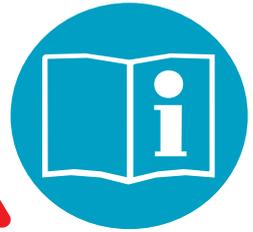


# ICE COBOTICS

[www.icecobotics.com](http://www.icecobotics.com)  
[www.icerental.com](http://www.icerental.com)



## Operator & Parts Manual

Ride-on Auto Sweeper



# iS1100L

**i-SYNERGY**  
Cleaning Management in Motion

7000704  
REV.04(10-2023)



## READ OPERATOR MANUAL MANUAL CAREFULLY

**IMPORTANT:**To ensure full warranty protection,Please fill out & return your warranty card.

Please fill out at time of installation for future reference.

Model No. \_\_\_\_\_

Serial No. \_\_\_\_\_

Machine Options \_\_\_\_\_

Sales Rep. \_\_\_\_\_

Sales Rep. phone no. \_\_\_\_\_

Customer ID Number \_\_\_\_\_

Installation Date \_\_\_\_\_

### HOW TO ORDER PARTS

Only use ICE Cobotics Company supplied or equivalent parts. Parts and supplies may be ordered online,by phone, by fax or by mail.

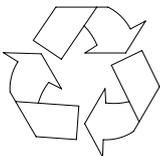
1. Identify the machine model.
2. Identify the machine serial number from the data label.
3. Ensure the proper serial number is used from the parts list.
4. Identify the part number and quantity.  
Do not order by page or reference numbers.
5. Provide your name, company name, customer ID number,billing and shipping address, phone number and purchase order number.



### PROTECT THE ENVIRONMENT

Please dispose of packaging materials,old machine components such as batteries, hazardous fluids, including antifreeze and oil, in an environmentally safe way according to local waste disposal regulations.

Always remember to recycle.



### ICE Cobotics (GuangDong) Company Limited

XiangShi Road, LiaoBu, DongGuan, GuangDong, China

Tel:0769-8186 9000

Fax:0769-8186 3000

Specifications and parts are subject to change without notice.

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## SAFETY PRECAUTIONS

The following symbols indicate potentially dangerous situations. Always read this information carefully and take all necessary precautions to safeguard people and property.

The operator's cooperation is essential in order to prevent injury. No accident prevention program is effective without the total cooperation of the person responsible for the machine operation. Most of the accidents that may occur in a factory, while working or moving around, are caused by failure to comply with the simplest rules for exercising prudence. A careful and prudent operator is the best guarantee against accidents and is essential for successful completion of any prevention program.

### SYMBOLS



#### **DANGER!**

It indicates a dangerous situation with risk of death for the operator.



#### **WARNING!**

It indicates a potential risk of injury for people or damage to objects.



#### **CAUTION!**

It indicates a caution or a remark related to important or useful functions. Pay careful attention to the paragraphs marked by this symbol.

#### **NOTE :**

It indicates a remark related to important or useful functions.

### GENERAL INSTRUCTIONS

Specific warnings and cautions to inform about potential damages to people and machine are shown below.



#### **DANGER!**

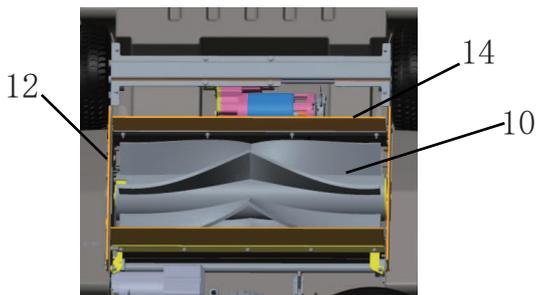
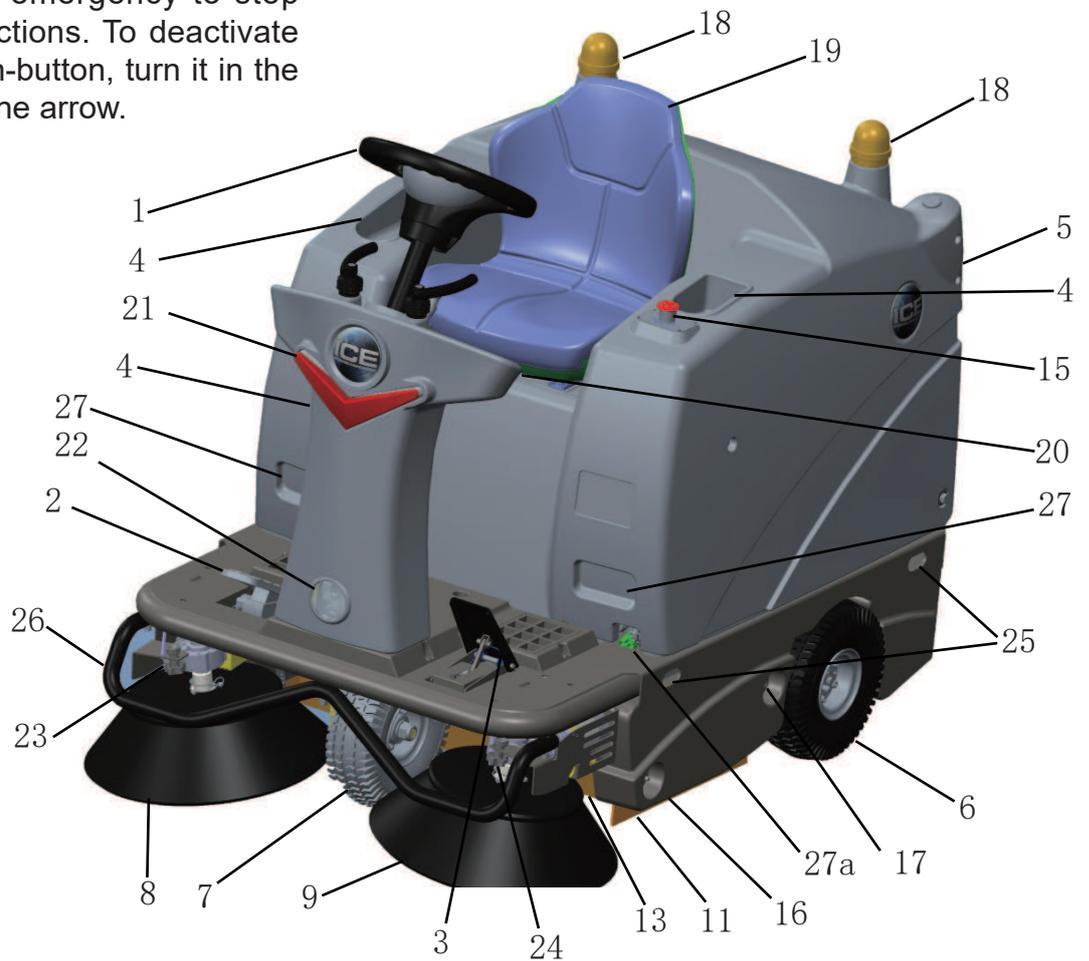
- Before performing any maintenance, repair, cleaning or replacement procedure disconnect the battery connector, remove the ignition key and engage the parking brake.
- This machine must be used by properly trained operators only. Children or disabled people cannot use this machine.
- Sharp turns must be made at slowest possible speed. Avoid abrupt turns on incline.
- Keep the batteries away from sparks, flames and incandescent material. During the normal operation explosive gases are released.
- Do not wear jewels when working near electrical components.
- Do not work under the lifted machine without supporting it with safety stands.
- When working under the open hood, ensure that it cannot be closed by accident.
- Do not operate the machine near toxic, dangerous, flammable and/or explosive powders, liquids or vapors. This machine is not suitable for collecting dangerous powders.

**WARNING!**

- Carefully read all the instructions before performing any maintenance/repair procedure.
- Take all necessary precautions to prevent hair, jewels and loose clothes from being caught by the machine moving parts.
- Before using the battery charger, ensure that frequency and voltage values, shown on the machine serial number plate, match the electrical mains voltage.
- Do not pull or carry the machine by the battery charger cable and never use the battery charger cable as a handle. Do not close a door on the battery charger cable, or pull the battery charger cable around sharp edges or corners. Do not run the machine on the battery charger cable. Keep the battery charger cable away from heated surfaces.
- Do not charge the batteries if the battery charger cable or the plug are damaged. If the battery charger cable is damaged, contact ICE Service Center.
- To reduce the risk of fire, electric shock, or injury, do not leave the machine unattended when it is plugged in. Before performing any maintenance procedure, disconnect the battery charger cable from the electrical mains.
- To avoid any unauthorized use of the machine, remove the ID card
- Do not leave the machine unattended without being sure that it cannot move independently.
- Do not use the machine on slopes with a gradient exceeding the specifications.
- Use only brushes supplied with the machine and those specified in the Operation Manual. Using other brushes could reduce safety.
- Before using the machine, close all doors and/or covers.
- Do not use the machine in excessively dusty areas.
- Do not wash the machine with direct or pressurised water jets, or with corrosive substances.
- Do not use compressed air to clean this type of machine, except for the filters (see the relevant paragraph).
- While using this machine, take care not to cause damage to other people, and children especially.
- Do not put any can containing fluids on the machine.
- The machine storage temperature must be 32°F to 104°F (0°C to +40°C).
- The machine working temperature must be 32°F to 104°F (0°C to +40°C).
- The humidity must be between 30% and 95%.
- Always protect the machine against the sun, rain and bad weather, both under operation and inactivity condition. Store the machine indoors, in a dry place. This machine must be used in dry conditions, it must not be used or kept outdoors in wet conditions.
- Do not use the machine as a means of transport, or for pushing/towing.
- Do not allow the brushes to operate while the machine is stationary to avoid damaging the floor.
- In case of fire, possibly use a powder fire extinguisher, not a water one.
- Do not bump into shelves or scaffoldings, especially where there is a risk of falling objects.
- Adjust the operation speed to suit the floor conditions.
- This machine cannot be used on roads or public streets.
- Do not tamper with the machine safety guards.
- Follow the routine maintenance procedures scrupulously.
- Do not remove or modify the plates affixed to the machine.
- In case of machine malfunctions, ensure that these are not due to lack of maintenance. Otherwise, request assistance from the authorised personnel or from an authorised Service Center.
- If parts must be replaced, require ORIGINAL spare parts from an Authorised Dealer or Retailer.
- To ensure machine proper and safe operation, the scheduled maintenance shown in the relevant chapter of this Manual must be performed by the authorised personnel or by an authorised Service Center.
- The machine must be disposed of properly, because of the presence of toxic-harmful materials (batteries, oils, etc.), which are subject to standards that require disposal in special centres (see the Scrapping chapter).

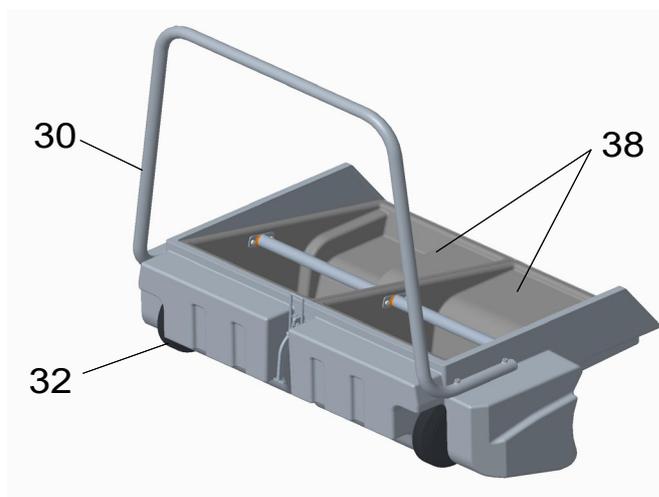
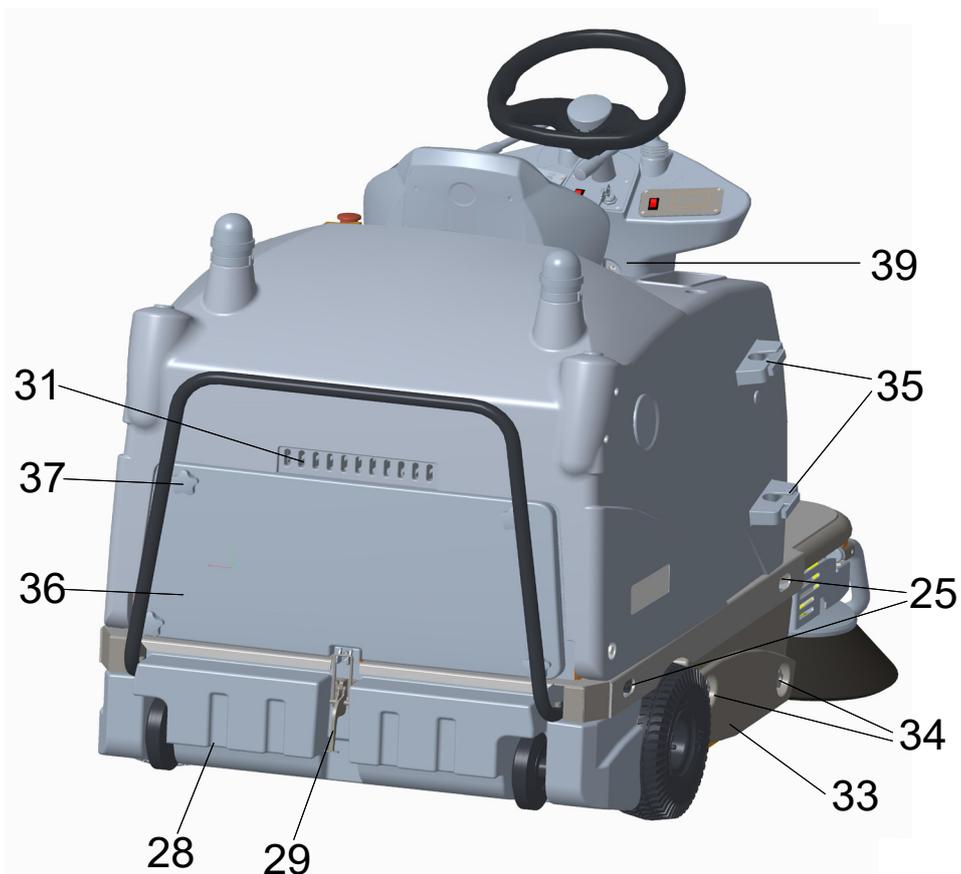
## MACHINE COMPONENTS

1. Steering wheel
2. Speed control pedal
3. Front skirt lifting pedal
4. Can holder
5. Body
6. Rear driving wheels on fixed axle
7. Front steering wheel
8. Right side brush
9. Left side brush
10. Main brush
11. Left side skirt
12. Right side skirt
13. Front skirt
14. Rear skirt
15. Emergency push-button  
Press it in case of emergency to stop all the machine functions. To deactivate the emergency push-button, turn it in the direction shown by the arrow.
16. Left cover (to be opened for performing maintenance procedures only)
17. Cover nuts
18. Flashing light (always on when the ignition key is turned to "I")
19. Driver's seat with safety microswitch
20. Seat longitudinal position adjusting lever
21. Led light
22. Working light (optional)
23. Right side brush height adjusting knob
24. Left side brush height adjusting knob
25. Machine lifting anchors
26. Front bumper
27. Body opening handles
- 27a. Off-board battery charger port



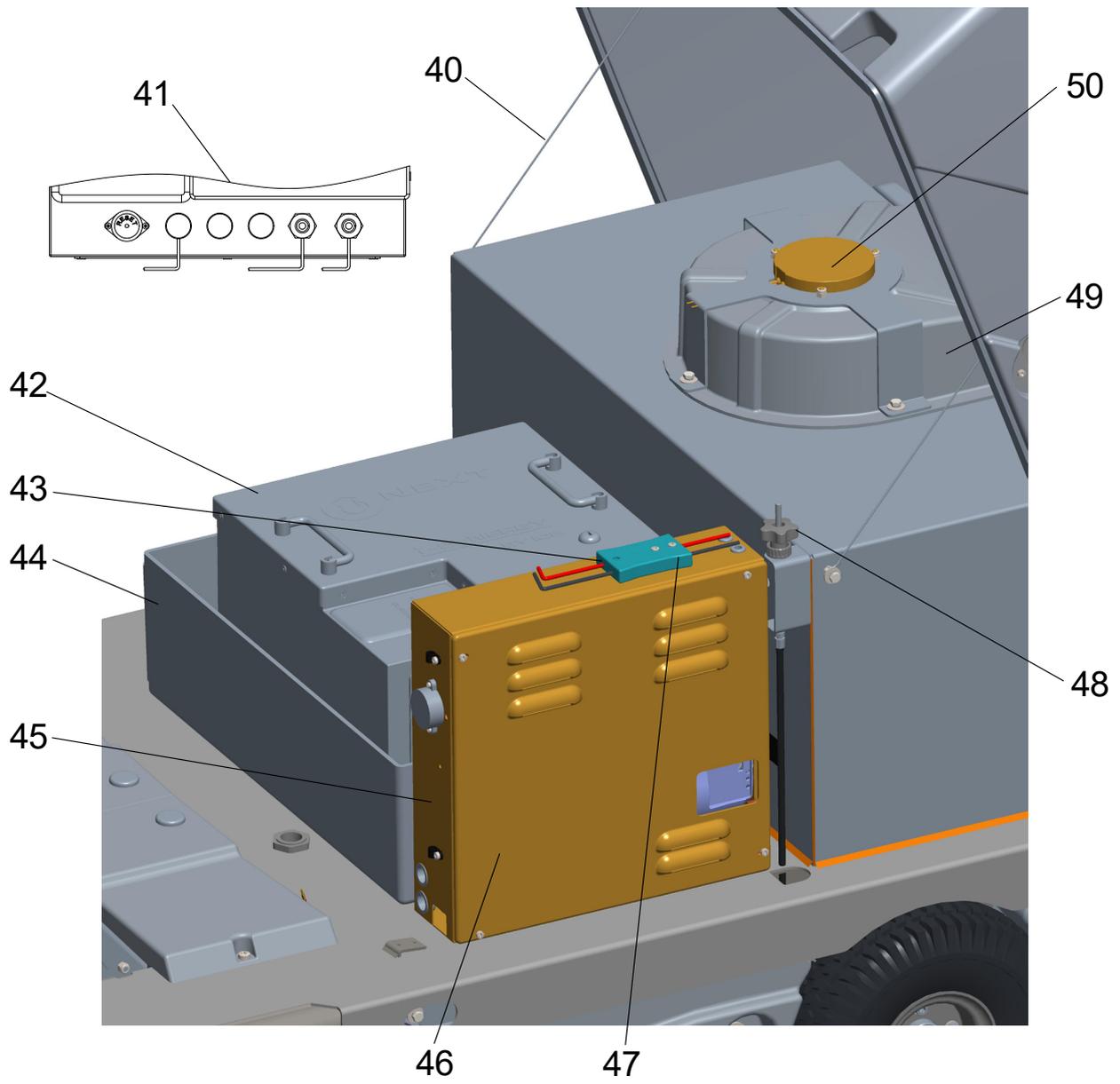
## MACHINE COMPONENTS (Continues)

