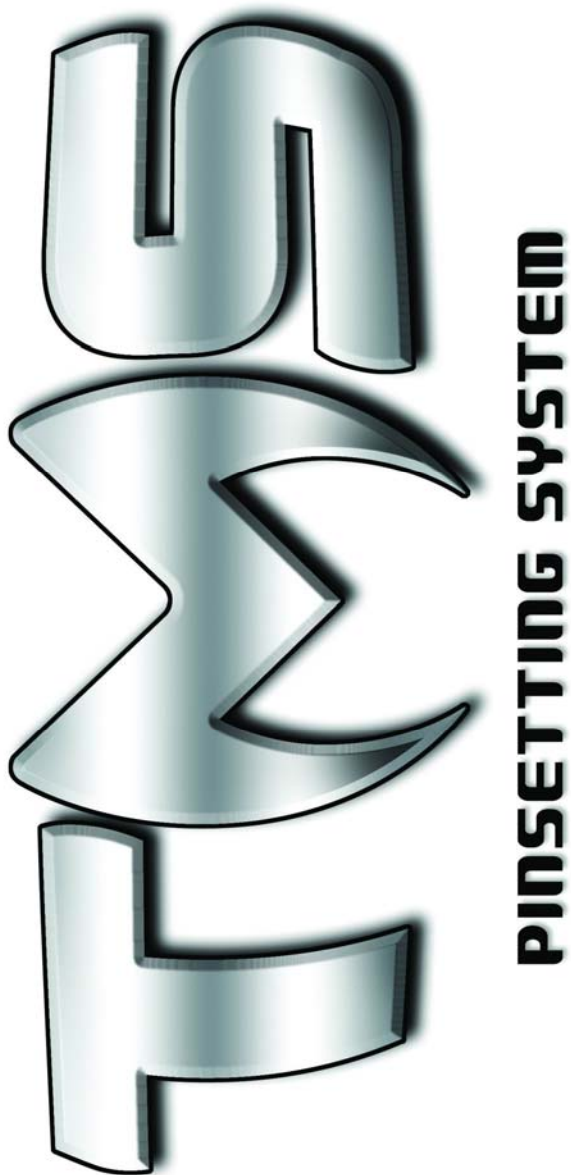




TMS Pinsetter Owner's Manual

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

**Second Release
May 2006**



QUBICAAMF
THE POWER OF PARTNERSHIP

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DOCUMENT UPDATES

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INTRODUCTION



Introduction to TMS Pinsetting System



QubicaAMF is proud to introduce you to your TMS Pinsetting System. This equipment was designed and manufactured by QubicaAMF and was sold to you through an authorized QubicaAMF representative. QubicaAMF is a leading manufacturer in bowling and entertainment products. We are proud to provide you with the finest products and equipment in the industry.

QubicaAMF 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 QubicaAMF-authorized technician.*** He or she will provide you with recommended products for use with your TMS Pinsetting System and will instruct you in the proper operation and maintenance techniques.



About this Manual

Thank you for selecting the 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. [“Introduction,”](#) describes the layout of this manual.
2. [“Important Safety Instructions,”](#) provides essential safety information that must be followed for the safe installation, operation, and maintenance of the TMS Pinsetter.
3. [Section 1, “TMS Pinsetting System Fundamentals,”](#) provides an overview of your TMS Pinsetting System machine. After reading this section you should be able to identify the major components of your TMS Pinsetting System and understand the basic principles of the machine’s operation.
4. [Section 2, “Setting Up and Adjusting 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.
5. [Section 3, “Troubleshooting,”](#) contains information that will help you identify and correct problems that might arise as you use your equipment.
6. [Section 4, “Wiring Diagrams,”](#) provides you with all necessary wiring and electronic information in easy to comprehend diagrams
7. [Section 5, “TMS Pinsetting System Drawings and Parts Catalog,”](#) provides you with a complete breakdown of all your equipment’s parts in exploded views for your reordering and servicing convenience.
8. [Parts Index,](#) provides a quick and easy way of locating and identifying parts by part number and description.



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IMPORTANT SAFETY INSTRUCTIONS



IMPORTANT SAFETY INSTRUCTIONS

READ, UNDERSTAND, and FOLLOW all of the safety requirements presented in this manual.

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 **OPENED** 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 (routed and secured) 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 input voltage, is to be used for the mains supply to the fluorescent light control box.
- ◆ Verify that the fluorescent light fixture has a voltage rating suitable for connection to the ac mains input to the fluorescent light control box.
- ◆ The power supply cord for the fluorescent light 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 light 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 light control box.
- ◆ The mains supply cord of the fluorescent light 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.
- ◆ The pinsetter contains motors, belts, pulleys, chains, and sprockets that can present a pinching or crushing hazard during operation. During setup and adjustment, it may be necessary to remove some guards to access certain components for adjustment. Exercise caution when working around these components.
- ◆ Do NOT place a machine into service with any of the guards removed.



Safety Symbols

The following are some of the symbols that could be found on the machine and in accompanying documentation. Be sure to observe the applicable safety warnings and precautions.

	This symbol means STOP, DO NOT PROCEED, and is a warning that hazards could exist. It is often followed by other symbols.		This symbol means that the mechanic should read, understand, and follow the technical manual before servicing the machine.
	This symbol indicates a LOCKOUT/TAGOUT point for performing maintenance.		This symbol reminds the user to remove main power from the machine prior to performing maintenance.
	This symbol warns the mechanic to unplug the motor before servicing.		This symbol indicates STOP! NO ACCESS FOR UNAUTHORIZED PERSONS. Service should be performed by authorized, trained personnel only.
	This symbol indicates that eye protection is required.		This symbol indicates that hearing protection is required.
	This symbol is a warning against breaking a photo eye beam, which will cause the machine to cycle.		This symbol indicates that the machine may start or cycle automatically without warning.



	This symbol states that a crushing hazard exists.		This symbol is a warning against operating the equipment with the guards removed.
	This symbol denotes that an entanglement hazard associated with gears exists.		This symbol denotes that an entanglement hazard associated with belts and pulleys exists.
	This symbol warns that a falling hazard exists.		This symbol warns that a tripping hazard exists.

The above symbols may be found displayed as follows:

WARNING AVERTISSEMENT ADVERTENCIA WARNUNG					
STOP. READ and UNDERSTAND TECHNICAL MANUAL Before Servicing Machine.	DETÉNASE. LEA y COMPRENDA el MANUAL TÉCNICO antes de iniciar las tareas de servicio.			HALT! Vor Arbeiten an der Maschine das TECHNISCHE HANDBUCH LESEN und VERSTEHEN.	ARRÊTER. LIRE et METTRE à BIEN COMPRENDRE les Instructions du MANUEL TECHNIQUE avant de travailler sur la machine.
LOCKOUT/TAGOUT. UNPLUG Main Power and UNPLUG Motor Before Servicing Machine. See Lockout Safety Procedure.	DESENERGIZAR/ "ETIQUETAR EN SERVICIO" Desconecte la alimentación de la red y DESENERGICE el motor antes de realizar las tareas de servicio. Consulte las procedimientos de bloqueo para obtener más información.			SPIERRUNG/SERVICE- KENNZEICHNUNG Vor Arbeiten an der Maschine Stromabschaltvor- und Motorabschaltvor- TRENNEIN. Stelle auch Sperrschuttschilder auf.	VERROUILLER/SIGNALISER. DÉSBRANCHEZ l'alimentation principale et le moteur avant de travailler sur la machine. Consultez la procédure de verrouillage de sécurité.
DO NOT BREAK PHOTO BEAM. Machine will cycle. STARTS AUTOMATICALLY. CRUSH HAZARD. Pin Deck Area.	NO ROMPA EL HAZ. FOTOGRAFICO o la máquina reanuda. ARRANCA AUTOMÁTICAMENTE. PLUGEO DE AÑASTAMIENTO. Área de la plataforma.			LICHTSTRAHL NICHT UNTERBRECHEN, da sich sonst die Maschine einschaltet. STARTET AUTOMATISCH. QUETSCHGEFAHR. Pinastiftfläche.	NE PAS INTERROMPRE LE FASCEAU DE LA CELLULE, la machine se mettra en marche. DÉMARRAGE AUTOMATIQUE. DANGER D'ECASSEMENT. Zone des queues.
DO NOT OPERATE WITHOUT GUARDS Belt Entanglement Gear Entanglement	NO HAGA FUNCIONAR LA MÁQUINA SIN GUARDAS debidamente instaladas. ATAQUE DE LAS CORRIAS. ATAQUE DE LAS MARCHAS.			INBETRIEBNAHME OHNE diverseifertig angebrachte SCHUTZGÜTER VERBODEN. GURTVERWICKLUNG. GETRIEBEVERWICKLUNG.	NE PAS METTRE EN MARCHÉ la machine sans les protections correctement installées. ENRÊLEMENT PAR LES COURROIES. ENRÊLEMENT PAR LES ENGRENAGES.
FALL / TRIP HAZARD. Do not use Front-End Platform Guards as a Catwalk to access other Pinpotholes in Operation.	PELIGRO DE CAÍDAS/VUELCO. No use las guardas de la plataforma frontal como pasarelas para acceder otros Puntos de acceso en operación.			FALL- BZW. KIPPGEFAHR! Frontplattform-Schuttgitter nicht als Laufweg zum Zugang zu anderen Punkten in Betrieb benutzen.	RISQUE D'ACCROCHAGE/ CHUTE Ne pas utiliser les protections de la plate-forme avant pour accéder aux autres renseignements en fonctionnement.
EYE PROTECTION REQUIRED. HEARING PROTECTION REQUIRED.	SE NECESITA PROTECCIÓN OCULAR. SE NECESITA PROTECCIÓN AUDITIVA.			Augenschutz ERFORDERLICH. Ohrenschutz ERFORDERLICH.	PROTECTION OCULAIRE REQUISE. PROTECTION AUDITIVE REQUISE.
NO ACCESS FOR UNAUTHORIZED PERSONS. Service by Authorized Personnel Only.	NO SE PERMITE LA ENTRADA A PERSONAL NO AUTORIZADO. Solo personal autorizado puede realizar tareas de servicio.			KEIN ZUGANG FÜR UNBEFUGTE. Service nur durch befugtes Fachpersonal!	ACCÈS INTERDIT AUX PERSONNES NON AUTORISÉES. Les opérations ne doivent être effectuées que par un personnel dûment formé et autorisé.

Spanish

German

French

WARNING AVERTISSEMENT ADVERTENCIA WARNUNG					
SERIOUS INJURY May Occur! Machine will start automatically or by breaking the photo beam. • Lock-out/Tag-out • Disconnect motor plugs before entering machine.		¡Pueden ocurrir serias lesiones! La máquina arrancará automáticamente o, rompiendo el haz fotográfico. • Desenergizar/etiquetar "En servicio" • Desconecte las orejetas del motor antes de entrar en la máquina.		Hohe Verletzungsgefahr! Maschine startet automatisch, bzw. wenn der Lichtstrahl unterbrochen wird. • Sperrung/Service-Kennzeichnung • Vor Zugang zur Maschine Motorstecker trennen.	
Risques de blessures graves! La machine peut se mettre en marche automatiquement ou si le faisceau de la cellule est interrompu. • Verrouiller/signaler. • Débrancher les prises des moteurs avant de pénétrer dans la machine.					

AMF 0004304



 WARNING ADVERTENCIA WARNUNG AVERTISSEMENT	 	Serious injury may occur. Crush hazard. Do not operate with guard removed.	¡Pueden ocurrir serias lesiones! Peligro de aplastamiento. No opere sin la defensa colocada en su lugar.	Hohe Verletzungsgefahr! Quetschgefahr. Nicht ohne Schutzvorrichtung in betrieblnehmen.	Risques de blessures graves! Danger d'écrasement. Ne pas utiliser avec la protection retirée.
---	---	---	---	---	--

AMF 800115

 CAUTION ATENCIÓN VORSICHT ATTENTION		Do NOT step or stand on this surface.	NO pise ni se ponga de pie sobre esta superficie.	Fläche NICHT betreten!	Ne PAS monter ou se tenir sur cette surface.
---	---	--	--	-------------------------------	---

AMF 90004305

 DANGER PELIGRO GEFahr DANGER					Pindeck Crush Area! • Lock-out • Tag-out • Unplug Power • Unplug Motor	¡Plataforma, área de aplastamiento! • Desenergizar • Etiquetar "En servicio" • Desconectar la alimentación • Desconectar el motor	Pinstandfläche, Quetschbereich! • Sperrung • Service-Kennzeichnung • Stromstecker trennen • Motorstecker trennen	Zone des quilles, danger d'écrasement! • Verrouiller. • Signaler. • Débrancher l'alimentation. • Débrancher le moteur.
--	---	---	---	---	--	---	--	--

AMF 9000430

It is also important to understand that the use of these symbols is not all-inclusive because it is impossible to warn of all the possible hazardous consequences that might be found in the workplace.



SECTION 1

TMS PINSETTING SYSTEM FUNDAMENTALS



1. TMS Pinsetting System Fundamentals

Section Overview

This Section provides an overview of your TMS Pinsetting System machine. After reading this section 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

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)

When the pinsetter is turned on, it will perform a calibration cycle, set the pins on the lane, and place the pinsetter in a “first ball” condition. The bowler rolls the ball which passes through the ball detector's infrared beam of light, sending a signal to the pinsetter power 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 ball lift.

Each pin has a string attached which activates its pin detection wheel when the pin is knocked down. In turn, the pin detection wheel notifies the pinsetter power box that the pin has been knocked down.

After a predetermined delay, the TMS power box will activate the DC drive motor to move the drawbar to the rear of the pinsetter. The shield, if installed, is lowered as the drawbar picks up the pins from the pit and quiets the motion of the pins in the stabilizer. The drawbar then reaches the rearmost optical sensor, which indicates to the TMS power box that the drawbar is at the end of its travel and that no strings are tangled. After a short pause, the pinsetter power box, using information received from the fallen pin(s), causes the pinsetter to function in one of two cycles.

Pinsetter Cycles

When the drawbar commences its forward motion, the TMS Pinsetter performs one of two different types of cycles:

Partial Set

If a partial set is necessary, the pinsetter power box activates the individual brake for each pin that was detected as being knocked down. The pinsetter lowers and sets only the pins that were not knocked down, raises the shield, and the system is ready for the next ball.

Full Set

If all of the pins were detected as being knocked down, then a full set is necessary, so none of the brakes are activated. The pinsetter spots a full set of pins on the lane, raises the shield, and the lane is ready for the next frame.

Note If the strings are tangled, the drawbar will not be able to reach the rear of the pinsetter. This will cause the TMS power box to activate the pinsetter's untangling routine, which directs the pinsetter to make up to eight attempts to untangle the strings by lowering and raising the pins in different manners until the strings are untangled or the number of attempts reaches 8.



The pinsetter must be able to take several different actions based on the rules of bowling, and set up the machine for delivery of the correct ball (first ball, second ball, and in some cases, third ball). After the bowler delivers the first ball of a frame, the ball detector sends a signal to the pinsetter power box. The pinsetter power box determines whether there are pins standing and what type of cycle to perform. This process is called reading, and according to all the information that the pinsetter power box analyzes, the pinsetter will cycle in one of 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 power box takes its reading, it will find no pins standing. At this point, the pinsetter power box has the pinsetter perform a full set and set up for a first ball situation (new frame).
- 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 power box takes its reading to find some pins still standing. At this point, the pinsetter power box has the pinsetter perform a partial set and sets up for the second ball of the frame.

Except when configured for duck pin bowling, when the bowler delivers a second ball, regardless of the number of pins knocked down, the pinsetter power box has the pinsetter perform a full set and places itself in a first ball (new frame) situation. In the tenth frame, a third ball may be necessary if a strike or spare is scored. The machine will set up in a first ball condition, but the scoring system will score the results as a third ball in the tenth frame only.



Major Components and Assemblies

There are a number of different assemblies that 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 first ball 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 (obstruct) the **ball detector's** infrared light beam. The ball detector's transmitter is placed just in front of the kickbacks. On the opposite side of the lane, facing the **transmitter**, is a **reflector** which returns the infrared light beam to the ball detector's **sensor**. Basically the ball detector has only one function, it triggers or starts the TMS Pinsetting System's various operations when its beam is interrupted 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 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, capacitor start, **AC 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 the correct pressure on the drive belt.



Pinsetter

Contrary to the ball being removed from the pit area and returned to the bowler, the pins remain in the pit area and are respotted 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 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 an **autoscore system**, or **Manager Control**.

Note The TMS pinsetter is designed to operate on 208–230 volts, 50 or 60 hertz, 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.

The electric power box is attached to a panel that is mounted between each pair of pinsetters and is 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 power 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 **OPEN** 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 more gently, and the untangling mode would lose its powerful effect. Another important factor is the speed and accuracy that 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 DC motor is coupled to a **reducer** and **chain and sprocket arrangement**, and is controlled by a **DC drive controller**.

The TMS power box controls the raising, lowering and stabilizing times. It also governs the braking action, untangling routine, and all other pinsetter actions. All of this is done through each pinsetter's DC drive controller. All of the different time delays are set by the user through **DIP switches** located inside the pinsetter power box.

Drawbar

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

In addition to moving the pins, the drawbar operates the **shield** (if installed), which is designed to prevent a ball from being rolled into the pit while the machine is cycling. The shield moves in opposition to the pins. When the drawbar is pulled to the rear of the pinsetter, the shield is lowered as the pins are raised. When the drawbar returns to the front of the pinsetter to lower the pins, 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 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 can be pulled through the pin, the worn out part (six inches) cut off, and the string refastened. Keeping in mind the four-foot length of spare string and the fact that six inches of string is cut off, each string may be repaired up to 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.



Shield

Some pinsetters are equipped with a shield that consists of a plastic panel that is lowered in front of the machine whenever the pins are raised. This panel prevents balls from entering the pin deck or pit area whenever the pins are up. This adds an element of safety whenever someone needs to enter the machine area for maintenance. The shield is connected to the back of the drawbar by a rope making its motion opposite that of the pins.

Pin Detector

Mounted at the front of each pinsetter are the **pin detector circuit board** (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 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 power box. The pinsetter power box then determines which pins, if any, have been knocked down.

The pin detector circuits are connected to the pinsetter power box along with the individual pin detectors and **brake solenoids** via the pin detector circuit board. The sensitivity of the pin detection optical sensors is determined through a dip switch setting inside the pinsetter power box.

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 to have fallen, its solenoid activates the cam which in turn causes the brake shoe to secure the string, holding the pin up while the drawbar lowers the remaining pins to the lane.



Optical Reading Devices

Ball Detector

With the pinsetter in a ready-to-bowl condition, 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 optical sensor (SB-ECIL-325-PD) for each bowling pin. When a pin is knocked down, its string rotates the wheel (9103058) through the optical sensor, indicating to the pinsetter power box that the pin has been knocked down. Once the reading pause expires, the 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 rearmost 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 pin detector circuit board.

Brake Optical Sensor (BOS)

This 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 situated on the pin detector circuit board.

Pin Pause Optical Sensor (PPOS)

This 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 pin detector circuit board.

Motor Encoder

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



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SECTION 2

**SETTING UP & ADJUSTING
THE TMS PINSETTING
SYSTEM**



2. Setting Up & Adjusting Your TMS Pinsetting System

Section Overview

This section 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.



Adjustments

Your pinsetter was installed by qualified QubicaAMF technicians and configured in a manner that gives maximum performance; however, in the following section we will explain all the setup functions. Understanding these adjustments and how they affect the operation of the machine will make it easier to keep the machine functioning smoothly and without problems.

Warning High voltage is present in the pinsetter power box. The main circuit breakers must always be OPEN 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 CPU software version in which the setting was introduced or changed is indicated in brackets following the description. The shaded areas indicate the preset factory settings.

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

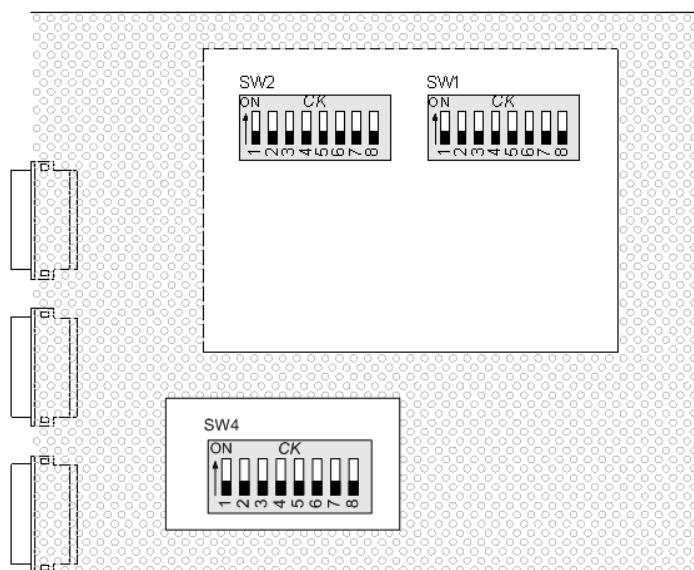


Figure 2-1 Dip Switch Location

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. Sixteen (16) different settings are possible. As the sensitivity increases, fewer holes must pass by the optical sensor 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	SW1-3	SW1-4	SW1-5	SW4-2 ON
More Sensitive 1	OFF	OFF	OFF	9
2	ON	OFF	OFF	10
3	OFF	ON	OFF	11
4	ON	ON	OFF	12
5	OFF	OFF	ON	13
6	ON	OFF	ON	14
7	OFF	ON	ON	15
Less Sensitive 8	ON	ON	ON	16

SW1-6 Stabilizing Pause Time (V1.00)

Used to determine the pause time during 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 times of ball detection and pinsetter action. The shorter the pause, the quicker the pinsetter will begin to respot pins (less time will be allotted for pins to fall which could 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 used for untangling the pins.

SW2-1	SW2-2	Untangling Routine
OFF	OFF	Type 1
ON	OFF	Not Used
OFF	ON	Not Used
ON	ON	Not Used

SW2-3 Pinsetter's 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 when in autoscoring mode (SW1-2 OFF) and in 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: • <i>Ball detection,</i> • <i>Any Command from the pin detector push button</i> • <i>Pinsetter command from Autoscoring system</i>

Reaction in autoscoring mode (SW1-2 OFF) and in 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 ON) and in 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 end the game 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 cycle 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 recognize the number of pins that 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, Hard Duck)

OFF	Two balls per frame
ON	Three balls per frame



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

Used to enable or disable the player buttons when the pinsetters are 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 range of holes necessary to consider a pin as fallen.

NOTE: To be effective you also need the version 1.9 of the pin detector.

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



Adjustment Procedures

Procedure 2-1, Ball Detector Alignment:

The ball detector is a simple, very reliable stand-alone device, but it may become misaligned once in a while due to the constant vibration caused by the balls rolling down the lane and pin action against the kickbacks. Located in front of the kickback, it communicates with the pinsetter power box via a cable.

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 side of the lane returns the light beam to the unit, which also contains a sensor. When the signal is interrupted (ball passes through the beam) the ball detector communicates the information to the pinsetter power box. This action starts the reading period followed by the appropriate pinsetter cycle, which depends on what ball (first, second, or in some cases, third) of the frame it is, the type of game being played, whether or not pins remain standing, etc.

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 is 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 power box has been cut or disconnected.

1. Loosen the screws that secure the ball detector to the coverboard or lane framing.
2. Move the detector, right or left or shim up or down until the green light appears on the ball detector.
3. Once you have a green light, lay a sheet of black construction paper on the lane where the ball detector is located and slide it from gutter to gutter. 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. Angle the ball detector up.
4. Once the ball detector is well aligned, tighten all the screws and check the adjustment again.

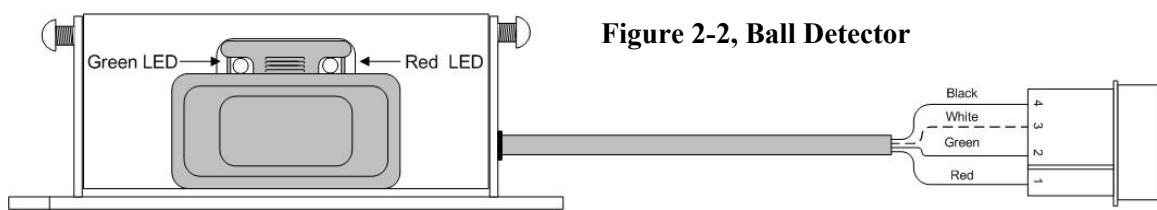


Figure 2-2, Ball Detector



Procedure 2-2, String Adjustment

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

There is a slight delay between the time a button is pushed and an action takes place. Allow several seconds between pushes. If the pinsetter does not respond, press the ON/OFF button and repeat the previous action.

1. If it is not already ON, power on the pinsetter.
2. Put button #4, located on the pin detector circuit board at the front of the machine, in the ON (down) position.
3. Push button #1 (Adjust) once. The pinsetter will go into a calibration cycle and the drawbar will stop in the string adjustment position (between the LOS and BOS sensors).
4. Adjust the strings with the take-up reels so that the pins are stable within the centering rings and are at the same height, and so that the reel arms are still touching the upper reel arm stopper (see Figure 2-4).

