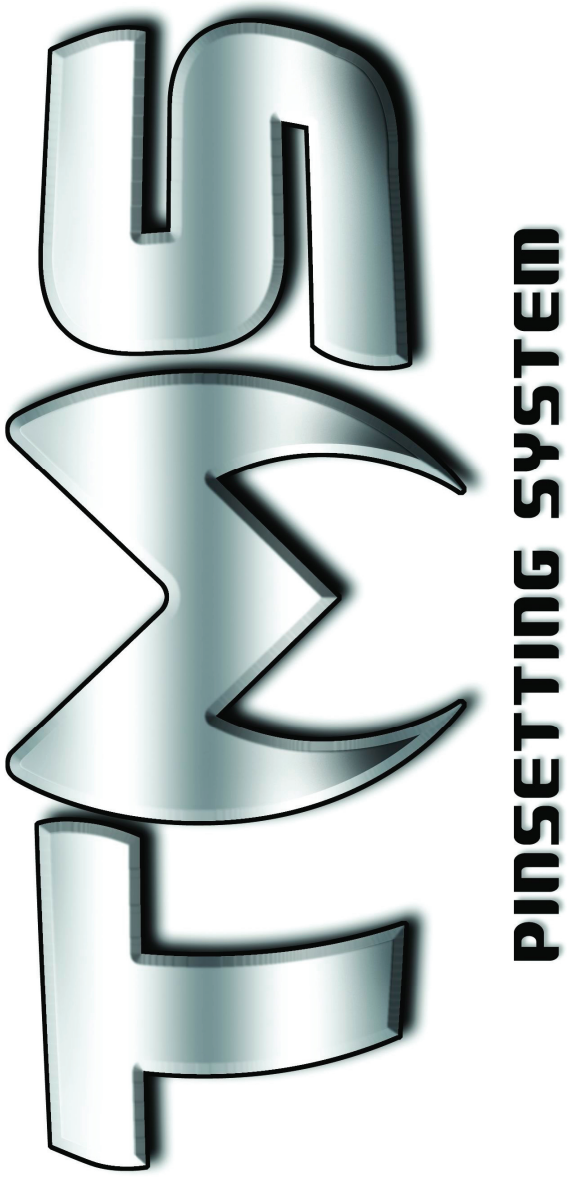

TMS Pinsetter Owner's Manual

ME-D03 DUCK PIN
ME-T03 TEN PIN
ME-F03 FIVE PIN
ME-HD03 HARD DUCK

First-Release R1.2
November 2005

QUBICA® WORLDWIDE

Qubica Worldwide
www.qubica.com

Revision Control Sheet

Release	Date	Description	Author
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	April 2005	Add warning for the CSA	Andre Hebert
R1.1	May 2005	Add bowling parts list	Andre Hebert
R1.2	November 2005	Add dip switch for PS, FS and add dip switch for Double pin sensitivity.	Andre Hebert

Document Information Sheet

Document name	Release Date	Author
TMS Owner's Manual First Release R1_1.doc	May 2005	Andre Hebert
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IMPORTANT SAFETY INSTRUCTIONS

Warning

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.

AN APPROVED POWER SUPPLY CORD, APPROPRIATELY RATED FOR THE AC VOLTAGE INPUT, IS TO BE USED FOR MAINS SUPPLY TO THE FLUORESCENT CONTROL BOX.

VERIFY THAT THE FLUORESCENT LIGHT FIXTURE HAS A VOLTAGE RATING SUITABLE FOR CONNECTION TO THE AC MAINS INPUT OF THE FLUORESCENT CONTROL BOX.

THE POWER SUPPLY CORD FOR THE FLUORESCENT CONTROL BOX IS TO BE INSTALLED BY THE MANUFACTURER OR TRAINED SERVICE REPRESENTATIVE TO ENSURE PROPER GROUNDING AND BONDING CONNECTIONS ARE MADE.

APPROPRIATE, APPROVED WIRING, ACCEPTABLE IN THE COUNTRY OF END USE, IS TO BE USED FROM THE MAINS OUTPUT

CONNECTIONS OF THE FLUORESCENT CONTROL BOX TO THE FLUORESCENT LIGHTING FIXTURES. ALSO, APPROPRIATE, APPROVED POLYMERIC TYPE STRAIN RELIEF DEVICES MUST BE USED FOR THIS WIRING AT THE EXIT POINTS FROM THE FLUORESCENT CONTROL BOX.

THE MAINS SUPPLY CORD OF THE FLUORESCENT CONTROL BOX MUST BE ROUTED SUCH THAT IT WILL NOT BE SUBJECTED TO MECHANICAL ABUSE.

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

Introduction to TMS Pinsetting System

Qubica Worldwide is proud to introduce you to your TMS Pinsetting System. 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 TMS Pinsetting System 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 TMS Pinsetting System and instruct you in the proper operation and maintenance techniques.

About this Book

Thank you for selecting TMS Pinsetting System for your fun and entertainment. Your TMS Pinsetting System 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 TMS Pinsetting System and its many features. It describes how to 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:

1. Chapter 1, "TMS Pinsetting System Fundamentals," provides an overview of your TMS Pinsetting System machine. After reading this chapter you should be able to identify the major components of your TMS Pinsetting System and understand the basic principles of the machine's operation.
2. Chapter 2, "Setting Up/Operating Your TMS Pinsetting System," 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.
3. Chapter 3, "Solving Problems," contains information that will help you identify and correct problems that might arise as you use your equipment.
4. Chapter 4, "Wiring Diagrams," provides you with all necessary wiring and electronic information in easy to comprehend diagrams
5. Chapter 5, "TMS Pinsetting System Parts Catalog," provides you with a complete breakdown of all your equipment's parts in exploded views for your reordering and servicing convenience.

1. TMS Pinsetting System Fundamentals

Chapter Overview

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

Understanding how the System Works

When the pinsetter is turned on, it will perform a calibration cycle, set the pins 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, 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. In turn, the pin detection wheel 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 in that position the DC drive will move the drawbar in front of the pinsetter and at the same time lowering the pins.

Note

If, during the calibration process, the drawbar is unable to reach the rear of the pinsetter, the TMS power box will stop the calibration process and wait for an intervention from the user. (See the Troubleshooting section for more details)

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.

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 number of attempts reaches 8.**

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.

Major Components and Assemblies

There are a number of different assemblies which make up your TMS Pinsetting System 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 the operation of your TMS Pinsetting System 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 TMS Pinsetting System's various operations when its signal is cut by a passing ball. It is important, then, that the ball detector be sensitive enough to detect a passing ball regardless of its speed.

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 sheer gravity to the front ball return rack located at the bowler's end of the lane.

The ball lift's conveyor is powered by a ½ hp, a capacitor starts the electric motor that is 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 autoscoring system, or Manager Control.

Note **The TMS pinsetter is supplied to operate on 208/230 volts, 50/60 cycles, single phase. The electrical supply lines must comply with all electrical codes. It is the responsibility of the owner to supply power to all the electrical components necessary for the normal operation 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.**

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 TMS 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.

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.

2. Setting Up/Adjusting Your TMS Pinsetting System

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 Bowl

Your pinsetter is installed by qualified Qubica technicians and configured in a manner to give you maximum performance; however in the following chapter we will explain all the setup function.

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.**

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.

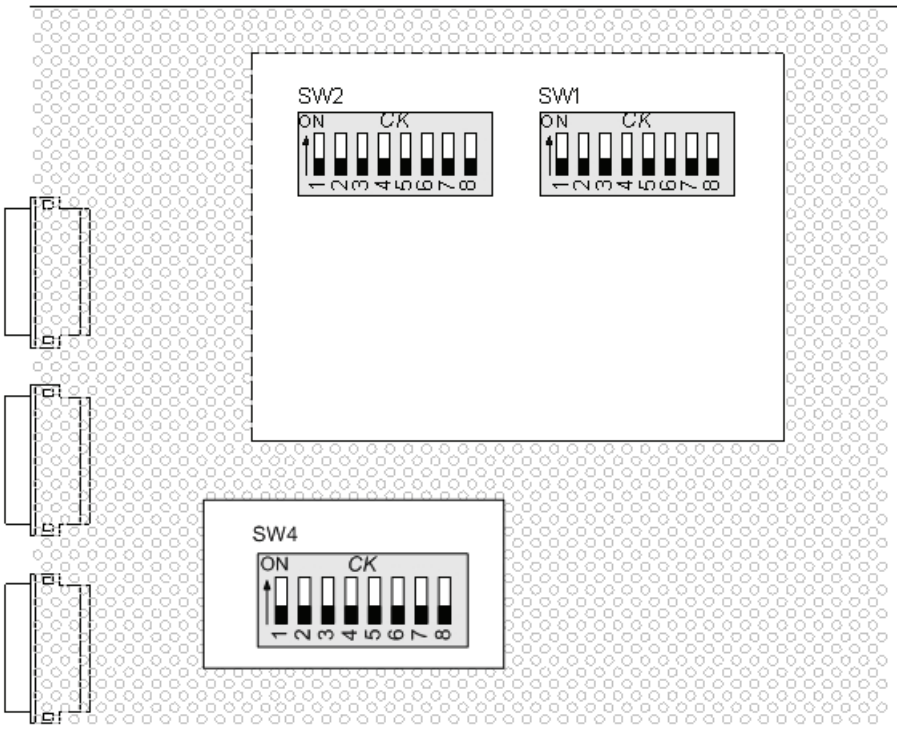


Figure 2-1 Dip Switch Location

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)

(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.

Starting with version 1.33B of the CPU and version 1.9 of the pin detector, SW4-2 will affect the sensitivity of the detection.

SW4-2 OFF	SW4-2 ON	SW1-3	SW1-4	SW1-5
More Sensitive 1	9	OFF	OFF	OFF
2	10	ON	OFF	OFF
3	11	OFF	ON	OFF
4	12	ON	ON	OFF
5	13	OFF	OFF	ON
6	14	ON	OFF	ON
7	15	OFF	ON	ON
Less Sensitive 8	16	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:

	Ball detection, ***Any Command from the pin detector push button*** ***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.

SW2-4 Pin Position when Pinsetters are OFF (V1.00)

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)

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)

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)

Used to determine the number of pins which are installed on the pinsetter.

OFF	Five Pins
ON	Ten Pins

SW2-8 Number of Balls per Frame (V1.16)

Used to determine the number of balls needed for a complete frame.

Note: Some game types require three balls per frame (Five Pin, Harduck)

OFF	Two balls per frame
ON	Three balls per frame

SW4-1 Enable – Disable Players buttons (V1.33B)

Used to enable or disable the players buttons when the pinsetters is controlled by a scoring system.

OFF	Disabled
ON	Enable

SW4-2 Double the sensitivity range of the Pin Detection (V1.33B)

Used to double the number of holes necessary to consider a pin as fallen.

NOTE: To be effective you also need the version 1.8 of the pin detector.

OFF	Normal (1 to 8 holes range)
ON	Double (9 to 16 holes ranges)

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.

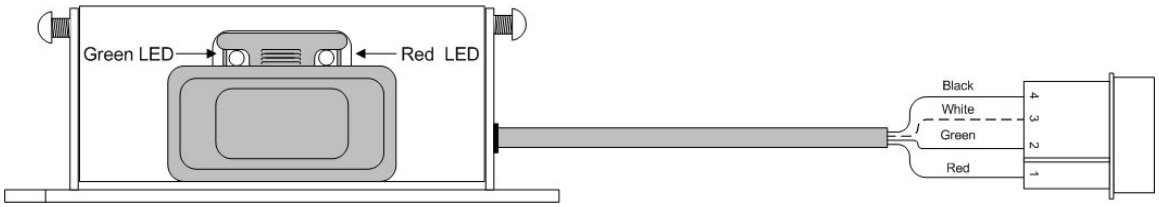
Ball detectors use a very simple principle. An invisible beam of light is constantly emitted from the ball detector. A reflector placed on the opposite of each lane returns the light beam to the unit. When the signal is cut (ball is detected) the ball detector communicates the information to the pinsetter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



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.

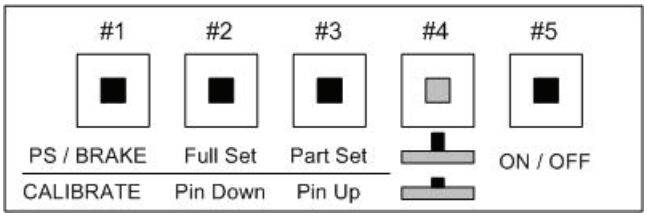


Figure 2-3 Pin Detector Button

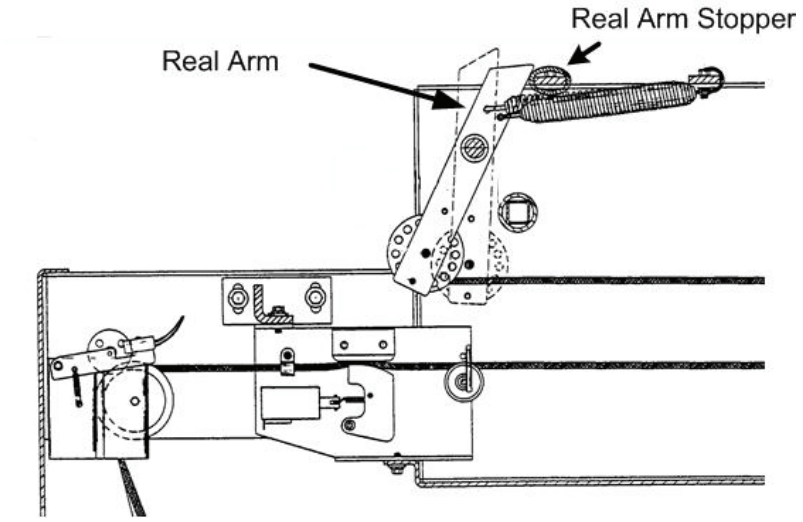


Figure 2-4 Reel Arm Position

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.

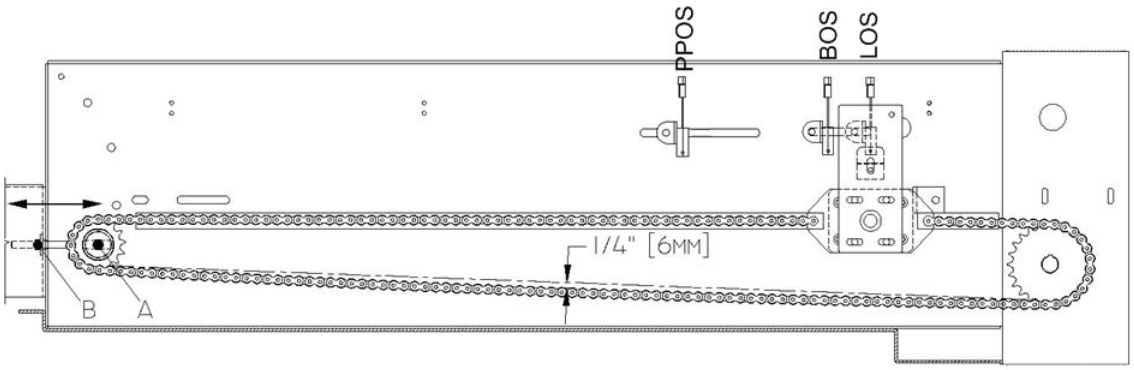
Procedure 2-4 - BOS Brake Optical Sensor

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



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

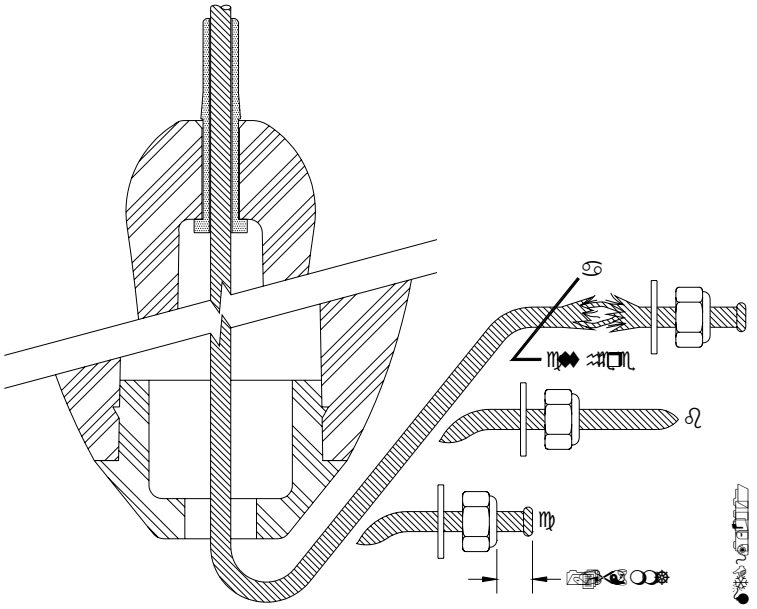


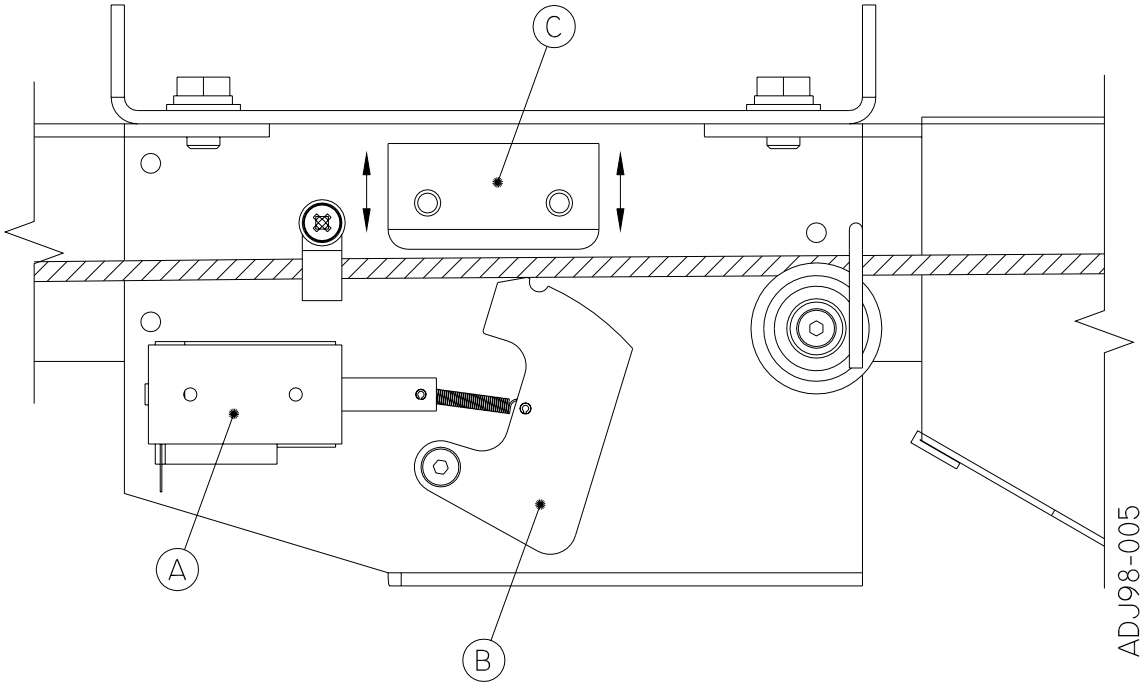
Figure 2-6 - String Repair

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



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.

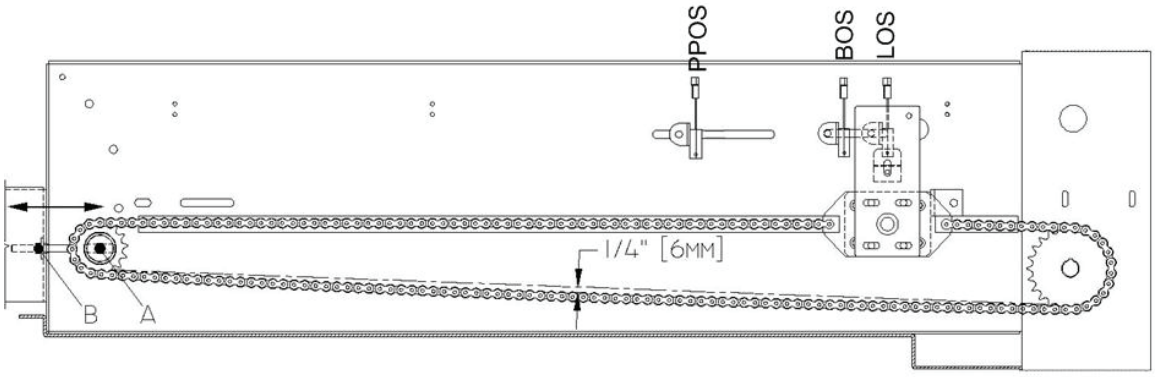
Procedure 2-8 - Pin Brake Adjustment

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.

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

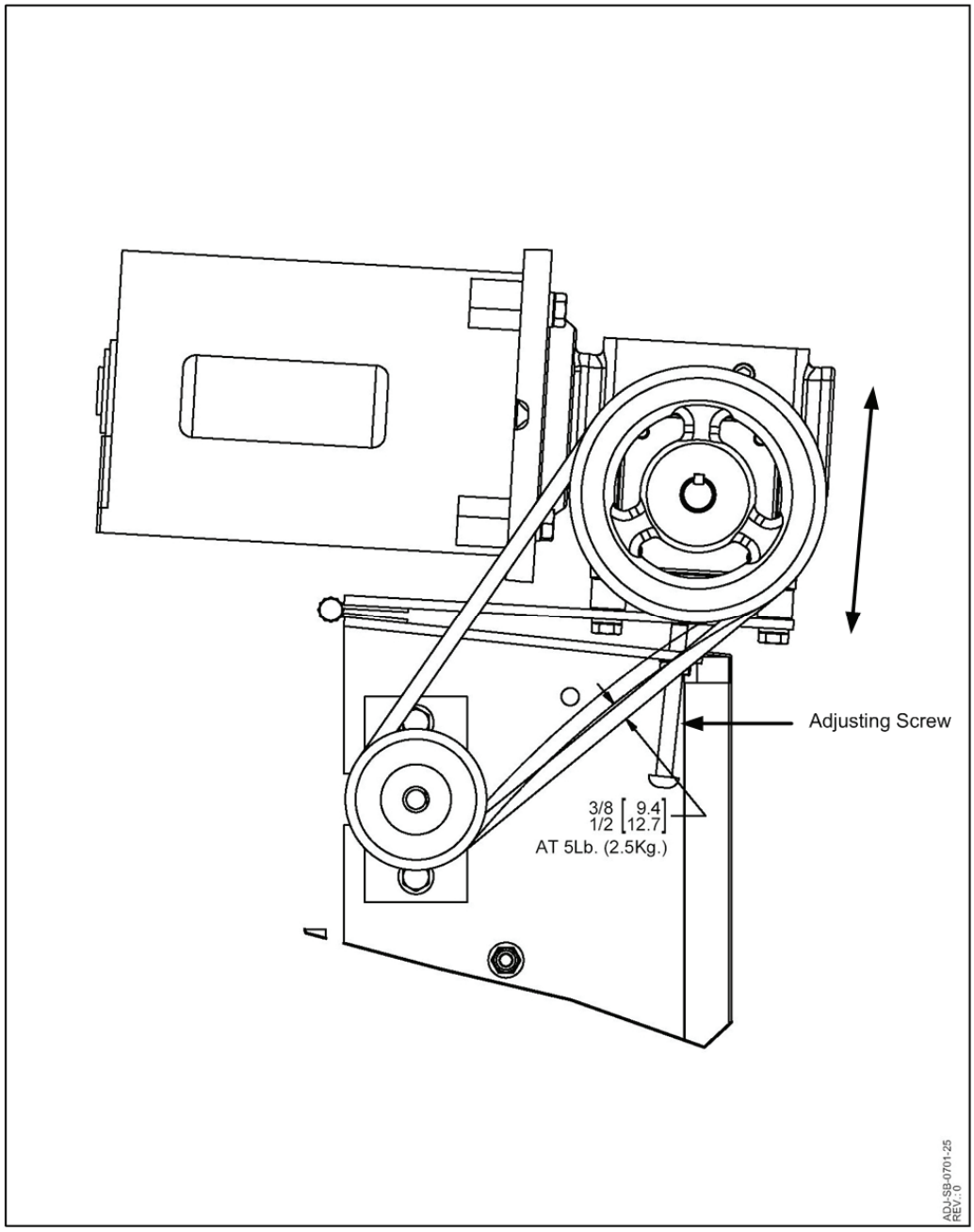


The drawbar chain must not be tightened to extreme. The mechanism must have some slack to it in order to extend the life of the pinsetter. Oil the chain with a very small quantity of SW10 motor oil only when absolutely needed. Remove all excess oil and grease from the chain and surrounding area on a 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 adjustment screw to raise or lower the motor assembly.

Figure 2-9 Adjusting Rear Ball Lift V-Belt



3. 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 3-1 - 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

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.

One or more fallen pins are Re-Spotted when they are not supposed to.

