TK Electronic®
and
TK Total™
Mechanism
Service Manual

March 1999

Sho-Rack®
By
Kaspar Wire Works

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TABLE OF CONTENTS

TROUBLE SHOOTING

CLEANING AND GENERAL CARE

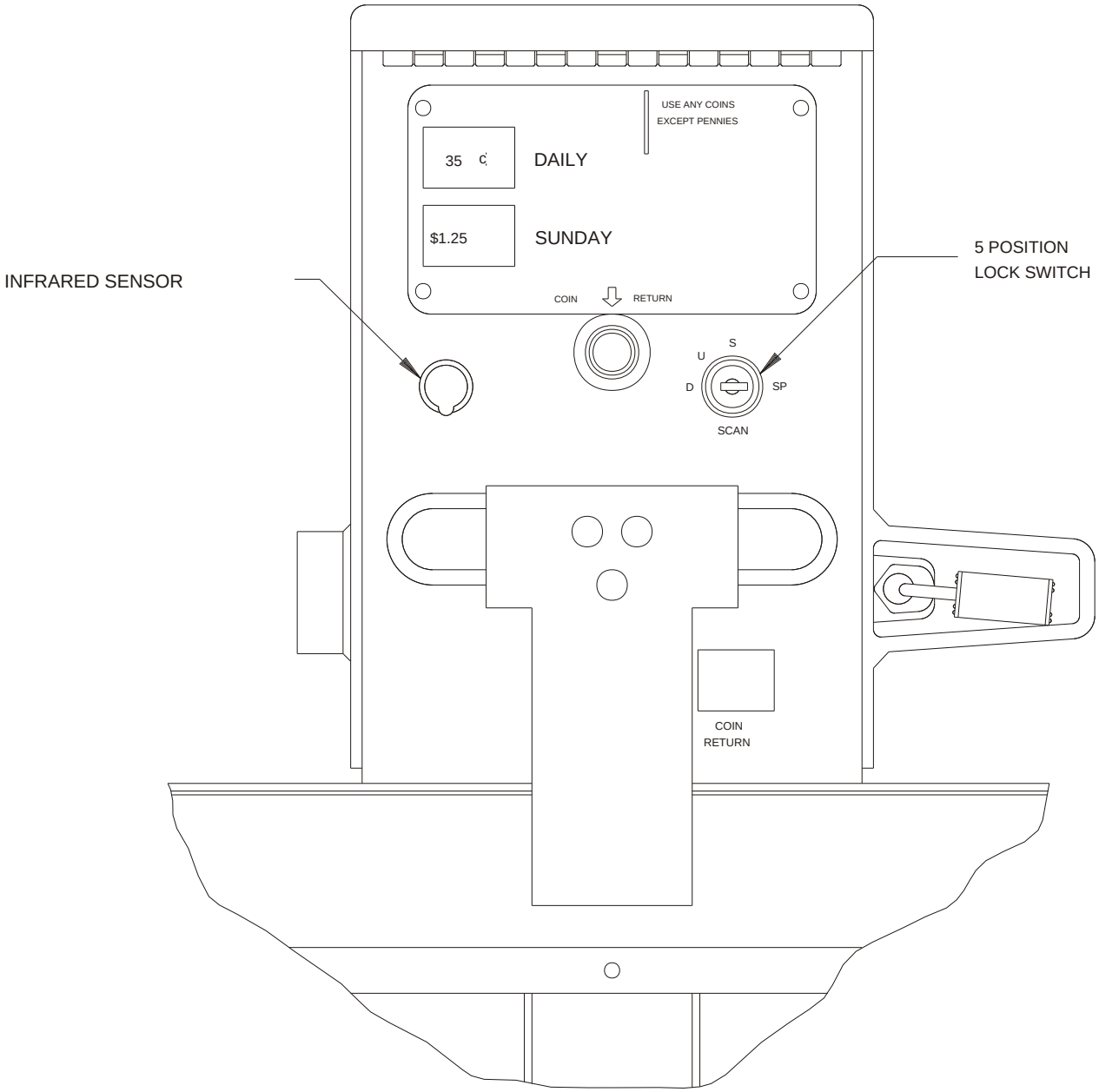
The TK Electronic and TK Total Mechs have no totalizer arm or wheel. They have fewer mechanical parts to wear out, adjust or jam making them less sensitive to dust, dirt or grime. The steel chassis, weather-coated circuit board, gold plated switches and contacts provide unmatched durability and help eliminate corrosion. Excess dirt or dust can be blown out with air. DO NOT wash the Mechs and DO NOT spray WD-40 into the Mechs. If something is jammed in the coil plates, they can easily be removed to clear the foreign object. (See page 9 of Service Manual)

Amsoil 100% Synthetic 5W-30 Motor Oil (Winterlube Oil) is only used on the studs that have working parts, including the studs that have rollers attached. Some areas of the Mech receive light applications of Lubriplate 105.

INFRARED SENSOR AND FIVE POSITION LOCK SWITCH

The Infrared Sensor may be used with all Sho-Rack Electronic mechs. This sensor allows communication with Sho-Rack scanners to change prices and to retrieve sales information stored in the circuit board.

Key locked in "D" position is for daily price papers (9:00 o'clock position). To change to Sunday price, insert key and turn to "S" (12:00 o'clock position) and remove key. Turning key between daily and Sunday positions to "U" (10:30 o'clock position) will automatically unlock the paper door for service. "SP" position (3:00 o'clock) is used for special or third selling price selection.

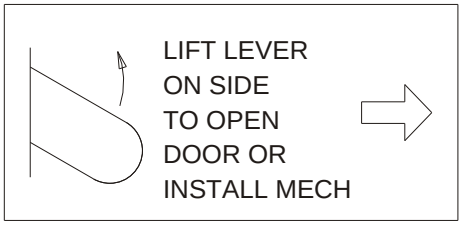


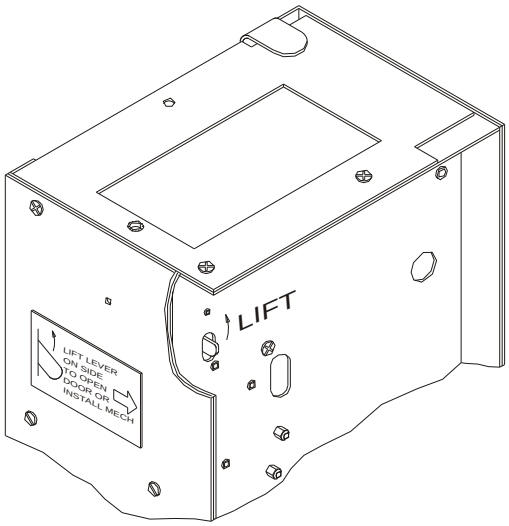
LATCHING SYSTEM

"Opening Rack Door Manually For Proper Mech Installation/Servicing Unit"

The rack door can no longer be opened by pushing up on the T825 latch roller. This is because of design changes of certain parts. The rack door can only be opened manually when the door latch lever is activated. This lever must be activated when mech is installed into rack. If lever is not activated, rack door will not close easily.