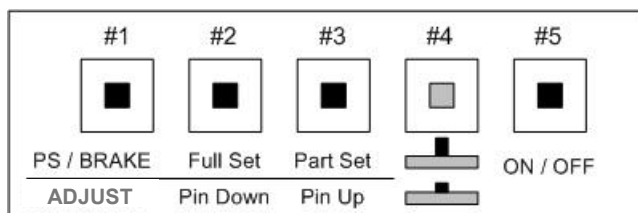


Figure 2-3, Pin Detector Button

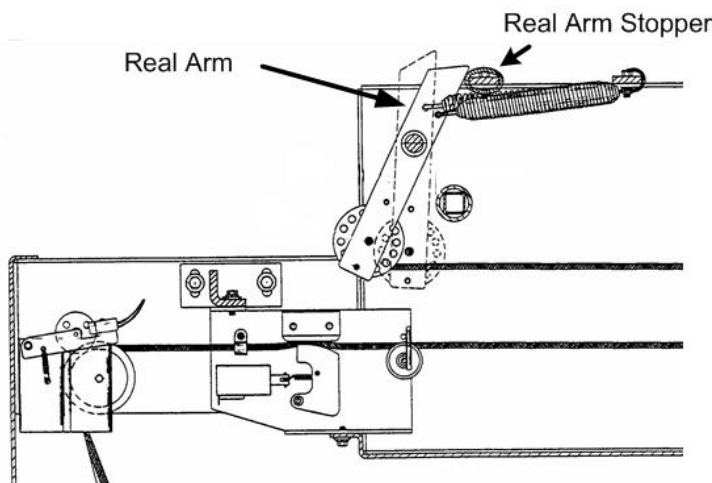


Figure 2-4, Reel Arm Position

5. When the string adjustment is done, put button #4 in the OFF (up) position and then press button #3. This will cause the pinsetter to set the pins as they were before string adjustment.

Procedure 2-3, Limit Optical Sensor (LOS)

This limit optical sensor is used to tell the TMS power box when the drawbar has reached its rearmost travel during the calibration process. The position of that sensor is fixed, and you should not attempt to move it.

Procedure 2-4, Brake Optical Sensor (BOS)

This optical sensor is used to tell the TMS power box the drawbar position at which to activate the pin brakes. By varying the position of this optical sensor you will determine the height of the pins when they are held in their upper position.

Procedure 2-5, Pin Pause Optical Sensor (PPOS)

This optical sensor is used to tell the TMS power box where it will have to slow down the movement of the drawbar in order to gently deposit the 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 pin detector circuit board. You should adjust the position of this sensor so that the pins are slowing down just before they hit the pin deck.

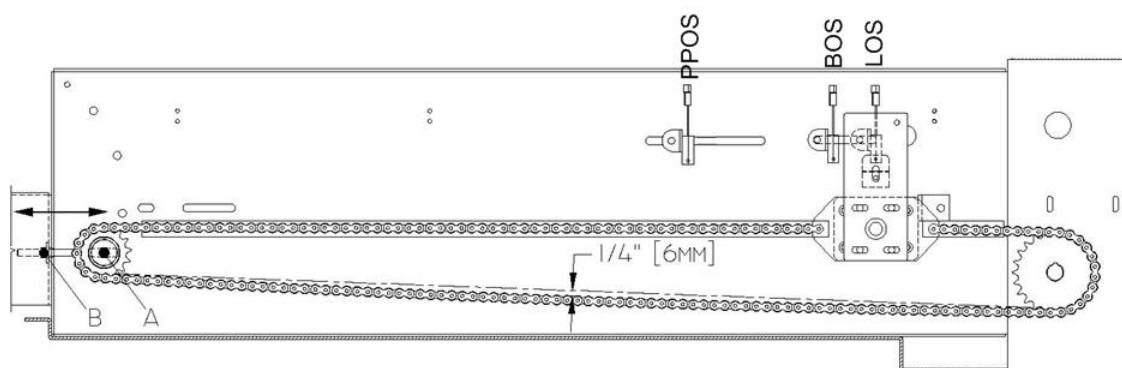


Figure 2-5, Optical Sensor Position

Procedure 2-6, Repairing Strings and Bushings

1. Raise the front cover of the pinsetter and press the Power ON button (button #5). 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 2-6a & 2-6b.

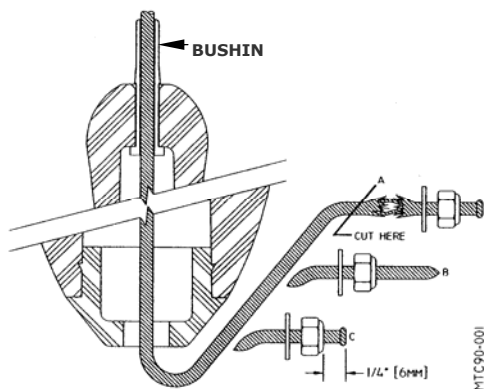


Figure 2-6a, Duck Pin String Repair

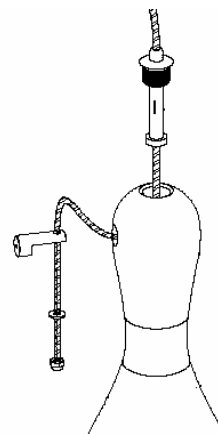


Figure 2-6b, Ten Pin String Repair

5. Slide the string down through the pin and cut off the worn-out section. On the larger ten pins, insert a screw part way into the hole in the plug near the top of the pin and remove the plug to access the string.
6. Carefully melt the string tip using a match or cigarette lighter. Use a rotating motion with a rag to create a point on the string.
7. Replace the pin-head bushing if necessary. Place a new washer and crimp a new nylon lock nut onto the string. Use the swaging tool (Z-001) supplied with your spare parts kit to crimp the nut on the string.
8. Cut the end of the string 1/4-inch (6mm) from the crimped nut. Melt the string tip to shape a lump under the nut. Slide the string back through the pin and check that the pin turns freely. On ten pins, seat the plug securely in the head of the pin and remove the screw that was used to remove the plug.
9. Once the repairs have been finished, close the circuit breaker on the power box and press the start button.
10. Proceed with the strings adjustment procedure. (Required whenever strings are repaired or replaced.)

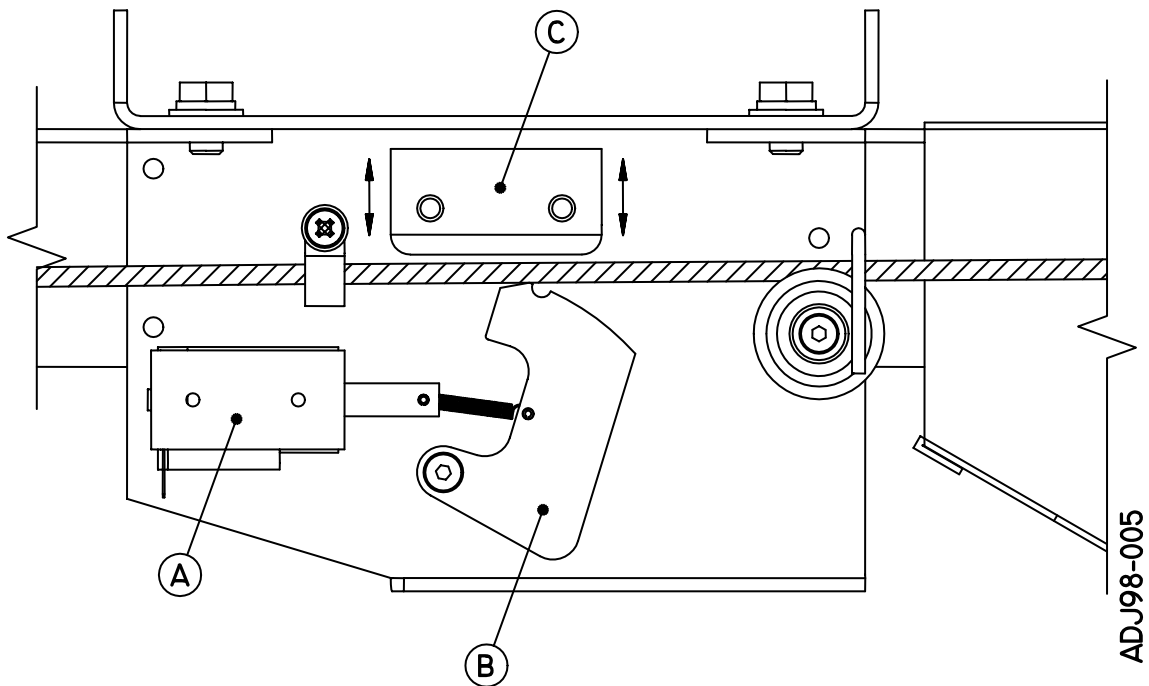


Procedure 2-7, Adjusting the Pin Brakes

Pin brakes should be inspected weekly and, if necessary, adjusted. The solenoid (A) [Figure 2-7] pulls the cam (B) which holds the string against 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 below to adjust 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. When set, tighten the bolts.
4. Press button #2 (Full Set) to reestablish normal functions.

Figure 2-7, Pin Brake Adjustment



Procedure 2-8, Adjusting Drawbar Chain Tension

1. Make sure that the drawbar is in the LOS (Pins 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).

The drawbar chain must not be tightened to the 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 10-weight 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.

5. Re-tighten the sprocket's nut (A).

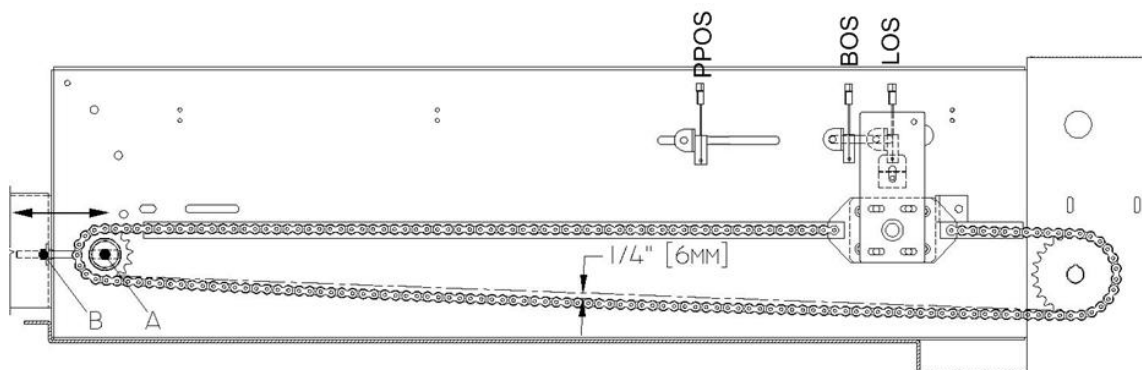
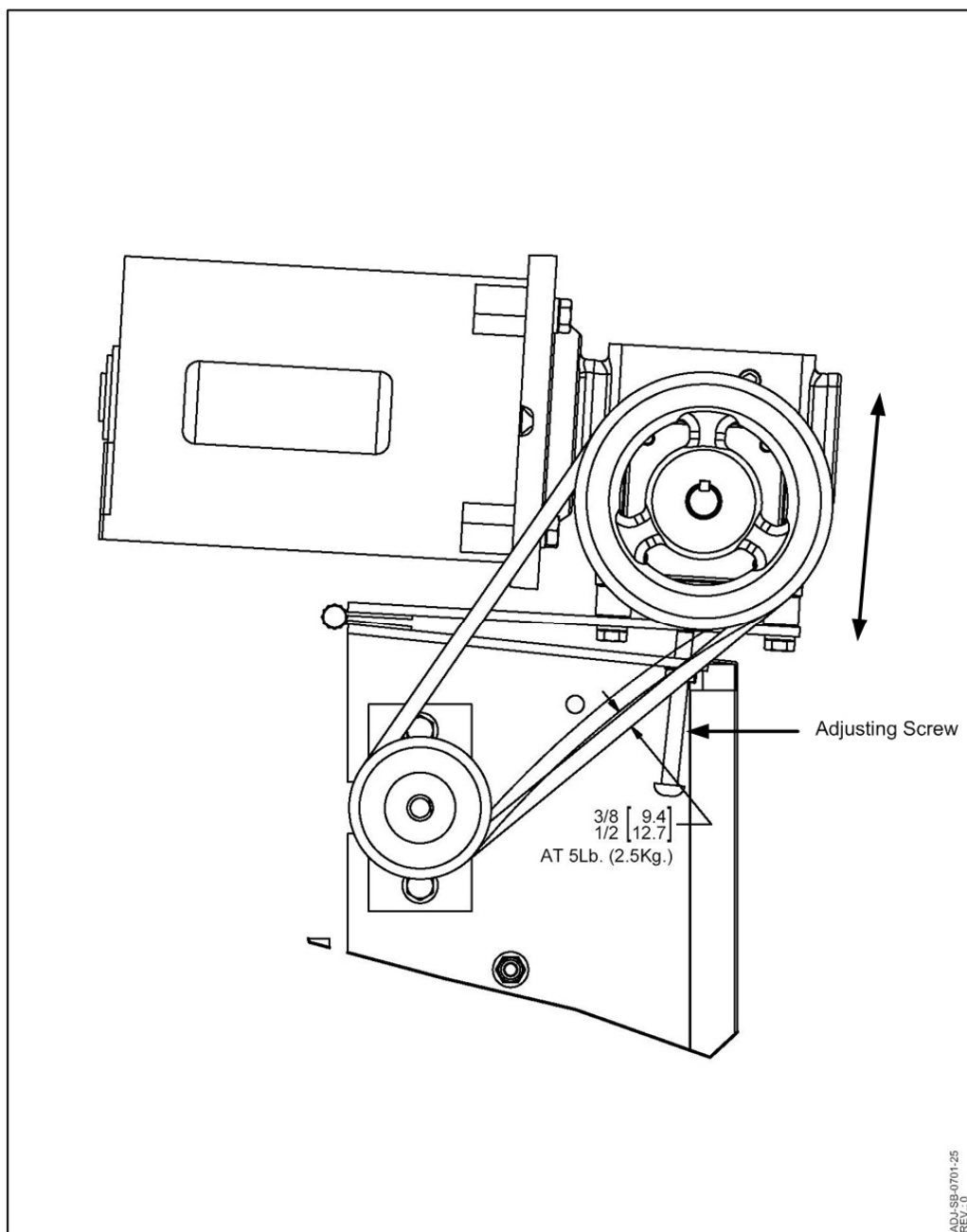


Figure 2-8, Drawbar Chain Adjustment

Procedure 2-9, Adjusting the Rear Ball Lift V-Belt

Adjust tension of the V-belt in order to have a deflection 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 which will tighten or loosen the belt.

Figure 2-9, Adjusting the Rear Ball Lift V-Belt



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SECTION 3

TROUBLESHOOTING



3. Troubleshooting

Section Overview

This section 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 OPEN 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 section.

- 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 suffer significant damage when it receives a static electricity discharge, be it from the players or a defective part.



Untangling Pin Strings

If pin strings tangle, the pinsetter will attempt to untangle them up to 8 times, if necessary. 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. This 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 the front of the pinsetter. The pins that were still in play will be respotted.
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. Ensure the Green LED on the detector is lit.
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 optical sensor.

The Drawbar does not go all the way back to the LOS Sensor.

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 Respotted When They Should not be.

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



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SECTION 4

WIRING DIAGRAMS



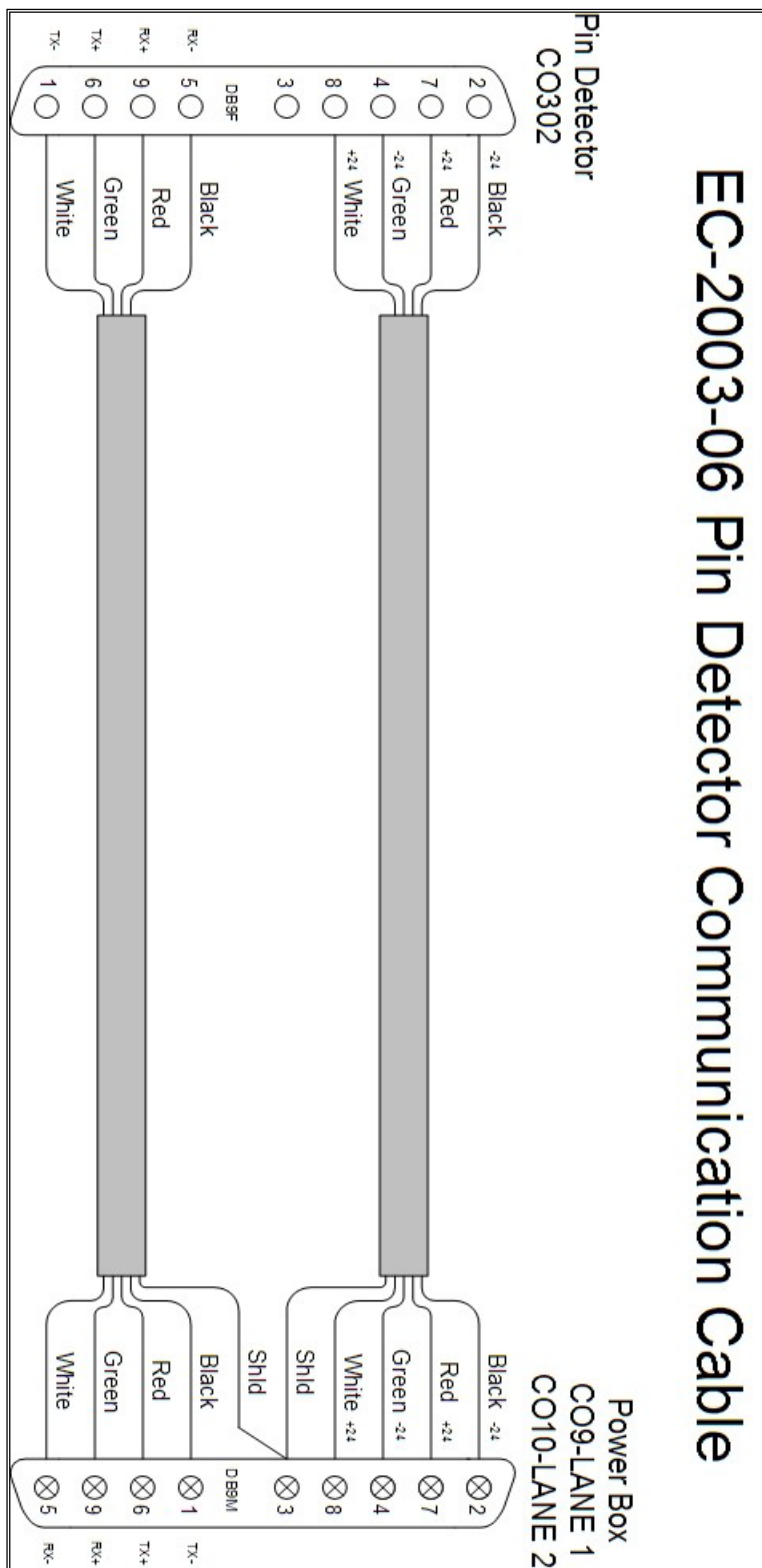
4. Wiring Diagrams

Section Overview

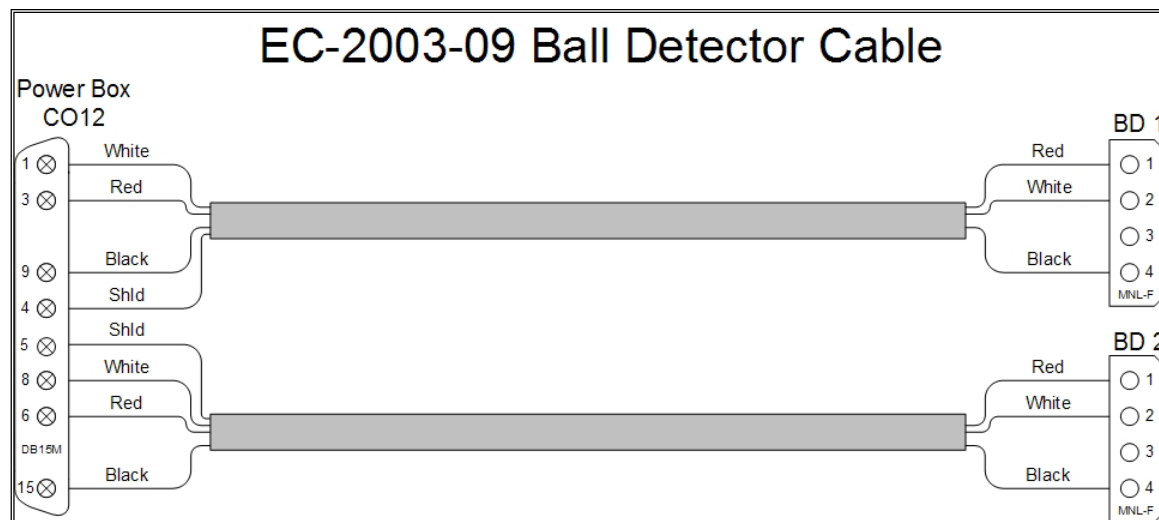
This Section provides you with all necessary wiring and electronic information in easy to comprehend diagrams.