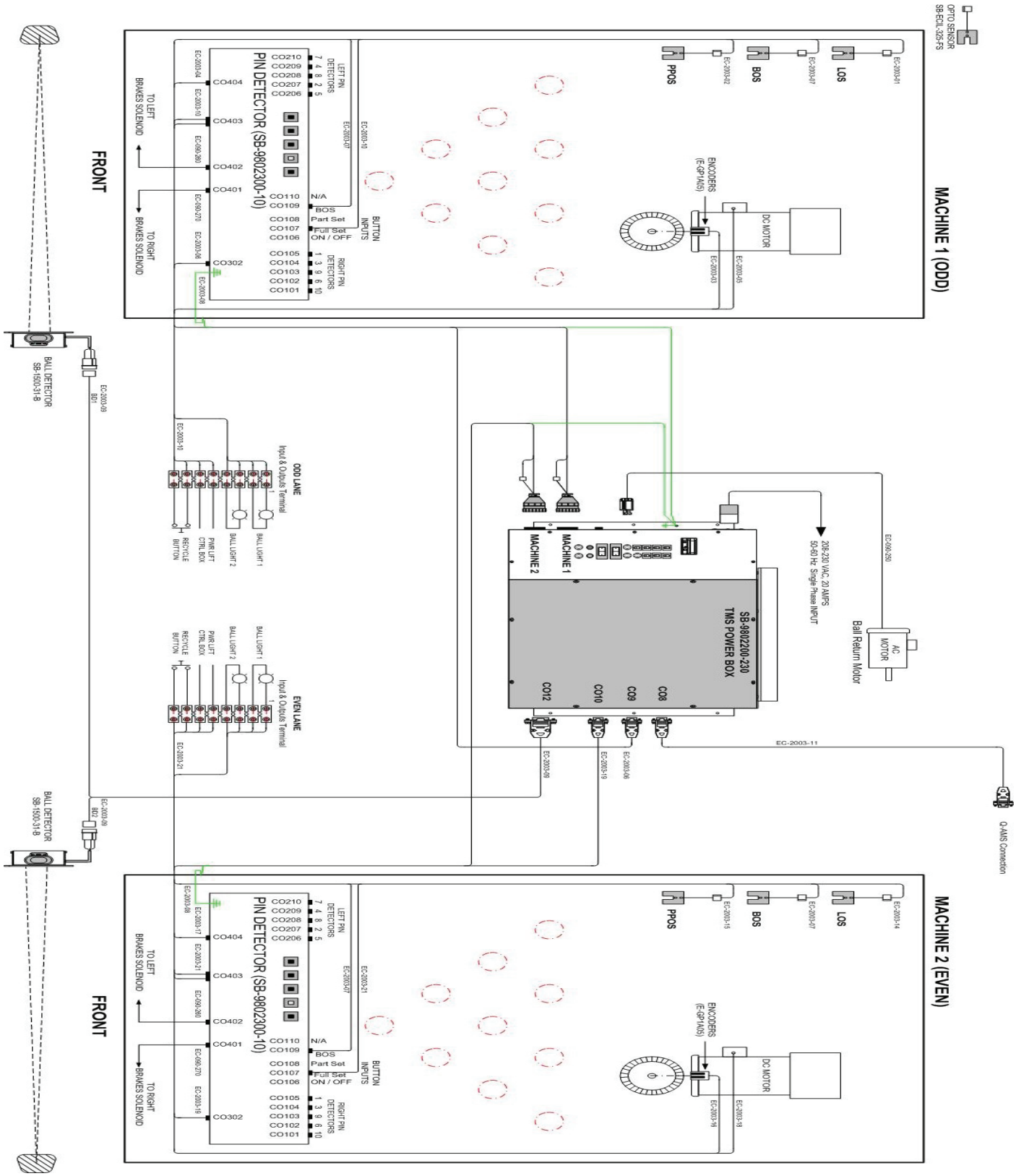
1. Check the brake adjustment of those pins.
2. Check solenoid connections.
3. Replace the solenoid.

4. Wiring Diagram

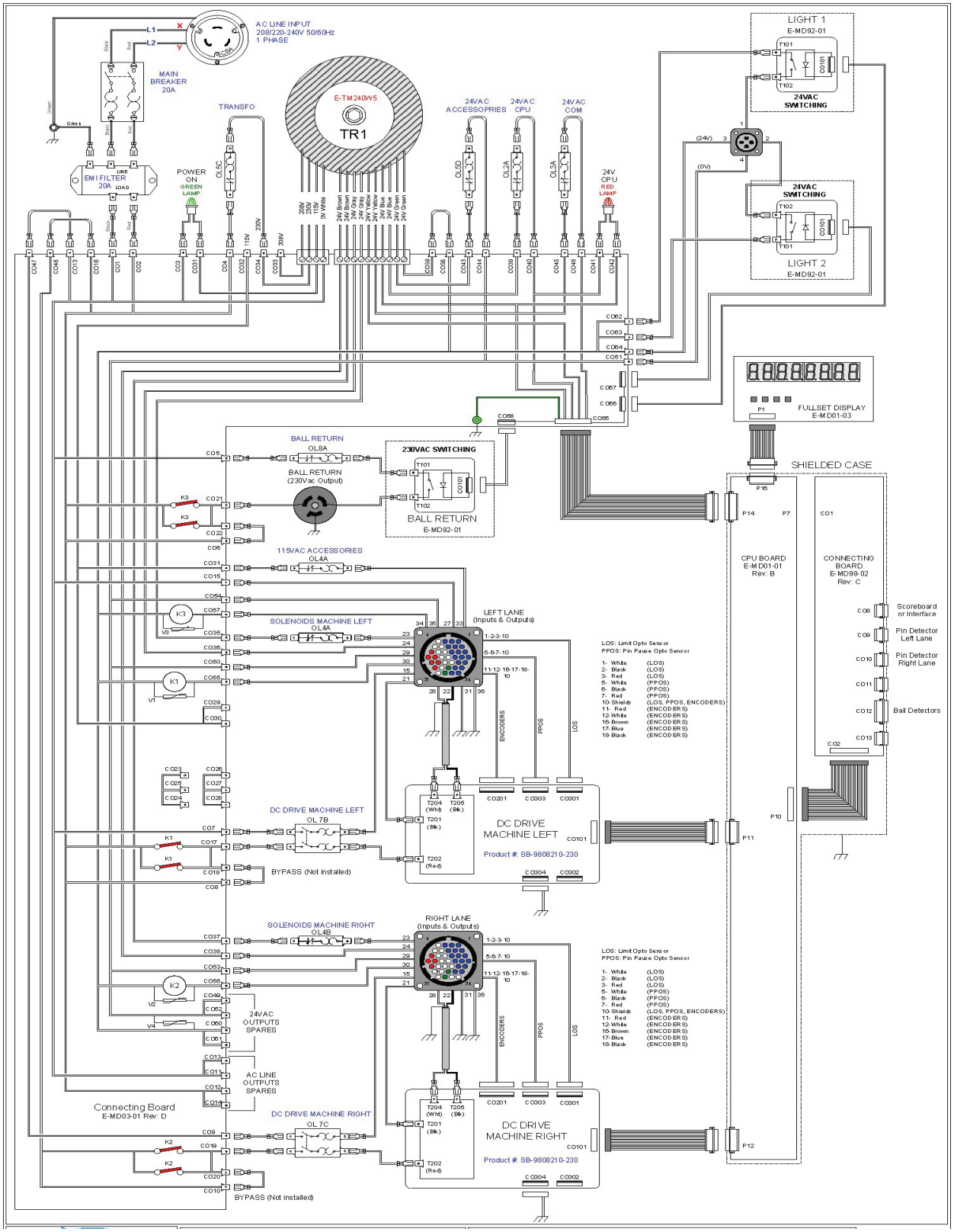
Chapter Overview

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

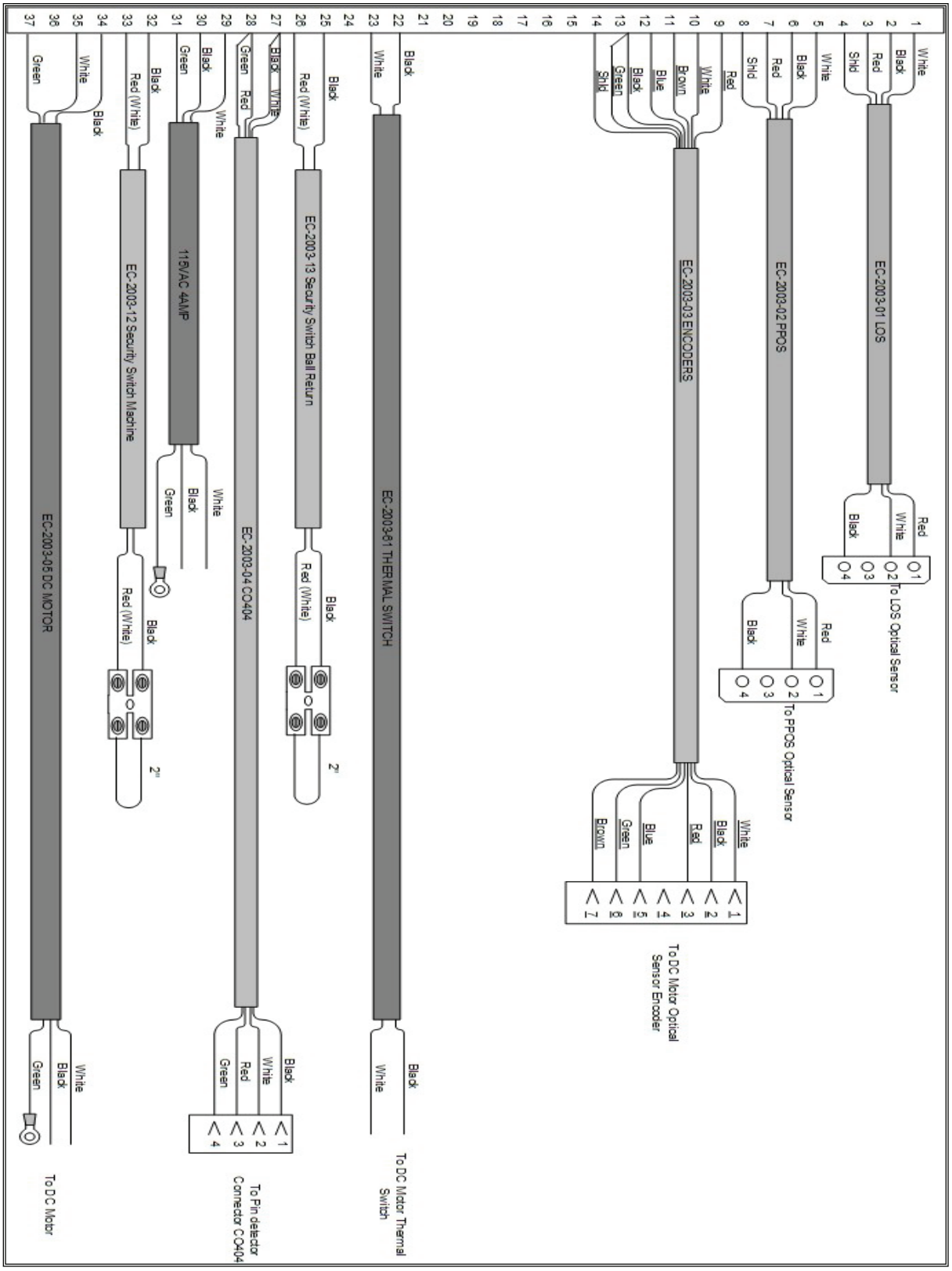
General Wiring



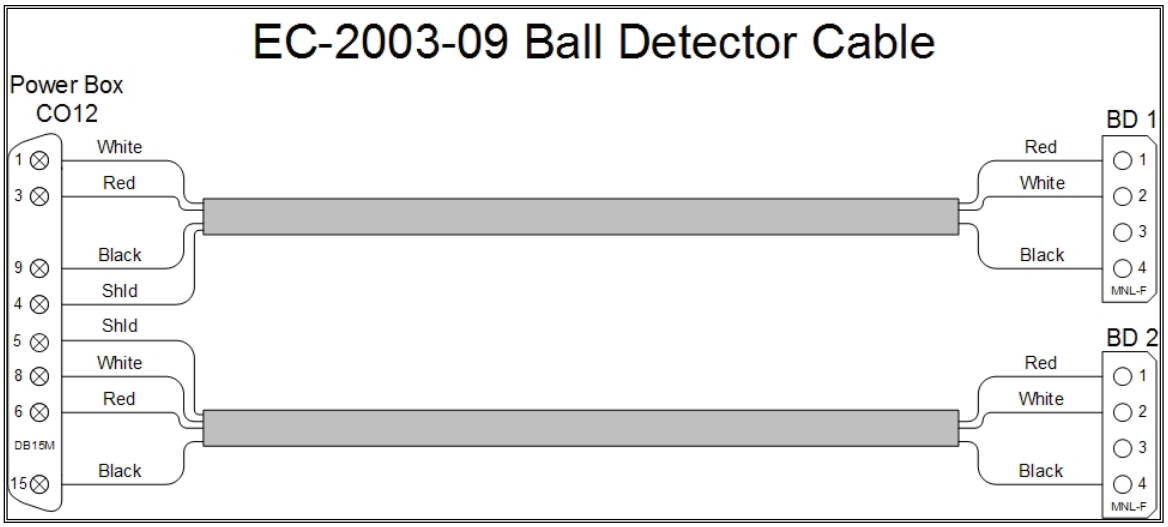
Power Box Wiring



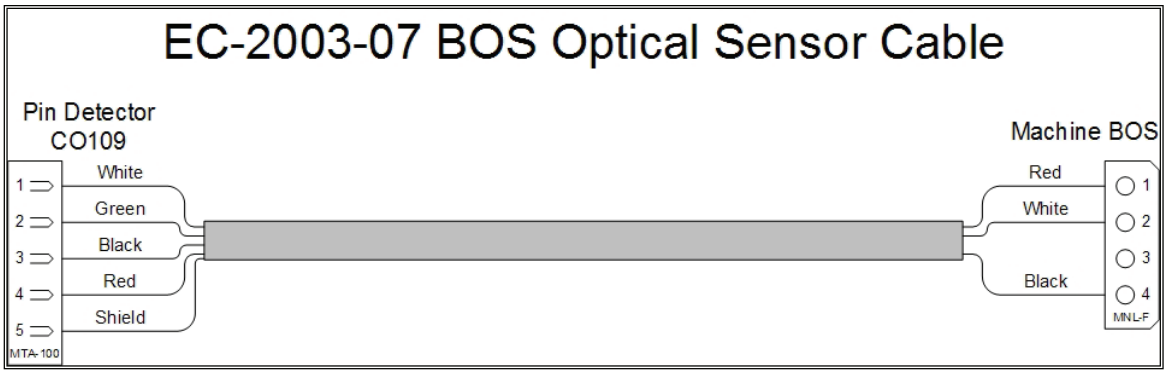
Machine Cable Detailed



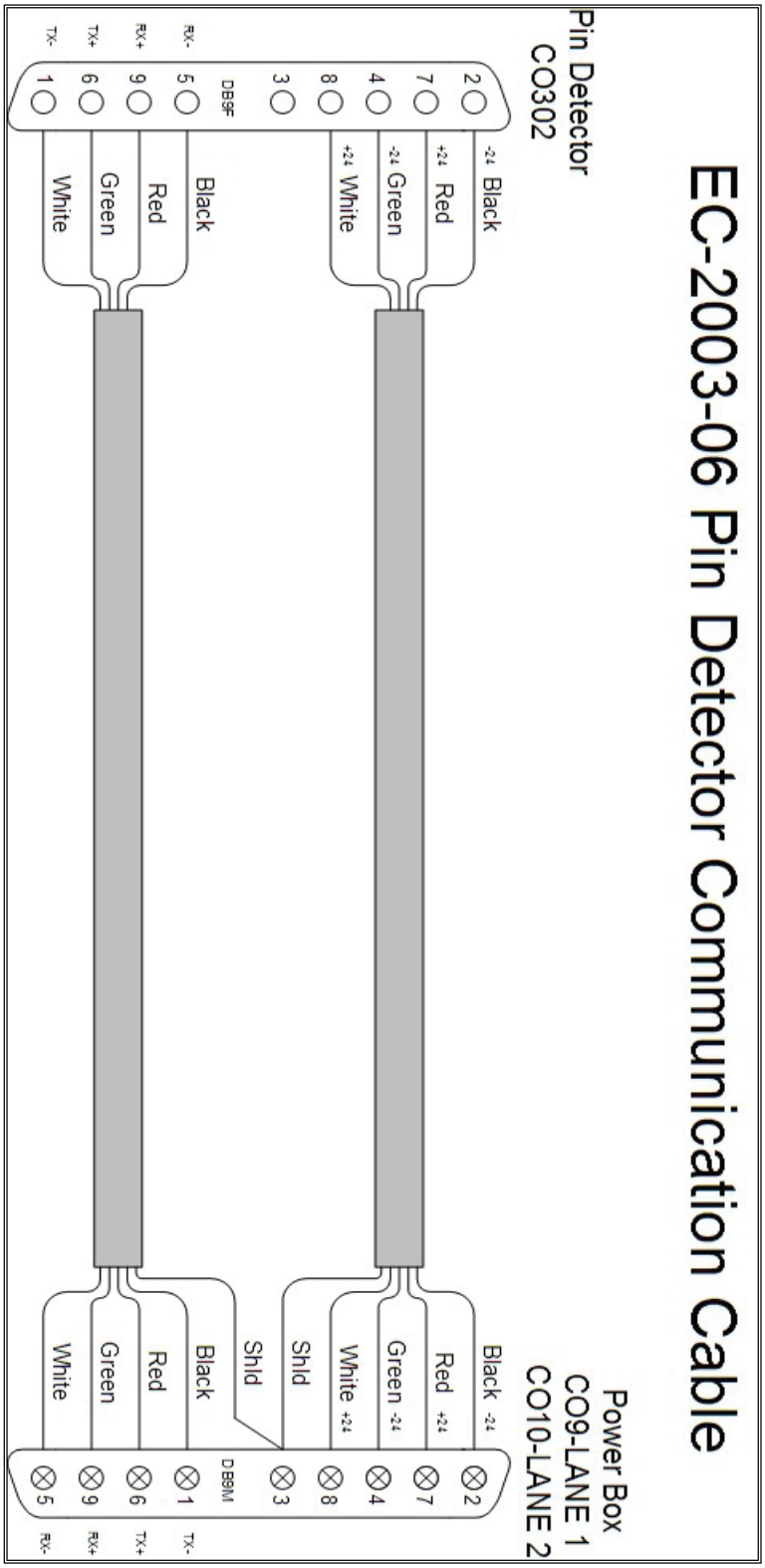
Ball Detector Cable



BOS Optical Sensor Cable



Communication Cable

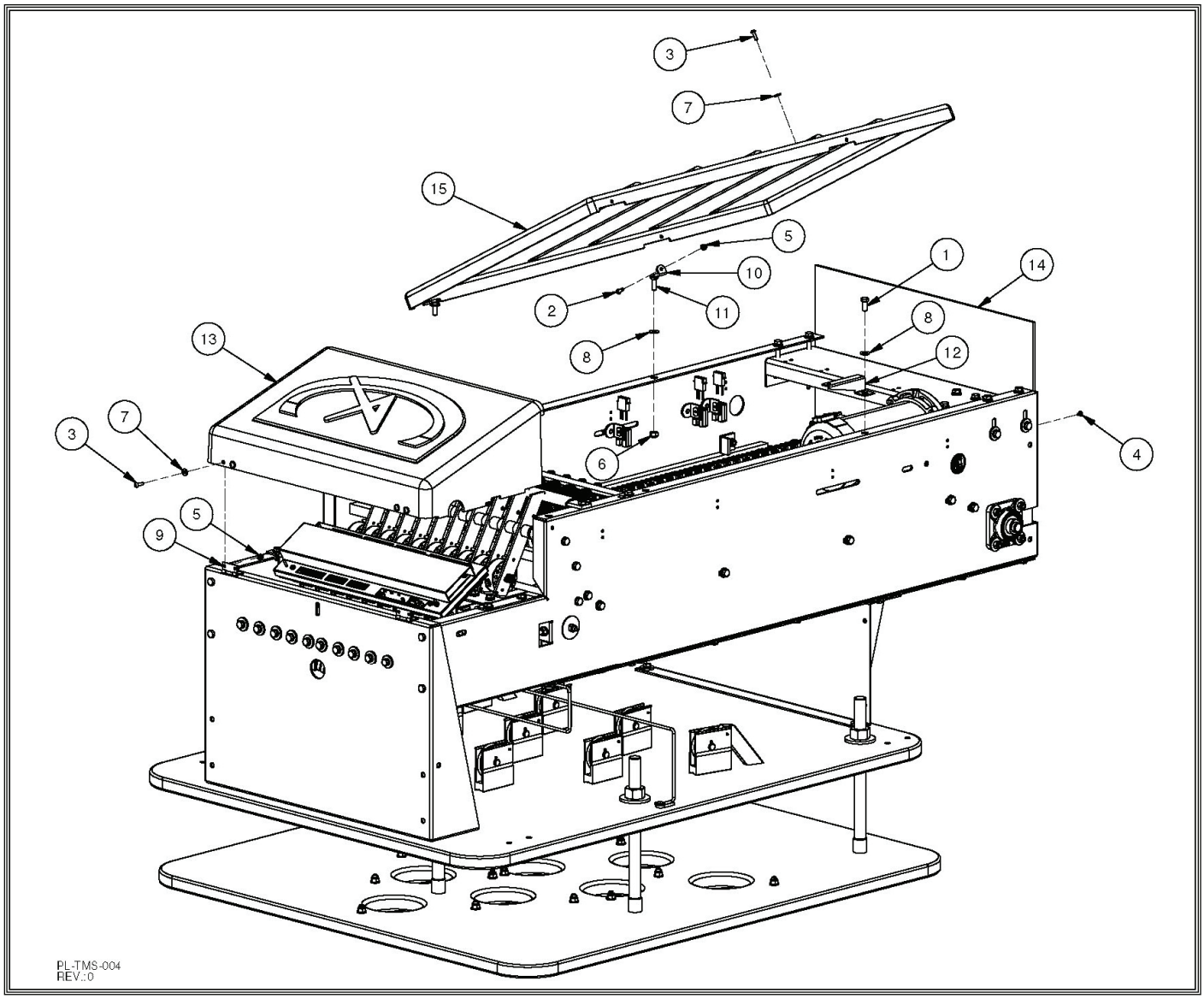


5. Parts Listing

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.

