

MFG: ALLEN HERSCHELL  
NAME: DODGEM  
TYPE: NON-KIDDIE

# **Amusement Ride Inspection Guide**

## **Bumper Cars, Dodge-Em Cars, Krazy Kars Various Manufacturers**

**Rate Speed:** Approximately 0-6 MPH

**Capacity:** 1-2 per car

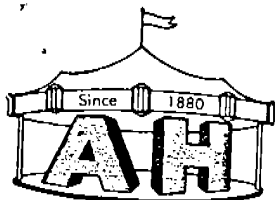


### **General Information**

- Cars are powered by individual 24 volt, DC electric motors. Cars get power through energized steel floor or ceiling.
- Ride operator controls power to ride with transformer switch at control console.
- Riders control direction and speed of cars either through control levers or steering wheel and foot pedal.

### **Inspection Points**

- All cars should be equipped with seat belts to be worn around the trunk so arms can be free.
- Cars with steering wheels must have hub pads.
- Rider size restrictions must be posted and enforced. No pre-school children allowed.
- Unless car is designed for 2 passengers, only one per car should be permitted.
- Spectators must be kept away from bumpers, entrance and exit during ride cycle.
- "ONE WAY" direction of travel is Recommended.
- The electrode post at the rear of the car should be padded.
- No loading or unloading of passengers while floor is energized.



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## DODGEM RIDE INSTRUCTIONS

### MAINTENANCE GUIDE

### AND

### DODGEM PARTS LIST

Dodgem cars are shipped ready for operation after the trolley pole is attached.

#### ASSEMBLY OF TROLLEY POLE

The LONG TROLLEY POLE should be inserted through the loosened TROLLEY POLE BRACKET located at top rear of car and then brought down firmly against the TROLLEY BASE PLATE on the FLOOR of the car and secured with the CAP SCREW from the under side of the TROLLEY BASE PLATE. It will be necessary to tip the car on its side to insert and tighten the CAP SCREW.

Be careful not to fracture the rubber tubing covering the TROLLEY POLE when tightening the TROLLEY POLE BRACKET CAP as it insulates the TROLLEY POLE from the body of the car. Also make sure that the rubber tubing is not cut or fractured where it passes through the body of the car under the TROLLEY POLE BRACKET.

The SHORT TROLLEY POLE is now inserted on the top of the LONG TROLLEY POLE and the TROLLEY ASSEMBLY is inserted at the top of the combination pole.

#### CHECK ALL BOLTS FOR TIGHTNESS BEFORE OPERATING.

The car is now ready to operate.

All cars are thoroughly inspected and lubricated before shipping.

#### MOTOR OPERATING AND MAINTENANCE INSTRUCTIONS

It is important that the full voltage of 115 or 230 volts be supplied to the floor and ceiling to insure proper operation. Voltage readings should be taken at the MOTOR in one of the cars at night when the full load of all DODGEMS, other rides, lights and concessions in the park are in use.

LOW VOLTAGE MUST BE GUARDED AGAINST AS IT WILL DAMAGE THE MOTOR AND REDUCE THE EFFICIENCY OF THE CLUTCH.

Because of the large ceiling and floor area to be electrified there is apt to be a voltage drop particularly if the transformer is located away from the ride. We recommend a separate transformer for the DODGEM RIDE, located within the building if possible.

The DODGEM MOTOR is designed and built for the job. It is equipped with sealed ball bearings which require lubrication only once every year. It is advisable to have this done in the off season at a good authorized motor service shop where they can also test the MOTOR and do any other MOTOR repair work that is necessary.

The BRUSHES should be checked and replaced at the beginning of each season. In the spring, replace any BRUSHES that will not last out the summer season. This will eliminate breakdowns due to BRUSHES wearing out during the operating season. Always replace all 4 BRUSHES at the same time. They are inexpensive and it is very important to use the BRUSH recommended by the motor manufacturer. Allan Herschell Company carries them in stock.

It is also advisable to vacuum clean the inside of the MOTOR after inspection or replacing BRUSHES.