Follow these instructions for proper mech installation and to open paper door.





DOOR HOOK ADJUSTMENTS

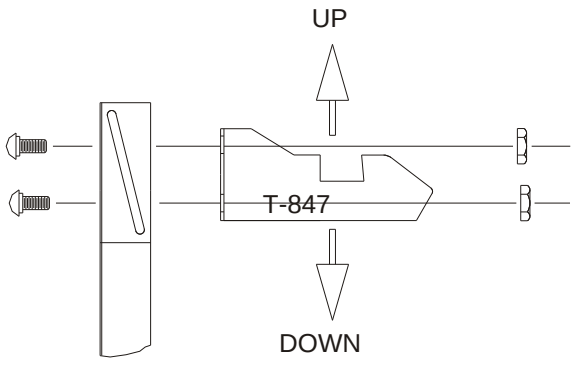
"Door May Not Open or Opens Without Money"

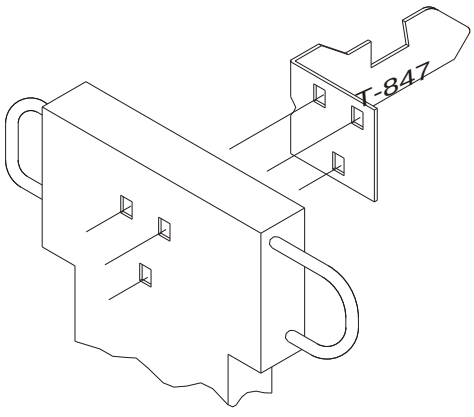
DOOR HOOK T-847

The new style TK Electronic Mech will only operate with the T-847 (dash) door hook. Old style door hooks T804 and T847 are too short and will not activate the Mech latching system.

POSITION OF DOOR HOOK

The T-847 door hook must be adjusted lower than the TK-Mech , $3.00 TK-Mech , or old style TK Electronic Mech. When the door hook adjustment plate is used, set hook lower so door will not close all the way. Door hook must be set as low as possible for proper operation.





ERROR LIGHT

"Low Battery, Coil Jam and Reset Button"

The Circuit Board on the TK Electronic /Total Mech is designed to check all functions once daily. The LED (error light) is red in color and is visible through a hole in the T885E Back Mounting Plate. If no error is present, the LED will have one flash every (5) five seconds showing that the Mech is working properly.

When an error occurs, the LED will flash two or three times (depending on error) until the error is cleared. See error light codes below.

1 Flash - All functions working properly

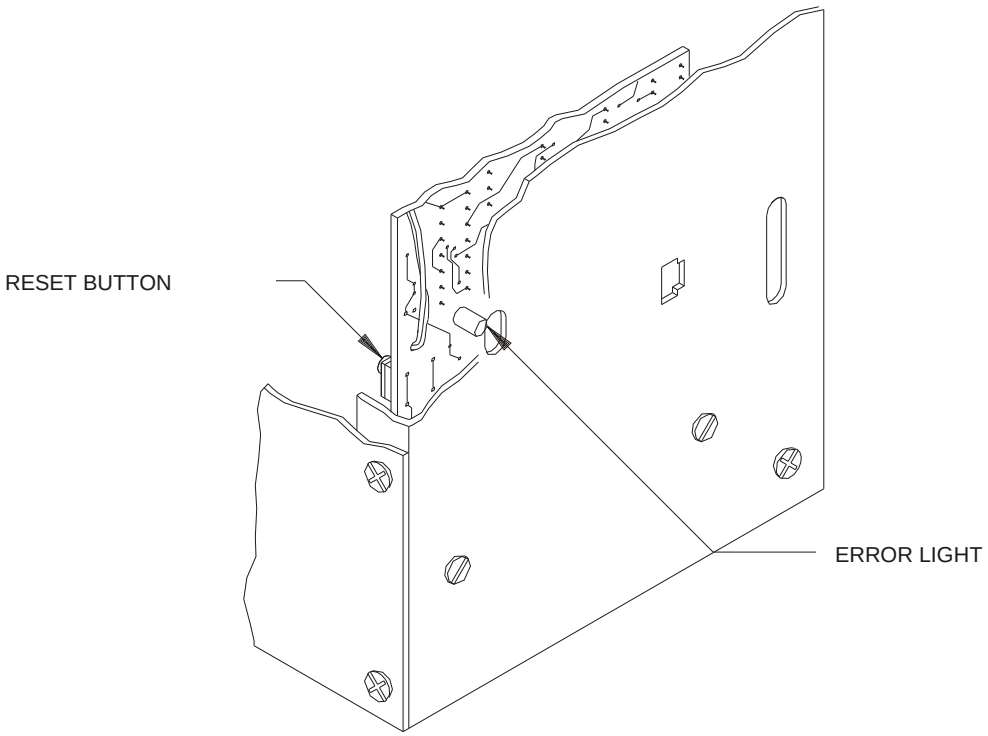
2 Flashes - Low battery (see error code list next page)

3 Flashes - Coil jam or other error (see error code list next page)

When any customer thinks they have an error condition of any kind, they should press the RESET button once for about one second, then release. (See error code list next page.)

If for some reason the error light will not reset itself back to one flash, disconnect the battery and connect again to check for proper connection. If error flashing continues, battery may need replacing or a jam may need to be cleared.

If error light is not flashing the Mech is probably not powered. Press the reset button and check error light for flash. If this does not work, check battery connection or replace battery.