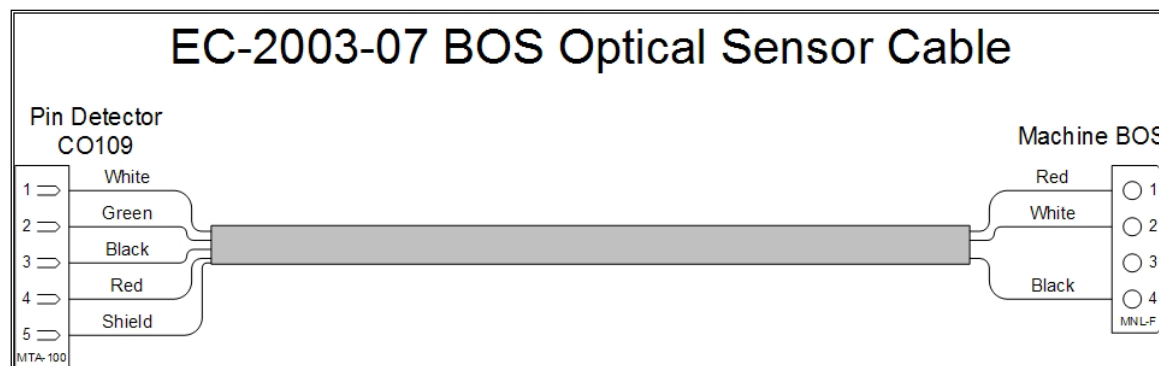
Communication Cable



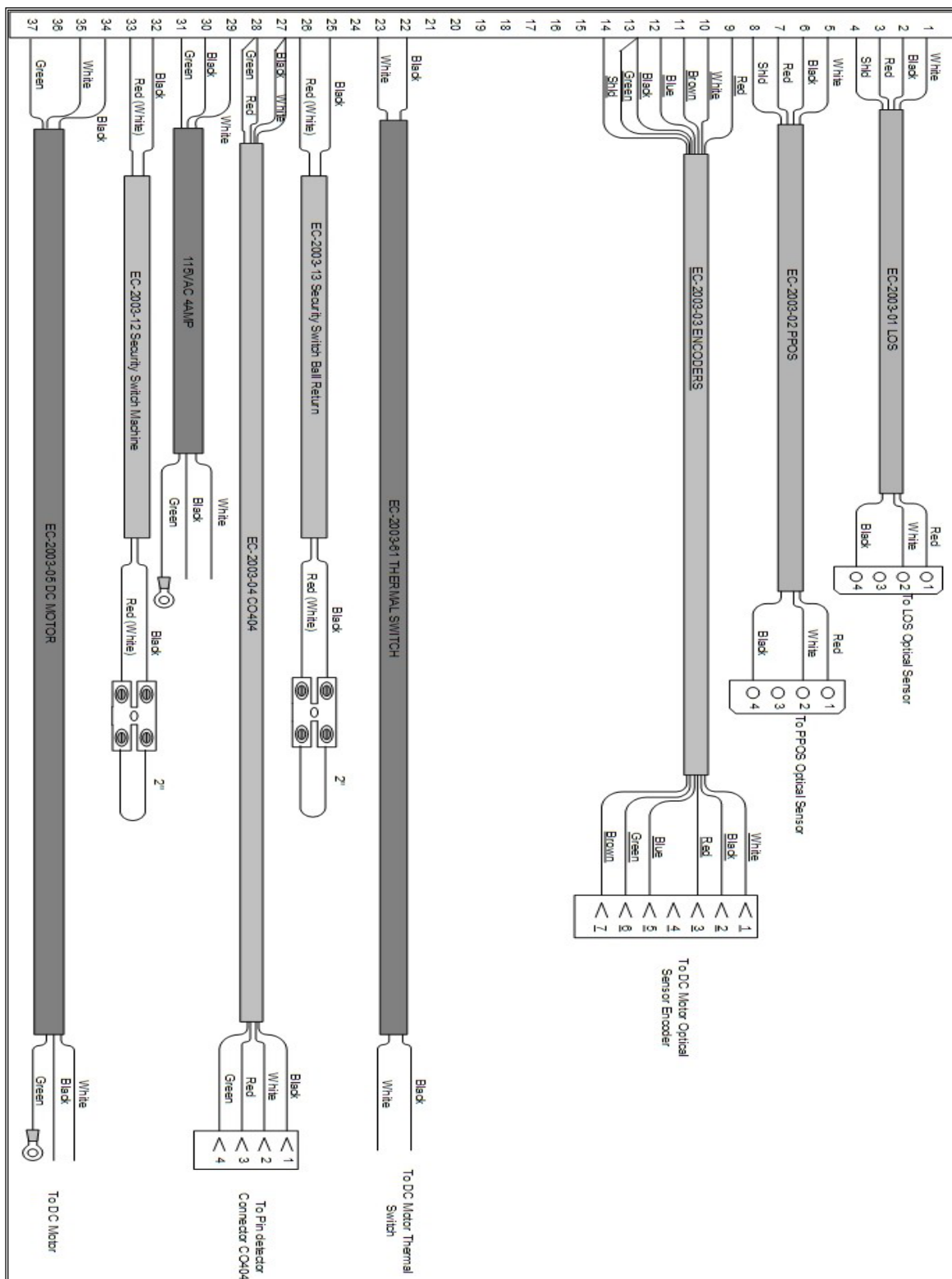
Ball Detector Cable



BOS Optical Sensor Cable



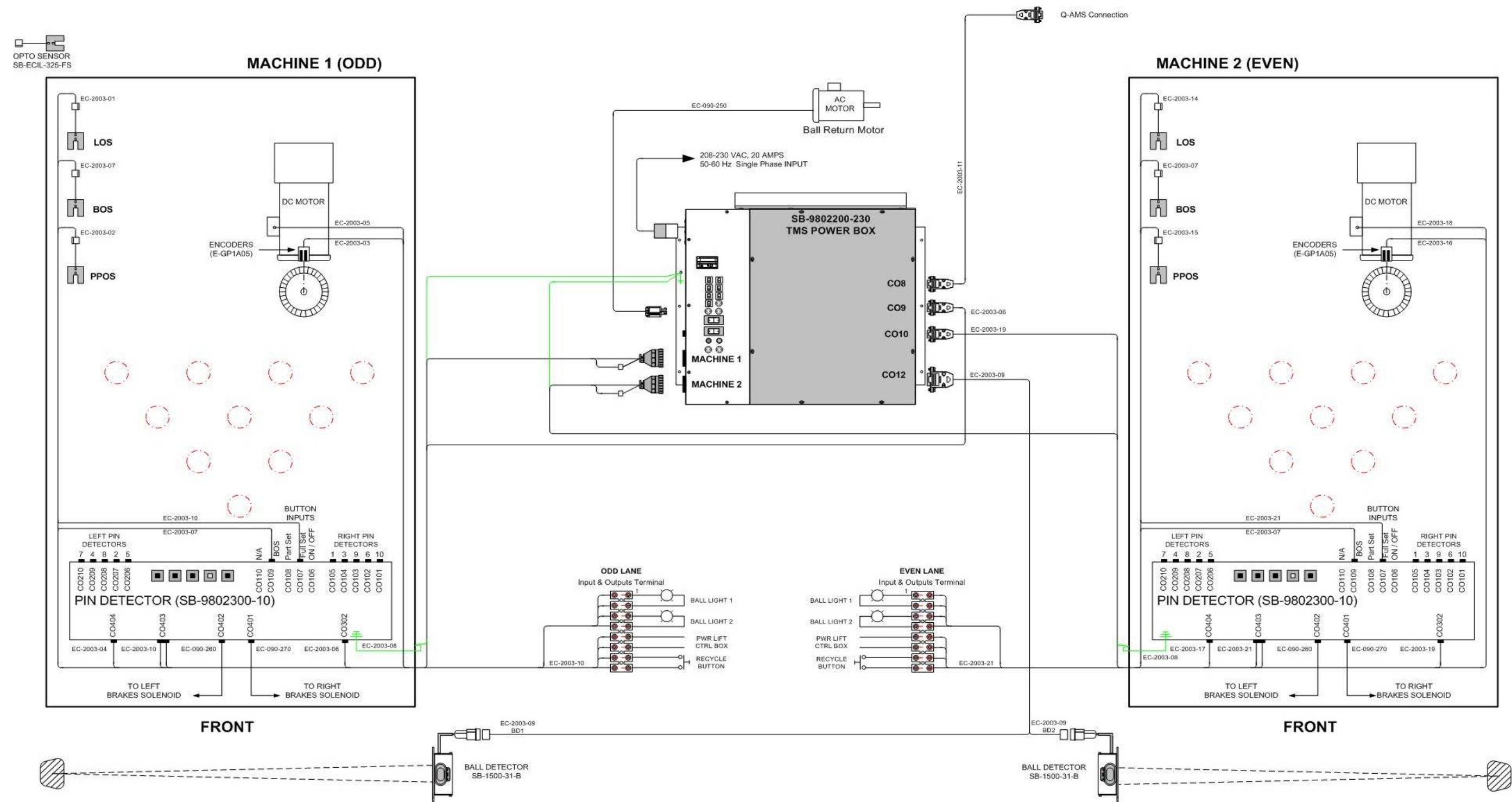
Machine Cable, Detailed

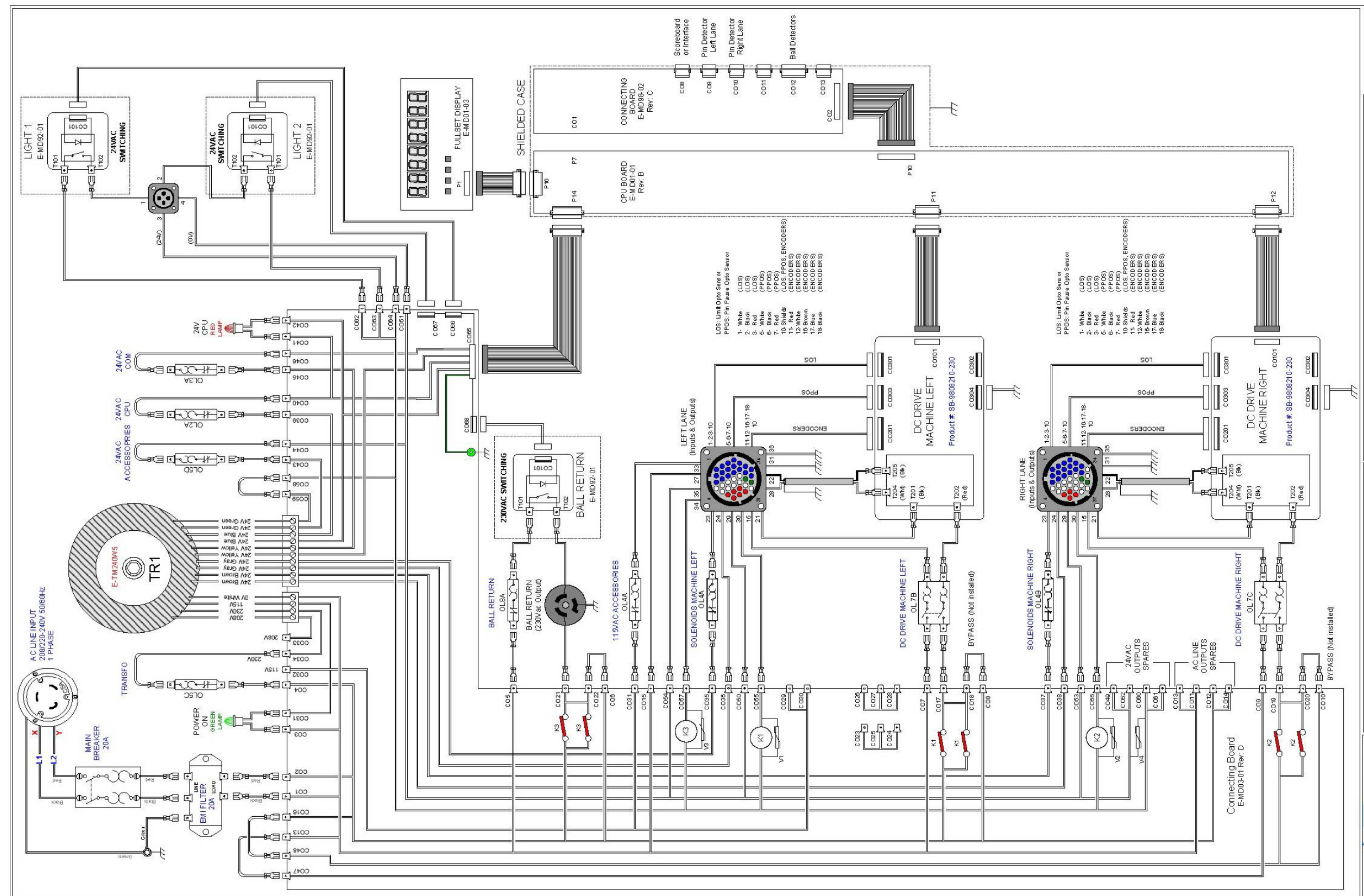


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General Wiring Diagram





SECTION 5

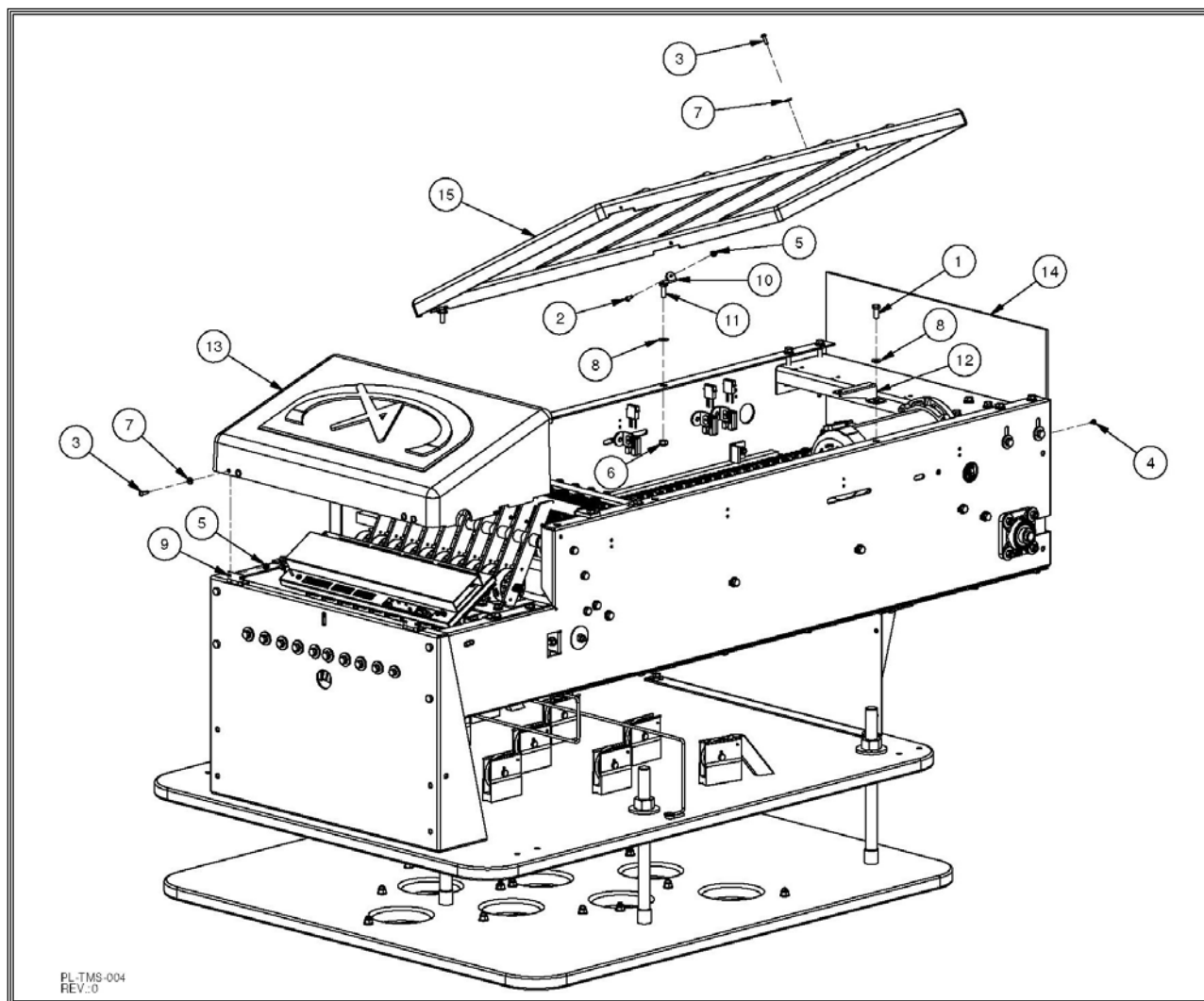
DRAWINGS

&

PARTS CATALOG



Safety Covers

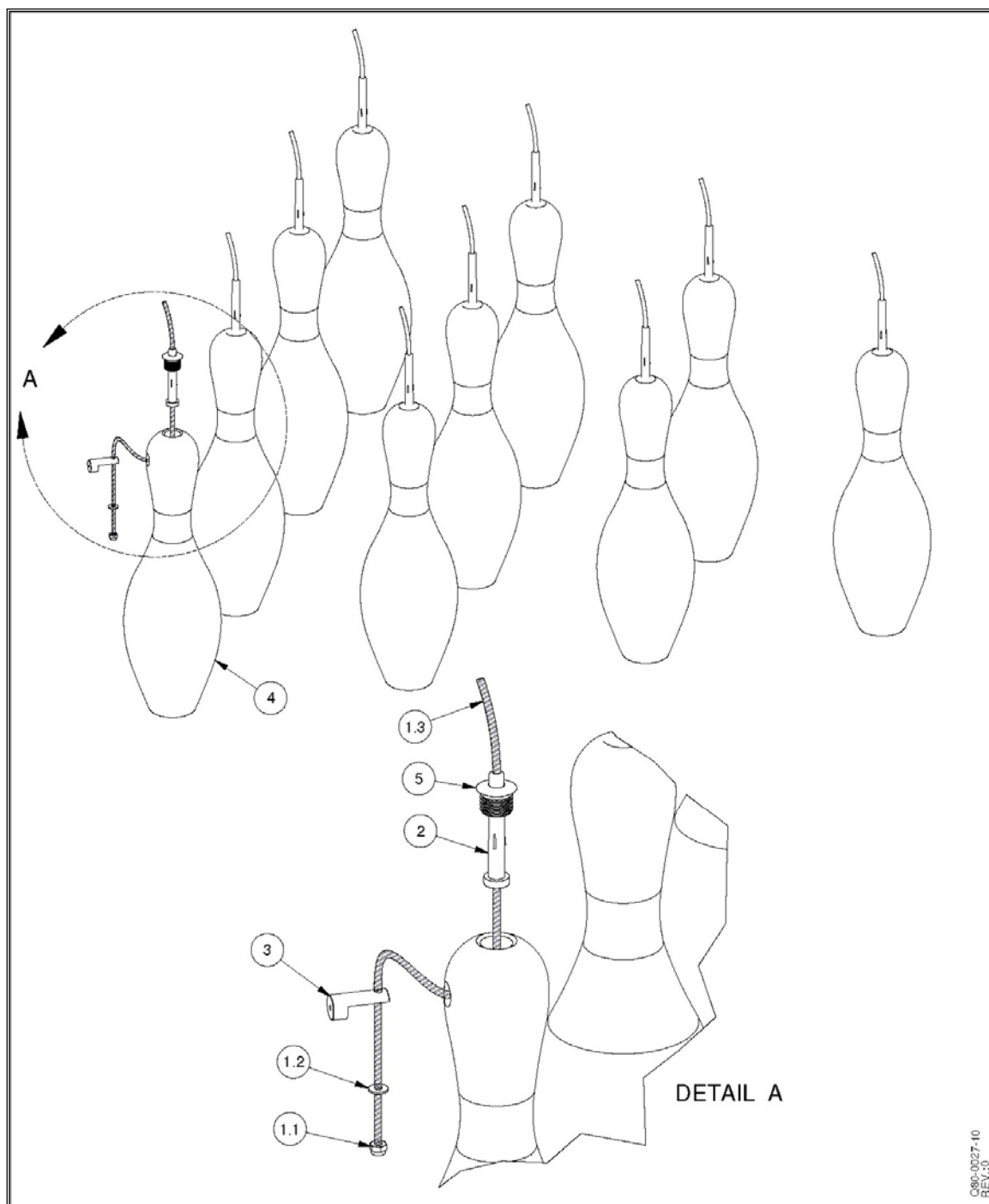


Safety Covers Parts List

Item	Part Number	Description
1	7010-003118-075	5/16-18 X 3/4 HEX CAP SCREW
2	7016-411032-050	10-32 X 1/2 ROUND HEAD MACH SCREW
3	7016-411032-062	10-32 X 5/8 ROUND HEAD MACH SCREW
4	7022-411000-037	#10 X 1 SELF-TAPPING SCREW
5	7036-001032-000	10-32 NYLON INSERT HEX NUT
6	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
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
14	9103202	REAR COVER
15	9103203	TOP COVER



Ten Pin Bowling pin



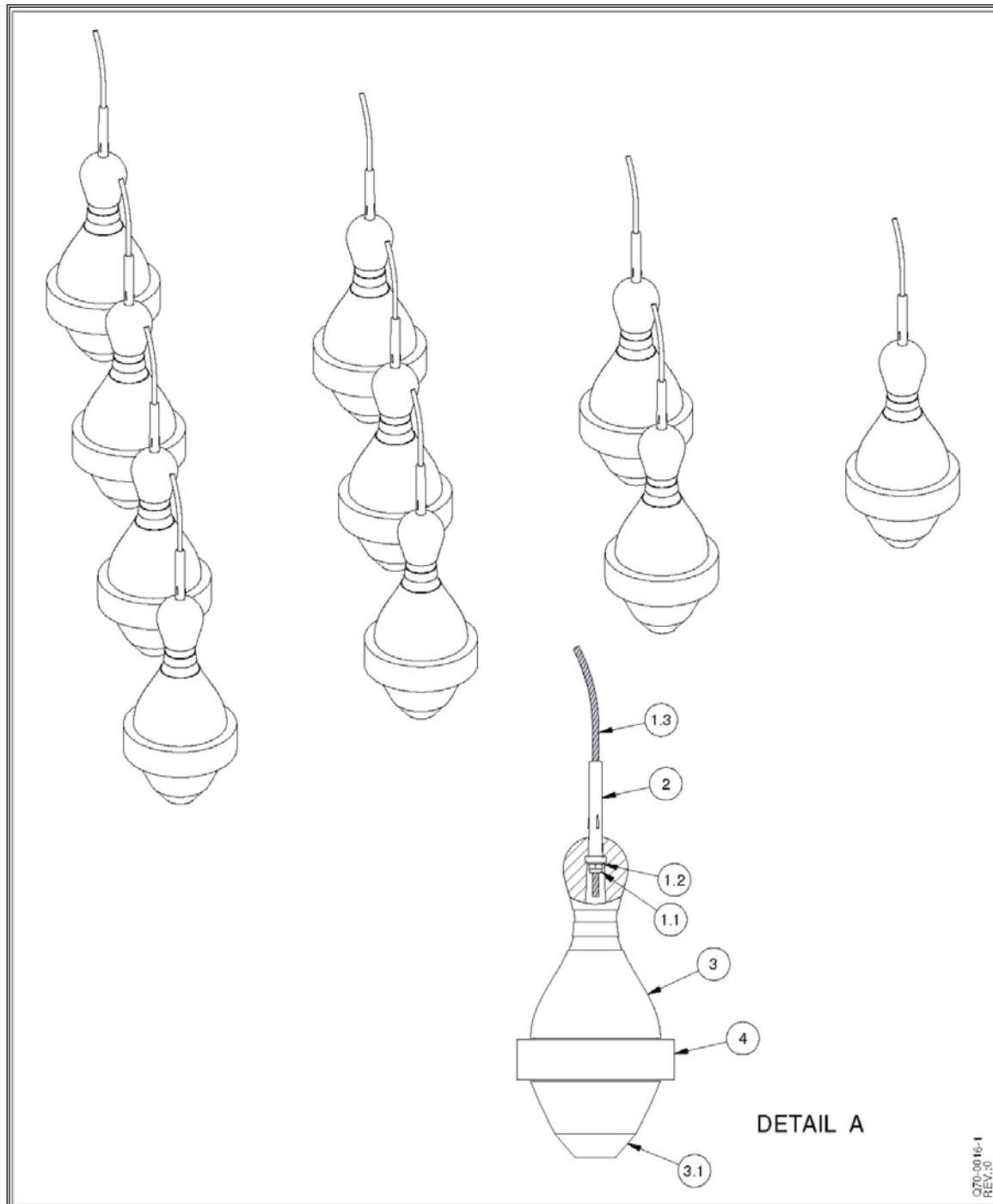
Q80-0027-10
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Ten Pin Parts List

Item	Part Number	Description
1	I-022A	STRING ASSEMBLY, 14 FOOT (4.3 METERS)
1.1	7036-001032-000	10-32 NYLON INSERT HEX NUT
1.2	7050-018048-004	3/16 X 31/64 X 3/64 FLAT WASHER
1.3	Q81-1050	PIN STRING, 50 METER 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



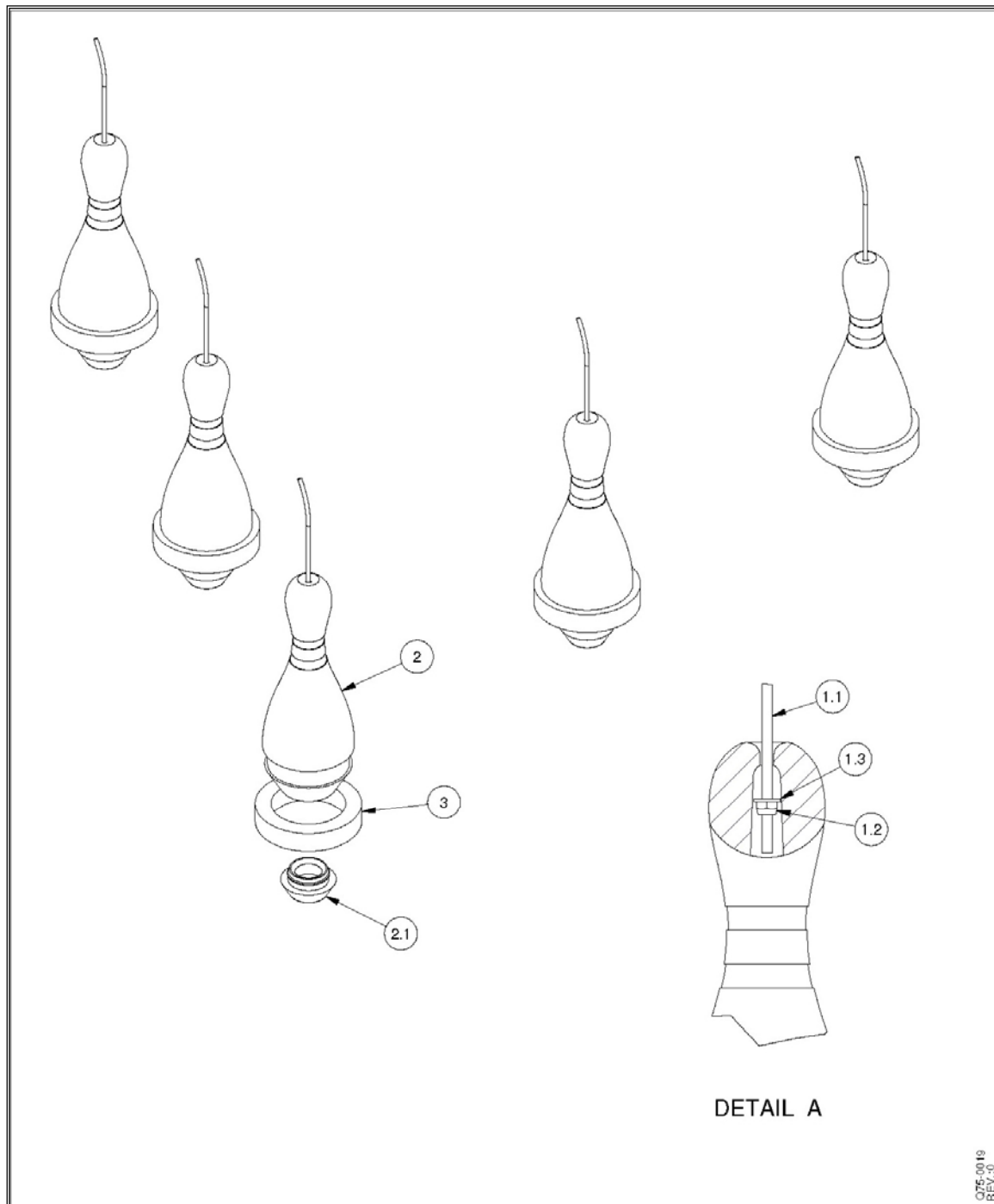
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REV.0