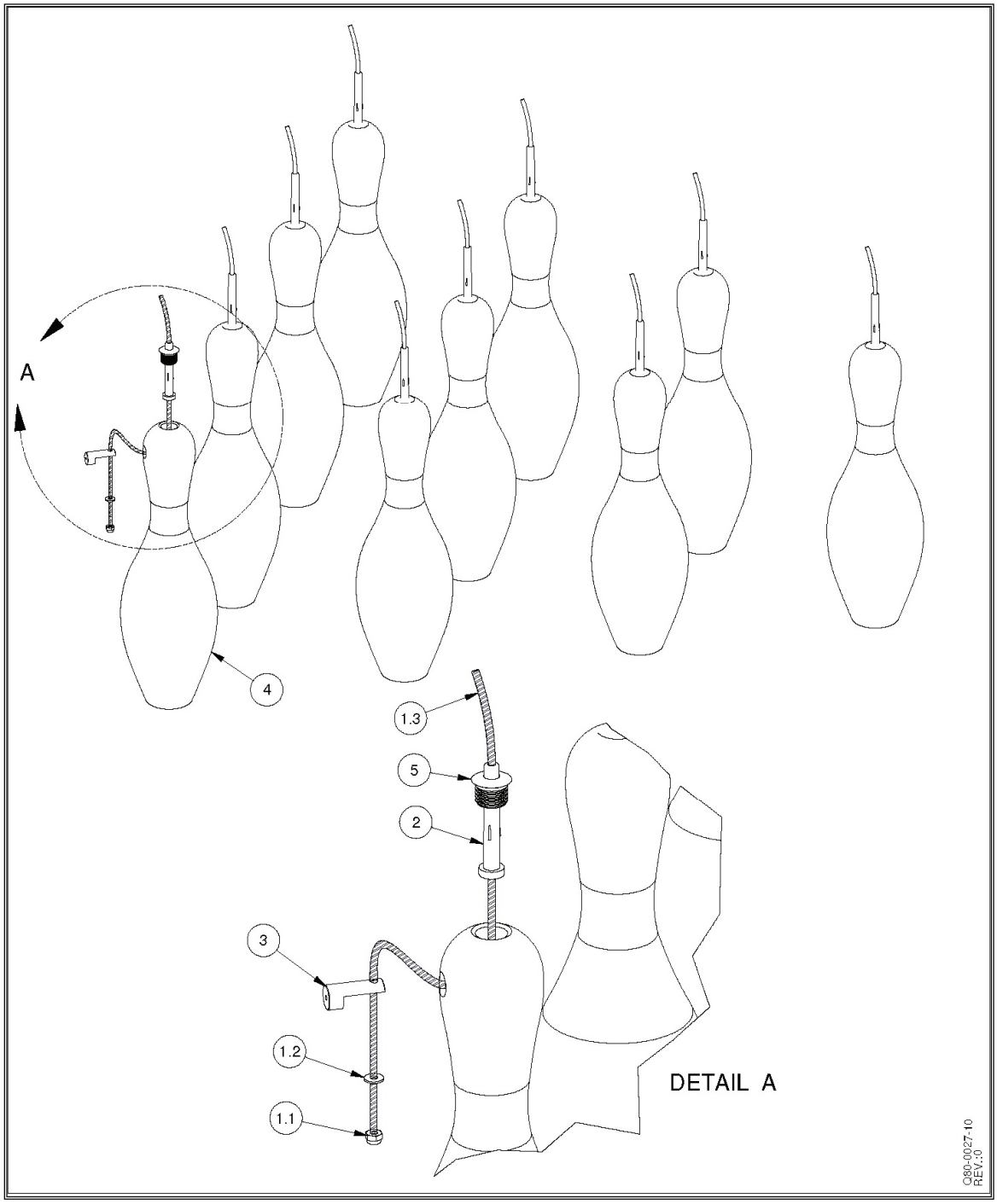
Safety Covers



Safety Covers Part List

Item	Part Number	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

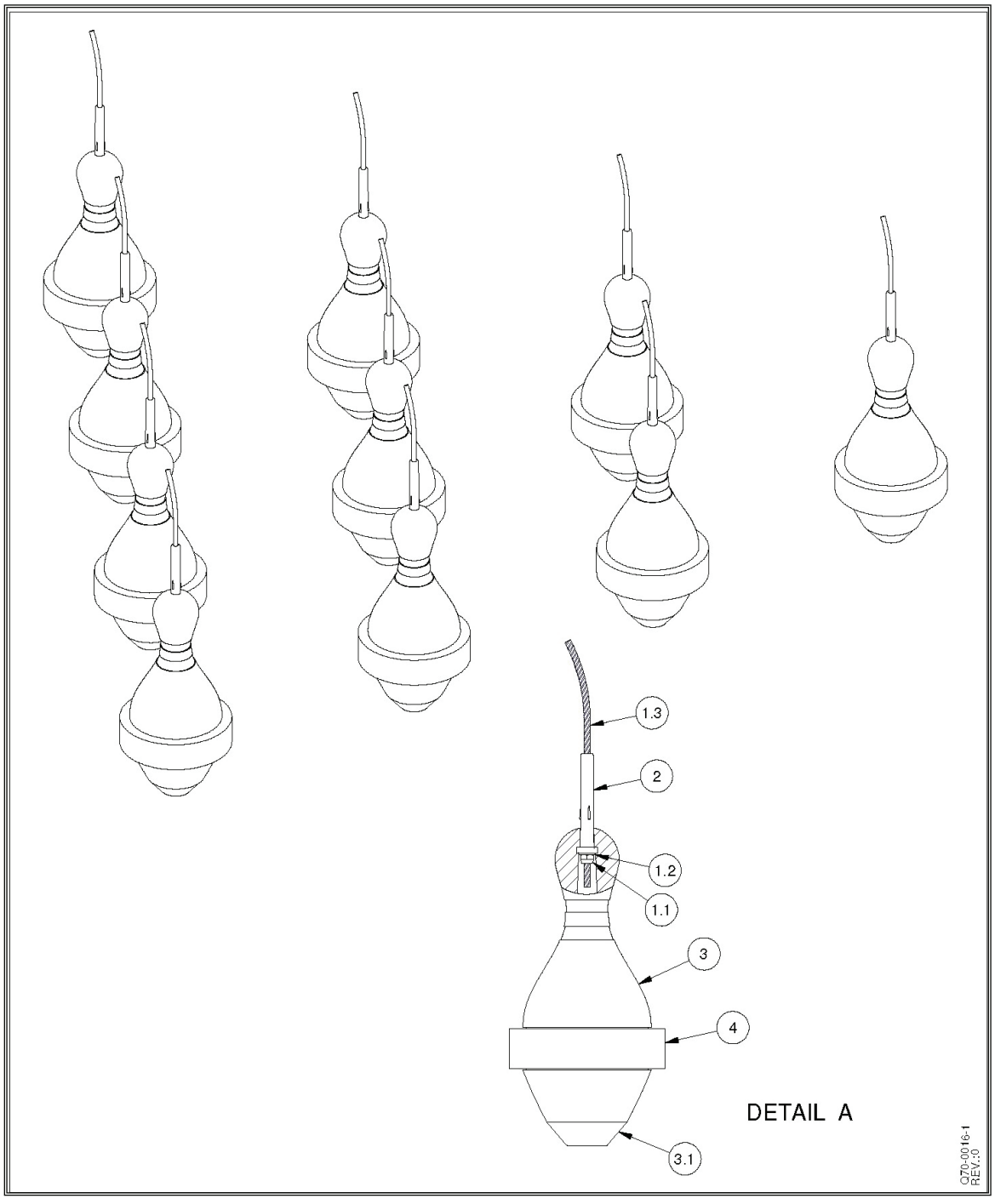
Ten Pin Bowling pin



Ten pin parts list

Item	Part Number	Description
1	I-022A	STRING ASSEMBLY 14 FOOT (4.3 METERS)
1.1	7036-001032-000	HEX NYLON NUT 10-32 UNF
1.2	7050-018048-004	3/16 X 31/64 X 3/64 FLAT WASHER
1.3	Q81-1050	PIN STRING - 50 METERS ROLL
2	P-241-10	MUSHROOM BUSHING
3	PT-002	PIN SWIVEL
4	Q80-0027-10	STRING TENPIN COMPLETE SET
5	Q80-2001-0020	STRING PIN CAP

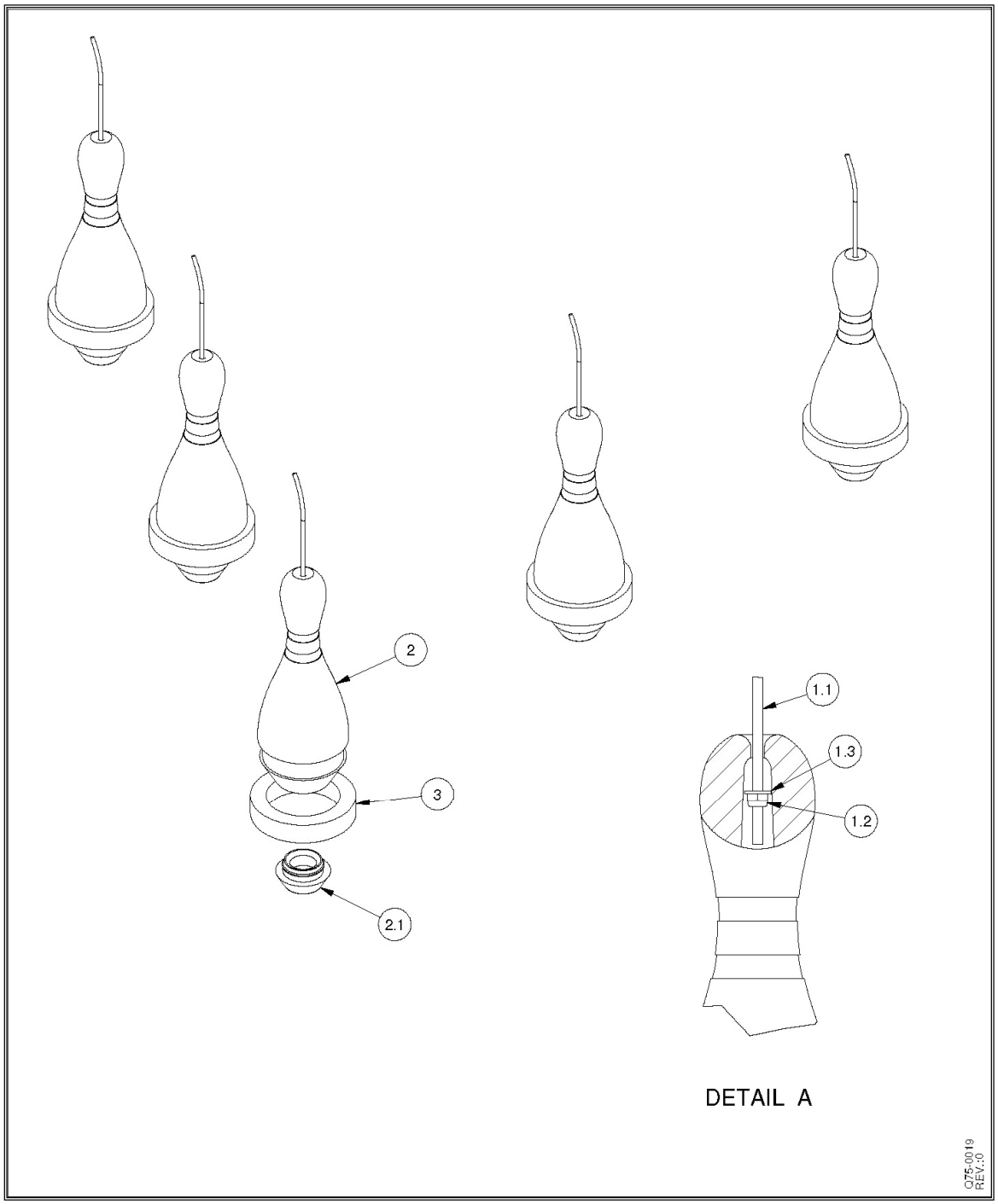
Duck Pin Bowling pin



Duck pin parts list

Item	Part Number	Description
1	I-022A	STRING ASSEMBLY 14 FOOT (4.3 METERS)
1.1	7036-001032-000	HEX NYLON NUT 10-32 UNF
1.2	7050-018048-004	3/16 X 31/64 X 3/64 FLAT WASHER
1.3	Q81-1050	PIN STRING - 50 METERS ROLL
2	P-241-10	MUSHROOM BUSHING
3	Q70-0015	SUPER DUCK DRILLED UNIT
3.1	Q70-0030	NYLON BASE, DUCKPIN
4	Q70-0020	SUPER BAND BLUE, DUCKPIN

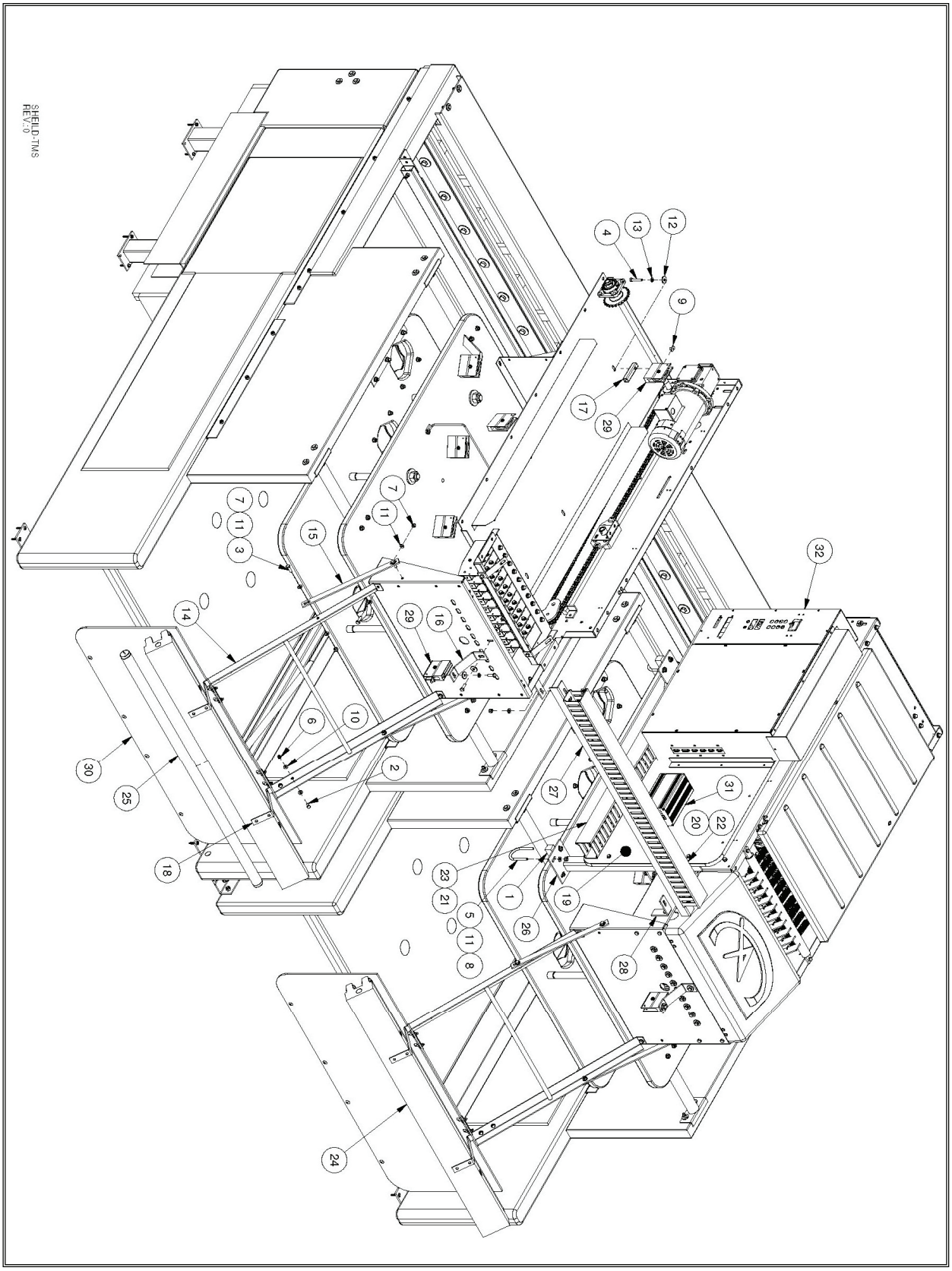
Five Pin Bowling pin



Five pin parts list

Item	Part Number	Description
1	I-022A	STRING ASSEMBLY 14 FOOT (4.3 METERS)
1.1	7036-001032-000	HEX NYLON NUT 10-32 UNF
1.2	7050-018048-004	3/16 X 31/64 X 3/64 FLAT WASHER
1.3	Q81-1050	PIN STRING - 50 METERS ROLL
2	Q75-0016	U.V. FIVE PIN DRILLED UNIT
2.1	Q75-0030	NYLON BASE SUPER FIVE
3	Q75-0020	SUPER BAND BLUE FIVEPIN UNIT

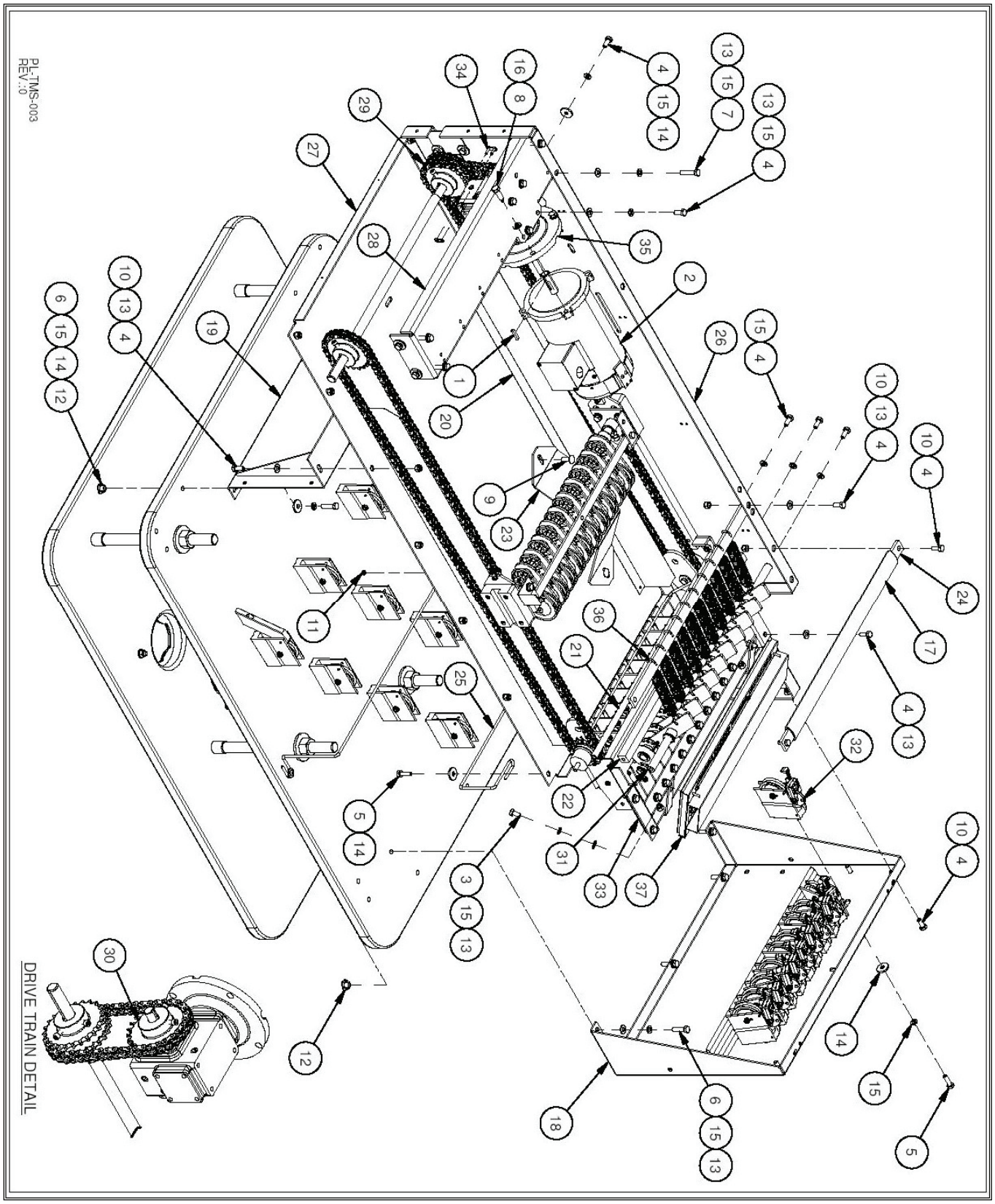
Shield



Shield Part List

Item	Part Number	Description
1	15W-0374-1	SPACER BLOCK
2	7010-002520-075	1/4-20 UNCX3/4 HEX CAP SCREW
3	7010-003118-100	5/16-18 UNCX1 HEX CAP SCREW
4	7010-003118-175	5/16-18 UNCX1 3/4 HEX CAP SCREW
5	7030-003118-325	5/16-18 x 3 1/4 U BOLT
6	7036-002520-000	HEX NYLON NUT 1/4-20 UNC
7	7036-003118-000	HEX NYLON NUT 5/16-18 UNC
8	7038-003118-000	5/16-18 UNC HEX KEEP NUT
9	7046-003118-037	5/16-18 UNC TEE NUT
10	7050-028062-006	9/32 X 5/8 X 1/16 FLAT WASHER
11	7050-034068-006	11/32 X 11/16 X 1/16 FLAT WASHER
12	7050-034100-012	11/32 X 1 X 1/8 FLAT WASHER
13	7060-031057-009	5/16 LOCK WASHER
14	9102161	SUPPORT SHIELD
15	9102162	BRACE
16	9102163	SHEILD BRACKET
17	9102164	PULLEY SPACER
18	9102165	FLUORESCENT BRACKET
19	9106134	MELAMINE PANEL
20	E-1633	WIRING DUCT 42.125in [1.07m] LONG
21	E-1633	WIRING DUCT 46.062in [1.17m] LONG
22	E-1634	WIRING DUCT COVER 42.125in [1.07m]
23	E-1634	WIRING DUCT COVER 46.062in [1.17m]
24	E-F48	FIXTURE 48 DOUBLE
25	E-F48T	20W FLUORESCENT LIGHT 48
26	M-0374	POWER BOX MOUNTING FOOT
27	M-0391	CROSS BAR
28	M-0392	ANGLE BRACKET
29	SB-043-1	PULLEY SHEAF
30	SB-0700-50-3	SHIELD ASSEMBLY
31	SB-302-7050-10	FLUORESCENT SWITCH BOX
32	SB-9802200-230	POWERBOX TMS 230VAC 50/60Hz