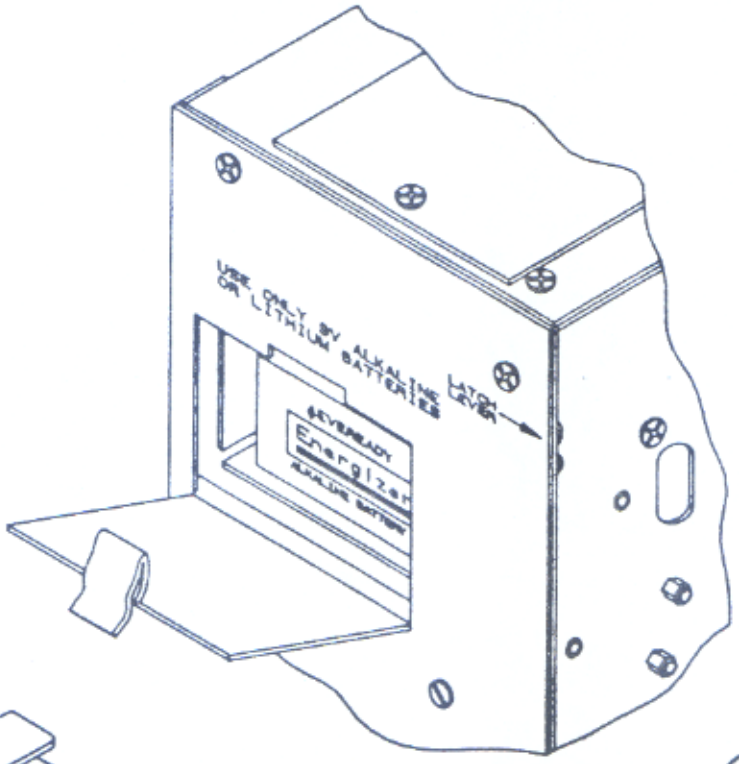
NOTE: THIS RESET DOES NOT ERASE ANY PRICE, CALIBRATION, OR SALES DATA STORED IN THE MECH MEMORY.

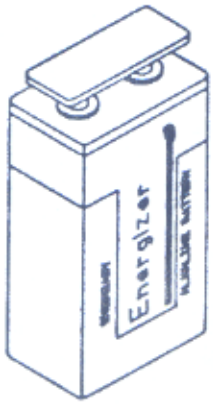
BATTERY REPLACEMENT

"Battery Installation/Types of Batteries Used"

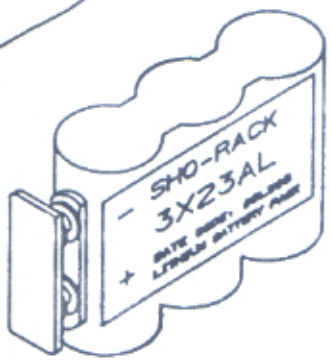
The Electronic Mechanism is powered by a 9 volt lithium battery pack. This battery pack is designed to give customers longer battery life. If replacement of the 9 volt lithium battery pack becomes necessary, the customer can install a 9 volt alkaline battery. This battery may be purchased at any local hardware store, giving customers another option of battery replacement. The 9 volt lithium battery pack if desired can be purchased direct from the factory.
Use caution when replacing the battery so terminals do not come in contact with the back plate. This will avoid any shorting of the battery. The Mech will show low battery error when the voltage drops to 7.2 volts.

DO NOT USE the cheaper "Heavy Duty" batteries available in some retail stores. These carbon-zinc batteries are not designed to power today's modern electronic devices and will lose charge after only a few days.
Lithium battery packs carry a pro-rated warranty.





9V ALKALINE
(OPTIONAL)



9V LITHIUM BATTERY PACK
(STANDARD)

EM-14 LATCH ADJUSTMENT

"Solenoid May Not Fire Due to Low Battery Voltage (2.7 Volts)"

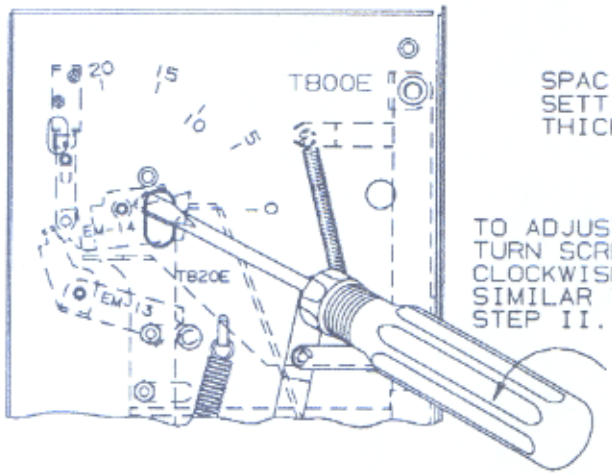
Thru further research and development efforts aimed at conserving battery life in our Electronic Mechanisms, we have discovered that an adjustment made to part EM-14 Latch can reduce power consumption each time the door latch fires. A further "adjustment" of the lengthening of the electrical pulse that signals the latch to fire can also keep the mechanism operational longer into the battery life.

The purpose of these two adjustments will not be to recharge a battery, but will allow the mechanism to operate on the lowest possible battery voltage for longer operational life. See illustration Step I and Step 2 for proper adjustment procedure.

Steps 3 and 4 illustrate over-adjusted views and how to correct.

If this adjustment is not made, some mechanisms may not function properly when the battery voltage drops around 2.7 volts.

STEP I

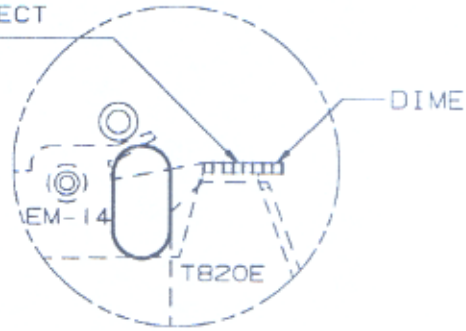


TO ADJUST TAB ON EM-14, TURN SCREWDRIVER COUNTER CLOCKWISE UNTIL IT LOOKS SIMILAR TO DETAIL A, STEP II.

STEP II

DETAIL A
CORRECT SETTING

SPACING FOR THE CORRECT SETTING IS THE THICKNESS OF A DIME.

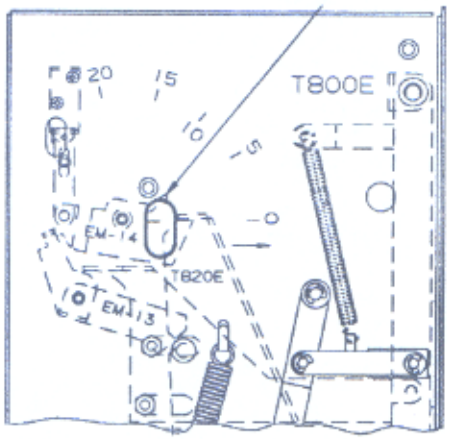


STEP III

OVER BENT VIEW

OVER BENT VIEW MEANS MECH WILL ALLOW DOOR TO OPEN WITHOUT COINS.