#### ELECTRICAL TROUBLE SHOOTING

If a car continues to blow its fuse - first check size of fuse. It should be 25 amps rating - NO LARGER. Then, check the rubber insulation on the TROLLEY POLE where it is held by the TROLLEY POLE BRACKET at the rear of the car. Next, check the round brass CONTACT PLATE over the MOTOR to make sure there is no short circuit between it and the ELECTRIC MOTOR. Next, check the wiring connections to the FOOT SWITCH. The wiring from the bottom of the TROLLEY POLE to the FUSE and to the FOOT SWITCH, to the arm fastened to the front of the car under the hood and the bronze WIPER that rests on the round brass CONTACT PLATE should be insulated from all other metal parts as the car is grounded to the building floor.

Be sure to keep the studs and nuts holding the MOTOR tightened securely to insure a good ground contact through the MOTOR BASE.

If the MOTOR should heat excessively it may be caused by insufficient lubrication, low or worn brushes or voltage problems.

#### STEEL FLOOR

- A. The steel floor should be CLEANED, PREFERABLY WITH A VACUUM CLEANER AND INSPECTED DAILY for loosened screws, protruding edges and sharp corners. The steel plates should be kept securely fastened down

at all times to insure good operating conditions.

- B. Do not permit nuts, bolts, screws, or any foreign objects to lie on the steel floor as they will easily become imbedded in the fabric driving wheel causing damage to it.
- C. An industrial type vacuum cleaner is excellent for use in keeping the steel floor clean and is especially recommended for cleaning inside the CARS, MOTORS AND DRIVE UNITS. A strong Oakite solution can be used to wash the steel FLOOR PLATES, thus providing a clean, positive contact between them and the CAR CASTER WHEELS. A CLEAN STEEL FLOOR is very important for good operation. Dirt is an insulator that will reduce the voltage to the MOTOR and will cause sparking not only at the rear CASTER WHEELS but a dirty floor will also cause sparking between the TROLLEY SHOE and the ceiling. Vacuum the floor at least three times a week and do not overlook using the vacuum cleaner between the bumper boards where dirt will accumulate and later blow onto the operating floor.
- D. A very easy and efficient way to clean the steel floor, especially in the spring is to use a portable Steam Cleaner. This equipment can be rented with an operator from any up-to-date garage. The cost should be very reasonable as it takes less than one day to clean the entire floor. It is recommended as it removes all rust and grime and sanding is not necessary.
- E. Check the bumper boards surrounding the operating floor to be certain that they are smooth and free from protruding nails, bolt heads and splinters, as these can cut the rubber car bumper.
- F. If graphite is used on the steel floor it should be used very sparingly as too much graphite will cause excessive sluing, making it difficult to steer the cars. Many operators do not use graphite but where it is necessary Allan Herschell Company can furnish a LIQUID GRAPHITE.

### INSTRUCTIONS FOR INSTALLATION

AND

### MAINTENANCE OF THE DODGEM CENTRIFUGAL

#### MOTOR SHAFT CLUTCH

Dodgem's motor shaft CLUTCH is easy to install and requires no adjustment.

#### WARNING:

For proper CLUTCH operation and protection of the MOTOR, the MOTOR as viewed from the shaft extension must turn COUNTER-CLOCKWISE.

All DODGEM MOTORS are shipped to run COUNTER CLOCKWISE. Should a customer use a foreign MOTOR that runs clockwise, it must be reversed, preferably by an electrician familiar with motors, otherwise CLUTCH

operation will be affected and the MOTOR is left unprotected.

The CLUTCH SLEEVE, part No. DO-16, is keyed to the motor shaft. If it is necessary to remove this SLEEVE, loosen the 3 SET SCREWS which fasten it to the shaft and remove the SLEEVE with a special puller. Do not use a hammer to remove the clutch sleeve.

#### ASSEMBLY:

First, place SLEEVE (DO-16) with the SET SCREW COLLAR, end first on the motor shaft as far as it will go to the shaft shoulder. Then, force MOTOR SHAFT KEY into keyway as far as possible so that a SET SCREW will land on the key. Then, tighten the 3 SET SCREWS, backing them off and securely retightening. NOTE: This method causes the SET SCREWS to cut a "seat" and hold securely. Wipe SLEEVE with a clean rag and smear with a film of grease. Then, assemble balance of parts in the following order:

DO-11 DRUM SHEAVE assembly, containing 2 BEARINGS, GREASE SEAL AND GREASE. (SEE CLUTCH LUBRICATION BELOW).