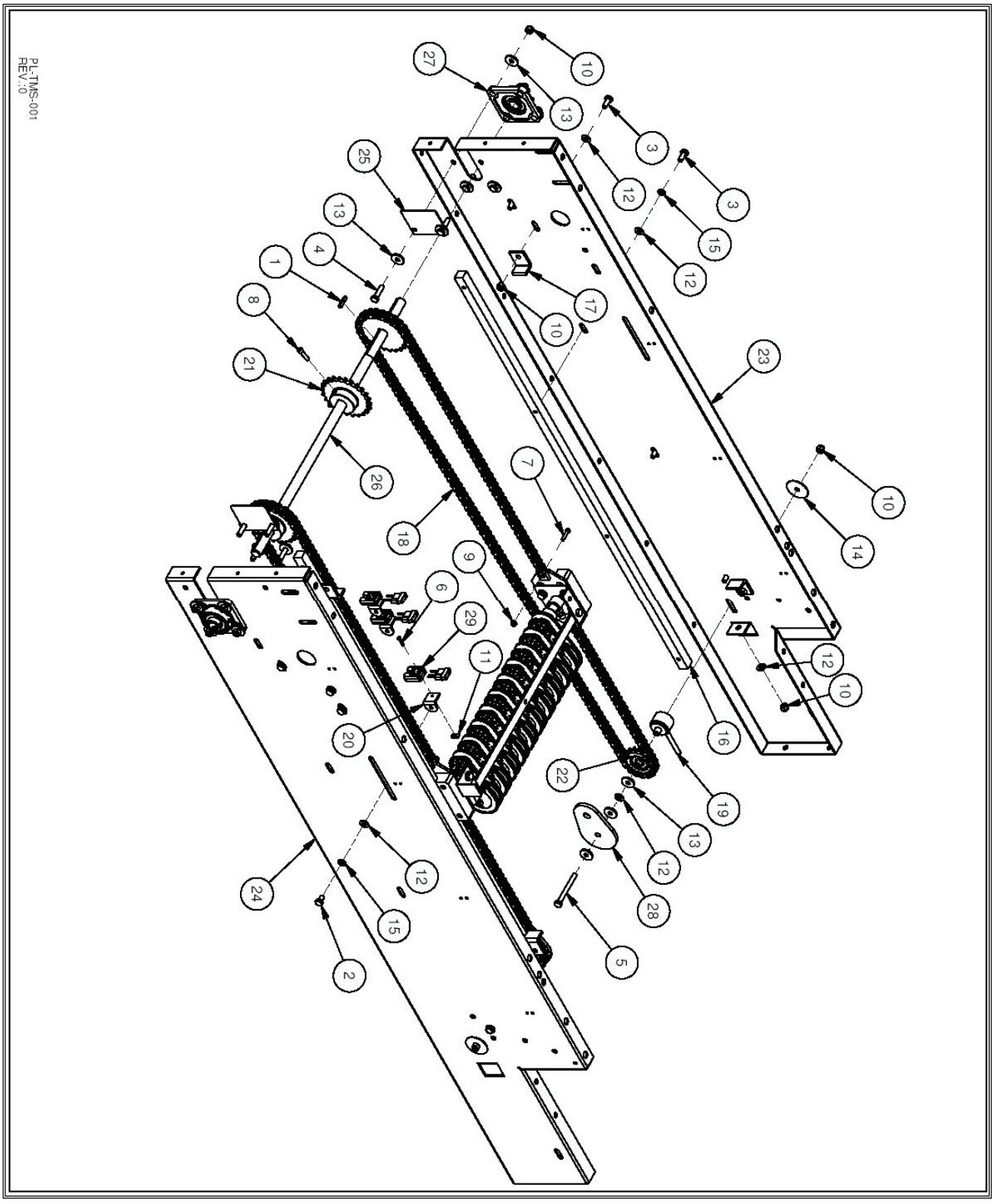
Main Components



Main Components Part List

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

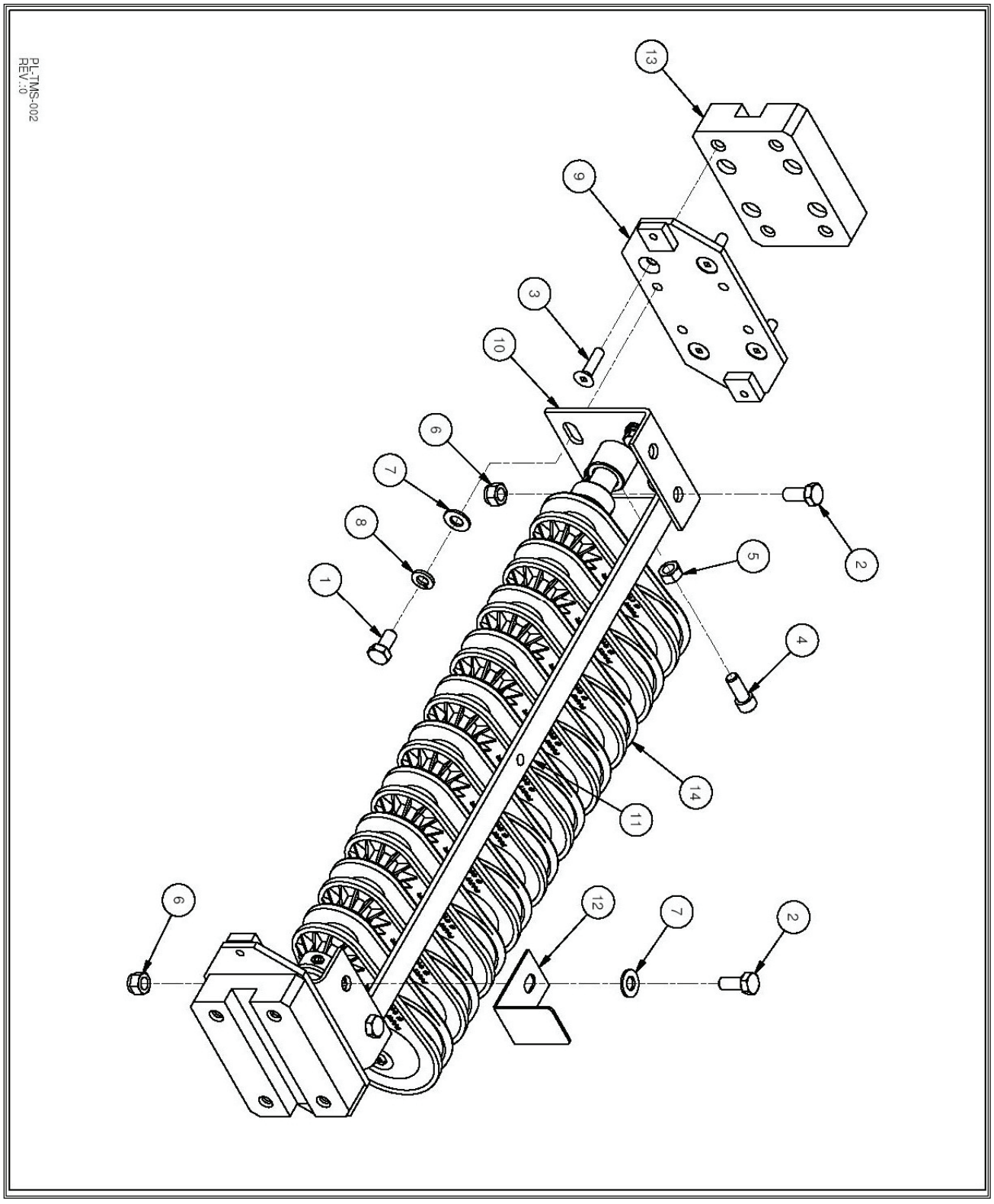
Frame Assembly



Frame Assembly Part List

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

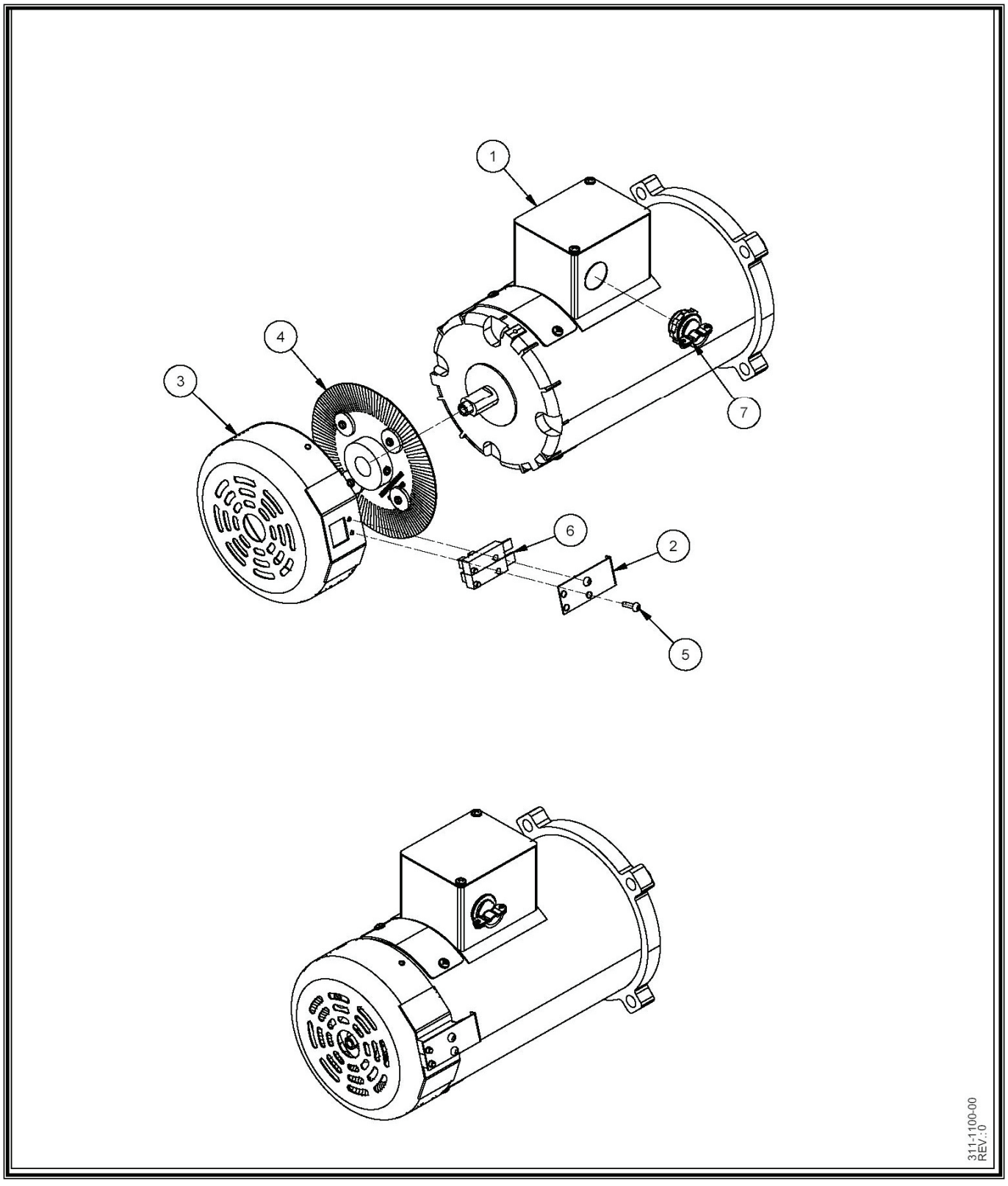
Drawbar Assembly



Drawbar Assembly Part List

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

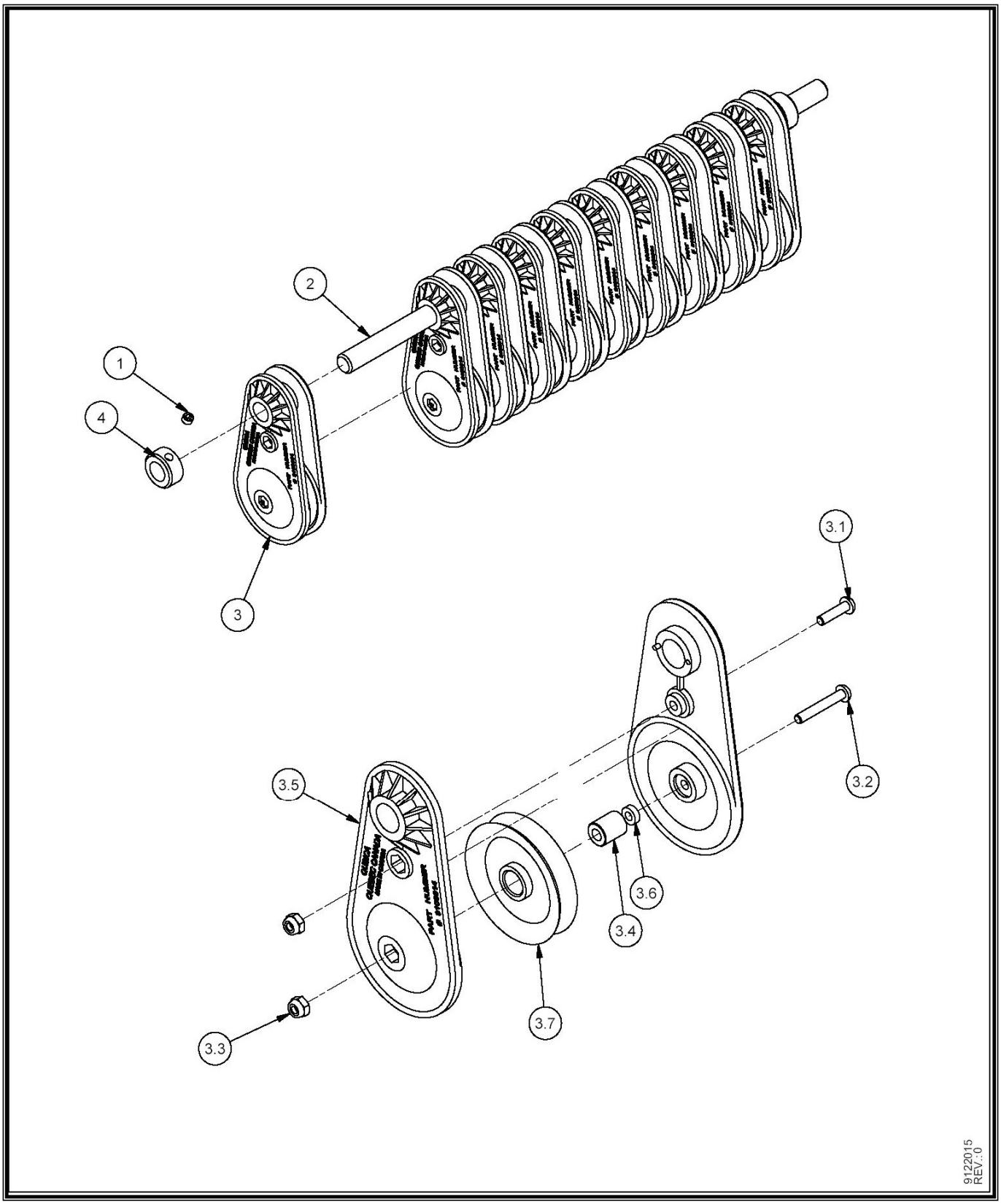
311-1100-00 DC Motor Assembly



311-1100-00 DC Motor Part List

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

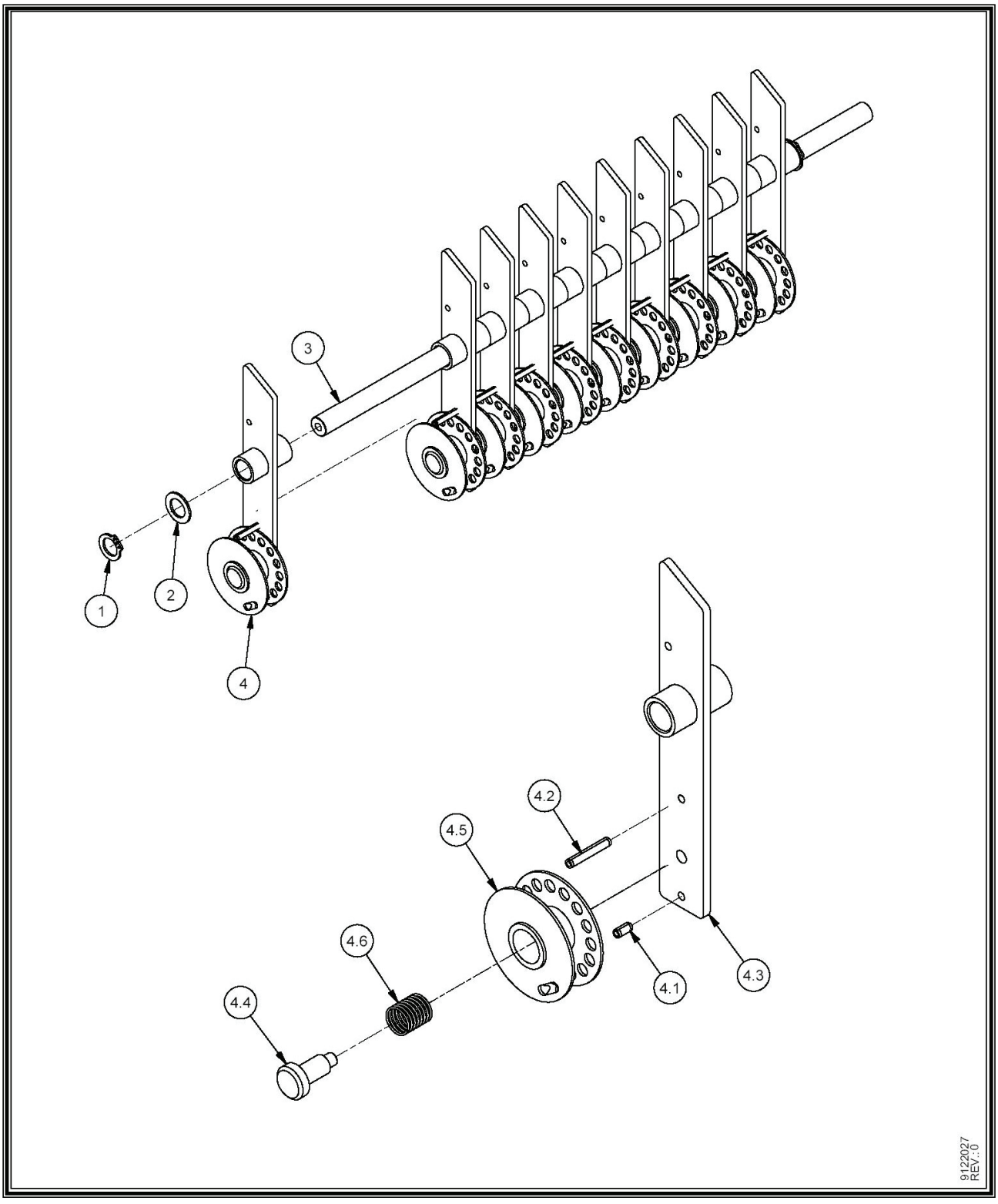
9122015 Drawbar Guide Assembly



9122015 Drawbar Guide Assembly Part List

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

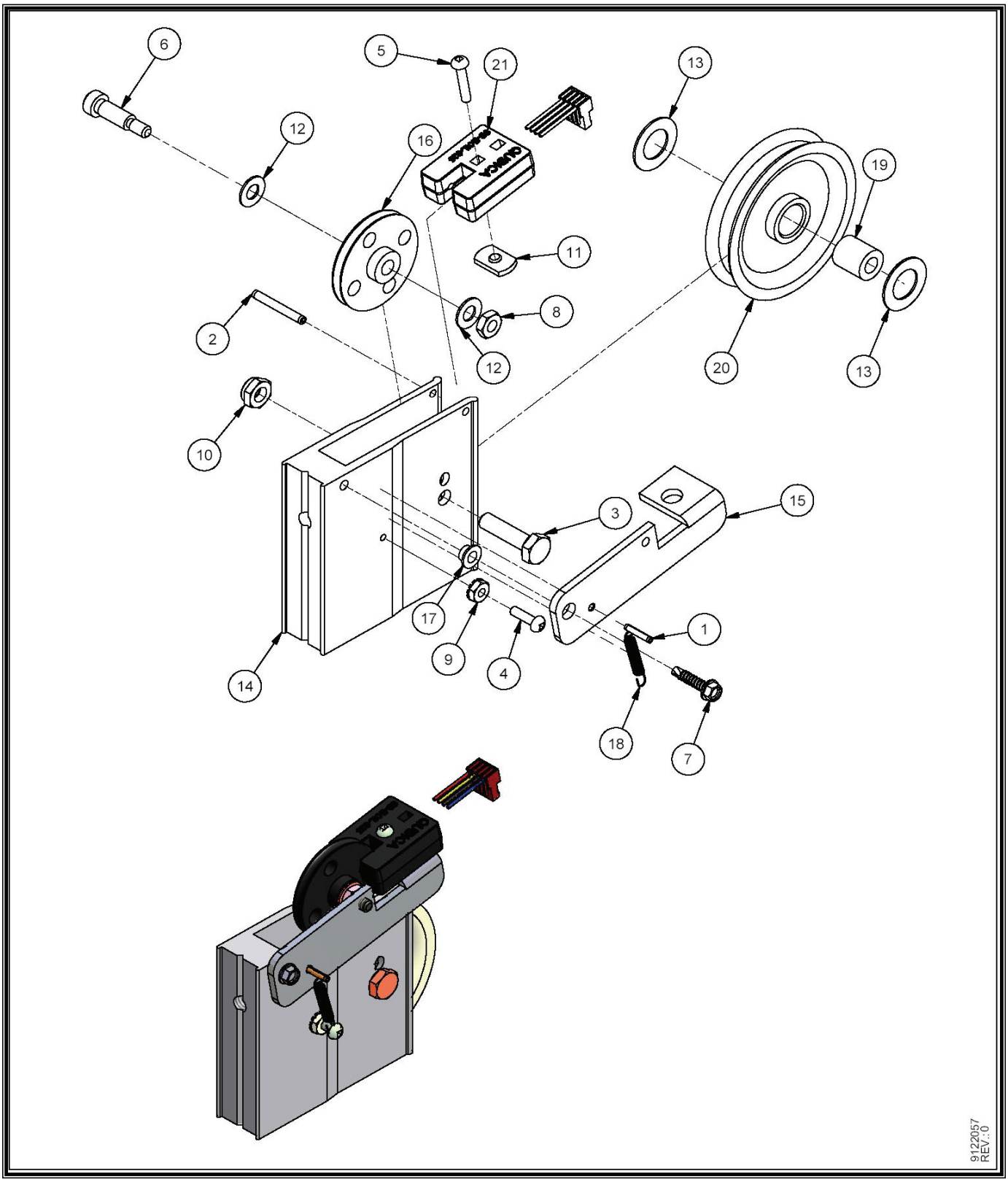
9122027 Reel Arm assembly



9122027 Reel Arm Assembly Part List

Item	Part Number	Description
1	7002-710000-62	5/8 EXTERNAL RETAIN. RING
2	7052-062100-006	5/8 X 1 X 1/16 FLAT WASHER
3	9102027	REEL ARM SHAFT
4	9122028	REEL ARM ASSEMBLY
4.1	7006-001800-037	SPRING PIN 3/16 X 3/8
4.2	7006-001800-112	SPRING PIN 3/16 X 1 1/8
4.3	9102028	REEL ARM
4.4	M-0011	STORAGE REEL AXLE
4.5	M-0042	STORAGE REEL
4.6	S-074	STORAGE REEL SPRING