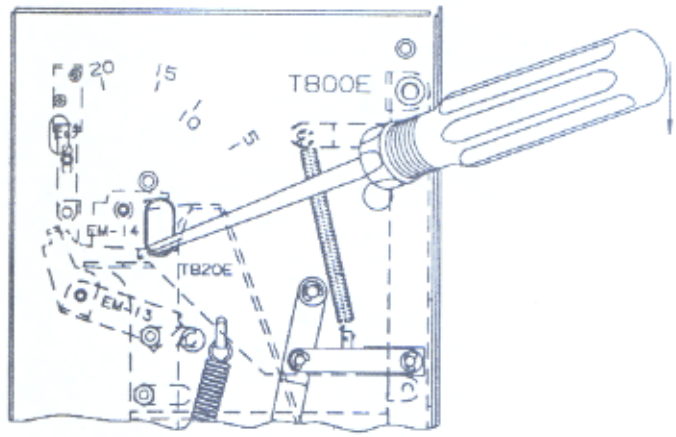
WHEN THE PART EM-14 IS BELOW T-820-E, MOVE THE PART T-820-E TO THE RIGHT. SEE DETAIL B, STEP IV, TO CORRECT.



STEP IV

DETAIL B

IF THE PART EM-14 IS OVER BENT PLACE A SCREWDRIVER UNDER EM-14 AND PULL DOWN TO RAISE EM-14 AS SHOWN IN DETAIL A, STEP II.



LOCKS AND KEYSWITCHES

"TK Electronic Keyswitch Positions"

The Chicago Lock (DCN) was used on all Electronic Light Tube Mechs. The keyswitch wire color codes are white, brown, red, gray and green. The Key Numbers were DCN 1-10.

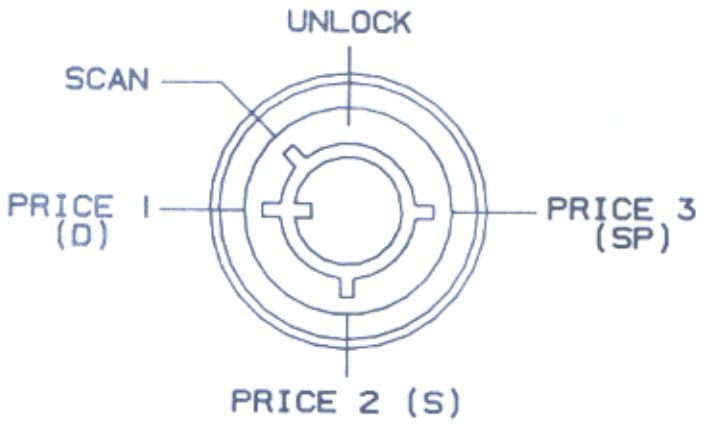
The National Remove-A-Core Lock Keyswitch has the same rotation as the Mechanical Lock. The keyswitch wire color codes are white, brown, red, yellow and green. The Key Numbers are C002BR, C004BR, C006BR and C008BR.

In January, 1997, a one-piece assembled keyswitch with 150 key number options will be available from Illinois Lock Company. The keyswitch wire color codes are the same as the National Remove-A-Core Lock.

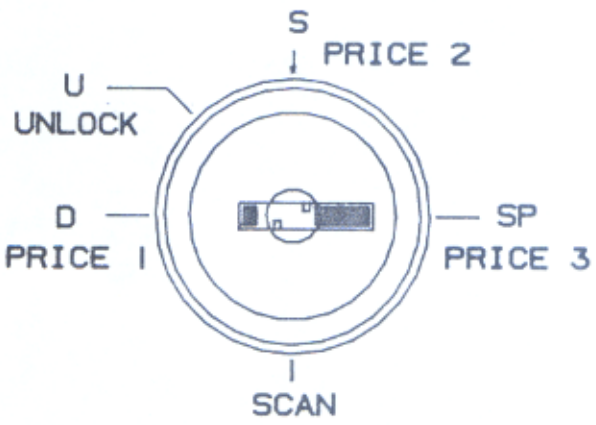
NOTE: NONE OF THE SWITCH LOCK HARNESS WIRES OR MECHANICAL PARTS INTERCHANGE WITH ONE ANOTHER.

FRONT VIEW OF LOCKS ARE IN DAILY POSITION

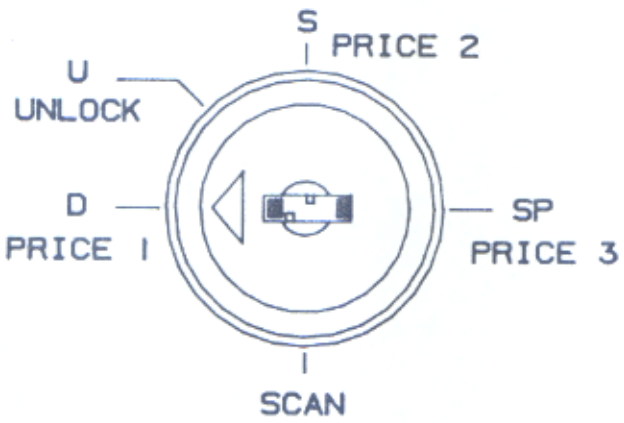
CHICAGO LOCK
(DCN)
OBSOLETE



NATIONAL REMOVE-A-CORE
LOCK (C002BR)



ILLINOIS LOCK
(C02R)



SHO-RACK® ELECTRONIC MECH KEYSWITCH ASSEMBLY

Installation & Operation

1. Hammer "knock-out" plug from inside Mech housing. SHO-RACK® lock knock-outs are located to the left of coin return on TK-80 rack, to lower right of door pull on K-80 rack. Other styles may vary.

2. Turn key in lock to "DAILY" price position if necessary. See Figure 1 below for proper lock shaft flat rotation.

3. Install lock into Mech housing with "DAILY" position at 9:00. Stamped key number on lock face should be on bottom, with key flat to left. See figures below for alignment details.

4. Install metal clip inside housing to hold lock body securely.

5. Place black plastic retaining collar over lock barrel assembly.

6. Align switch to Lock so that plastic tabs will match correctly to switch body and lock shaft flats will mate. Use screwdriver blade to turn gray switch shaft if necessary. See Figure 2.

7. When aligned, press switch firmly towards lock until plastic tabs snap in place. Do not twist or bend tabs!

8. Slide retaining collar over tabs (toward switch) until locked.

9. Rotate key in lock to test all keyswitch positions for proper operation. See page 7 for standard SHO-RACK® Electronic Keyswitch position locations.

