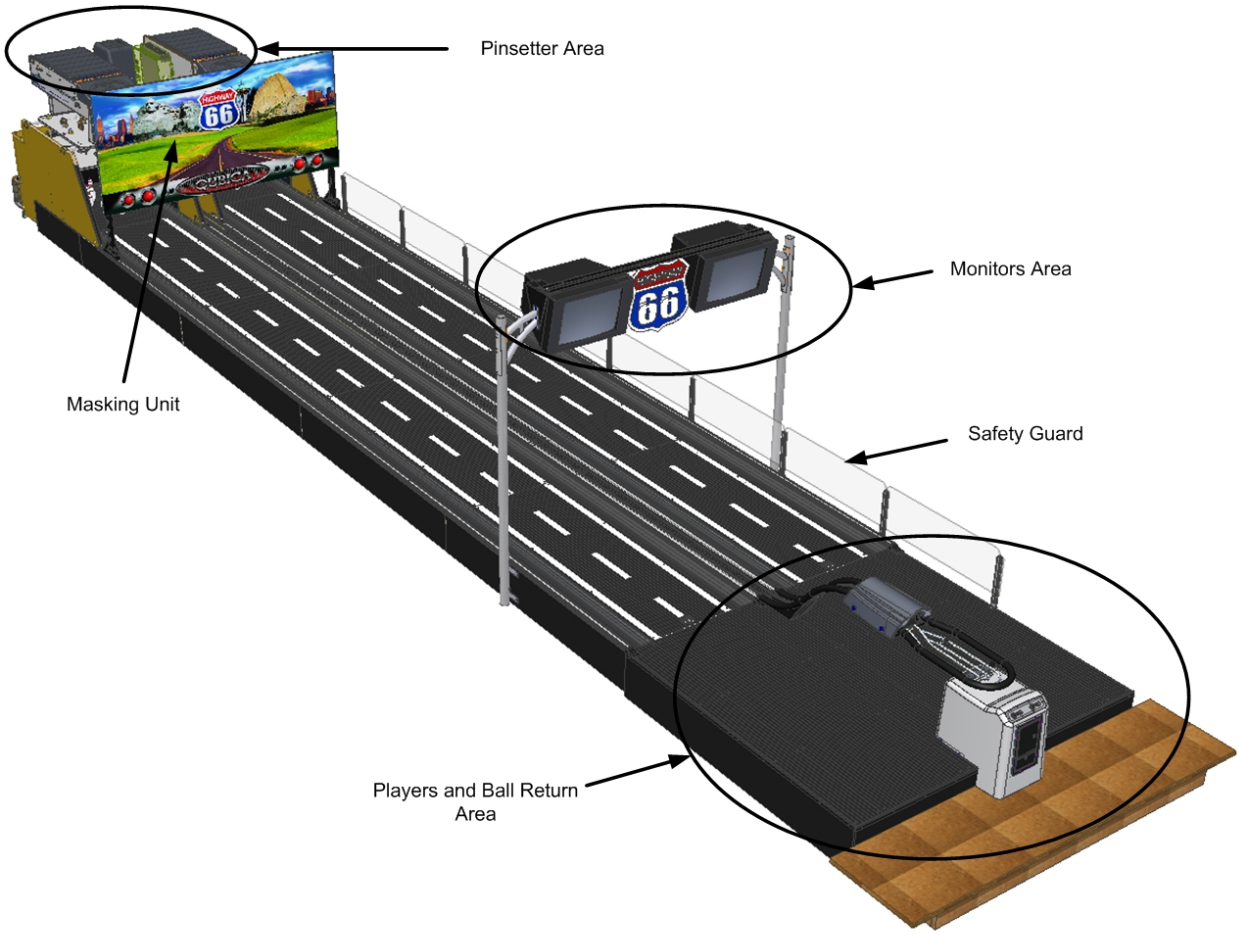
# Identifying Your Highway 66 System Components



## Understanding how the Game is played

Highway 66 is installed with the TARGTEN basic game; more games will be available with time. Check with your Qubica representative to see which games are available now.


In order to understand the way the game is played, please read the game manual supplied with the CD ROM delivered with the Highway 66.

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# About This Book

Thank you for selecting Highway 66 for your fun and entertainment. Your Highway 66 incorporates many of the latest advances in technology and is very easy to maintain for many years of enjoyment and profit.

This publication helps you become familiar with your Highway 66 equipment and its many features. It describes how to install, configure, operate, and maintain your machine. In the unlikely event you experience problems; you can also find helpful troubleshooting information as well as instructions for obtaining service and parts.

This book is organized as follows:

- Chapter 1, "Highway 66 Fundamentals," provides an overview of your Highway 66 machine. After reading this chapter you should be able to identify the major components of your Highway 66 and understand the basic principles of the machine's operation.
- Chapter 2, "Setting Up/Operating Your Highway 66," provides step-by-step instructions for setting up and configuring your equipment in order to meet your needs and requirements along with instructions for the day-to-day use and management of your equipment.
- Chapter 3, "Taking Care of Your Highway 66," contains information about the proper handling and care of your equipment.
- Chapter 4, "Solving Problems," contains information that will help you identify and correct problems that might arise as you use your equipment. A description of the wide variety of resources available from Qubica to assist you in the use of your equipment is also included along with instructions on how to obtain additional information about Qubica products.
- Chapter 5, "Wiring Diagrams," provides you with all necessary wiring and electronic information in easy to comprehend diagrams for your reordering and servicing convenience.
- Chapter 6, "Highway 66 Parts Catalog," provides you with a complete breakdown of all your equipment's parts in exploded views for your reordering and servicing convenience.

# Safety Information

Use of common sense and industry experience are key factors which one should utilize whenever operating electromechanical equipment. As with all machinery, there is an element of risk if the rules of safety are disregarded. Training in the operation of this equipment is available. Schools in the equipment's use and operation are held on a regular basis. It is the responsibility of the attendant to provide his or her own travel, lodging and school expenses. Anyone interested in attending a factory training school should contact their local Qubica sales or service representative.

1. **Always open the circuit breaker or disconnect the power plug from the electrical box before looking for, and clearing, any problem.**
2. **Always reach over and around the equipment assemblies, never through or between the components.**
3. **Avoid the use of cleaners that are toxic.**
4. **Immediately wipe up any oil or liquids that have spilled to prevent slipping.**
5. **Store oily rags and any other combustibles in a fireproof container.**
6. **The mechanic / maintenance person must teach all personnel who will work on the equipment enough about the equipment to prevent accidents through ignorance.**
7. **Under no circumstances allow an unqualified person to work on the equipment.**
8. **Use the right tool for each job to prevent injury to yourself and to the equipment. Remove all tools from the equipment before turning it on.**
9. **Wear the proper clothing when working on the equipment. Do not wear neckties or loose clothing that may be caught by the equipment. Wear trousers without cuffs to prevent tripping. Wear shoes with safety, non-slip soles.**
10. **When more than one person is working on the equipment, never turn on the equipment without checking to see if everyone is clear of the equipment.**
11. **When the safety guards are removed from the equipment, be extra cautious when the equipment is turned on. Replace the guards immediately when the work is completed.**

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# 1. Highway 66 Fundamentals

## Chapter Overview

This chapter provides an overview of your Highway 66 machine. After reading this chapter you should be able to identify the major components of your Highway 66 and understand the basic principles of the machine's operation.

# Major Components and Assemblies

There are a number of different assemblies which make up your Highway 66 machine, and each performs its own function.

When the unit is turned on, the pins are set on the lane and the pinsetter is placed in a ball one situation. Let’s begin by taking a look at operation of your Highway 66 as it goes through a game. With ten pins set on the lane, the bowler rolls the first ball.

## Ball Detector

As the ball rolls down the lane, it will cross (cut) the ball detector's infrared light beam. The ball detector's transmitter is placed at the bottom of the kickbacks. On the opposite side of the lane, facing the transmitter is a reflector which returns the infra red light beam to the ball detector's transmitter. Basically, the ball detector has only one function, it triggers or starts the Highway 66’s various operations when its signal is cut by a passing ball. It is important, then, that the ball detector be sensitive enough so that, regardless of the speed of the passing ball, it is able to detect it.

## Pit

Located at the rear of each lane's pin deck is the pit which is slanted to the inside of the pair of lanes in order to direct the ball to the ball elevator. Above the pit, the cushion absorbs the impact of the bowling ball.

As the ball leaves the playing area of the lane, its forward momentum carries it across the pit until it strikes the pit cushion, which is suspended across the rear of the pit. Both the ball and the knocked down pins come to rest in the pit.

From the pit, the ball needs to be returned to the bowler. So far its forward motion has been stopped by the pit cushion and it has rolled into the trough located behind the pit.

## Ball Elevator

To return the ball to the bowler, the ball moves through the ball elevator. The ball elevator is fastened to the floor between each pair of pinsetters. Using a simple conveyor system, the ball is raised to a level above the pinsetters and then propelled by gravity to the front ball return rack located at the bowler's end of the lane.

The ball lift conveyor is powered by a ½ hp capacitor start electric motor mounted on the motor support bracket at the top of the ball lift's frame. The power generated by the motor is relayed to the conveyor's chains through the pulley on the motor shaft, the drive belt, the drive pulley, and the drive wheel. The motor support bracket is adjustable to obtain constant pressure on the drive belt.

## Pinsetter

Contrary to the ball being removed from the pit area and returned to the bowler, the pins remain at the rear and are re-spotted for the next delivery. The equipment used to control the flow of pins is called a pinsetter.

Each time a bowler rolls a ball, the pinsetter goes through a specific sequence of operations. This sequence of operations is called the pinsetter cycle.

The various operations of the pinsetter are guided by the pinsetter electronics. The pinsetter electronics distribute the electrical power to the various motors and components as needed. Specifically, the pinsetter electronics activate the DC motor which transmits power to the drawbar in order to raise or lower the pins to the playing surface. The pinsetter electronics can be considered the brains of the pinsetter. From the time a bowler has rolled the first ball, the electronics must be able to direct the pinsetter through its different combinations of operations.

Each pair of pinsetters has an electric power box which is used in conjunction with the coin mechanism activated by the introduction of the correct amount of money.

## Note

*The TMS pinsetter is supplied to operate on 240 volts, 50/60 cycles, single phase. The electrical supply lines must conform to all electrical codes and it is the responsibility of the proprietor to supply power to all the electrical components necessary for the normal function of the pinsetters.*

## TMS Power Box

A power supply line is run from the main service circuit breaker distribution panel to a junction box mounted above each pair of pinsetters. From each junction box, a three-conductor drop cord (2-wires plus an insulated ground), terminating in a twist lock connector, is plugged into the power box of each pair of pinsetters to supply the necessary electrical power.

Attached to a panel which is mounted between each pair of pinsetters is the electric power box used to supply the necessary electrical power to all components on a pair of pinsetters. Unlike conventional electrical circuits, which are controlled through a multitude of micro switches, all opening and closing of electrical circuits on the TMS pinsetter and its accessories is done through the pinsetter control box using software and optical reading devices (sensors and transmitters/receivers).

An on-off switch is located on the power box and is used to manually open and close the thermal overload circuit breaker.

## Warning

*High voltage is present in the pinsetter power box. The main circuit breakers must always be shut off or the twist lock plug disconnected prior to removing the power box cover.*

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## Pin Stabilizer

Mounted below the pinsetter is the stabilizer assembly which absorbs most of the vibration and then stabilizes each pin before its descent to the lane. The stabilizer assembly is a very important part of the pinsetter. Without it, the pins would have to be picked up much gentler than they are and the untangling mode would lose its powerful effect. Another important factor is the speed and accuracy which is obtained through the stabilizer. Each pin is spotted according to its position in the stabilizer, thus allowing for consistent pin spotting cycle after cycle.

## Main Motor

Located at the rear of each pinsetter is the main motor. This motor is coupled with a reducer and controlled by a DC Drive.

The power box takes care of the raising, lowering and stabilizing times. It also takes care of the braking action, untangling routine and all other pinsetter actions, all of this is done trough the DC drive of each pinsetter. All of the different delays are controlled by the user through DIP switches located inside the pinsetter control box.

## Drawbar

Attached to both chains on the sides of the pinsetter is the drawbar. The drawbar is made up of sheaf assemblies (one for each pin) mounted on a shaft. Each sheaf pulls its corresponding pin's string when the drawbar is pulled to the rear of the machine by the chains.

The shield is powered by the drawbar's forward and backward movements. When the drawbar is pulled to the rear of the pinsetter, the shield is lowered. When the drawbar returns to the front of the pinsetter, the shield is raised.

The strings themselves are the concept of the machine. Each pin has a fourteen-foot length of string attached to its head. A four-foot length of this same string is wound on each reel and storage assembly to be used as spare string. In other words, the pinsetter needs ten feet of string to operate normally.

With a well adjusted pinsetter, the only point of wear on the string is immediately above the top of the pin. When it wears, it may be merely pulled through the pin, the worn out part cut (six inches), and the string refastened. Keeping in mind the four-foot length of spare string and the fact that six inches of string is cut, each string may be repaired eight times before having to replace the complete length of string (fourteen feet).

## Note

*The TMS Pinsetter's good operation is directly related to the proper length of the strings. Any variation in the length of the strings caused by humidity or stretching is sufficient to disturb the system.*

## Solenoid/Opto Control Box

Mounted at the front of each pinsetter is the solenoid/opto control box (SB-9802300-10) and the pin detection wheels (one for each pin). These wheels are activated (rotated) by their corresponding strings when a pin is knocked down. Each wheel has holes in it and the wheel itself rotates through an optical sensor (SB-ECIL-325-PD). As the wheel turns, its optical sensor counts the number of holes which pass through it. This information is transmitted to the pinsetter control box. The pinsetter control box then determines which pins, if any, have been knocked down.

The solenoid/opto control box is connected to the pinsetter control box along with the individual pin detectors and brake solenoids. The sensitivity of the pin detection optical sensors is determined through a dip switch setting inside the pinsetter control box itself.

## Pin Brakes

Mounted behind the pin detectors and below the reel and storage assemblies are the pin brakes. There is one brake assembly for each pin. The brake assembly has three main parts: a cam, a solenoid and a brake-shoe. When a pin is determined as fallen by the pinsetter control box, its solenoid activates the cam which in turn secures the string holding the pin up while the drawbar descends the remaining pins to the lane.

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# Optical Reading Devices

## Ball Detector

With the pinsetter in a ready to bowl position, the ball detector allows for the detection of the ball on its way down the lane. Once a ball is detected, the reading pause commences.

*The ball detector must be operational in order for the pinsetter to function. All commands to and from the pinsetter start with the detection of a ball.*

## Pin Detectors

There is one PD optical sensor (SB-ECIL-325-PD) for each bowling pin. When a pin is knocked down, its string rotates the wheel (9103058) through the PD, indicating to the pinsetter control box that the pin has been knocked down. Once the reading pause expires, the PD optical sensors are placed in an idle mode until the next ball detection.

## Limit Optical Sensor (LOS)

This limit optical sensor is used to tell the TMS power box when the drawbar reaches its upper position during the calibration process. That calibration occurs every time the pinsetter is turned on, or it can be done manually using the pushbutton situated on the Solenoid/Opto Control Box.

## Brake Optical Sensor (BOS)

This limit optical sensor is used to tell the TMS power box where it will have to activate the pin brakes. The TMS power box records that position during the calibration process. That calibration occurs every time the pinsetter is turned on, or it can be done manually using the pushbutton situate on the Solenoid/Opto Control Box.

## Pin Pause Optical Sensor (PPOS)

This limit optical sensor is used to tell the TMS power box where it will have to slow down its movement in order to gently deposit pins on the pin deck. The TMS power box records that position during the calibration process. That calibration occurs every time the pinsetter is turned on, or it can be done manually using the pushbutton situated on the Solenoid/Opto Control Box.

## Motor Encoder

This Optical Sensor is located at the rear end of the DC motor, it is used to tell the TMS power box where exactly is situated the drawbar of the pinsetter.

## Q-AMS Game Controller

Located on the wooden board between the two machines the Q-AMS is the game controller. It does include a CD drive that enables the use of different games. The Q-AMS have connections to the TMS Power Box, to the two monitors above the lanes and to the I/O controller located inside the ball rack at the player end.

The power for the Q-AMS is supplied by the TMS Power Box.

The I/O controller has the joysticks, buttons and the coin mechanical connections.

## Overhead Monitors

Located above the lanes are two monitors used to display the game process. These monitors have a special keyboard on top of them to perform adjustments. The power for those monitors is supplied by the TMS Power Box.

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# Understanding how the System Works

When the pinsetter is turned on, it will perform a calibration cycle. Then the pins are set on the lane and the pinsetter is placed in a ball one situation. The bowler rolls the ball which passes through the ball detector's infrared beam of light thus sending a signal to the pinsetter control box. The ball knocks down some pins which fall into the pit. The floor of the pit is angled so that the ball moves toward the rear ball lift.

Each pin has a string attached to its head which activates its pin detection wheel when the pin is knocked down. The pin detection wheel, in turn, advises the pinsetter control box that the pin has been knocked down.

After a pre-determined delay, the TMS power box will activate the DC drive in order to move the drawbar to the rear of the pinsetter. The shield is lowered as the drawbar picks up the pins from the pit and secures them in the stabilizer. The drawbar then reaches the rear of the pinsetter, which indicates to the TMS power box that the drawbar is at the end of its cycle and that no strings are tangled. After a short pause at that position the DC drive will move the drawbar forward the pinsetter and at the same time lowering the pins

## Note

*If the strings are tangled, the drawbar will not be able to reach the rear of the pinsetter. This will order the TMS power box to activate the pinsetter's untangling routine, which will cause the pinsetter to lower and raise the pins in different manners until the strings are untangled or if the numbers of attempts reach 8.*

# Pinsetter Cycles

After a slight pause, the drawbar will commence its downward cycle. The TMS Pinsetter will then perform one of two different types of cycles:

## Part Set

The pinsetter sets only the pins which weren't knocked down on the lane, the shield raises and the lane is ready for the next ball. If a part set is necessary, the pinsetter control box activates each individual brake for each pin which was detected as knocked down.

## Full Set

The pinsetter spots a full set of pins on the lane, the shield raises and the lane is ready for the next frame. If a full set is necessary, none of the brakes are activated.

The pinsetter must be able to determine his different reactions based on the rules of bowling and set up by delivery of the ball. After the bowler delivers the ball, the ball detector sends a signal to the pinsetter control box. The pinsetter control box will determine whether there are pins standing and what type of cycle to perform. This process is called reading and according to all the information which the pinsetter control box analyzes, the pinsetter will cycle in one of the two possible manners.

- If the bowler rolls the first ball down the lane and knocks down all the pins (strike), the pin detection wheels all rotate through their corresponding optical sensors and when the pinsetter control box takes its reading it will find no pins standing. At this point, the pinsetter control box has the pinsetter perform a full set.
- If the bowler rolls the first ball down the lane and knocks down some pins but not all, the pin detection wheels again rotate through their corresponding optical sensors and the pinsetter control box takes its reading to find some pins still standing. At this point, the pinsetter control box has the pinsetter perform a part set.
- Whenever the bowler delivers a second ball, regardless of the number of pins knocked down, the pinsetter control box has the pinsetter perform a full set.

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# 2. Setting Up/Operating Your Highway 66

## Chapter Overview

This chapter provides step-by-step instructions for setting up and configuring your equipment in order to meet your needs and requirements along with instructions for the day-to-day use and management of your equipment.

# Getting Ready to Play!

Please refer to the game manual for the special set-up function of each individual's games.

Each game has its own set-up menu where you can choose different options such as:

- Numbers of coins for one game.
- Amount of time allowed for one ball.
- Amount of time allowed for one game.
- Etc.

That set-up menu can be accessed by the service button inside the coin-op door, no matter the game.

# TMS power box DIP switches

The following tables describe the various DIP switch functions. The version in which the setting was introduced or changed is indicated in brackets following the description. The shaded areas indicate the preset factory settings.

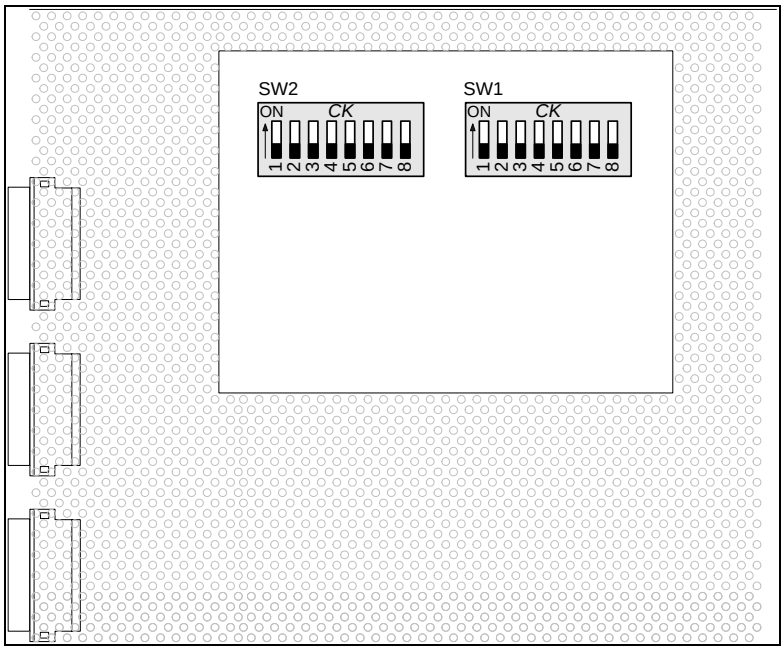


*Figure 2-1 Dip Switch Location*

The dip switches are located on the main CPU board inside the TMS power box.

## SW1-1 Jumping Ball (V1.16)

Used to determine whether or not the jumping ball routine is activated. When the jumping ball routine is activated, the pinsetter's electronics verify if any pins have been knocked down at regular intervals instead of waiting for a signal from the ball detector. This option is used to counter a ball which bounces over the ball detector.

| | |
|---|---|
| OFF | Deactivated |
| ON | Activated |

## SW1-2 Control Mode (V1.00)

Used to determine if there is an external device (like autoscoring) controlling the pinsetters.

| | |
|---|---|
| OFF | Pinsetters are controlled by an external device. (Autoscoring Mode) |
| ON | Pinsetters are not controlled by an external device. (Manual, Stand Alone Mode) |

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## (SW1-3,4,5) Pin Detection Sensitivity

These dip switches are used to set the pin detector wheels' sensitivity. In order for the pinsetter to detect a pin as fallen, a specific quantity of holes located on the pin detector wheels must pass through its corresponding optical sensor. Eight (8) different settings are possible. The more sensitive the setting, the fewer number of holes is necessary to count a pin as fallen. You usually won't have to change these dip switches, but if you do, refer to the settings below. The first setting indicates the most sensitive reading possible while the last setting indicates the least sensitive reading possible.

| Sensitivity | SW1-3 | SW1-4 | SW1-5 |
|---|---|---|---|
| More Sensitive 1 | OFF | OFF | OFF |
| 2 | ON | OFF | OFF |
| 3 | OFF | ON | OFF |
| 4 | ON | ON | OFF |
| 5 | OFF | OFF | ON |
| 6 | ON | OFF | ON |
| 7 | OFF | ON | ON |
| Less Sensitive 8 | ON | ON | ON |

## SW1-6 Stabilizing Pause Time (V1.00)

Used to determine the pause time which the pins will be held in the UP position during a normal pinsetter cycle.

| | |
|---|---|
| OFF | 1.5 Seconds |
| ON | 1.75 Seconds |

## SW1-7, 8 Pin Reading Pause Time (V1.00)

Used to determine the reading pause time between the ball detection and pinsetter action. The shorter the pause, the quicker the pinsetter will be to re-spot pins (less time will be allotted for pins to fall which may cause erroneous pin fall detection).

| SW1-7 | SW1-8 | Setting |
|---|---|---|
| OFF | OFF | 1.0 Second |
| ON | OFF | 2.0 Seconds |
| OFF | ON | 2.5 Seconds |
| ON | ON | 3.0 Seconds |

## SW2-1, 2 Untangle Routine Type (V1.00)

Used to determine the type of routine use for untangling the pins.

| SW2-1 | SW2-2 | Tangling |
|---|---|---|
| OFF | OFF | Type 1 |
| ON | OFF | Not Used |
| OFF | ON | Not Used |
| ON | ON | Not Used |

## SW2-3 Pinsetters Reaction after Power Failure (V1.16)

Used to determine if the pinsetters will come back ON after a power failure if they were ON before.

Note: The reaction will be different if they are in Manual mode or in Highway 66 or Standard mode.

| Reaction in autoscoring mode SW1-2 in OFF position and Standard mode SW2-6 OFF | |
|---|---|
| OFF | Pinsetters will stay OFF and you will have to manually power ON the pinsetter. |
| ON | Pinsetters will come back to their previous state when one of the following events occur:<br>***Ball detection***,<br>***Any Command from the pin detector push button***<br>***Pinsetter command from Autoscoring system*** |

| Reaction in autoscoring mode SW1-2 in OFF position and Highway 66 mode SW2-6 ON | |
|---|---|
| OFF | Pinsetters will stay OFF and you will have to manually power ON the pinsetter. |
| ON | Pinsetters will come back to their previous state after a short random delay. |

| Reaction in Manual mode SW1-2 in ON position and Standard mode SW2-6 OFF | |
|---|---|
| OFF | Pinsetters will stay OFF and you will have to manually power ON the pinsetter. |
| ON | Pinsetters will come back to their previous state after a short random delay. |

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| **SW2-4 Pin Position when Pinsetters are OFF (V1.00)**<br>Used to determine if the pinsetters will close with all ten pins on the deck, or it will raise all the pins up and keep them in this position. | |
|---|---|
| OFF | All pins in UP position. |
| ON | All pins on deck. |

| **SW2-5 Pinsetter Reaction on Gutter Ball (V1.00)**<br>Used to determine if the pinsetters will cycle or not when a gutter ball is thrown. | |
|---|---|
| OFF | No cycle. |
| ON | Cycle. |

| **SW2-6 Type of Game (V1.00)**<br>Used to determine the type of game played. | |
|---|---|
| OFF | Standard (Tenpin, Duckpin, Hard Duck, Five Pin) |
| ON | Highway 66 Mode |

| **SW2-7 Number Pins Installed (V1.11)**<br>Used to determine the number of pins which are installed on the pinsetter. | |
|---|---|
| OFF | Five Pins |
| ON | Ten Pins |

# Procedures and Adjustments

*Procedure 2-1 - Ball detector:*

The ball detector is a simple, very reliable stand alone device but may become misaligned once in a while due to the constant vibration caused by the balls rolling down the lane. Located in front of the kickback, it communicates to the pinsetter control box through a cable assembly.

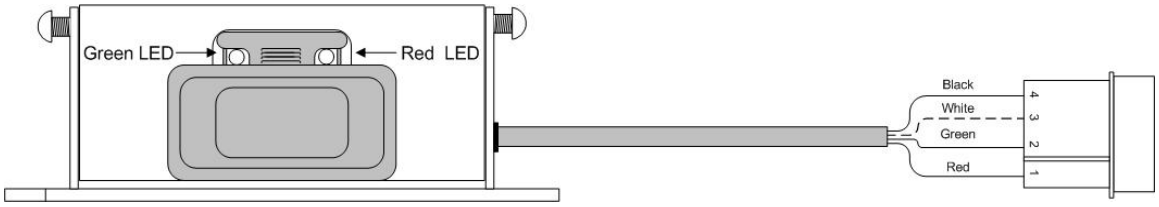
Ball detectors use a very simple principle. An invisible beam of light is constantly emitted from the ball detector. A reflector placed on the opposite of each lane returns the light beam to the unit. When the signal is cut (ball is detected) the ball detector communicates the information to the pinsetter control box. Then the pinsetter control box will start the different movements of the appropriate pinsetter.