- 28. Hopper (empty it when it is full)
- 29. Hopper fastening hook
- 30. Hopper handle
- 31. Exhaust hole
- 32. Hopper wheel
- 33. Right cover (for main broom removal)
- 34. Door knobs
- 35. Tool Holder
- 36. Vacuum filter compartment cover
- 37. Cover knobs
- 38. Internal containers with handle for dumping
- 39. Serial decal



## MACHINE COMPONENTS (Continues)

- 40. Body rope
- 41. Li\_ion batteries or optional gel batteries (GEL)
- 42. Battery connection diagram
- 43. Battery caps (for WET batteries only)
- 44. Battery connector
- 45. Battery container
- 46. Electrical component box
- 47. Electrical component cover
- 48. Machine connector
- 49. Main broom height adjusting knob
- 50. Vacuum Fan cover
- 51. Vacuum fan



## MACHINE COMPONENTS (Continues)

### Electrical component box

52. Drive system electronic board

53. Buzzer

54. Pillar

55. Main fuse

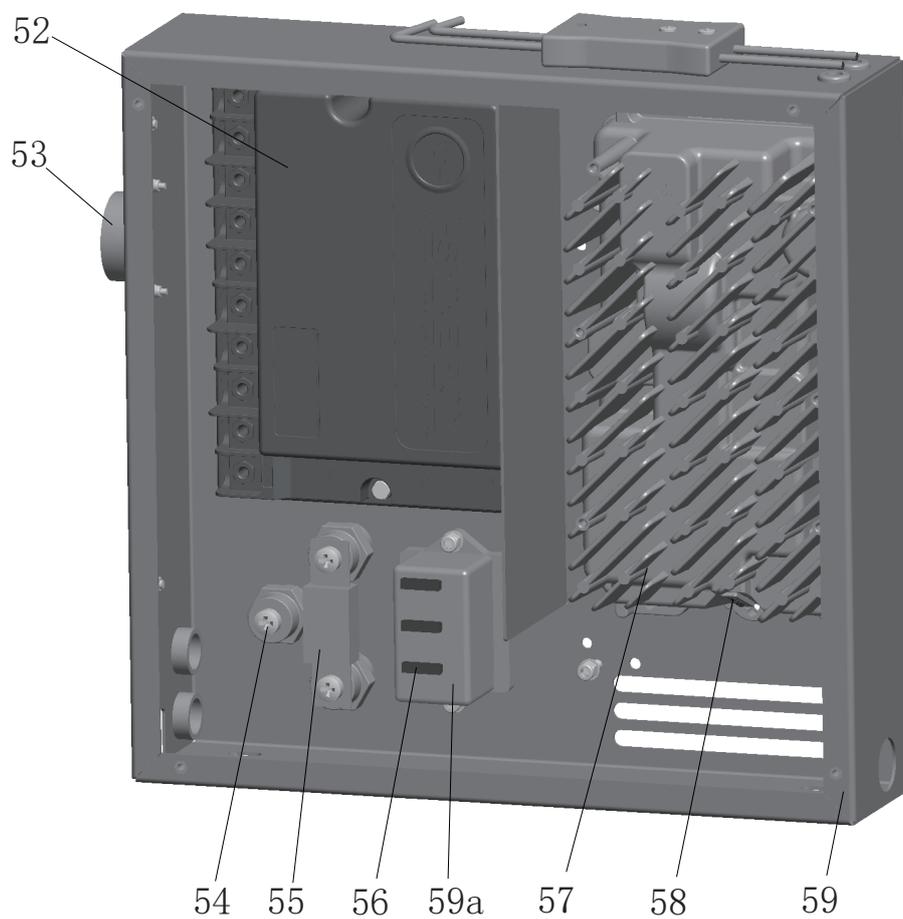
56. Lamellar fuse box

57. Electronic battery charger

58. Charged battery warning light

59. Electrical component box

59a. Fuse Holder

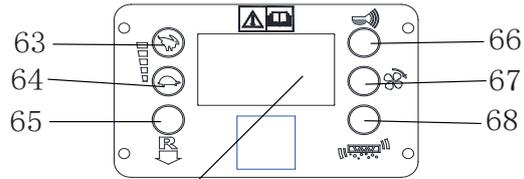
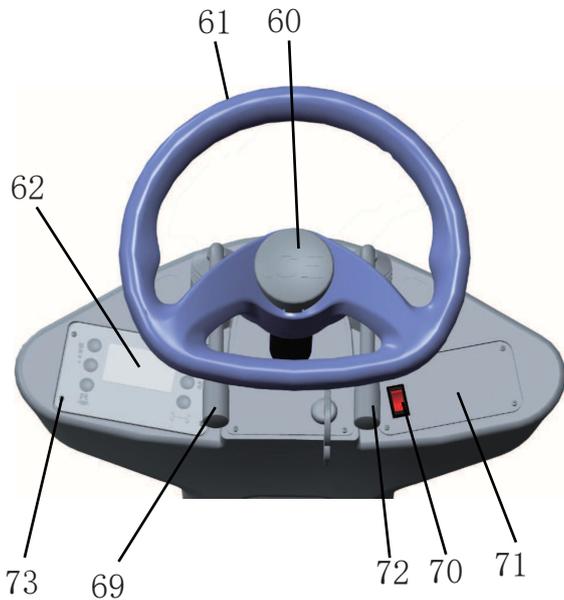


## MACHINE COMPONENTS (Continues)

### CONTROL PANEL

- 60. Cover, Steering wheel
- 61. Steering wheel
- 62. LCD display screen.
- 63. Speed increasing switch
- 64. Speed deincreasing switch
- 65. Backward direction switch, Buzzer indicates if backward direction is active (buzzer on) or not (buzzer off)
- 66. Buzzer enable switch
- 67. Vacuum enable switch
- 68. Filter shaker switch

- 69. Left and right side brush lifting/lowering lever
- 70. Switch (working light)
- 71. i-synergy™, ID card scanning area (when it turns the machine off and disables all functions; when turned on, it enables all machine functions; it also turns on the flashing light )
- 72. Main broom lifting/lowering lever
- 73. Panel fastening screws

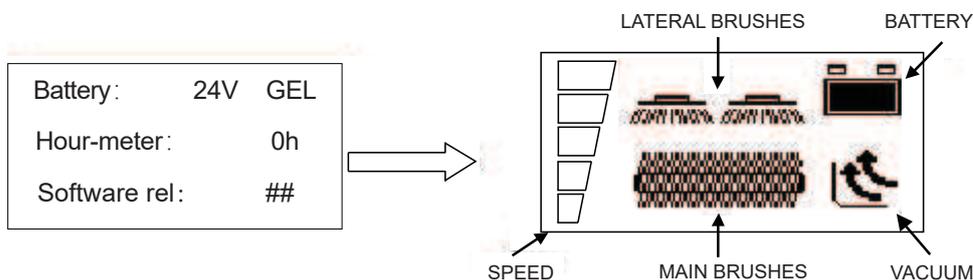


### BATTERY LEVEL INDICATOR

The battery level indicator shows the charge level of the batteries with a segmented display. When the batteries are fully charged, all the segments are lit. As the batteries discharge, the segments shut off.

The batteries should be recharged when only one segment displays. At this point, the battery icon will begin flashing, and sweeping and vacuum will automatically shut off to alert the operator of the battery condition. When all the segments have shut off, everything set off.

At power on, the display shows: battery voltage, hourmeter and software release (for about 1 second). Then system instantaneous conditions are shown: active functions, battery charge, active alarms...



### ACCESSORIES/OPTIONS

In addition to the standard components, the machine can be equipped with the following accessories/options, according to the machine specific use:

- Main and side brooms with harder or softer bristles
- Working light
- Skirts of various materials
- Protective roof

For further information concerning the optional accessories, contact an authorised Retailer.

## SPECIFICATIONS

<b>General</b>	<b>Values</b>
Machine length	59 in (1,500 mm)
Machine width (without side brushes)	36.8 in (937 mm)
Machine maximum height (at the steering wheel)	50.3 in (1,250 mm)
Cleaning width (without side brushes)	27.6 in (700 mm)
Cleaning width (with side brushes)	50.8 in (1,290 mm)
Minimum distance from the floor (skirts not included)	2.6 in (67 mm)
Main brush size (diameter x length)	11.8 x 27.6 in (300 mm x 700 mm)
Side brush diameter	17.7 in (450 mm)
Main brush speed	550 rpm
Side brush speed	80 rpm
Front steering wheel diameter	11.8 in (300 mm)
Rear driving wheel diameter	11.8 in (300 mm)
Front wheel specific pressure on the floor	159.5 psi (1.1 N/mm <sup>2</sup> )
Rear wheel specific pressure on the floor	101.5 psi (0.7 N/mm <sup>2</sup> )
Total machine weight (without batteries)	573.2 lb (255 kg)
Hopper capacity	21.2 gal (80 liters)
Main brush motor	0.67 HP (500 W)
Side brush motors	0.1 HP (80 W)
Drive system motor	0.8 HP (600 W), 110 rpm
Vacuum system motor	0.41 HP (310 W)
Filter shaker motor	0.13 HP (100 W), 6,500 rpm
Sound pressure level at workstation (A Lpa)	63.8 dB(A)
Vibration level at the operator's arms (*)	<8.2ft/s <sup>2</sup> (2.5m/s <sup>2</sup> )
Vibration level at the operator's body (*)	<1.9ft/s <sup>2</sup> (0.6m/s <sup>2</sup> )

(\*) Under normal working conditions, on a level asphalt surface.

<b>Performance</b>	<b>Values</b>
Maximum forward/reverse speed	3.7 mph (6 km/h)
Maximum reverse speed	1.8 mph (3 km/h)
Gradeability	11.3° (20 %)
Minimum turning radius	51.6 in(1,310mm)

<b>Batteries</b>	<b>Values</b>
Battery voltage	24 V
Standard battery	Li-ion battery (i-synergy),100Ah
Battery container inner size (length x width xheight)	21x14.7x6.1in(534x374x155mm)

	<b>Values</b>
Dust vacuuming and filtering	
Paper dust filter 5-10 µm	38.8ft <sup>2</sup> (3.6m <sup>2</sup> )
Main brush compartment vacuum	0.43 in (11mm H <sub>2</sub> O)
Filter shaker activation	Electric



## WIRING DIAGRAM

### Key

BAT	Batteries, 24V
CH1	Battery charger
DB	Display board
EB1	Function controller board
Fuse1	Main fuse (150A)
Fuse2	Vacuum fan&Horn&Electrobrake (15A)
Fuse3	Display card fuse (5A)
Fuse4	Working light & flashing light fuse (3A)
i-SYNERGY SW	i-SYNERGY starting up switch
K2	Working light switch
L1	Working light
L2	Led light
L3	Flashing light (left)
L4	Flashing light (right)
M1	Drive system motor
M2	Main brush motor
M3	Vacuum fan
M4	Right side brush motor
M5	Left side brush motor
M6	Filter shaker motor
Pedal	Drive speed potentiometer (pedal)
Out1	Electrobrake output
SWS	Emergency push-button
SW1	Driver's seat safety microswitch
SW2	Main brush microswitch
SW3	Side brush microswitch
WP	Cleaning area sensor

### Color code

BK	Black
BU	Blue
BN	Brown
GN	Green
GY	Grey
RD	Red
VT	Violet
WH	White
YE	Yellow

## **i-synergy™ INTRODUCTION**

i-synergy™ collects operational data from cleaning machines and transmit the information to ICE's server. The ICE server generates daily reports and send them to designated end users by email. From these reports, end users will have information about machines' usage and even specific timings.

Besides, i-synergy™ also collects data on lithium-ion battery, vacuum motor, brush deck motor, transaxle, and other electrical components at least once every minute when the machine is in use and even during battery charging.

i-synergy™ will send notifications instantly to the ICE server in case of any malfunction. ICE maintenance personnel will receive a SMS within minutes from the ICE server for immediate servicing.

## **OPERATION**



On some points of the machine there are some adhesive plates indicating:

- DANGER
- WARNING
- CAUTION

While reading this Manual, the operator must pay careful attention to the symbols shown on the plates. Do not cover these plates for any reason and immediately replace them if they are damaged.

## **BATTERY CHECK ON A NEW MACHINE**

**NOTE:**if the machine is equipped with electronic battery charger (optional), this must be connected to the batteries to allow the machine to operate.

The machine can be supplied in the following configurations:

- 一、 Li-ion battery already installed on the machine
- 二、 The on board Li-ion battery charger installed on the machine

According to machine configuration, proceed as follows.

### **一、 Li-ion batteries already installed on the machine**

- 1) Open the machine body(5) and check that the batteries are connected to the machine with the connector (44).  
Connect machine i-synergy™ COM port to the batteries.
- 2) Close the body (5).
- 3) Place the ID card on the scanning area (71) to turn on the machine.  
If the battery level indicator shows all the segment , the batteries are charged.  
If the battery level indicator begins flashing, the batteries must be charged (see the procedure in Maintenance chapter).

**Lithium-ion battery must be stored in a charged state, please charge monthly.**

---

## SWEEPING AND BRUSH INFORMATION

Pick up oversized debris before sweeping. Flatten or remove bulky cartons from aisles before sweeping. Pick up pieces of wire, twine, string, etc., which could become entangled in the brush or brush plugs

Plan the sweeping in advance. Try to arrange long runs with minimum stopping and starting. Do an entire floor or section at one time. Drive the straightest path possible. Avoid bumping into posts or scraping the sides of the machine. Overlap the brush paths.

Avoid turning the steering wheel too sharply when the machine is in motion. The machine is very responsive to the movement of the steering wheel. Avoid sudden turns, except in emergencies. For best results, use the correct brush type for your sweeping application. The following are recommendations for main sweeping and side brush applications.

### **Polypropylene main brush&side brush**

Superior pick-up of sand, gravel, and paper litter. polypropylene retains its stiffness when wet and can be used indoors or outdoors with equal performance, Not recommended for high-temperature debris.

### **Mix Fiber main brush&side brush**

The natural choice for cleaning fine debris on carpet and sweeping very heavy dust and other fine particles on hard surfaces. When cleaning carpet, check brush and perma filter panel regularly for carpet debris.

### **Polypropylene&wire main brush&side brush**

Polypropylene gives this brush good general-purpose sweeping ability. While the wire provides a light cutting action for impacted dirt or mud.

### **Nylon main brush&side brush**

Excellent wear life, but less aggressive and performs less well in conditions with moisture or high humidity. Often used on rough surfaces or high-temperature environments because of its toughness and long wear characteristics.

## STARTING AND STOPPING THE MACHINE

### Starting the machine

- 1) Sit on the driver's seat (19).
- 2) If necessary, adjust the seat to a comfortable position by using the lever (20).
- 3) Turn on the machine and do not press the pedal (2). Check that battery level indicator on the LCD display screen shows all the segment(charged battery). If battery level indicator begins flashing, turn off the machine and charge the batteries (see the procedure in Maintenance chapter).
- 4) Drive the machine to the working area, by keeping the hands on the steering wheel and pressing the pedal (2) to move forward and press the switch (65) to move backward (buzzer on). The drive speed can be adjusted from zero to maximum speed by increasing the pressure on the pedal (2).

**Note:**The seat (19) is equipped with a safety sensor, which allows the machine to be driven by pressing the pedal (2) only when the operator is on the driver's seat.

- 5) Lower the main brush(10) with the lever (72); it will start turning.
- 6) Turn on the vacuum fan(51) by pressing the switch (67).

**Note:**The vacuum system turns on only when the main brush is lowered.

- 7) Lower the side brushes (8 and 9) with the lever (69).

**Note:**The side brushes (8 and 9) can be lowered and lifted even when the machine is moving.

**The side brushes do not turn when they are lifted or when the main brush is lifted.**

- 8) Start sweeping by turning the steering wheel (1) and moving the machine forward by pressing the pedal (2).

### Stopping the machine

- 9) To stop the machine, release the pedal (2).  
In case of emergency, press the emergency push-button (15) to immediately stop the machine. To deactivate the emergency push-button (15), turn it in the direction shown by the arrow.
- 10) Lift the side brushes (8 and 9) with the lever (69).
- 11) Turn off the vacuum fan(51) by pressing the switch (67) .
- 12) Lift the main brush (10) with the lever (72).
- 13) To stop the machine, turn off the machine.