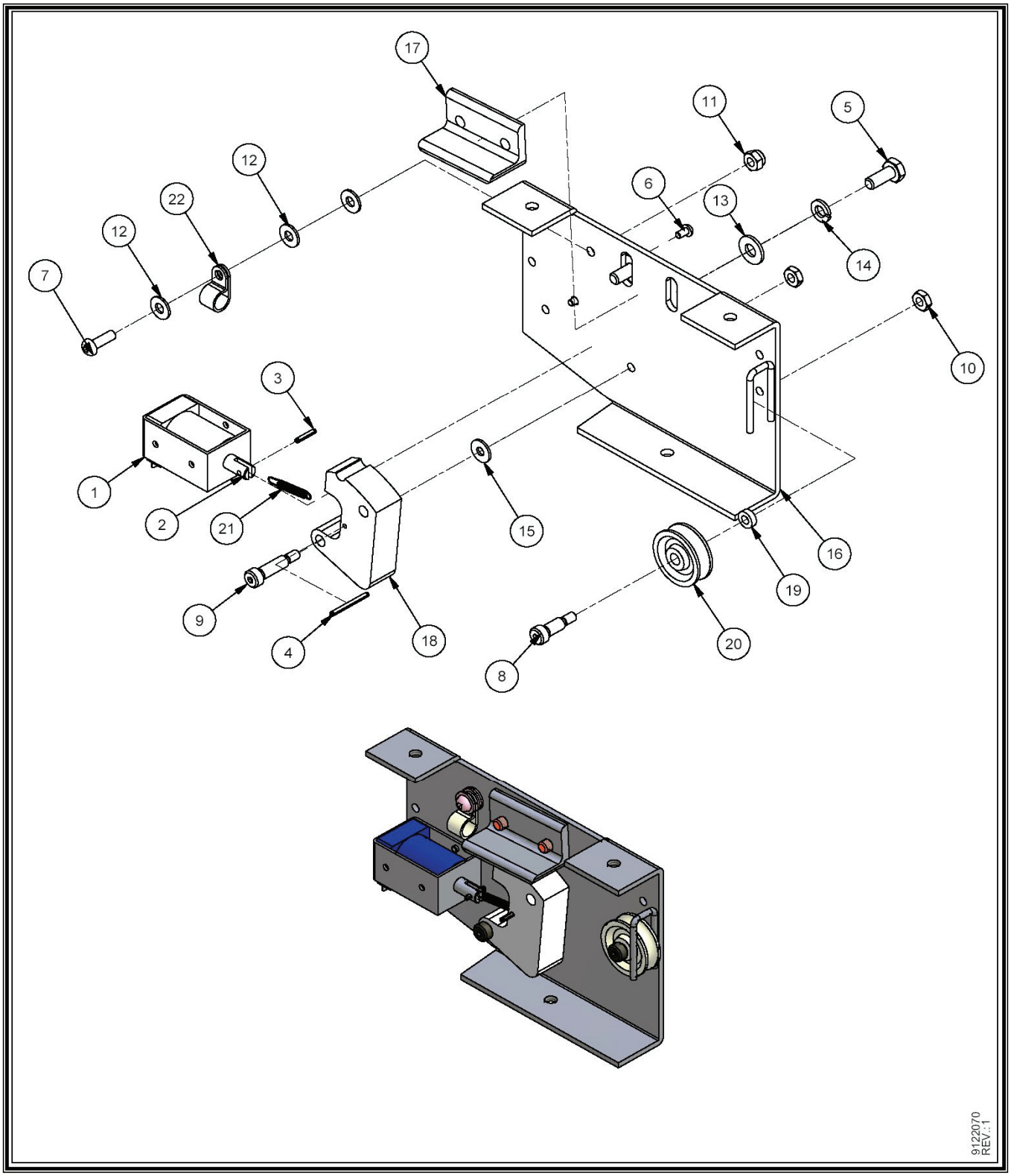
9122057 Pulley Detection Assembly



9122057 Pulley Detection Assembly Part List

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

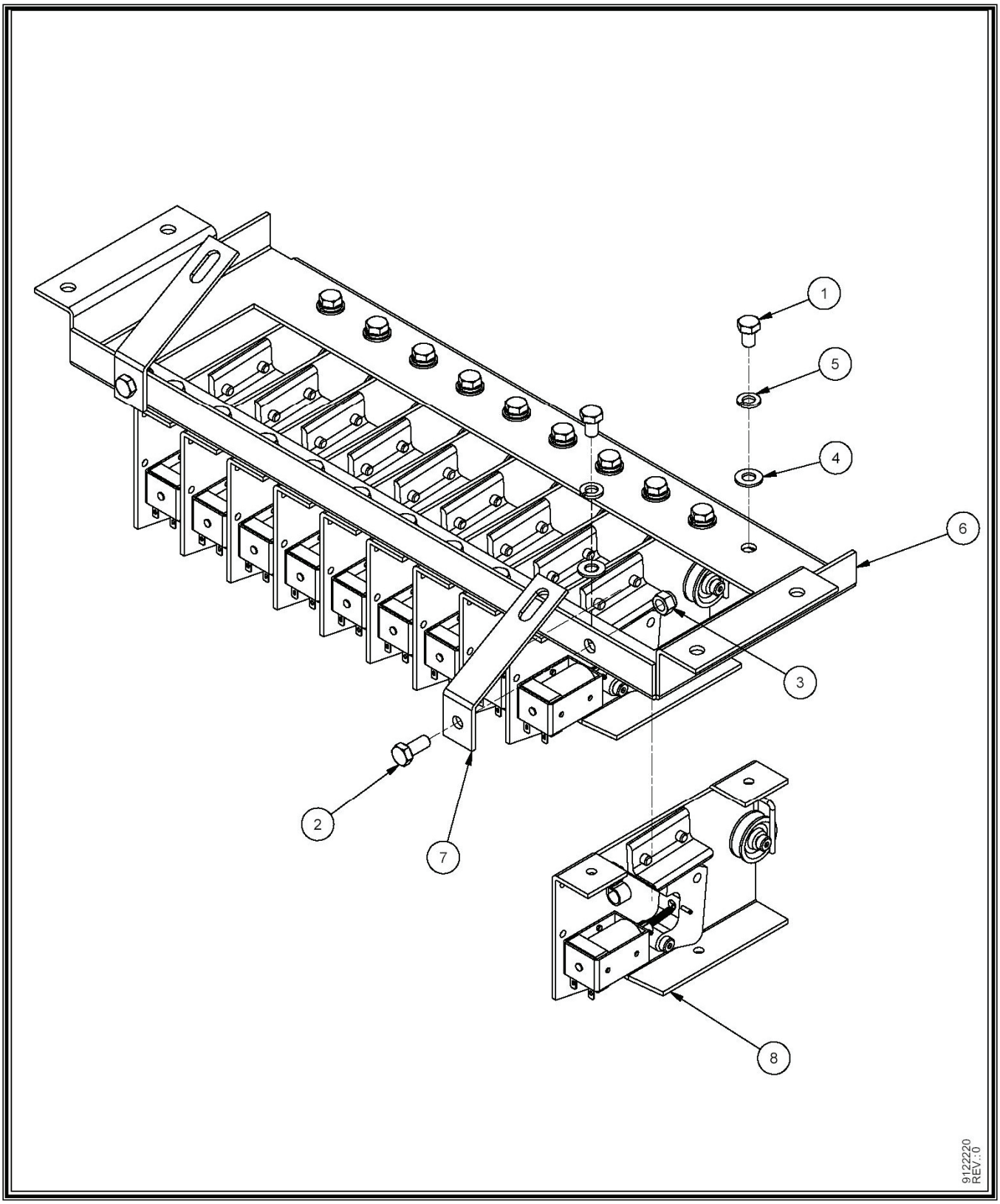
9122070 Pin Brake



9122070 Pin Brake Part List

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

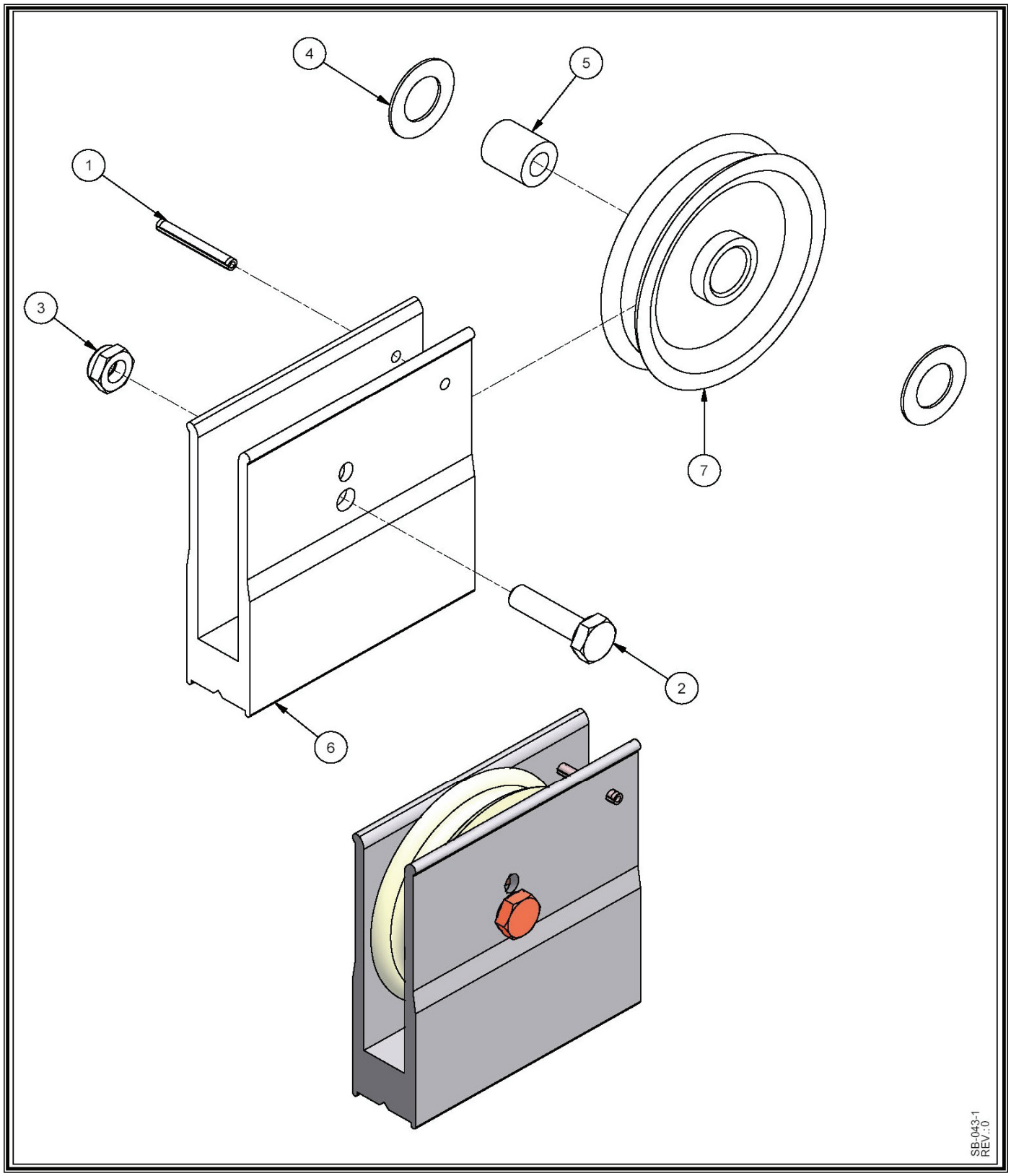
9122220 Pin Brake Assembly



9122220 Pin Brake Assembly Part List

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

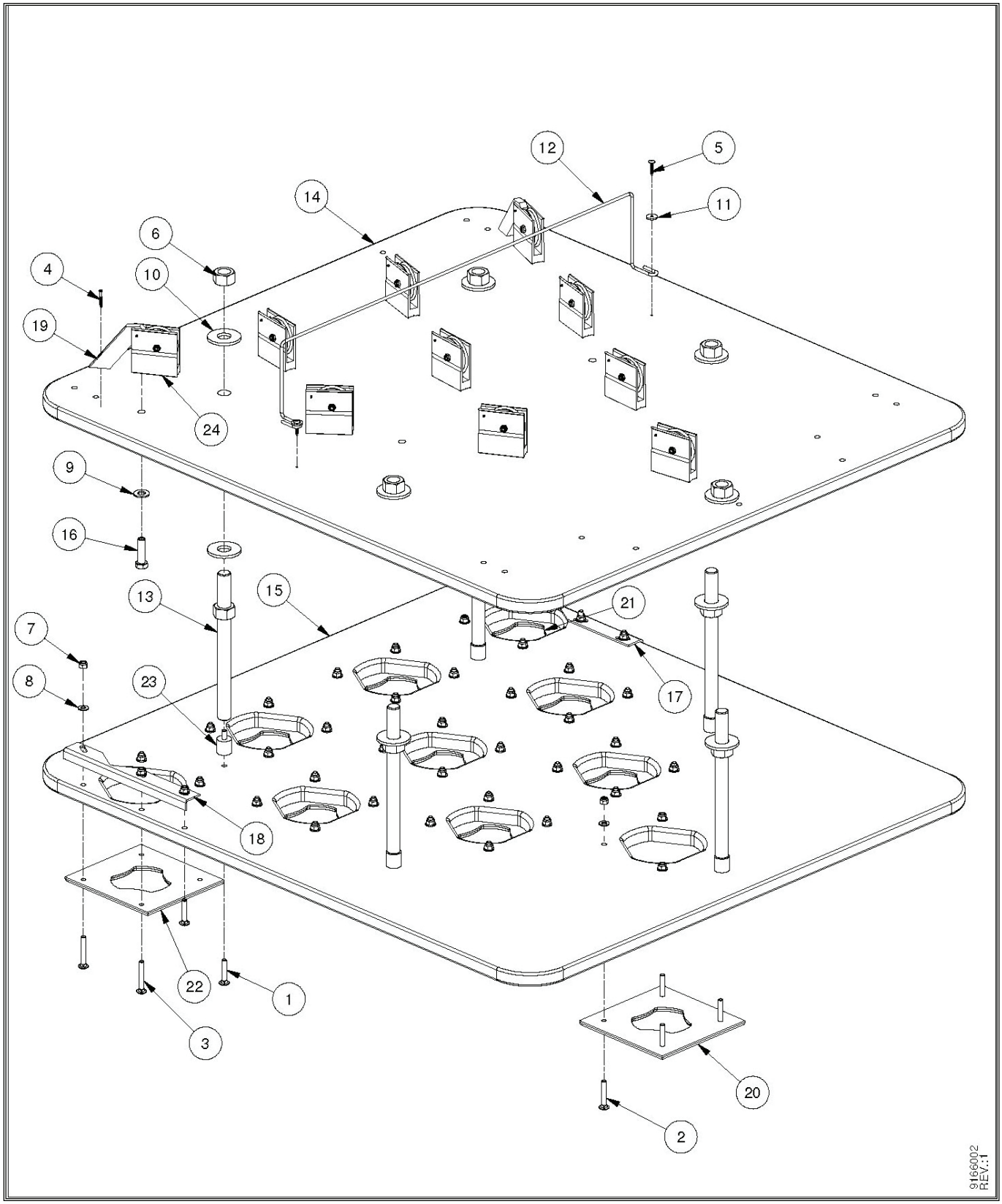
SB-043-01 Pulley



SB-043-01 Pulley Part List

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

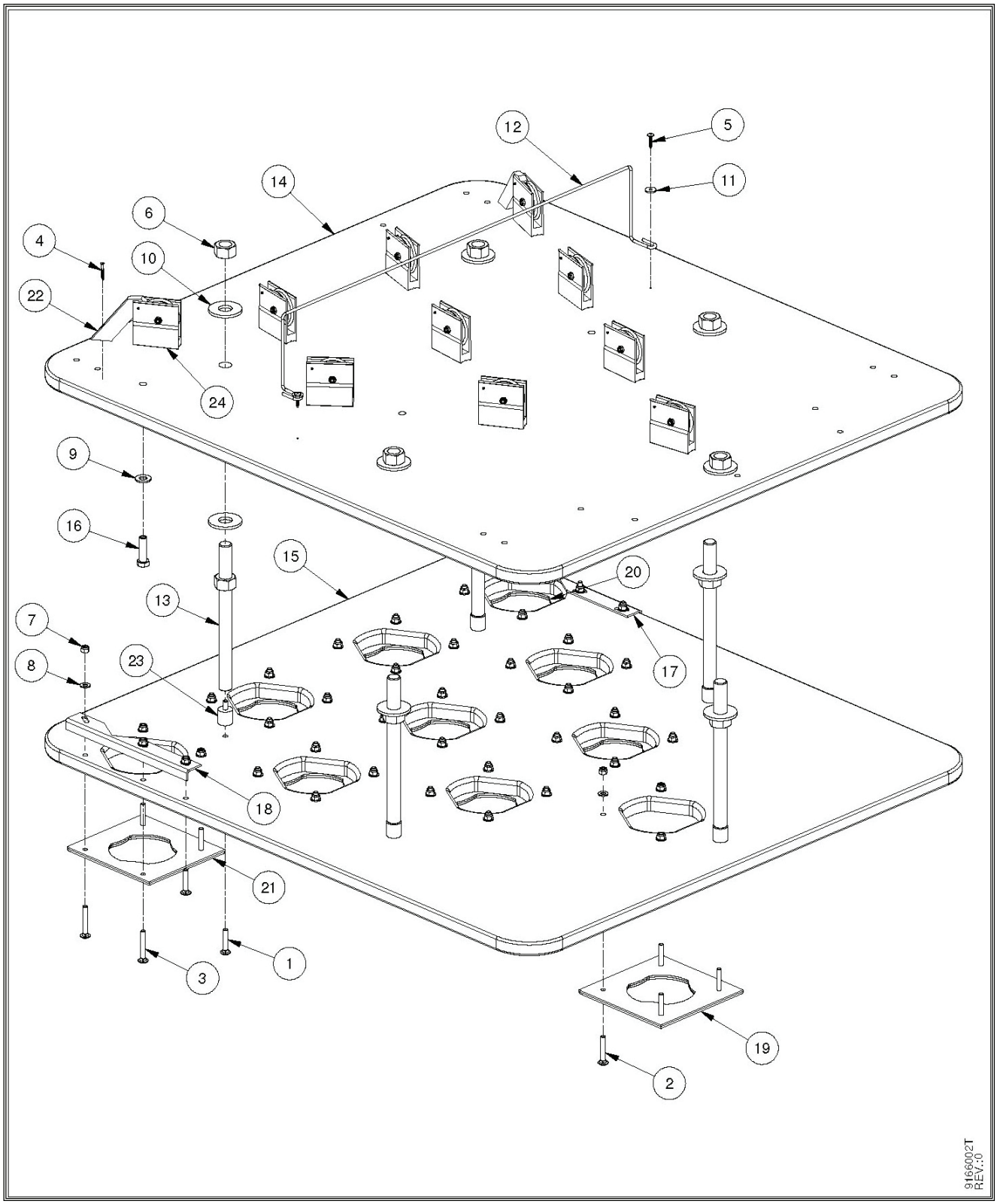
9166002 Stabilizer (ME-D03, ME-HD03)



9166002 Stabilizer Part List (ME-D03, ME-HD03)

Item	Part Number	Description
1	7012-003118-150	5/16-18 UNC X 1 1/2 CARRIAGE BOLT
2	7012-003118-175	5/16-18 UNC X 1 3/4 CARRIAGE BOLT
3	7012-003118-200	5/16-18 UNC X 2 CARRIAGE BOLT
4	7022-310600-125	#6 X 1 1/4 WOOD SCW FH SOCK
5	7024-711000-100	#10 X 1 TAP SCW PH SOCK
6	7034-008709-000	7/8-9 UNC HEXAGON NUT
7	7036-003118-000	HEX NYLON NUT 5/16-18 UNC
8	7050-034068-006	11/32 X 11/16 X 1/16 FLAT WASHER
9	7050-050106-009	17/32 X 1 1/16 X 3/32 FLAT WASHER
10	7052-093225-018	15/16 X 2 1/4 X 3/16 FLAT WASHER
11	7150-019075-009	.193 X 3/4 X 3/32 FLAT WASHER
12	9102038	STRING SUPPORT
13	9102039	SPACER ROD
14	9106001	TOP BASE PLATE DUCK/FIVE/TEN
15	9106002	BOTTOM BASE PLATE DUCK/TEN
16	M-0041	SPECIAL SCREW
17	M-0680-32-4	BASE PLATE REINFORT RIGHT
18	M-0680-32-7	BASE PLATE REINFORT LEFT
19	P-043	PULLEY SHEAVE GUARD
20	PD-013-10	PIN CENTERING RING
21	PD-013-10-4	PIN CENTERING RING RIGHT
22	PD-013-10-7	PIN CENTERING RING LEFT
23	R-014	BUMPER PAD
24	SB-043-1	PULLEY SHEAF

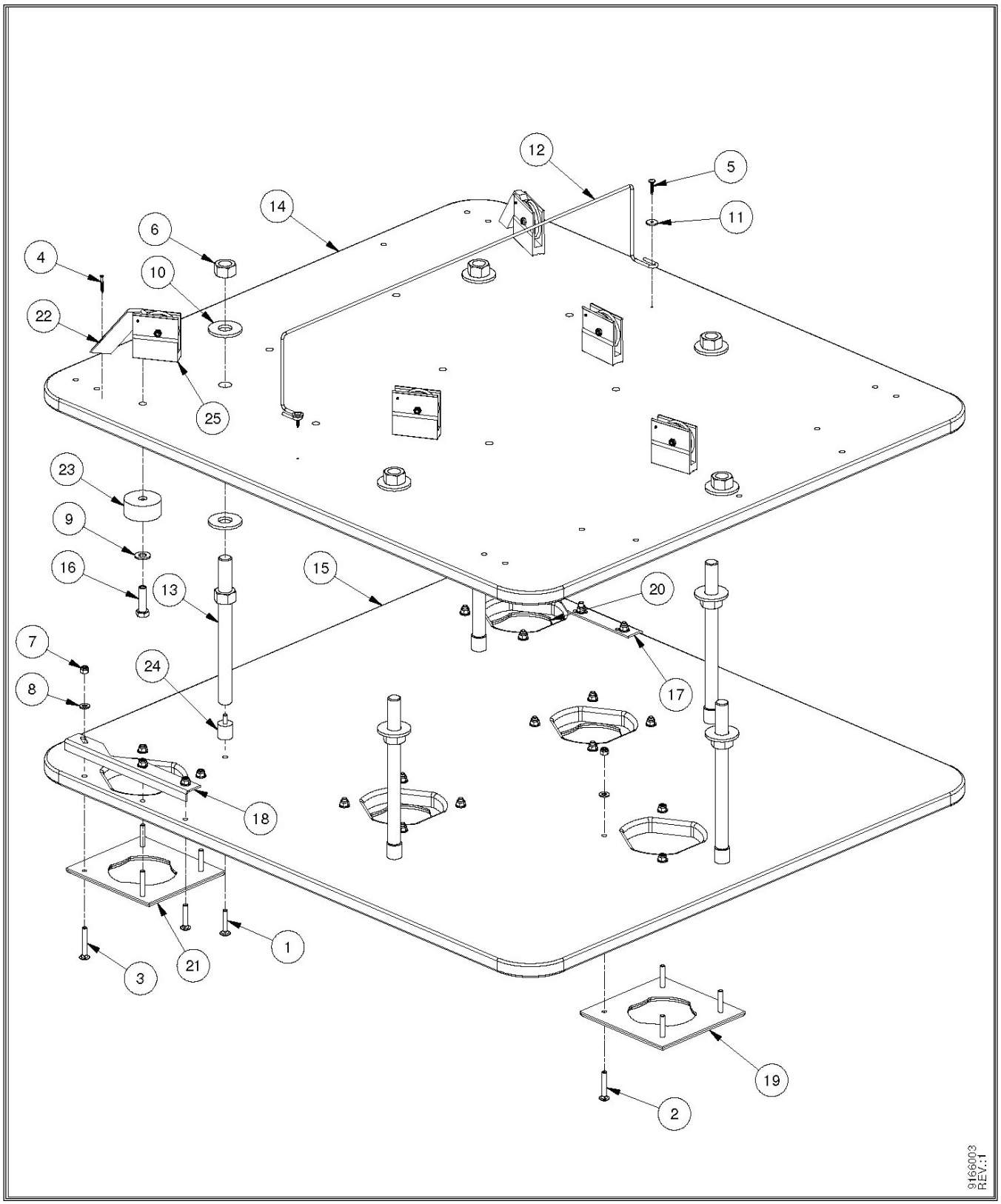
9166002T Stabilizer (ME-T03)



9166002T Stabilizer Part List (ME-T03)

Item	Part Number	Description
1	7012-003118-150	5/16-18 UNC X 1 1/2 CARRIAGE BOLT
2	7012-003118-175	5/16-18 UNC X 1 3/4 CARRIAGE BOLT
3	7012-003118-200	5/16-18 UNC X 2 CARRIAGE BOLT
4	7022-310600-125	#6 X 1 1/4 WOOD SCW FH SOCK
5	7024-711000-100	#10 X 1 TAP SCW PH SOCK
6	7034-008709-000	7/8-9 UNC HEXAGON NUT
7	7036-003118-000	HEX NYLON NUT 5/16-18 UNC
8	7050-034068-006	11/32 X 11/16 X 1/16 FLAT WASHER
9	7050-050106-009	17/32 X 1 1/16 X 3/32 FLAT WASHER
10	7052-093225-018	15/16 X 2 1/4 X 3/16 FLAT WASHER
11	7150-019075-009	.193 X 3/4 X 3/32 FLAT WASHER
12	9102038	STRING SUPPORT
13	9102039	SPACER ROD
14	9106001	TOP BASE PLATE DUCK/FIVE/TEN
15	9106002	BOTTOM BASE PLATE DUCK/TEN
16	M-0041	SPECIAL SCREW
17	M-0680-32-4	BASE PLATE REINFORT RIGHT
18	M-0680-32-7	BASE PLATE REINFORT LEFT
19	P-013	PIN CENTERING RING
20	P-013-4	PIN CENTERING RING RIGHT
21	P-013-7	PIN CENTERING RING LEFT
22	P-043	PULLEY SHEAVE GUARD
23	R-014	BUMPER PAD
24	SB-043-1	PULLEY SHEAF

9166003 Stabilizer (ME-F03)

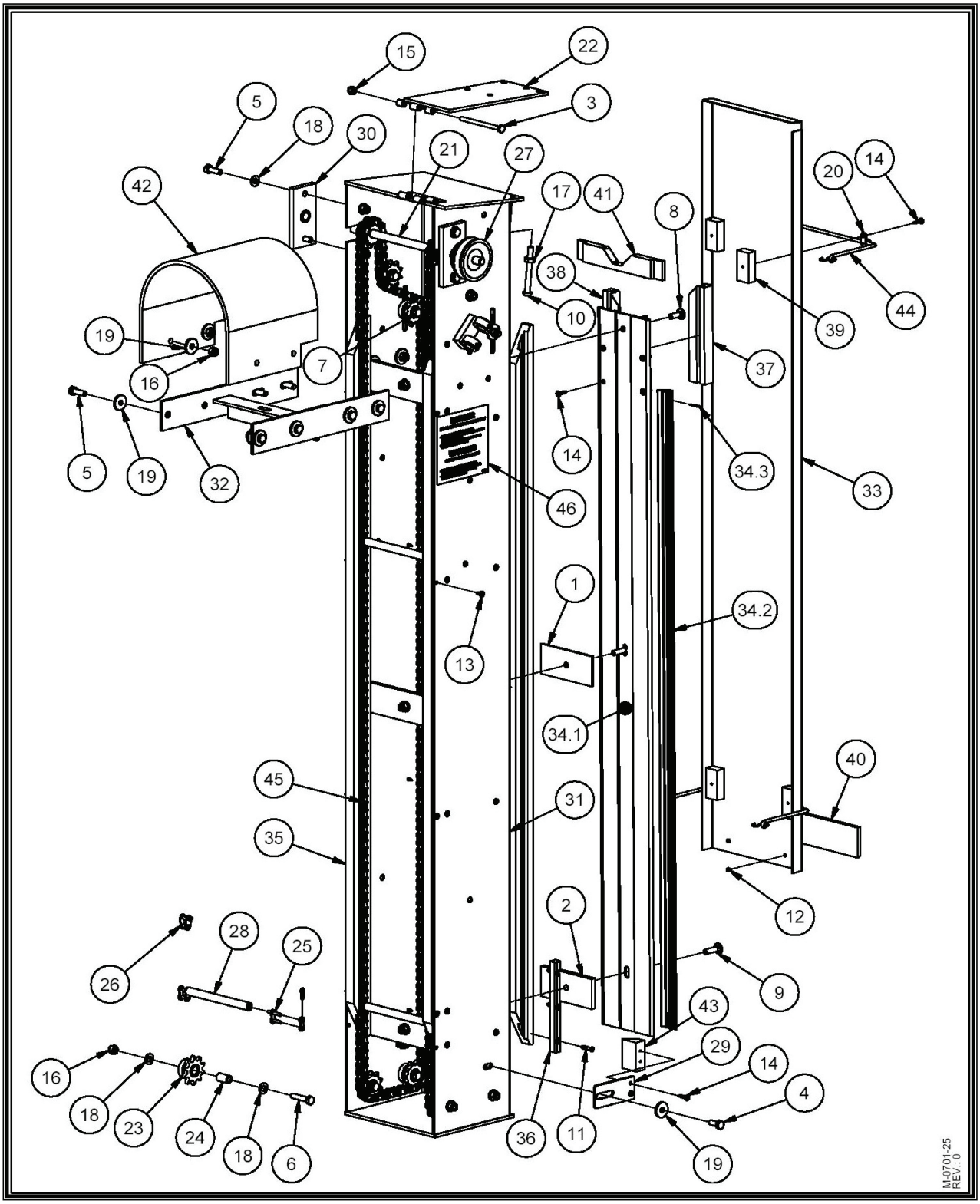


9166003 Stabilizer Part List (ME-F03)

Item	Part Number	Description
1	7012-003118-150	5/16-18 UNC X 1 1/2 CARRIAGE BOLT
2	7012-003118-175	5/16-18 UNC X 1 3/4 CARRIAGE BOLT
3	7012-003118-200	5/16-18 UNC X 2 CARRIAGE BOLT
4	7022-310600-125	#6 X 1 1/4 WOOD SCW FH SOCK
5	7024-711000-100	#10 X 1 TAP SCW PH SOCK
6	7034-008709-000	7/8-9 UNC HEXAGON NUT
7	7036-003118-000	HEX NYLON NUT 5/16-18 UNC
8	7050-034068-006	11/32 X 11/16 X 1/16 FLAT WASHER
9	7050-050106-009	17/32 X 1 1/16 X 3/32 FLAT WASHER
10	7052-093225-018	15/16 X 2 1/4 X 3/16 FLAT WASHER
11	7150-019075-009	.193 X 3/4 X 3/32 FLAT WASHER
12	9102038	STRING SUPPORT
13	9102039	SPACER ROD
14	9106001	TOP BASE PLATE DUCK/FIVE/TEN
15	9106003	BOTTOM BASE PLATE FIVE
16	M-0041	SPECIAL SCREW
17	M-0680-32-4	BASE PLATE REINFORT RIGHT
18	M-0680-32-7	BASE PLATE REINFORT LEFT
19	P-013	PIN CENTERING RING
20	P-013-4	PIN CENTERING RING RIGHT
21	P-013-7	PIN CENTERING RING LEFT
22	P-043	PULLEY SHEAVE GUARD
23	R-010	PIN BUMPER
24	R-014	BUMPER PAD
25	SB-043-1	PULLEY SHEAF