Each ball detector has two LEDs that simplify the adjustment of the unit. The green light signifies that the beam is perfectly aligned with the reflector while the red light indicates that the alignment is borderline.

If neither of the lights are visible on a ball detector, one of three things is possible: The ball detector is completely misaligned, it is defective or the cable from the pinsetter control box has been cut or disconnected.

1. Loosen the screw located on the ball detector.
2. Move up, down, right or left until the green light appears on the ball detector.
3. Once you have a green light, slide a sheet of black construction paper across the lane where the ball detector is located. The green light should stay on. If the green light goes off, this means that the signal is bouncing off the lane instead of being just above the lane. Move up the ball detector.
4. Once the ball detector is well aligned, tighten all the screws and check the adjustment again.

Figure 2-2 Ball detector

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*Procedure 2-2 Strings Adjustment*

A good strings adjustment is the key for the proper operation of the TMS pinsetter. Before attempting any other adjustment please perform the string adjustment.

1. If it is not already ON, power on the pinsetter.
2. Put button #4 in the ON position (Down).
3. Push button #1 (adjust) once. The pinsetter will go to a calibration cycle and the drawbar will stop in the string adjustment position (between the LOS and BOS sensors).
4. Adjust the string in a manner that the pins are stable in their position and that the reel arm is still touching the upper reel arm stopper.

*Figure 2-3 Pin Detector Button*

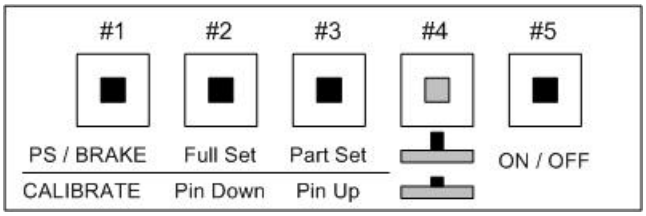
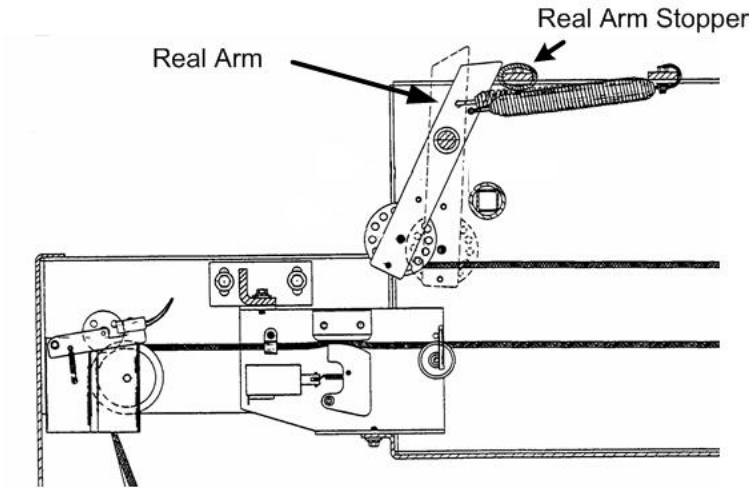



*Figure 2-4 Reel Arm Position*




5. When the string adjustment is done, put button #4 in off position (up) and press button #3. This will cycle the pinsetter.

### *Procedure 2-3 - LOS Limit Optical Sensor*

This limit optical sensor is used to tell the TMS power box when the drawbar reach is in the upper position during the calibration process. The position of that sensor is fixed, and you should not attempt to move it.

### *Procedure 2-4 - BOS Brake Optical Sensor*

This limit optical sensor is used to tell the TMS power box where it will have to activate the pin brakes. By varying the position of this optical sensor you will determine the height of the pin when they are in their upper position.

### *Procedure 2-5 - PPOS Pin Pause Optical Sensor*

This limit optical sensor is used to tell the TMS power box where it will have to slow down its movement in order to gently deposit pins on the pin deck. The TMS power box records that position during the calibration process. That calibration occurs every time the pinsetter is turned on, or it can be done manually using the pushbutton situated on the Solenoid/Opto Control Box. You should adjust the position of that sensor in such a manner that the pins are slowing down just before they hit the floor.

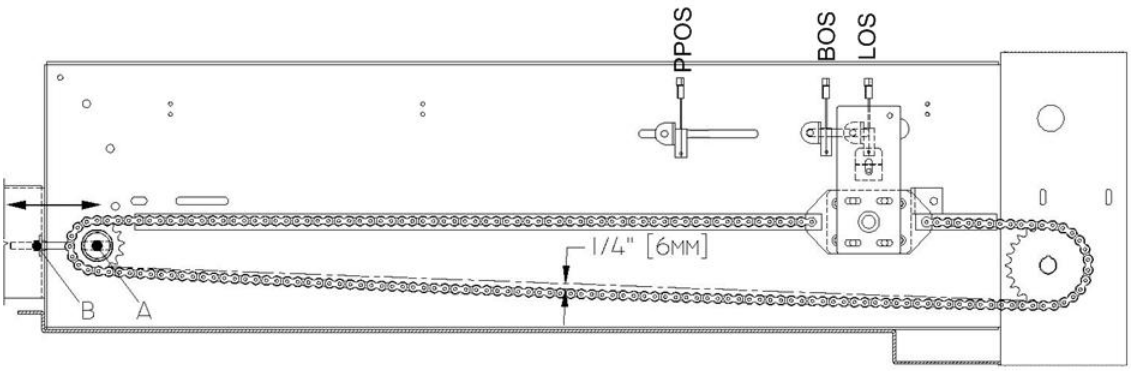



*Figure 2-5 - Optical Sensor Position*

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*Procedure 2-6 - Repairing String and Bushing*

1. Raise the front cover of the pinsetter and press the Power On button. The pinsetter will start up and set the pins on the lane
2. Open the circuit breaker located on the power box between the two pinsetters.
3. Look for visual signs of wear on strings and pin head bushings.
4. Any string which is frayed or worn should be repaired or replaced as illustrated in Figure 2.6

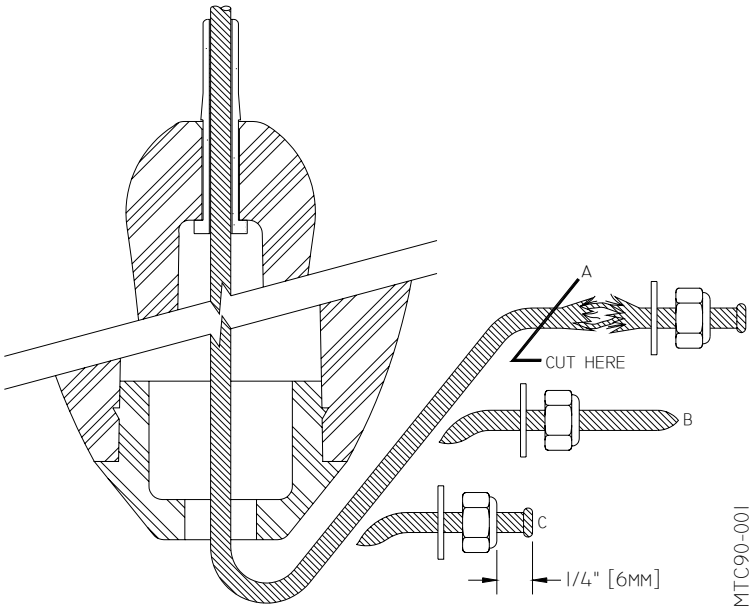


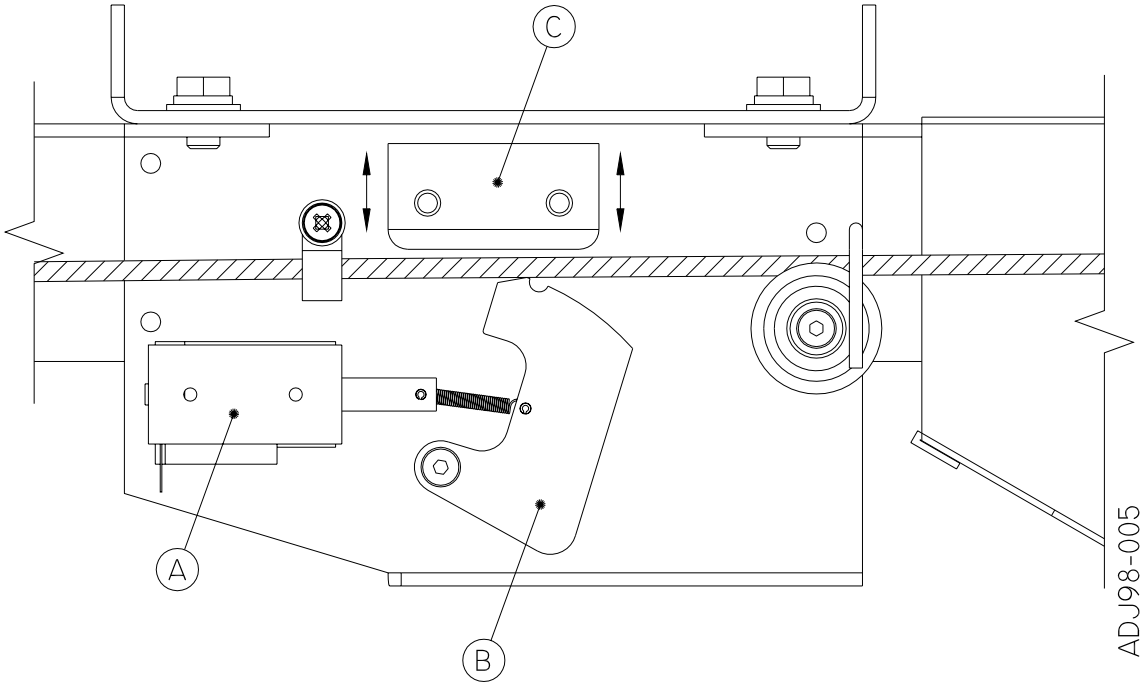

*Figure 2-6 - String Repair*

1. Slide the string down through the pin and cut the worn out section.
2. Burn the string tip using a match or cigarette lighter. Use a rotating motion with a rag to create a point on the string. Replace the pin head bushing if necessary. Place a new washer and crimp a new nylock nut on the string. Use the swaging tool (Z-001) supplied with your spare parts kit to crimp the nut on the string.
3. Cut the end of the string ¼-inch (6mm) from the crimped nut. Burn the string tip to shape a lump under the nut. Slide the pin along the string and check that it turns freely.
4. Once the repairs have been finished, close the circuit breaker on the power box and press the start button.
5. Proceed with the strings adjustment procedure.

*Procedure 2-7 - Adjusting the Pin Brakes*

1. Raise the front cover of the pinsetter and press the Power On button. The pinsetter will start up and set the pins on the lane.
2. Press button #1 (PS Brake). The drawbar will move to the rear of the pinsetter and each pin brake will be activated.
3. The brake plate may be moved in the direction shown by the arrows in Figure 2.7. Slightly loosen the bolts which hold the brake plate in place and then raise the brake plate to loosen the pin's string or lower the brake plate to tighten the pin's string.
4. Press button #3 (Full Set) to reestablish normal functions.

*Figure 2-7 - Pin Brake Adjustment*




*Procedure 2-8 - Pin Brake Adjustment*

Pin brakes should be inspected weekly and if necessary, adjusted. The solenoid (A) pulls the cam (B) which jams the string on the brake plate (C). If a pin is lowered to the lane when it should stay up or if a pin stays up when it should be lowered to the lane, the pin brakes need adjusting. Follow the procedure above to adjust your pin brakes.

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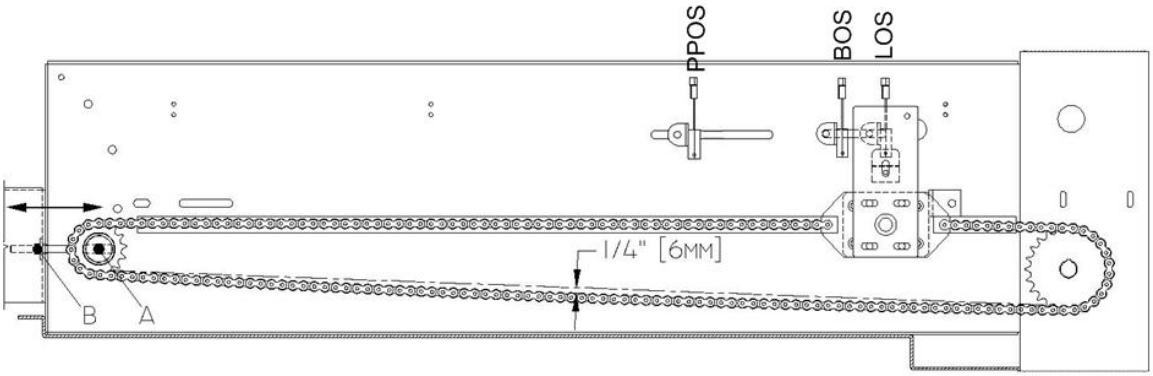
*Procedure 2-9 - Adjusting Chain Tension of the Drawbar*

1. Make sure that the drawbar is in the D2 (UP) position.
2. Open the main circuit breaker located on the power box situated between the two pinsetters.
3. Visually check for a 1/4-inch (6mm) dip in the middle of the chain.
4. If adjustment is necessary, loosen the sprocket's nut (A) and adjust as necessary using the front end adjustment nut (B).
5. Re-tighten the sprocket's nut (A).

Figure 2-8 - Drawbar Chain Adjustment

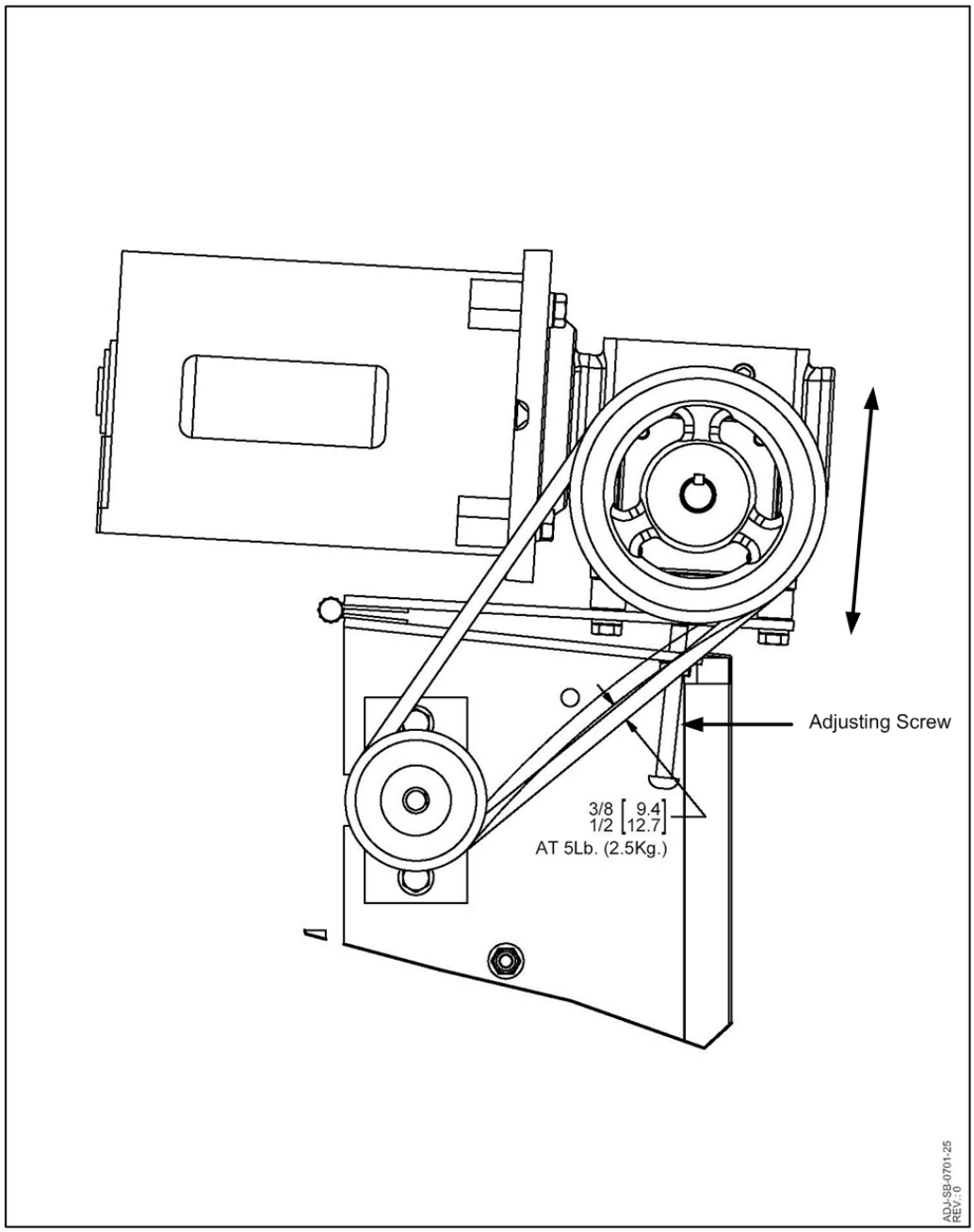



The drawbar chain must not be tightened to extreme. The mechanism must have some slack to it in order to extend the life of the pinsetter. Oil the chain with a very small quantity of SW10 motor oil only when absolutely needed. Remove all excess oil and grease from the chain and surrounding area on a weekly basis. The chain's tension should be verified and adjusted on a monthly basis.

*Procedure 2-10 Adjusting Rear Ball Lift V-Belt*

Adjust tension of the V-belt in order to have a span of 3/8 to 1/2” with 5 pounds of pressure on the middle of the belt. Use the Adjusting Screw to raise or lower the motor assembly.

*Figure 2-9 Adjusting Rear Ball Lift V-Belt*

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# 3. Taking Care of Your Highway 66

## Chapter Overview

This chapter contains information about the proper handling and care of your equipment.

# Preventive Maintenance Basics

Here are some basic points about keeping your equipment functioning properly.

Machines must be kept free of dirt, dust and excess oil. A well cared for machine is a clean machine. A clean machine performs much better and reduces the chance of electronic problems.

Do not place items on top of electronic components or cover any of their vents. These vents provide airflow to keep your electronics from overheating.

Keep food and drinks away from electronic components. Food particles and spills might make the electronics sticky and unusable.

Do not get the power switches or other components wet. Moisture can damage these parts and cause an electrical hazard.

Always disconnect a power cord by grasping the plug, not the cord.

Machines are subject to constant vibration and must be checked frequently for loose nuts and bolts. All bolts on the machines and accessories must be tightened with a torque wrench. Over tightening bolts will simply cause them to break and depending on the function of the bolt, may cause operating headaches. Also, check and tighten any loose screws on the pinsetters, especially the setscrews, as well as any loose bolts on the pit cushions and ball elevators at regular intervals.

Setup and maintain a preventive maintenance program as outlined in this chapter.

# Manufacturer’s Recommendations

Always use original Qubica parts with your equipment.

The detailed part listings in this publication make it easy to locate parts for reordering purposes. Always order parts by the part number and description, not by index and/or page numbers because this information is subject to change.

Always supply your equipment’s serial number when placing an order.

## Setting up a Preventive Maintenance Program

The simplicity of Qubica equipment being its main characteristic, it is very easy to understand its concept. At the same time, it must be understood that equipment of any kind requires a minimum of maintenance and should operate according to standards. Regular, scheduled maintenance is very important in order to keep your equipment in excellent condition.

# Getting Organized

The Preventive Maintenance Work Schedule is an organized schedule of routine preventive maintenance that must be performed on all machines over a four-week period.

First, the machines must be divided into four groups as evenly as possible. For example, if your center has sixteen lanes of equipment that are divided into four groups, each group would have four machines. Maintenance is performed on each group during different days of the week.

Let's briefly look at how the Preventive Maintenance Work Schedule is organized.

At the top of the work schedule are the four different colored boxes. This color-coding prevents confusion between the groups of machines. For example, if machines 1-4 are color-coded in green, once the scheduled preventive maintenance has been performed on machines 1-4, it is recorded in green on the work schedule.

Looking down the rest of the work schedule we see that the maintenance is divided into five areas. The headers on the right side of the page indicate these.

They show that the preventive maintenance is divided into five areas, according to time. There are services that must be performed daily, weekly, monthly, and quarterly.

Qubica strongly suggests that you make copies of the Preventive Maintenance Work Schedule and set up your own maintenance program as detailed on the pages in this section.

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# Preventive Maintenance Work Schedule

**Machine #** _____ **Thru #** _____ **Machine #** _____ **Thru #** _____

**Machine #** _____ **Thru #** _____ **Machine #** _____ **Thru #** _____

4-week period ending:_____

| **Daily Service** | **Assign** | **S** | **M** | **T** | **W** | **T** | **F** | **S** | **S** | **M** | **T** | **W** | **T** | **F** | **S** | **S** | **M** | **T** | **W** | **T** | **F** | **S** | **S** | **M** | **T** | **W** | **T** | **F** | **S** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Check stop sheets | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Check and repair strings | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wipe ball detectors and reflectors | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clean all lane surfaces | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Weekly Service** | **Assign** | **S** | **M** | **T** | **W** | **T** | **F** | **S** | **S** | **M** | **T** | **W** | **T** | **F** | **S** | **S** | **M** | **T** | **W** | **T** | **F** | **S** | **S** | **M** | **T** | **W** | **T** | **F** | **S** |
| Clean all optical sensors | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Verify all pin brakes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wipe all stabilizers | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vacuum pit area | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wipe bowling balls | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Monthly Service** | **Assign** | **S** | **M** | **T** | **W** | **T** | **F** | **S** | **S** | **M** | **T** | **W** | **T** | **F** | **S** | **S** | **M** | **T** | **W** | **T** | **F** | **S** | **S** | **M** | **T** | **W** | **T** | **F** | **S** |
| Ball detector alignment | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clean all pin detector wheels | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Verify all chains | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Verify drawbar | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Verify ball elevator | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Quartely Service** | **Assign** | **S** | **M** | **T** | **W** | **T** | **F** | **S** | **S** | **M** | **T** | **W** | **T** | **F** | **S** | **S** | **M** | **T** | **W** | **T** | **F** | **S** | **S** | **M** | **T** | **W** | **T** | **F** | **S** |
| Tighten bolts and screws | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Verify pin pause | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Annual Service** | **Assign** | **S** | **M** | **T** | **W** | **T** | **F** | **S** | **S** | **M** | **T** | **W** | **T** | **F** | **S** | **S** | **M** | **T** | **W** | **T** | **F** | **S** | **S** | **M** | **T** | **W** | **T** | **F** | **S** |
| Check oil level in motor reducer | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

# Daily Maintenance Schedule

Let's look at the daily maintenance required of all machines each and every day.

- Everyday, all the machines must be checked for stop sheets. These are pieces of paper that are put on the back of the machine to indicate if something went wrong with it the night before. A qualified maintenance technician should immediately correct the malfunction.
- Pin strings should be inspected daily. If they show evidence of wear, they should be shortened and refastened and the string tension readjusted to compensate for the shortened string. If a proper program of string maintenance and inspection is set up, you will never experience a broken string during normal play. Put very simply, there is no excuse for strings breaking in play other than careless string maintenance.
- Wipe the ball detectors and reflectors with a damp cloth.
- Clean all lane surfaces and surrounding areas with a phosphate-free lane cleaner (Qubica part number Q82-0070) or similar. Regardless of the product you choose, it must be used in accordance with the manufacturers instructions. Always use a hand spray applicator.
- Condition all lane surfaces using bowling lane conditioner or standard vegetable cooking oil, but sparingly. Excess conditioner will make lanes appear to be dirty, it will also cause balls to be slippery - making them difficult to handle and also impede their return. Too much conditioner will also cover the bowling balls causing them to spin at the base of the ball elevator and block the ball pit. Do not apply conditioner to the approach sections, any conditioner in this area will cause players to slip.

*Once the daily maintenance is finished for all the machines, it is color-coded in the appropriate places on the work schedule.*

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# Weekly Maintenance Schedule

Following the daily maintenance of the machines there is also scheduled maintenance that needs to be performed weekly. Most of the weekly maintenance is simply cleaning which requires wiping off the major assemblies. All assemblies should be wiped clean with a dry cloth. Sometimes oil or grease may accumulate on these surfaces and a dry cloth will not remove them. When this happens, it makes sense to moisten the cloth with machine cleaner.

The weekly work schedule does not require that all the machines be serviced together. Rather, only one quarter of the machines must be serviced every two days. For a sixteen lane center, machine numbers one to four would be serviced on Monday, machine numbers five to eight would be serviced on Wednesday, machine numbers nine to twelve would be serviced on Friday, and machines thirteen to sixteen would be serviced on Sunday. This process repeats itself so that by the end of the month each machine will have been serviced four times.

## Weekly Cleaning

The cleaning simply involves wiping the various components indicated with a dry cloth. The pit area is best cleaned by vacuuming the dust that accumulates. Dust also accumulates inside the various optical reading devices located on the machine. This dust is best removed by using compressed air prior to vacuuming.

- Clean all optical sensors and pin detector wheels.
- Remove all excess oil and grease from the chains and surrounding area.
- Remove all dust deposits which have accumulated on the pin tables and pin stabilizer boards.
- Vacuum the pit area.
- Vacuum the ball elevator area.
- Wipe the ball detectors and reflectors with a damp cloth.
- Wipe the ball return track.
- Wipe the front ball rack and the bowling balls.
- Wipe the work area (bench, room, aisle).

## Weekly Adjustments

There is one adjustment which must be verified on a weekly basis, the pin brakes.

*Once the weekly items are finished for one quarter of all the machines, it is color-coded in the appropriate places on the work schedule.*

# Monthly Maintenance Schedule

Moving on to items performed monthly, we see that the first area to inspect and correct is the ball detector alignment. Although the ball detector is not a mechanical part of the drive train, it is a critical component to the machine's mechanics since all commands to and from the machine start with the detection of a ball.

The remaining monthly procedures are just as important as the rest of the preventive maintenance program. Although most of the adjustments listed below will not need adjusting, you must verify each one of them correctly in order to ensure yourself of their perfection thus allowing yourself to rest easy for another month.

- Check the drawbar chain and alignment.
- Check the ball elevators.

*Once the monthly items are finished for one quarter of all the machines, it is color-coded in the appropriate places on the work schedule.*

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# Quarterly and Annual Maintenance Schedule

Although the quarterly and annual servicing of machines is not done as frequently as the other services, they are just as important. Much of the quarterly service involves tightening the bolts and screws of the various assemblies. Loose bolts and screws may result in premature failure of the machine and may even result in serious damage to the machine or an operator.

## Nuts and Bolts

Machines are subject to constant vibration and must be checked for loose nuts and bolts. All bolts on the machines and accessories must be tightened with a torque wrench as indicated in the table below. Over tightening bolts will simply cause them to break and depending on the function of the bolt, may cause operating headaches.

The vibro-insulators and base plate spacer bolts located on the stabilizers are subject to continual violent shock and extreme vibration. They should be checked frequently for tightness.

| Bolt Size | American | Newton |
|---|---|---|
| 1/4” | 15 FT. LB. | 67 N/M |
| 5/16” | 19 FT. LB. | 85 N/M |
| 3/8” | 25 FT. LB. | 112 N/M |
| 1/2” | 29 FT. LB. | 130 N/M |

Tightening loose bolts and screws should not be limited to quarterly service however. Any time you come across a loose bolt or screw, it should be corrected immediately.