**WARNING! Before leaving machine or performing any maintenance, repair, cleaning or replacement procedure, stop on level surface, turn off machine, and remove ID card.**

## MACHINE OPERATION



**WARNING! Pay careful attention when operating the machine at high speed: sudden steering could cause this three-wheel machine to become unstable due to weight distribution.**

**Always reduce the speed before steering.**

- 1) Avoid stopping for a long time with the machine in the same position and the brushes turning: this could create unwanted marks on the floor.
- 2) To collect light and bulky waste materials, lift the front skirt by pressing the pedal (3); take into consideration that the machine vacuum capability is reduced when the front skirt is lifted.



**CAUTION! When operating on wet grounds, it is essential to turn off the vacuum fan with the switch (67) to prevent the dust filter from being damaged.**

- 3) For machine proper operation, the dust filter must be as clean as possible. To clean it while sweeping, turn on the filter shaker by pressing the switch (68), it will last a few seconds.  
During this operation the vacuum fan is automatically shut off.  
After cleaning the filter, then start sweeping again.  
While working, repeat the procedure every 15 minutes on average (depending on the dustiness of the area to be cleaned).

**NOTE: When the dust filter is clogged and/or the hopper is full, the machine cannot collect dust and debris anymore.**

- 4) The hopper (28) should be dumped after each working period and whenever it is full (see the procedure in the next paragraph).

## HOPPER EMPTYING

- 1) Stop the machine on a level surface by releasing the drive pedal.
- 2) Turn off the machine.
- 3) Disengage the hook (29) by pulling its lower end.
- 5) Remove the hopper (28) by using the handle (30) and by disengaging it from the inner guides.  
To move the hopper (28) by using the handle (30).  
Discharge all the debris into special containers. To make discharging procedure easier, inside the hopper there are two different containers (optional) with handle (38).
- 6) Install the containers with handle (38), if equipped.
- 7) Install the hopper (28) and engage it to the inner guides, then fasten it with the hook (29).
- 8) The machine is ready to start sweeping again.

## AFTER USING THE MACHINE

After working, before leaving the machine, perform the following procedures.

- 1) Lift the side brushes with the lever (69).
- 2) Lift the main brush with the lever (72).
- 3) Turn on the filter shaker with the switch (68).
- 4) Empty the hopper (28) (see the procedure in the previous paragraph).
- 5) Turn off the machine (71).

## PUSHING/TOWING THE MACHINE

To push/tow the machine when it is turned off, no special prearrangement is necessary.

## MACHINE STORAGE

If the machine is not going to be used for more than 30 days, proceed as follows:

- 1) Check that the machine storage area is dry and clean.
- 2) Disconnect the battery connector (44).

## FIRST PERIOD OF USE

After the first 8 hours perform the following procedures:

- Check the fastening and connecting parts for proper tightening.
- Check the visible parts for integrity and leakages.

## MAINTENANCE

The lifespan of the machine and its maximum operating safety are ensured by proper and regular maintenance.

The following table provides the scheduled maintenance. The intervals shown may vary according to particular working conditions, which are to be defined by the person in charge of the maintenance.

All scheduled or extraordinary maintenance procedures must be performed by qualified personnel, or by an authorised Service Center.

This Manual describes only the easiest and most common maintenance procedures.

For other maintenance procedures shown in the Scheduled Maintenance Table, refer to the Service Manual that can be consulted at any Service Center.



**Warning! To perform maintenance procedures, the machine must be off on a level surface, and, if necessary, the batteries must be disconnected.**

**Read carefully the instructions shown in Safety chapter before performing any maintenance procedure,**

## SCHEDULED MAINTENANCE TABLE

Procedure	Upon delivery	Every 10 hours	Every 50 hours	Every 100 hours	Every 200 hours	Every 400 hours
Side and main brush height check and adjustment						
Dust filter cleaning and integrity check						
Skirt height and operation check						
Filter shaker operation check						
Main brush driving belt visual inspection						
Nut and screw tightening check				(1)		
Steering chain check and cleaning						
Main brush driving belt replacement						
Main motor and drive system motor carbon brush check or replacement						

(1) And after the first 8 running-in hours.

## MAIN BRUSH HEIGHT CHECK AND ADJUSTMENT

**NOTE:**Brushes with harder or softer bristles are available. This procedure is applicable to all types of brushes.

1) Check the main brush distance from the floor as shown below:  
 -Drive the machine on a level floor.  
 -Keep the machine stationary, lower the main brush and turn it on for a few seconds.  
 -Stop and lift the main brush, then move the machine and switch it off.  
 -Check that the main brush print (A, Fig. 1), along its length is 0.8 to 1.6 in (2 to 4 cm) wide.  
 If the print (A) is not within specifications, adjust the brush height as shown in step 2.

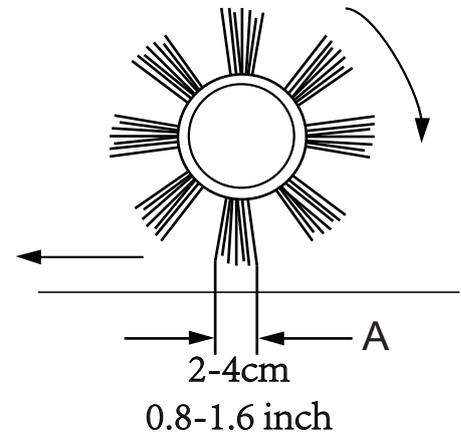


Figure1

2) Turn off the machine.  
 3) Open the body(5)  
 4) Loosen the knob (A, Fig. 2) on the left side of the machine.  
 5) Turn the knob (B, Fig. 2) and remind that:  
 -It must be screwed to lift the brush;  
 -It must be unscrewed to lower the brush.

After the adjustment, hold the knob (B) and tighten the knob (A).

6) Perform step 1 again to check the proper adjustment of the main broom height.  
 8) When the brush is too worn to be adjusted, replace it as shown in the next paragraph.

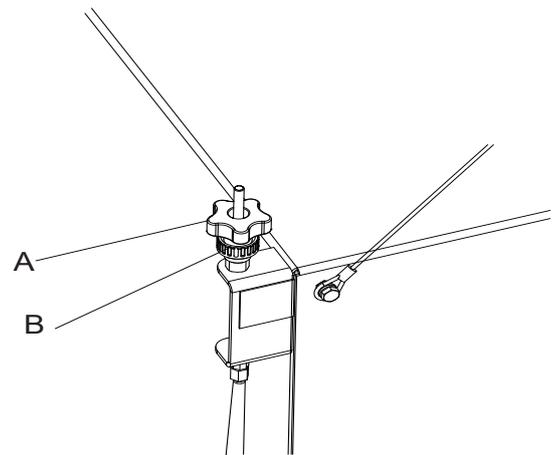


Figure2

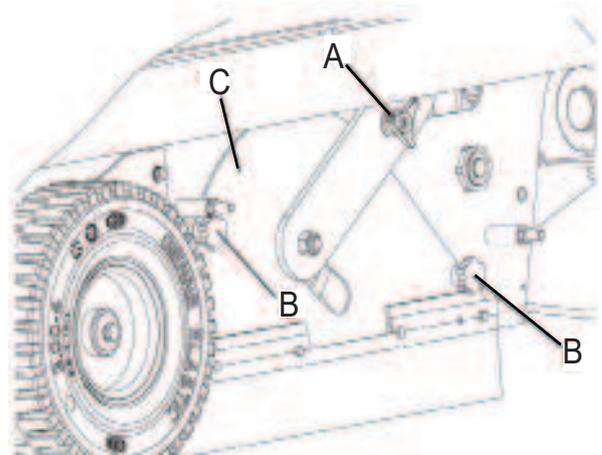
**CAUTION!** If the main broom print is excessive (larger than 1.6 in (4 cm)), the machine regular operation is affected and the moving or electrical parts can overheat, thus reducing machine life. Pay careful attention when performing the above-mentioned checks, and always use the machine according to the indicated conditions.

## MAIN BRUSH REPLACEMENT

**NOTE:**Brushes with harder or softer bristles are available. This procedure is applicable to all types of brooms.

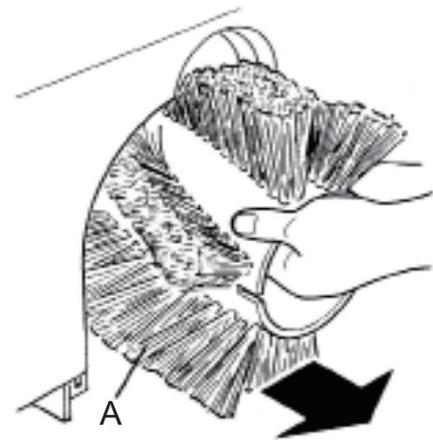


**CAUTION!** It is advisable to wear protective gloves when replacing the main brush because there can be sharp debris between the bristles.

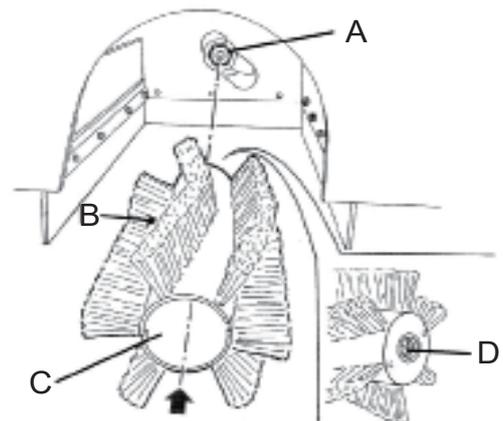


**Figure3**

- 1) Drive the machine on a level floor and release the pedal (2) and stop the machine.
- 2) Turn on the machine
- 3) Unscrew the knobs (34) and remove the right cover (33).
- 4) Loosen the knob (A, Fig. 3).
- 5) Unscrew the knobs (B, Fig. 3) and remove the brush compartment cover (C).
- 6) Remove the brush (A, Fig.4)
- 7) Check that the drive hub (A, Fig. 5) is free from dirt or foreign materials (ropes, rags, etc.) accidentally rolled up.
- 8) The new main brush must be installed with the bristles rows (B, Fig. 5) bent as shown in the figure.
- 9) Install the new main brush (C, Fig. 5) and ensure that the mesh (D) correctly fits into the relevant drive hub (A).
- 10) Install the broom compartment cover (C, Fig. 3) and tighten the knobs (B) and (A).
- 11) Install the right cover (33), then tighten the knobs (34).
- 12) Check and adjust the main broom height as shown in the previous paragraph.



**Figure4**



**Figure5**

## SIDE BRUSH HEIGHT CHECK AND ADJUSTMENT

**NOTE:Brushes with harder or softer bristles are available. This procedure is applicable to all types of brushes.**

1) Check the side brush distance from the floor, according to the following procedure:

-Drive the machine on a level ground and lower the side brushes.

-Keep the machine stationary and turn on the side brushes for a few seconds.

-Lift the side brushes, then move the machine and turn it off.

-Check that the side brush prints are as shown in the figure (A and B, Fig. 6).

If the print is not within specifications, adjust the brush height, according to the procedure shown in step 2.

2) Turn off the machine.

3) Loosen the knob (A, Fig. 7) positioned above the brush.

4) Turn the knob (B, Fig. 7) and remind that:

-It must be screwed to lift the brush;

-It must be unscrewed to lower the brush.

After the adjustment, hold the knob (B) and tighten the knob (A).

5) Perform step 1 again to check the proper adjustment of the side brush height.

6) When the brushes are too worn and can no longer be adjusted, replace them according to the procedure shown in the relevant paragraph.

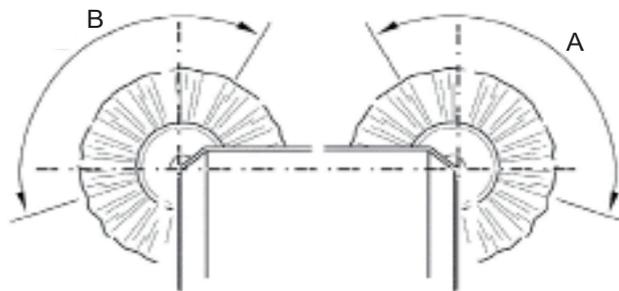


Figure6

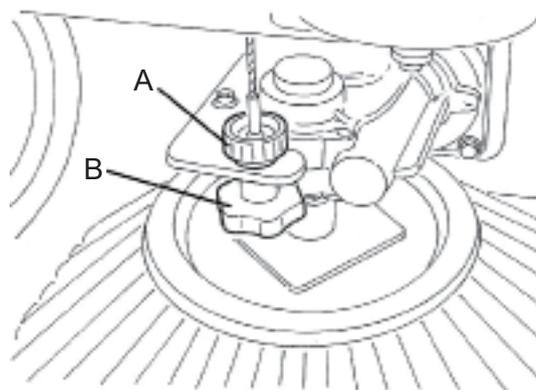


Figure7

## SIDE BRUSH REPLACEMENT

**NOTE:Brushes with harder or softer bristles are available. This procedure is applicable to all types of brushes.**



**CAUTION! It is advisable to wear protective gloves when replacing the side brushes because there can be sharp debris between the bristles.**

1) Drive the machine on a level ground and release the pedal (2) and stop the machine.

2) Turn off the machine.

3) Release the spring (A, Fig. 8), remove the pin (B) and the brush (C) from the gearmotor shaft.

4) Install the new side brush on the gearmotor shaft, insert the pin (B, Fig. 8) in the holes (D, Fig. 8), and engage the spring (A, Fig. 8)

5) Check and adjust the side brush height as shown in the previous paragraph.

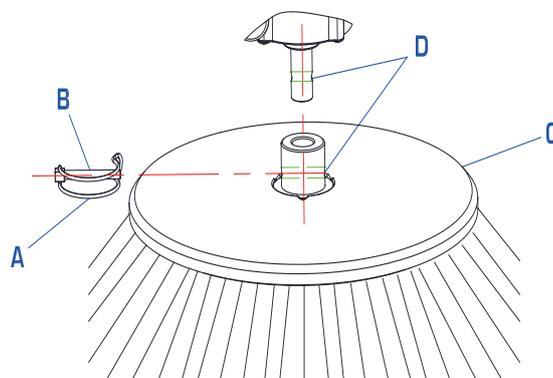


Figure8

## DUST FILTER CLEANING AND INTEGRITY CHECK

**NOTE:** Besides the standard paper filter, polyester filters are also available. The following procedure is applicable to each type of filter.

- 1) Drive the machine on a level floor and release the pedal (2) and stop the machine.
- 2) Turn on the machine.
- 3) Disengage the hook (29) by pulling its lower end.
- 4) Remove the hopper (28) by using the handle (30) and by using hand and by disengaging it from the inner guides.
- 5) Unscrew the knobs (37) and remove the filter compartment cover (36).
- 6) Loosen the knobs (A, Fig.9).
- 7) Disconnect the connector (B, Fig.9) from the filter shaker motor (C).
- 8) Remove the dust filter fastening frame (D, Fig.9).
- 9) Remove the dust filter (E, Fig. 9).
- 10) In an outdoor area, clean the filter by shaking it on a level and clean surface, tapping the side (A, Fig. 10) opposite to the wire gauze (B).

Complete the cleaning procedure by using compressed air (C, Fig. 10) at maximum 6 Bar, blowing only from the side of the wire gauze (B), at a minimum distance of 11.8 in (30 cm).

According to the filter type, observe the following cautions:

- Paper filter : Do not use water or detergents to clean it, otherwise it can be damaged.
- Polyester filter : For a better cleaning, it is allowed to wash the filter with water and non-lathering detergents. This provides better quality cleaning but reduces the life of the filter, which will have to be replaced more frequently. The use of inadequate detergents can damage the filter.

- 11) Check the filter body for tears. If necessary, replace the filter.

13) Clean the rubber gasket (A, Fig.10) of the cover (36) and check it for integrity and efficiency; if necessary replace it.

14) Assemble the components in the reverse order of disassembly, and note the following:

- Install the filter (E, Fig. 9) with the wire gauze (B, Fig. 10) facing upwards.

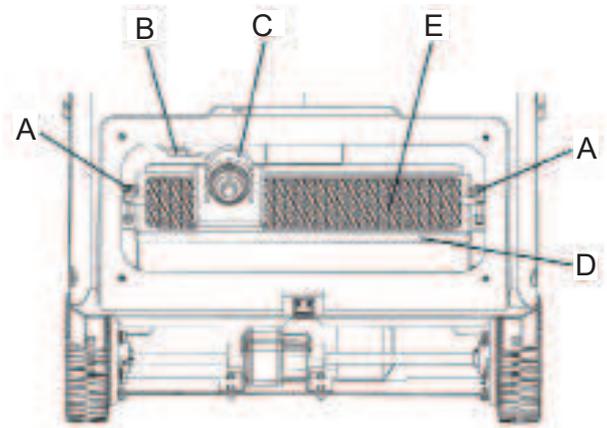


Figure9

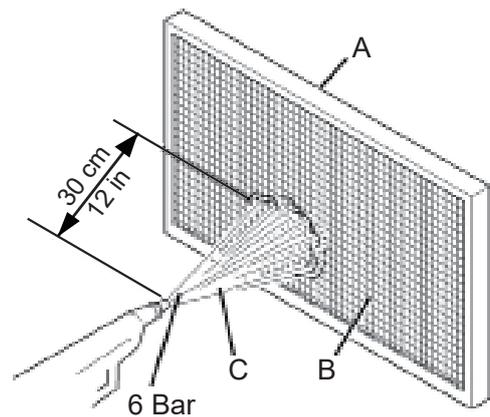


Figure10

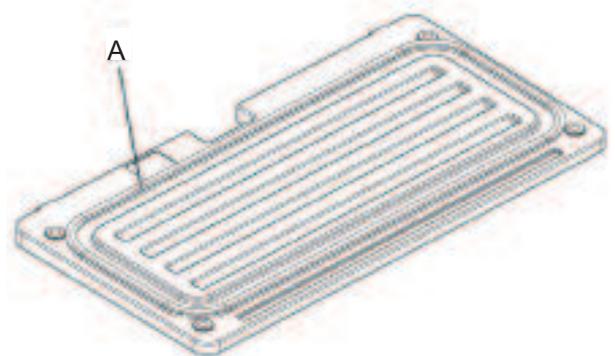


Figure11

## SKIRT HEIGHT AND OPERATION CHECK

- 1) Drive the machine on a level floor that is suitable for checking the skirt height.
- 2) Turn off the machine.