Rear Ball Lift M-0701-25 (Without Ball Cleaner)

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



Rear Ball Lift Part List M-0701-25

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

Item	Part Number	Description
1	50W-0700-90	BALL LIFT TRACK SPACER MID
2	50W-0700-91	BALL LIFT TRACK SPACER BOTTOM
3	7010-002520-350	1/4-20 UNCX3 1/2 HEX CAP SCREW
4	7010-003118-075	5/16-18 UNCX3/4 HEX CAP SCREW
5	7010-003118-100	5/16-18 UNCX1 HEX CAP SCREW
6	7010-003118-150	5/16-18 UNCX1 1/2 HEX CAP SCREW
7	7010-003118-175	5/16-18 UNCX1 3/4 HEX CAP SCREW
8	7012-003118-075	5/16-18 UNC X 3/4 CARRIAGE BOLT
9	7012-003118-100	5/16-18 UNC X 1 CARRIAGE BOLT
10	7016-413118-300	MA SC RH SOCK 5/16-18 UNCX3
11	7022-310800-100	#8 X 1 WOOD SCW FH SOCK
12	7024-610600-025	#6 X 1/4 TAP SCW PH SOCK
13	7024-710800-050	#8 X 1/2 TAP SCW PH SOCK
14	7024-710800-075	#8 X 3/4 TAP SCW PH SOCK
15	7036-002520-000	HEX NYLON NUT 1/4-20 UNC
16	7036-003118-000	HEX NYLON NUT 5/16-18 UNC
17	7038-003118-000	5/16-18 UNC HEX KEEP NUT
18	7050-034068-006	11/32 X 11/16 X 1/16 FLAT WASHER
19	7050-034100-012	11/32 X 1 X 1/8 FLAT WASHER
20	E-660-09	CABLE CLAMP
21	M-0700-07	DRIVE SHAFT ASSEMBLY
22	M-0700-09	MOTOR BASE PLATE
23	M-0700-10	IDLER SPROCKET 40B10
24	M-0700-10-02	STEEL BUSHING
25	M-0700-14	CHAIN COUPLING SPECIAL
26	M-0700-15	HALF LINK
27	M-0700-22	CARROUSEL PULLEY
28	M-0700-27	CROSS CHAIN TRAVEL SHAFT
29	M-0700-55	BALL LIFT BOTTOM PROTECTOR
30	M-0700-67	STEEL BEARING BLOCK
31	M-0700-90	BALL LIFT FRAME ASSEMBLY
32	M-0700-94	BALL LIFT BRIDGE
33	M-0700-96	BALL LIFT SMALL COVER

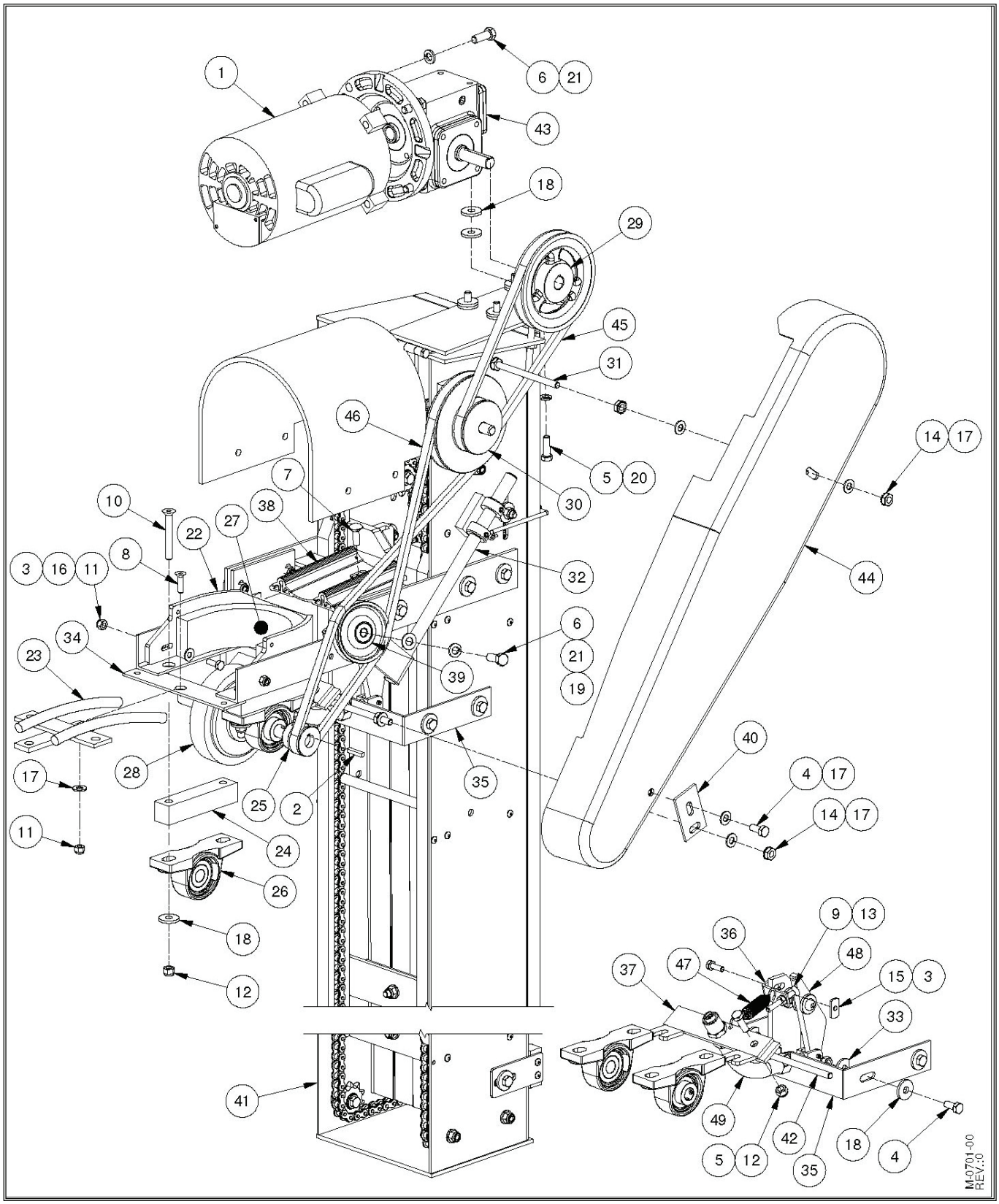
Rear Ball Lift Part List M-0701-25

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

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

Rear Ball Lift M-0701-00 (With Ball Cleaner)

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



Rear Ball Lift Part List M-0701-00

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

Item	Part Number	Description
1	301-1200-00	ELECTRIC MOTOR 208/230 VAC 1/2
2	302-2410-00	KEYWAY 3/16
3	7010-002520-075	1/4-20 UNCX3/4 HEX CAP SCREW
4	7010-003118-075	5/16-18 UNCX3/4 HEX CAP SCREW
5	7010-003118-100	5/16-18 UNCX1 HEX CAP SCREW
6	7010-003716-100	3/8-16 UNCX1 HEX CAP SCREW
7	7012-003118-075	5/16-18 UNC X 3/4 CARRIAGE BOLT
8	7016-312520-100	1/4-20 UNC X 1 FH MA SC
9	7016-312520-200	1/4-20 UNC X 2 FH MA SC
10	7016-313118-250	5/16-18 UNC X 2 1/2 FH MA SC
11	7036-002520-000	HEX NYLON NUT 1/4-20 UNC
12	7036-003118-000	HEX NYLON NUT 5/16-18 UNC
13	7038-002520-000	1/4-20 UNC HEX KEEP NUT
14	7038-003118-000	5/16-18 UNC HEX KEEP NUT
15	7046-002520-000	1/4-20 UNC WELD NUT
16	7050-028062-006	9/32 X 5/8 X 1/16 FLAT WASHER
17	7050-034068-006	11/32 X 11/16 X 1/16 FLAT WASHER
18	7050-034100-012	11/32 X 1 X 1/8 FLAT WASHER
19	7050-040081-006	13/32 X 13/16 X 1/16 FLAT WASHER
20	7060-031057-009	5/16 LOCK WASHER
21	7060-037067-010	3/8 LOCK WASHER
22	EZP-010	PAD RETAINER
23	EZP-011-1	RAIL BALL EXIT
24	EZP-027	SPACER BLOCK
25	EZP-040	PULLEY MA1.5X5/8
26	EZP-050	PILLOW BLOCK 5/8
27	EZP-053	BUFFING PAD
28	EZP-SB026	SHAFT & WHEEL ASS"Y
29	M-0700-21-2	PULLEY MA50X5/8
30	M-0700-24	DOUBLE PULLEY
31	M-0700-29	THREADED ROD
32	M-0700-33	TENSIONNER BRACKET
33	M-0700-34	STOPPER

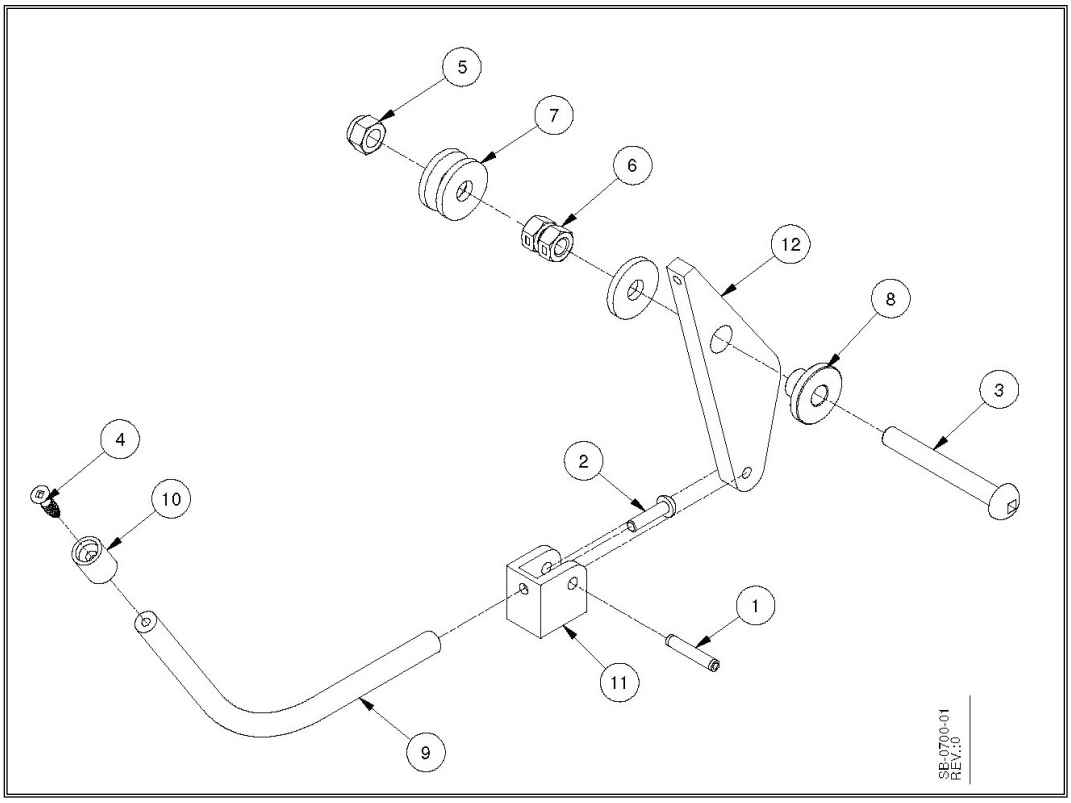
Rear Ball Lift Part List M-0701-00

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

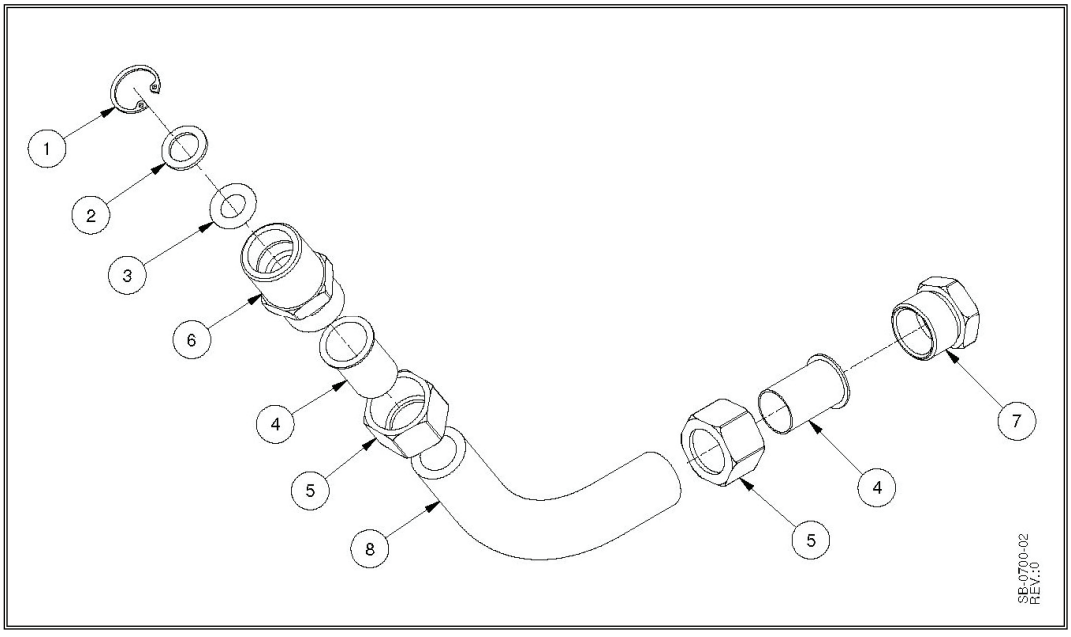
Item	Part Number	Description
34	M-0700-35	BALL POLISHER FRAME
35	M-0700-36	BASE FRAME PUSHER
36	M-0700-37	BRACKET ADJUSTMENT
37	M-0700-38	PUSHER SUPPORT
38	M-0700-39	BALL TRACK EXIT
39	M-0700-70	TENSIONNER PULLEY
40	M-0700-71	GUARD BRACKET
41	M-0701-25	BALL LIFT ASS"Y
42	M-0880-42	PULLEY GUARD BRACKET
43	M-BMQ1133-3	MOTOR REDUCER
44	P-700-63	PULLEY GUARD
45	R-0700-01	V-BELT
46	R-0700-03	V BELT 3L460
47	S-071	EXTENSION SPRING
48	SB-0700-01	BALL PUSHER POLISHER IN
49	SB-0700-02	BALL PUSHER POLISHER OUT

Ball Pusher Assembly SB-0700-01

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



P-700-64 Part Details



Ball Pusher Part List SB-0700-01

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

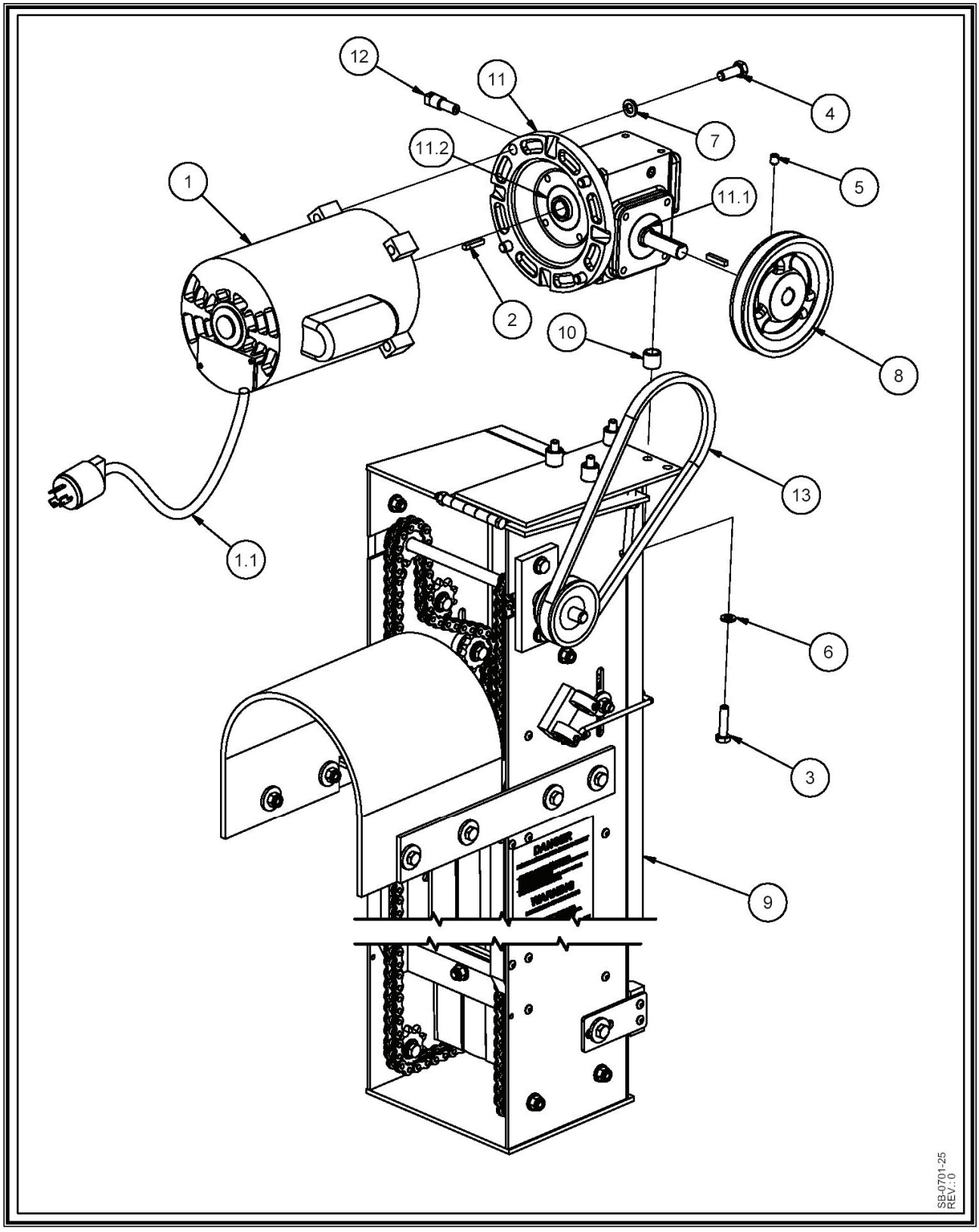
Item	Part Number	Description
1	7006-001800-100	SPRING PIN 3/16 X 1
2	7016-411032-075	10-32 UNFX3/4 MA SC RH SO
3	7016-413118-250	5/16-18 UNCX2 1/2 MA SC RH SO
4	7022-310800-075	#8 X 3/4 WOOD SCW FH SOCK
5	7036-003118-000	HEX NYLON NUT 5/16-18 UNC
6	7040-003118-000	5/16-18 UNC TWO WAY LOCK NUT
7	7050-034100-012	11/32 X 1 X 1/8 FLAT WASHER
8	M-0680-31	STEEL BUSHING
9	P-700-64	INSIDE PUSHER
10	P-700-66	PUSHER PROTECTOR
11	P-700-67	PUSHER TUBE ATTACHMENT
12	P-700-68	PUSHER CAM

P-700-64 Part List

Item	Part Number	Description
1	7004-300000-062	INTERNAL RETAINING RING [5/8]
2	7350-040061-005	BRASS FLAT WASHER
3	A-010J	O RING
4	A-058-18	INSERT 3/4"
5	A-058-31	NUT 3/4"
6	M-0700-77	LOWER BUSHING
7	M-0700-78	UPPER BUSHING
8	P-700-65	HOSE

Rear Ball Lift Motor Assembly SB-0701-25

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

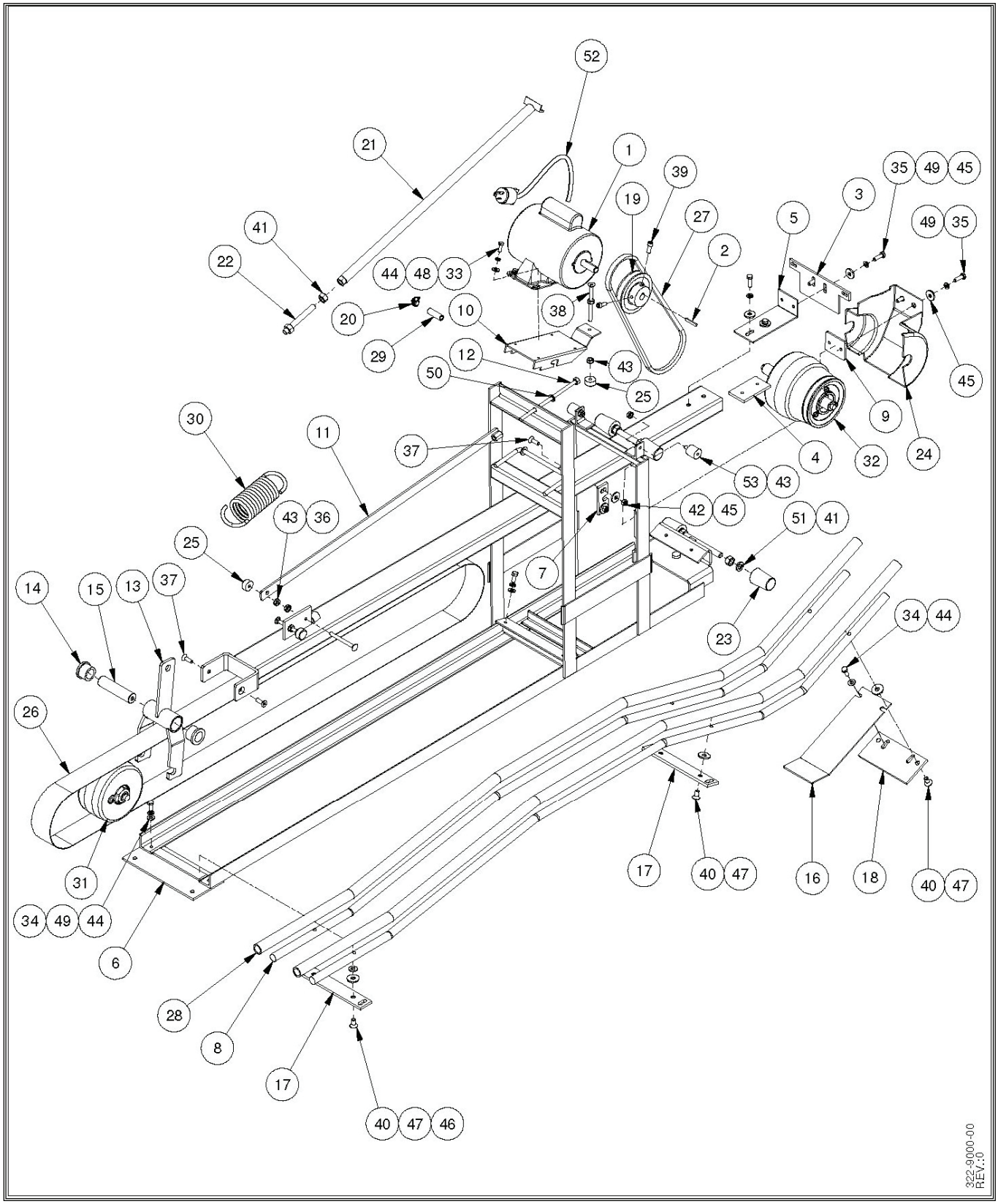


Rear Ball Lift Motor Part List SB-0701-25

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

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

Ball Accelerator 322-9000-00 (ME-T03)