The following items must also be performed quarterly:

- Check the pin pause.
- Oil all chains if necessary;
- Oil all pulleys if necessary.

**Note**

*Oil all pulleys and chains with very small quantities of SW10 motor oil only if judged necessary. Don't forget that any excess oil will only drip into undesired places causing headaches for cleaning.*

# Annual Inspection

An annual inspection of the machine is best done by a qualified mechanic. He has the experience to determine the wear of parts and their need for replacement. The oil in all motor reducers must also be checked and added if required (use 80W-80 oil).

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# 4. Solving Problems

## Chapter Overview

This chapter contains information that will help you identify and correct problems that might arise as you use your equipment.

Services available and telephone numbers listed are subject to change without notice.

## Warning

***HIGH VOLTAGE IS PRESENT IN THE PINSETTER POWER BOX. THE MAIN CIRCUIT BREAKERS MUST ALWAYS BE SHUT OFF OR THE TWIST LOCK PLUG DISCONNECTED PRIOR TO REMOVING THE POWER BOX COVER OR BEFORE PERFORMING ANY ADJUSTMENT.***

## Read This First

If you have a problem with your TMS Pinsetter System, always verify the following points before replacing system components as indicated in this chapter.

- Check that you have electrical power to the system; a glance at the fuse box could save you a lot of precious time.
- Make sure that the LED on the ball detector is green.
- Simulate a power failure.
- Check that all cabling assemblies are well connected.

## Hint on Cabling Problems

There are only two possible solutions to cabling problems. First, any one of the connectors used with the cable assembly may have become loose due to the constant vibration generated from play. Second, a cable may be cut or have been pinched by a foreign object. The solutions are simple, ensure that all connectors are well positioned and push down on each one to ensure its proper contact. If this fails to resolve your problem, use a multi-meter to verify the cable assembly's continuity.

- Verify the relative humidity in your center. When humidity levels get too low, static electricity transported by people can build up to enormous levels. These levels can be so large that even good grounds will not stop the destruction of these static discharges. Be advised that the recommended relative humidity level for a bowling center is between 40 and 50 percent.
- Retrace the ground wire installed with your equipment all the way to the building's main ground. Never depend upon the ground installed with your outlets, since many electricians do not reliably install these grounds. If your equipment is not properly grounded the CPUs can literally blow their electronic chips when they receive a static electricity discharge, be it from the players or a defective part.

## Procedure 4-1 - Untangling Pin String

If pin strings tangle, the pinsetter will attempt to untangle them 8 times. If strings are knotted, they will have to be untangled manually. Use the following steps to perform such an operation

1. Raise the masking unit and enter beneath it to the front of the pinsetter.
2. Lift the cover at the front of the pinsetter and press button #4. That will stop the movement of the pinsetter.
3. Untangle the strings by hand.
4. Press button #4 again and then press button #3 (Part set) The pinsetter will cycle.
5. Close the cover on front of the pinsetter. The pins which were still in play will be re-spotted.
6. Leave the pinsetter area and lower the masking unit to its normal position
7. 

## The Pinsetter Doesn't React to a Ball Rolled Down the Lane.

1. Check the ball detector's adjustment and cabling.
2. Reset the main circuit board, if this does not rectify the problem, replace the lane Ball Detector.

## The Pinsetter Cycles when it Shouldn't.

1. Check the ball detector's adjustment
2. Reset the pinsetter’s main circuit board. If this does not rectify the problem, replace the CPU board inside the main control box.

## The Drawbar Continuously Moves Back and Forth.

1. Strings may be too tight, check their adjustment.
2. If this problem occurs when you start the pinsetter, check the LOS opto**.**

## The Drawbar does not Attain the Rear of the Pinsetter.

1. Check the string adjustment, they are probably too tight**.**

## The Chains Emit a Loud Noise.

1. Chains need to be adjusted**.**

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## One or more Fallen pins are Re-Spotted when they are not Supposed to

1. Check the brake adjustment of those pins.
2. Check solenoid connections.
3. Replace the solenoid.

## There are no Pictures on the Monitors

1. Check the cabling between the monitors and the Q-AMS.
2. Check the power for the monitors and the Q-AMS. If there is no power verify the overload circuit breaker identified “Accessories” on the TMS Power Box.
3. Reboot the Q-AMS, do so by unplugging the power cord and plugging it back.
4. Change the Q-AMS.

## There is no Reaction from the Joystick

1. Verify all joystick connections.
2. Check the cabling between I/O controller and the Q-AMS.
3. Check the power for the Q-AMS. If there is no power, verify the overload circuit breaker identified “Accessories” on the TMS Power Box.
4. Reboot the Q-AMS, do so by unplugging the power cord and plugging it back.
5. *Change the Q-AMS.*

## There is no Reaction from the Machines.

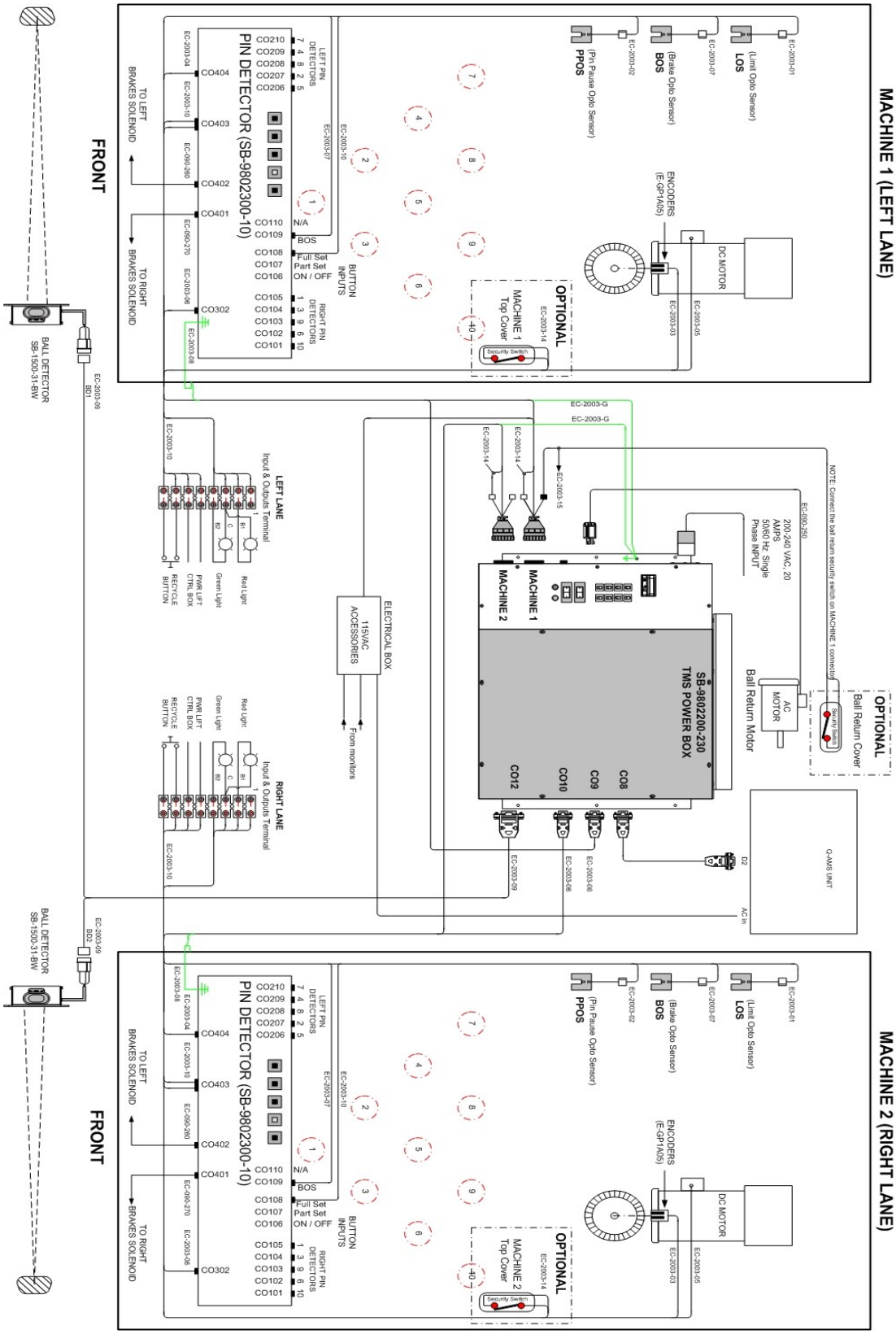
1. Check the cabling between TMS Power Box and the Q-AMS.
2. Check the power for the Q-AMS. If there is no power, verify the overload circuit breaker identified “Accessories” on the TMS Power Box.
3. Reboot the Q-AMS, do so by unplugging the power cord and plugging it back.
4. Change the Q-AMS.

# 5. Wiring Diagrams

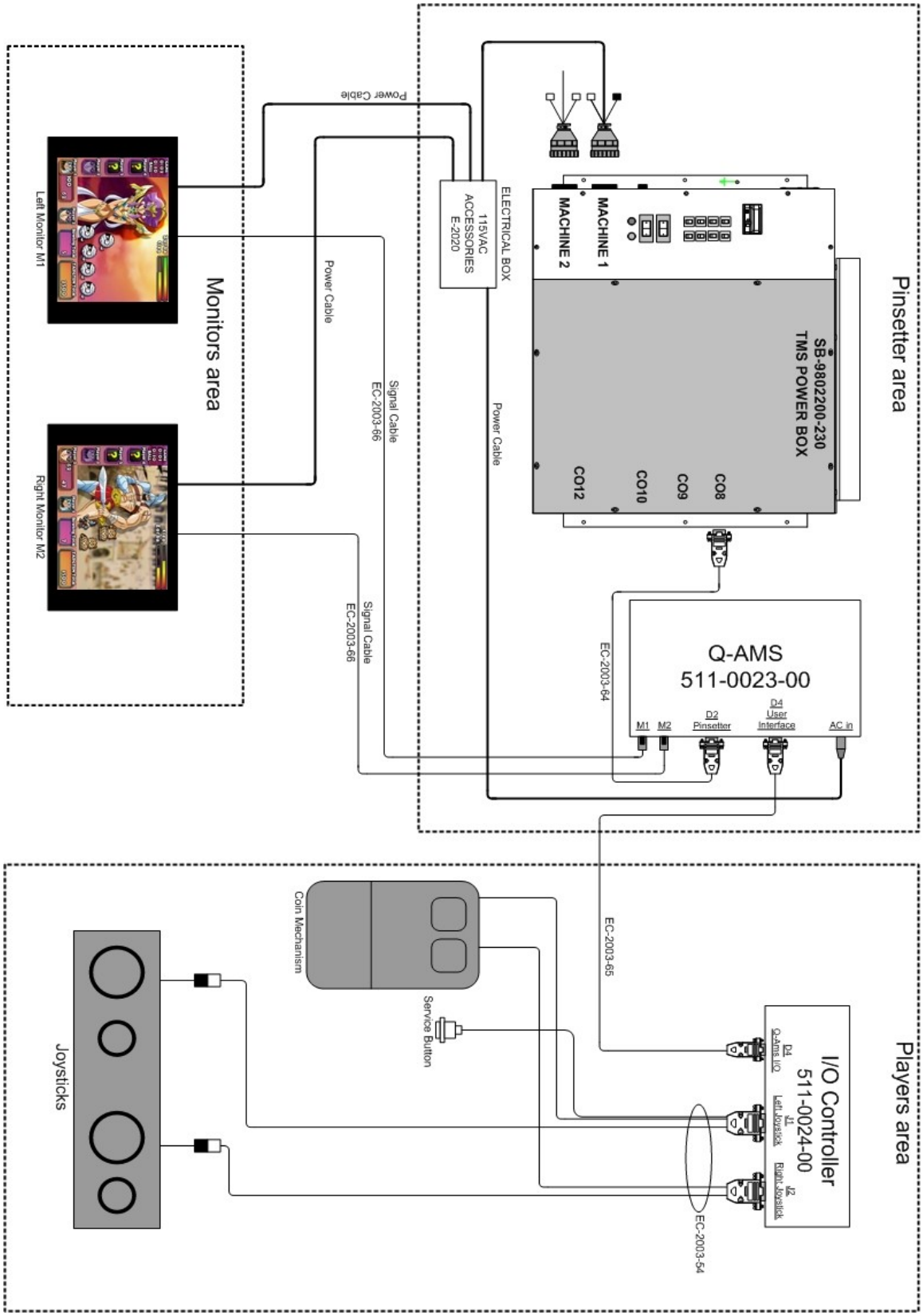
## Chapter Overview

This chapter provides you with all necessary wiring and electronic information in easy to comprehend diagrams.

# General Wiring



# Electronics Wiring

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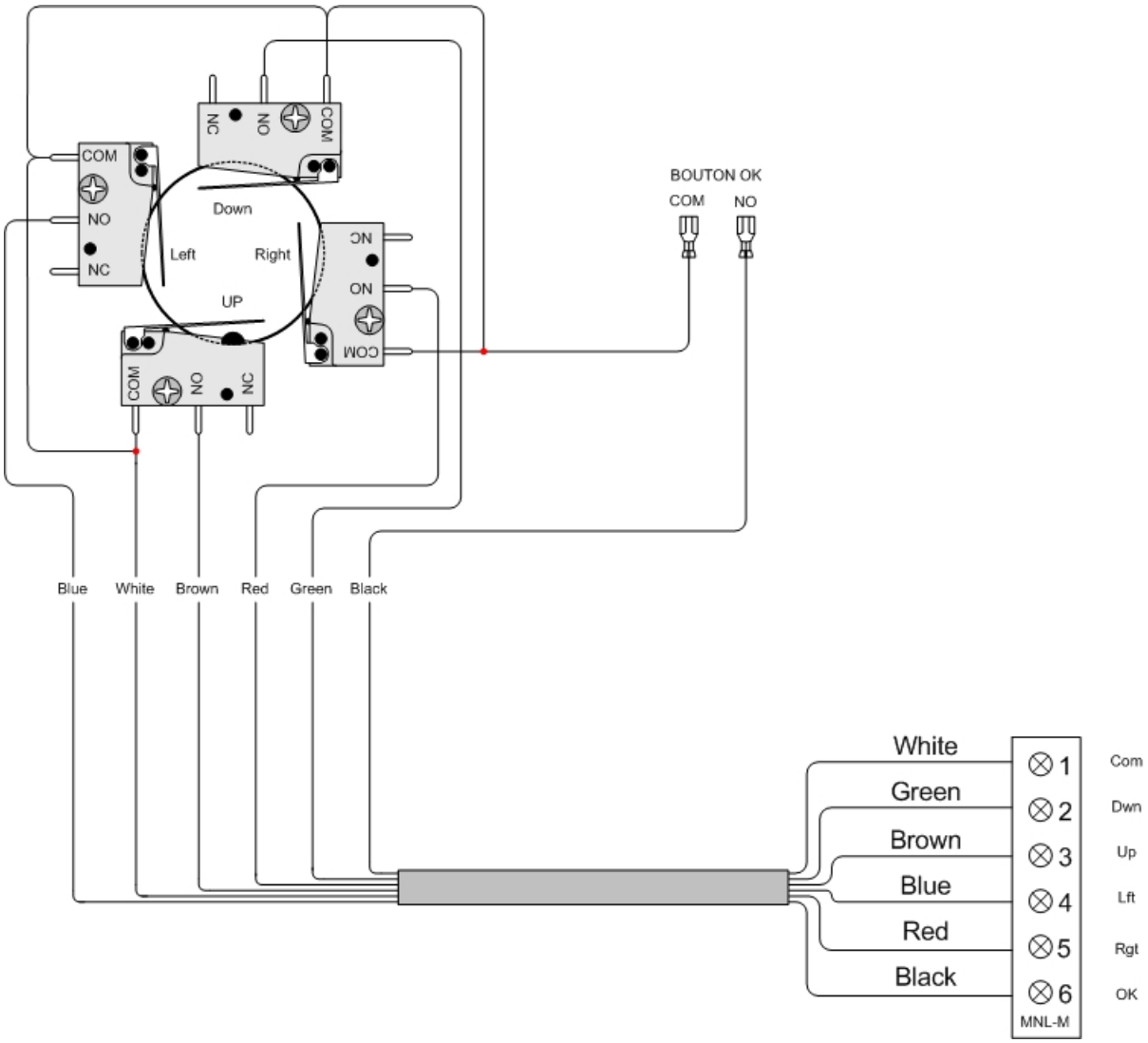
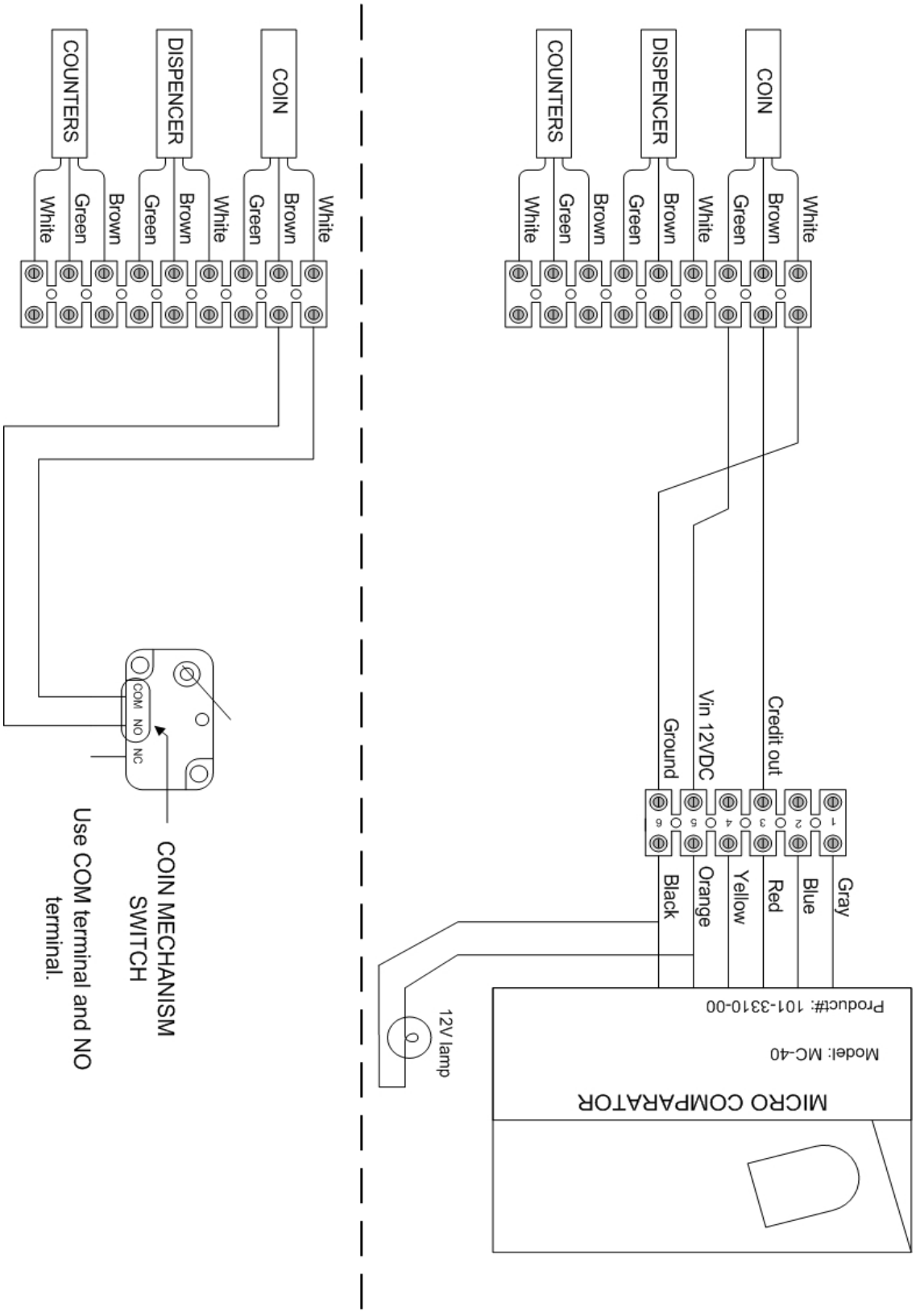
# Joystick Diagram



# Coin Mechanism (Coin Comparator)

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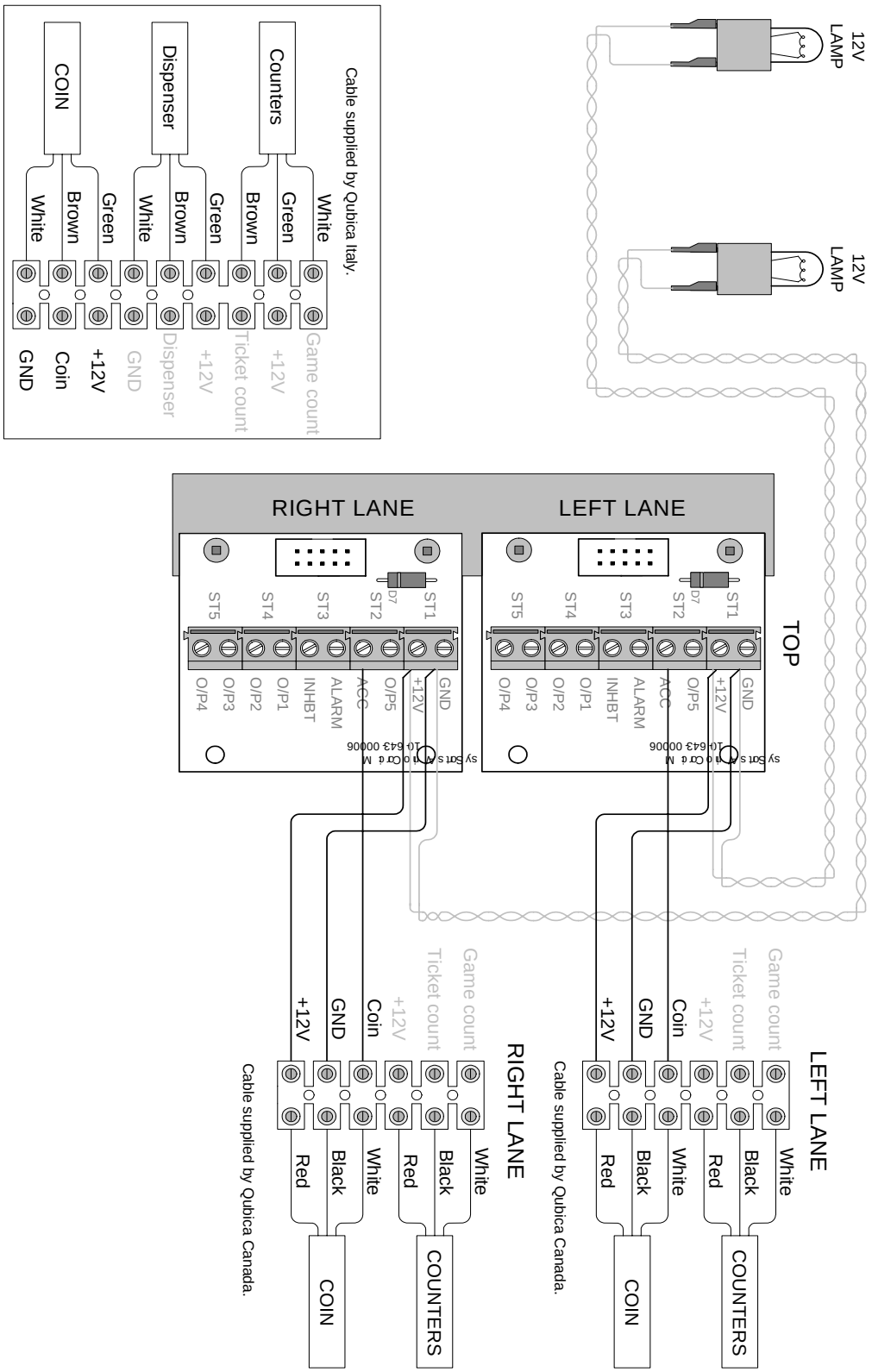
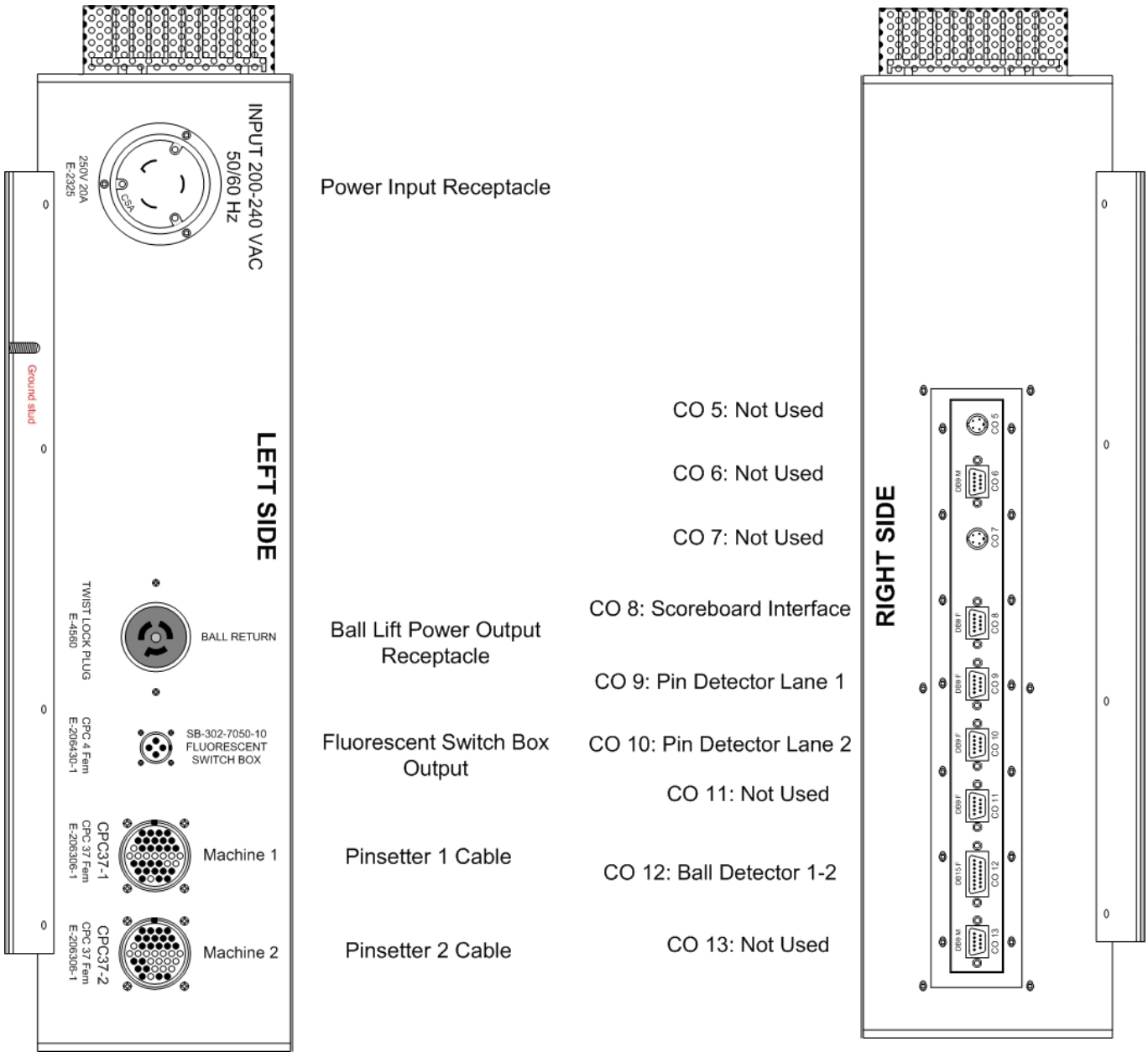
# Coin Mechanism (Multi Coin)