Duck Pin Parts List

Item	Part Number	Description
1	I-022A	STRING ASSEMBLY, 14 FOOT (4.3 METERS)
1.1	7036-001032-000	10-32 NYLON INSERT HEX NUT
1.2	7050-018048-004	3/16 X 31/64 X 3/64 FLAT WASHER
1.3	Q81-1050	PIN STRING, 50 METER 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

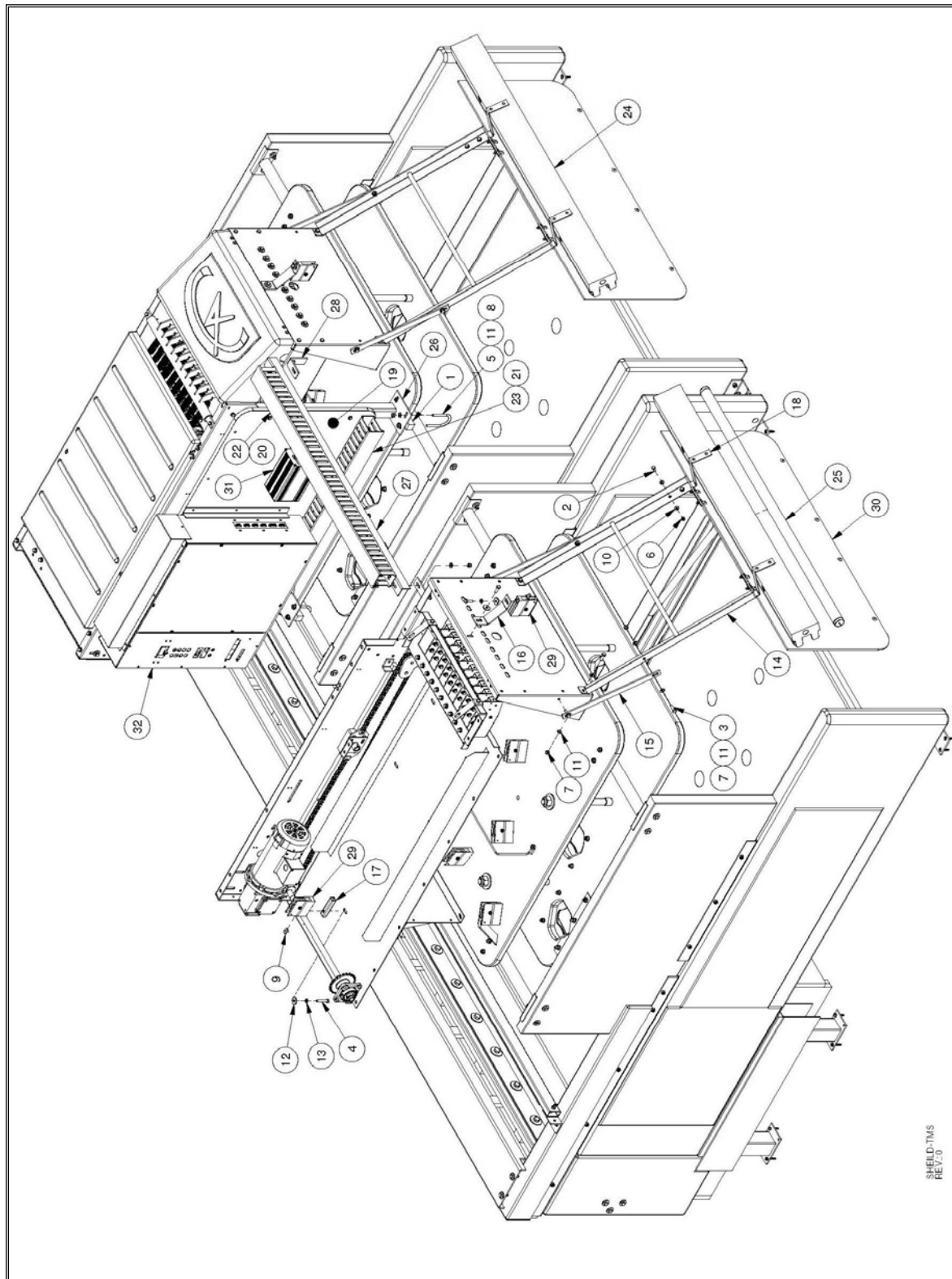


Five Pin Parts List

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



Shield Assembly

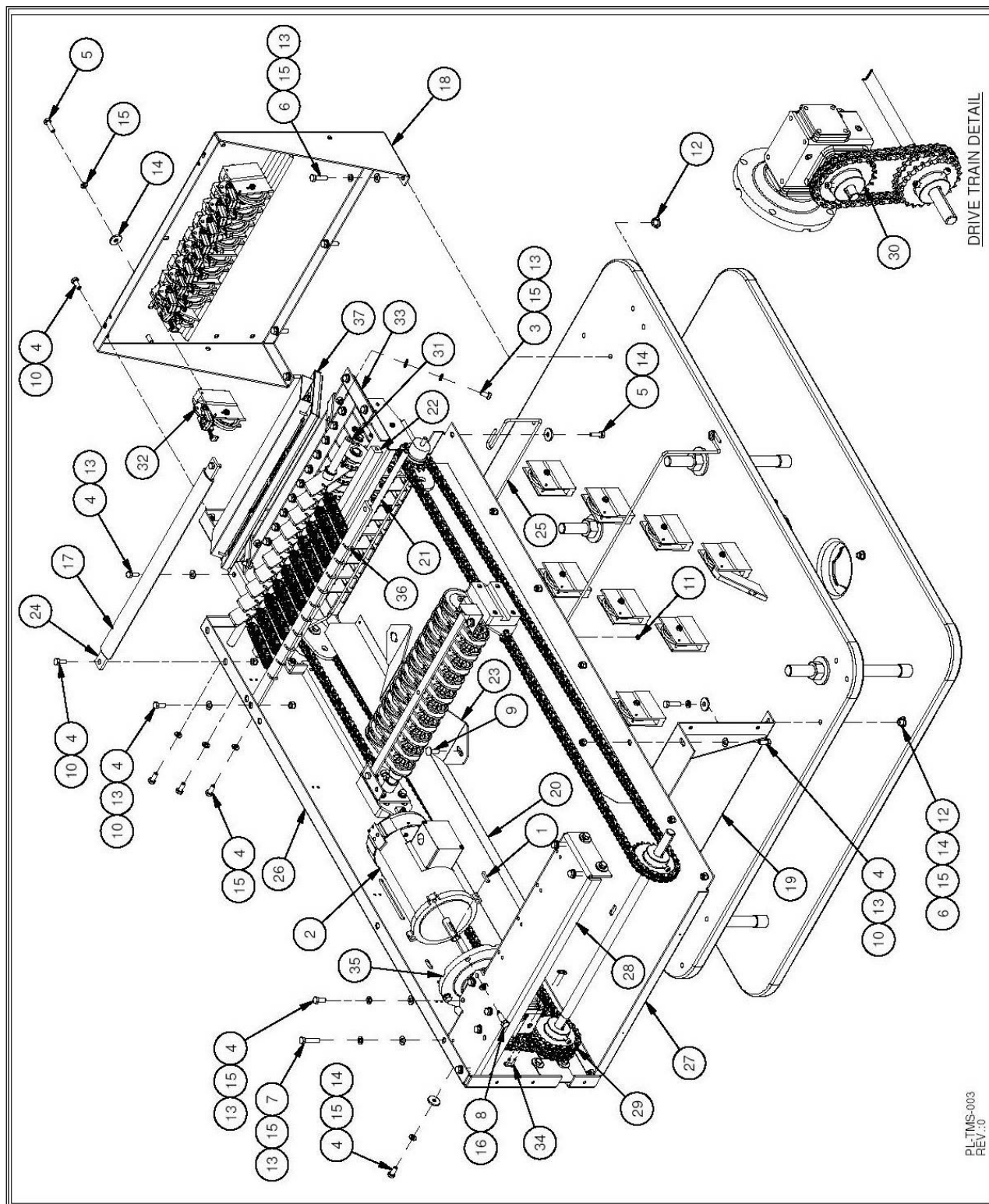


Shield Assembly Parts List

Item	Part Number	Description
1	15W-0374-1	SPACER BLOCK
2	7010-002520-075	1/4-20 X 3/4 HEX CAP SCREW
3	7010-003118-100	5/16-18 X 1 HEX CAP SCREW
4	7010-003118-175	5/16-18 X 1-3/4 HEX CAP SCREW
5	7030-003118-325	5/16-18 X 3-1/4 U-BOLT
6	7036-002520-000	1/4-20 NYLON INSERT HEX NUT
7	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
8	7038-003118-000	5/16-18 HEX KEP NUT
9	7046-003118-037	5/16-18 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	SHIELD 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
23	E-1634	WIRING DUCT COVER 46.062in
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 SHEAVE
30	SB-0700-50-3	SHIELD ASSEMBLY
31	SB-302-7050-10	FLUORESCENT SWITCH BOX
32	SB-9802200-230	POWER BOX, TMS, 230 VAC 50/60 Hz



Main Components

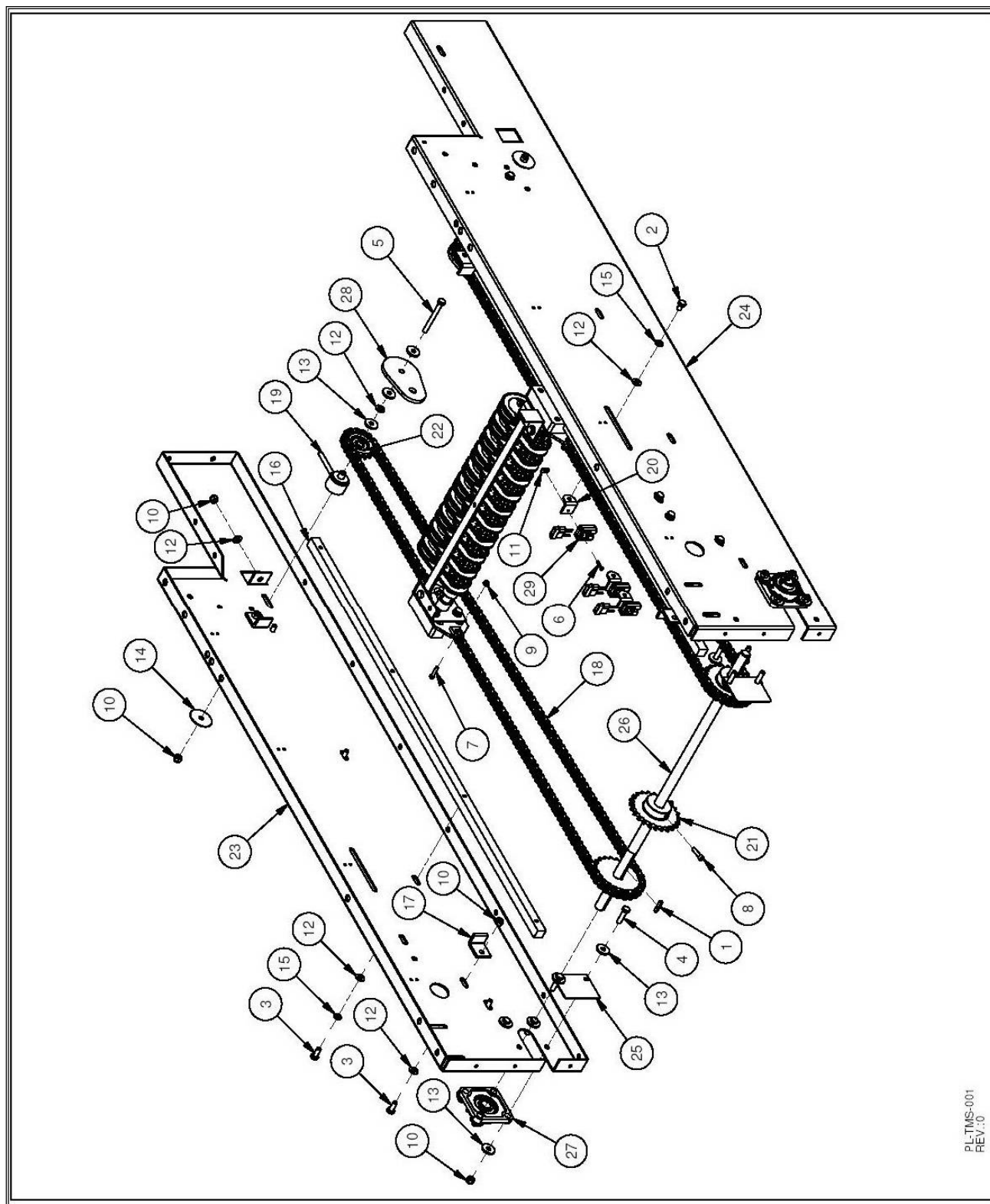


Main Components Parts List

Item	Part Number	Description
1	302-2410-00	KEY, 3/16 X 1
2	311-1100-00	MOTOR ASSEMBLY
3	7010-003118-062	5/16-18 X 5/8 HEX CAP SCREW
4	7010-003118-075	5/16-18 X 3/4 HEX CAP SCREW
5	7010-003118-100	5/16-18 X 1 HEX CAP SCREW
6	7010-003118-125	5/16-18 X 1-1/4 HEX CAP SCREW
7	7010-003118-150	5/16-18 X 1-1/2 HEX CAP SCREW
8	7010-003716-100	3/8-16 X 1 HEX CAP SCREW
9	7012-003118-075	5/16-18 X 3/4 CARRIAGE BOLT
10	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
11	7038-000632-000	6-32 HEX KEP NUT
12	7045-003118-037	5/16-18 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	PVC 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 HOLDER
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



Frame Assembly



Frame Assembly Parts List

Item	Part Number	Description
1	302-2410-00	KEY, 3/16 X 1
2	7010-003118-050	5/16-18 X 1/2 HEX CAP SCREW
3	7010-003118-075	5/16-18 X 3/4 HEX CAP SCREW
4	7010-003118-125	5/16-18 X 1-1/4 HEX CAP SCREW
5	7010-003118-300	5/16-18 X 3 HEX CAP SCREW
6	7016-410632-075	6-32 X 3/4 ROUND HEAD MACH SCREW
7	7018-001032-087	10-32 X 7/8 HEX CAP SCREW
8	7018-002520-087	1/4-20 X 7/8 HEX CAP SCREW
9	7036-001032-000	10-32 NYLON INSERT HEX NUT
10	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
11	7046-000632-006	6-32 X 1/16 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	TENSIONER
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

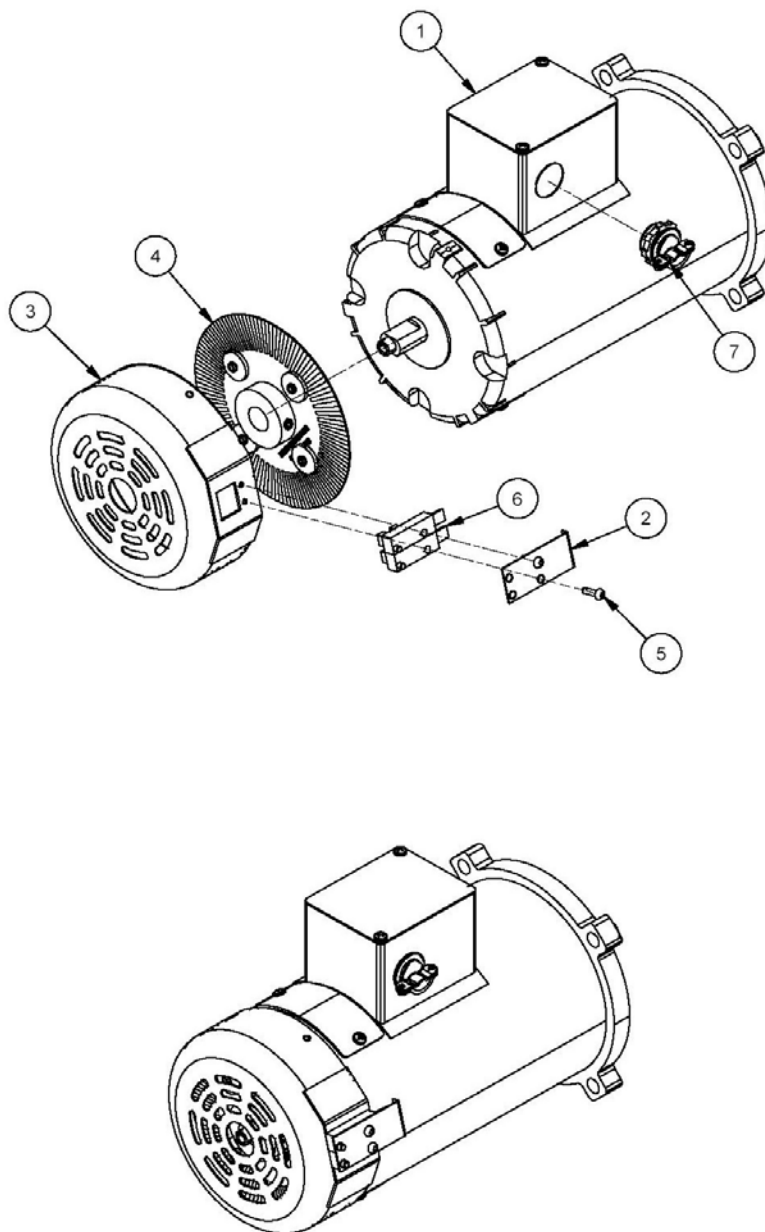


Drawbar Assembly Parts List

Item	Part Number	Description
1	7010-003118-062	5/16-18 X 5/8 HEX CAP SCREW
2	7010-003118-075	5/16-18 X 3/4 HEX CAP SCREW
3	7016-312520-100	1/4-20 X 1 FLAT HEAD MACH SCREW
4	7018-003118-075	5/16-18 X 3/4 HEX CAP SCREW
5	7034-003118-000	5/16-18 HEX NUT
6	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
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 & Encoder Assembly



311-1100-00
REV: 0

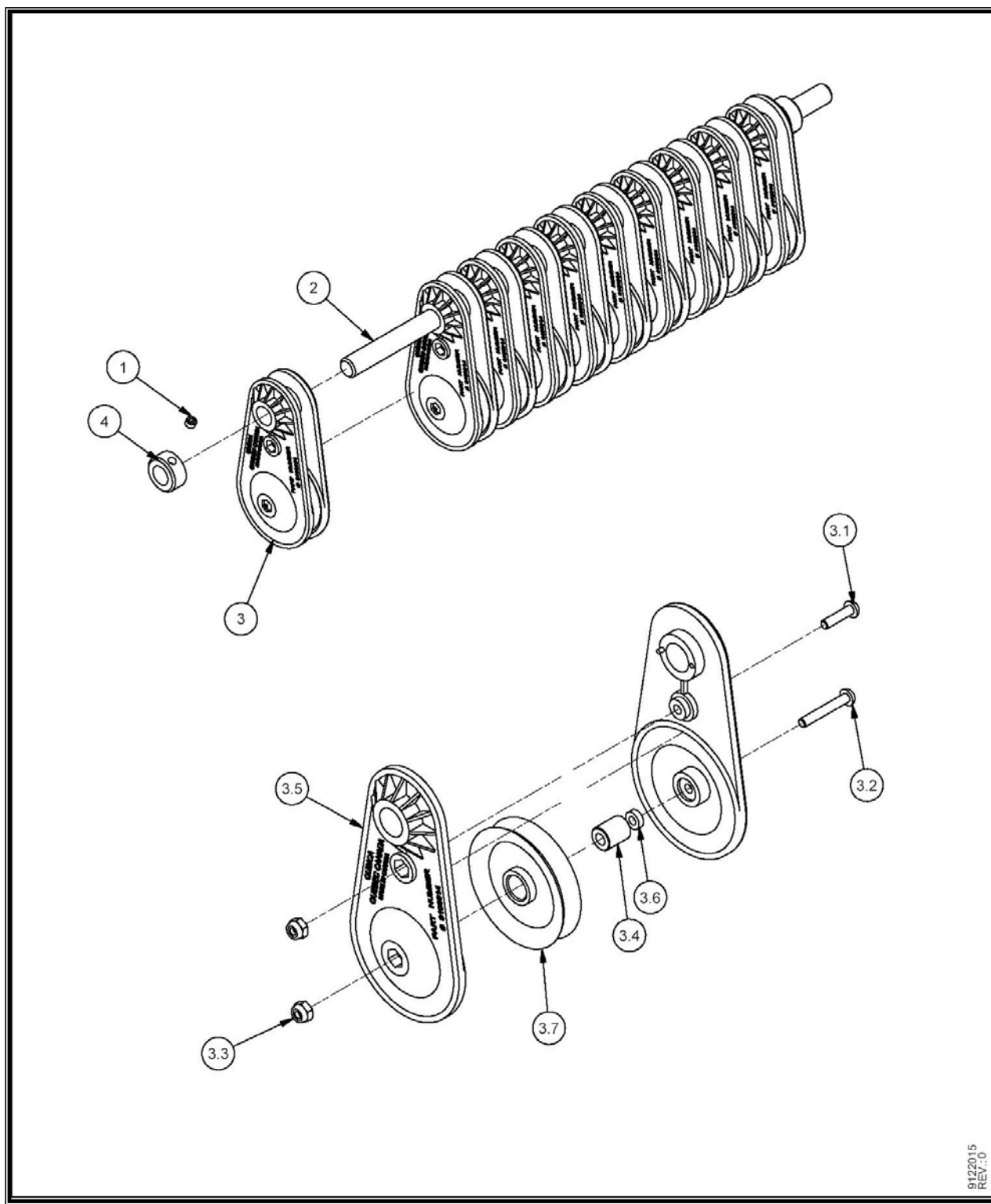


311-1100-00 DC Motor & Encoder Parts List

Item	Part Number	Description
1	301-1100-00	ELECTRIC MOTOR, 180 VDC, 3/4 HP
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	6-32 X 1/2 ROUND HEAD MACH SCREW
6	E-GP1A05	ENCODER OPTICAL SENSOR
7	E-THS3350	CABLE CLAMP



9122015 Drawbar Guide Assembly

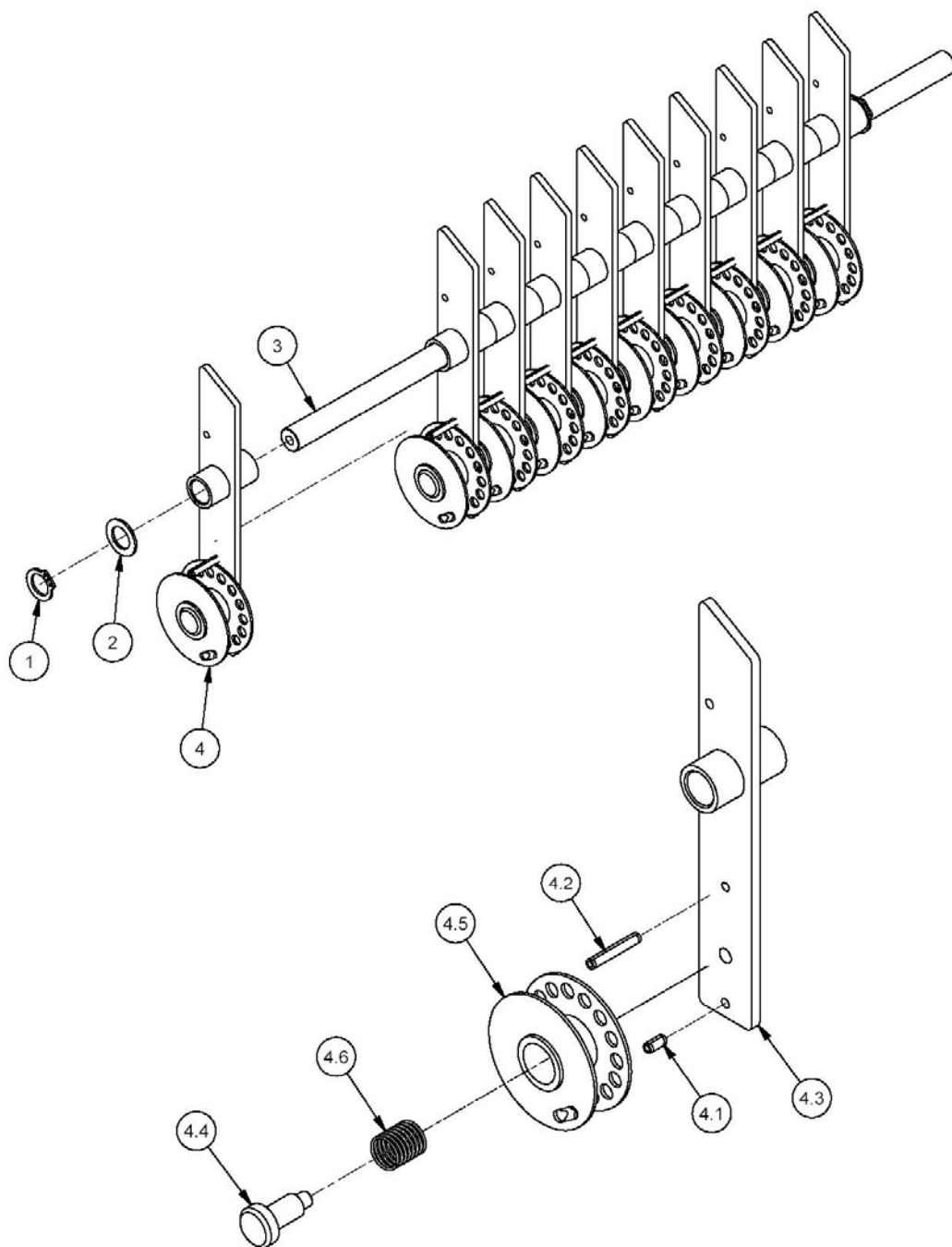


9122015 Drawbar Guide Assembly Parts List

Item	Part Number	Description
1	7014-003118-025	5/16-18 X 1/4 SET SCREW
2	9102015	DRAWBAR SHAFT
3	9133014	SHEAVE PLATE ASSEMBLY
3.1	7016-411032-075	10-32 X 3/4 ROUND HEAD MACH SCREW
3.2	7016-411032-125	10-32 X 1-1/4 ROUND HEAD MACH SCREW
3.3	7036-001032-000	10-32 NYLON INSERT HEX NUT
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
REV:0