### Side skirt check

- 1) Unscrew the knobs (17 and 34) and remove both left (16) and right covers (33).
- 2) Check the side skirts (11 and 12) for integrity. Replace the skirts when they have cuts (A, Fig. 12) larger than 0.79 in (20 mm) or cracks (B) larger than 0.39 in (10 mm) (for skirt replacement).
- 3) Check that distance from the ground of the side skirts (11 and 12) is within 0 – 0.12 in (0 – 3 mm) (A, Fig. 13). If necessary, adjust the skirt height by using the slots on the screws (A, Fig. 16).
- 4) Assemble the components in the reverse order of disassembly.

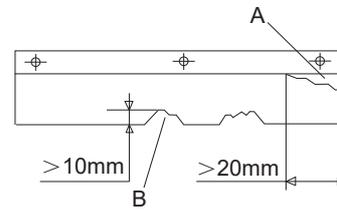


Figure12

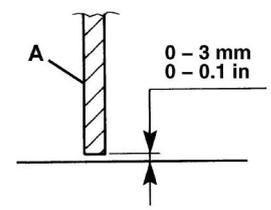


Figure13

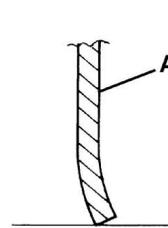


Figure14

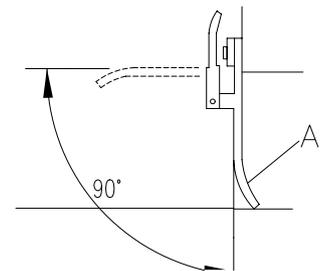


Figure15

### Front and rear skirt check

- 1) Remove the main brush as shown in the relevant paragraph.
- 2) Check the front (13) and rear skirts (14) for integrity. Replace the skirts when they have cuts (A, Fig. 12) larger than 0.79 in (20 mm) or cracks (B) larger than 0.39 in (10 mm) (for skirt replacement).
- 3) Check that:
  - The front skirt (A, Fig. 17) slightly touches the floor (A, Fig. 14).
  - The distance from the ground of the rear skirt (B, Fig. 17) is within 0-0.12 in 0-3 mm (A, Fig. 12).

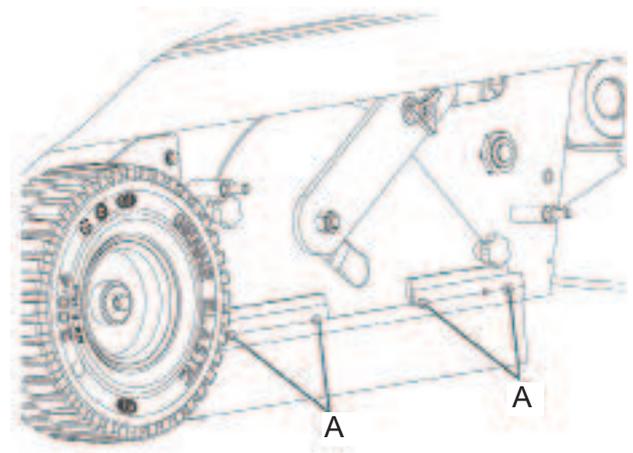


Figure16

- 4) If necessary, adjust the skirt height by using the slots on the screws (C and D, Fig. 17).
- 5) Press the front skirt lifting pedal (3) and check that the front skirt (A, Fig. 15) turns upward for about 90° (as shown in the figure); then release the pedal and check that the skirt does not remain in an intermediate position but returns to its initial position. If necessary, for the front skirt control cable adjustment or replacement.
- 6) Assemble the components in the reverse order of disassembly.

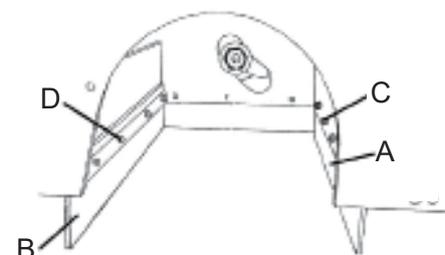


Figure17

## BATTERY CHARGING



**CAUTION!** Charge the batteries when battery level indicator begins flashing and at the end of each cleaning cycle. Keeping the batteries charged make their life last longer.



**WARNING!** When the batteries are discharged, charge them as soon as possible, as that condition makes their life shorter.



**WARNING!** Do not smoke while charging the batteries. While charging the batteries always keep the body open.

- 1) Drive the machine on a level floor and release the pedal (2) and stop the machine.
- 2) Turn off the machine.
- 3) Open the body (5).
- 4) Charge the batteries according to the following methods,

### Charging the batteries with an external battery charger

1) Check that the battery charger is suitable by referring to the Battery Charger Manual. The battery charger voltage rating is 24 V.



**CAUTION!** Use a battery charger suitable for the type of batteries installed.

- 2) Connect the external battery charger to the charger port(27a).
- 3) Connect the battery charger to the electrical mains.
- 4) After charging, disconnect the battery charger from the electrical mains and from the charger port(27a).
- 5) Close the body(5). The machine is ready to be used.

### Charging the batteries with the on-board battery charger

1) Connect the battery charger cable to the electrical mains.



**WARNING!** Check that the voltage and frequency shown on the machine serial number plate (39) match the electrical mains values.

**NOTE:** When the battery charger is connected to the electrical mains, all machine functions are automatically disabled.

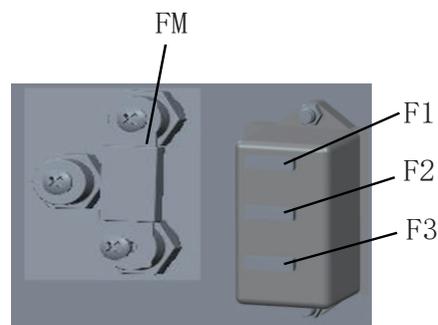
- 2) When the green warning light (58) turns on, the batteries are charged.
- 3) For further information about the battery charger operation (57), see the Battery Charger Manual.
- 4) Disconnect the battery charger cable from the electrical mains and place it in its housing on the machine.
- 5) Close the body (5). The machine is ready to be used.

## FUSE CHECK/REPLACEMENT/RESET

- 1) Drive the machine on a level floor and release the pedal (2) and stop the machine.
- 2) Turn off the machine.
- 3) Open the body(5).
- 4) Disconnect the battery connector (44).

### Lamellar fuse check/replacement

- 1) Remove the electrical component box cover (47).
- 2) Check/replace the following fuse (Fig. 18):  
FM: (A): Main fuse (150A)
- 3) Remove the fuse box cover (59a).
- 4) Check/replace the relevant fuse among the following (Fig. 18):  
F1: Main fuse (key circuit) (15A)  
F2: Display board fuse (5A)  
F3: Working light fuse (3A)



**Figure18**

## SAFETY FUNCTIONS

The machine is equipped with the following safety functions.

### EMERGENCY PUSH-BUTTON

It is located in an easily accessible position(15).It has to be pressed in case of emergency, to stop all the machine functions.

### DRIVER'S SEAT MICROSWITCH

It is located inside the driver's seat and it does not allow the machine drive system to operate if the operator is not seated on the driver's seat.

## ALARMS

Active alarms are shown on the display.

Alarm #id	Meaning	Action
F01:Seat Empty	No sit in the seat or Seat circuit open	Sit in the operator seat or Check circuit
F04:Vac Mtr O.L RE-START	Vac Mtr ammeter protection	Verify vacuum motor working current value
F05:Main Bru Mtr O.L RE-START	Main bru mtr ammeter protection	Verify main bru motor working current value
F06:Side Bru Mtr O.L RE-START	Side bru mtr ammeter protection	Verify side bru motor working current value
F07:Propel Mtr O.L	Propel Motor ammeter protection	Verify Propel Motor current value
F10:Batt Low Charge batt	Battery is low	Charging the battery
F11:Batt Very Low Charge batt NOW!!	Battery is very low	Charging the battery
F12:Brake Wiring Error	Brake circuit open	Check brake wirings and circuit
F13:Release Foot Pedal	Stepping the foot pedal when starting machine	Release the foot pedal when turn on the machine
F14:Replace Brake Assy	Brake circuit short	Check brake wirings and circuit
F16:Control Unit Overheat! Wait	Over Temp or Control Unit Fault	Verify motor working current value or Change Control Unit
F17:Replace Control Unit	Temp. Sensor failure	ChangeControl Unit
F18:Replace Foot Pedal Assy	Foot Pedal Sensor failure	Verify pedal wirings and pedal sensor
F20:Check Main Brush Motor	Main Motor error or circuit open	Verify wirings and main brush motor
F21:Check Vac Mtr	Vac Motor error or circuit open	Verify wirings and vac motor
F24:Check Propel Motor	Propel Motor error or circuit open	Verify wirings and propel motor
F25:Check Side Brush Motor	Side Brush Motor error or circuit open	Verify wirings and side brush motors
F40:Check Proximity Sw	Sw Sensor failure	Change Sw Sensor
F42:Replace Control Unit	Relay Contact error	Change Control Unit
F43:Turn Dead Sw Off RE-START	Emergency stop button be actived or circuit open	Reset emergency stop button, restart the machine or check circuit
F44:Replace Control Unit	Control Unit Fault	Change Control Unit
F45:Return Control Unit	Control Unit Fault	Change Control Unit
F46:Return Control Unit	Control Unit Fault	Change Control Unit
F47:Replace Control Unit	Control Unit Fault	Change Control Unit
F48:Return Control Unit	Control Unit Fault	Change Control Unit

## TROUBLESHOOTING

Trouble	Possible cause	Remedy
The machine does not start when turning the machine on.	The battery connector (44) is disconnected.	Connect the battery connector.
	The FM fuse in the holder (54) is open.	Replace the FM fuse.
	The battery charger cable is connected to the electrical mains.	Disconnect the battery charger cable from the electrical mains.
The main brush does not work.	The main brush microswitch faulty.	Replace the main brush microswitch.
The side brushes do not operate.	The main brush is not lowered.	Lower the main brush.
	The side brush microswitch faulty.	Replace the side brush microswitch.
The machine operates only when stationary, otherwise battery level indicator begins flashing,.	The batteries are discharged.	Charge the batteries. If the problem persists, replace the battery.
The battery autonomy is low.	The batteries are dead.	Replace the batteries.
	The battery capacity is low.	Buy batteries with higher capacity (see the Technical Data paragraph).

## SCRAPPING

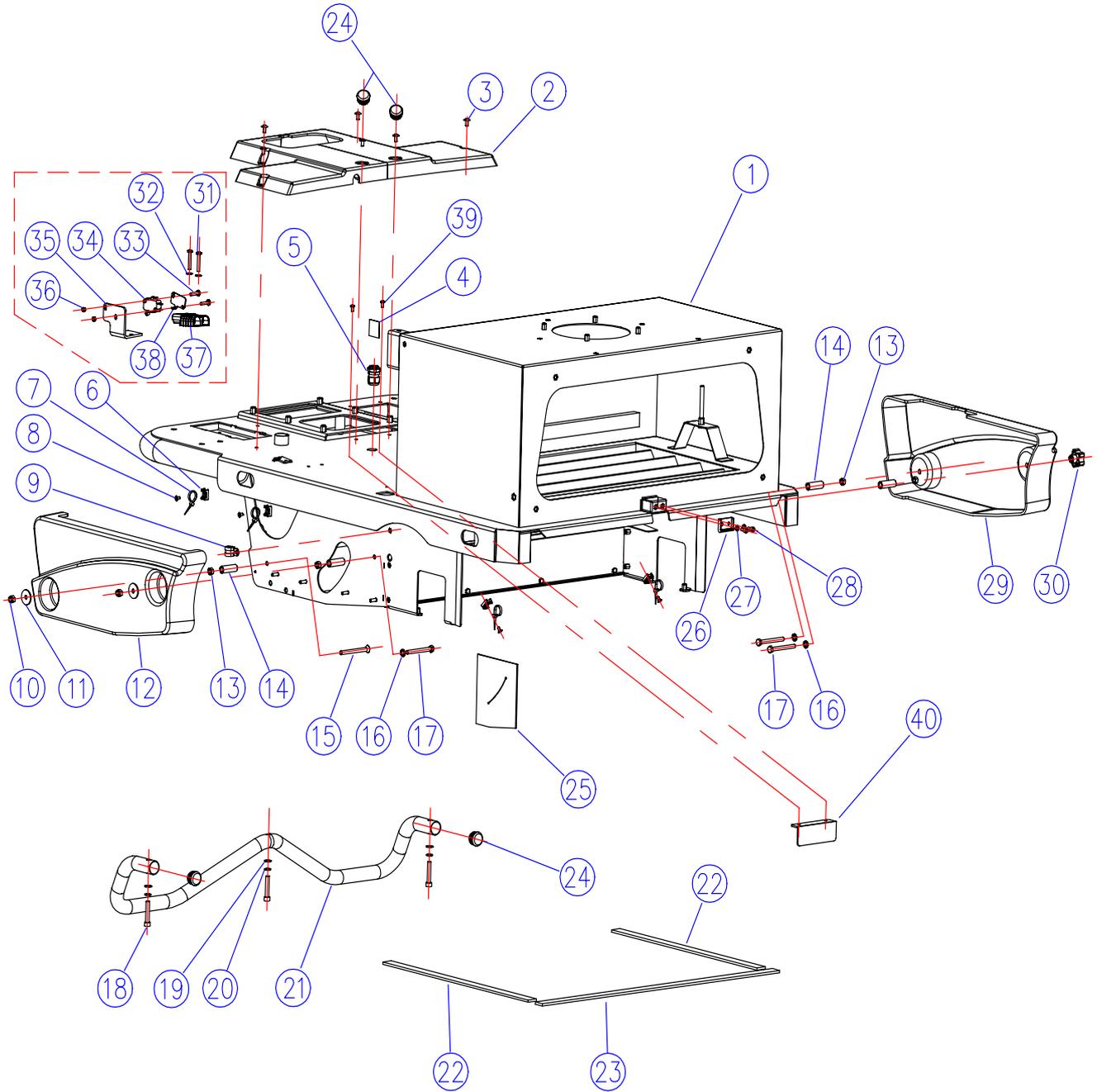
Have the machine scrapped by a qualified scrapper.

Before scrapping the machine, remove and separate the following materials, which must be disposed of properly according to the Law in force:

- Batteries
- Engine oil
- Polyester dust filter
- Main and side brushes
- Plastic hoses and components
- Electrical and electronic components (\*)

(\*) Refer to the nearest ICE Center especially when scrapping electrical and electronic components.

# CHASSIS ASSEMBLY



OPERATOR

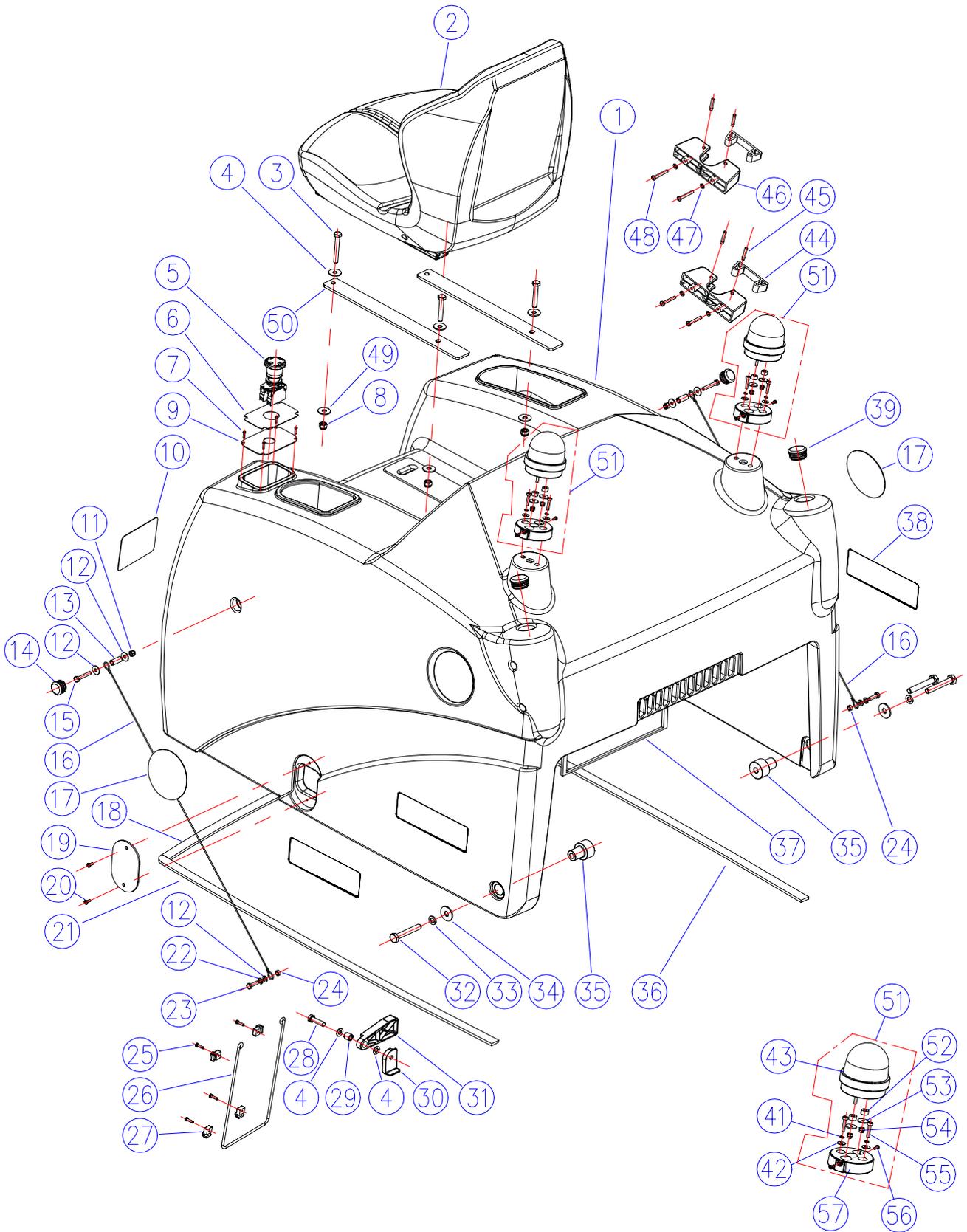
PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	7000000	Chassis Assembly		1
2	7000028	Foot Borad		1
3	1221614	Screw,Ph,M6X14		6
4	7000712	Decal,Main Brush Adjustment		1
5	7000277	Strain Relief		1
6	7000275	Clamp Support		4
7	1914080	Plastic Clamp		4
8	1513510	Countersunk Hex Screw,M5X10		5
9	6150712	Clamp		1
10	1123810	Nut,Lock,SS,M8		2
11	1421828	Washer,Plain, $\phi$ 8X $\phi$ 28X3		2
12	7000414	Left Cover		1
13	1121807	Nut,SS,M8		4
14	7000033	Spacer		4
15	1513875	Countersunk Hex Screw,M8X75		1
16	1434800	Spring Lock Washer, $\phi$ 8		1
17	1021870	Screw, RHM, M8X70, SST		3
18	1022845	Screw, RHM, M8X45, SST		3
19	1411816	Washer,Plain, $\phi$ 8X $\phi$ 16X1.6		3
20	1422821	Washer, Lock, $\phi$ 8		3
21	7000269	Front Bumper		1
22	7000271	Gasket		2
23	7000270	Gasket		1
24	7000283	Cap		4
25	7000286	Gasket		1
26	7000181-4	Hook		1
27	1422616	Washer, Lock, $\phi$ 6		2
28	1521612	Socket Head, M6X12, SST		2
29	7000415	Right Cover		1
30	7000180	Knob		2
31	1221425	Screw,Ph,M4X25		2
32	1421412	Washer,Plain, $\phi$ 4X $\phi$ 11X1		2
33	1211320	Screw,Ph,M3X20		2
34	8310423	Micro Switch		1
35	7000319	Bracket (for Gel battery charger)		1
36	1123305	Nut,Lock,SS,M3		2
37	7000762	Anderson Connector(for Gel battery charger)		1
38	7000326	Plate		1
39	1221512	Screw,Ph,M5X12		2
40	7000225	Plate,Front		1