DO-20 THRUST WASHER - Smear one face only with a film of grease where related to the "finished" HUB thrust surface on DRUM SHEAVE. Do not overlook placing this WASHER in position as it is an important part of the CLUTCH.

DO-13 and DO-19 DISC AND SEGMENT ASSEMBLY.

DO-169 SMALL KEY - place in keyway of HUB and SLEEVE.

DO-127 COTTER PIN - 3/32" X 1-5/8".

The CASTELLATED NUT should be securely tightened and with COTTER PIN inserted, permit the DRUM SHEAVE to turn freely on the SLEEVE. Only if required to, back off the nut 1/6 turn for play. Under normal conditions this should not be necessary.

The CLUTCH has been greased at the factory and has sufficient lubrication for a season's operation. CLEAN OUT AND REPACK WITH NEW GREASE ONCE A YEAR.

When operating under extremely dirty conditions, periodically disassemble CLUTCH and wash out the DRUM SHEAVE only with WHITE GASOLINE, never allowing it to remain in the bath for an extended period, drying same thoroughly - otherwise the RUBBER GREASE SEAL may become affected.

NOTE: Do not wash the DISC and SEGMENT ASSEMBLY in gasoline as it will affect the linings.

#### CLUTCH LUBRICATION:

When regreasing, use only a good grade of high temperature grease.

The removal of the SLEEVE from the MOTOR SHAFT is not required when cleaning and regreasing. However, do check tightness of the 3 SET SCREWS holding same.

When regreasing, pack space between BEARINGS only to a point below the NEEDLE BEARINGS. Overgreasing should be avoided.

#### LININGS:

The LININGS are husky and will last several seasons under normal conditions. When required, replacement LININGS are available. When replacing LININGS, be sure to get a tight fit against the CLUTCH SEGMENT. This fit must be very tight so that no gap exists between the CLUTCH SEGMENT AND LININGS. At inspection, the SCREWS that fasten the LININGS TO THE SEGMENTS should be checked for tightness. A loose SCREW will SCORE THE DRUM SHEAVE RACE.

You should have 3 or 4 DO-18 CLUTCH SEGMENT ASSEMBLIES on hand as spares for quick installation when LININGS wear out. With spares on hand you can remove the CLUTCH DISC and replace with a fresh one in a few minutes. Then, reline the CLUTCH SEGMENTS in spare time.

#### BEARINGS AND SEAL:

Replacement of BEARINGS and GREASE SEAL should be required only after many seasons of operation and then only in rare cases. If and when this is necessary, their insertion should be effected with a hand press in preference to driving with a hammer.

Generally speaking, if the DODGEM CLUTCH is kept clean and properly lubricated its satisfactory service is practically unlimited.

#### CHECK BELT TENSION:

During initial operation the V-BELTS MAY STRETCH SLIGHTLY. However, there is no need for alarm as this is a normal condition. In fact, a slightly loose BELT will better transmit power than one which is excessively tight. An excessively tight BELT will affect operation and cause unnecessary wear to the CLUTCH and MOTOR BEARINGS. After lengthy service, if the BELTS should become worn and stretched, the slack can easily be taken up by inserting SHIMS beneath the MOTOR. (Same are supplied). When it becomes necessary to replace worn BELTS, "matched" pairs of the proper size and length should be installed. If one BELT is slightly longer than the other, the shorter BELT will do all the work. To replace BELTS, remove the STUD NUTS that fasten the MOTOR and tip it shaft end down, thus providing ample clearance to remove and reinstall the belts. Quality belts of the proper size can be obtained from the Allan Herschell Company. If purchased locally, avoid old dry stock.

C A U T I O N

DO NOT USE THE TROLLEY POLE FOR LEVERAGE TO TIP THE CAR ON ITS SIDE OR TO LIFT IT BACK. IT WAS NOT DESIGNED FOR THAT PURPOSE. THE STRAIN MAY BEND THE POLE. TIP THE CAR BY LIFTING FROM SIDE AT BUMPER - A TWO MAN JOB.