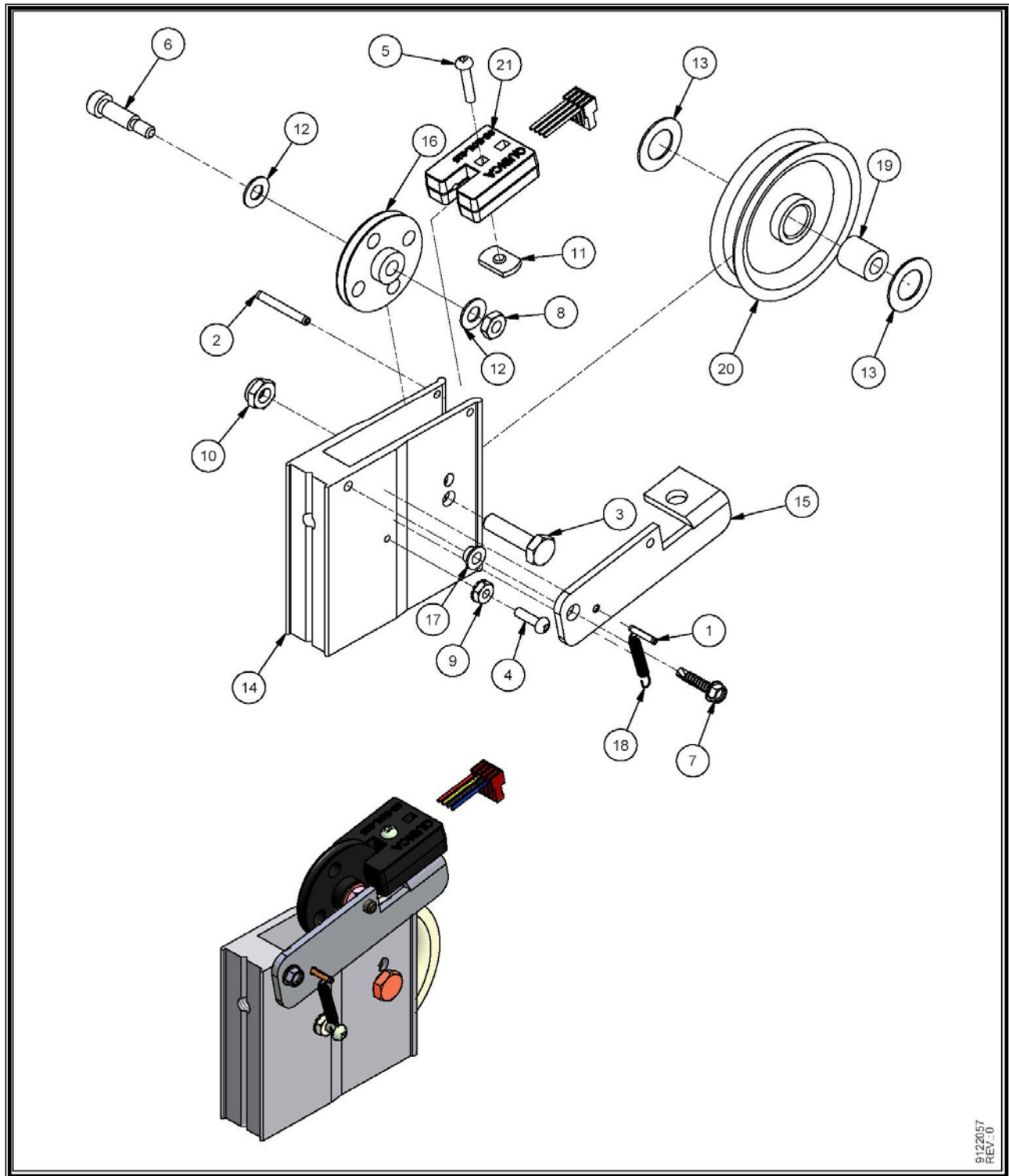


9122027 Reel Arm Assembly Parts List

Item	Part Number	Description
1	7002-710000-062	5/8 EXTERNAL RETAINING. 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



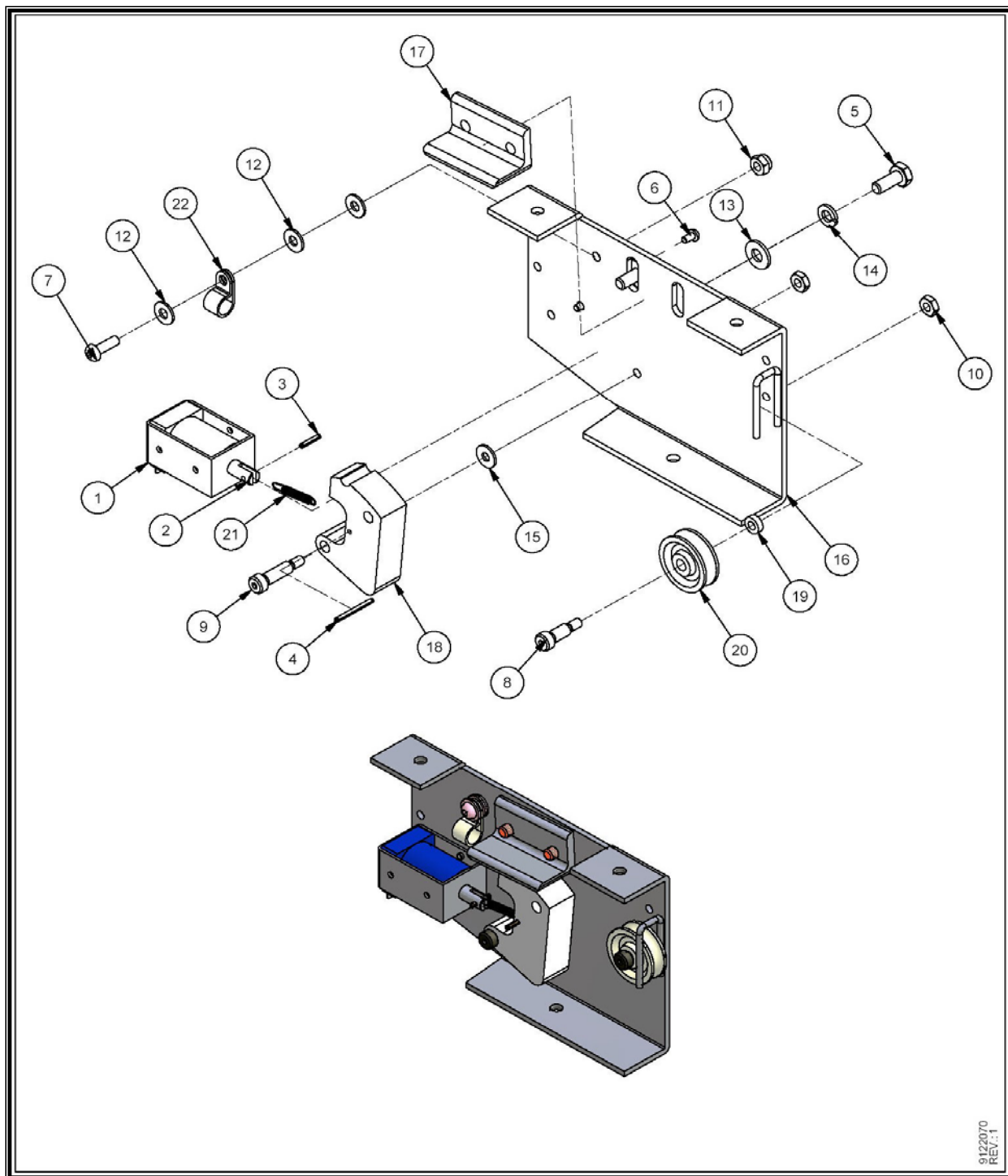
9122057
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9122057 Pulley Detection Assembly Parts List

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 X 1 HEX CAP SCREW
4	7016-410632-050	6-32 X 1/2 ROUND HEAD MACH SCREW
5	7016-410632-075	6-32 X 3/4 ROUND HEAD MACH SCREW
6	7020-002500-062	1/4 X 5/8 SHOULDER SCREW
7	7027-200818-075	8-18 X 3/4 HEX/WASHER HEAD TEC SCREW
8	7034-001024-000	10-24 HEX NUT
9	7038-000632-000	6-32 HEX KEP NUT
10	7044-002520-000	1/4-20 NYLON INSERT HEX NUT, THIN
11	7046-000632-006	6-32 X 1/16 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

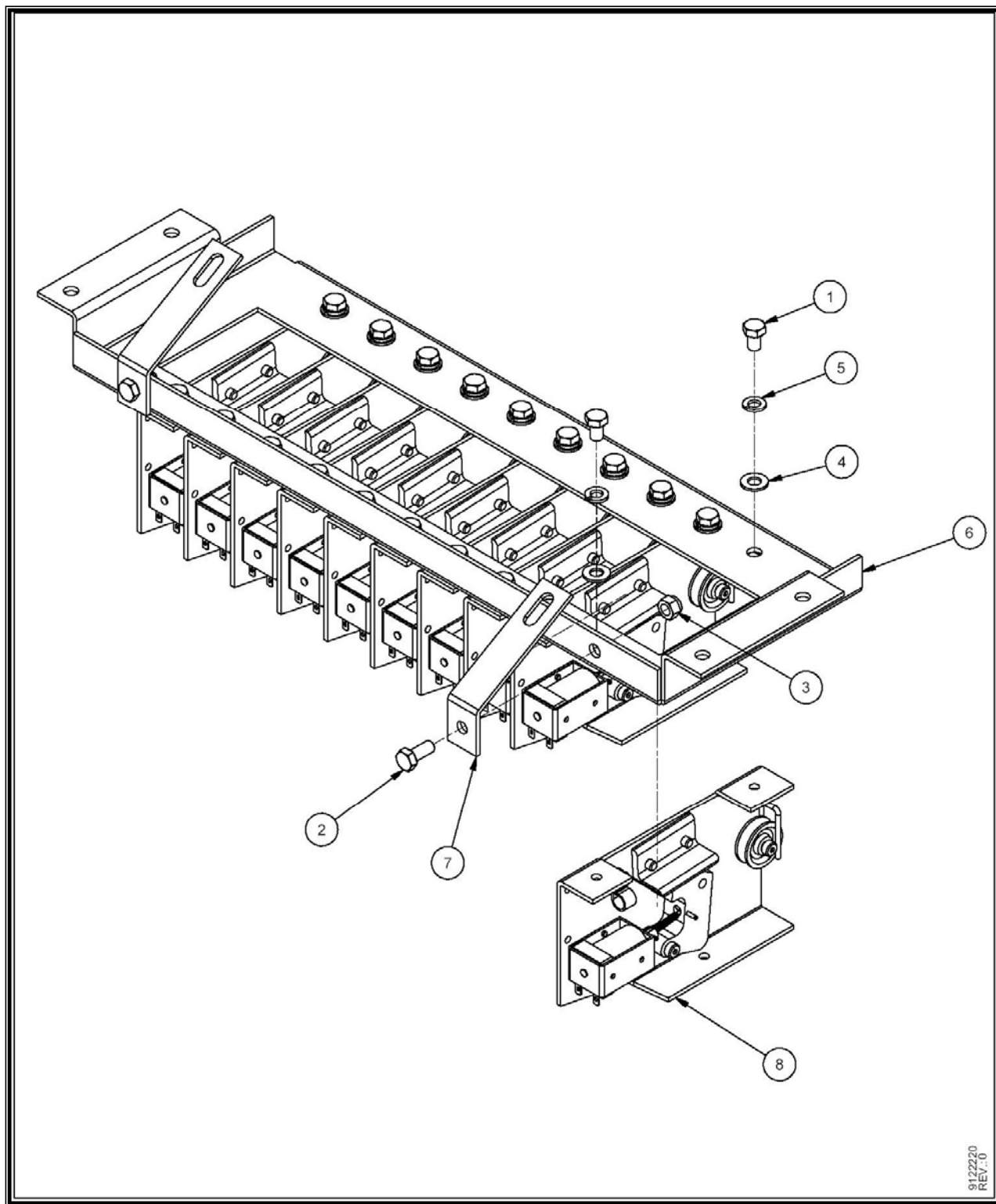


9122070 Pin Brake Parts List

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 X 5/8 HEX CAP SCREW
6	7016-410632-025	6-32 X 1/4 ROUND HEAD MACH SCREW
7	7016-411032-062	10-32 X 5/8 ROUND HEAD MACH SCREW
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 HEX NUT
11	7036-001032-000	10-32 NYLON INSERT HEX NUT
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

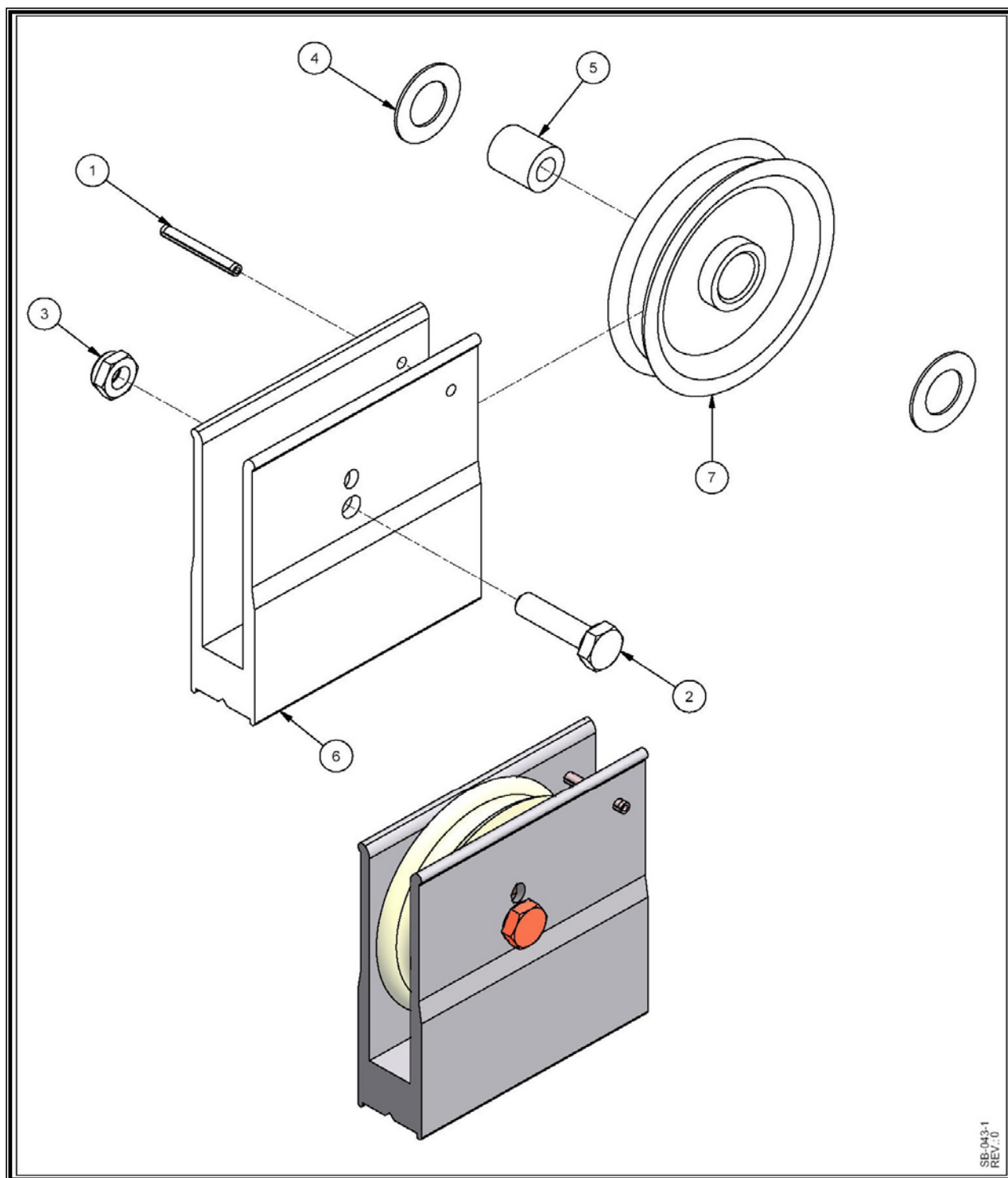


9122220 Pin Brake Assembly Parts List

Item	Part Number	Description
1	7010-003118-050	5/16-18 X 1/2 HEX CAP SCREW
2	7010-003118-075	5/16-18 X 3/4 HEX CAP SCREW
3	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
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

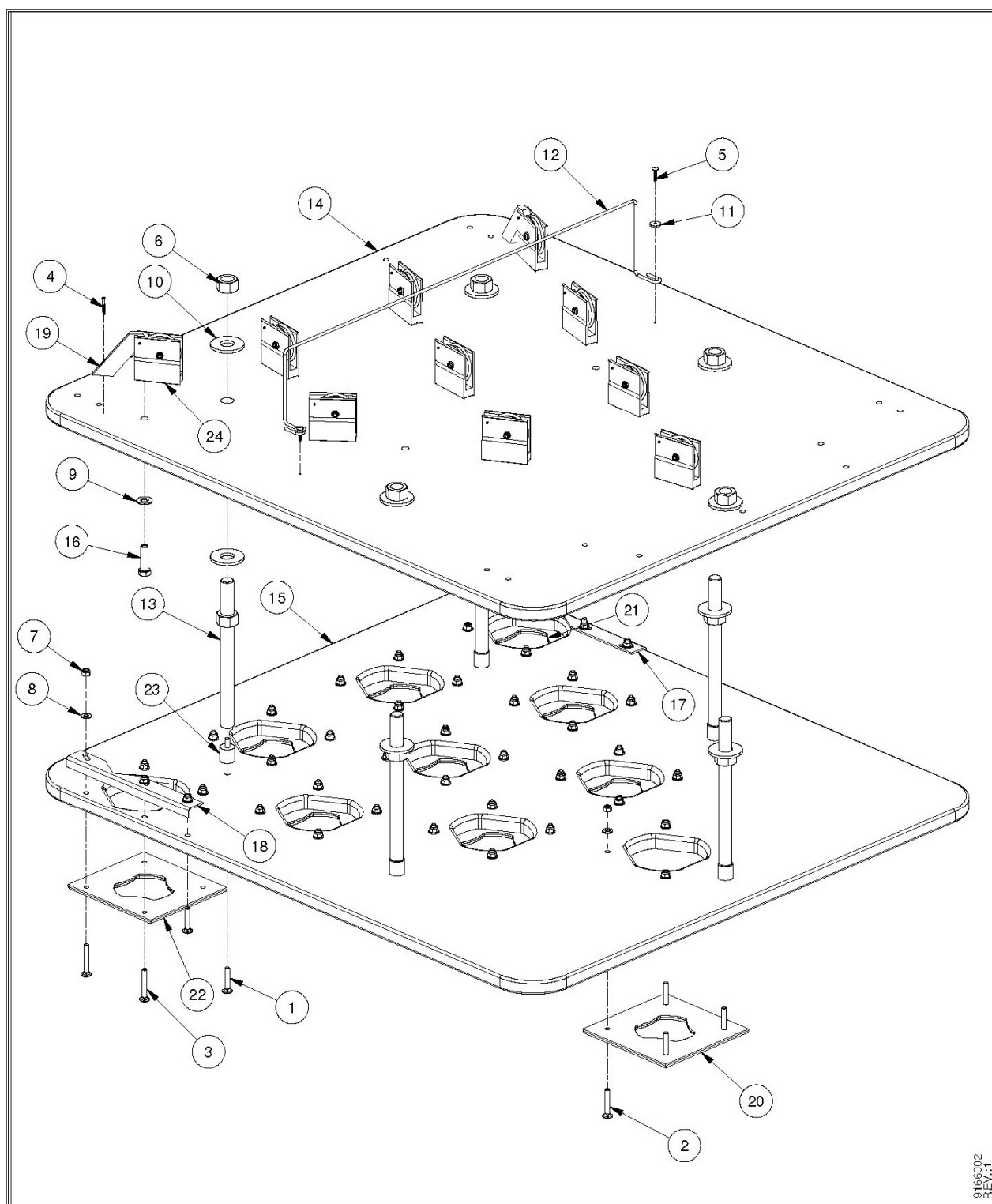


SB-043-01 Pulley Parts List

Item	Part Number	Description
1	7006-001200-100	SPRING PIN, 1/8 X 1
2	7010-002520-100	1/4-20 X 1 HEX CAP SCREW
3	7044-002520-000	1/4-20 NYLON INSERT HEX NUT, THIN
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, Duck Pin (ME-D03, ME-HD03)



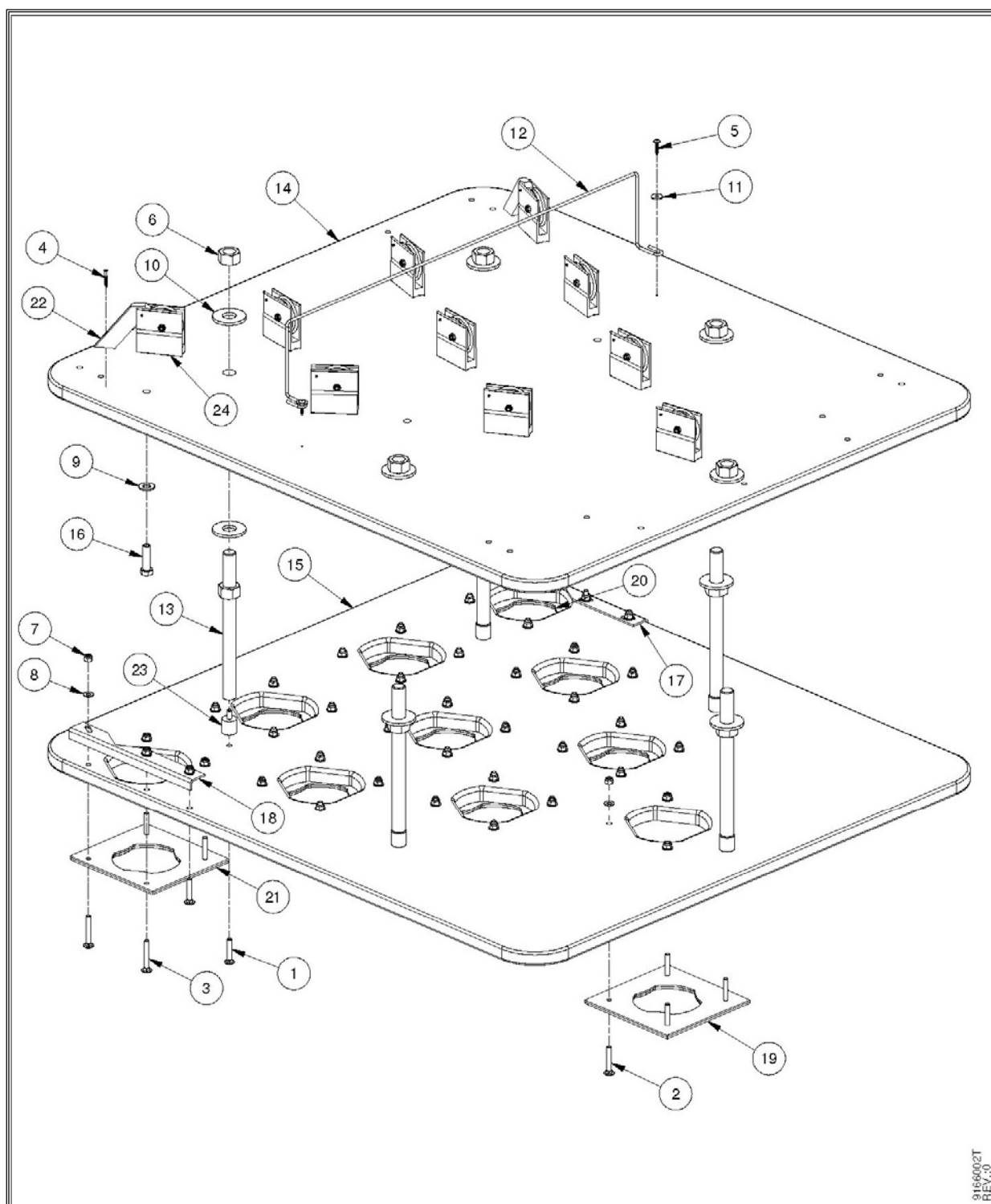
9166002
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9166002 Stabilizer Parts List (ME-D03, ME-HD03)