# Power Box Connectors

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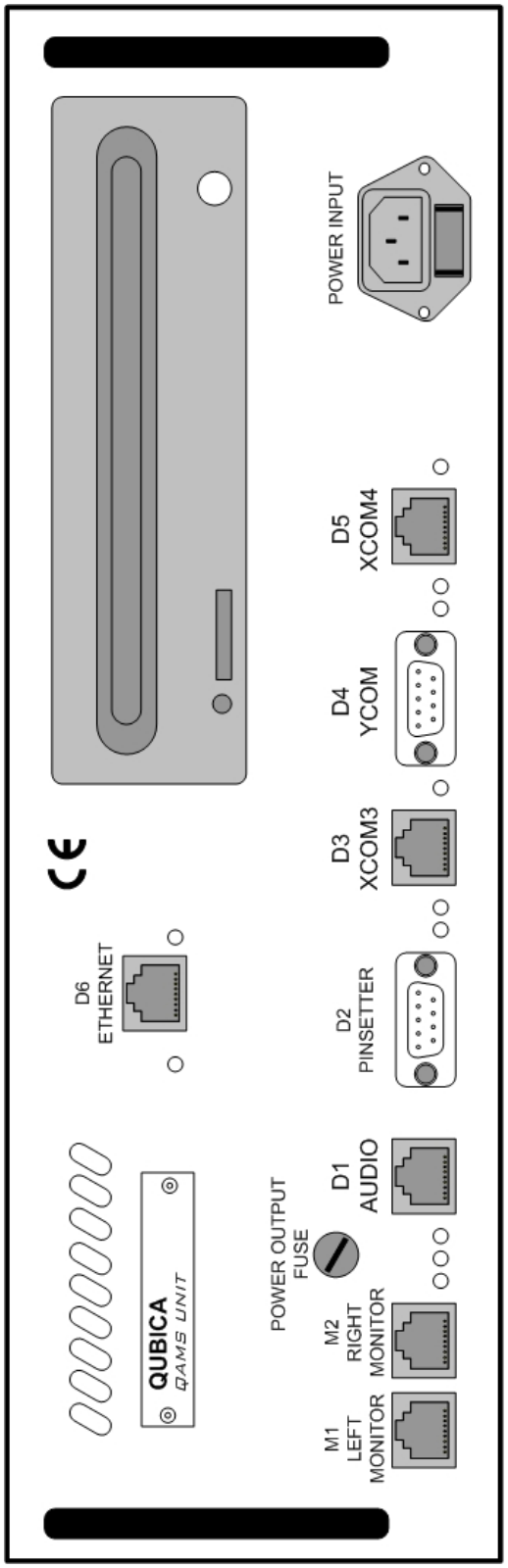
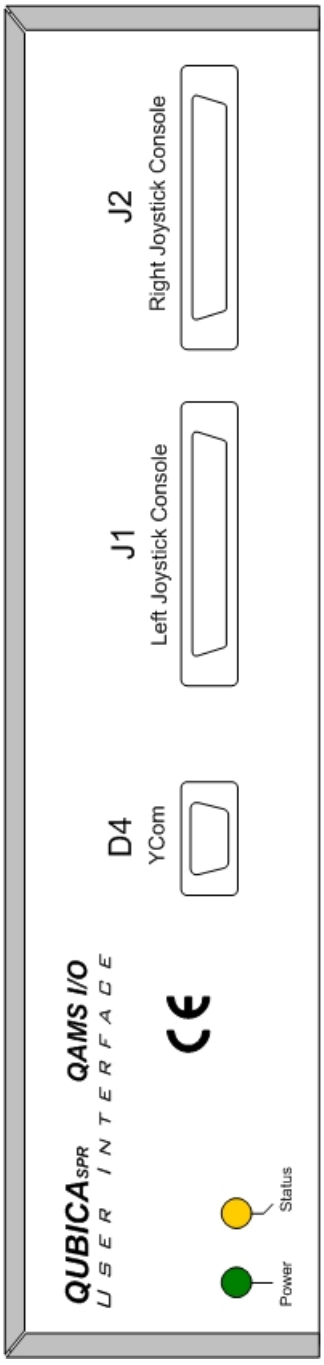
# Q-AMS Connectors



# I/O Controller Connectors




Right Lane Joystick, Button and Coin Mechanism

Left Lane Joystick, Button and Coin Mechanism

Q-AMS Input

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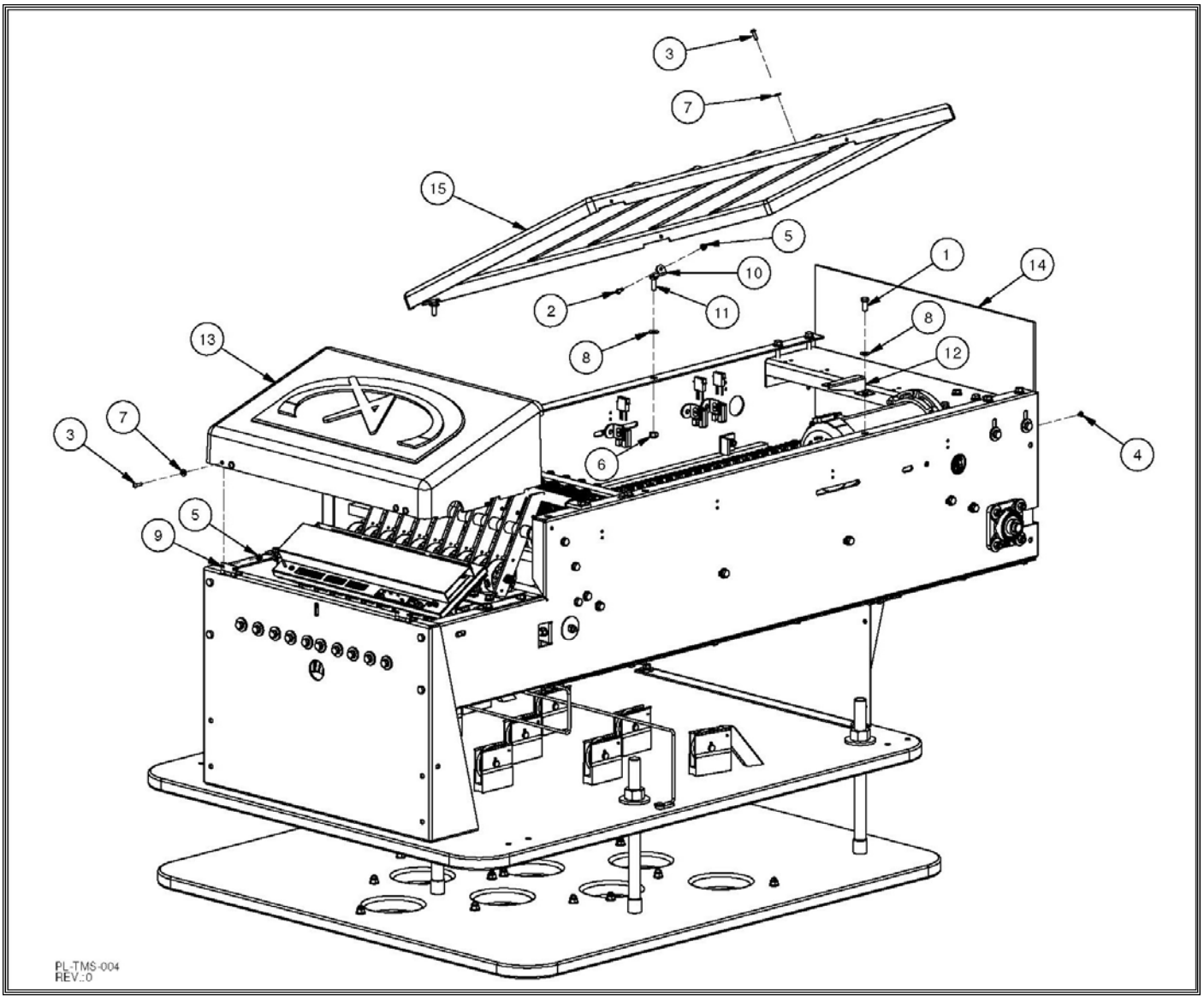
# 6. Parts Listing

## Chapter Overview

This chapter provides you with a complete breakdown of all your equipment’s parts in exploded views for your reordering and servicing convenience

# Safety Covers



# Liste de pièces des Couverts

| Item | Numéro de pièce | Description |
|---|---|---|
| 1 | 7010-003118-075 | 5/16-18 UNCX3/4 HEX CAP SCREW |
| 2 | 7016-411032-050 | 10-32 UNFX1/2 MA SC RH SO |
| 3 | 7016-411032-062 | 10-32 UNFX5/8 MA SC RH SO |
| 4 | 7022-411000-037 | #10 X 1 TAP SCW PH SOCK |
| 5 | 7036-001032-000 | HEX NYLON NUT 10-32 UNF |
| 6 | 7036-003118-000 | HEX NYLON NUT 5/16-18 UNC |
| 7 | 7050-021050-006 | 7/32 X 1/2 X 3/64 FLAT WASHER |
| 8 | 7050-034068-006 | 11/32 X 11/16 X 1/16 FLAT WASHER |
| 9 | 9102044 | HINGE |
| 10 | 9102047 | D RING CLIP |
| 11 | 9102048 | TOP COVER PIVOT |
| 12 | 9102203 | TOP COVER BRACKET |
| 13 | 9103201 | PIN DETECTION COVER TMS |
| 14 | 9103202 | REAR COVER |
| 15 | 9103203 | TOP COVER |

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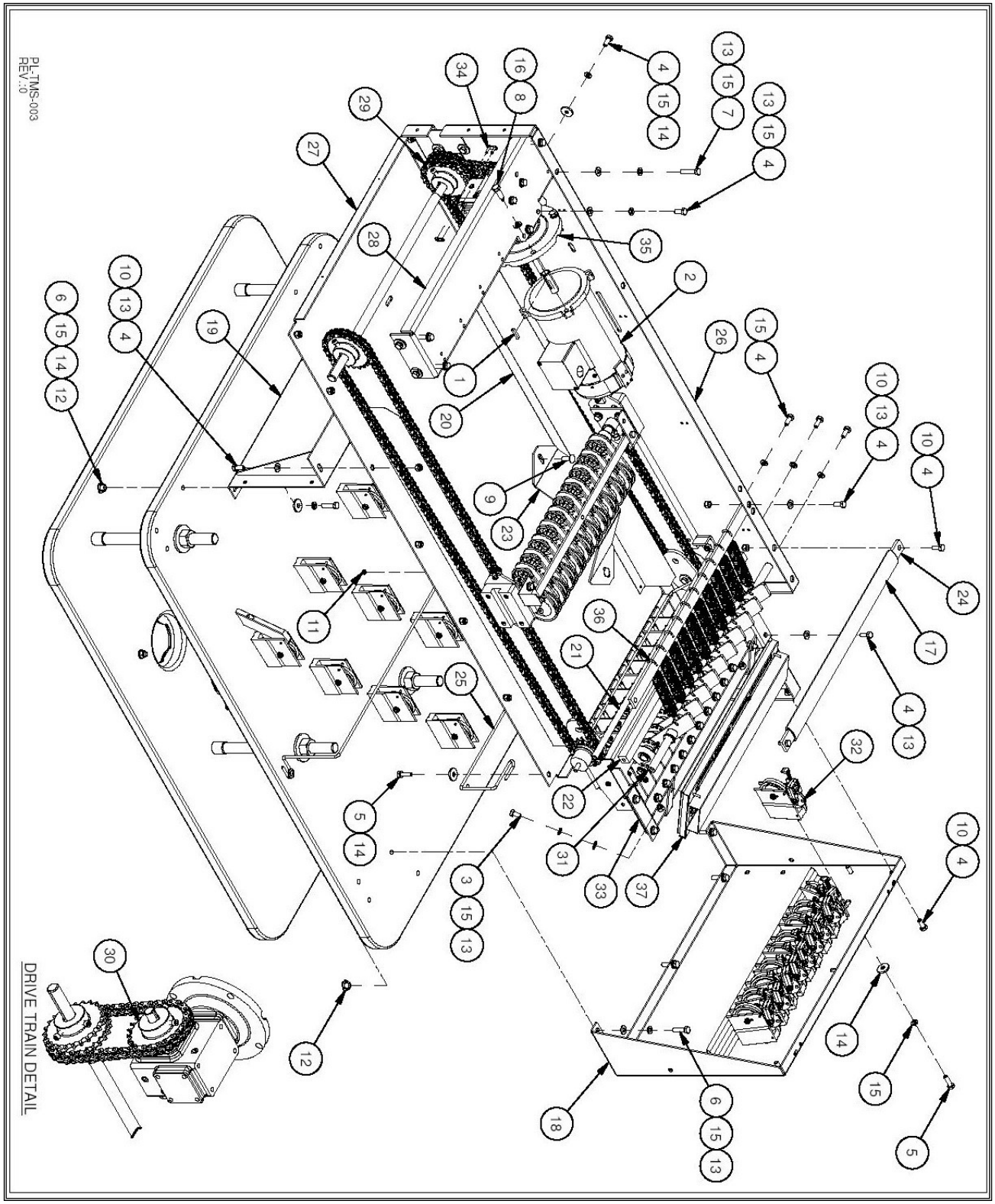
# Main Components



# Main Components Part List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 302-2410-00 | KEYWAY 3/16 | 5 |
| 2 | 311-1100-00 | MOTOR ASSEMBLY | 1 |
| 3 | 7010-003118-062 | 5/16-18 UNCX5/8 HEX CAP SCREW | 10 |
| 4 | 7010-003118-075 | 5/16-18 UNCX3/4 HEX CAP SCREW | 53 |
| 5 | 7010-003118-100 | 5/16-18 UNCX1 HEX CAP SCREW | 12 |
| 6 | 7010-003118-125 | 5/16-18 UNCX1 1/4 HEX CAP SCREW | 15 |
| 7 | 7010-003118-150 | 5/16-18 UNCX1 1/2 HEX CAP SCREW | 4 |
| 8 | 7010-003716-100 | 3/8-16 UNCX1 HEX CAP SCREW | 4 |
| 9 | 7012-003118-075 | 5/16-18 UNC X 3/4 CARRIAGE BOLT | 2 |
| 10 | 7036-003118-000 | HEX NYLON NUT 5/16-18 UNC | 45 |
| 11 | 7038-000632-000 | 6-32 UNC HEX KEEP NUT | 6 |
| 12 | 7045-003118-037 | 5/16-18 UNC TEE NUT | 7 |
| 13 | 7050-034068-006 | 11/32 X 11/16 X 1/16 FLAT WASHER | 67 |
| 14 | 7050-034100-012 | 11/32 X 1 X 1/8 FLAT WASHER | 40 |
| 15 | 7060-031057-009 | 5/16 LOCK WASHER | 56 |
| 16 | 7060-037067-010 | 3/8 LOCK WASHER | 4 |
| 17 | 8664-137112-012 | CAOUTCHOU PROTECTOR | 1 |
| 18 | 9102005 | SENSOR PLATE FRONT | 1 |
| 19 | 9102006 | PINSETTER SUPPORT PLATE | 1 |
| 20 | 9102007 | SIDE GUARD | 2 |
| 21 | 9102025 | SHAFT | 1 |
| 22 | 9102026 | LOWER REEL ARM STOPPER | 1 |
| 23 | 9102029 | ROPE HOLDING | 1 |
| 24 | 9102030 | UPPER REEL ARM STOPPER | 2 |
| 25 | 9102037 | STRING SUPPORT | 1 |
| 26 | 9102200 | SIDE FRAME-RIGHT | 1 |
| 27 | 9102210 | BOTTOM MOUNTING PLATE | 1 |
| 28 | 9102230 | COMMAND SUPPORT CHANNEL | 1 |
| 29 | 9102281 | DRIVE CHAIN | 1 |
| 30 | 9102292 | SPROCKET 40B24, 5/8 BORE | 1 |
| 31 | 9122027 | REEL ARM SHAFT ASSEMBLY | 1 |
| 32 | 9122057 | PIN DETECTION ASSEMBLY | 10 |
| 33 | 9122220 | BRAKE SUPPORT ASSEMBLY | 1 |
| 34 | M-0690-01-1 | CHAIN LINK #40 | 1 |
| 35 | M-BMQ1133-3 | MOTOR REDUCER | 1 |
| 36 | S-080 | EXTENSION SPRING | 10 |
| 37 | SB-9802300-10 | PIN DETECTOR TMS ASS'Y | 1 |

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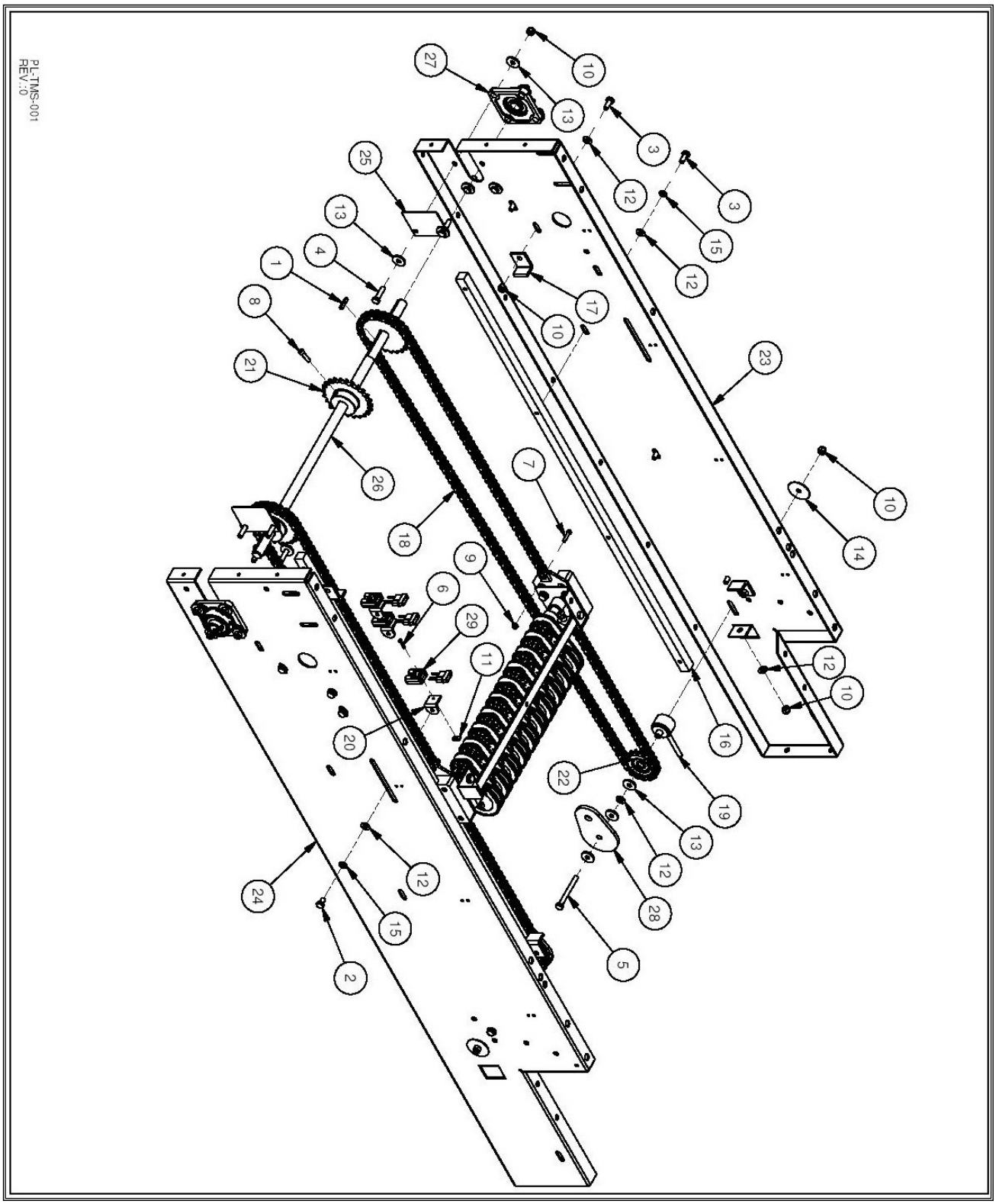
# Frame Assembly



## Frame Assembly Part List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 302-2410-00 | KEYWAY 3/16 | 4 |
| 2 | 7010-003118-050 | 5/16-18 UNCX1/2 HEX CAP SCREW | 3 |
| 3 | 7010-003118-075 | 5/16-18 UNCX3/4 HEX CAP SCREW | 53 |
| 4 | 7010-003118-125 | 5/16-18 UNCX1 1/4 HEX CAP SCREW | 15 |
| 5 | 7010-003118-300 | 5/16-18 UNCX3 HEX CAP SCREW | 2 |
| 6 | 7016-410632-075 | MA SC RH SOCK 6-32 UNCX3/4 | 3 |
| 7 | 7018-001032-087 | 10-32 UNFX7/8 HEX SO CA SCW | 4 |
| 8 | 7018-002520-087 | 1/4-20 UNCX7/8 HEX SO CA SCW | 8 |
| 9 | 7036-001032-000 | HEX NYLON NUT 10-32 UNF | 12 |
| 10 | 7036-003118-000 | HEX NYLON NUT 5/16-18 UNC | 45 |
| 11 | 7046-000632-006 | 6-32 UNCX1/16 WELD NUT | 3 |
| 12 | 7050-034068-006 | 11/32 X 11/16 X 1/16 FLAT WASHER | 67 |
| 13 | 7050-034100-012 | 11/32 X 1 X 1/8 FLAT WASHER | 40 |
| 14 | 7050-034175-012 | 11/32 X 1 3/4 X 1/16 FLAT WASHER | 2 |
| 15 | 7060-031057-009 | 5/16 LOCK WASHER | 56 |
| 16 | 9102016 | DRAWBAR GUIDE | 2 |
| 17 | 9102017 | DRAWBAR STOPPER | 4 |
| 18 | 9102019 | DRAWBAR CHAIN #40 | 2 |
| 19 | 9102036 | TENSIONNER | 2 |
| 20 | 9102054 | OPTICAL SENSOR SUPPORT | 3 |
| 21 | 9102092 | SPROCKET 40B24, 3/4 BORE | 3 |
| 22 | 9102094 | SPROCKET 40B15 | 2 |
| 23 | 9102200 | SIDE FRAME-RIGHT | 1 |
| 24 | 9102205 | SIDE FRAME-LEFT | 1 |
| 25 | 9102260 | PLATE BLANK | 2 |
| 26 | 9102350 | DRIVE SHAFT | 1 |
| 27 | M-0690-21 | FLANGE BEARING | 2 |
| 28 | P-001A | DRAWBAR SHEAVE PLATE | 2 |
| 29 | SB-ECIL-325-FS | OPTICAL SENSOR ASS'Y WHITE | 3 |

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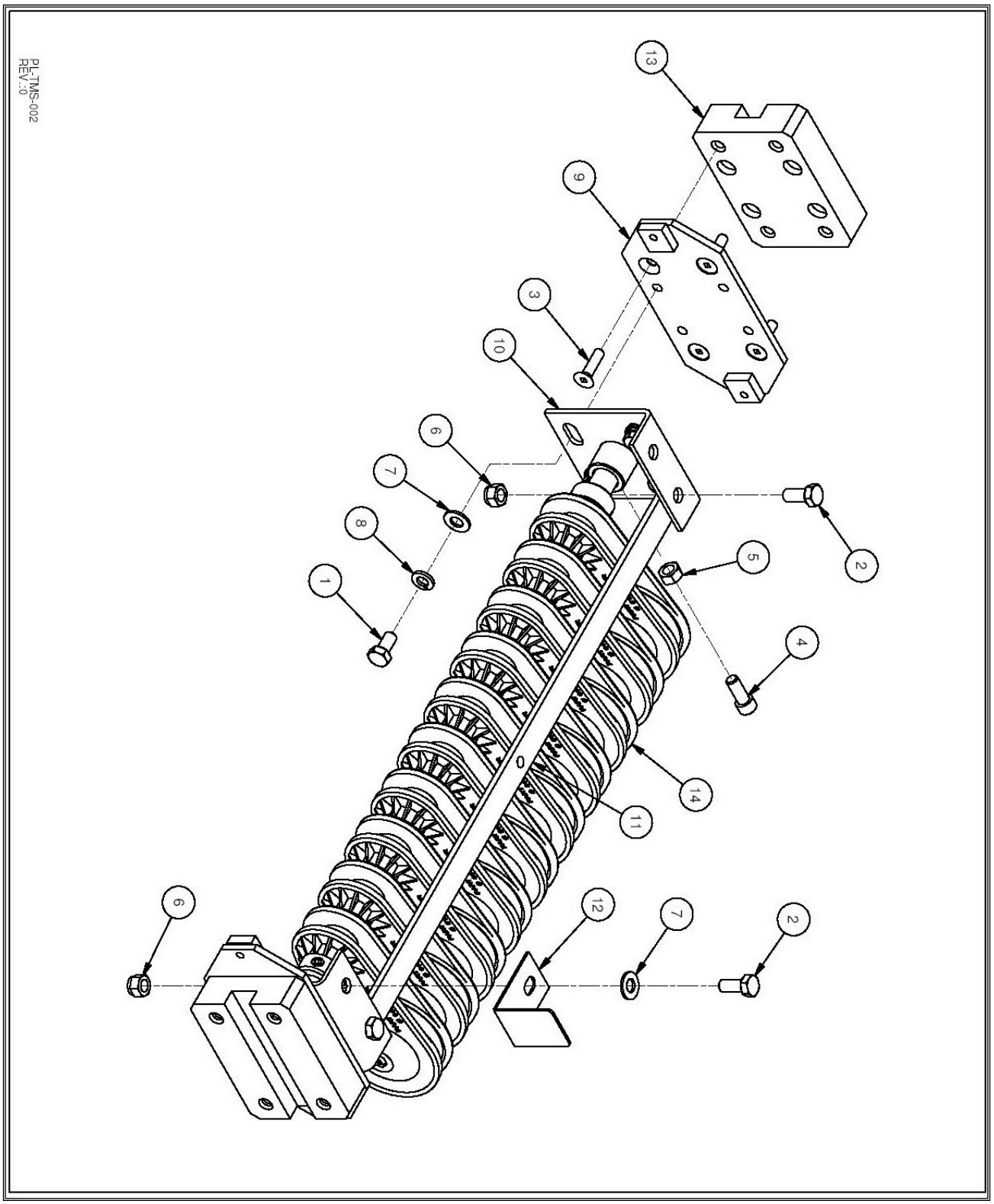
# Drawbar Assembly



## Drawbar Assembly Part List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 7010-003118-062 | 5/16-18 UNCX5/8 HEX CAP SCREW | 10 |
| 2 | 7010-003118-075 | 5/16-18 UNCX3/4 HEX CAP SCREW | 53 |
| 3 | 7016-312520-100 | 1/4-20 UNC X 1 FH MA SC | 8 |
| 4 | 7018-003118-075 | 5/16-18 UNCX3/4 HEX SO CA SCW | 2 |
| 5 | 7034-003118-000 | 5/16-18 UNC HEXAGON NUT | 2 |
| 6 | 7036-003118-000 | HEX NYLON NUT 5/16-18 UNC | 45 |
| 7 | 7050-034068-006 | 11/32 X 11/16 X 1/16 FLAT WASHER | 67 |
| 8 | 7060-031057-009 | 5/16 LOCK WASHER | 56 |
| 9 | 9102011 | DRAWBAR CHAIN PLATE | 2 |
| 10 | 9102213 | DRAWBAR ADJUSTMENT PLATE | 2 |
| 11 | 9102250 | DRAWBAR BRACE | 1 |
| 12 | 9102255 | ACTUATOR BRACKET | 1 |
| 13 | 9103011 | DRAWBAR GUIDE | 2 |
| 14 | 9122015 | DRAWBAR ASSEMBLY | 1 |