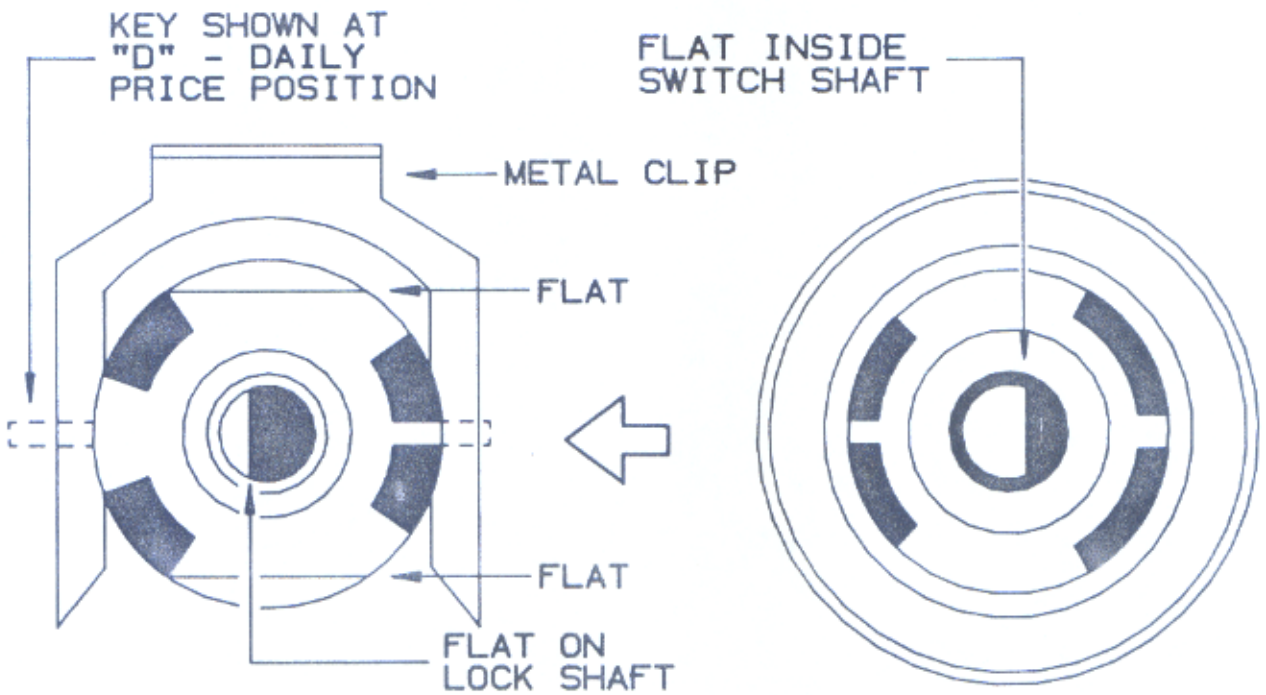


FIGURE 1

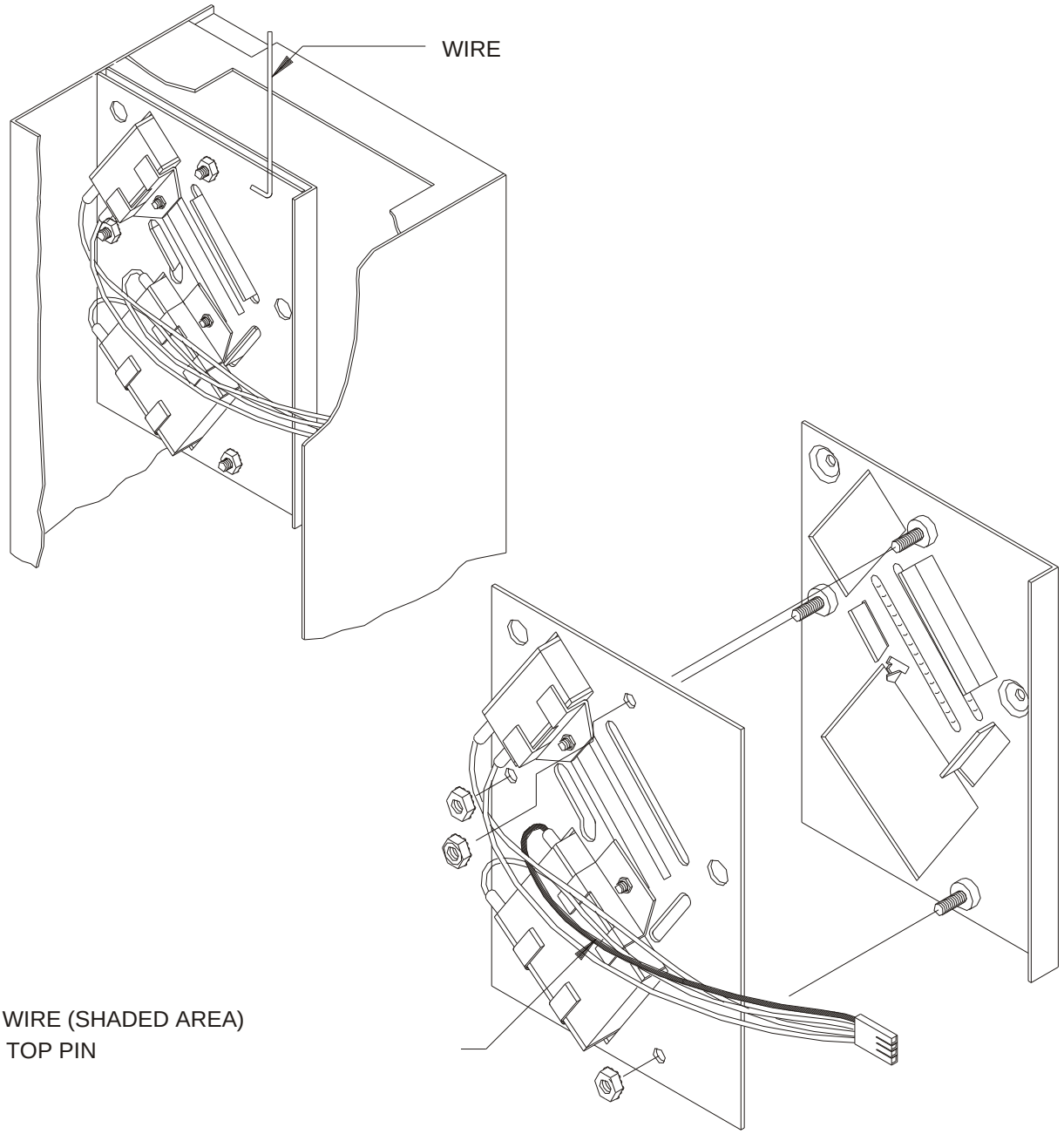
FIGURE 2

REAR OF LOCK ⇦ FRONT OF SWITCH

COINS OR FOREIGN OBJECTS LODGED IN COIL PLATES

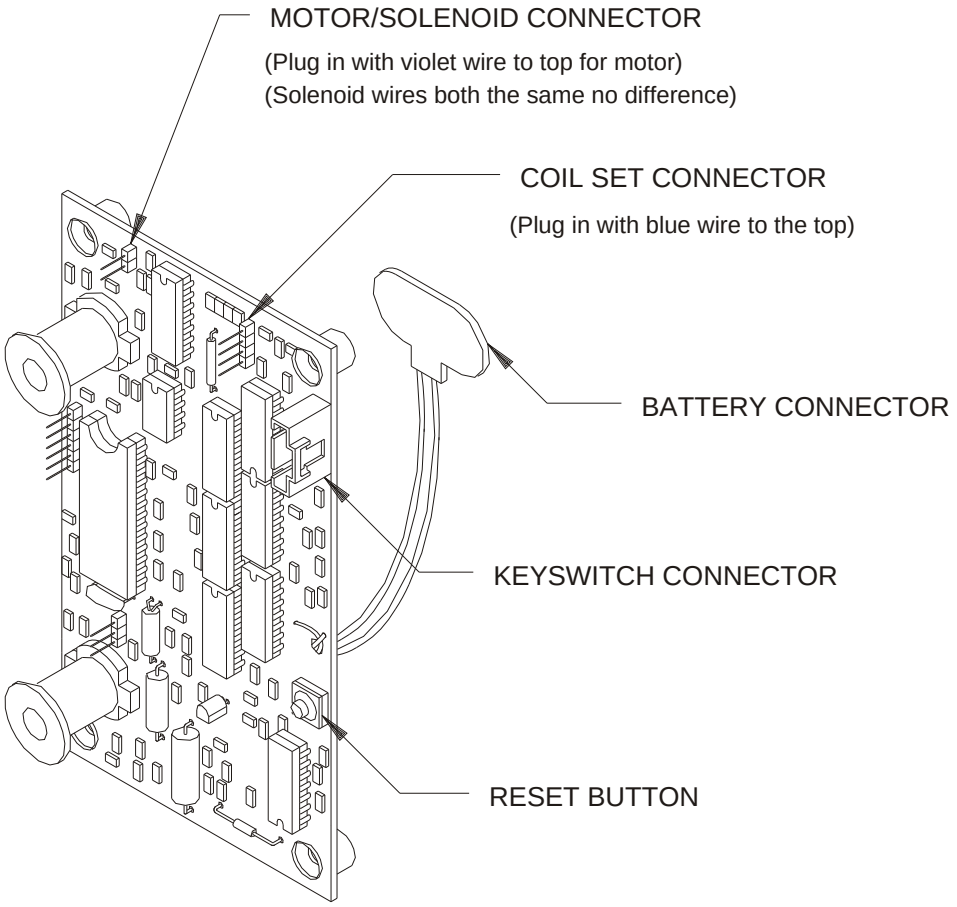
"Coins Will Not Fall Through Coil Plates"

The Coil (Coin Guide) Plates on the new style TK Electronic Mech are stationary and do not swing open when the coin return button is activated. If an object is lodged between the plates, it may be cleared by removing the T811 (Top Cover Plate) and inserting a wire (bent into a hook shape) to remove the object through the top of coil plates. If necessary, the stationary Coil (Coin Guide) Plates may be taken apart by