WHEN RETURNING CAR TO UPRIGHT POSITION - LET IT OVER EASY. DO NOT PERMIT THE CAR TO DROP HARD ON ITS WHEELS.

LUBRICATING INSTRUCTIONS:

All BEARINGS on the DODGEM CAR have been lubricated at the factory. They will require relubricating as follows:

FLOOR RING:

Lubricate through the red painted OIL FITTING which can be reached through the hand hole in the unit under the MOTOR, once each week, or as needed for easy steering.

CAUTION:

USE ONLY KEYSTONE No. 2 PENETRATING OIL in pressure type oil can. Do not use regular motor oil in this BEARING as it will create sludge and make steering hard.

CLUTCH:

See Clutch Lubrication instructions under "CLUTCH INSTRUCTIONS."

COUNTERSHAFT BEARINGS:

Two FITTINGS in the unit under the MOTOR. Use No. 33 Alemite Grease once at the beginning of each season.

STEERING SHAFT BEARING:

Held by the U-BOLT under the STEERING WHEEL, UNIVERSAL JOINT and the oil hole in the STEERING STAND under the UNIVERSAL JOINT. Use regular motor oil twice a month.

DRIVING AND STEERING CHAINS:

One FITTING. Use No. 33 Alemite Grease only once at the beginning of each season.

FLOOR RING BEARINGS:

Greased and sealed for life of the BEARING.

CASTER WHEEL BEARINGS:

Use No. 33 Alemite Grease at beginning of each season.

BUMPERS:

A graphite lubricant is available to be applied to the face of the RUBBER BUMPERS as needed. This will allow the cars to slip freely by one another.

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SUGGESTIONS FOR OPERATION

The Front Wheel Drive DODGEM CAR can get away from any obstruction without the assistance of the operator, provided that the rider turns the wheel completely around. We suggest calling attention to this fact by placing a sign where it can be read by the riders, such as --

"IF YOUR CAR IS BLOCKED, TURN STEERING WHEEL SLOWLY"

The dirigible Front Wheel Drive can be used as a FORWARD OR REVERSE drive, or as a FORWARD drive only. The cars are shipped for this FORWARD and REVERSE driving. To reverse the direction of the car the patron has only to turn the steering wheel two revolutions. If you wish to restrict the driving to FORWARD only, turn the steering wheel so the unit is in position for FORWARD driving V-BELTS ON THE LEFT HAND SIDE, tip car on its side and push the PIN located under the car just ahead of the driving unit, in toward the DRIVING WHEEL. This pin will act as a stop and prevent the unit from turning completely around.

DODGEM CARS can be operated on an open floor or with a center "Island". With either type of operation it is desirable to have the cars travel in a COUNTER-CLOCKWISE direction about the floor. This can be established by placing arrows on the posts or fence lettered --

"FOLLOW THE ARROW"

Head on collisions should not be permitted. Post a sign to this effect.

The operator should be alert at all times to stop the ride if anyone gets out of a car while the ride is in operation or if a patron rides with one foot outside.

A public address system is useful for instructing the riders. Just before the operator starts the ride he may announce --

"STEP ON THE BUTTON AND TURN THE WHEEL"

or

"ALREADY, FOLLOW THE ARROW"

If a car is against the bumper or blocked by another car, an announcement directed to the patron such as --

"KEEP YOUR FOOT ON THE SWITCH AND TURN YOUR WHEEL COMPLETELY AROUND"

-- will help the patron get clear. When the ride is over, the operator should announce --

"READY FOR THE NEXT RIDE. STAY IN YOUR CAR IF YOU WISH TO RIDE AGAIN"

or

"HAVE YOUR TICKET PUNCHED FOR THE NEXT RIDE"

etc.

Repeat rides run heavy on the DODGEM so it is advisable to use a ticket system that will not take up too much time between rides. The most popular is the "PAY AS YOU LEAVE SYSTEM" whereby each patron is handed a ticket with one punch in it as they enter the ride and rerides are punched by the attendants.

The patron pays for the number of punches in his ticket as he leaves. Special attention should be given to the time consumed for unloading, loading and punching tickets between rides.