NOTES:

DIA NO. 31-38 are only used for sales machine, i-Synergy is not used.

BODY ASSEMBLY



PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	7000311	Body		1
2	7000276A	Seat	60152100101-60152100275	1
	7000281	Seat	60152100276-	1
3	1022855	Screw, RHM, M8X55, SST		4
4	1411816	Washer, Plain, $\phi$ 8X $\phi$ 16X1.6		6
5	8310707	Emergency Switch		1
6	7000299	Decal, Emergency Switch		1
7	1310016	Screw, ST2.9X16, SST		4
8	1123810	Nut, Lock, SS, M8		4
9	7000298	Panel, Emergency Switch		1
10	7000710	Warning Decal		1
11	1123608	Nut, Lock, SS, M6		2
12	1421618	Washer, Plain, $\phi$ 6.4X $\phi$ 18X1.6		6
13	7000308	Tube		2
14	7000318	Cap		2
15	1021635	Screw, RHM, M6X35, SST		2
16	7000416	Rope		2
17	4010316	ICE Logo		2
18	7000305	Middle Gasket		1
19	8210114	Clear Window		1
20	1221410	Screw, Ph, M4X10		2
21	7000306	Left Gasket		1
22	1422616	Washer, Lock, $\phi$ 6		2
23	1021616	Screw, RHM, M6X16, SST		2
24	7000295	Tube		2
25	1222416	Screw, M4X16, SST		4
26	8133501	Mesh		1
27	8133502	Clip, Mesh		4
28	1021830	Screw, RHM, M8X30, SST		1
29	8115404	Bushing		1
30	8111008	Stopper		1
31	8111007	Bracket		1
32	1021065	Screw, RHM, M10X65, SST		2
33	1422026	Washer, Lock, $\phi$ 10		2
34	1421030	Washer, Plain, $\phi$ 10X $\phi$ 30X2.5		2
35	7000025	Pin		2
36	7000307	Right Gasket		1
37	7000165	Gasket		1
38	8130099	Decal (only for i-Synergy)		2
39	7000287	Cap		4

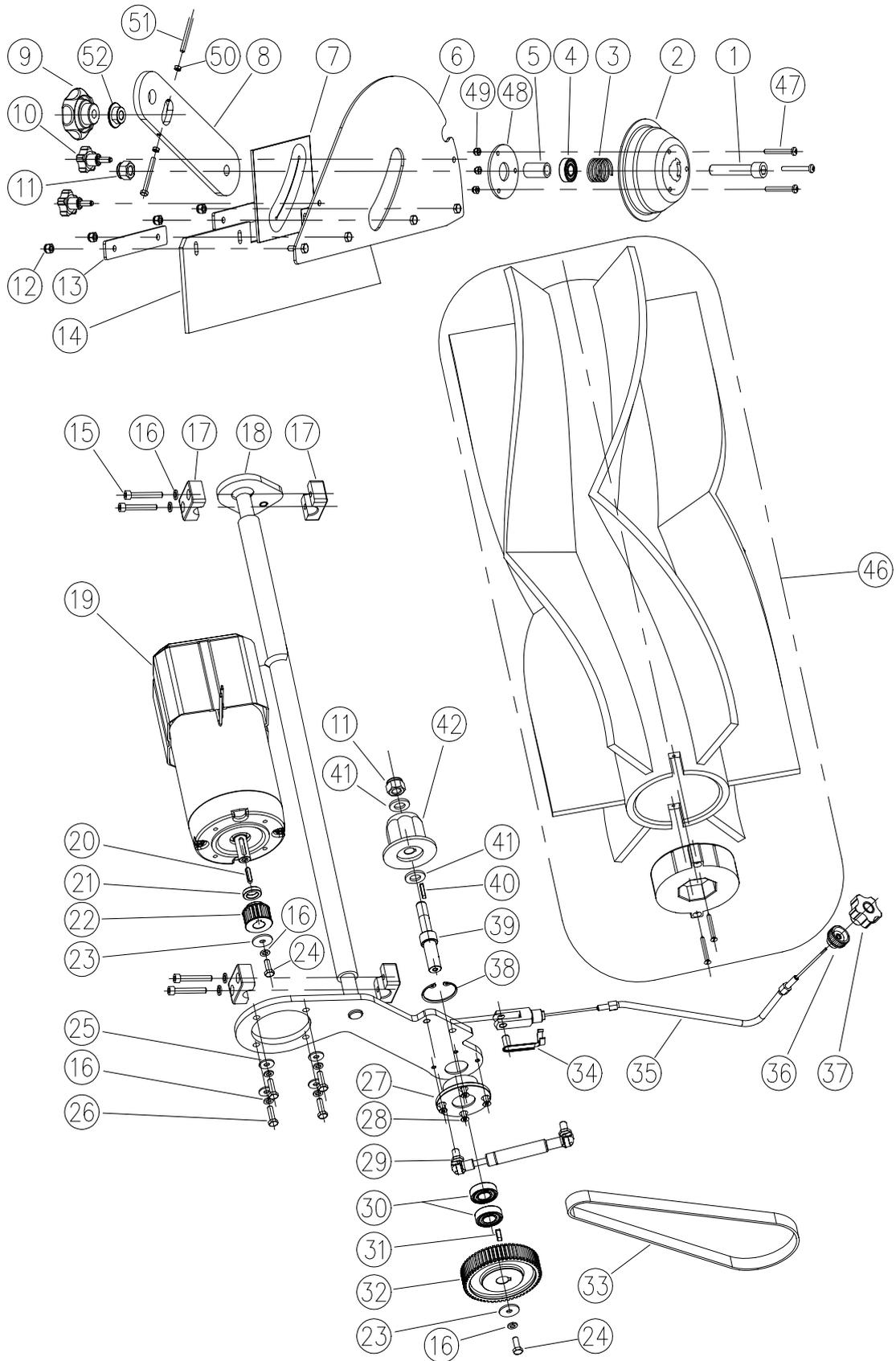
## PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
40	1121403	Nut,SS,M4	60152100101-60152100275	4
41	1422411	Washer, Lock, Ø4		4
42	1421412	Washer,Plain, φ 4X φ 12X1		4
43	7000313A	Flash Light		2
44	7000316	Clamp		2
45	7000317	Pin		4
46	7000315	Bracket		2
47	1421512	Washer,Plain, φ 5X φ 12X1		4
48	1221535	Screw,Ph,M5X35		4
49	1421828	Washer,Plain, φ 8X φ 28X3		4
50	7000279	Bracket		2
51	7000282	Kit Flashing Light Assembly	60152100276-	2
52	6195092	Nylon Cushion	60152100276-	4
53	1421416	Flat Washer, φ 4.3× φ 16×1.5	60152100276-	4
54	1123406	Nut,Lock,SS,M4	60152100276-	4
55	1221420	Screw, Ph, M4 X20	60152100276-	4
56	1311009	Screw,Ph,ST2.9 X9.5	60152100276-	4
57	7000201	Indicator Plate	60152100276-	2

## NOTES:

1. DIA NO. 40 is deleted, because of optimal design needs;
2. DIA NO. 51—57 are additional parts.
3. DIA NO. 2, 7000276A and 7000281, the installation and use mode are fully compatible.

# MAIN BRUSH ASSEMBLY



## PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	1521260	Socket Head, M12X60, SST		1
2	7000069	Free Hub		1
3	7000070	Spring		1
4	7000185	Ball Bearing		1
5	7000068	Spacer		1
6	7000133	Support,Right Skirt		1
7	7000285	Gasket Adhesive		1
8	7000067	Plate		1
9	7000174	Knob,M10		1
10	7000179	Knob,M6		2
11	1123115	Nut,Lock,SS,M12		2
12	1123608	Nut,Lock,SS,M6		4
13	7000135	Plate,Side Skirt		2
14	7000134	Side Skirt		1
15	1521640	Screw, RHM, M6X40, SST		4
16	1422616	Washer, Lock, Ø6		10
17	7000053	Support,Main Brush Shaft		4
18	7000055	Shaft,Main Brush		1
19	7000324A	Main Brush Motor		1
20	1655020	Key,5X5X20		1
21	7000064	Spacer		1
22	7000065	Pulley,HTD20 5M 15 6F		1
23	1621624	Washer,Plain, φ 6.6X φ 22X2		2
24	1021616	Screw, RHM, M6X16, SST		2
25	1421618	Washer,Plain, φ 6.4X φ 18X1.6		4
26	1021620	Screw, RHM, M6X20, SST		4
27	7000060	Flange		1
28	1222512	Screw, HH, M5X12, SST		4
29	7000190	Gas,Spring		1
30	7000186	Ball Bearing,6002 2RS		2
31	1655015	Key,5X5X15		1
32	7000062	Pulley,HTD60 5M 15 6W		1
33	7000192	Belt		1
34	7000512	Clips		1
35	7000513	Cable,Main Brush		1
36	7000177	Knob		1
37	7000178	Knob		1
38	1437032	Ring Retaining		1
39	7000061	Pin		1

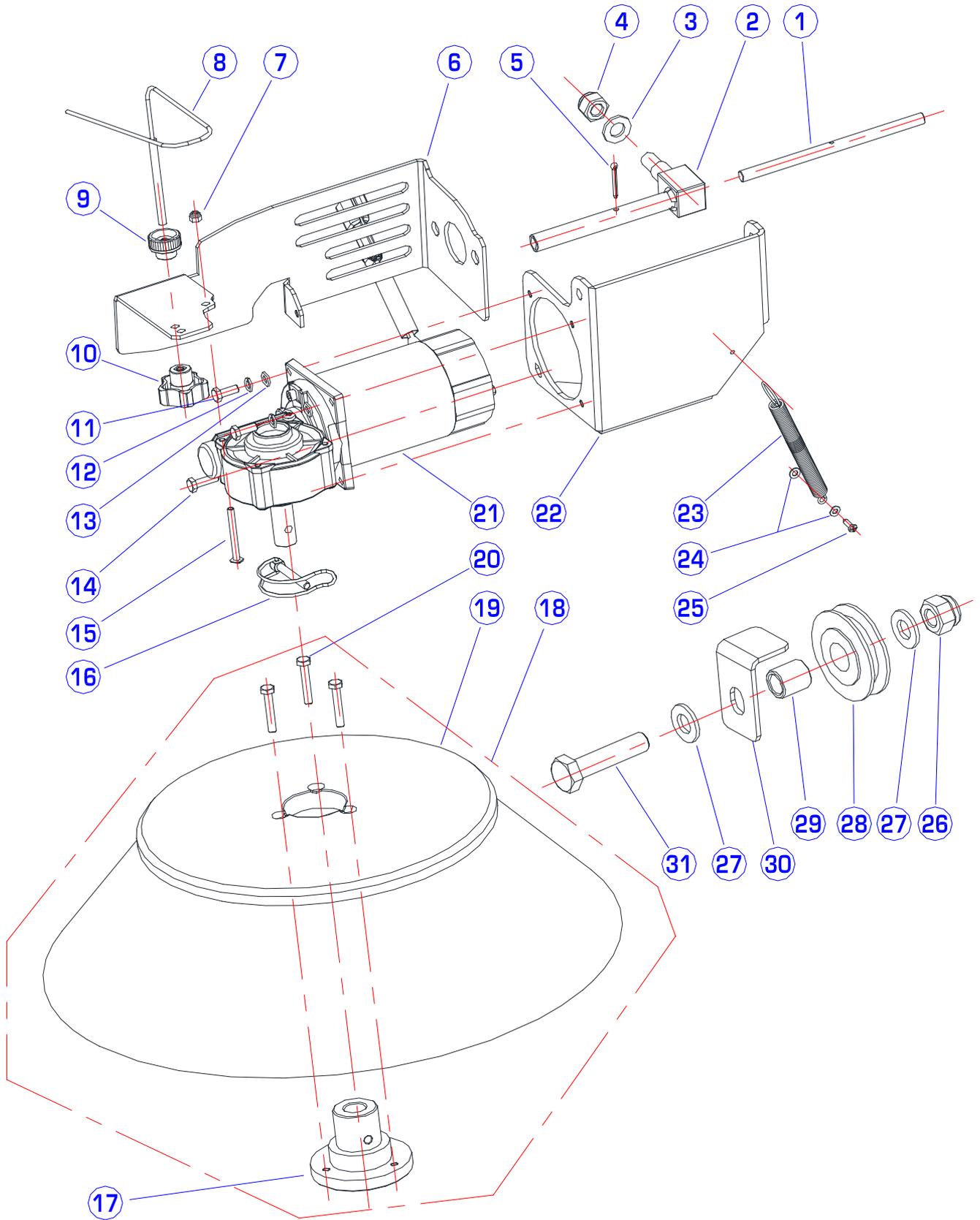
PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
40	1644020	Key,4X4X20		1
41	1421124	Washer,Plain, $\phi$ 13X $\phi$ 25X2.5		2
42	7000063	Traction Hub		1
43	1321240	Screw,ST4.2X40, SST	60152100101-60152100275	2
44	7000073	Hub	60152100101-60152100275	1
45	7000072	Main Brush (Poly)	60152100101-60152100275	1
	7000620-1	Main Brush (Poly/Wire)	60152100101-60152100275	1
	7000621-1	Main Brush (Mix Fibres)	60152100101-60152100275	1
	7000631-1	Main Brush Assembly (Pa66)	60152100101-60152100275	1
46	7000071	Main Brush Assembly (Poly)		1
	7000620	Main Brush Assembly (Poly/Wire)		1
	7000621	Main Brush Assembly (Mix Fibres)		1
	7000631	Main Brush Assembly (Pa66)		1
47	1221540	Screw,Ph,M5X40		3
48	7000069-1	Plate		1
49	1123507	Nut,Lock,SS,M5		3
50	1121505	Nut,SS,M5		2
51	1021530	Screw, RHM, M5X30, SST		2
52	7000067-1	Bushing		1

NOTES:

DIA NO. 43—45 are deleted, they have all assembled into DIA NO. 46.  
 Later, only sell semi-finished products DIA NO. 46.