Item	Part Number	Description
1	7012-003118-150	5/16-18 X 1-1/2 CARRIAGE BOLT
2	7012-003118-175	5/16-18 X 1-3/4 CARRIAGE BOLT
3	7012-003118-200	5/16-18 X 2 CARRIAGE BOLT
4	7022-310600-125	#6 X 1-1/4 FLAT HEAD WOOD SCREW
5	7024-711000-100	#10 X 1 SELF-TAPPING SCREW
6	7034-008709-000	7/8-9 HEX NUT
7	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
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 REINFORCEMENT, RIGHT
18	M-0680-32-7	BASE PLATE REINFORCEMENT, 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 SHEAVE



9166002T Stabilizer, Ten Pin (ME-T03)



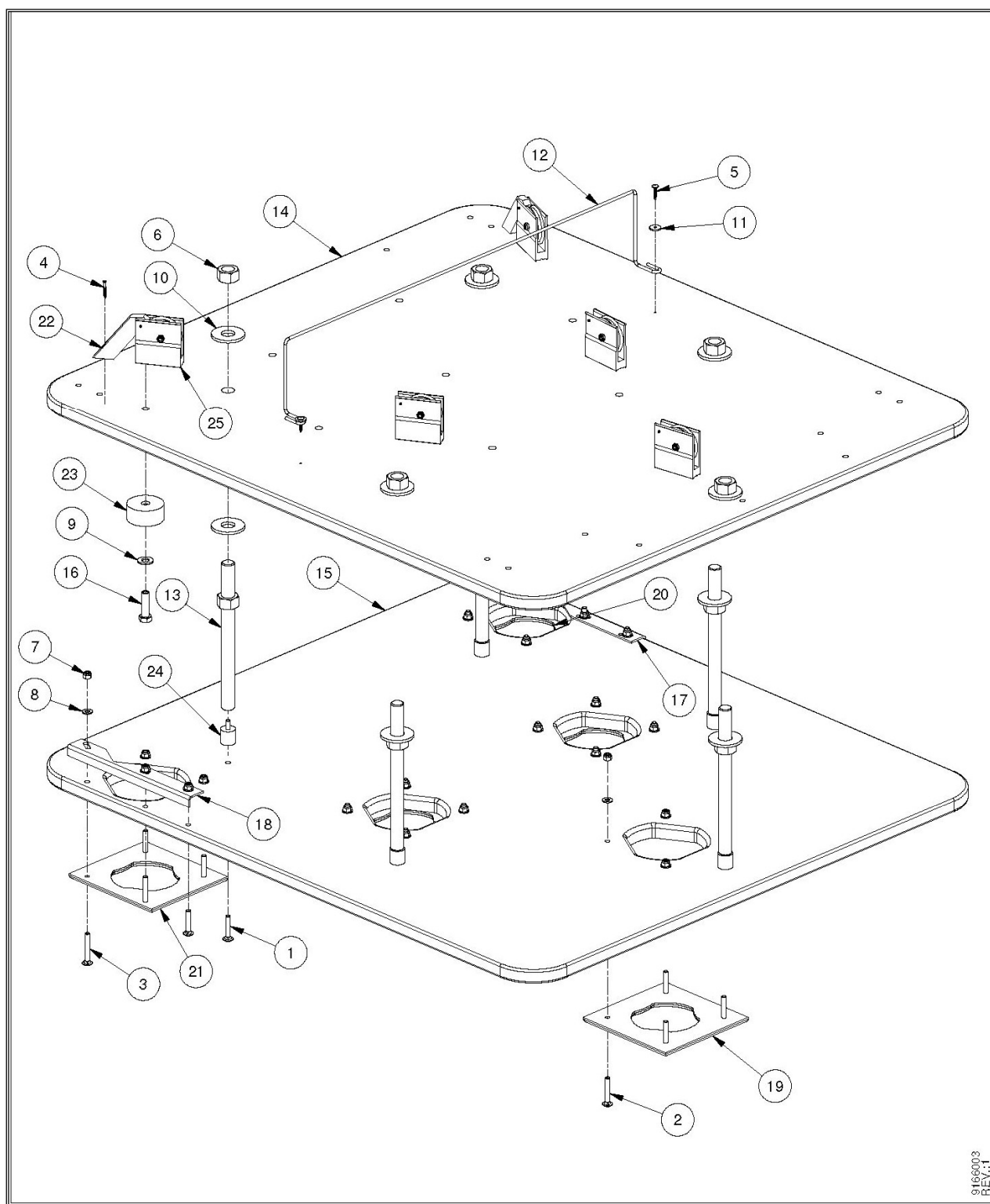
9166002T
REV.0

9166002T Stabilizer Part List (ME-T03)

Item	Part Number	Description
1	7012-003118-150	5/16-18 X 1-1/2 CARRIAGE BOLT
2	7012-003118-175	5/16-18 X 1-3/4 CARRIAGE BOLT
3	7012-003118-200	5/16-18 X 2 CARRIAGE BOLT
4	7022-310600-125	#6 X 1-1/4 FLAT HEAD WOOD SCREW
5	7024-711000-100	#10 X 1 SELF-TAPPING SCREW
6	7034-008709-000	7/8-9 HEX NUT
7	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
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 REINFORCEMENT, RIGHT
18	M-0680-32-7	BASE PLATE REINFORCEMENT, 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 SHEAVE



9166003 Stabilizer, Five Pin (ME-F03)



9166003
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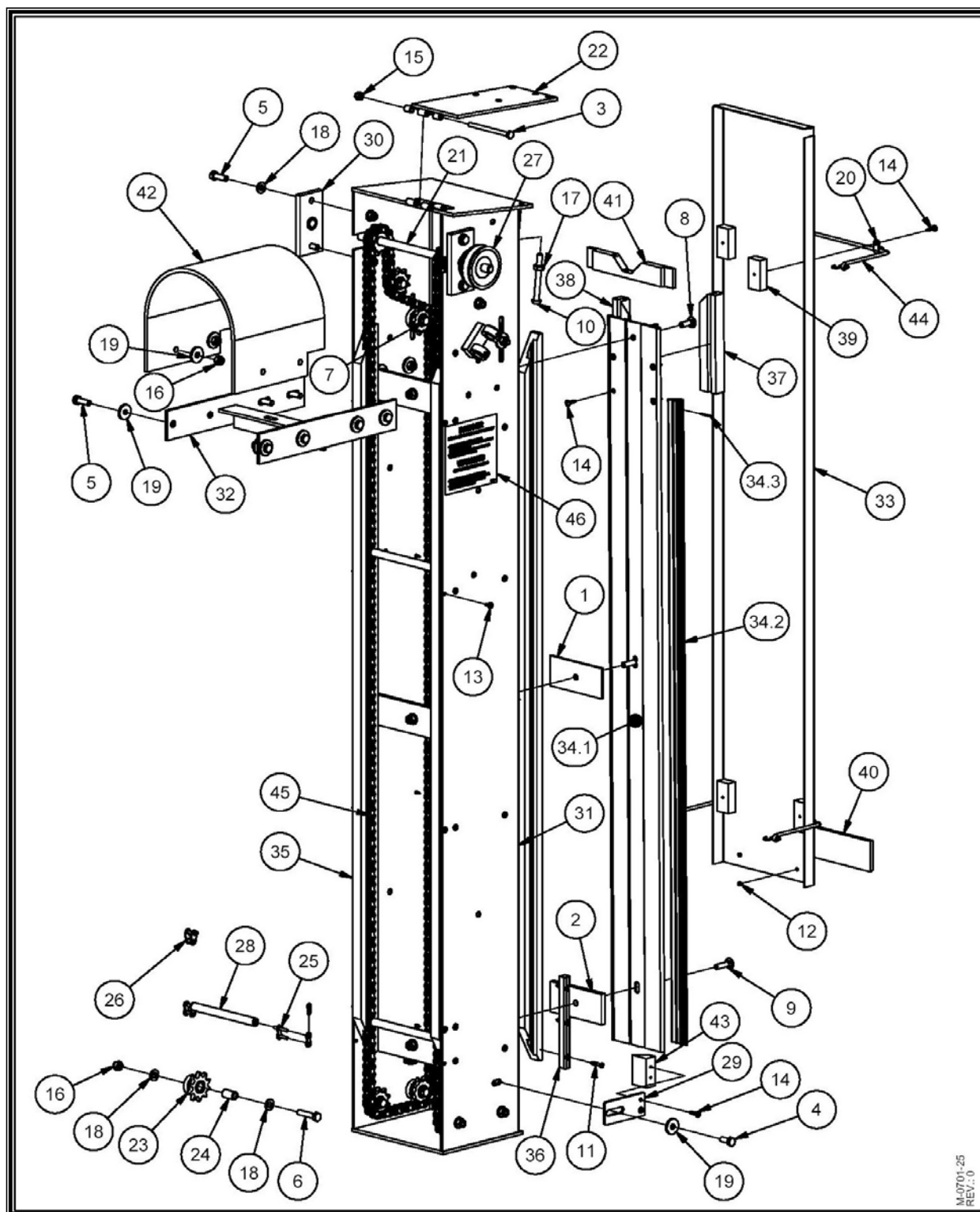
9166003 Stabilizer Parts List (ME-F03)

Item	Part Number	Description
1	7012-003118-150	5/16-18 X 1-1/2 CARRIAGE BOLT
2	7012-003118-175	5/16-18 X 1-3/4 CARRIAGE BOLT
3	7012-003118-200	5/16-18 X 2 CARRIAGE BOLT
4	7022-310600-125	#6 X 1-1/4 FLAT HEAD WOOD SCREW
5	7024-711000-100	#10 X 1 SELF-TAPPING SCREW
6	7034-008709-000	7/8-9 HEX NUT
7	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
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 REINFORCEMENT, RIGHT
18	M-0680-32-7	BASE PLATE REINFORCEMENT, 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 SHEAVE



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

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



Rear Ball Lift Parts 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 X 3-1/2 HEX CAP SCREW
4	7010-003118-075	5/16-18 X 3/4 HEX CAP SCREW
5	7010-003118-100	5/16-18 X 1 HEX CAP SCREW
6	7010-003118-150	5/16-18 X 1-1/2 HEX CAP SCREW
7	7010-003118-175	5/16-18 X 1-3/4 HEX CAP SCREW
8	7012-003118-075	5/16-18 X 3/4 CARRIAGE BOLT
9	7012-003118-100	5/16-18 X 1 CARRIAGE BOLT
10	7016-413118-300	5/16-18 X 3 ROUND HEAD MACH SCREW
11	7022-310800-100	#8 X 1 FLAT HEAD WOOD SCREW
12	7024-610600-025	#6 X 1/4 SELF-TAPPING SCREW
13	7024-710800-050	#8 X 1/2 SELF-TAPPING SCREW
14	7024-710800-075	#8 X 3/4 SELF-TAPPING SCREW
15	7036-002520-000	1/4-20 NYLON INSERT HEX NUT
16	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
17	7038-003118-000	5/16-18 HEX KEP 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	CAROUSEL 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



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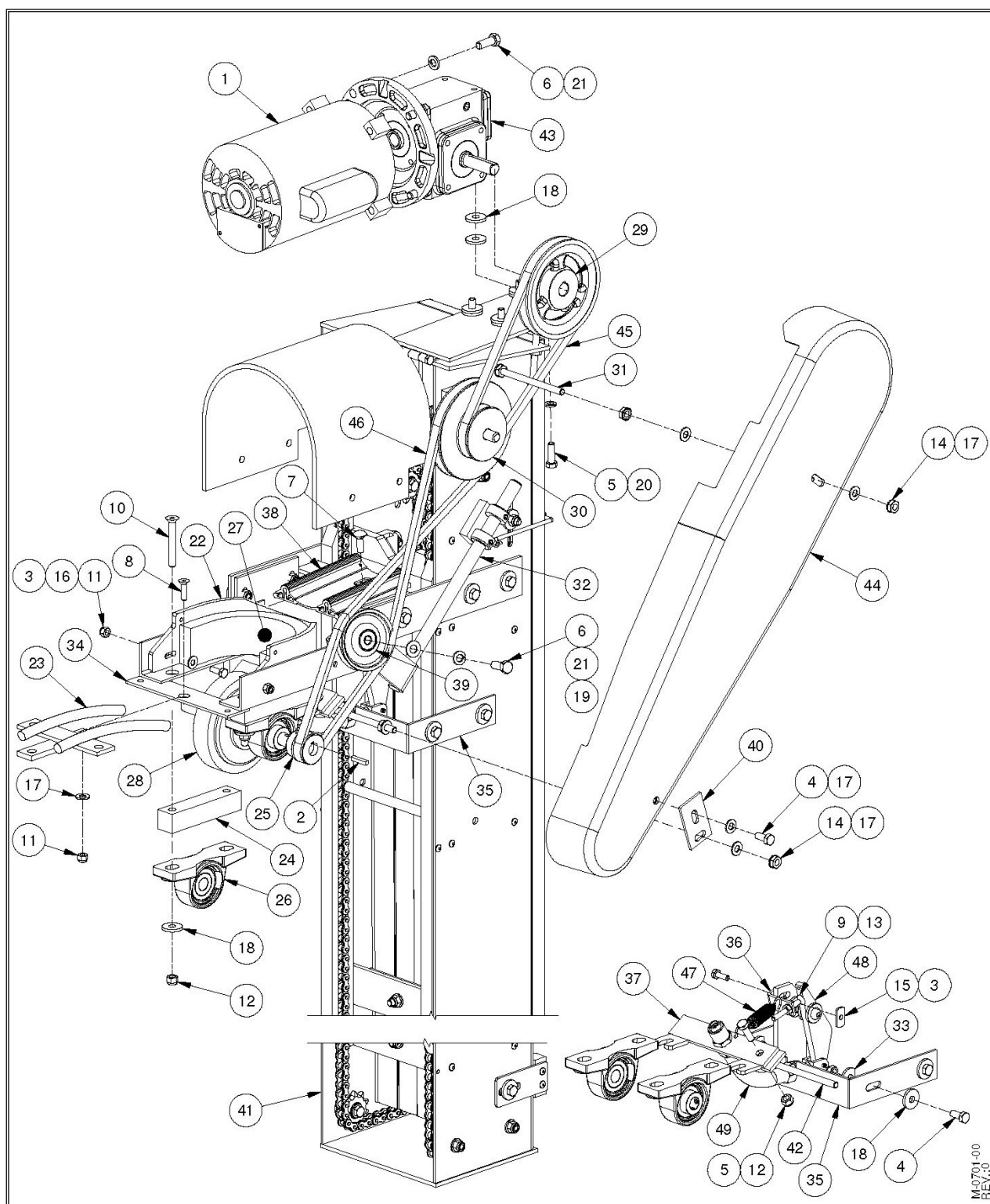
Rear Ball Lift Part List M-0701-25
(ME-B03, ME-D03, ME-F03, ME-HD03)

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)



M-0701-00
REV:0



Rear Ball Lift Parts 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 HP
2	302-2410-00	KEY, 3/16 X 1
3	7010-002520-075	1/4-20 X 3/4 HEX CAP SCREW
4	7010-003118-075	5/16-18 X 3/4 HEX CAP SCREW
5	7010-003118-100	5/16-18 X 1 HEX CAP SCREW
6	7010-003716-100	3/8-16 X 1 HEX CAP SCREW
7	7012-003118-075	5/16-18 X 3/4 CARRIAGE BOLT
8	7016-312520-100	1/4-20 X 1 FLAT HEAD MACH SCREW
9	7016-312520-200	1/4-20 X 2 FLAT HEAD MACH SCREW
10	7016-313118-250	5/16-18 X 2-1/2 FLAT HEAD MACH SCREW
11	7036-002520-000	1/4-20 NYLON INSERT HEX NUT
12	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
13	7038-002520-000	1/4-20 HEX KEP NUT
14	7038-003118-000	5/16-18 HEX KEP NUT
15	7046-002520-000	1/4-20 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 MACH, 1.5 X 5/8
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, MACH, 5.0 X 5/8
30	M-0700-24	DOUBLE PULLEY
31	M-0700-29	THREADED ROD
32	M-0700-33	TENSIONER BRACKET
33	M-0700-34	STOPPER



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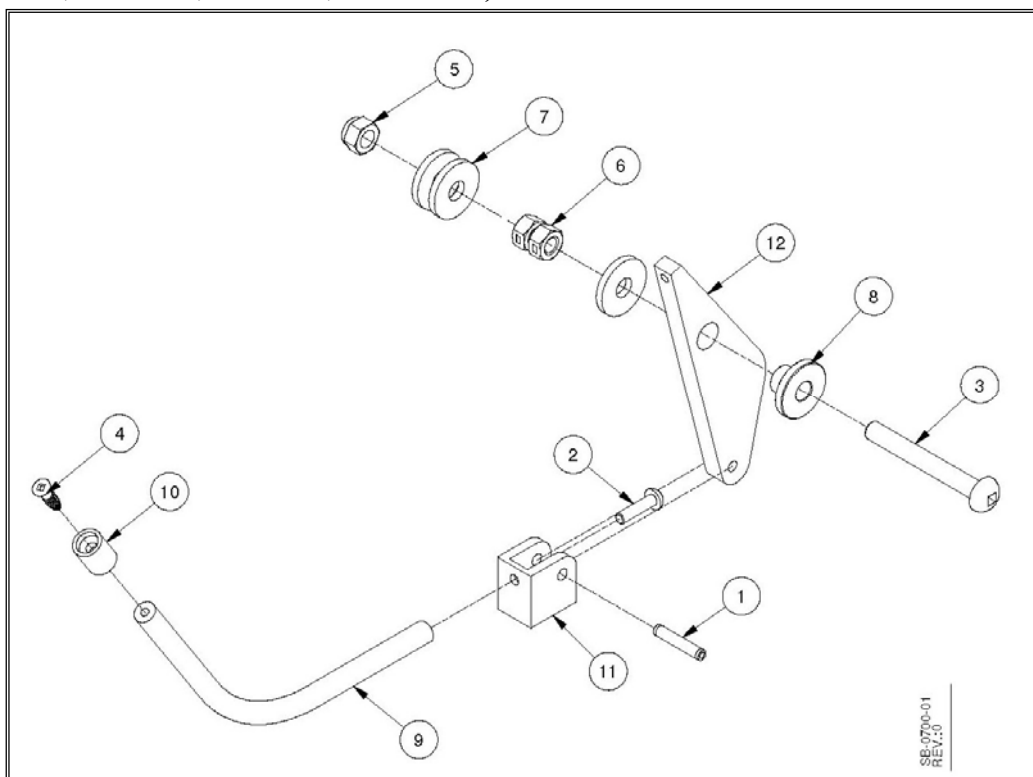
Rear Ball Lift Part List M-0701-00
(ME-B03, ME-D03, ME-F03, ME-HD03)

Item	Part Number	Description
34	M-0700-35	BALL POLISHER FRAME
35	M-0700-36	BASE FRAME PUSHER
36	M-0700-37	ADJUSTMENT BRACKET
37	M-0700-38	PUSHER SUPPORT
38	M-0700-39	BALL TRACK, EXIT
39	M-0700-70	TENSIONER 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

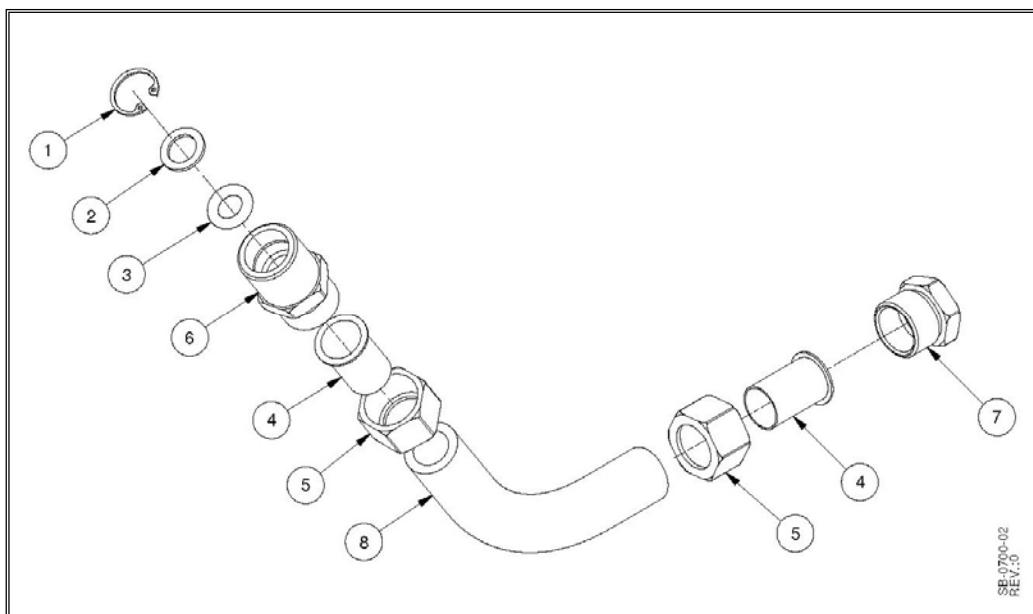


Ball Pusher Assembly SB-0700-01

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



P-700-64 Part Details



Ball Pusher Parts 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 X 3/4 ROUND HEAD MACH SCREW
3	7016-413118-250	5/16-18 X 2-1/2 ROUND HEAD MACH SCREW
4	7022-310800-075	#8 X 3/4 FLAT HEAD WOOD SCREW
5	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
6	7040-003118-000	5/16-18 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

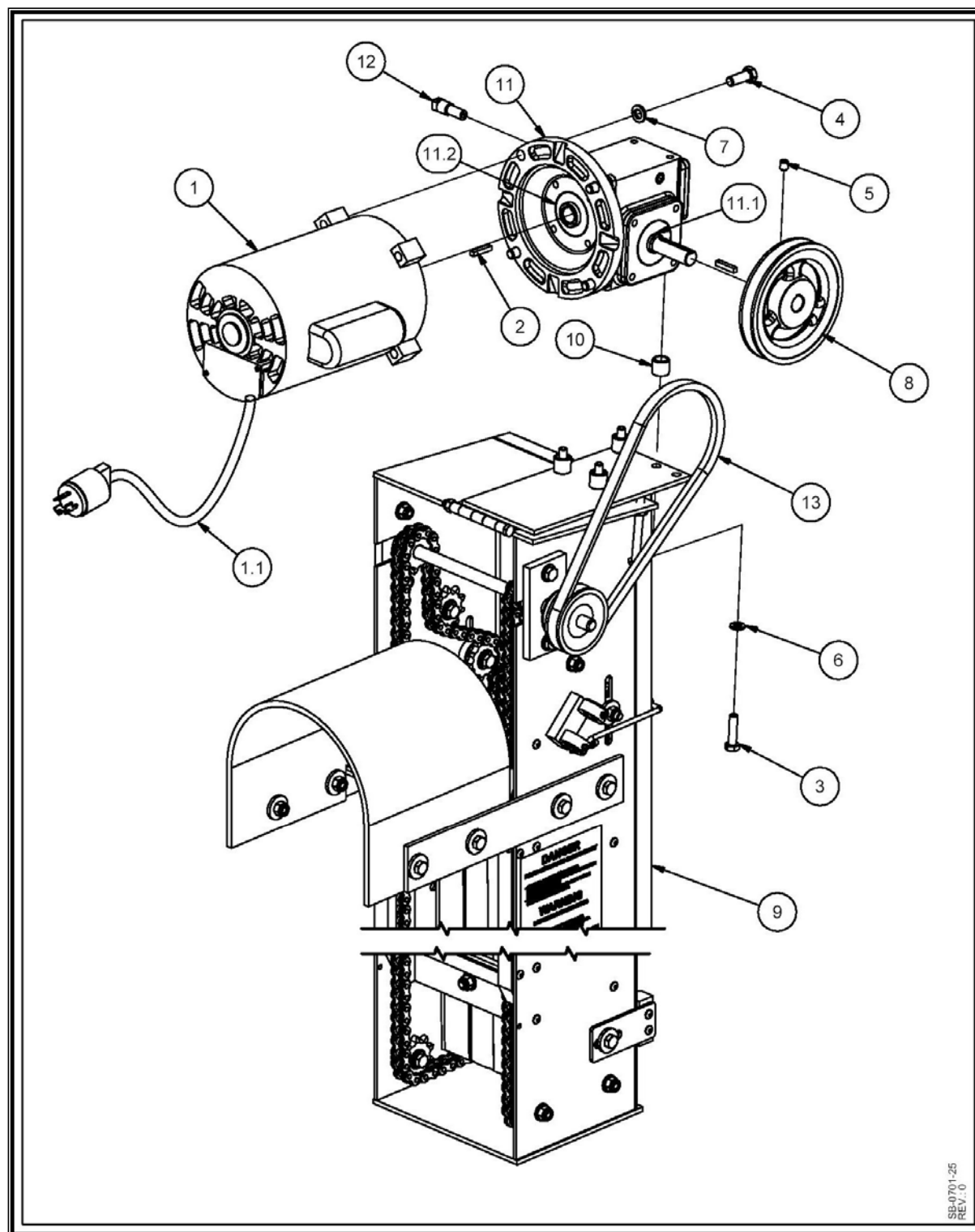
P-700-64 Parts List

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)