On busy days the length of the ride is usually cut to 2 minutes. During the day or during slow periods the rides can be extended to 3 or 4 minutes as it is always well to keep the ride in operation to attract more patrons.

Most DODGEM installations gross more than the cost of the DODGEMS each and every season.

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## GENERAL MAINTENANCE OF THE DODGEM CAR

We will separate this list into the following different headings:

- ① Generalities and frequency of maintenance operations
- ② Maintenance of the pneumatic bumper.
- ③ Maintenance of the wheels and the steering unit
- ④ Maintenance of the motor unit

A/ Electric motor

B/ Double clutch

C/ Reducer

- ⑤ Maintenance of the accessories

A/ Resistance

B/ Support and base of the trolley pole

C/ Pedal contact

D/ Automatic slot

E/ Breakdowns and cures

F/ Wiring

G/ Branching

- ⑥ Repairs of lighting breakdowns

- ⑦ Body repairs

## MAINTENANCE PLAN

Every morning

talc your tires

Every month

check the fastenings of the car body  
check the nuts holding the seat in place  
check the current intake brushes  
check the adjustment of play of the clutch  
check the switch of the pedal contact

With the help of compressed air blow out the dust which is inside the motor, the double clutch and the automatic slot.

Every six months

polish the body  
cleaning and greasing of the motor level ball bearings

Every year

grease the reducer  
check the fixing of the base and support of the pole  
grease the steering unit  
take up the play of the back wheels bearings  
clean and adjust the pivot casing  
check the motor brushes

Maintenance of the exterior surface

The colour is incorporated in the fibre-glass, the maintenance is thus reduced to a simple wash with water and detergent (type Teepol or other) one bucket of water to one glass of detergent, and wipe with a chamois leather.

Chrome

Normally maintenance can be effected by washing at the same time as the body. If it is very dirty rub with a rag soaked in methylated spirits.  
During the winter time smear all the chrome trimmings with a neutral grease (vaseline)  
Avoid the use of plastic car covers which retain humidity.

Seats

The washing of the seats can be done with the same product as the body. Clean fairly frequently.

## MAINTENANCE OF THE PNEUMATIC BUMPER

The tyre of the dodgem car must be sufficiently inflated. A tyre which is not inflated enough will cut up very quickly, over inflated it will spoil the comfort and might burst.

If you run slowly (75 to 80V) inflate to 2.0 bars/cm<sup>2</sup> (28 lbs per sq. in.)

If you run fast (110 V) inflate to 2.2 bars/cm<sup>2</sup> (31 lbs sq. in.)

Experience proves that the comfort and upkeep of the tyre depends on the speed and inflation pressure.

In order to reduce the wear and to increase the sliding of the tyres, one against the other, talc your tyres at least twice a day. For this prepare in a bucket (10 litres - 2 gall.) a paste of talc and water (consistency like pancake batter mixture) add. to this 3 table spoons of wall paper size, the spread on with a paint brush.

## MAINTENANCE OF THE WHEELS

### Ground

1/- Steel wheel

The steel wheel serves as the earth for the dodgem car (until the 1972 model when a wire brush in the middle of the axle was introduced), electric pickup causes heating thus the steel wheel uses more grease than the rubber wheel. Grease every six months. Once a year grease with yellow ball bearing grease, check the axle nut is tight by taking out pin 49. Tighten the nut until it blocks then unscrew enough to reinsert pin.

2/- Rubber wheel

Same adjustment operation. Annual greasing.

## MAINTENANCE OF THE STEERING UNIT

1/- Steering unit

Greased for one year's running (2000 hours)

Once a year clean with petrol and grease the crown, race and TIMKEN pivot bearing with yellow grease. The steering column has been greased for its lifetime. In case of dismantling it clean the bearings with petrol, recharge with grease and remount.

## 2/- Pivot insulator

The insulator 575 of the current intake socket no. 576 is fitted into the pivot, to change the insulator, dismount it by using a pin punch from underneath. Refitting is done from the same side.

## 3/- Adjustment

At the end of the season control the inside play of the unit S 566. If there is some play take it up by the castle nut S 589 accessible by taking off S 611 (casing current intake). Unbolt the stop washer S 588 and tighten gradually until play disappears. Reblock the stop washer.