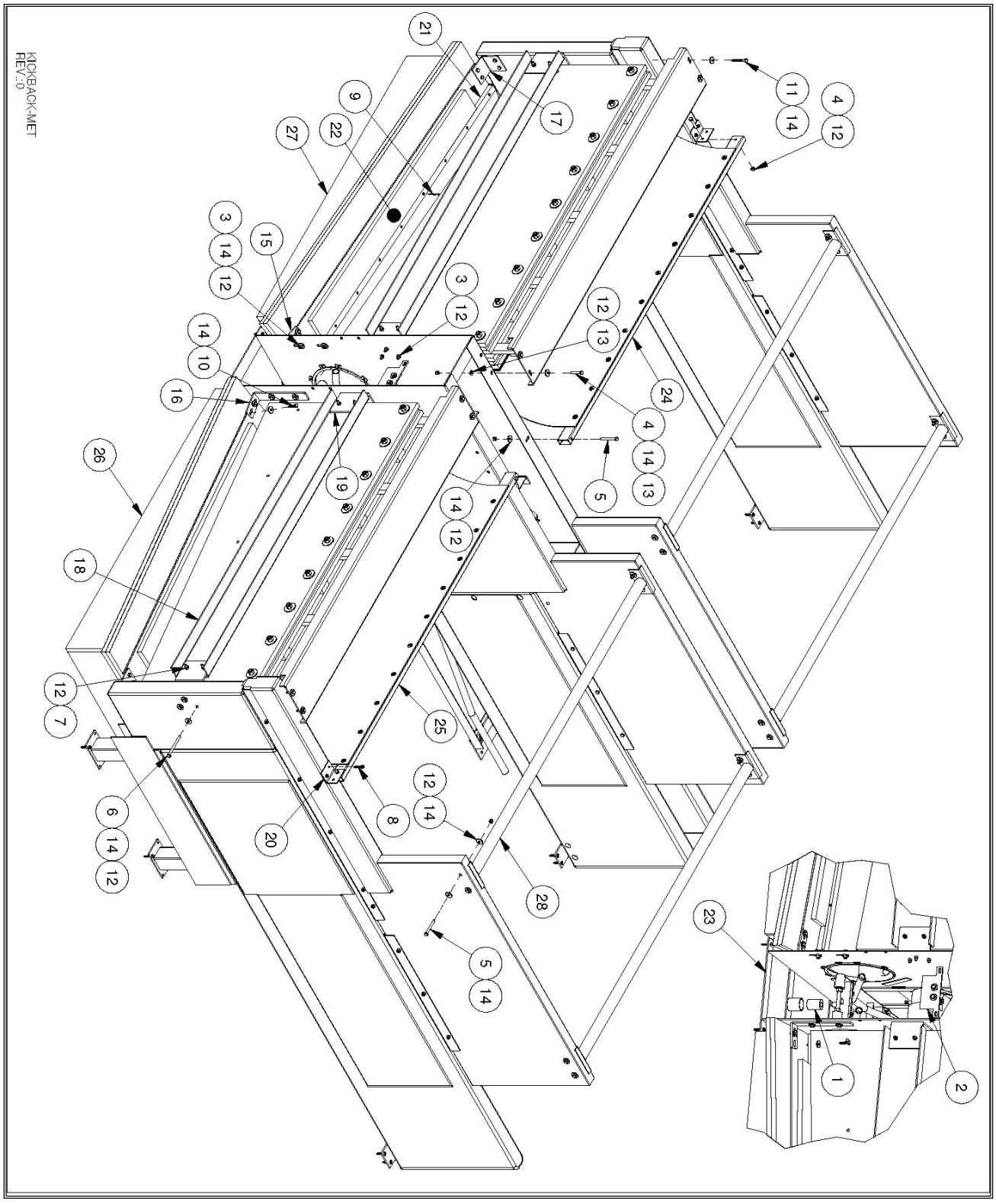
Ball Accelerator Part List322-9000-00 (ME-T03)

Item	Part Number	Description
1	301-1300-00	ACCELERATOR MOTOR, 208/230VAC
2	302-2430-00	KEYWAY 3/16
3	302-6560-00	OPTO SUPPORT
4	302-6565-00	MOUNTING PLATE
5	302-6570-00	MOUNTING PLATE
6	302-9000-00	ACCELARATOR FRAME
7	302-9010-00	ADJUSTMENT PLATE
8	302-9020-00	TRACK
9	302-9030-01	BALL GUARD BRACKET
10	302-9060-00	MOTOR SUPPORT
11	302-9070-00	TENSION BAR
12	302-9075-00	SPECIAL BOLT
13	302-9090-00	TENSION BRACKET
14	302-9095-00	FLANGE BEARING
15	302-9100-00	ACCELERATOR SHAFT
16	302-9120-00	PIN HEAD GUARD
17	302-9180-00	ATTACHEMENT PLATE
18	302-9190-00	ATTACHMENT PLATE
19	302-9200-00	ACCELERATOR PULLEY
20	302-9210-00	STEEL COLLAR SIZE 8
21	302-9220-00	STABILIZER ARM
22	302-9230-00	ADJUSTMENT THREAD ROD
23	303-6530-00	BALL DOOR SROPPER
24	303-9030-00	BELT GUARD
25	304-1560-00	BUMPER PAD
26	304-9000-00	ACCELERATOR BELT
27	304-9010-00	ACCELERATOR MOTOR BELT
28	304-9020-00	TRACK TUBING
29	304-9210-00	COLLAR TUBING
30	305-9080-00	ACCELERATOR SPRING
31	333-9110-01	TENSION WHEEL ASSY
32	333-9140-01	DRIVE WHEEL ASSY
33	7010-002520-075	1/4-20 UNCX3/4 HEX CAP SCREW

Ball Accelerator Part List 322-9000-00 (ME-T03)

Item	Part Number	Description
34	7010-003118-075	5/16-18 UNCX3/4 HEX CAP SCREW
35	7010-003118-100	5/16-18 UNCX1 HEX CAP SCREW
36	7012-003118-300	5/16-18 UNC X 3 CARRIAGE BOLT
37	7016-313118-100	5/16-18 UNC X 1 FH MA SC
38	7016-313118-400	5/16-18 UNC X 4 FH MA SC
39	7018-003118-075	5/16-18 UNCX3/4 HEX SO CA SCW
40	7018-303716-075	FHMS 3 8-16 UNCX0.75
41	7034-005013-000	1/2-13 UNC HEXAGON NUT
42	7036-003118-000	HEX NYLON NUT 5/16-18 UNC
43	7038-003118-000	5/16-18 UNC HEX KEEP NUT
44	7050-034068-006	11/32 X 11/16 X 1/16 FLAT WASHER
45	7050-034100-012	11/32 X 1 X 1/8 FLAT WASHER
46	7050-040081-006	13/32 X 13/16 X 1/16 FLAT WASHER
47	7050-040112-012	13/32 X 1 1/8 X 1/8 FLAT WASHER
48	7060-025046-006	1/4 LOCK WASHER
49	7060-031057-009	5/16 LOCK WASHER
50	7060-037067-010	3/8 LOCK WASHER
51	7060-050087-012	1/2 LOCK WASHER
52	EC-090-250	MOTOR POWER SUPPLY CABLE
53	R-014	BUMPER PAD

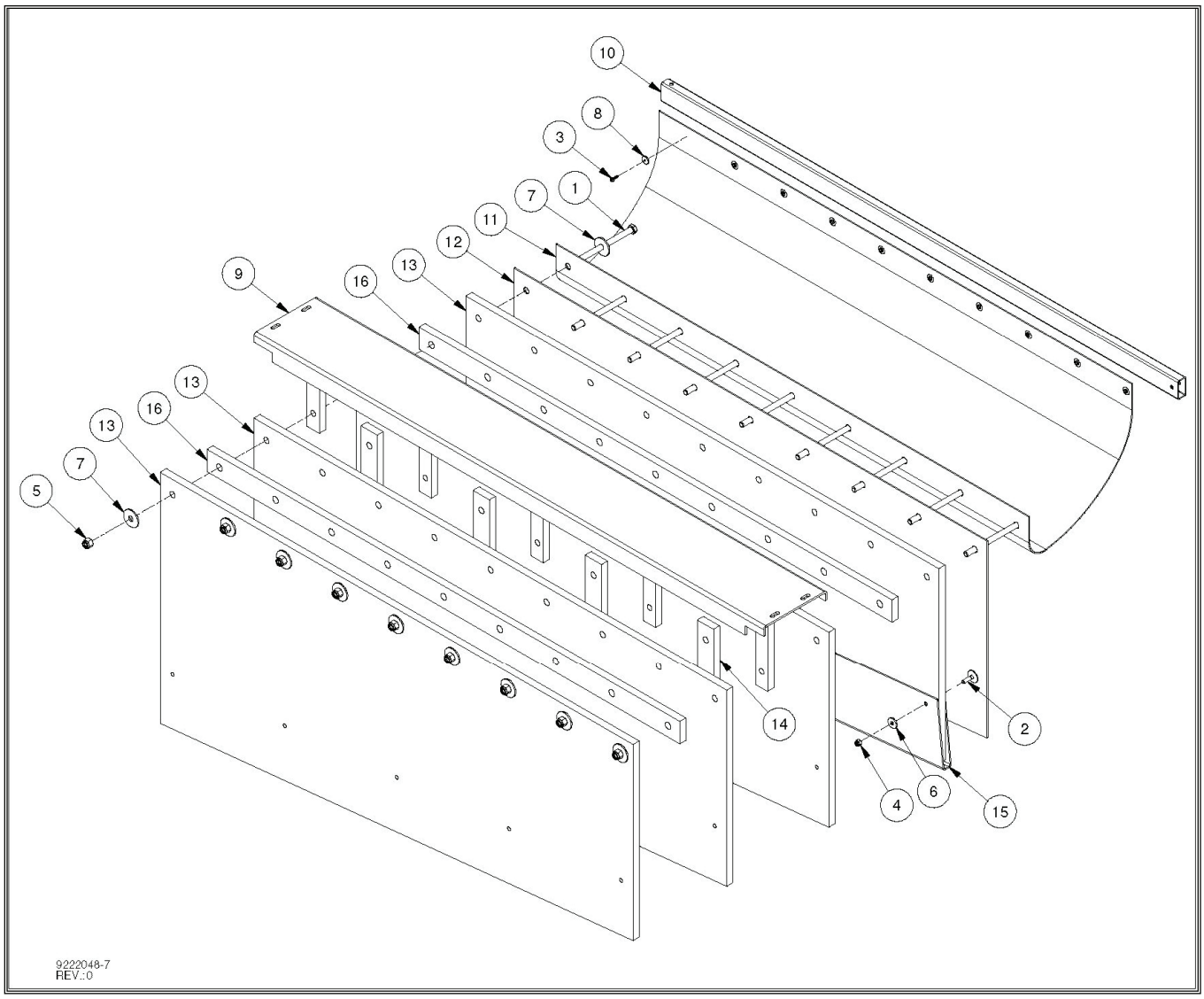
Pit Assembly (ME-T03)



Pit Assembly Part List (ME-T03)

Item	Part Number	Description
1	304-9030-00	POSITIONNING TUBE
2	322-9000-00	BALL ACCELERATOR ASS Y
3	7010-003118-100	5/16-18 UNCX1 HEX CAP SCREW
4	7010-003118-175	5/16-18 UNCX1 3/4 HEX CAP SCREW
5	7010-003118-275	5/16-18 UNCX2 3/4 HEX CAP SCREW
6	7010-003118-400	5/16-18 UNCX4 HEX CAP SCREW
7	7012-003118-100	5/16-18 UNC X 1 CARRIAGE BOLT
8	7024-201400-150	#14-10 X 1 1/2 TAP SCW HEX WASHER
9	7026-310800-200	#8 X 2 SELF DR SCW FH SOCK
10	7028-003100-150	5 in / 16 ul X 1.500 in LAG SCREW
11	7028-003100-250	5/16 X 2 1/2 LAG SCREW
12	7036-003118-000	HEX NYLON NUT 5/16-18 UNC
13	7050-034068-006	11/32 X 11/16 X 1/16 FLAT WASHER
14	7050-034100-012	11/32 X 1 X 1/8 FLAT WASHER
15	9202043	PIT HOLDING BRACKET RIGHT
16	9202044	PIT HOLDING BRACKET RIGHT
17	9202045	PIT HOLDING BRACKET
18	9202047	CUSHION STOP PLANK
19	9202049	CUSHION STOP BRACKET
20	9202054	TUBING BRACKET
21	9203052	BALL GUIDE
22	9206055	BALL GUIDE STOPPER
23	9222001	BALL RETURN KICKBACK ASSY
24	9222048-4	CUSHION RIGHT ASSEMBLY
25	9222048-7	CUSHION LEFT ASSEMBLY
26	9266051	PIT FLOOR LANE 1
27	9266052	PIT FLOOR LANE 2
28	M-0376	MAIN CROSS SUPPORT

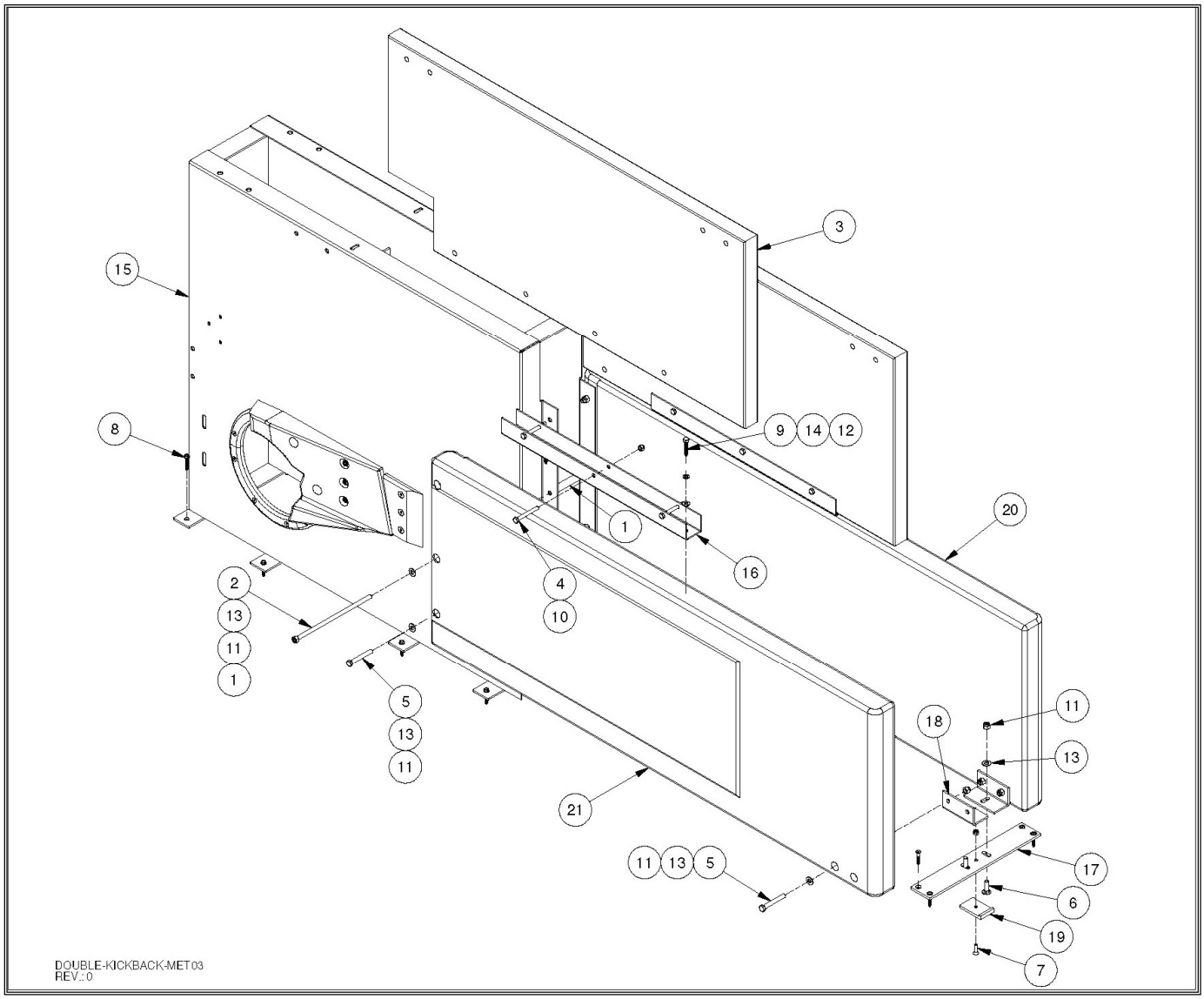
Cushion Assembly 9222048-7 (ME-T03)



Cushion Assembly Part List 9222048-7 (ME-T03)

Item	Part Number	Description
1	7010-005013-650	1/2-13 UNCX6 1/2 HEX CAP SCREW
2	7013-003118-125	5/16-18 UNC X 1 1/4 ELEVATOR BOLT
3	7027-201016-075	#10-16 X 3/4 TECK SCW HEX WASHER
4	7036-003118-000	HEX NYLON NUT 5/16-18 UNC
5	7036-005013-000	HEX NYLON NUT 1/2-13 UNC
6	7050-034100-012	11/32 X 1 X 1/8 FLAT WASHER
7	7050-051175-012	17/32 X 1 3/4 X 1/8 FLAT WASHER
8	7150-019075-009	.193 X 3/4 X 3/32 FLAT WASHER
9	9202048	CUSHION SUPPORT CHANNEL
10	9202053	APRON TUBING
11	9204037	APRON PROTECTOR
12	9204038	PIT APRON
13	9204039	PIT CUSHION
14	9204040	CUSHION SPACER
15	9204041	PIT APRON PROTECTOR
16	9206039	CUSHION WOOD SPACER

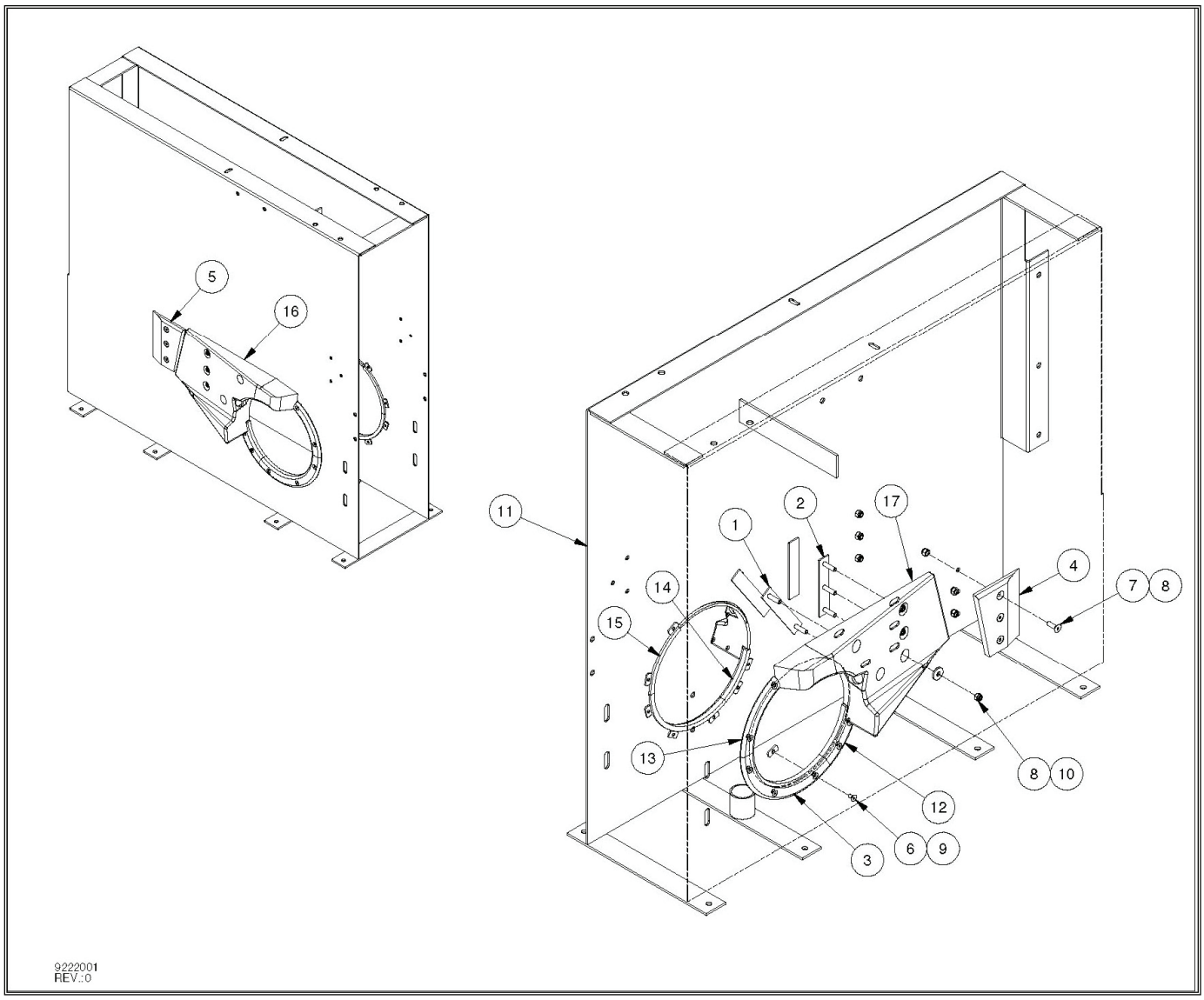
Double Kickback Assembly (ME-T03)



Double Kickback Part list (ME-T03)

Item	Part Number	Description
1	302-6650-00	SPACER FOR KICKBACK
2	302-6660-00	SPECIAL BOLT FOR KICKBACK
3	30W-0180-45	PINSETTER SUPPORT TENPIN
4	7010-003118-275	5/16-18 UNCX2 3/4 HEX CAP SCREW
5	7010-003716-275	3/8-16 UNCX2 3/4 HEX CAP SCREW
6	7012-003716-100	3/8-16 UNC X 1 CARRIAGE BOLT
7	7016-312520-100	1/4-20 UNC X 1 FH MA SC
8	7024-201400-150	#14-10 X 1 1/2 TAP SCW HEX WASHER
9	7028-003100-175	5/16 X 1 3/4 LAG SCREW
10	7036-003118-000	HEX NYLON NUT 5/16-18 UNC
11	7036-003716-000	HEX NYLON NUT 3/8-16 UNC
12	7050-034068-006	11/32 X 11/16 X 1/16 FLAT WASHER
13	7050-040081-006	13/32 X 13/16 X 1/16 FLAT WASHER
14	7060-031057-009	5/16 LOCK WASHER
15	9222001	BALL RETURN KICKBACK ASSY
16	M-0180-37-8	KICKBACK U BAR 24
17	M88-0181-03	KICKBACK MOUNTING PLATE
18	M88-0181-04	KICKBACK BRACKET
19	P88-0181-03	PLASTIC PROTECTOR
20	Q88-0181-30L	BALL RETURN MAG3 KICKBACK LEFT
21	Q88-0181-30R	BALL RETURN MAG3 KICKBACK RIGHT

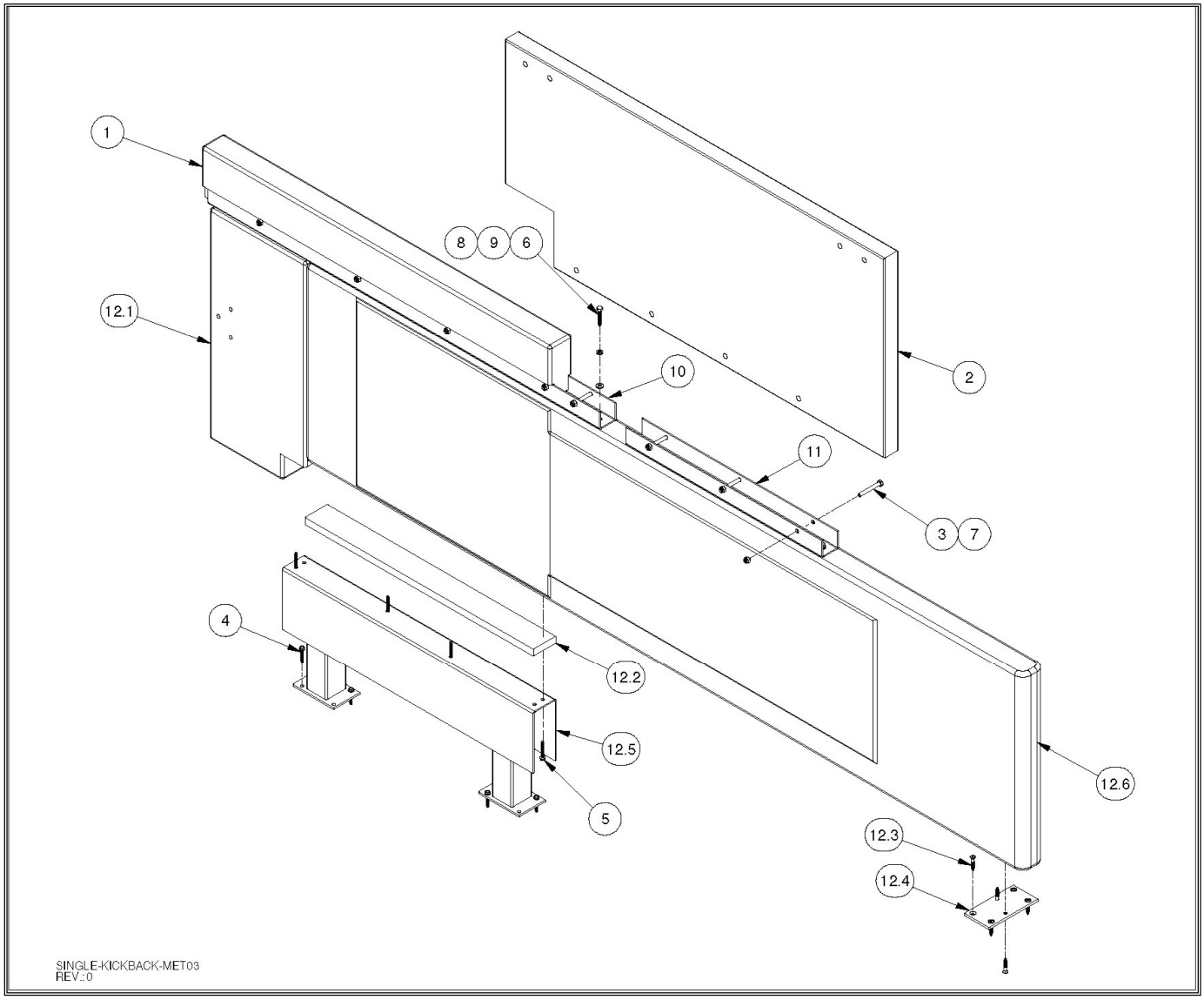
Ball Return Kickback Pit Section (ME-T03)