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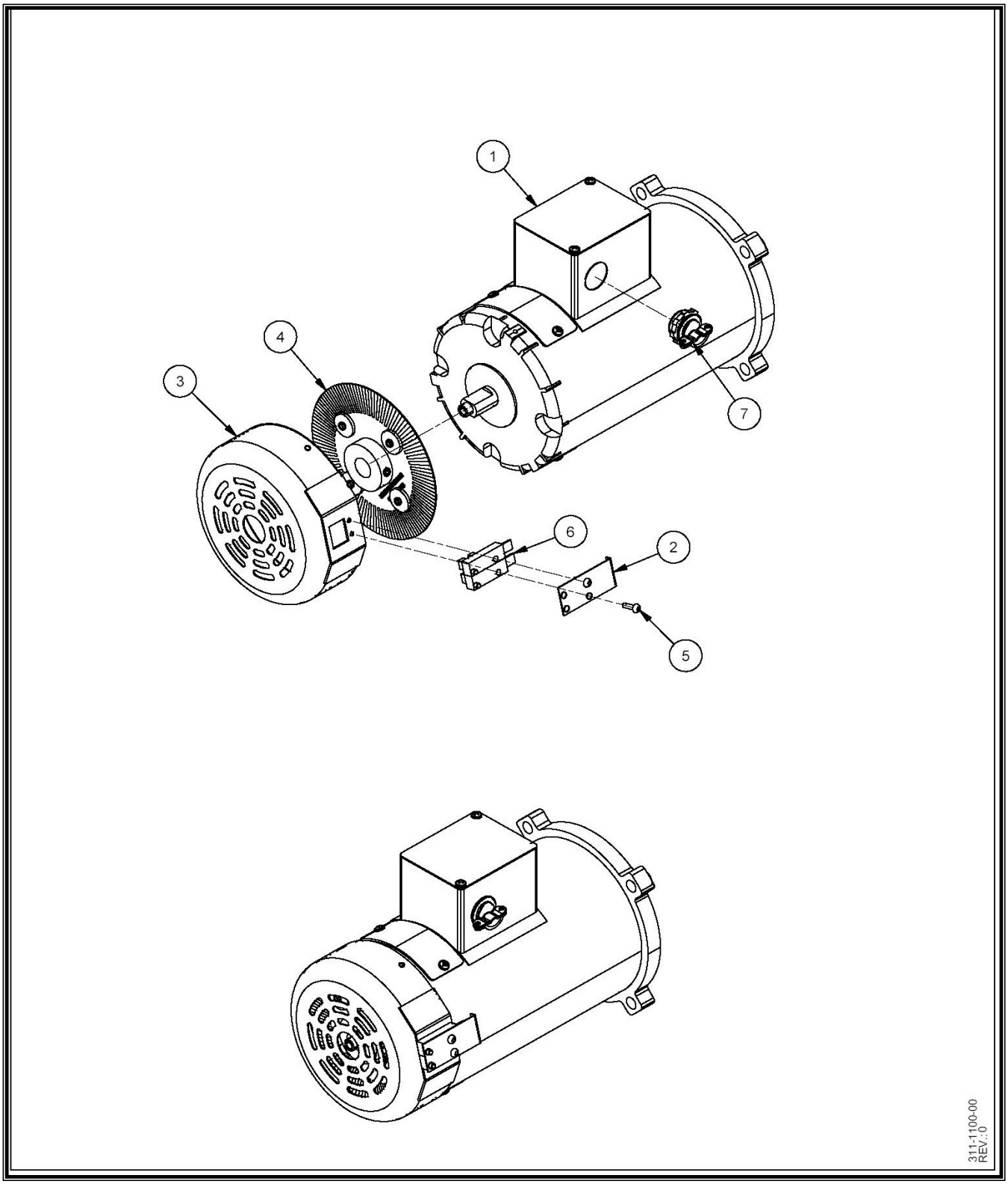
# 311-1100-00 DC Motor Assembly



# 311-1100-00 DC Motor Assembly Part List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 301-1100-00 | ELECTRIC MOTOR, 180VDC 3/4HP | 1 |
| 2 | 302-2200-00 | CONNECTION RETAINER | 1 |
| 3 | 302-2210-00 | ENCODER, DC MOTOR COVER | 1 |
| 4 | 322-2220-00 | MOTOR ENCODER PLATE ASS'Y | 1 |
| 5 | 7016-410632-050 | MA SC RH SOCK 6-32 UNCX1/2 | 2 |
| 6 | E-GP1A05 | ENCODER OPTICAL SENSOR | 2 |
| 7 | E-THS3350 | CONNECTEUR A LOOMEX | 1 |

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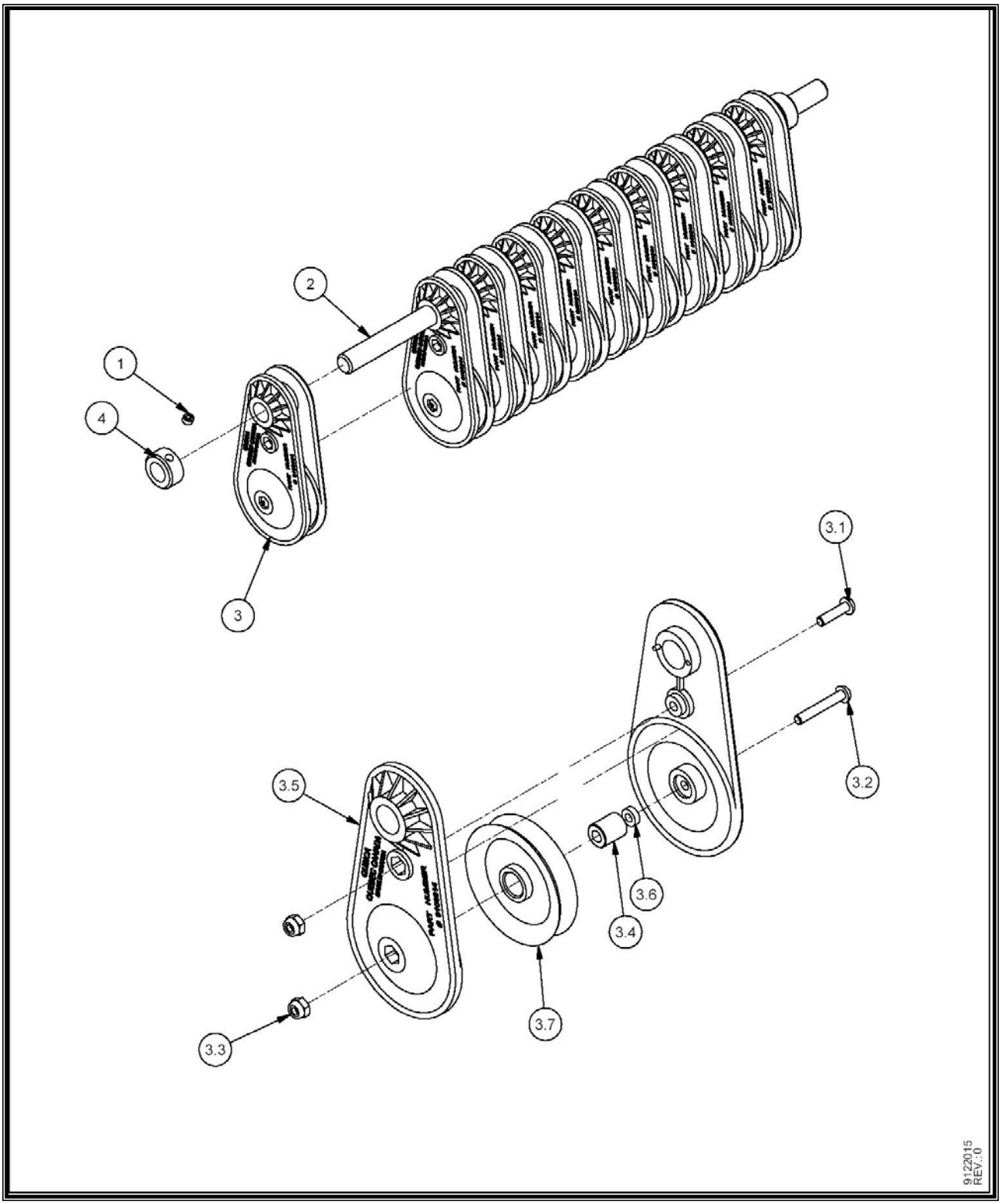
# 9122015 Drawbar Shaft assembly



# 9122015 Drawbar Shaft assembly Part List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 7014-003118-025 | 5/16-18 UNC X 1/4 SET SCREW | 2 |
| 2 | 9102015 | DRAWBAR SHAFT | 1 |
| 3 | 9133014 | SHEAF PLATE ASSEMBLY | 10 |
| 3.1 | 7016-411032-075 | MA SC RH SOCK 10-32 UNFX3/4 | 1 |
| 3.2 | 7016-411032-125 | MA SC RH SOCK 10-32 UNFX1 1/4 | 1 |
| 3.3 | 7036-001032-000 | HEX NYLON NUT 10-32 UNF | 2 |
| 3.4 | 9102020 | BUSHING | 1 |
| 3.5 | 9103014 | SHEAVE PLATE | 2 |
| 3.6 | 9103071 | PLASTIC SPACER | 1 |
| 3.7 | P-016A | PULLEY | 1 |
| 4 | M-0190 | STEEL COLLAR | 2 |

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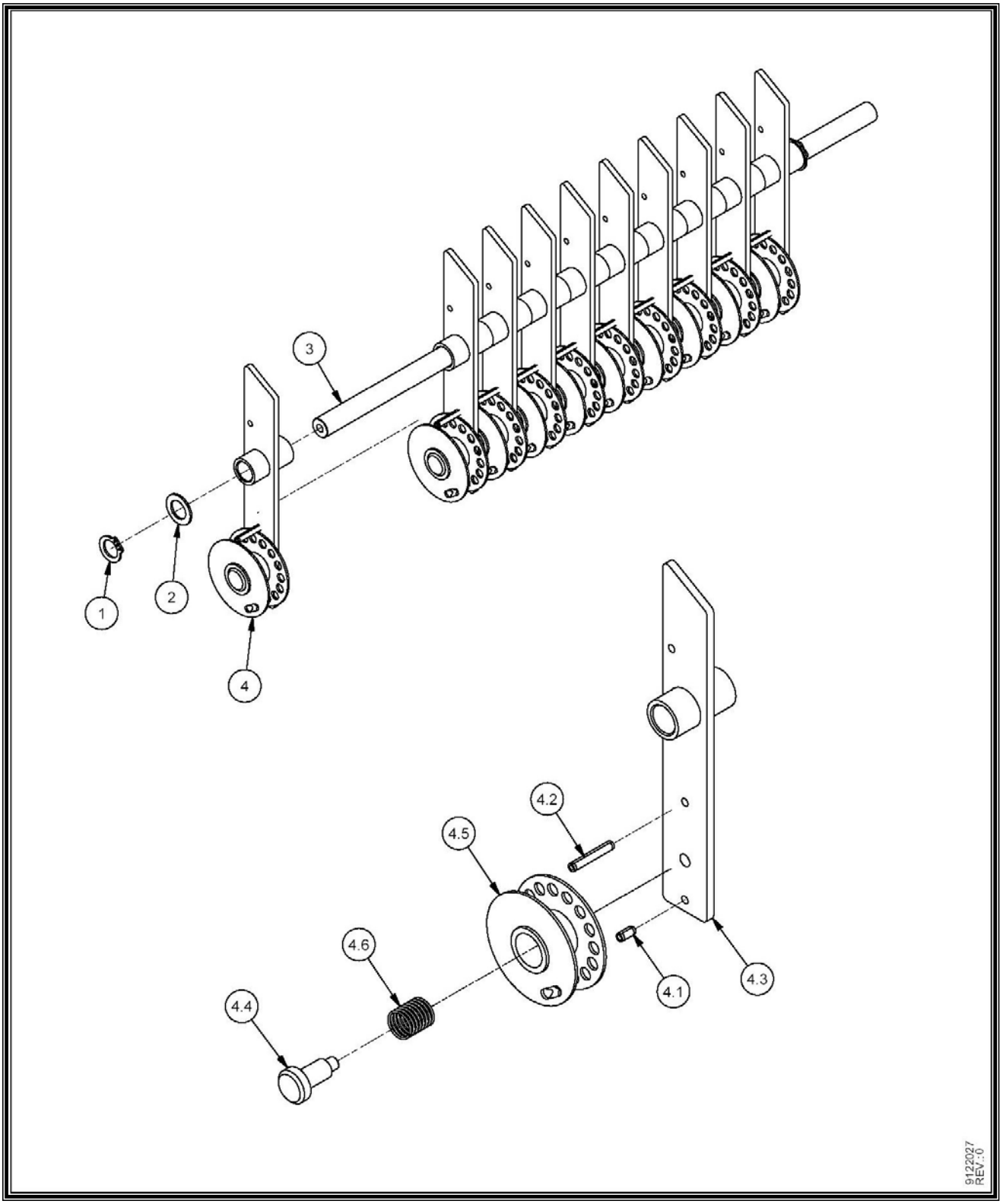
# 9122027 Reel Arm assembly



# 9122027 Reel Arm assembly part List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 7002-710000-62 | 5/8 EXTERNAL RETAIN. RING | 2 |
| 2 | 7052-062100-006 | 5/8 X 1 X 1/16 FLAT WASHER | 2 |
| 3 | 9102027 | REEL ARM SHAFT | 1 |
| 4 | 912202 | REEL ARM ASSEMBLY | 10 |
| 4.1 | 7006-001800-037 | SPRING PIN 3/16 X 3/8 | 1 |
| 4.2 | 7006-001800-112 | SPRING PIN 3/16 X 1 1/8 | 1 |
| 4.3 | 9102028 | REEL ARM | 1 |
| 4.4 | M-0011 | STORAGE REEL AXLE | 1 |
| 4.5 | M-0042 | STORAGE REEL | 1 |
| 4.6 | S-074 | STORAGE REEL SPRING | 1 |

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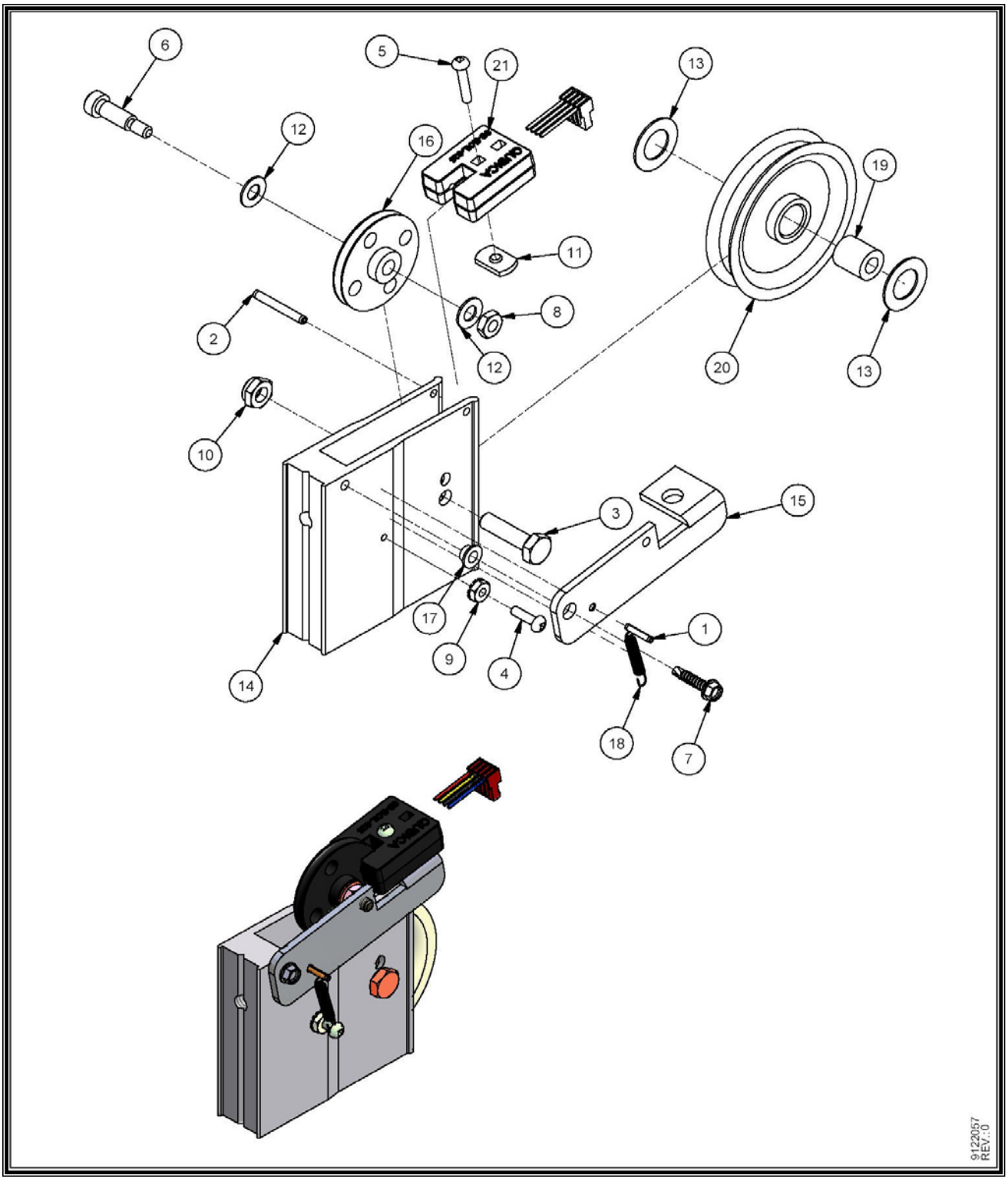
# 9122057 Pulley Detection Assembly



# 9122057 Pulley Detection Assembly Part List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 7006-000900-050 | SPRING PIN 3/32 X 1/2 | 1 |
| 2 | 7006-001200-100 | SPRING PIN 1/8 X 1 | 1 |
| 3 | 7010-002520-100 | 1/4-20 UNCX1 HEX CAP SCREW | 1 |
| 4 | 7016-410632-050 | MA SC RH SOCK 6-32 UNCX1/2 | 1 |
| 5 | 7016-410632-075 | MA SC RH SOCK 6-32 UNCX3/4 | 1 |
| 6 | 7020-002500-062 | 1/4 X 5/8 SHOULDER SCREW | 1 |
| 7 | 7027-200818-075 | #8-18 X 3/4 TECK SCW HEX WASHER | 1 |
| 8 | 7034-001024-000 | 10-24 UNC HEXAGON NUT | 1 |
| 9 | 7038-000632-000 | 6-32 UNC HEX KEEP NUT | 1 |
| 10 | 7044-002520-000 | HEX THIN NYLON NUT 1/4-20 UNC | 1 |
| 11 | 7046-000632-006 | 6-32 X 1/16 WELD NUT | 1 |
| 12 | 7052-025050-003 | 1/4 X 1/2 X 1/32 FLAT WASHER | 2 |
| 13 | 7052-050087-003 | 1/2 X 7/8 X 1/32 FLAT WASHER | 2 |
| 14 | 9102057 | SENSOR SHEAVE | 1 |
| 15 | 9102058 | SUPPORT BRACKET | 1 |
| 16 | 9103058 | WHEEL MOVEMENT DETECTOR | 1 |
| 17 | 9103059 | NYLON SHOULDER WASHER | 1 |
| 18 | 9105070 | EXTENSION SPRING | 1 |
| 19 | M-0100B | BUSHING | 1 |
| 20 | P-016A | PULLEY | 1 |
| 21 | SB-ECIL-325-PD | OPTICAL SENSOR ASS'Y RED | 1 |

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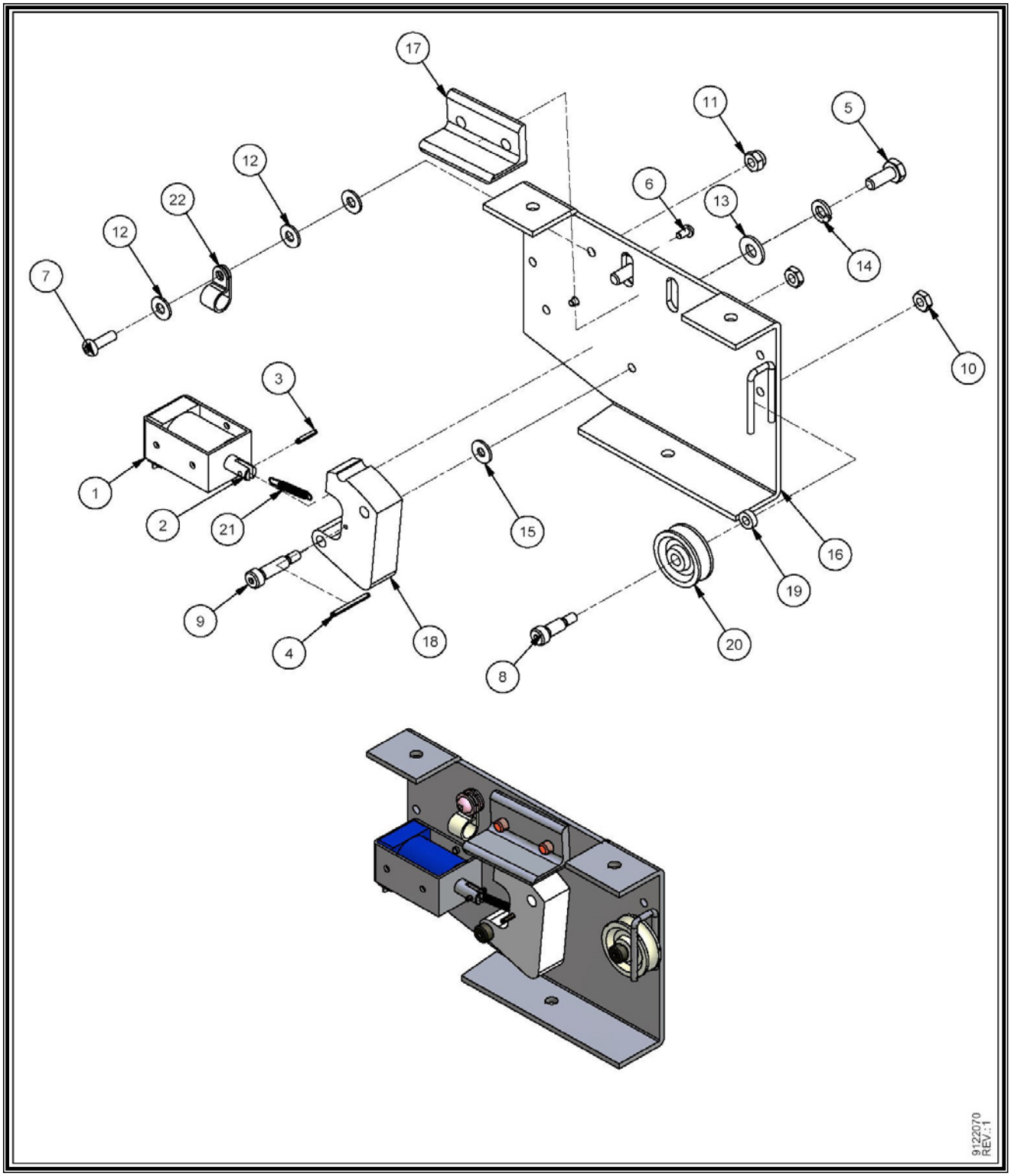
# 9122070 Pin Brake Assembly



# 9122070 Pin Brake Assembly Parts List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 301-5170-00 | SOLENOID | 1 |
| 2 | 302-5540-00 | SOLENOID SHAFT | 1 |
| 3 | 7006-000900-050 | SPRING PIN 3/32 X 1/2 | 1 |
| 4 | 7006-000900-100 | SPRING PIN 3/32 X 1 | 1 |
| 5 | 7010-002528-062 | 1/4-28 UNFX5/8 HEX CAP SCREW | 2 |
| 6 | 7016-410632-025 | MA SC RH SOCK 6-32 UNCX1/4 | 2 |
| 7 | 7016-411032-062 | MA SC RH SOCK 10-32 UNFX5/8 | 1 |
| 8 | 7020-002500-050 | 1/4 X 1/2 SHOULDER SCREW | 1 |
| 9 | 7020-002500-075 | 1/4 X 3/4 SHOULDER SCREW | 1 |
| 10 | 7034-001024-000 | 10-24 UNC HEXAGON NUT | 2 |
| 11 | 7036-001032-000 | HEX NYLON NUT 10-32 UNF | 1 |
| 12 | 7050-021050-006 | 7/32 X 1/2 X 3/64 FLAT WASHER | 3 |
| 13 | 7050-028062-006 | 9/32 X 5/8 X 1/16 FLAT WASHER | 2 |
| 14 | 7060-025046-006 | 1/4 LOCK WASHER | 2 |
| 15 | 7150-019050-004 | .193 X 1/2 X 3/64 FLAT WASHER | 1 |
| 16 | 9102070 | BRAKE PLATE | 1 |
| 17 | 9102071 | BRAKE ANGLE PLATE | 1 |
| 18 | 9103070 | BRAKE CAM | 1 |
| 19 | 9103071 | PLASTIC SPACER | 1 |
| 20 | 9103072 | GUIDE WHEEL | 1 |
| 21 | 9105070 | EXTENSION SPRING | 1 |
| 22 | E-660-09 | CABLE CLAMP | 1 |