SB-0701-25
REV. 0

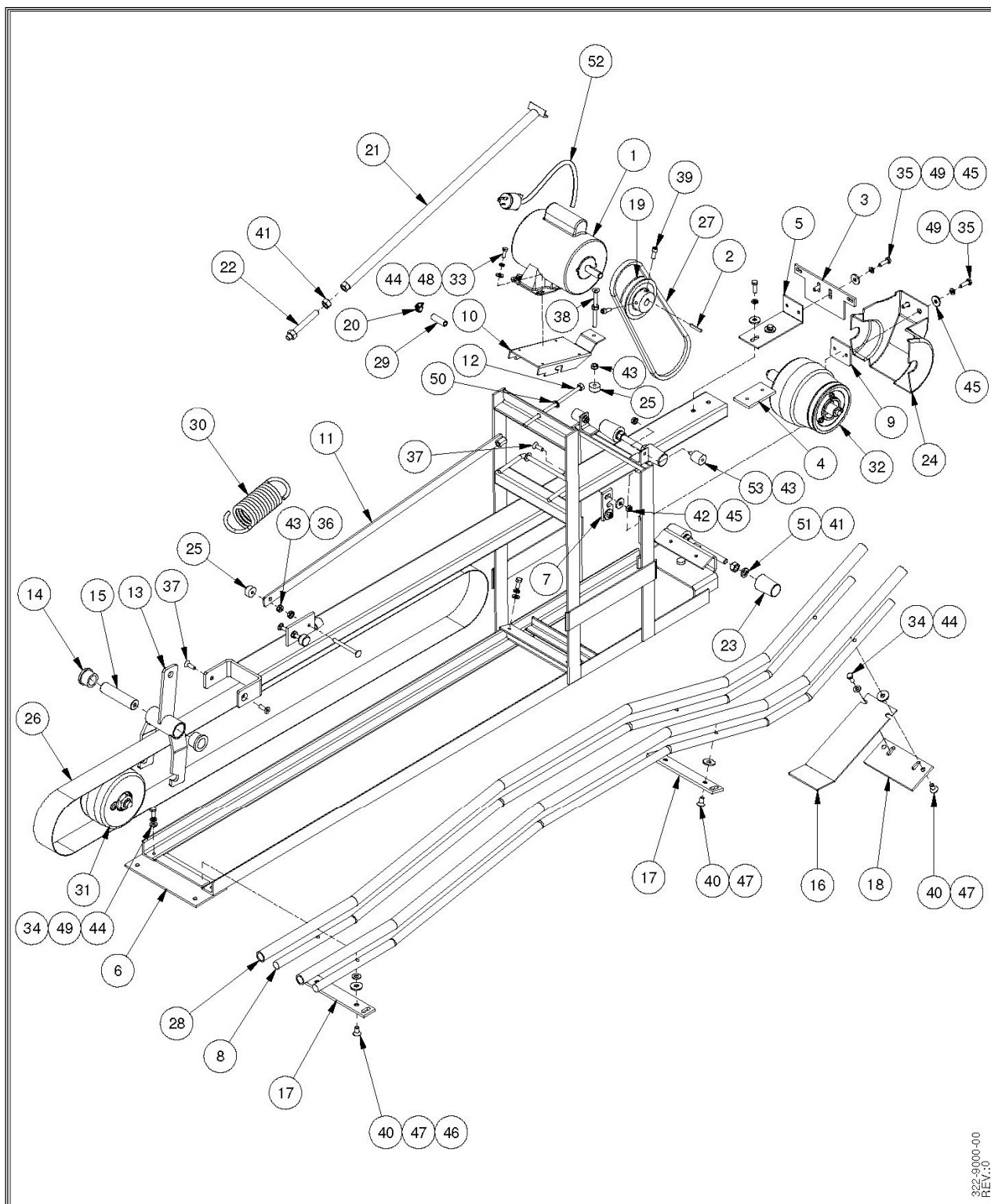


Rear Ball Lift Motor Parts List SB-0701-25 **(ME-B03, ME-D03, ME-F03, ME-HD03)**

Item	Part Number	Description
1	301-1200-00	ELECTRIC MOTOR, 208/230 VAC, 1/2 HP
1.1	EC-090-250	MOTOR POWER SUPPLY CABLE
2	302-2410-00	KEY, 3/16 X 1
3	7010-003118-125	5/16-18 X 1-1/4 HEX CAP SCREW
4	7010-003716-100	3/8-16 X 1 HEX CAP SCREW
5	7014-003118-037	5/16-18 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, MACH, 5.0 X 5/8
9	M-0701-25	BALL LIFT ASS'Y
10	M-0880-19	SLEEVE BUSHING
11	M-BMQ1133-3	MOTOR REDUCER
11.1	M-BMQ1133-17	OUTPUT SEAL
11.2	M-BMQ1133-18	INPUT SEAL
12	P-1133-3	REDUCER VENT
13	R-0700-01	V-BELT



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



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

Item	Part Number	Description
1	301-1300-00	ACCELERATOR MOTOR, 208/230 VAC
2	302-2430-00	KEY, 3/16
3	302-6560-00	OPTO SUPPORT
4	302-6565-00	MOUNTING PLATE
5	302-6570-00	MOUNTING PLATE
6	302-9000-00	ACCELERATOR 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	ATTACHMENT 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 ROD
23	303-6530-00	BALL DOOR STOPPER
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 ASS'Y
32	333-9140-01	DRIVE WHEEL ASS'Y
33	7010-002520-075	1/4-20 X 3/4 HEX CAP SCREW



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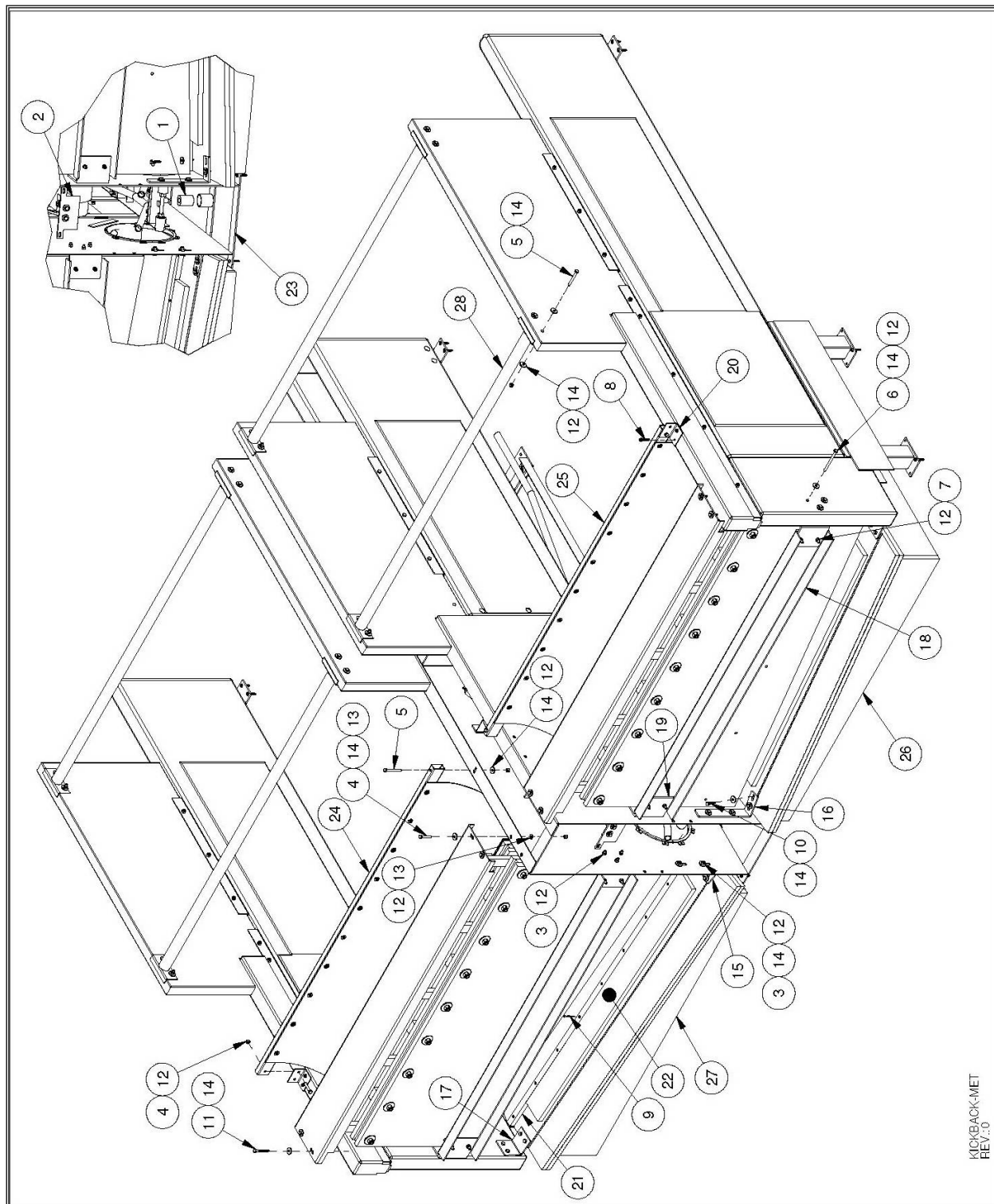


Ball Accelerator Parts List 322-9000-00 (ME-T03)

Item	Part Number	Description
34	7010-003118-075	5/16-18 X 3/4 HEX CAP SCREW
35	7010-003118-100	5/16-18 X 1 HEX CAP SCREW
36	7012-003118-300	5/16-18 X 3 CARRIAGE BOLT
37	7016-313118-100	5/16-18 X 1 FLAT HEAD MACH SCREW
38	7016-313118-400	5/16-18 X 4 FLAT HEAD MACH SCREW
39	7018-003118-075	5/16-18 X 3/4 HEX CAP SCREW
40	7018-303716-075	3/8-16 X 3/4 FLAT HEAD MACH SCREW
41	7034-005013-000	1/2-13 HEX NUT
42	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
43	7038-003118-000	5/16-18 HEX KEP 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, Ten Pin (ME-T03)

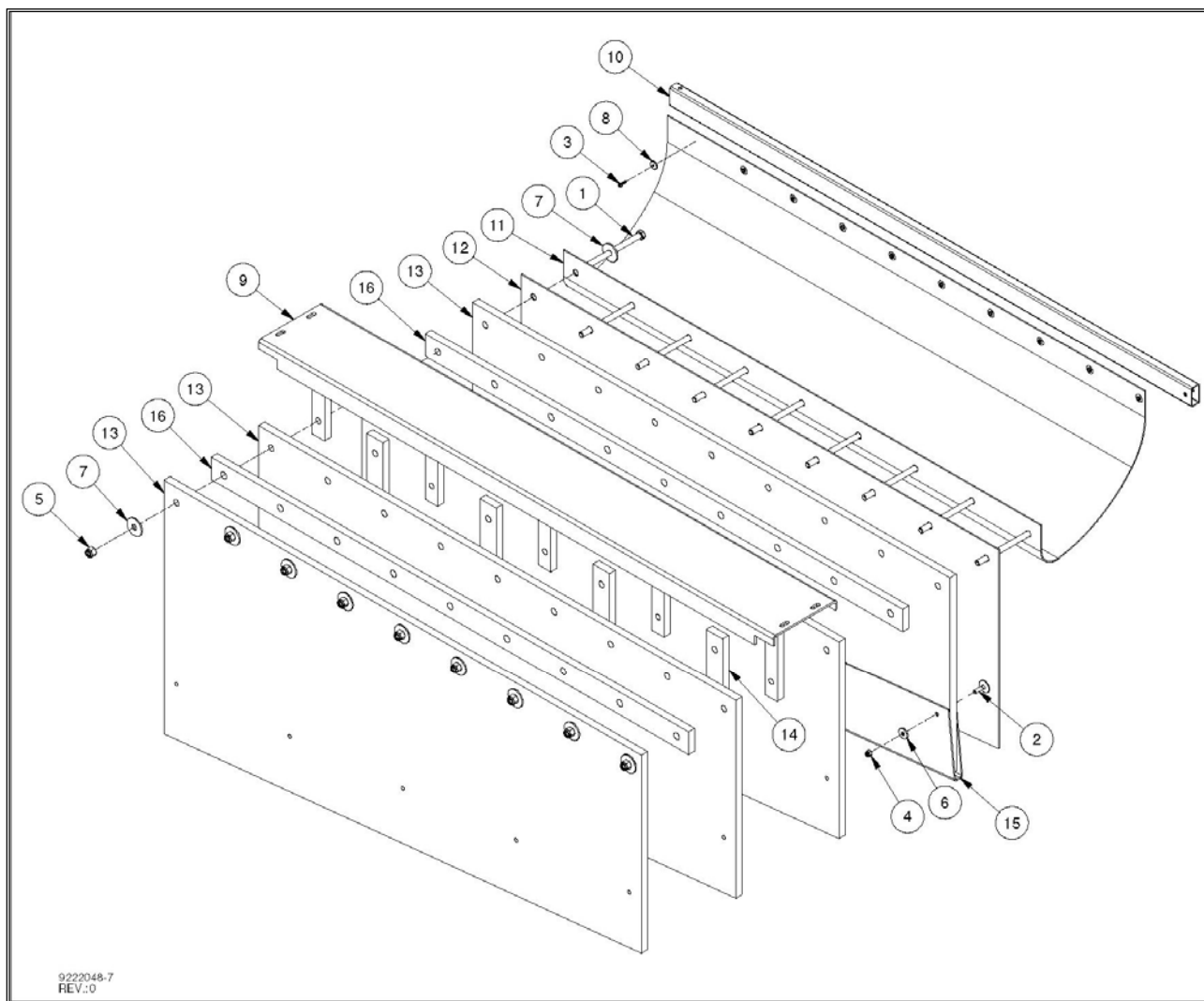


Pit Assembly Parts List (ME-T03)

Item	Part Number	Description
1	304-9030-00	POSITIONING TUBE
2	322-9000-00	BALL ACCELERATOR ASS'Y
3	7010-003118-100	5/16-18 X 1 HEX CAP SCREW
4	7010-003118-175	5/16-18 X 1-3/4 HEX CAP SCREW
5	7010-003118-275	5/16-18 X 2-3/4 HEX CAP SCREW
6	7010-003118-400	5/16-18 X 4 HEX CAP SCREW
7	7012-003118-100	5/16-18 X 1 CARRIAGE BOLT
8	7024-201400-150	14-10 X 1-1/2 HEX/WASHER HEAD SELF-TAPPING SCREW
9	7026-310800-200	#8 X 2 SELF-DRILLING FLAT HEAD SCREW
10	7028-003100-150	5/16 X 1-1/2 LAG SCREW
11	7028-003100-250	5/16 X 2-1/2 LAG SCREW
12	7036-003118-000	5/16-18 NYLON INSERT HEX 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	9202043	PIT HOLDING BRACKET, LEFT
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 ASS'Y
24	9222048-4	CUSHION ASSEMBLY, RIGHT
25	9222048-7	CUSHION ASSEMBLY, LEFT
26	9266051	PIT FLOOR, LANE 1
27	9266052	PIT FLOOR, LANE 2
28	M-0376	MAIN CROSS SUPPORT



Cushion Assembly, Ten Pin 9222048-7 (ME-T03)

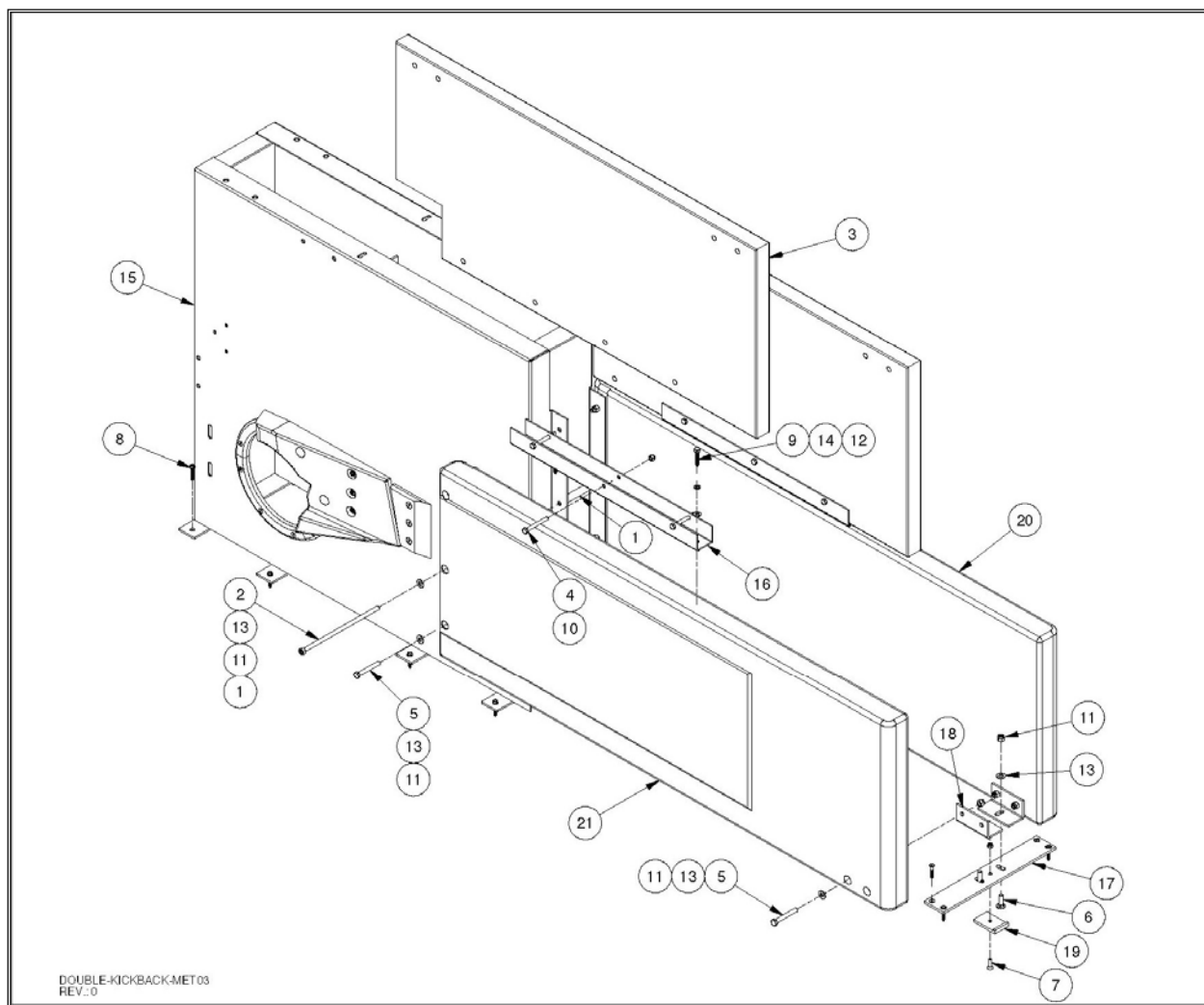


Ten Pin Cushion Assembly Parts List 9222048-7 (ME-T03)

Item	Part Number	Description
1	7010-005013-650	1/2-13 X 6-1/2 HEX CAP SCREW
2	7013-003118-125	5/16-18 X 1-1/4 ELEVATOR BOLT
3	7027-201016-075	#10-16 X 3/4 HEX/WASHER HEAD TEC SCREW
4	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
5	7036-005013-000	1/2-13 NYLON INSERT HEX NUT
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)

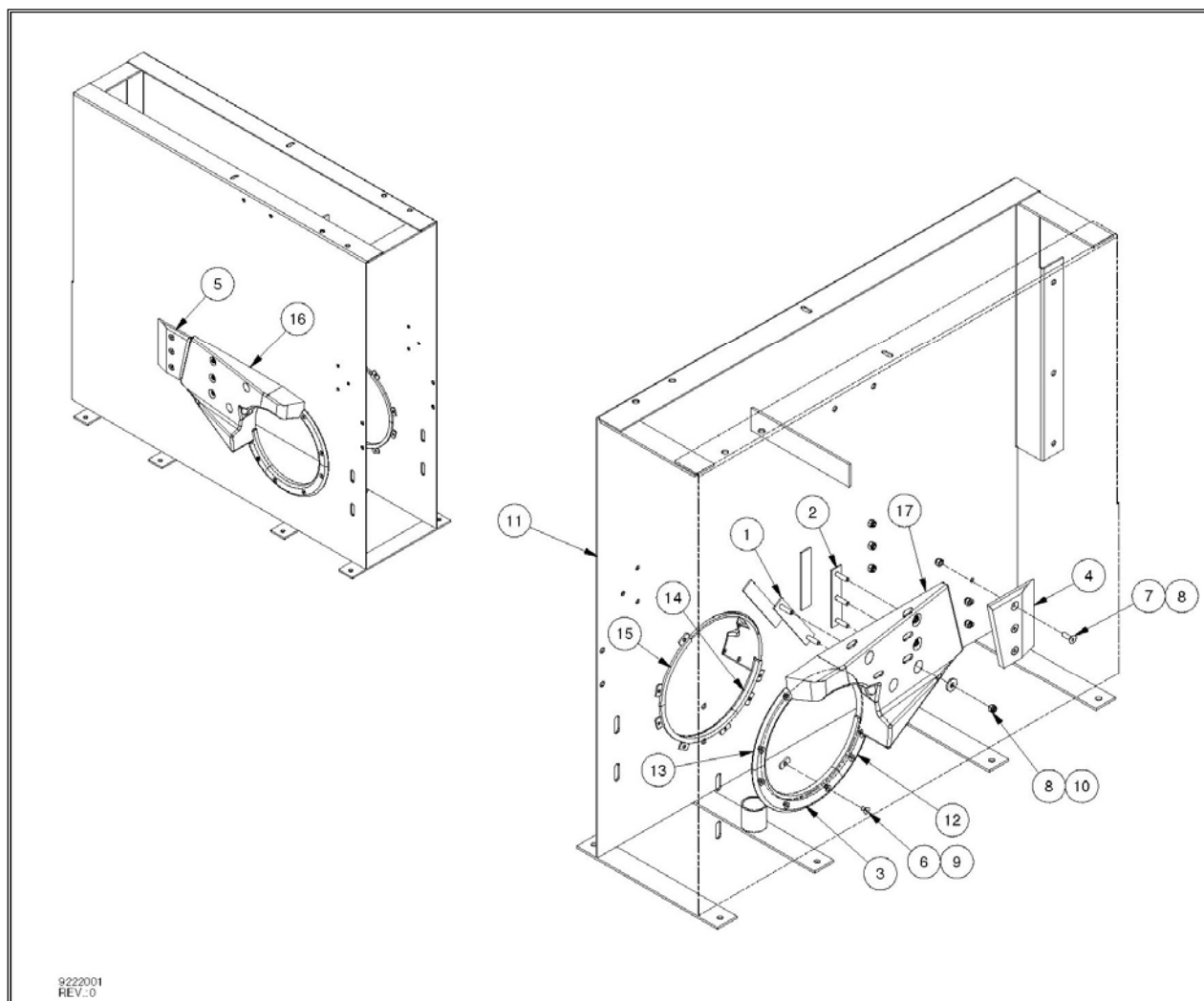


Double Kickback Parts list (ME-T03)