Add another washer under the nut if it is at the end of the thread.

Each month check the current intake brush S 620 and its shunt to do this take off S 617 then S 611 and lastly the brush. Blow out the dust and remount.

# MAINTENANCE OF THE MOTOR UNIT

## General Considerations

The motor is the heart of your car, by giving it attentive care you will obtain good results results on which depends the returns of your equipment.

Before going into the details, remember that dust has never got on very well with precision engineering.

Some knowledge of the Reversion drive motor will help you to maintain it better. We have divided in into three main parts:

### A/- The electric motor

It is of a series type, the kind used in electrical drive, its maintenance as we will see further on is practically nil. It serves as a rim for the front wheels.

### B/- Double clutch

This organ protects the mechanical part of the reducer, its role is to limit the bumps due to rough stopping of the dodgem car. In normal service or when stopped with the motor under tension, it cannot slide thus there is a little or no wear or adjusting to do.

### C/- The reducer

Takes the speed of the induced current (about 1000 r/m to the speed of 250 r/m on the motor body to obtain a speed of 12 km/h (8 m p.h.) of the dodgem car.



## DOUBLE CLUTCH

### 1<sup>st</sup> Maintenance

Every month blow out the dust with compressed air. In the case of a grease leakage take off the clutch disc No S 660 and degrease it with petrol.

### 2<sup>nd</sup> Adjustment

On a normally fitted motor: the play between the motor plate S 624 and the clutch plate S 625 should be in the order of 7 to 10/10th (control this with wedges through the ventilation holes). In case that this play has not been obtained:  
Dismantle the reducer and the clutch plate, add or take off shim washers S 621 until you have normal play.

### 3<sup>rd</sup> Control

On a normally fitted motor, car lying on its side, block the motor with a bar or piece of wood (attention to the rotation direction), and connect the current before the resistance; the armature should practically not turn, the intensity read on the ampimeter (from the cash desk for example) should not surpass 12 amps.  
Do the same test again but connect up after the resistance, now the armature turns and the intensity should be 14 to 16 amps on the ampimeter.

# THE ELECTRIC MOTOR

## 1/ Electrical maintenance

Once a month take off the cover of the motor current intake by removing circlips S 558. Check the brush and the shunt (strand of copper wire inside the spring), blow the dust out and remount. Once a year check and change if necessary the motor brushes, two caps S 661 to unscrew on the outside motor casing.

## 2/ Mechanical maintenance

Every six months take off the cover of the motor bearing S 549. Check the paulstra joint S 558, clean the bearing S 524 and lubricate it with yellow grease (1 coffee spoon ful). The paulstra joints are fragile, when fitting be careful not to damage edge.

## 3/ Changing the rubber wheels

Dismantling: As it ages the rubber adheres to the steel of the motor casing the most simple way to take off a worn wheel is, after removing stop rings S 553 and S 554, to cut it with a hack-saw.

Mounting: Mounting should be effected with a press.  
Clean the motor casing thoroughly  
Coat it with tallow grease  
Also grease the inside of the rubber band and mount it.

Attention! The mounting of the rubber wheels must be done from the current intake side.

## REDUCER

### 1°/ Greasing - maintenance

Greased when delivered for 4 months running, must be recharged every 4 months use grease with fusion point 250°C. (IGOL Compound) (2 to 3 table spoons)  
In case of disassembling the reducer, clean the parts with petrol (watch out for impurities in the ball bearings)

Check the state of the paulstra joints S 516 and S 523, never remount a damaged joint.

### 2°/ Particular points when remounting

The ball bearings S 505, S 507, S 510, S 524 must be lightly greased with compound before remounting (never fill a bearing completely).

The paulstra joints S 516 and S 523 must be in perfect condition immerse the joints in oil before remounting, check the cleanliness and polish of their bearing on the planetary gear S 504 and shaft S 512.

Before replacing the sealing plate S 514 grease the crown and the pinions. Do not forget the paper joint S 520 before fitting S 660 plate.