### RIGHT SIDE BRUSH ASSEMBLY

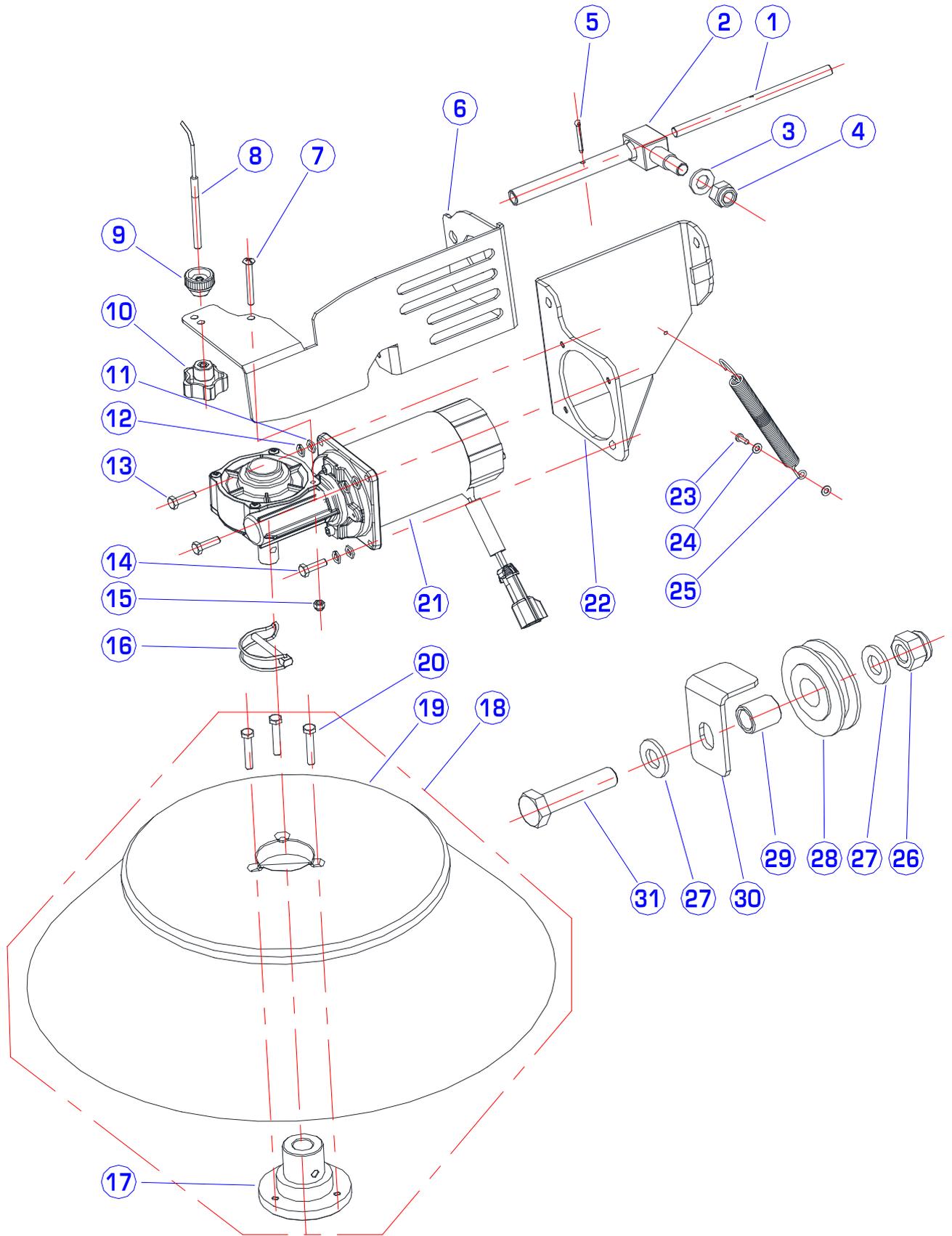


OPERATOR

PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	7000080	Shaft, Side Brush		1
2	7000077	Linkage Assembly, Side Brush		1
3	1421124	Washer,Plain, $\phi$ 24X $\phi$ 13X2.5		1
4	1123115	Nut,Lock,SS,M6		1
5	1645324	Split Pin, $\phi$ 3. 2X24		1
6	7000267	Plate		1
7	1123507	Nut,Lock,SS,M5		1
8	7000503	Cable,Right Side Brush		1
9	7000177	Knob		1
10	7000178	Knob		1
11	1021616	Screw, RHM, M6X16, SST		2
12	1422616	Washer, Lock, $\phi$ 6		4
13	1421612	Washer,Plain, $\phi$ 6X $\phi$ 12X1.6		4
14	1021625	Screw, RHM, M6X25, SST		2
15	1221550	Screw,Ph,M5X50		1
16	7000274	Split Pin		1
17	7000085	Hub,Side Brush		1
18	7000083	Side Brush Assembly(Poly)		1
	7000622	Side Brush Assembly(Poly/Wire)		1
	7000623	Side Brush Assembly(Mix Fibres)		1
19	7000084	Side Brush (Poly)		1
	7000622-1	Side Brush (Poly/Wire)		1
	7000623-1	Side Brush (Mix Fibres)		1
20	1513626	Countersunk Hex Screw,M6X25		3
21	7000194A	Right Side Brush Motor		1
22	7000075	Support,Right Side Brush		1
23	7000323	Spring		1
24	1421412	Washer,Plain, $\phi$ 4X $\phi$ 12X1		2
25	1311417	Screw,ST4X14		1
26	1123810	Nut,Lock,SS,M8		1
27	1411816	Washer,Plain, $\phi$ 8X $\phi$ 16X1.6		2
28	7000032	Pulley		1
29	7000031	Spacer		1
30	7000030	Bracker,Cable Fixing		1
31	1021835	Screw, RHM, M8X35, SST		1

LEFT SIDE BRUSH ASSEMBLY

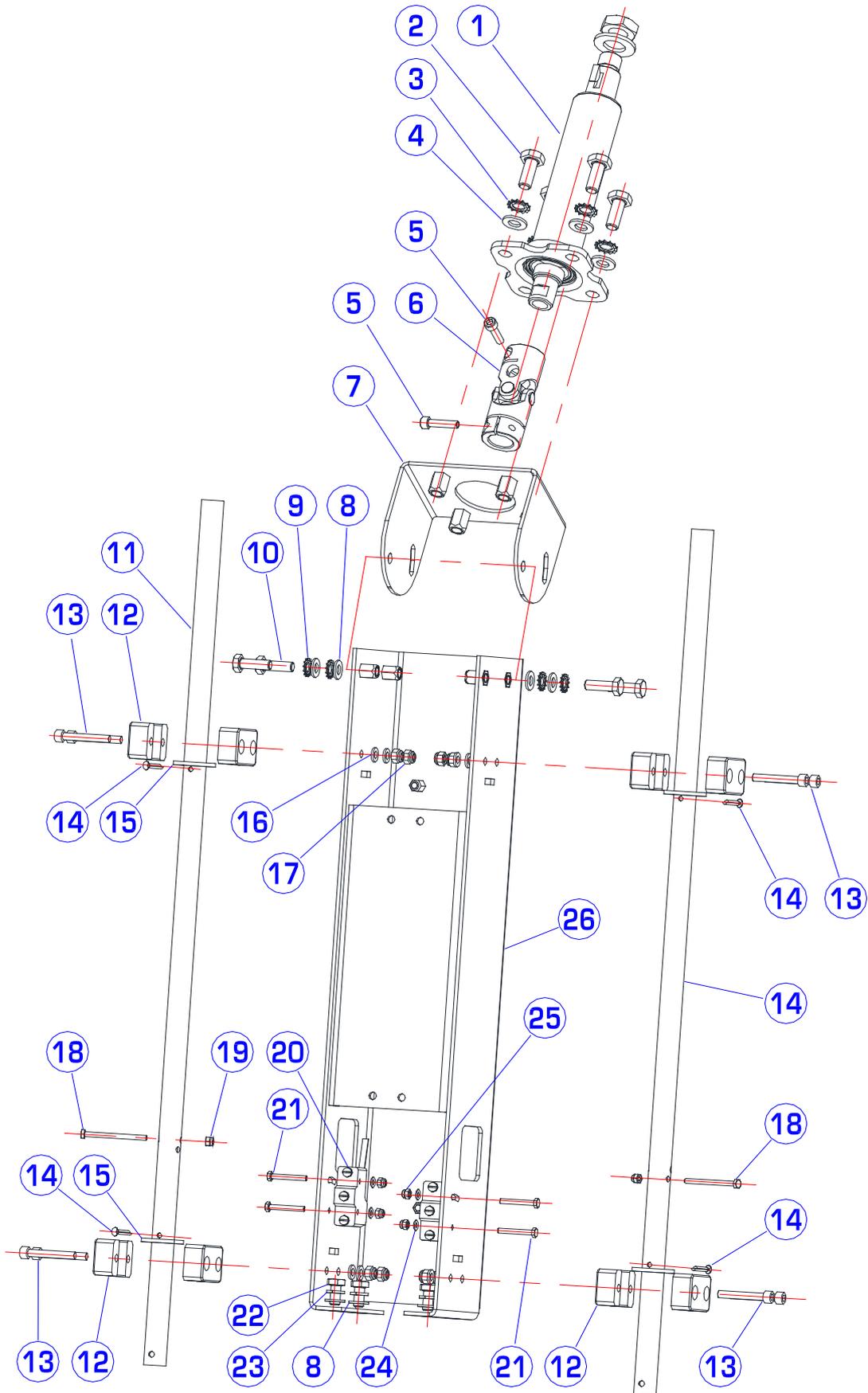


OPERATOR

PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	7000080	Shaft, Side Brush		1
2	7000077	Linkage Assembly, Side Brush		1
3	1421124	Washer,Plain, $\phi$ 24X $\phi$ 13X2.5		1
4	1123115	Nut,Lock,SS,M6		1
5	1645324	Split Pin, $\phi$ 3. 2X24		1
6	7000266	Plate		1
7	1221550	Screw,Ph,M5X50		1
8	7000504	Cable,Left Side Brush		1
9	7000177	Knob		1
10	7000178	Knob		1
11	1421612	Washer,Plain, $\phi$ 6X $\phi$ 12X1.6		4
12	1422616	Washer, Lock, $\phi$ 6		4
13	1021616	Screw, RHM, M6X16, SST		3
14	1021625	Screw, RHM, M6X25, SST		1
15	1123507	Nut,Lock,SS,M5		1
16	7000274	Split Pin		1
17	7000085	Hub,Side Brush		1
18	7000083	Side Brush Assembly(Poly)		1
	7000622	Side Brush Assembly(Poly/Wire)		1
	7000623	Side Brush Assembly(Mix Fibres)		1
19	7000084	Side Brush (Poly)		1
	7000622-1	Side Brush (Poly/Wire)		1
	7000623-1	Side Brush (Mix Fibres)		1
20	1513626	Countersunk Hex Screw,M6X25		3
21	7000193A	Left Side Brush Motor		1
22	7000082	Support,Left Side Brush		1
23	1311417	Screw,ST4X14		1
24	1421412	Washer,Plain, $\phi$ 4X $\phi$ 12X1		2
25	7000323	Spring		1
26	1123810	Nut,Lock,SS,M8		1
27	1411816	Washer,Plain, $\phi$ 8X $\phi$ 16X1.6		2
28	7000032	Pulley		1
29	7000031	Spacer		1
30	7000030	Bracker,Cable Fixing		1
31	1021835	Screw, RHM, M8X35, SST		1

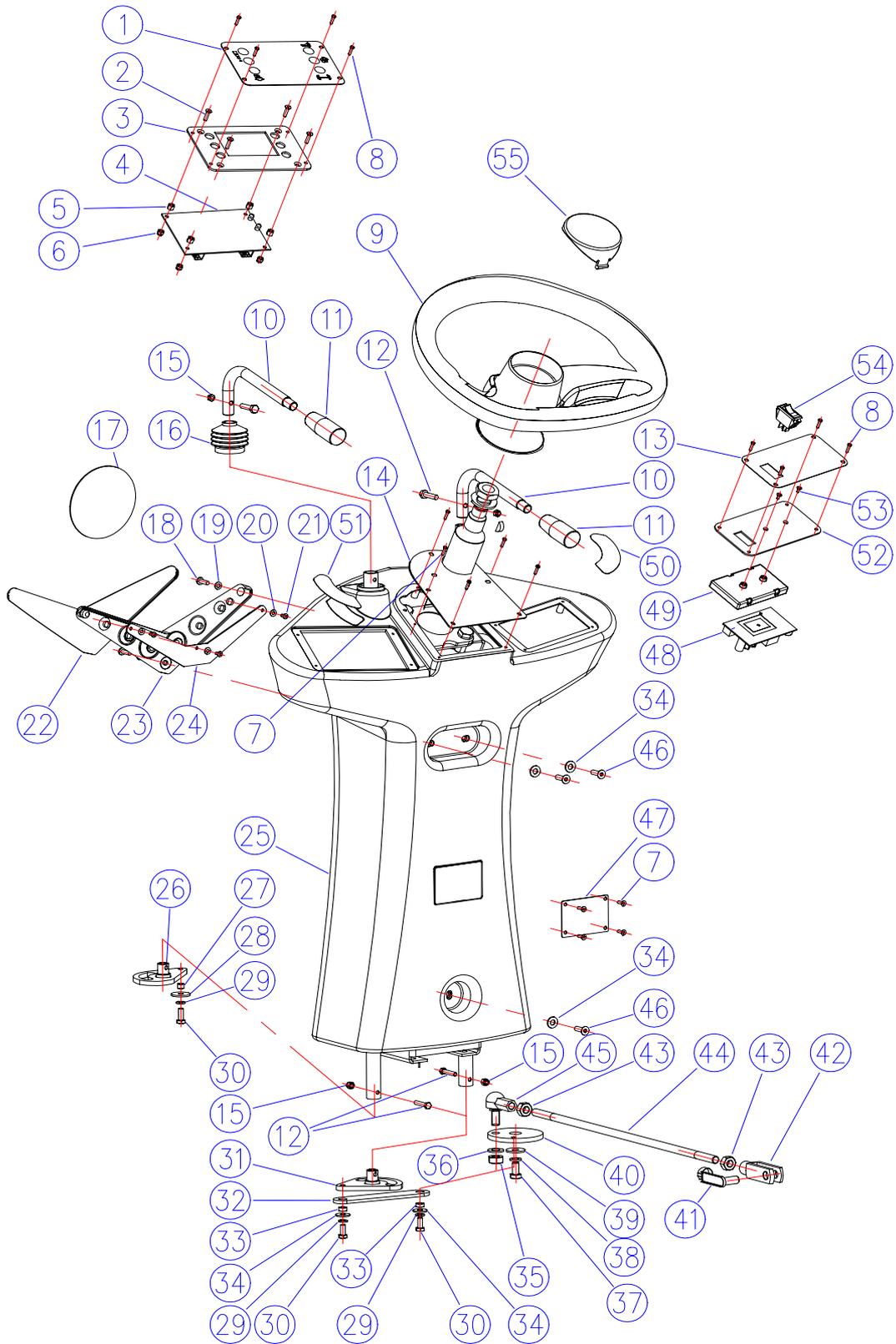
STEERING ASSEMBLY



## PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	7000410	Steering Column		1
2	1021025	Screw, RHM, M10X25, SST		4
3	1434100	Spring Lock Washer, $\phi$ 10		4
4	1421020	Washer,Plain, $\phi$ 10X $\phi$ 20X2		4
5	1521625	Socket Head, M6X25, SST		2
6	7000411	Joint		1
7	7000113	Support		1
8	1411816	Washer,Plain, $\phi$ 8X $\phi$ 16X1.6		4
9	1434800	Spring Lock Washer, $\phi$ 8		4
10	1021816	Screw, RHM, M8X16, SST		4
11	7000051	Lever Shaft		2
12	7000053	Support,Main Brush Shaft		4
13	1521640	Socket Head, M6X40, SST		8
14	1645425	Elastic Pin, $\phi$ 4X25		4
15	1421334	Washer,Plain, $\phi$ 19X $\phi$ 34X3		4
16	1421612	Washer,Plain, $\phi$ 6X $\phi$ 12X1.6		8
17	1123608	Nut,Lock,SS,M6		8
18	7000051-1	Hex Head Screw, SST		2
19	1123507	Nut,Lock,SS,M5		2
20	7000412	Micro Switch		2
21	1021430	Screw, RHM, M4X30, SST		4
22	1021816	Screw, RHM, M8X16, SST		4
23	1422821	Washer, Lock, $\phi$ 8		4
24	1421409	Washer,Plain, $\phi$ 4.3X $\phi$ 9X0.8		4
25	1123406	Nut,Lock,SS,M4		4
26	7000112	Column		1