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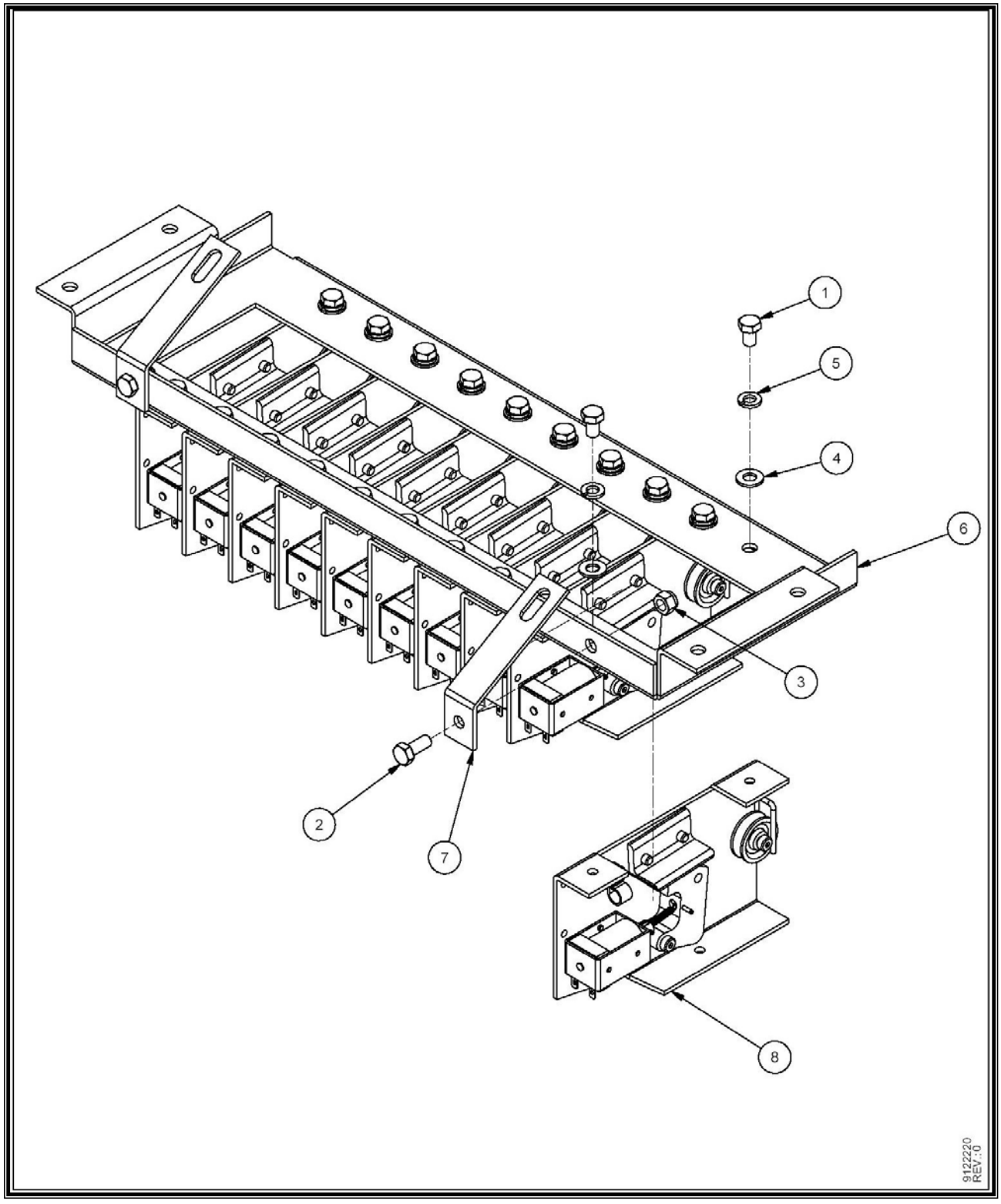
# 9122220 Ten Pins Brakes Assembly



# 9122220 Pin Brake Assembly Parts List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 7010-003118-050 | 5/16-18 UNCX1/2 HEX CAP SCREW | 20 |
| 2 | 7010-003118-075 | 5/16-18 UNCX3/4 HEX CAP SCREW | 2 |
| 3 | 7036-003118-000 | HEX NYLON NUT 5/16-18 UNC | 2 |
| 4 | 7050-034068-006 | 11/32 X 11/16 X 1/16 FLAT WASHER | 20 |
| 5 | 7060-031057-009 | 5/16" LOCK WASHER | 20 |
| 6 | 9102220 | BRAKE CHANNEL SUPPORT | 1 |
| 7 | 9102221 | CONTROLLER BRACKET | 2 |
| 8 | 9122070 | PIN BRAKE ASS'Y | 10 |

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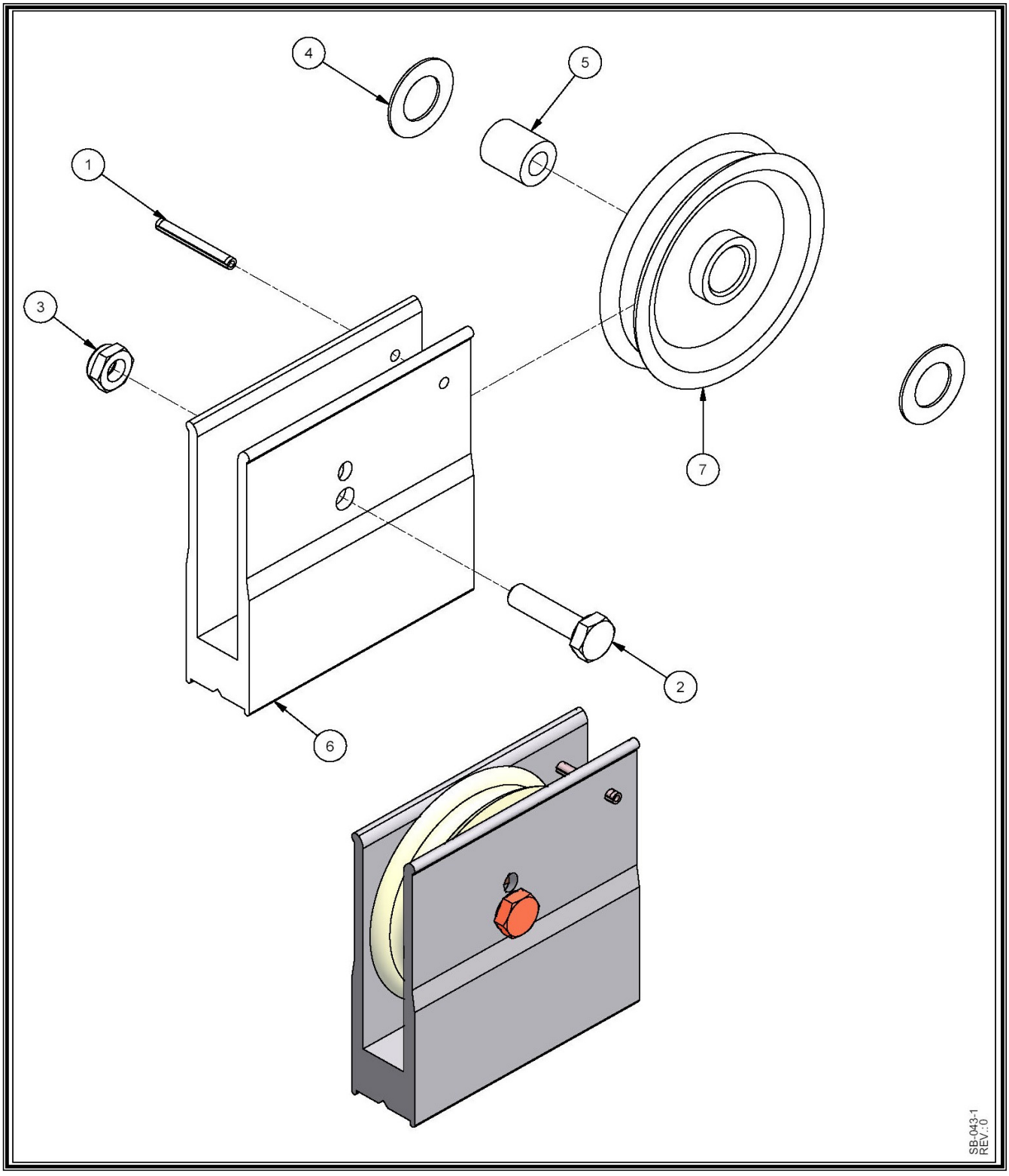
# SB-043-01 Pulley Assembly



# SB-043-01 Pulley Assembly Parts List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 7006-001200-100 | SPRING PIN 1/8 X 1 | 1 |
| 2 | 7010-002520-100 | 1/4-20 UNCX1 HEX CAP SCREW | 1 |
| 3 | 7044-002520-000 | HEX THIN NYLON NUT 1/4-20 UNC | 1 |
| 4 | 7052-050087-003 | 1/2 X 7/8 X 1/32 FLAT WASHER | 2 |
| 5 | M-0100B | BUSHING | 1 |
| 6 | M-043-1 | SHEAVE | 1 |
| 7 | P-016A | PULLEY | 1 |

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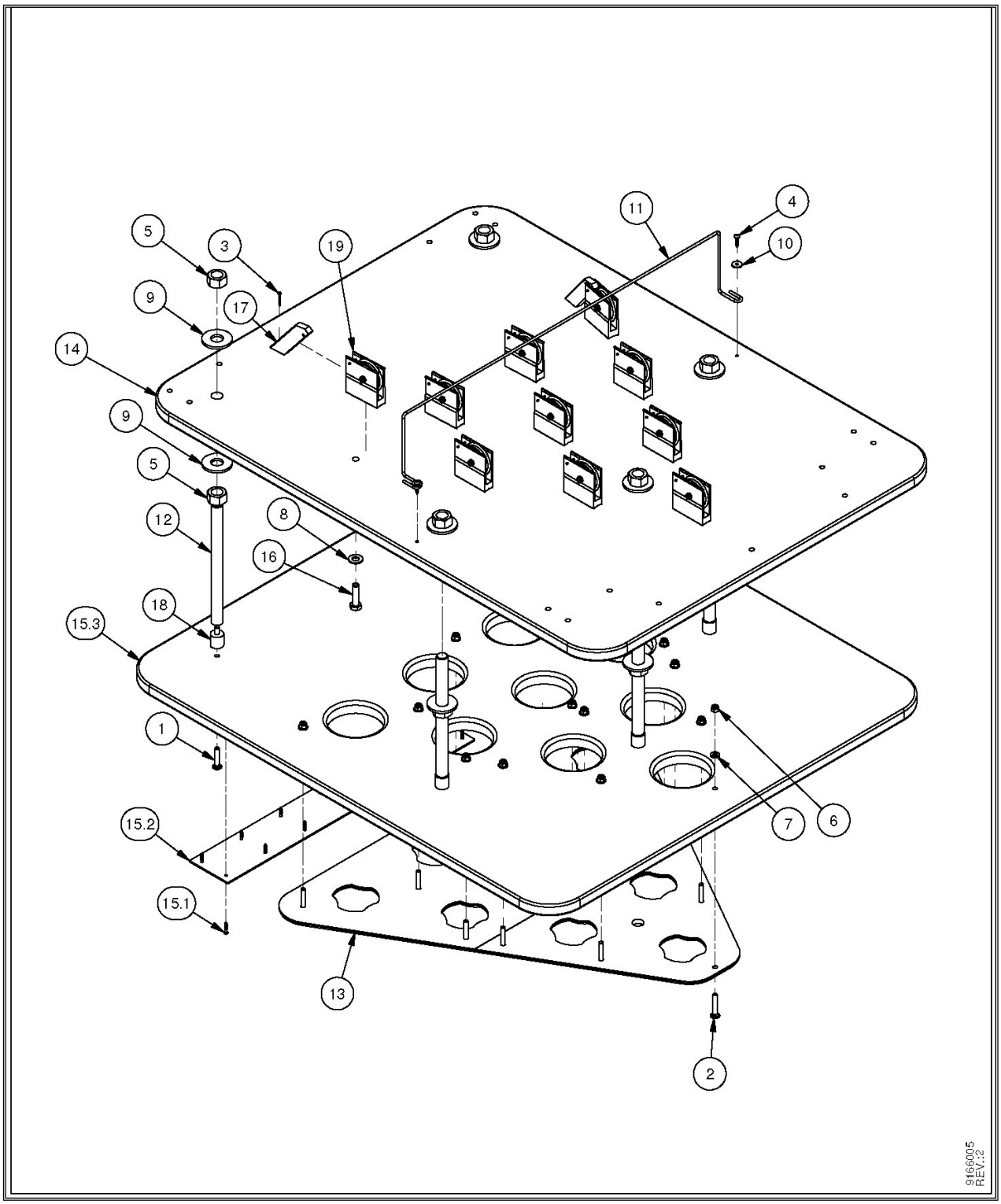
# 9166005 Table and Stabilization Assembly (ME-B03)



# 9166005 Table and Stabilization Parts List (ME-B03)

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 7012-003118-150 | 5/16-18 UNC X 1 1/2 CARRIAGE BOLT | 5 |
| 2 | 7012-003118-175 | 5/16-18 UNC X 1 3/4 CARRIAGE BOLT | 14 |
| 3 | 7022-410600-125 | #6 X 1 1/8 TAP SCW PH SOCK | 2 |
| 4 | 7024-711000-100 | #10 X 1 TAP SCW PH SOCK | 2 |
| 5 | 7034-008709-000 | 7/8-9 UNC HEXAGON NUT | 10 |
| 6 | 7036-003118-000 | HEX NYLON NUT 5/16-18 UNC | 14 |
| 7 | 7050-034068-006 | 11/32 X 11/16 X 1/16 FLAT WASHER | 14 |
| 8 | 7050-050106-009 | 17/32 X 1 1/16 X 3/32 FLAT WASHER | 10 |
| 9 | 7052-093225-018 | 15/16 X 2 1/4 X 3/16 FLAT WASHER | 10 |
| 10 | 7150-019075-009 | .193 X 3/4 X 3/32 FLAT WASHER | 2 |
| 11 | 9102038 | STRING SUPPORT | 1 |
| 12 | 9102039 | SPACER ROD | 5 |
| 13 | 9103005 | CENTERING RING | 1 |
| 14 | 9106004 | PINSETTER SUPPORT TABLE | 1 |
| 15.1 | 7022-310800-100 | #8 X 1 WOOD SCW FH SOCK | 14 |
| 15.2 | 9103006 | PLASTIC PROTECTOR | 1 |
| 15.3 | 9106005 | BOTTOM TABLE ASS'Y | 1 |
| 16 | M-0041 | SPECIAL SCREW | 10 |
| 17 | P-043 | PULLEY SHEAVE GUARD | 2 |
| 18 | R-014 | BUMPER PAD | 5 |
| 19 | SB-043-1 | PULLEY SHEAF | 10 |

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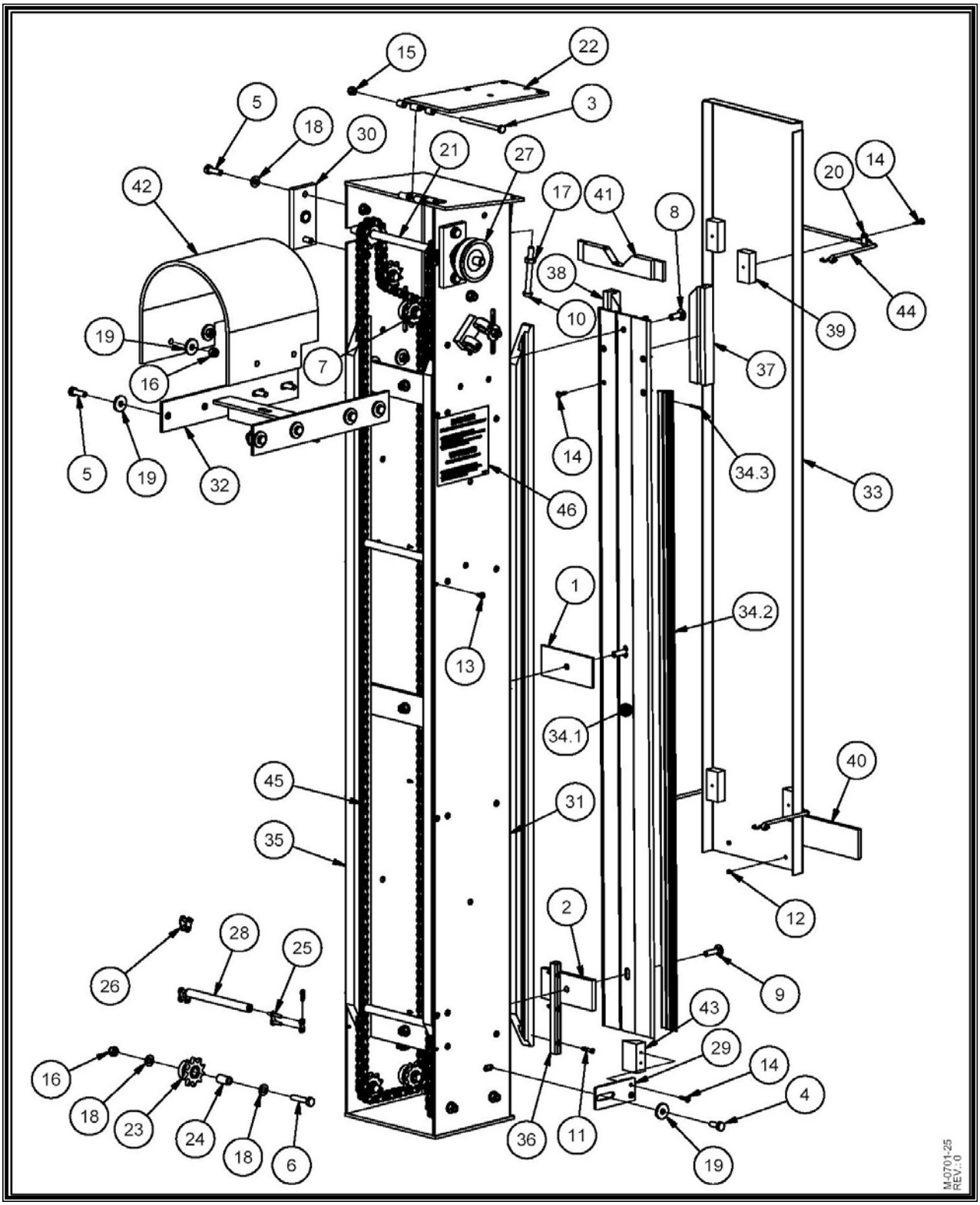
# M-0701-25 Rear Ball Lift

(ME-B03, ME-D03, ME-F03, ME-HD03)



# M-0701-25 Rear Ball Lift Parts List

(ME-B03, ME-D03, ME-F03, ME-HD03)

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 50W-0700-90 | BALL LIFT TRACK SPACER MID | 1 |
| 2 | 50W-0700-91 | BALL LIFT TRACK SPACER BOTTOM | 1 |
| 3 | 7010-002520-350 | 1/4-20 UNCX3 1/2 HEX CAP SCREW | 1 |
| 4 | 7010-003118-075 | 5/16-18 UNCX3/4 HEX CAP SCREW | 2 |
| 5 | 7010-003118-100 | 5/16-18 UNCX1 HEX CAP SCREW | 12 |
| 6 | 7010-003118-150 | 5/16-18 UNCX1 1/2 HEX CAP SCREW | 6 |
| 7 | 7010-003118-175 | 5/16-18 UNCX1 3/4 HEX CAP SCREW | 2 |
| 8 | 7012-003118-075 | 5/16-18 UNC X 3/4 CARRIAGE BOLT | 1 |
| 9 | 7012-003118-100 | 5/16-18 UNC X 1 CARRIAGE BOLT | 2 |
| 10 | 7016-413118-300 | MA SC RH SOCK 5/16-18 UNCX3 | 1 |
| 11 | 7022-310800-100 | #8 X 1 WOOD SCW FH SOCK | 6 |
| 12 | 7024-610600-025 | #6 X 1/4 TAP SCW PH SOCK | 2 |
| 13 | 7024-710800-050 | #8 X 1/2 TAP SCW PH SOCK | 36 |
| 14 | 7024-710800-075 | #8 X 3/4 TAP SCW PH SOCK | 12 |
| 15 | 7036-002520-000 | HEX NYLON NUT 1/4-20 UNC | 1 |
| 16 | 7036-003118-000 | HEX NYLON NUT 5/16-18 UNC | 25 |
| 17 | 7038-003118-000 | 5/16-18 UNC HEX KEEP NUT | 1 |
| 18 | 7050-034068-006 | 11/32 X 11/16 X 1/16 FLAT WASHER | 27 |
| 19 | 7050-034100-012 | 11/32 X 1 X 1/8 FLAT WASHER | 20 |
| 20 | E-660-09 | CABLE CLAMP | 4 |
| 21 | M-0700-07 | DRIVE SHAFT ASSEMBLY | 1 |
| 22 | M-0700-09 | MOTOR BASE PLATE | 1 |
| 23 | M-0700-10 | IDLER SPROCKET 40B10 | 8 |
| 24 | M-0700-10-02 | STEEL BUSHING | 8 |
| 25 | M-0700-14 | CHAIN COUPLING SPECIAL | 8 |
| 26 | M-0700-15 | HALF LINK | 2 |
| 27 | M-0700-22 | CARROUSEL PULLEY | 1 |
| 28 | M-0700-27 | CROSS CHAIN TRAVEL SHAFT | 4 |
| 29 | M-0700-55 | BALL LIFT BOTTOM PROTECTOR | 2 |
| 30 | M-0700-67 | STEEL BEARING BLOCK | 2 |

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## M-0701-25 Rear Ball Lift Parts List

(ME-B03, ME-D03, ME-F03, ME-HD03)

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 31 | M-0700-90 | BALL LIFT FRAME ASSEMBLY | 1 |
| 32 | M-0700-94 | BALL LIFT BRIDGE | 1 |
| 33 | M-0700-96 | BALL LIFT SMALL COVER | 1 |
| 34.1 | M-0700-97 | ALUMINUM TRACK | 1 |
| 34.2 | Q89-0310 | VINYL TRACK 42.5 (1.08M) | 2 |
| 34.3 | 7006-000900-100 | SPRING PIN 3/32 X 1 | 2 |
| 35 | P-0700-69 | CHAIN GUIDE | 4 |
| 36 | P-0700-71 | BALL GUIDE BOTTOM | 2 |
| 37 | P-0700-72-4 | PLASTIC BALL GUIDE RIGHT | 1 |
| 38 | P-0700-72-7 | PLASTIC BALL GUIDE LEFT | 1 |
| 39 | P-0700-73 | SPACER BLOCK | 4 |
| 40 | P-0700-74 | PROTECTOR BLOCK | 1 |
| 41 | P-0700-75 | BALL GUIDE TRACK | 1 |
| 42 | P-700-13 | BALL GUARD OUTSIDE | 1 |
| 43 | P-700-55 | BOTTOM BALL LIFT GUARD | 2 |
| 44 | R-0700-90 | BALL LIFT COVER BUNGEE | 2 |
| 45 | SB-0700-13 | BALL LIFT CHAIN | 2 |
| 46 | Z-452 | WARNING STICKER | 2 |

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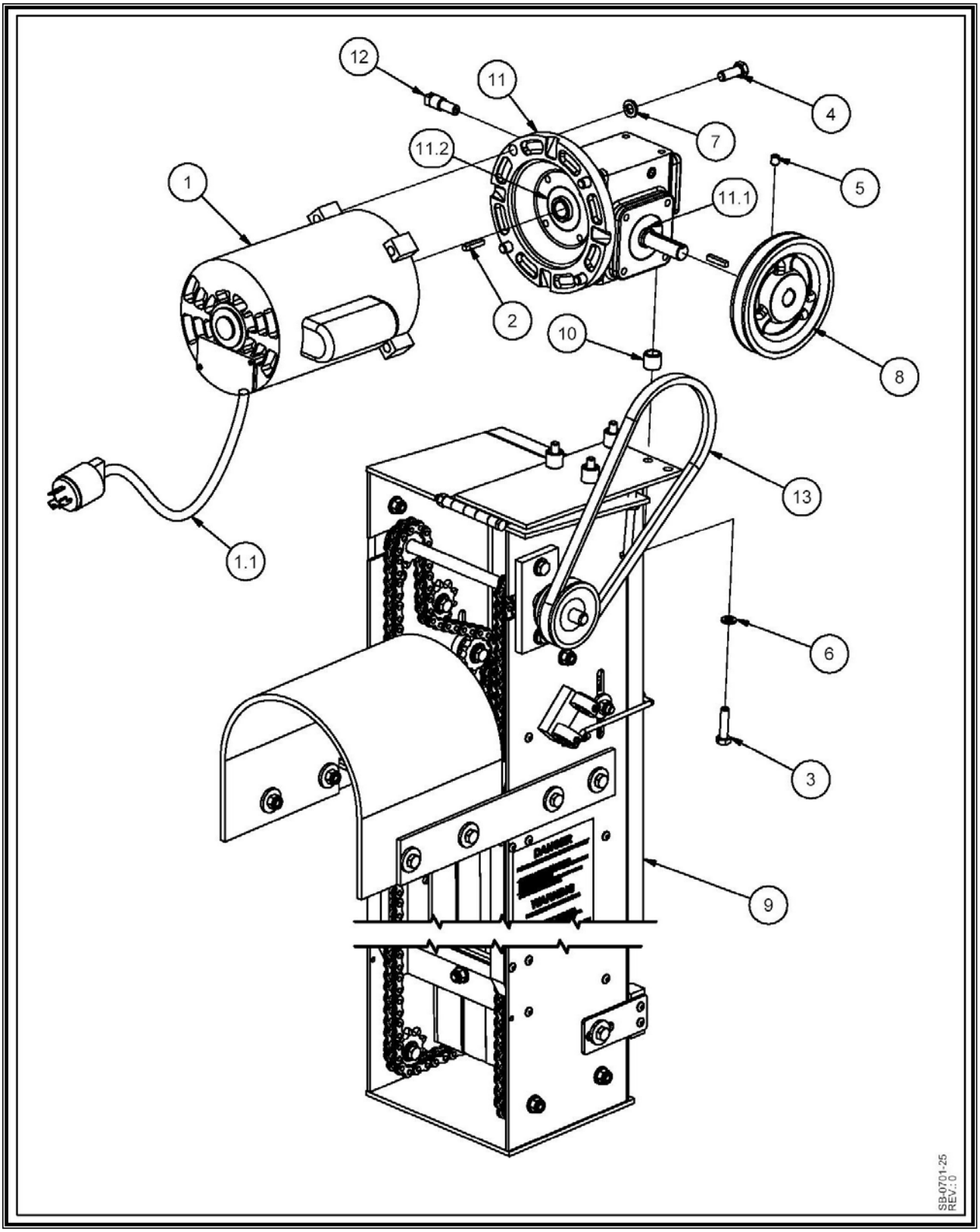
# SB-0701-25 Rear Ball Lift Assembly

(ME-B03, ME-D03, ME-F03, ME-HD03)



## SB-0701-25 Rear Ball Lift Assembly Parts List

(ME-B03, ME-D03, ME-F03, ME-HD03)

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 301-1200-00 | ELECTRIC MOTOR 208/230 VAC 1/2 | 1 |
| 1.1 | EC-090-250 | MOTOR POWER SUPPLY CABLE | 1 |
| 2 | 302-2410-00 | KEYWAY 3/16 | 2 |
| 3 | 7010-003118-125 | 5/16-18 UNCX1 1/4 HEX CAP SCREW | 4 |
| 4 | 7010-003716-100 | 3/8-16 UNCX1 HEX CAP SCREW | 4 |
| 5 | 7014-003118-037 | 5/16-18 UNC X 3/8 SET SCREW | 2 |
| 6 | 7060-031057-009 | 5/16" LOCK WASHER | 1 |
| 7 | 7060-037067-010 | 3/8" LOCK WASHER | 4 |
| 8 | M-0700-21-2 | PULLEY MA50X5/8 | 1 |
| 9 | M-0701-25 | BALL LIFT ASS'Y | 1 |
| 10 | M-0880-19 | SLEEVE BUSHING | 4 |
| 11 | M-BMQ1133-3 | MOTOR REDUCER | 1 |
| 11.1 | M-BMQ113317 | OUTPUT SEAL | 1 |
| 11.2 | M-BMQ1133-18 | INPUT SEAL | 1 |
| 12 | P-1133-3 | REDUCER VENT | 1 |
| 13 | R-0700-01 | V-BELT | 1 |