removing 3 (8-32) nuts. (Use 11/32 nut driver.) The outside plate then can be removed to clear any foreign object or jam. Be sure to reconnect the coils to the circuit board with the blue wire to the top pin.

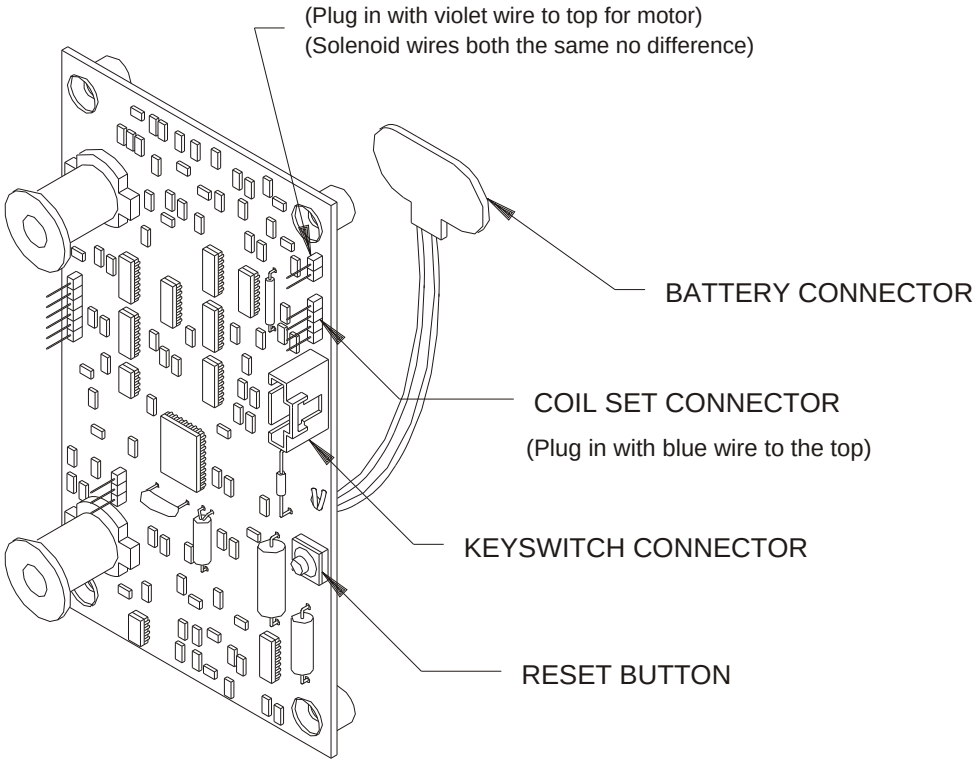


BOARD CONNECTORS

"Proper Connections are Required for Mech Operation"



MOTOR SOLENOID CONNECTOR (NEW STYLE after June 1995)



TOTAL PRICE CHANGER - TPC

"Changing Prices on TK-Total and K-Total"

Kaspar Sho-Rack has the TPC (Total Price Changer) to make changing the prices on your TK-Total and K-Total Mechs affordable, simple and fast. The TPC uses Dip Switch Banks to set your desired price. NO PC or programming is required.