# STEERING ASSEMBLY



OPERATOR

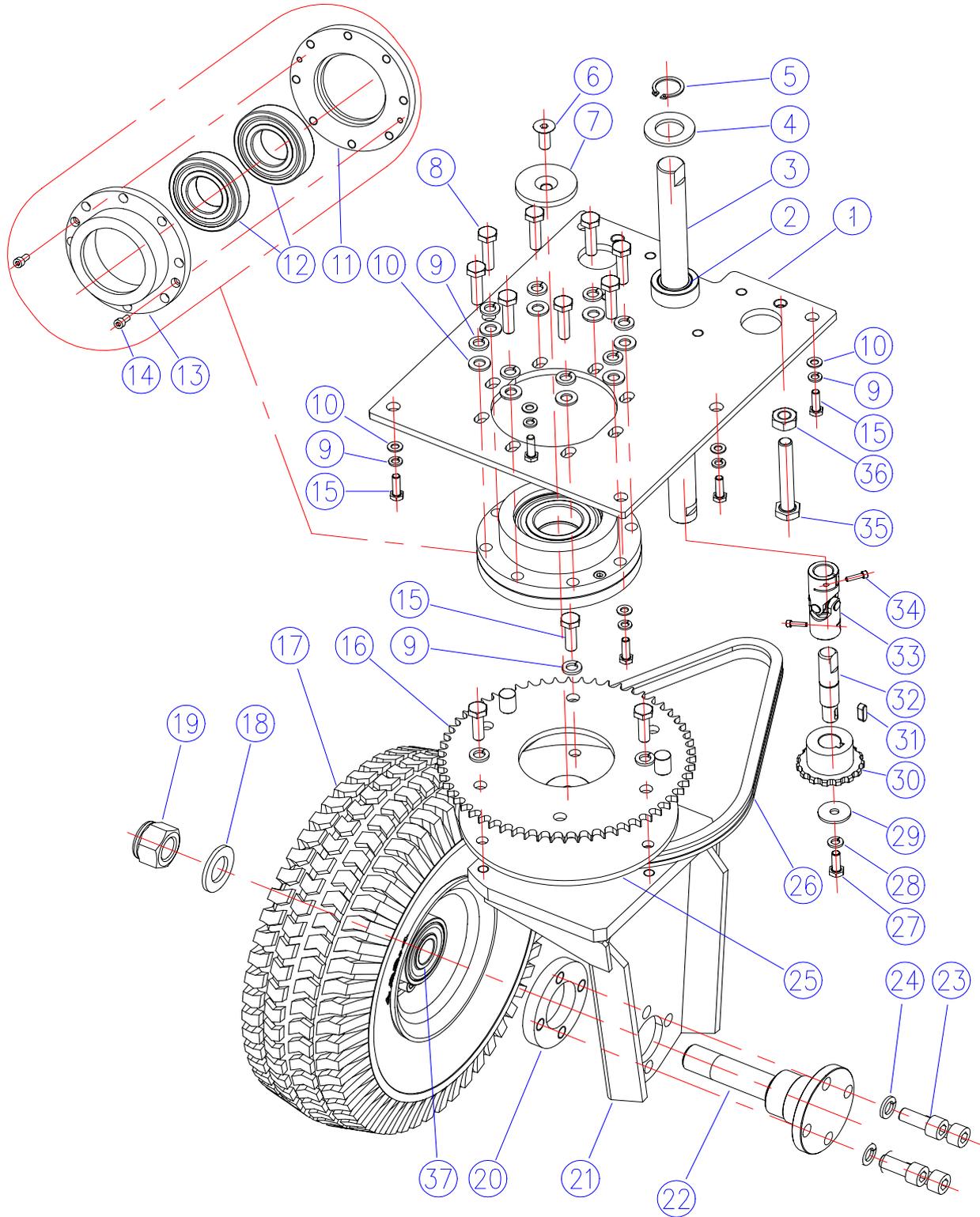
PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	7000398	Decal,Dash Board		1
2	1222416	Screw, FH, M4X16, SST		4
3	7000399	Plate,Electronic Board		1
4	7000418	Electronic Board		1
5	7000310	Spacer		4
6	1123406	Nut,Lock,SS,M4		4
7	1310016	Screw,ST2.9X16		9
8	1221310	Screw, PH, M3X10, SST		8
9	7000401	Steering Wheel		1
10	7000293	Lever		2
11	7000293-1	Cover, Lever		2
12	1021525	Screw, RHM, M5X25, SST		4
13	7000425	Decal, Switch		1
14	7000426	Support, Switch		1
15	1123507	Nut,Lock,SS,M5		2
16	7000314	Rubber Cover		2
17	4010316	ICE Logo		1
18	1221516	Screw, PH, M5X16, SST		3
19	1421510	Washer,Plain, $\phi$ 5.3X $\phi$ 10X1		3
20	1421409	Washer,Plain, $\phi$ 4.3X $\phi$ 9X0.8		3
21	1321110	Screw,ST3.5X10		3
22	8133602	Cover,Led Lighter		1
23	8133601	Support,Led Lighter		1
24	8133610	Led Lighter		1
25	7000407	Cover,Steering Column		1
26	7000116	Return Lever,Side Brush		1
27	7000115	Spacer		1
28	1621624	Washer,Plain, $\phi$ 6.6X $\phi$ 22X2		1
29	1422616	Washer, Lock, $\phi$ 6		3
30	1021616	Screw, RHM, M6X16, SST		1
31	7000119	Return Lever,Main Brush		1
32	7000171	Lever		1
33	7000172	Spacer		2
34	1421618	Washer,Plain, $\phi$ 6.4X $\phi$ 18X1.6		5
35	1123012	Nut,Lock,SS,M10		1
36	1421020	Washer,Plain, $\phi$ 10.5X $\phi$ 20X2		1
37	1021816	Screw, RHM, M8X16, SST		1
38	1422821	Washer, Lock, $\phi$ 8		1
39	1421824	Washer,Plain, $\phi$ 8X $\phi$ 24X2		1

## PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
40	7000170	Disk Plate		1
41	7000502	Clips		1
42	7000501	Fork(long)		1
43	1121008	Nut,SS,M10		2
44	7000173	Bar		1
45	7000294	Joint-head		1
46	1521625	Socket Head, M6X25, SST		3
47	7000707	Serial Decal		1
48	8134768	RFID PCB		1
49	8134769	Box, PCB		1
50	7000423	Decal, Main brush		1
51	7000427	Decal, Side brush		1
52	7000424	Support, Switch		1
53	1222305	Screw, FH, M3X5, SST		2
54	6210503	Switch		1
55	7000428	Cover, Steering Wheel		1

# FRONT WHEEL ASSEMBLY



## PARTS LIST

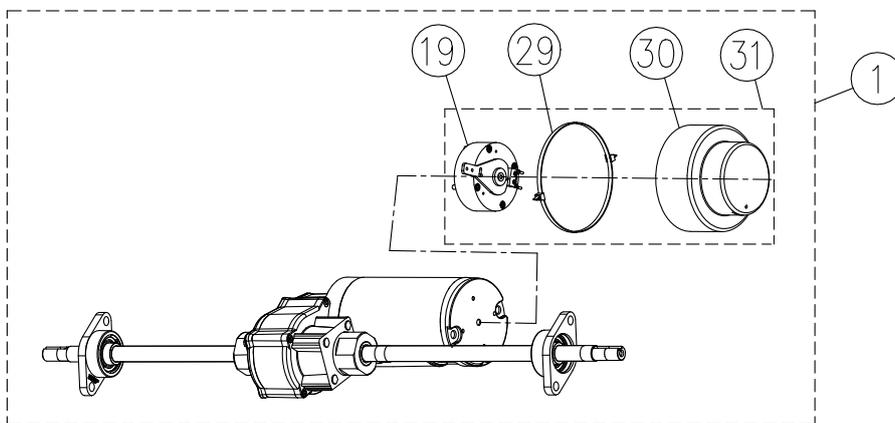
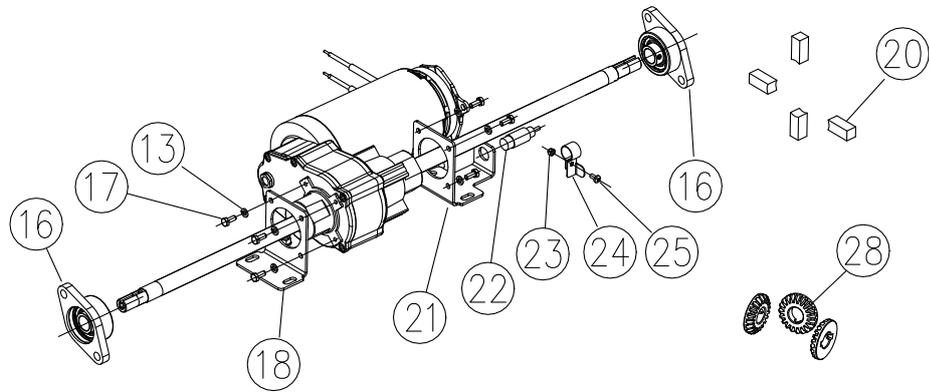
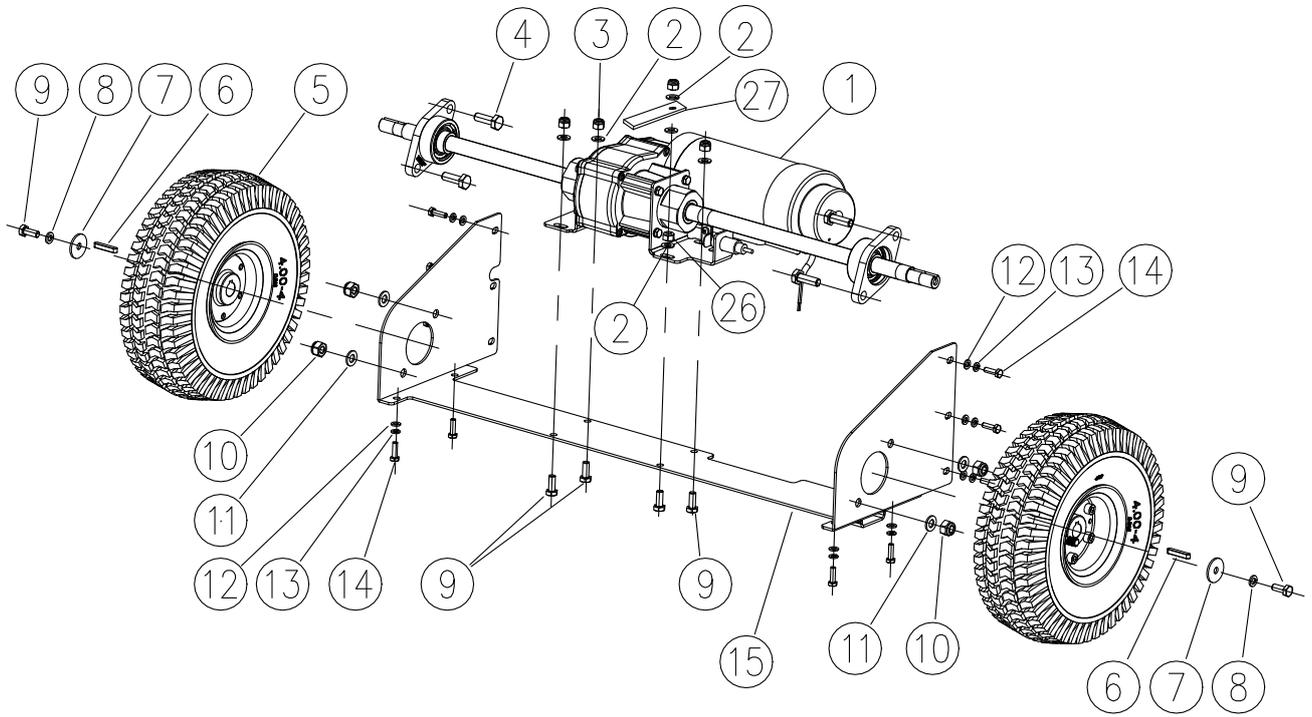
DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	7000099	Plate Supporting		1
2	7000103	Bushing		1
3	7000107	Shaft		1
4	1421330	Washer,Plain, $\phi$ 21X $\phi$ 37X3		1
5	1436020	Ring Retaining		1
6	1513825	Countersunk Hex Screw,M8X25		1
7	7000106	Bearing Retainer		1
8	1021830	Screw, RHM, M8X30, SST		8
9	1422821	Washer, Lock, $\phi$ 8		17
10	1411816	Washer,Plain, $\phi$ 8X $\phi$ 16X1.6		14
11	7000098	Flange		1
12	7000187	Ball Bearing,6207 2RS		2
13	7000097	Flange		1
14	1521512	Socket Head, M5X12, SST		2
15	1021825	Screw, RHM, M8X25, SST		9
16	7000093	Crown		1
17	7000198	Front Wheel		1
18	1421330	Washer,Plain, $\phi$ 21X $\phi$ 37X3		1
19	1123020	Nut,Lock,SS,M20		1
20	7000104	Flange		1
21	7000087	Support,Front Wheel		1
22	7000105	Shaft,Front Wheel		1
23	1521025	Socket Head, M10X25, SST		4
24	1422026	Washer, Lock, $\phi$ 10		4
25	7000092	Plate		1
26	7000110	Chain		1
27	1021616	Screw, RHM, M6X16, SST		1
28	1422616	Washer, Lock, $\phi$ 6		1
29	1621624	Washer,Plain, $\phi$ 6.6X $\phi$ 22X2		1
30	7000109	Sprocket		1
31	1655015	Key,5X5X15		1
32	7000108	Steering Shaft		1
33	7000411	Joint		1
34	1521625	Socket Head, M6X25, SST		2
35	1022065	Screw, RHM, M10X65, SST		2
36	1121008	Nut,SS,M10		2
37	7000198-3	Ball Bearing,6204 2RS		2



## PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	7000214	Pedal		1
2	1421612	Washer,Plain, $\phi$ 6X $\phi$ 12X1.6		8
3	1123608	Nut,Lock,SS,M6		3
4	1521655	Socket Head, M6X55, SST		1
5	7000220	Roller		2
6	1021625	Screw, RHM, M6X25, SST		2
7	1422616	Washer, Lock, $\phi$ 6		5
8	7000221	Cover		1
9	1222690	Screw, RHM, M6X90, SST		1
10	1521616	Socket Head, M6X16, SST		4
11	7000211	Pedal Support		1
12	7000217	Spring		1
13	7000213	Spacer		1
14	7000508	Cable,Front Skirt Lift-up		1
15	7000219	Lever		1
16	7000507	Clips		1
17	7000162	Speed Control Pedal		1
18	1411816	Washer,Plain, $\phi$ 8X $\phi$ 16X1.6		3
19	1422821	Washer, Lock, $\phi$ 8		3
20	1521820	Socket Head, M8X20, SST		3
21	7000210	Front Skirt Raising Pedal Kit		1
22	7000161	Speed Control Pedal Kit		1
23	1621624	Washer,Plain, $\phi$ 6X $\phi$ 22X2		1
24	7000218	Stopper		1
25	7000162-2	Sensor Service Kit (for Speed Control Pedal 7000162)		1

# DRIVE ASSEMBLY



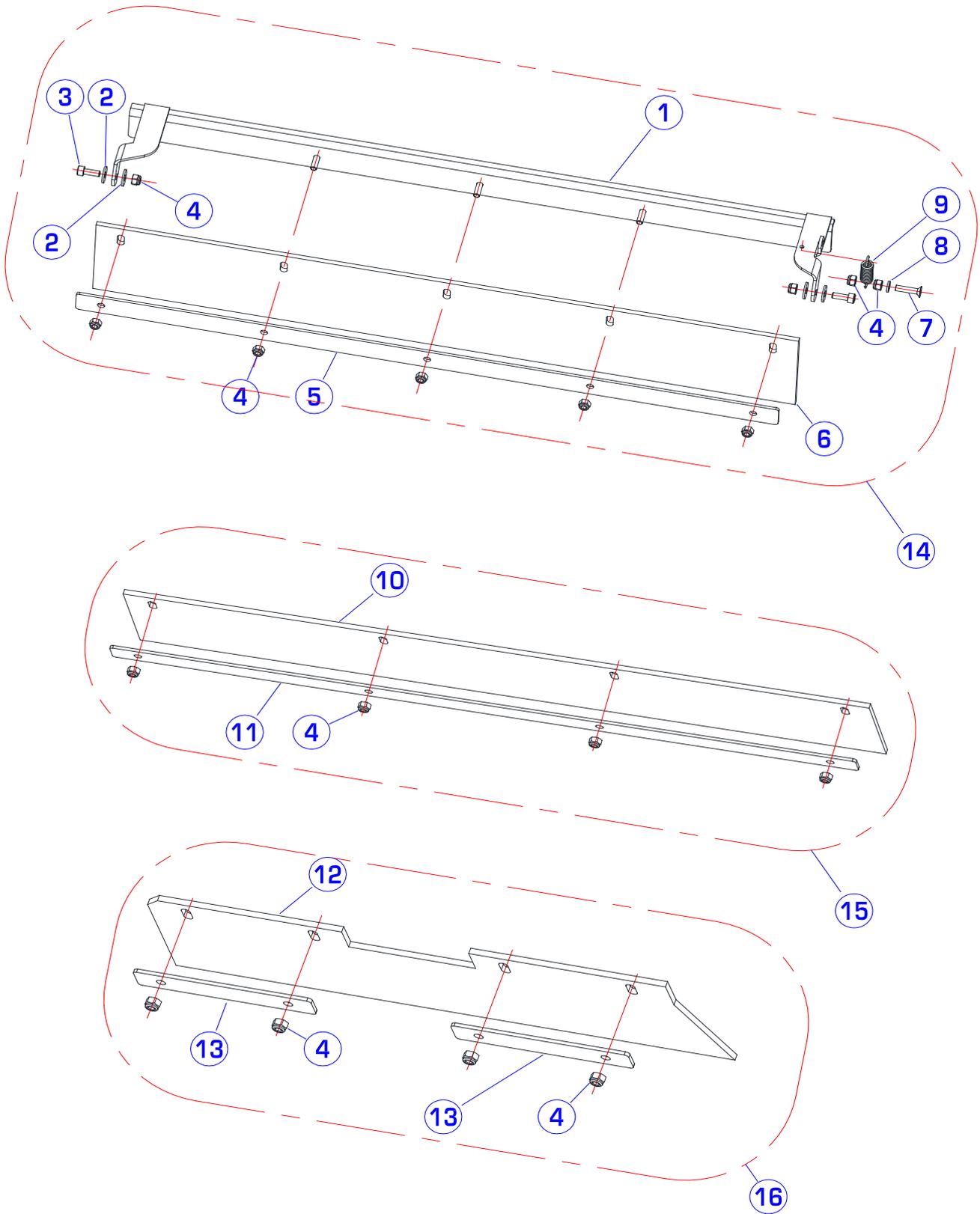
## PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	7000325	Transaxle( CCL)		1
2	1421824	Washer,Plain, $\phi$ 8X $\phi$ 24X2		6
3	1123810	Nut,Lock,SS,M8		4
4	1021030	Screw, RHM, M10X30, SST		4
5	7000199	Traction Wheel		2
6	1666035	Key,6X6X35		2
7	1421828	Washer,Plain, $\phi$ 8X $\phi$ 28X3		2
8	1422821	Washer, Lock, $\phi$ 8		2
9	1021820	Screw, RHM, M8X20, SST		6
10	1123012	Nut,Lock,SS,M10		4
11	1411020	Washer,Plain, $\phi$ 10X $\phi$ 20X2		4
12	1421612	Washer,Plain, $\phi$ 6X $\phi$ 12X1.6		10
13	1422616	Washer, Lock, $\phi$ 6		18
14	1021620	Screw, RHM, M6X20, SST		10
15	7000037	Support,Transaxle		1
16	7000188	Ball Bearing with Flange		2
17	1021616	Screw, RHM, M6X16, SST		8
18	7000040	Bracket,Transaxle		1
19	7000327	Electric brake (Without Connector Shell and Terminal)		1
20	7000325-1	Carbon brushes (for CCL motor 7000325A)		4
21	7000227	Right Bracket,Transaxle		1
22	8134709A	Approach Switch		1
23	1123507	Nut,Lock,SS,M5		1
24	7000228	Bracket		1
25	1221512	Screw, PH, M5X12, SST		1
26	1121807	HEX NUT M8		1
27	8210118	STATIC STRAP		1
28	7000325-2	Bevel Gear(for CCL motor 7000325)	60152100274-	3
29	1914300	Plastic Cable Tie		2
30	7000339	Electric Brake Cover		1
31	7000327A	Electric brake kit (for CCL motor 7000325)		1

## NOTES:

- 1.DIA NO. 28, Bevel Gear, Sub-components of CCL motor 7000325, The original material is powder metallurgy, the new is alloy steel.
- 2.DIA NO. 30, 7000339 is available for any version of 7000325 and 7000327.