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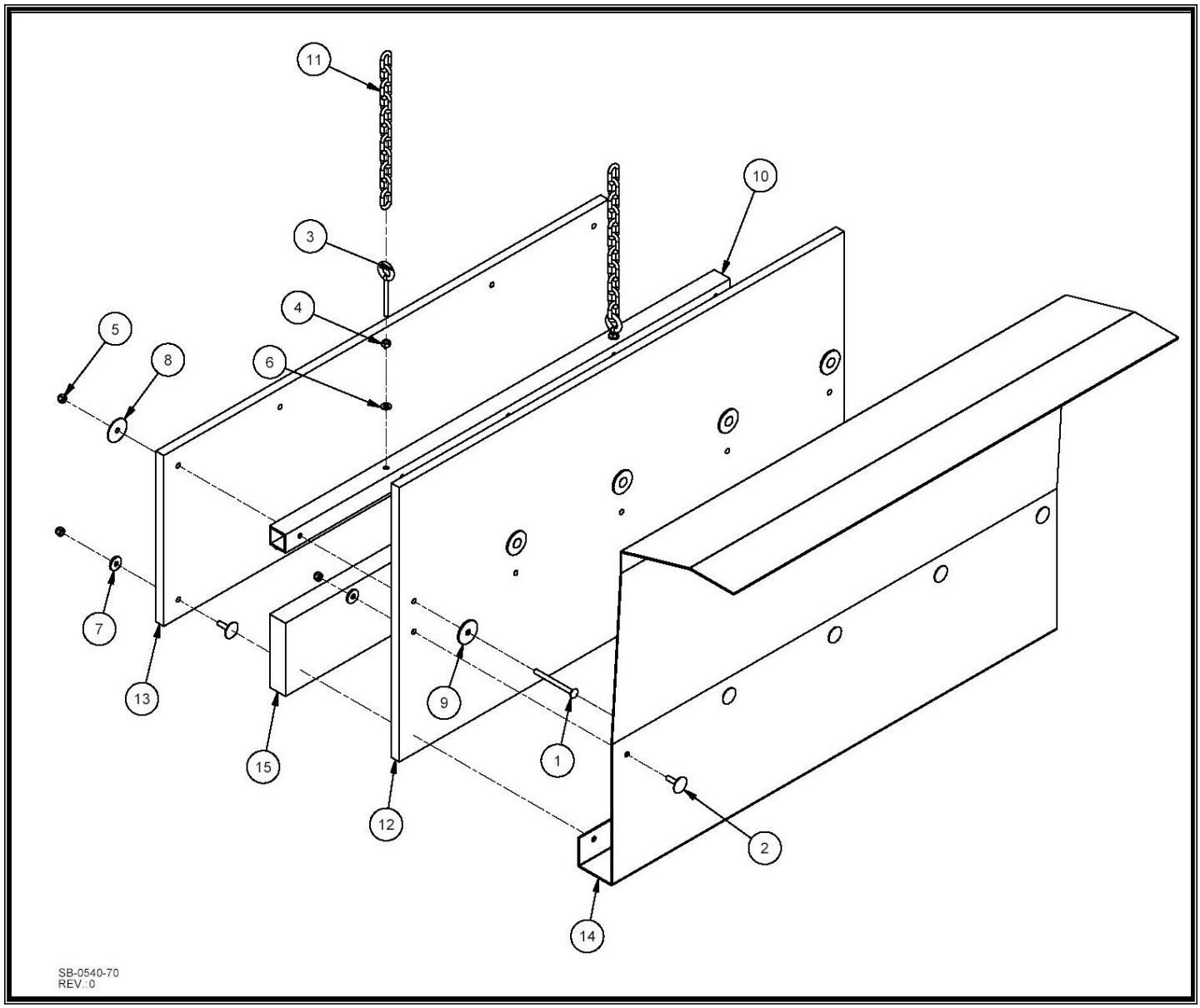
# SB-0540-70 Pit Cushion Assembly



# SB-0540-70 Pit Cushion Assembly Parts List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 7012-003118-350 | 5/16-18 UNC X 3 1/2 CARRIAGE BOLT | 5 |
| 2 | 7013-003118-125 | 5/16-18 UNC X 1 1/4 ELEVATOR BOLT | 10 |
| 3 | 7032-003118-400 | 5/16-18 UNC X 4 EYE BOLT | 2 |
| 4 | 7034-003118-000 | 5/16-18 UNC HEXAGON NUT | 2 |
| 5 | 7036-003118-000 | HEX NYLON NUT 5/16-18 UNC | 17 |
| 6 | 7050-034068-006 | 11/32 X 11/16 X 1/16 FLAT WASHER | 4 |
| 7 | 7050-034100-012 | 11/32 X 1 X 1/8 FLAT WASHER | 10 |
| 8 | 7050-034175-012 | 11/32 X 1 3/4 X 1/16 FLAT WASHER | 5 |
| 9 | 7050-040175-012 | 13/32 X 1 3/4 X 1/8 FLAT WASHER | 5 |
| 10 | M-0540-70 | CUSHION SUPPORT | 1 |
| 11 | M-0540-71 | CUSHION CHAIN | 2 |
| 12 | R-0540-70 | CUSHION [FRONT] | 1 |
| 13 | R-0540-71 | CUSHION [REAR] | 1 |
| 14 | R-0540-72 | CUSHION APRON | 1 |
| 15 | R-0540-73 | CUSHION ABSORBER | 1 |

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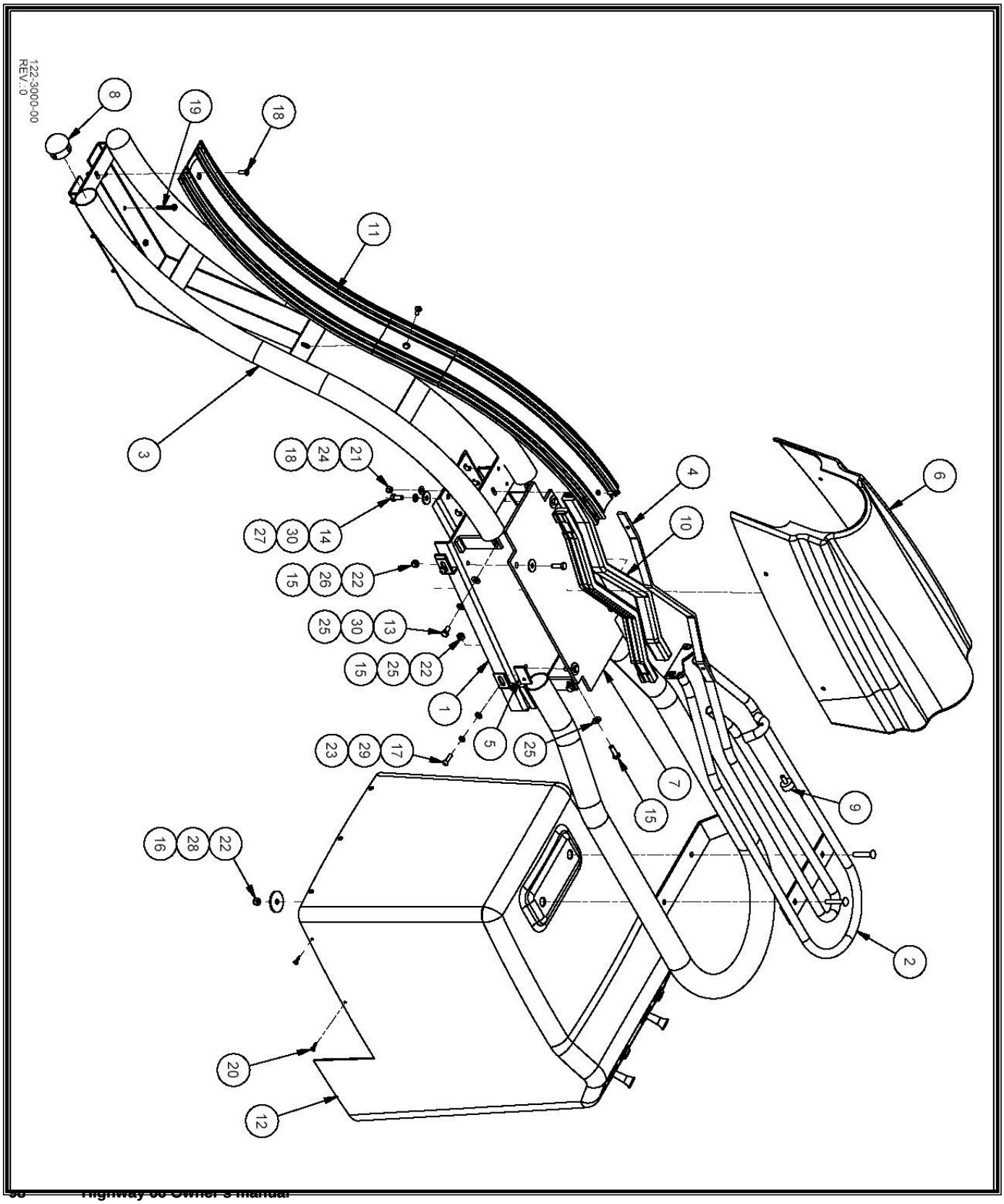
# 122-3000-00 Ball Rack Assembly



# 122-3000-00 Ball Rack Assembly Parts List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 102-3000-00 | UPPER BALL RACK | 1 |
| 2 | 102-3010-00 | H66 BALL RACK INSIDE RAIL | 1 |
| 3 | 102-3020-00 | BALL RACK DROP ASS'Y | 1 |
| 4 | 102-3030-00 | ZIGZAG | 2 |
| 5 | 102-3040-00 | NUT PLATE | 4 |
| 6 | 103-3010-00 | BALL RACK COVER | 1 |
| 7 | 103-3020-00 | BALL PROTECTOR | 1 |
| 8 | 103-3030-00 | CAPS | 2 |
| 9 | 104-2010-00 | BUMPER PAD | 1 |
| 10 | 104-3040-00 | ZIGZAG | 2 |
| 11 | 108-3020-00 | DROP TRACK | 1 |
| 12 | 133-3000-00 | HOOD ASS'Y | 1 |
| 13 | 7010-003118-062 | 5/16-18 UNCX5/8 HEX CAP SCREW | 4 |
| 14 | 7010-003118-075 | 5/16-18 UNCX3/4 HEX CAP SCREW | 4 |
| 15 | 7010-003118-100 | 5/16-18 UNCX1 HEX CAP SCREW | 6 |
| 16 | 7012-003118-175 | 5/16-18 UNC X 1 3/4 CARRIAGE BOLT | 2 |
| 17 | 7016-412520-100 | MA SC RH SOCK 1/4-20 UNCX1 | 4 |
| 18 | 7018-302520-075 | FHMS 1_4-20 UNCX0.75 | 3 |
| 19 | 7024-201400-175 | #14-20 X 1 3/4 TECK SCW HEX WASHER | 6 |
| 20 | 7024-710800-075 | #8 X 3/4 TAP SCW PH SOCK | 7 |
| 21 | 7036-002520-000 | HEX NYLON NUT 1/4-20 UNC | 3 |
| 22 | 7036-003118-000 | HEX NYLON NUT 5/16-18 UNC | 8 |
| 23 | 7050-025056-004 | 1/4 X 9/16 X 3/64 FLAT WASHER | 4 |
| 24 | 7050-028062-006 | 9/32 X 5/8 X 1/16 FLAT WASHER | 3 |
| 25 | 7050-034068-006 | 11/32 X 11/16 X 1/16 FLAT WASHER | 6 |
| 26 | 7050-034100-006 | 11/32 X 1 X 1/16 FLAT WASHER | 4 |
| 27 | 7050-034100-012 | 11/32 X 1 X 1/8 FLAT WASHER | 4 |
| 28 | 7050-040175-012 | 13/32 X 1 3/4 X 1/8 FLAT WASHER | 2 |
| 29 | 7060-025046-006 | 1/4 LOCK WASHER | 4 |
| 30 | 7060-031057-009 | 5/16 LOCK WASHER | 8 |

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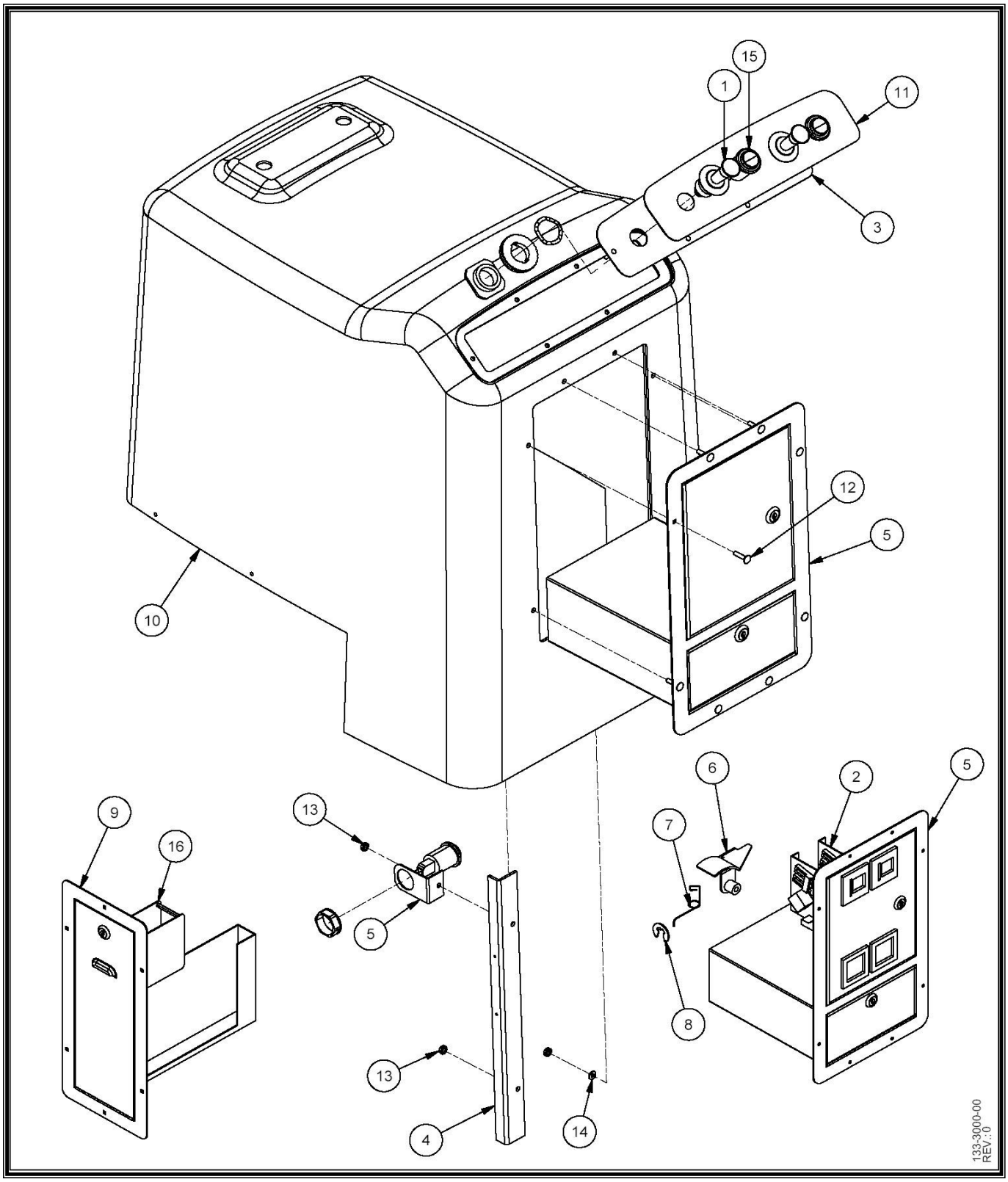
# 133-3000-00 Ball Rack Hood Assembly



# 133-3000-00 Ball Rack Hood Assembly Parts List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 101-3050-00 | JOYSTICK - BLACK | 2 |
| 2 | 101-3300-00 | HIGHWAY 66 COIN-UP 0.25 US$ | 1 |
| 2 | 101-3310-00 | HIGHWAY 66 COIN COMPARATOR | 1 |
| 2 | 101-3311-00 | HIGHWAY 66 MULTI COIN COMPARATOR | 1 |
| 3 | 102-3050-00 | JOYSTICK PLATE | 1 |
| 4 | 102-3060-00 | CASH DRAWER ANGLE | 2 |
| 5 | 102-3070-00 | PUSH BUTTON BRACKET | 1 |
| 5 | 102-3300-00 | HIGHWAY 66 COIN UP DOOR 0.25 US$ | 1 |
| 5 | 102-3310-00 | HIGHWAY 66 COIN COMPARATOR DOOR | 1 |
| 5 | 102-3330-00 | HIGHWAY 66 BLANK DOOR | 1 |
| 6 | 102-3315-00 | REJECT LEVER | 1 |
| 7 | 102-3316-00 | REJECT LEVER SPRING | 1 |
| 8 | 102-3317-00 | REJECT LEVER RETAINING WASHER | 1 |
| 9 | 102-3320-00 | TICKET TRAY ASS'Y | 1 |
| 10 | 103-3000-01 | HIGHWAY 66 CONSOLE | 1 |
| 11 | 103-3050-00 | PLASTIC STICKER | 1 |
| 12 | 7012-001024-075 | 10-24 UNC X 3/4  CARRIAGE BOLT | 8 |
| 13 | 7038-001024-000 | 10-24 UNC HEX KEEP NUT | 8 |
| 14 | 7050-018043-004 | 3/16 X 7/16 X 3/64 FLAT WASHER | 4 |
| 15 | E-591BK | PUSH BUTTOM | 3 |
| 16 | E-9801600 | ENTROPY 2000 TICKET DISPENSER | 1 |

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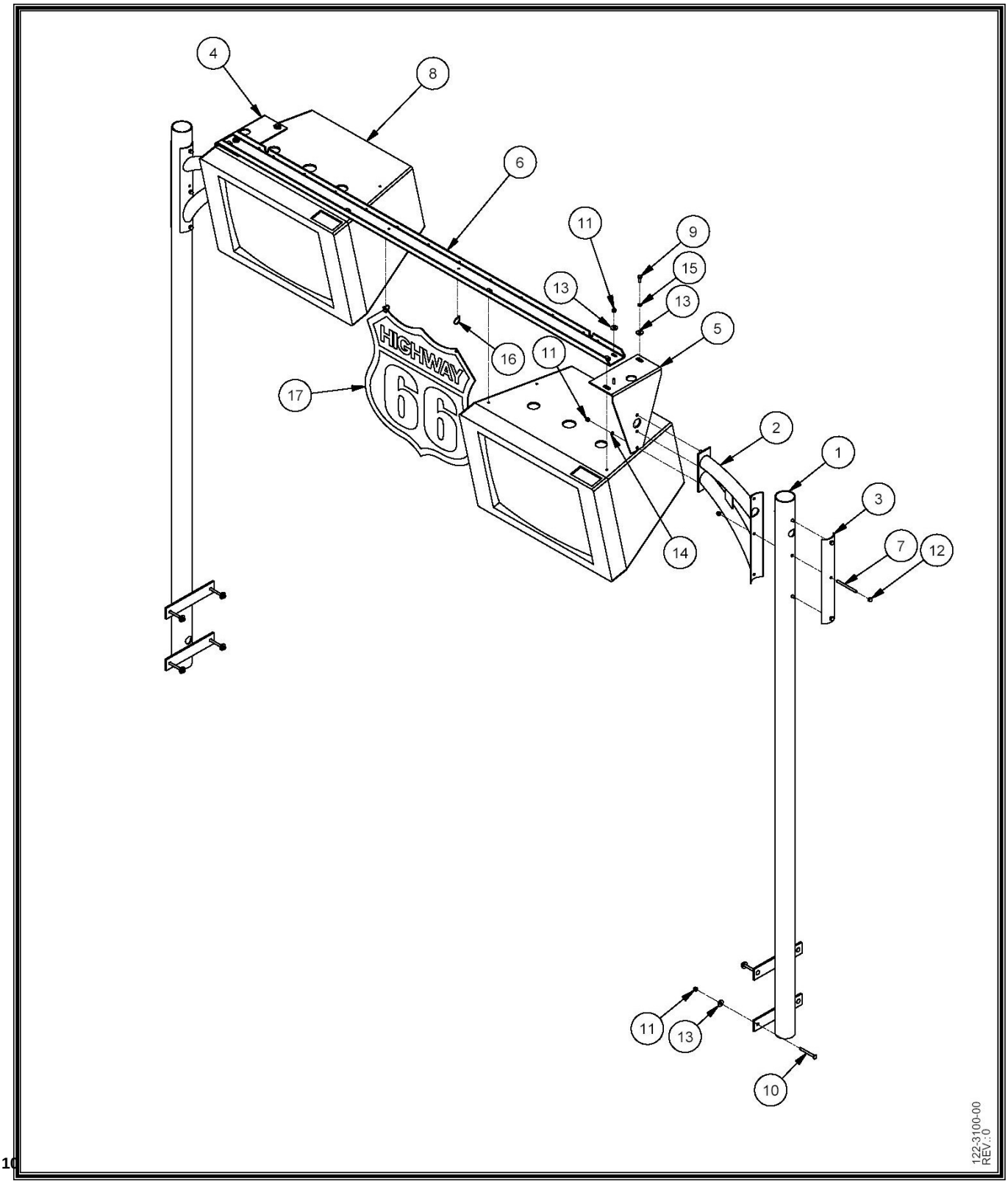
# 122-3100-00 Monitors and Supports Assembly






First Edition October 2003

# 122-3100-00 Monitors and Supports Assembly Parts List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 102-3100-00 | TV SUPPORT POST | 2 |
| 2 | 102-3110-00 | TV SUPPORT | 2 |
| 3 | 102-3120-00 | TV SUPPORT CLAMP | 2 |
| 4 | 102-3130-00 | TV BRACKET RIGHT | 1 |
| 5 | 102-3135-00 | TV BRACKET LEFT | 1 |
| 6 | 102-3140-00 | OVERHEAD CHANNEL | 1 |
| 7 | 102-3150-00 | THREAD ROD | 6 |
| 8 | 511-2800-00 | MONITOR 28" W/CABINET | 2 |
| 9 | 7010-000813-075 | METRIC BOLT | 6 |
| 10 | 7012-003118-300 | 5/16-18 UNC X 3 CARRIAGE BOLT | 8 |
| 11 | 7036-003118-000 | HEX NYLON NUT 5/16-18 UNC | 16 |
| 12 | 7037-003118-000 | HEX CAP NUT 5/16-18 UNC | 12 |
| 13 | 7050-034100-012 | 11/32 X 1 X 1/8 FLAT WASHER | 16 |
| 14 | 7052-034056-003 | 11/32 X 9/16 X 1/32 FLAT WASHER | 6 |
| 15 | 7060-031057-009 | 5/16" LOCK WASHER | 6 |
| 16 | E-056 | CABLE TIES 11.4" PLT3-I-M | 2 |
| 17 | Z-HW66-003 | HIGHWAY PANEL | 1 |

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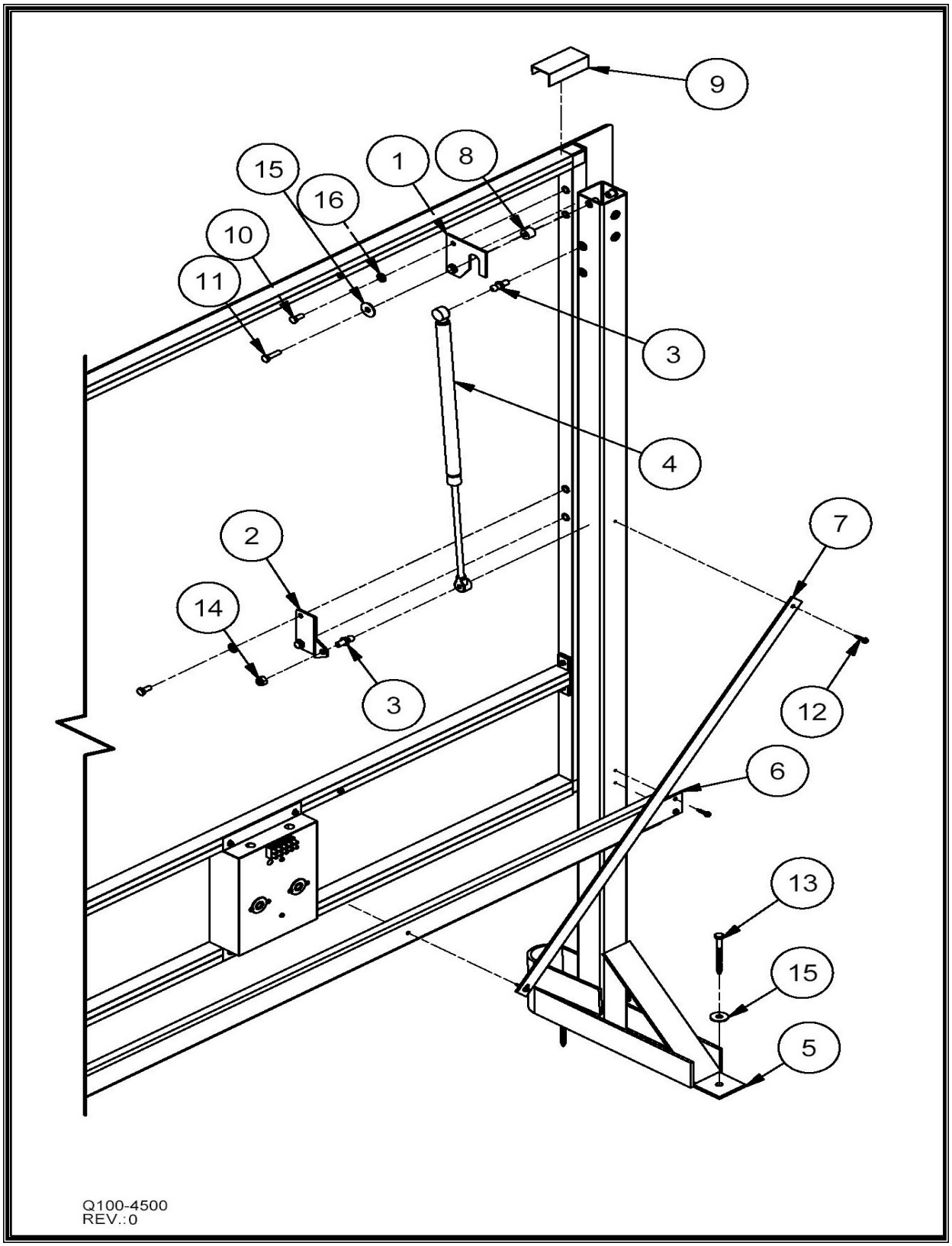
# Q100-4500 Masking Unit



# Q100-4500 Masking Unit Parts List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 102-4010-00 | MASKING HOOK CLAMP | 2 |
| 2 | 102-4020-00 | MASKING SHOCK BRACKET | 2 |
| 3 | 102-4030-00 | BALL STUD | 4 |
| 4 | 102-4040-00 | GAS SHOCK | 2 |
| 5 | 102-4050-00 | MASKING FOOT | 2 |
| 6 | 102-4500-00 | H66 MASKING UNION BRACE | 1 |
| 7 | 102-4510-00 | H66 MASKING FLAT BRACE | 2 |
| 8 | 103-4030-00 | BUSHING | 2 |
| 9 | 188-4500-00 | H66 MASKING UNIT FRAME ASS'Y | 1 |
| 10 | 7010-002520-062 | 1/4-20 UNCX5/8 HEX CAP SCREW | 8 |
| 11 | 7010-002520-100 | 1/4-20 UNCX1 HEX CAP SCREW | 2 |
| 12 | 7027-200818-075 | #8-18 X 3/4 TECK SCW HEX WASHER | 25 |
| 13 | 7028-002500-300 | 1/4 X 3 LAG SCREW | 4 |
| 14 | 7036-003118-000 | HEX NYLON NUT 5/16-18 UNC | 2 |
| 15 | 7050-034100-006 | 11/32 X 1 X 1/16 FLAT WASHER | 6 |
| 16 | 7060-031057-009 | 5/16" LOCK WASHER | 8 |