To set your prices, use a pointed object to push in the Dip Switches for Price 1 (Daily), Price 2 (Sunday) and Price 3 (Special) as illustrated in Figure 1. Set the Dip Switches to total each of your prices. Plug the wire into the Price Change connector on the back of your mechanism as shown in Figure 2. Press the Push Button Switch (Send) for one second. The Green "OK" light will blink and beep once to indicate a successful price change. Red will signal failure and blink and beep three times. Run coins through the mechanism to check each price for accuracy. Two light blinks on fail means the battery is low in the TPC. Replace with a 9 volt battery.

FIGURE 1

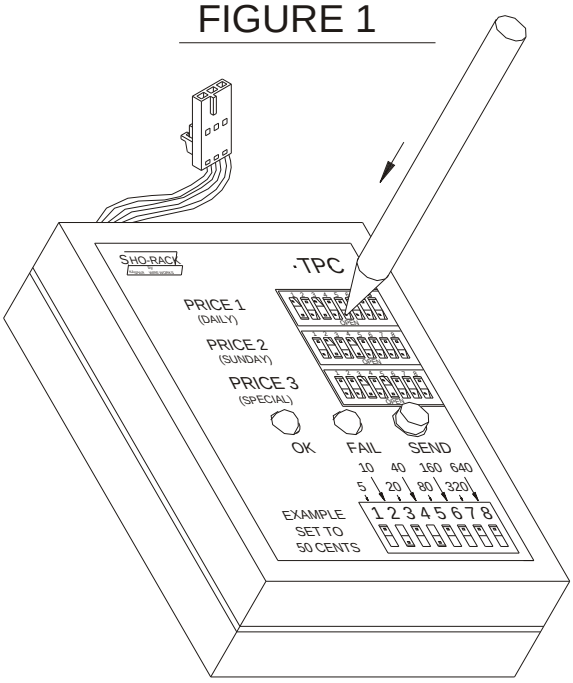
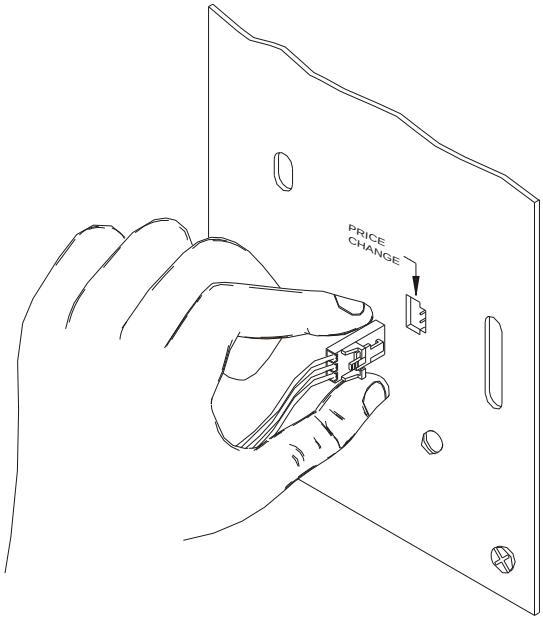