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 X 2-3/4 HEX CAP SCREW
5	7010-003716-275	3/8-16 X 2-3/4 HEX CAP SCREW
6	7012-003716-100	3/8-16 X 1 CARRIAGE BOLT
7	7016-312520-100	1/4-20 X 1 FLAT HEAD MACH SCREW
8	7024-201400-150	14-10 X 1-1/2 HEX/WASHER HEAD SELF-TAPPING SCREW
9	7028-003100-175	5/16 X 1-3/4 LAG SCREW
10	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
11	7036-003716-000	3/8-16 NYLON INSERT HEX NUT
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 ASS'Y
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)

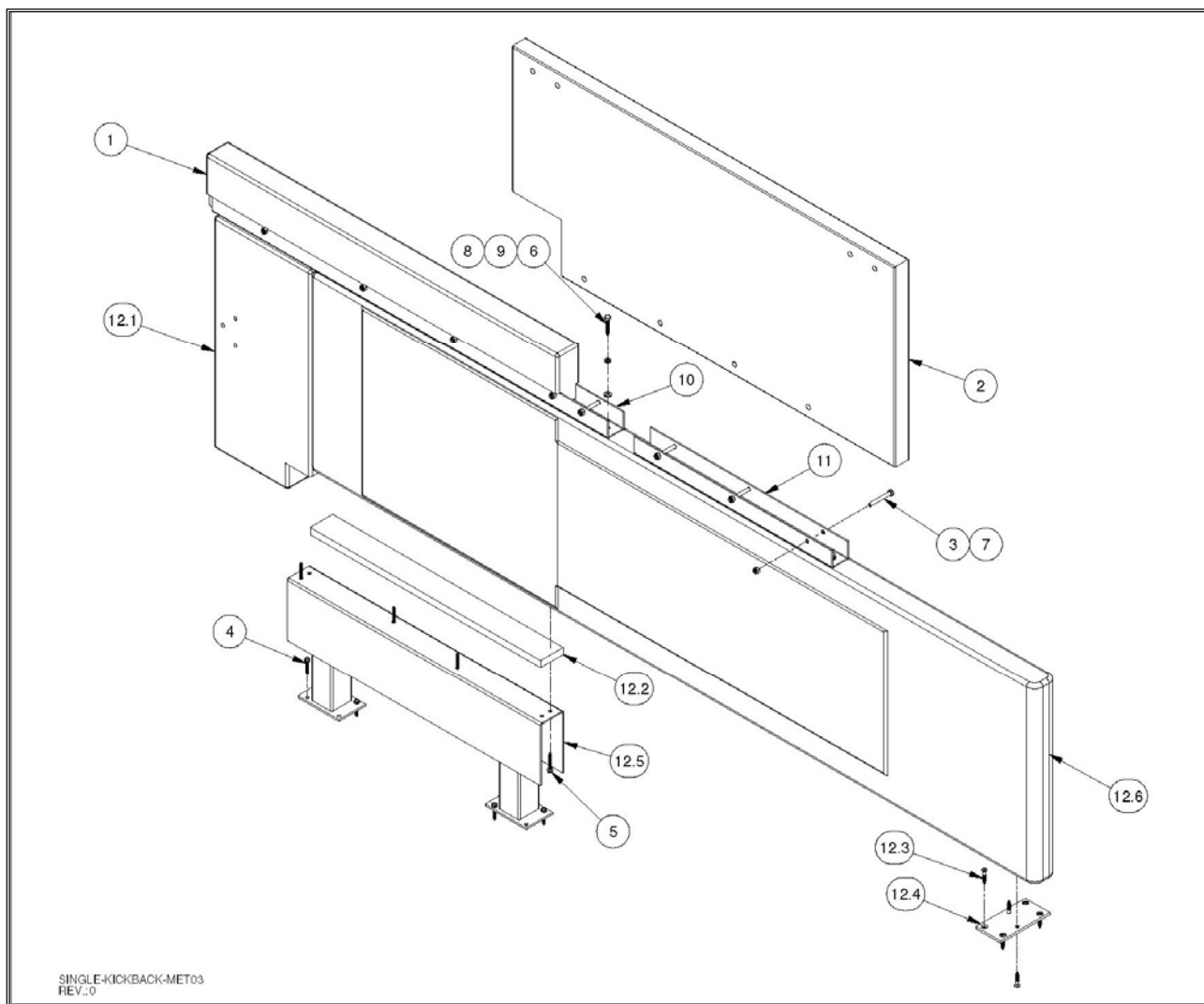


Ball Return Kickback Part List (ME-T03)

Item	Part Number	Description
1	302-6680-00	DEFLECTOR BLOCK MOUNTING
2	302-6690-00	DEFLECTOR BLOCK MOUNTING
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 X 1/2 FLAT HEAD MACH SCREW
7	7016-313118-100	5/16-18 X 1 FLAT HEAD MACH SCREW
8	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
9	7046-002520-000	1/4-20 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, Ten Pin (ME-T03)

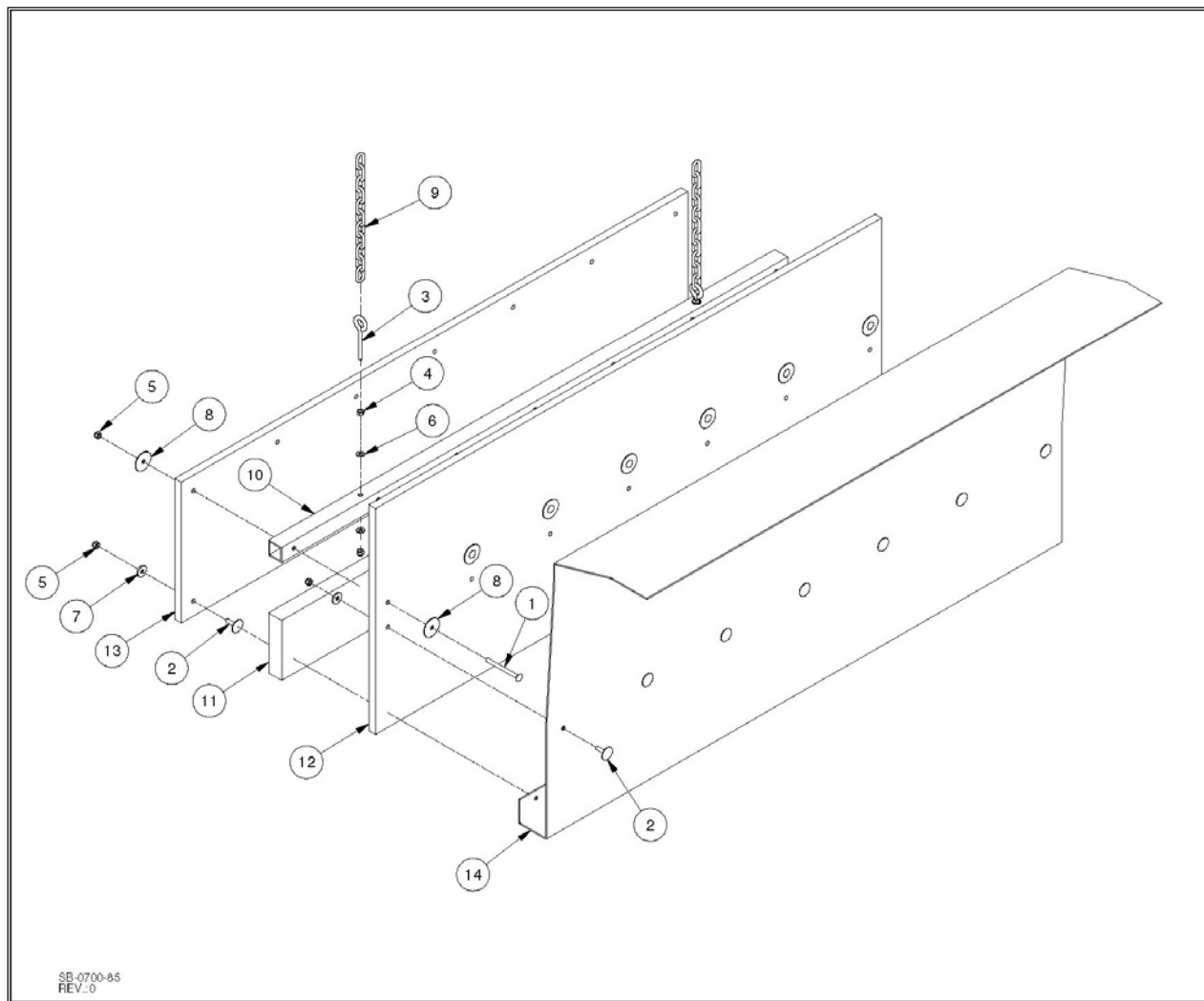


Single Kickback Parts List (ME-T03)

Item	Part Number	Description
1	30W-0180-44	SPACER BLOCK KICKBACK
2	30W-0180-45	PINSETTER SUPPORT, TENPIN
3	7010-003118-250	5/16-18 X 2-1/2 HEX CAP SCREW
4	7024-201400-150	14-10 X 1-1/2 HEX/WASHER HEAD SELF-TAPPING SCREW
5	7024-201400-175	14-10 X 1-3/4 HEX/WASHER HEAD SELF-TAPPING SCREW
6	7028-003100-175	5/16 X 1-3/4 LAG SCREW
7	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
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
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 FLAT HEAD WOOD SCREW
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, Duck Pin, Five Pin SB-0700-85 (ME-D03, ME-F03, ME-HD03)

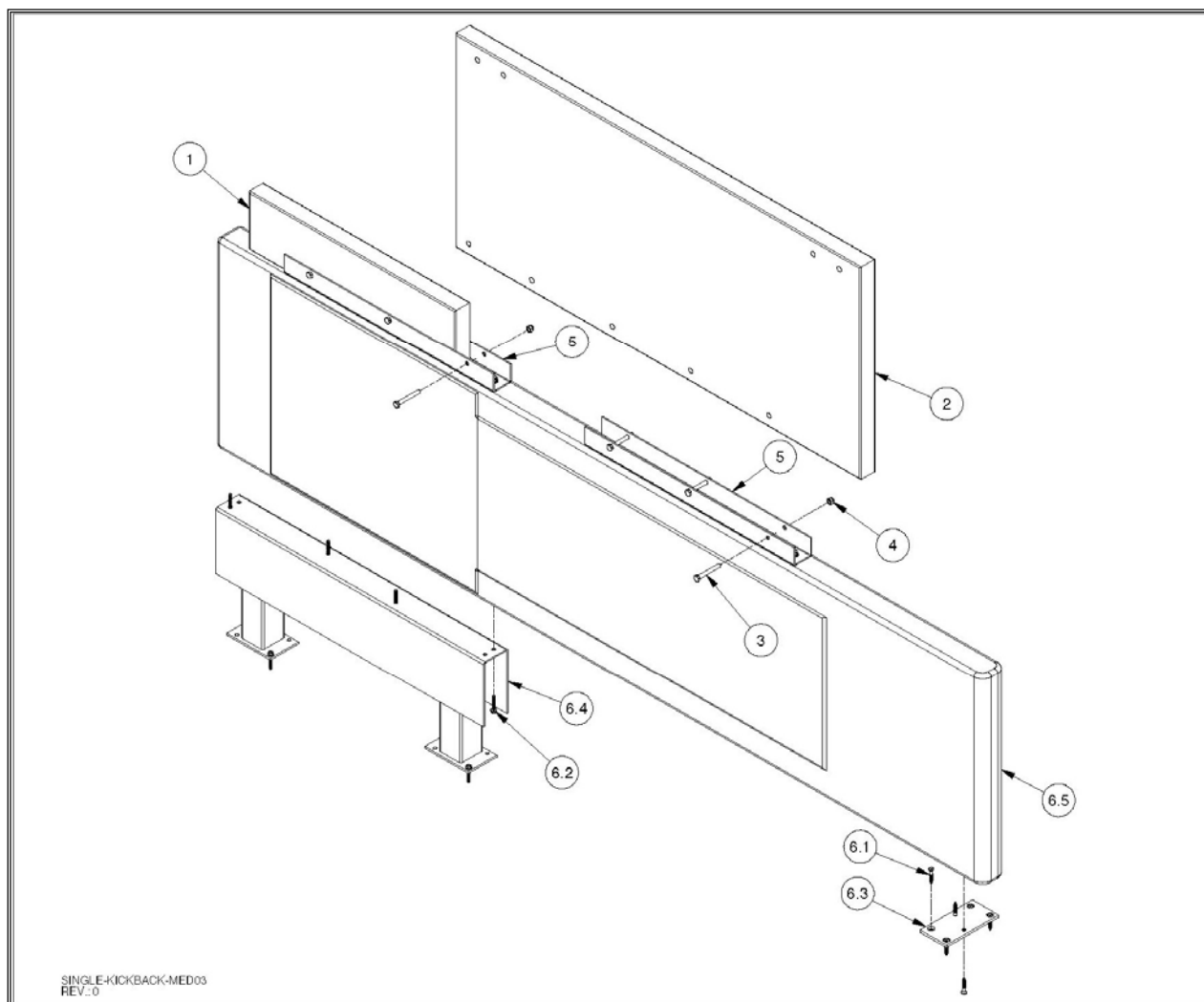


Cushion Assembly Parts List SB-0700-85 (ME-D03, ME-F03, ME-HD03)

Item	Part Number	Description
1	7012-003118-350	5/16-18 X 3-1/2 CARRIAGE BOLT
2	7013-003118-125	5/16-18 X 1-1/4 ELEVATOR BOLT
3	7032-003118-400	5/16-18 X 4 EYE BOLT
4	7034-003118-000	5/16-18 HEX NUT
5	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
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, Duck Pin, Five Pin (ME-D03, ME-F03, ME-HD03)

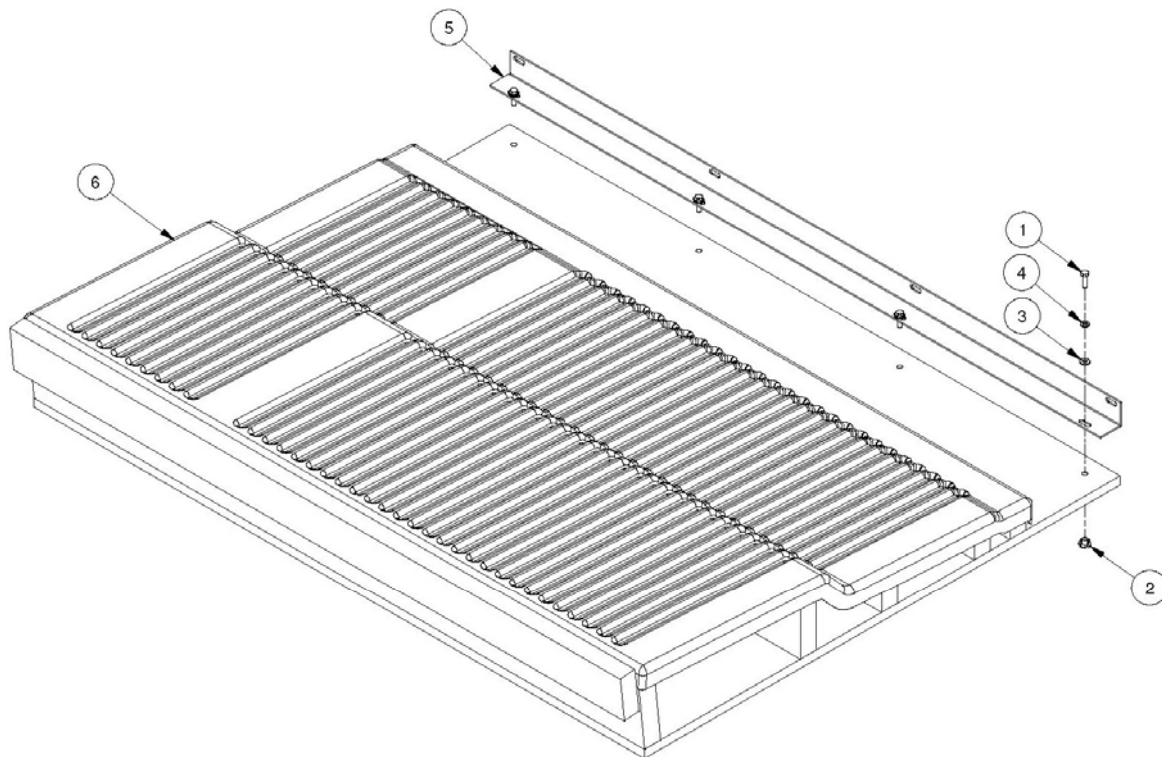


Single Kickback Parts List (ME-D03, ME-F03, ME-HD03)

Item	Part Number	Description
1	30W-0180-30	KICKBACK SUPPORT
2	30W-0180-46	PINSETTER SUPPORT KICKBACK
3	7010-003118-250	5/16-18 X 2-1/2 HEX CAP SCREW
4	7036-003118-000	5/16-18 NYLON INSERT HEX NUT
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 FLAT HEAD WOOD SCREW
6.2	7024-201400-150	14-10 X 1-1/2 HEX/WASHER HEAD SELF-TAPPING SCREW
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, Duck Pin, Five Pin (ME-D03, ME-F03, ME-HD03)



35W-105
REV.:0

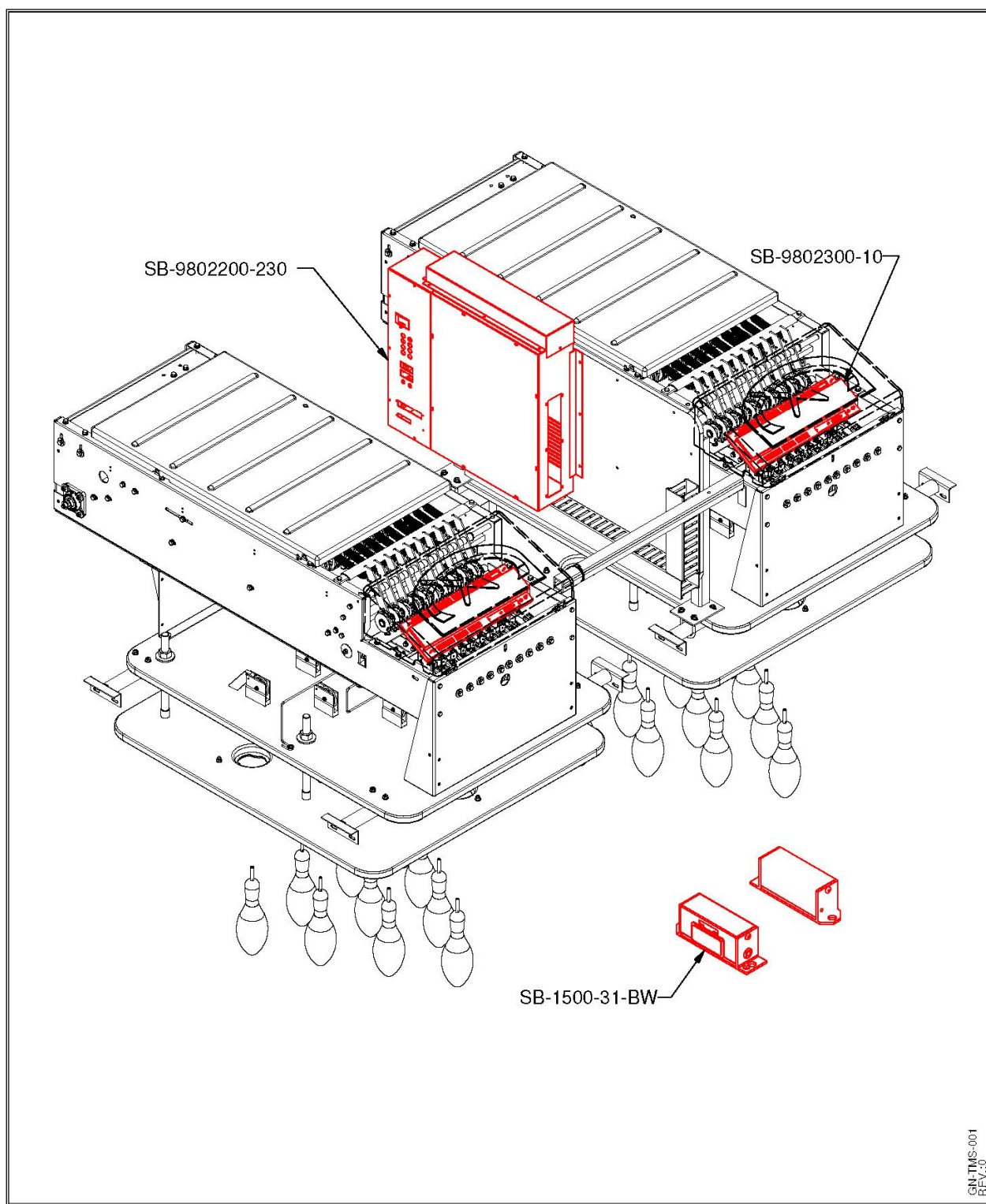


Pit Floor Assembly Parts List (ME-D03, ME-F03, ME-HD03)

Item	Part List	Description
1	7010-003118-100	5/16-18 X 1 HEX CAP SCREW
2	7045-003118-037	5/16-18 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

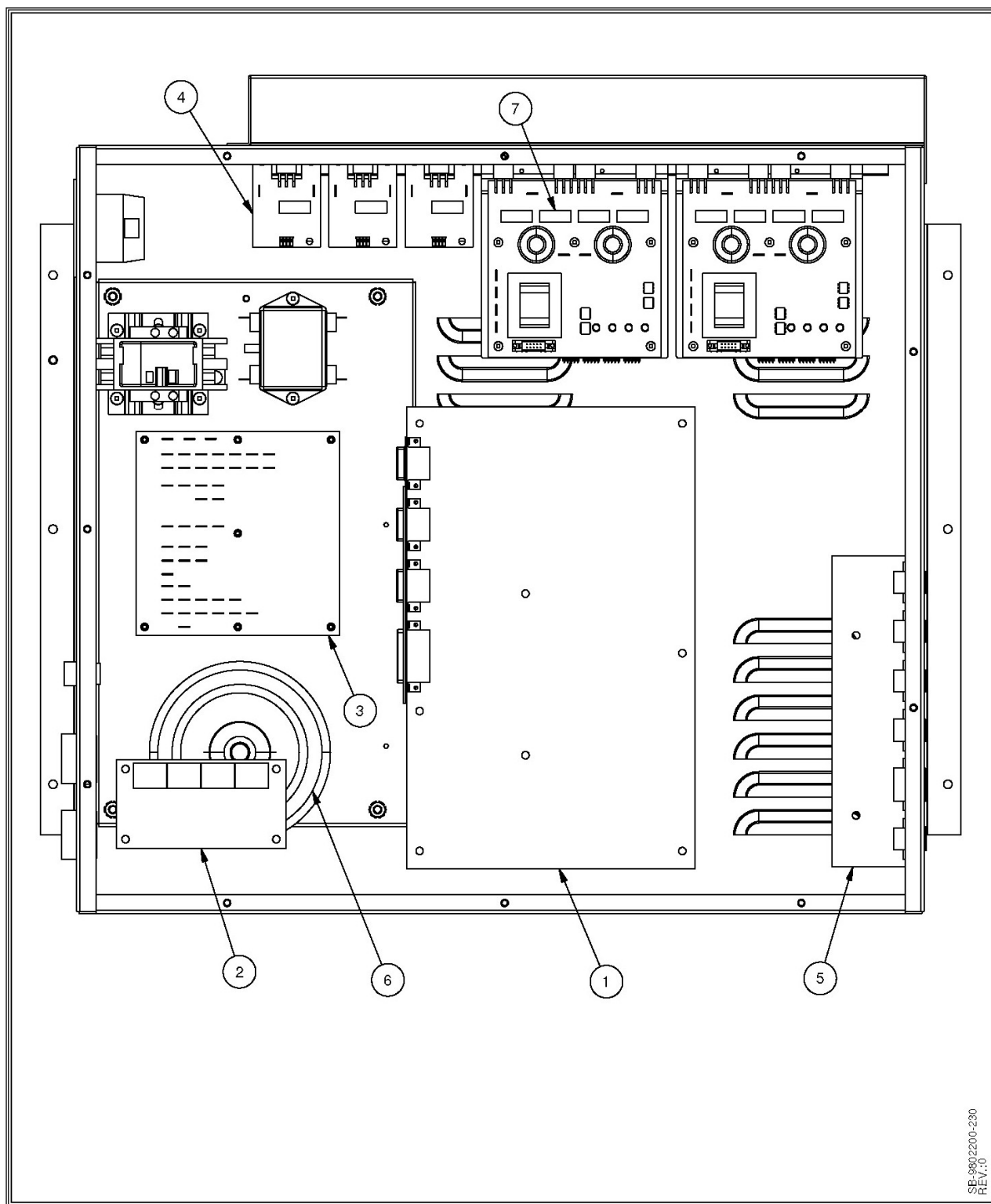


Electronic Components Parts List

Item	Part Number	Description
1	SB-9802200-230	POWER BOX, TMS, 230 VAC, 50/60 Hz
2	SB-9802300-10	PIN DETECTOR, TMS
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 TRANSFORMER
7	SB-9808210-230	DC DRIVE ASS'Y



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