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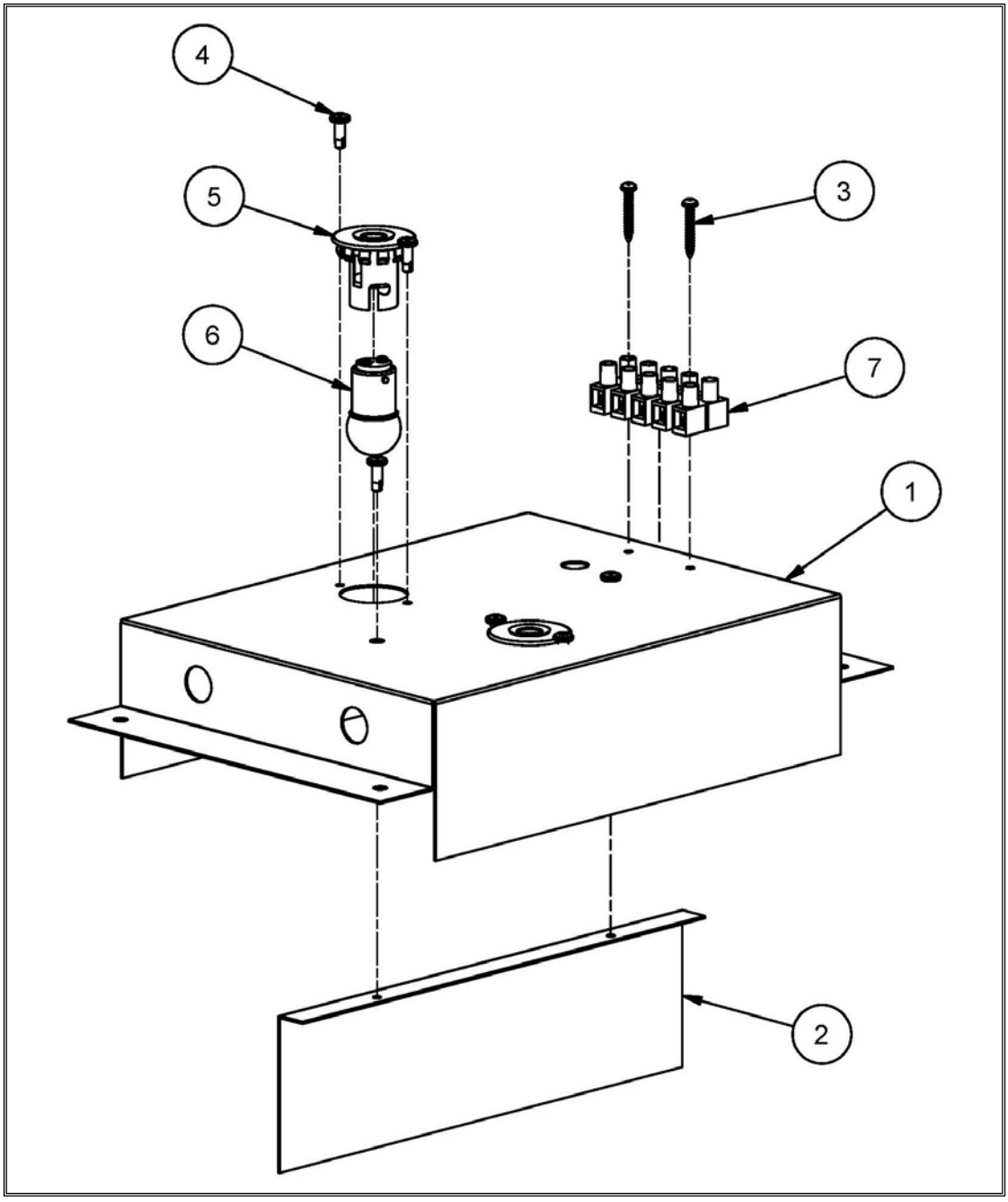
# Q100-4150 ONE/TWO Ball Light



# Q100-4150 ONE/TWO Ball Light Parts List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 102-4150-00 | ONE/TWO BALL LIGHT SOCKET | 1 |
| 2 | 102-4160-00 | SEPARATOR PANEL | 1 |
| 3 | 7024-610400-075 | #4 X 3/4 TAP SCW PH SOCK | 2 |
| 4 | 7025-610600-037 | #6-32 X 3/8 THR. CUT P.H.SOCK | 6 |
| 5 | E-12-240XT | LAMP SOCKET | 2 |
| 6 | E-1252 | MINIATURE LIGHT BULB 28V | 2 |
| 7 | E-323HDS12-5 | TERMINAL STRIP (5 POSITION) | 1 |

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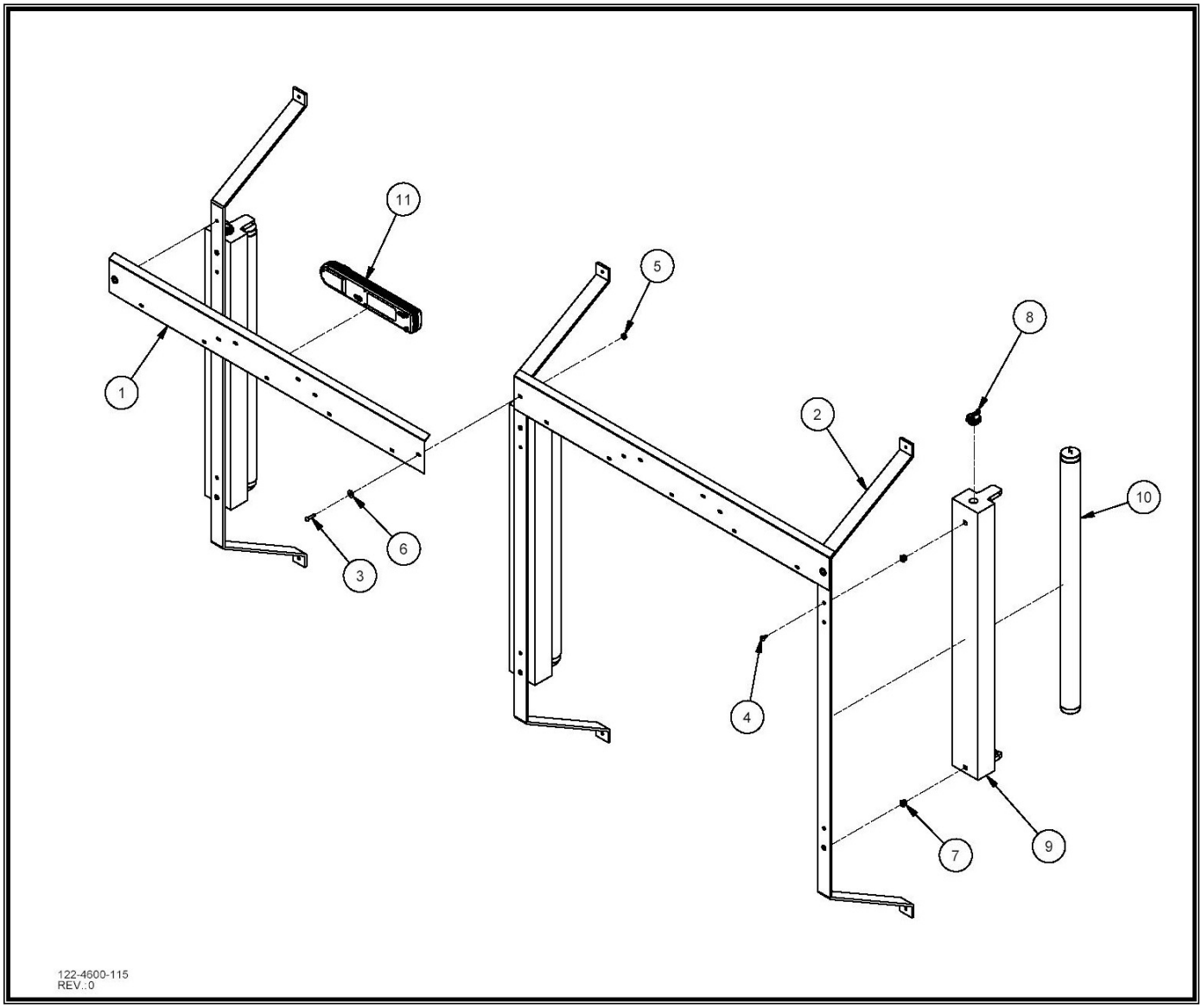
# 122-4600-115 Fluorescent Support 115 Vac



# 122-4600-115 Fluorescent Support 115 Vac Parts List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 102-4100-00 | WIRING DUCT | 2 |
| 2 | 102-4110-00 | FLUORESCENT BRACKET | 3 |
| 3 | 7016-410832-075 | MA SC RH SOCK 8-32 UNCX3/4 | 3 |
| 4 | 7024-710800-050 | #8 X 1/2 TAP SCW PH SOCK | 6 |
| 5 | 7038-000832-000 | 8-32 UNC HEX KEEP NUT | 3 |
| 6 | 7050-025056-004 | 1/4 X 9/16 X 3/64 FLAT WASHER | 3 |
| 7 | 7080-800000-240 | NYLON EXPANSION NUT 5/16-10 | 6 |
| 8 | E-3302M | CONNECTEUR A LOOMEX | 3 |
| 9 | E-F24 | FIXTURE 24" | 3 |
| 10 | E-F24T | 20W FLUORESCENT LIGHT 24" | 3 |
| 11 | E-PB-4A-115 | POWER BAR 4 OUTLETS 115V | 1 |

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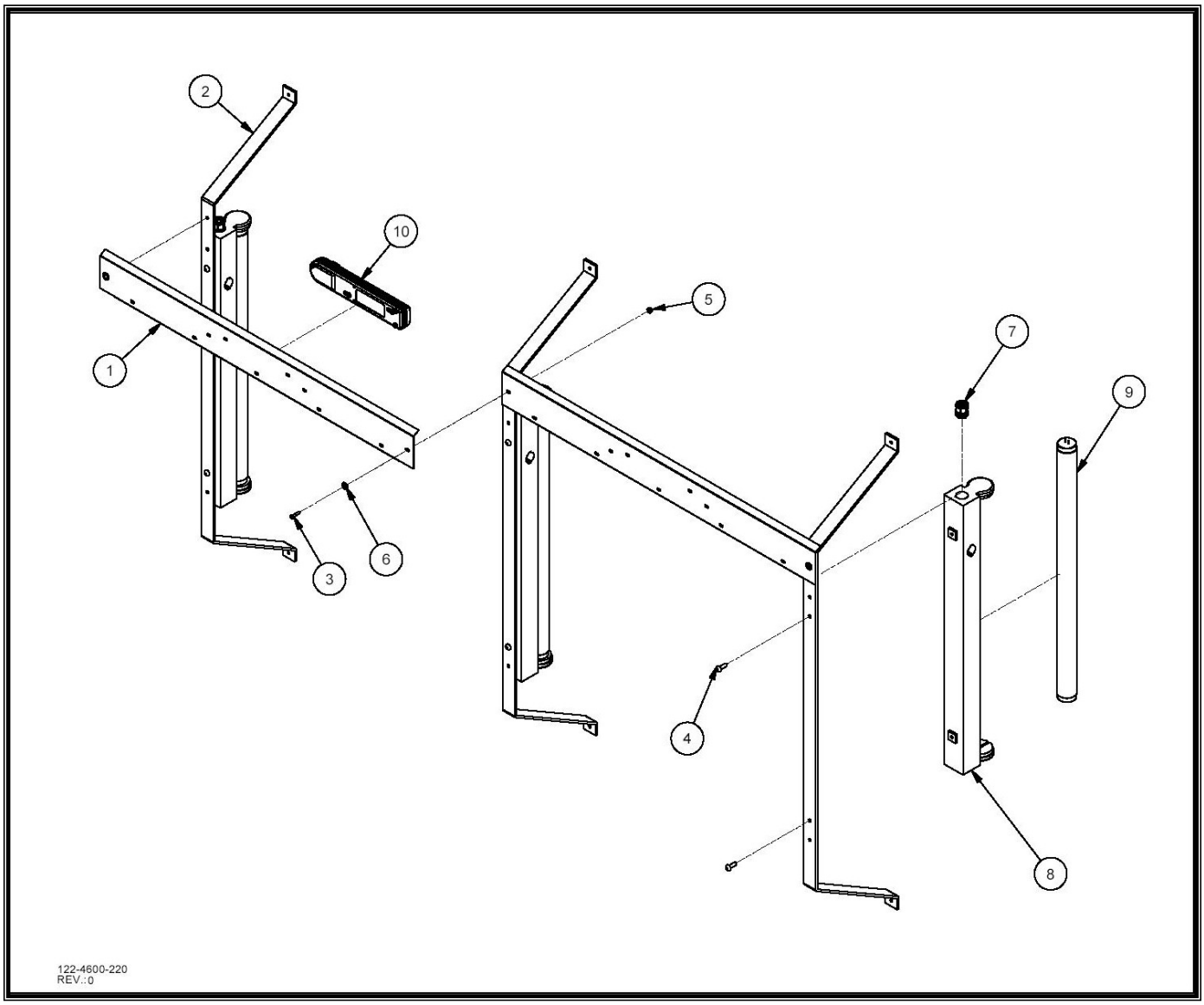
# 122-4600-220 Fluorescent Support 220 Vac



# 122-4600-220 Fluorescent Support 220 Vac Parts List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 102-4100-00 | WIRING DUCT | 2 |
| 2 | 102-4110-00 | FLUORESCENT BRACKET | 3 |
| 3 | 7016-410832-075 | MA SC RH SOCK 8-32 UNCX3/4 | 3 |
| 4 | 7016-412520-075 | MA SC RH SOCK 1/4-20 UNCX3/4 | 6 |
| 5 | 7038-000832-000 | 8-32 UNC HEX KEEP NUT | 3 |
| 6 | 7050-025056-004 | 1/4 X 9/16 X 3/64 FLAT WASHER | 3 |
| 7 | E-565 | PLASTIC WIRE CONNECTOR | 3 |
| 8 | E-F24T8 | FIXTURE 24" 1 TUBE 50HZ 220V | 3 |
| 9 | E-F24TT8 | 18W FLUORESCENT LIGHT 24" T8 | 3 |
| 10 | E-PB-4A-220 | POWER BAR 4 OUTLETS 220V | 1 |

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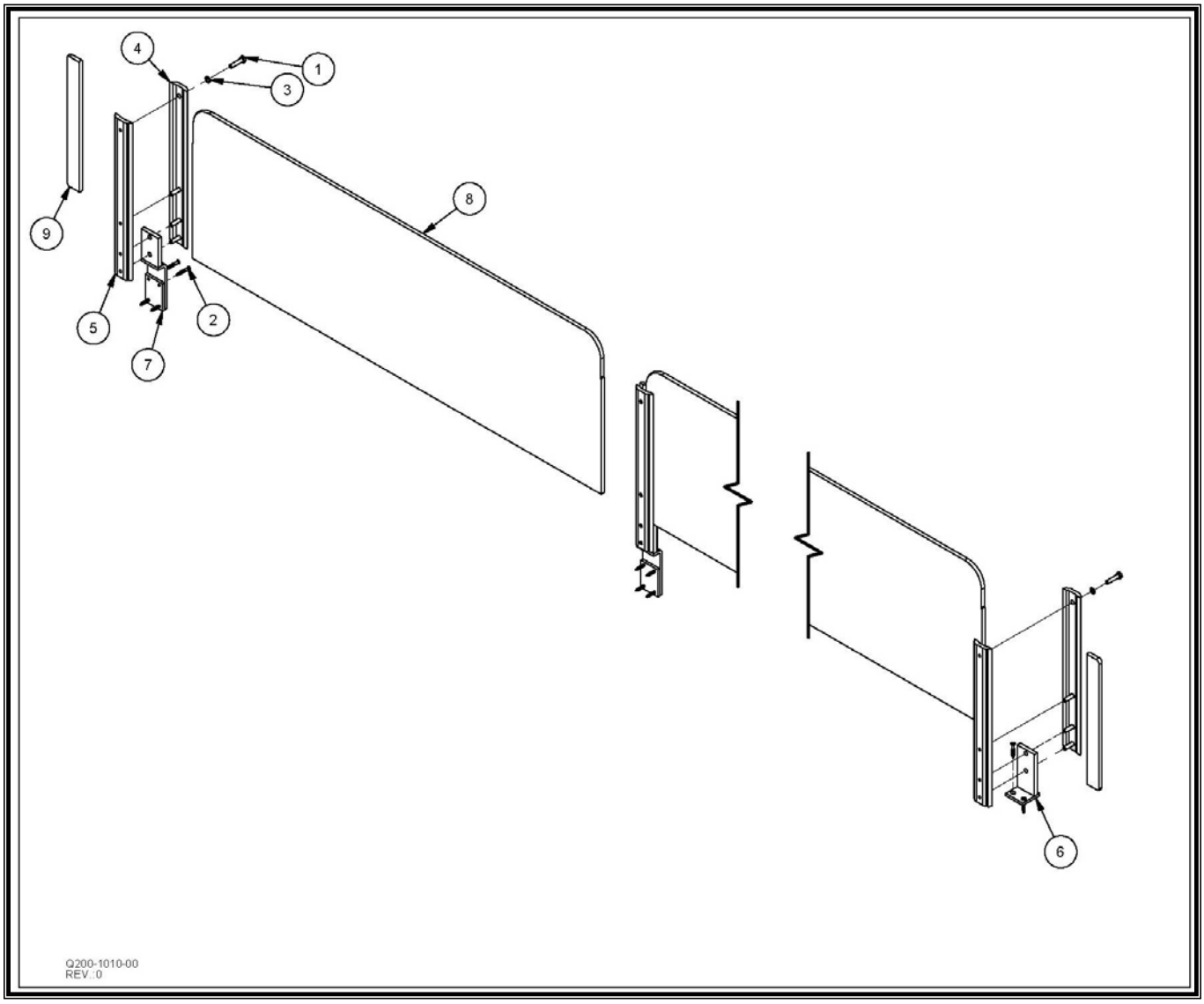
# Q200-1010-00 Lateral Safety Guard



# Q200-1010-00 Lateral Safety Guard Parts List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | 7010-003118-137 | 5/16-18 UNCX1 3/8 HEX CAP SCREW | 36 |
| 2 | 7022-311000-150 | #10 X 1 1/2 WOOD SCW FH SOCK | 34 |
| 3 | 7052-034056-003 | 11 in / 32 ul X 9 in / 16 ul X 1 in / 32 ul FLAT WASHER | 36 |
| 4 | M-0540-100 | SAFETY GUARD CLAMP | 9 |
| 5 | M-0540-105 | SAFETY GUARD CLAMP (THD) | 9 |
| 6 | M-0540-110 | SAFETY GUARD BRACKET (AP) | 1 |
| 7 | M-0540-120 | SAFETY GUARD BRACKET (LANE) | 8 |
| 8 | P-0540-100 | SAFETY GUARD GLASS | 8 |
| 9 | P-0540-110 | SAFETY GUARD SPACER | 2 |

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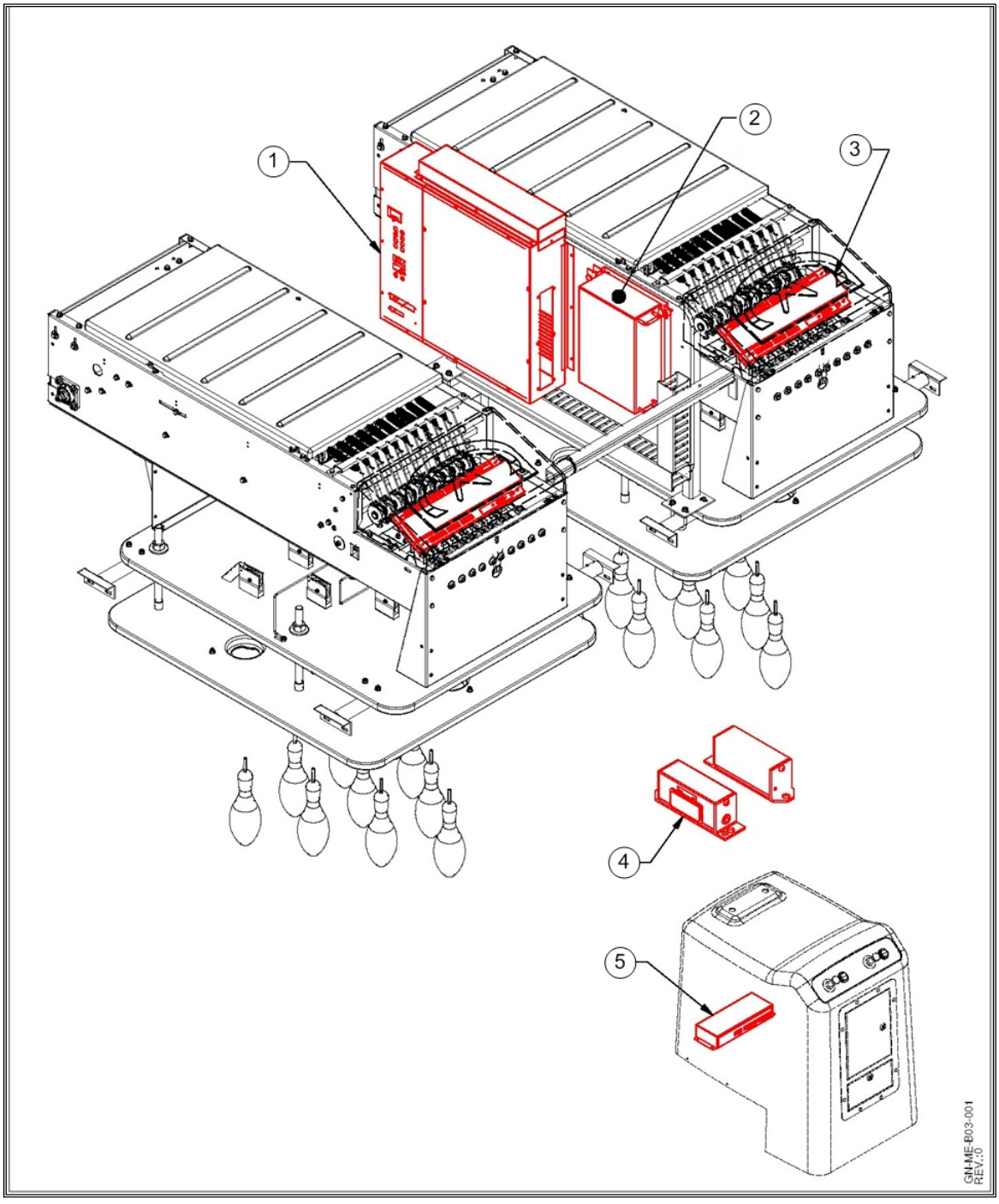
# Electronic Components



# Electronic Components Parts List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | SB-9802200-230 | POWER BOX | 1 |
| 2 | 511-0023-00 | Q-AMS VIDEO CONTROLER | 1 |
| 3 | SB-9802300-10 | PIN DETECTORS | 2 |
| 4 | SB-1500-31-BW | BALL DETECTOR | 2 |
| 5 | 511-0024-00 | I/O CONTROLER | 1 |

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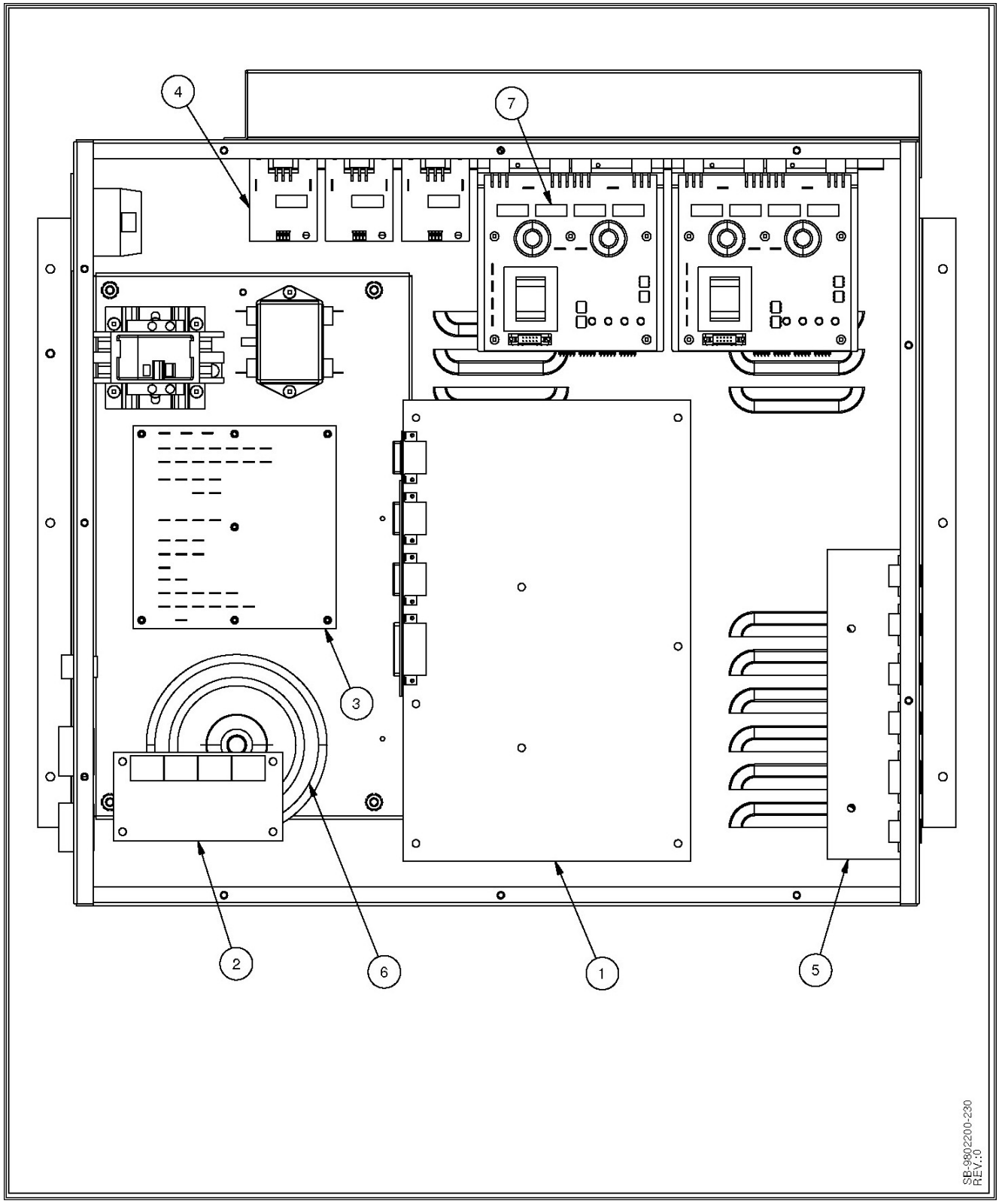
# SB-9802200-230 Power Box



# SB-9802200-230 Power Box Parts List

| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | E-MD01-01 | CENTRAL PROCESSING UNIT PCB | 1 |
| 2 | E-MD01-03 | PCB DISPLAY FULL SET | 1 |
| 3 | E-MD03-01 | POWER CONNECTING BOARD | 1 |
| 4 | E-MD92-01 | AC DRIVE PCB | 3 |
| 5 | E-MD98-02 | CONNECTOR PANEL | 1 |
| 6 | E-TM216S | TOROID POWER TRANSFORM | 1 |
| 7 | SB-9808210-230 | DC DRIVE ASS'Y | 2 |

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# Parts Number Index

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# Parts Description Index

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