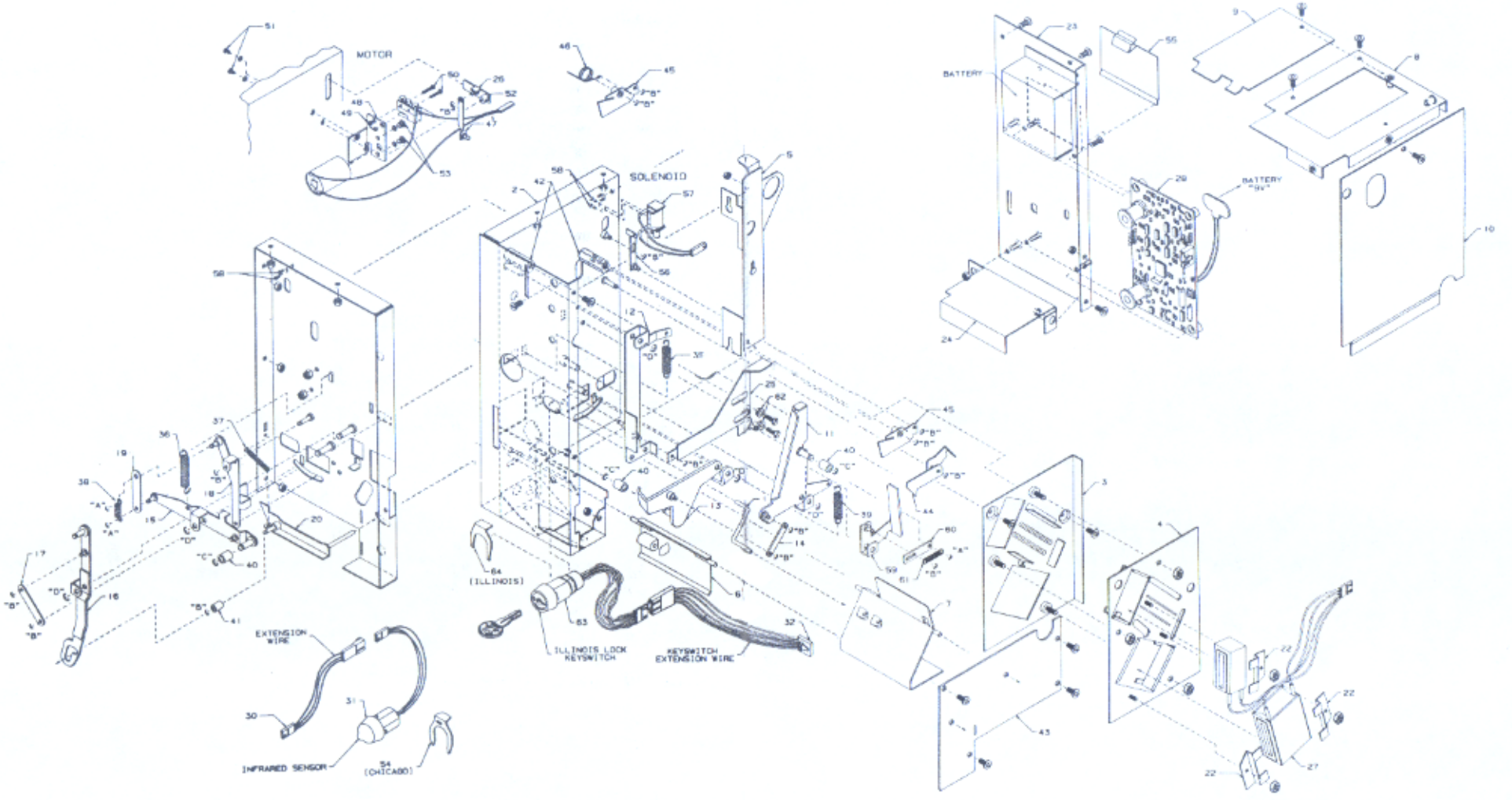
FIGURE 2



TK-ELECTRONIC/TK-TOTAL PARTS LIST

PART NO	ILLUS NO	DESCRIPTION	PRICE CODE NO
T-81	1	Receiver Door Link	5021
T-800-E	2	"E" Chassis	4800
T-801-E	3	Inside Coin Guide Plate (Stainless Steel)	4801
T-802-E	4	Outside Coin Guide Plate (Stainless Steel)	4802
T-806	5	Hold Down Assembly	5070
T-808	6	Coin Return Door	5019
T-809-E	7	Coin Receiver Door	4852
T-810	8	Top	5066
T-811	9	Top Cover Plate	5065
T812-E	10	Side Cover	4803
T-820-E	11	Latch Release & Anti-Cheat Stop	4804
T-824-E	12	Coin Return Bar & Cancellation	4805
T-825	13	Latch	5047
T-830	14	Cushion Arm Link	5046
T-835	15	Rocker Arm	5009
T-837	16	Actuator Bar	5010
T-838	17	Rocker Arm Connector Link	5007
T-840-E	18	Receptacle Arm & Sale Acceptance	4806
T-841-E	19	Rocker Arm Link	4853
T-842-E	20	Coin Return Door Arm	4854
T-854	*	National Cylinder Lock Retainer Clip	5048
T-855 (16)	*	M4 X 8MM Pan Head Machine Screw	5081
T-856 (1)	*	M4 X 8MM Flat Head Machine Screw	5082
T-857 (13)	*	M4 X .7 Hex Nut	5083
T-857-1 (2)	*	M4 X .7 Nylon Stop Nut	5099
T-881-E (3)	22	Bolt on Coil Mount	4807
T-885-E	23	Back Mounting Plate	4808
T-886-E	24	Baffle	4809
T-887-E	25	Coin Return Linkage	4810
T-888-E	26	Motor Bracket & Latch Release	4811
T-892	27	Coil Assembly - 58507-101 (200 X 175)	4812
T-893	28	Circuit Board - 57651-20 (Full Audit)	4813
T-896	30	IR Extension Wire Assembly (Length 5")	4816
T-897	*	Micro-Switch - 311 SM701-T (Motor Style)	4817
T-898	31	IR Sensor - 47571	4818
T-899	*	P/N 413-1AA1 1" Plastic Cap Plug	4819
T-900	32	Keylock Ext. Harness - 7652-6 (Length 11")	4820
T-901	*	Lock Assembly Retainer Ring - 5105-21	4821
T-902	*	Nylon Cable Clamp - 3352	4822
T-905	*	Motor RF-370CA-15370	4825
T-800 - T-824-E	35	Extension Spring	5037
T-800E - T-835	36	Extension Spring	5011
T-800E - T-842	37	Extension Spring	5016
T-835- T-840	38	Extension Spring	5035
T-800E - T-820-E	39	Extension Spring	5042
T-82 (3)	40	Rollers	5006
T-80	41	Roller	5015
T-43 (2)	42	Coin Guide Spacers (In Field Replacement)	5024
T-807-E	43	Side Mounting Plate	4855
EM-13	44	Disc Latch	4826
EM-14	45	Release Disc	4827
EM-23	46	Release Disc Recoil Spring	4828
EM-24	47	Motor Shaft Bracket Linkage	4829
EM-27	48	Motor Mount Micro-Switch Bracket	4830
T-906 (2)	49	2-56 Hex Nuts	4831
T-907 (2)	50	2-56 X 7/16" RSMS (S/S)	4832
T-908 (2)	51	4-40 X 3/16" SBHS	4833
T-909 (6)	*	#4 Internal Shakeproof Washer	4834
T-910	52	Socket Set Screw - 6-32 X 1/8"	4835
T-911	*	Molex 2 Pin Connector 50-57-9202-D	4836
T-912 (2)	53	M3 X 4MM Cheese Head Screw	4837
T-913	54	Chicago Retainer Clip for IR Sensor	4838
T-916-E	55	Snap-In Door	4843
T-892-E	56	Solenoid Linkage & Latch Release	4844
T-917-E (K9404-A)	57	Solenoid	4845
T-918-E (2)	58	2-56 X 1/8" RPMS	4846
T-919-E	59	Cancellation Flag	4847
T-920-E	60	Return Cancellation Linkage	4848

TK-ELECTRONIC/TK-TOTAL- MECHANISM



TK-ELECTRONIC/TK-TOTAL PARTS LIST

PART NO	ILLUS NO	DESCRIPTION	PRICE CODE NO
T-308	61	Extension Spring	4960
KM-8-0-10 (2)	62	Bushing	1102
T-921-E	63	Illinois Lock (Specify Key Number)	4850
T-922-E	64	Illinois Lock Retainer Clip	4851
T-914	*	Jam Washer #6003	4839
CM-100-68 (3)	*	6-32 Kep Nuts	1059
CM-100-71 (3)	*	8-32 Kep Nuts	1061
CM-100-63 (4)	*	6-32 X 5/16" Screws	1055
5133-9ZF	A	"E" Ring (For 3/32" Dia. Shaft)	5074
5133-12ZF	B	"E" Ring (For 1/8" Dia. Shaft)	5075
5133-15ZF	C	"E" Ring (For 5/32" Dia. Shaft)	5076
5133-18ZF	D	"E" Ring (For 3/16" Dia. Shaft)	5077

Note: * Not Shown or Illustrated

TK-ELECTRONIC/TOTAL INSPECTION PROCEDURES

Symptom Observed	Cause/Action
Error light does not flash	* Press reset button * Dead battery
Error light flashes twice	* Press reset button * Reconnect battery * Replace battery if necessary
Error light flashes three times	* Remove jam from coil plates * Coil set disconnected or plugged in wrong on circuit board (blue wire on top) * Press reset button and insert coins
Rack door will not open for any reason	* Door hook too high * Wrong door hook (T-847) * Dead battery * Rack door out of alignment
Rack door opens without money	* Door hook too high (lower door hook)
Rack door will not open for key, but works with cash/scanner	* Keyswitch wires broken or loose * Keyswitch or lock installed wrong * Key turned to wrong setting
Rack door will not open for scanner, but works with cash/key	* IR sensor wires broken * IR sensor damaged or painted face * Scanner IR damaged or broken * Power from scanner to IR head failed (try another head or return to Sho-Rack)
Rack door opens at unexpected or unselected price	* Keyswitch broken * Keyswitch installed incorrectly * Scanner program set to wrong place * Mech programmed to wrong price * Lock turned to wrong price position