### 3°/ Grease leaks

- either paulstra joint S 523 (deteriorated or worn out)
- or tightening screw S 521 unscrewed
- or paper joint S 520 destroyed or non existing
- or filling plug joint S 419 squashed

# MAINTENANCE OF THE ACCESSORIES

A/- Resistance

The resistance requires no maintenance, as it normally heats never paint it.

B/- The support and base of the trolley pole

Check every 4 months that the three bolts fixing the pole support and the screw of the pole base are tight. (Never put any grease in the base)

C/- Pedal contact

Every month blow dust away and check the contacts of the switch.

D/- Automatic slot

The automatic slot requires no special maintenance. Blow out dust with compressed air every month. Grease lightly the brass wheel and the axle of the check slot shutter. When the car is running with the staff key, never use the key to cut off the current, first release the pedal, (otherwise deteriorates the contacts).

E/- Possible breakdowns, causes, cures

Before checking anything make sure that the current is coming into the slot !...

BREAKDOWNS	CAUSES
Slot shutter will not open and the car continues running (on all cars)	Polarity dynamo or polarity 24v inverted election
Same breakdown on only one car	Resistance 500 $\Omega$ of the slot is cut
The shutter will not open but the car no longer works.	The shutter of slot is blocked
The shutter will not close	Deterioration of one of the 2 micro-switch H576 5F, or the contactor coil.

T/- Wiring

The electrical distribution on the dodgem car is done by one trunk of lines. The only parts which can cause any problem are the connections of the automatic slot and the contact.

Connecting the automatic slot:

Earth - blue connector, female clip

Pole intake - red connector, female clip

Output contact - yellow connector, female clip

G/- Branching

Positive tension feed (+) to the netting  
negative (-) to the track

Branching contact:

Automatic slot	yellow
Headlight circuit output	green
Resistance output	blue
Pedal output	

Lighting feed

Yellow cable

Consists of 4 or 8 bulbs in series fed between the input terminal of the slot and the earth from the motor body.

## REPAIRING LIGHTING BREAKDOWNS

The lighting consists, according to the type of car of 4 bulbs 24 volts 35 Watts or 8 bulbs 12 Volt 15 Watts wired in series.

### 1. Breakdown: no bulb lights

Check that electricity is arriving in the car and that the fuse has not gone (for example by running the motor). If this test works then the filament of one of the bulbs must be broke; find which one it is either with a bulb on a testing socket or with a voltmeter.

### 2. Breakdown: One or several bulbs are not lighting, while others are lit brighter than normal

There must be a short circuit which must be found either inside the headlight (contact blade earthing) or one of the headlights touching the chrome or a bare wire or terminal touching the headlight.

## REPAIRING THE CHECK BOX AND THE CAR BODY INTERIOR

1/ Remove the top off the surface to be repaired either with acetone or cellulose thinners. Finish with sand paper.

2/ Prepare the materials: Two layers of fibreglass matting and one layer of tissue. Overlap round the break about 5cm (2in).

3/ Take 300gr. of resin, add to this 15 drops of accelerator. Mix then add a dessert spoon of catalyst. H

4/ Wet the tissues with the prepared resin, either using a brush or by soaking them in the resin.

5/ Use acetone or cellulose thinners to clean hands and brush.

## REPAIRING THE EXTERIOR OF THE CAR BODY

### 1°/ Preparing the place

At the spot where the Gel Coat is damaged sand down to the fibre glass. Even the edges with emery paper and degrease with thinners or acetone.

### 2°/ Take these precautions

The ideal working temperature for Gel Coat is about 20°C. Never repair in wet weather.

The repairs should be done in a horizontal position.

If this is not possible or if the repair has to be done vertically, fill in the place to be repaired by applying the product from bottom to top going slightly thicker. Stick cello tape over it to avoid running.

N.B. Any product left over cannot be used again.

### 3°/ Preparing the Gel Coat

Take a level dessert spoon of Gel Coat, add 15 drops of catalyst; mix well and spread on with a spatula in the following 2' to 3 minutes; leave to dry.

### 4°/ Finish

After drying when hard to nail touch, (take off the cello tape if work done vertically) Thin down the thickness with a fine file. Then sand with wet and dry paper 280 and 400 using a block of wood as support. Finish the repaired surface with a non silicone polish.