Ball Return Kickback Part List (ME-T03)

Item	Part Number	Description
1	302-6680-00	DEFLECTOR BLOCK MOUNTING PLATE
2	302-6690-00	DEFLECTOR BLOCK MOUNTING PLATE
3	303-6550-00	PLASTIC RING
4	303-6620-00	BALL DEVIATOR [RIGHT]
5	303-6625-00	BALL DEVIATOR [LEFT]
6	7016-312520-050	1/4-20 UNC X 1/2 FH MA SC
7	7016-313118-100	5/16-18 UNC X 1 FH MA SC
8	7036-003118-000	HEX NYLON NUT 5/16-18 UNC
9	7046-002520-000	1/4-20 UNC WELD NUT
10	7050-034100-012	11/32 X 1 X 1/8 FLAT WASHER
11	9202001	BALL RETURN CASING
12	9203001-1	PLASTIC RING
13	9203001-2	PLASTIC RING
14	9203001-3	PLASTIC RING
15	9203001-4	PLASTIC RING
16	9266003	DEFLECTOR BLOCK LEFT
17	9266004	DEFLECTOR BLOCK RIGHT

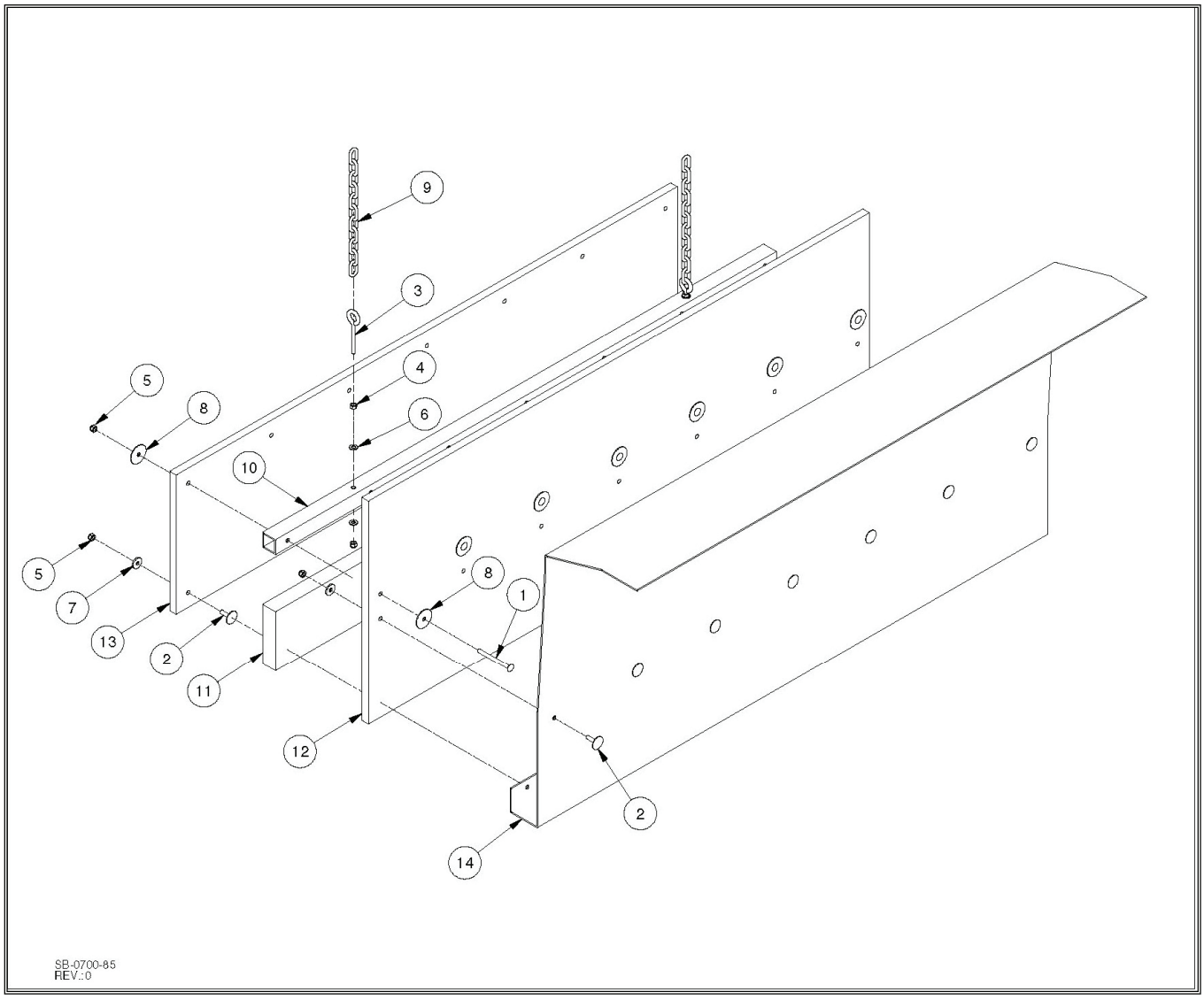
Single Kickback (ME-T03)



Single Kickback Part List (ME-T03)

Item	Part Number	Description
1	30W-0180-44	SPACER BLOCK KICKBACK MET
2	30W-0180-45	PINSETTER SUPPORT TENPIN
3	7010-003118-250	5/16-18 UNCX2 1/2 HEX CAP SCREW
4	7024-201400-150	#14-10 X 1 1/2 TAP SCW HEX WASHER
5	7024-201400-175	#14-20 X 1 3/4 TAP SCW HEX WASHER
6	7028-003100-175	5/16 X 1 3/4 LAG SCREW
7	7036-003118-000	HEX NYLON NUT 5/16-18 UNC
8	7050-034068-006	11/32 X 11/16 X 1/16 FLAT WASHER
9	7060-031057-009	5/16 LOCK WASHER
10	M-0180-37-12	KICKBACK U BAR 48
11	M-0180-37-8	KICKBACK U BAR 24
12	Q88-0180-42	SINGLE KICKBACK MET
12.1	30W-0180-12	REAR KICKBACK BLOCK
12.2	30W-0180-29	KICKBACK SPACER
12.3	7022-311400-150	#14 X 1 1/2 WOOD SCW FH SOCK
12.4	M88-0181-02	ATTACHMENT PLATE 2 3/4
12.5	M88-0181-30	WOOD KICKBACK SUPPORT
12.6	W88-0180-30	SINGLE DIVISION KICKBACK

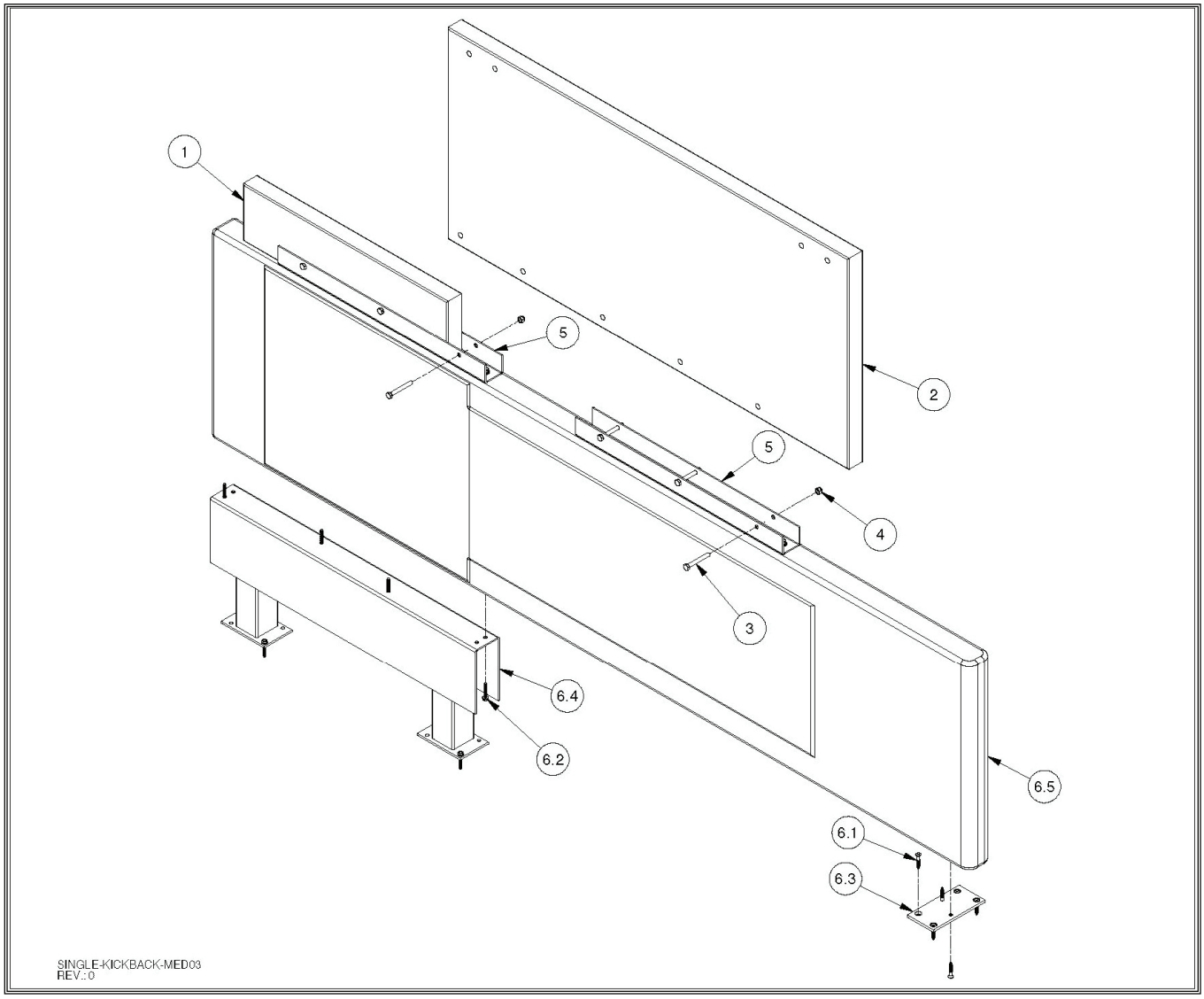
Cushion Assembly SB-0700-85 (ME-D03, ME-F03, ME-HD03)



Cushion Assembly Part List SB-0700-85 (ME-D03, ME-F03, ME-HD03)

Item	Part Number	Description
1	7012-003118-350	5/16-18 UNC X 3 1/2 CARRIAGE BOLT
2	7013-003118-125	5/16-18 UNC X 1 1/4 ELEVATOR BOLT
3	7032-003118-400	5/16-18 UNC X 4 EYE BOLT
4	7034-003118-000	5/16-18 UNC HEXAGON NUT
5	7036-003118-000	HEX NYLON NUT 5/16-18 UNC
6	7050-034068-006	11/32 X 11/16 X 1/16 FLAT WASHER
7	7050-034100-012	11/32 X 1 X 1/8 FLAT WASHER
8	7050-034175-012	11/32 X 1 3/4 X 1/16 FLAT WASHER
9	M-0540-71	CUSHION CHAIN
10	M-0700-85	CUSHION TUBULAR
11	R-0700-73	CUSHION ABSORBER
12	R-0700-85	CUSHION FRONT
13	R-0700-86	PIT CUSHION REAR
14	R-0700-87	CUSHION APRON

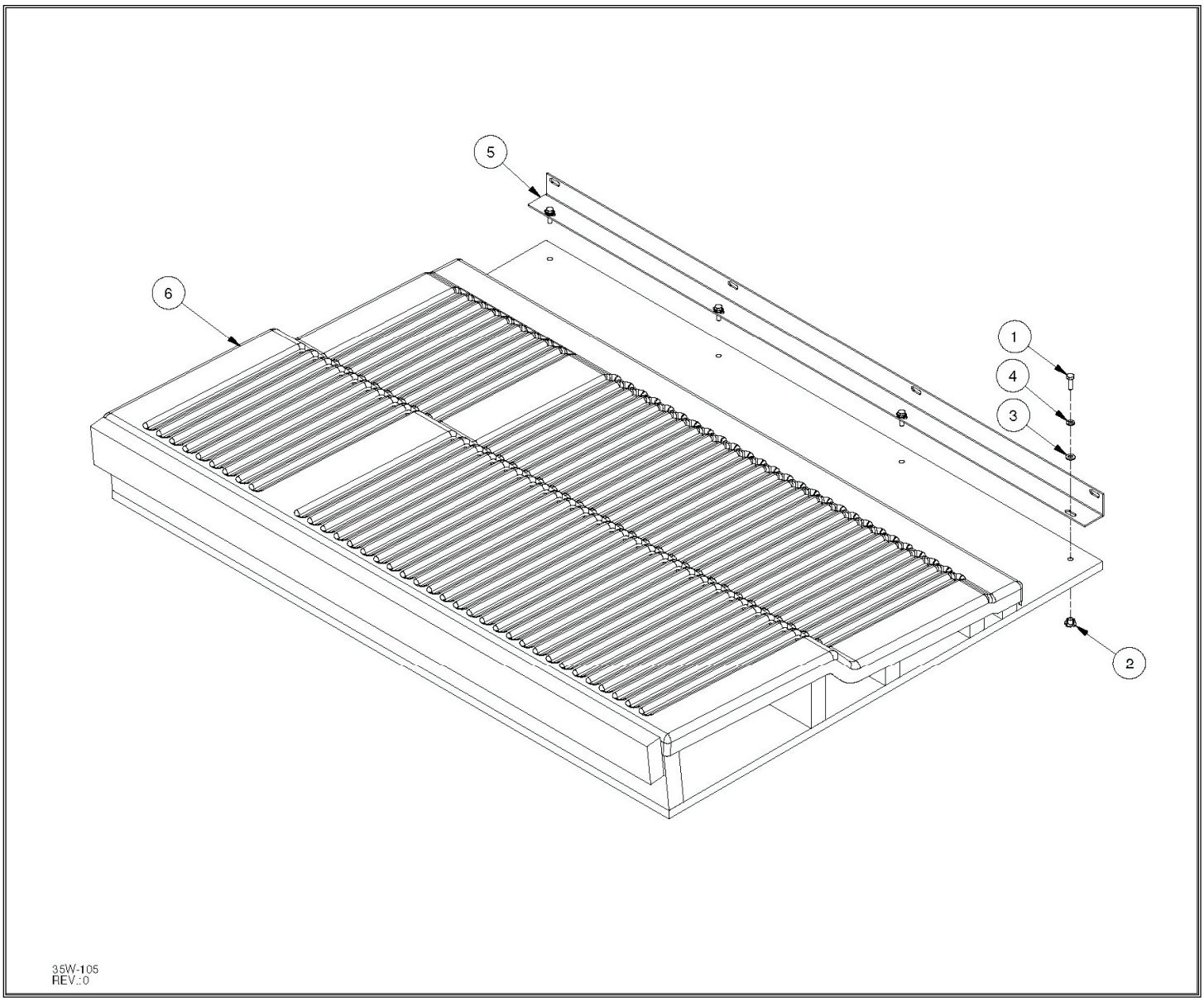
Single Kickback (ME-D03, ME-F03, ME-HD03)



Single Kickback Part List (ME-D03, ME-F03, ME-HD03)

Item	Part Number	Description
1	30W-0180-30	KICKBACK SUPPORT
2	30W-0180-46	PINSETTER SUPPORT KICKBACK
3	7010-003118-250	5/16-18 UNCX2 1/2 HEX CAP SCREW
4	7036-003118-000	HEX NYLON NUT 5/16-18 UNC
5	M-0180-37-8	KICKBACK U BAR 24
6	Q88-0180-30	SINGLE DIVISION KICKBACK
6.1	7022-311400-150	#14 X 1 1/2 WOOD SCW FH SOCK
6.2	7024-201400-150	#14-10 X 1 1/2 TAP SCW HEX WASHER
6.3	M88-0181-02	ATTACHMENT PLATE 2 3/4
6.4	M88-0181-30	WOOD KICKBACK SUPPORT
6.5	W88-0180-30	SINGLE DIVISION KICKBACK

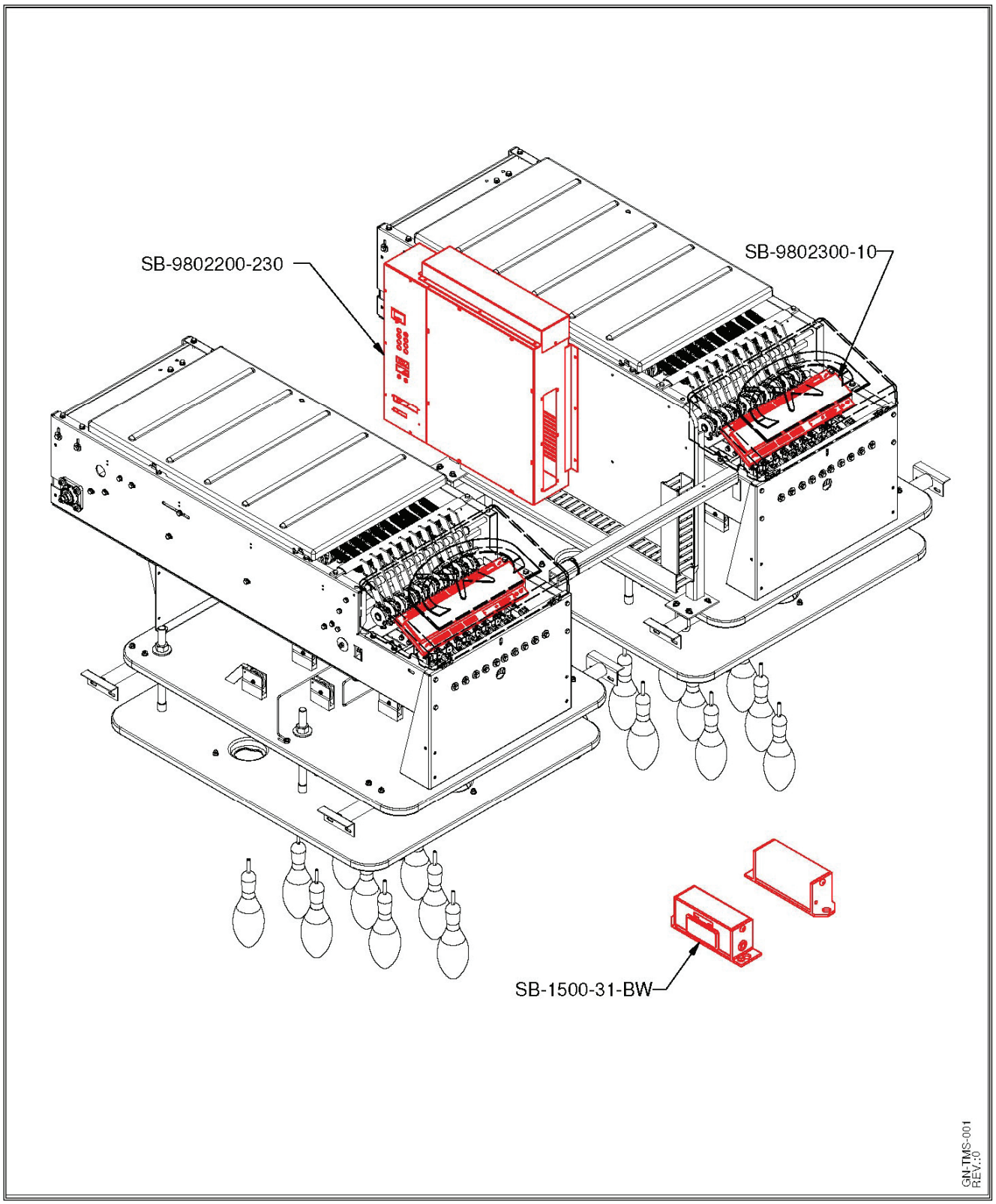
Pit Floor Assembly (ME-D03, ME-F03, ME-HD03)



Pit Floor Assembly Part List (ME-D03, ME-F03, ME-HD03)

Item	Numéro de pièce	Description
1	7010-003118-100	5/16-18 UNCX1 HEX CAP SCREW
2	7045-003118-037	5/16-18 UNC TEE NUT
3	7050-034068-006	11/32 X 11/16 X 1/16 FLAT WASHER
4	7060-031057-009	5/16 LOCK WASHER
5	M-0700-49	BALL STOP BRACKET
6	MBP-1000-105-1	PLASTIC PIT DUCKPIN

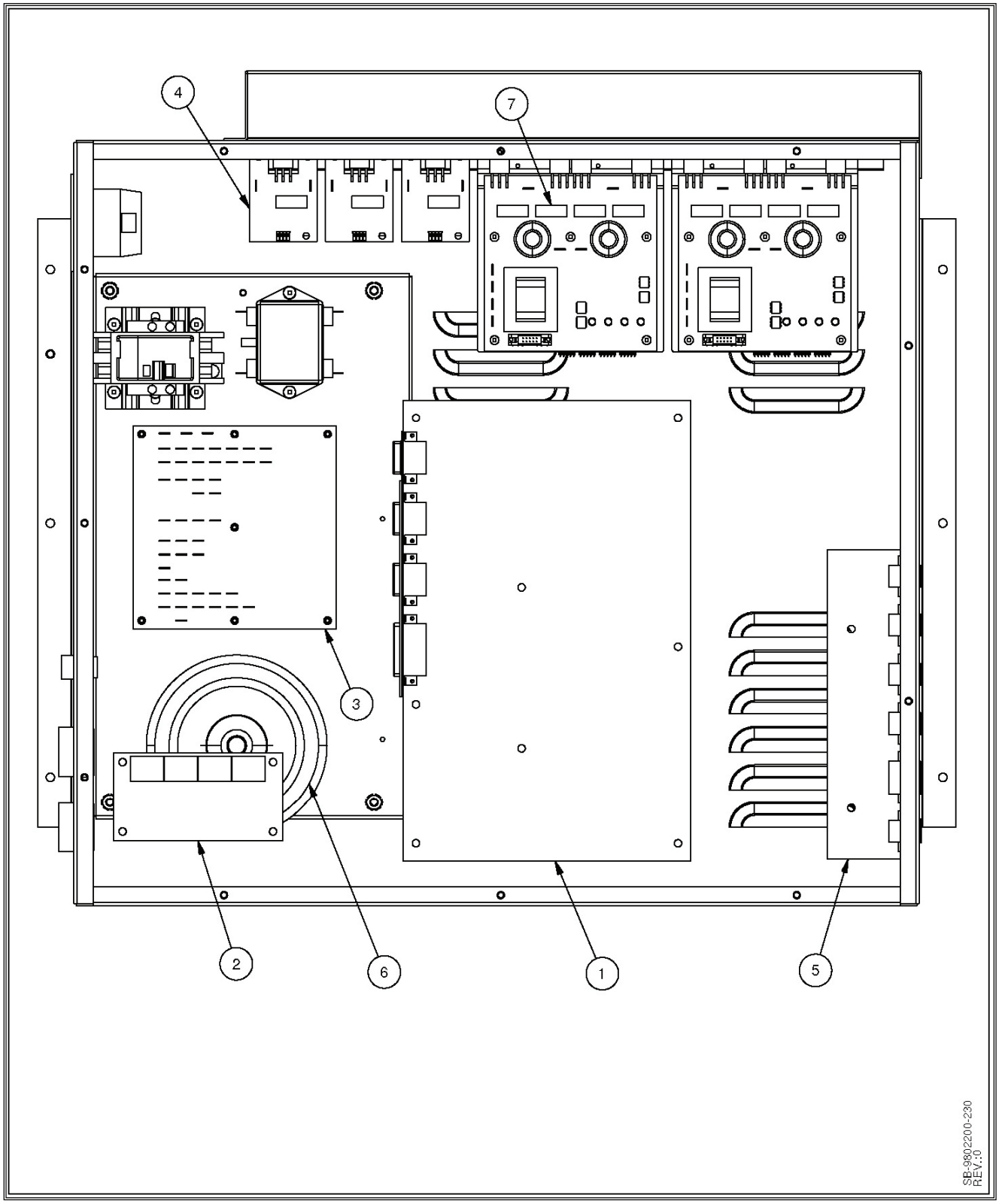
Electronic Components



Electronic Components Part List

Item	Part Number	Description
1	SB-9802200-230	POWER BOX
2	SB-9802300-10	PIN DETECTORS
3	SB-1500-31-BW	BALL DETECTOR

Power Box SB-9802200-230



Power Box Part List SB-9802200-230

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

Parts Index