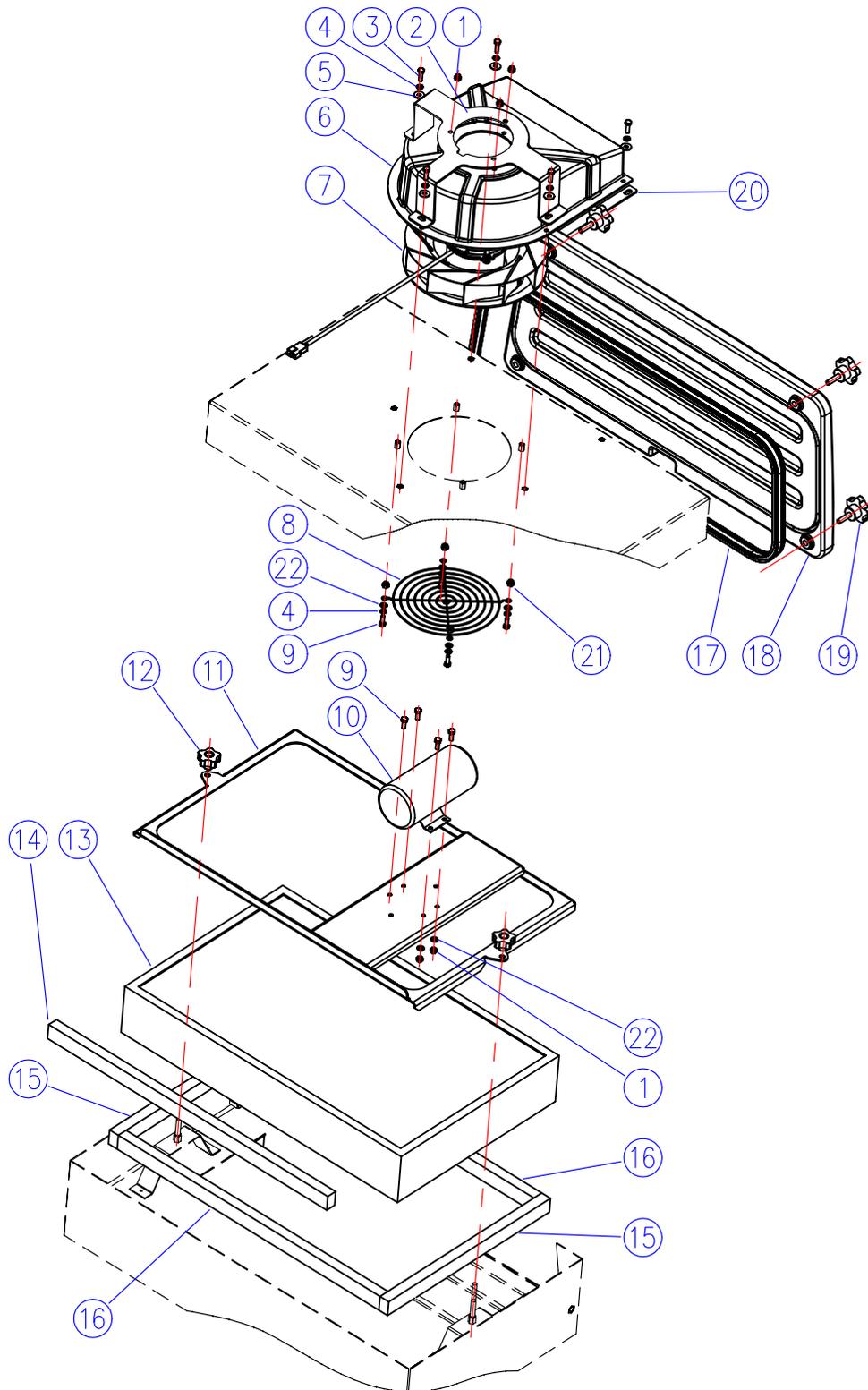
### SKIRTS ASSEMBLY



## PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	7000123	Frame,Front Skirt		1
2	1421618	Washer,Plain, $\phi$ 6.4X $\phi$ 18X1.6		4
3	1521616	Socket Head, M6X16, SST		2
4	1123608	Nut,Lock,SS,M6		17
5	7000128	Plate,Front Skirt		1
6	7000127	Front Skirt		1
7	1513626	Countersunk Hex Screw,M6X25		1
8	1421612	Washer,Plain, $\phi$ 6X $\phi$ 12X1.6		1
9	7000147	Spring		1
10	7000130	Rear Skirt		1
11	7000131	Plate,Rear Skirt		1
12	7000134	Side Skirt		1
13	7000135	Plate,Side Skirt		2
14	7000122	Front Skirt Assembly		1
15	7000129	Rear Skirt Assembly		1
16	7000136	Left Skirt Assembly		1

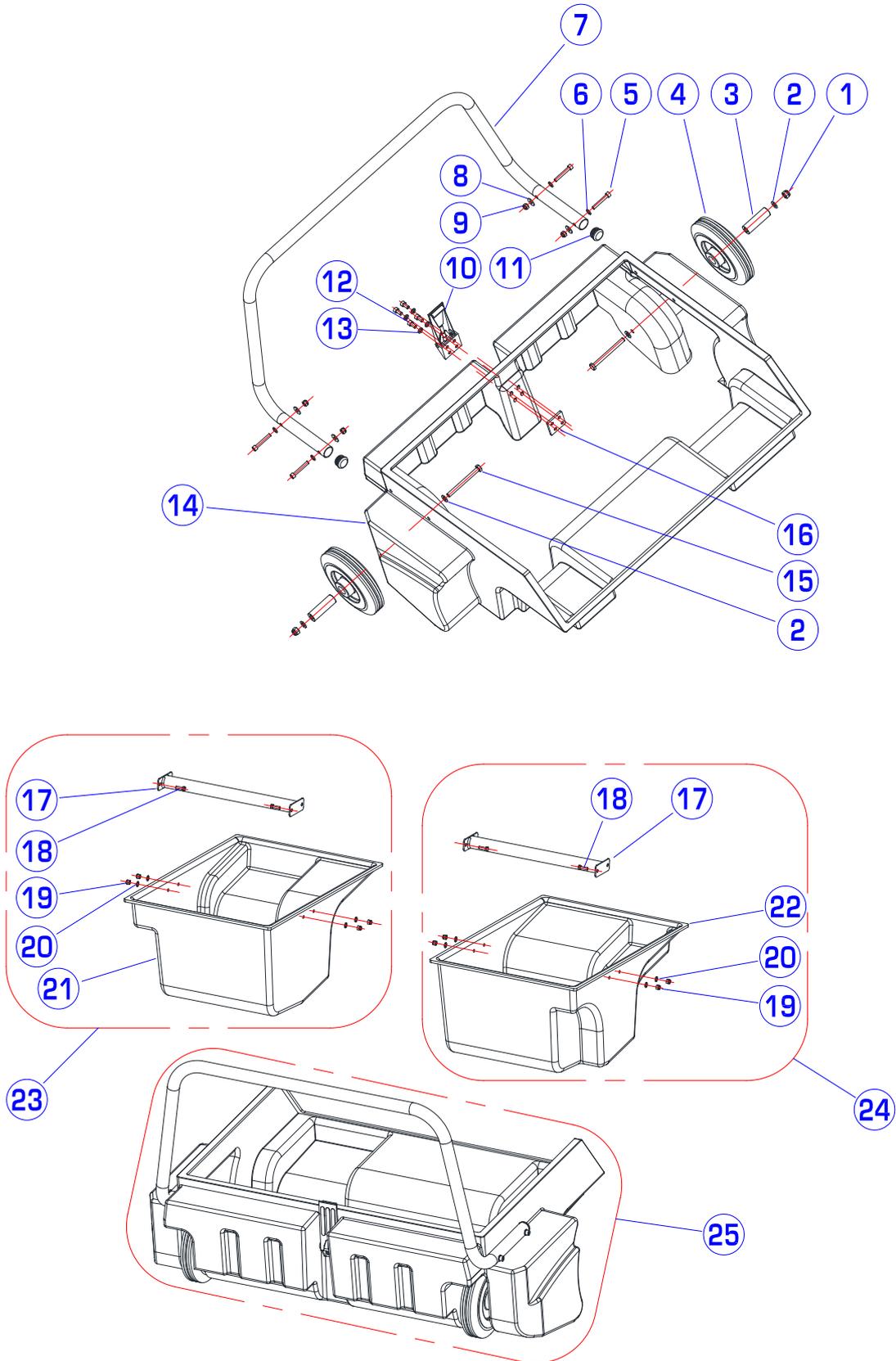
DUST CONTROL SYSTEM



## PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	1123608	Nut,Lock,SS,M6		7
2	7000158-1	Plate		1
3	1021620	Screw, RHM, M6X20, SST		5
4	1422616	Washer, Lock, Ø6		9
5	1421618	Washer,Plain, φ 6.4X φ 18X1.6		5
6	7000158	Cover		1
7	7000159A	Vacuum Fan		1
8	7000160	Screen Protection		1
9	1021616	Screw, RHM, M6X16, SST		4
10	7000195A	Filter Shaker Motor		1
11	7000042	Filter Frame		1
12	7000180	Knob		2
13	7000048	Panel Filter		1
14	7000291	Gasket		1
15	7000047	Gasket(Short)		2
16	7000046	Gasket(Long)		2
17	7000265	Gasket		1
18	7000264	Rear Cover		1
19	7000175	Knob		4
20	7000164	Gasket		1
21	1121605	Nut,SS,M6		4
22	1421612	Washer,Plain, φ 6X φ 12X1.6		8

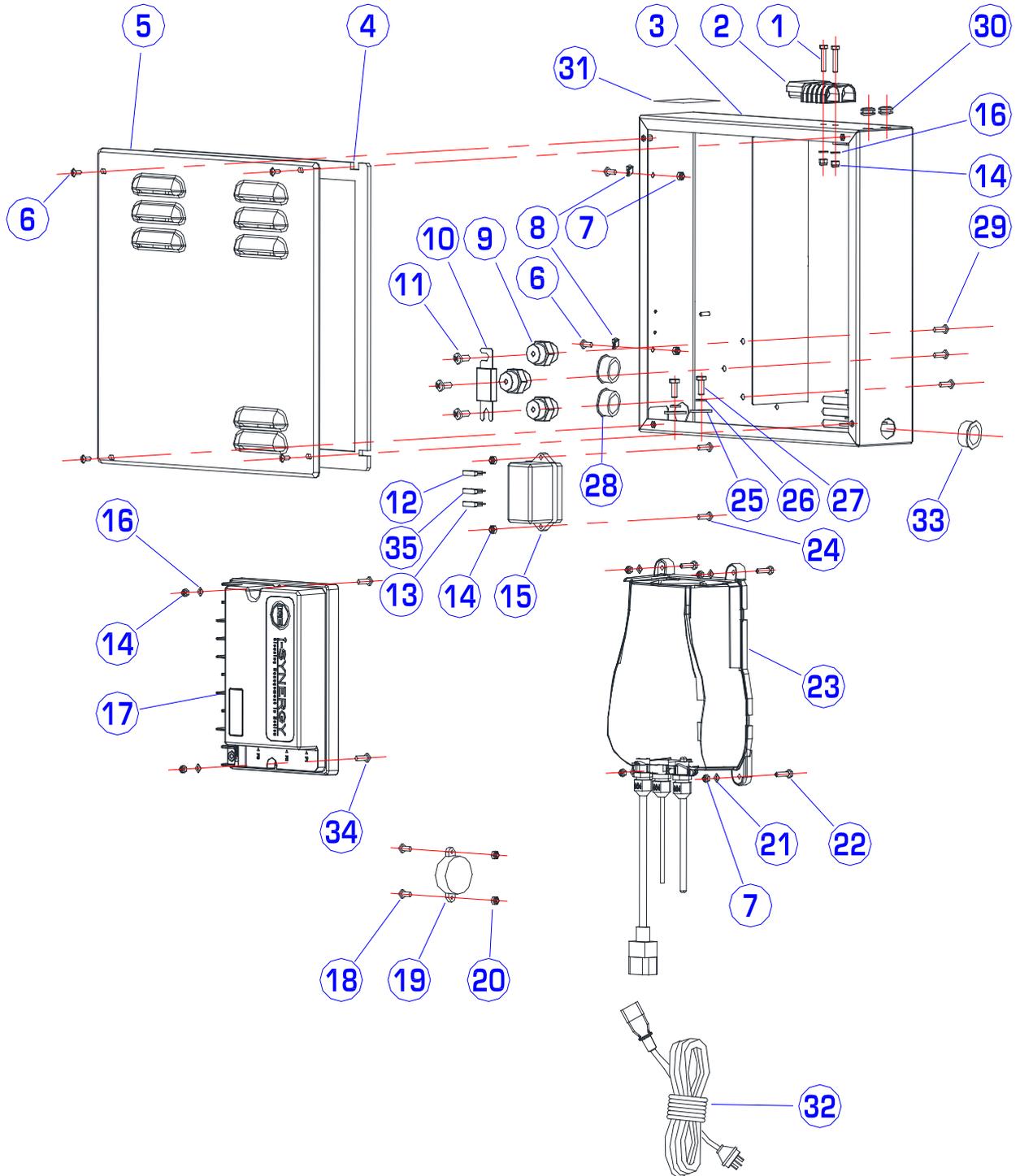
# HOPPER ASSEMBLY



## PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	1123810	Nut,Lock,SS,M8		2
2	1411816	Washer,Plain, $\phi$ 8X $\phi$ 16X1.6		4
3	7000146	Spacer		2
4	7000139	Hopper Wheel		2
5	1521640	Socket Head, M6X40, SST		4
6	1421612	Washer,Plain, $\phi$ 6X $\phi$ 12X1.6		4
7	7000145	Handle		1
8	1421618	Washer,Plain, $\phi$ 6X $\phi$ 18X1.6		4
9	1123608	Nut,Lock,SS,M6		4
10	7000181	Latch		1
11	7000140	Cap		2
12	1521616	Socket Head, M6X16 SST		4
13	1422616	Washer, Lock, $\phi$ 6		4
14	7000138	Hopper		1
15	1022890	Screw, RHM, M8X90, SST		2
16	7000141	Plate		1
17	7000232	Handle Assembly		2
18	1021516	Screw, RHM, M5X16, SST		8
19	1123507	Nut,Lock,SS,M5		8
20	1421510	Washer,Plain, $\phi$ 5.3X $\phi$ 10X1		8
21	7000238	Left Bocket		1
22	7000236	Right Bocket		1
23	7000237	Kit Left Bocket		1
24	7000235	Kit Right Bocket		1
25	7000137	Hopper Assembly		1

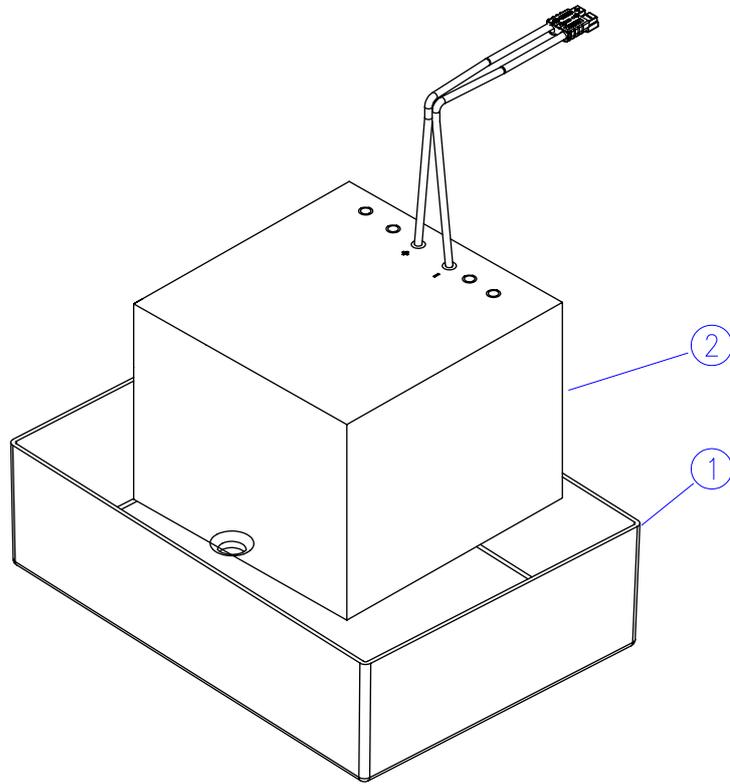
# ELECTRONIC BOX ASSEMBLY



## PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	1221420	Screw, PH, M4X20, SST		2
2	7000746	Connector		1
3	7000153	Electronic Box		1
4	7000155	Gasket		1
5	7000154	Cover,Electronic Box		1
6	1221412	Screw, PH, M4X12, SST		8
7	1123406	Nut,Lock,SS,M4		4
8	2320236	Clamp		2
9	8114705	Pillar		3
10	1885289	Fuse,150A		1
11	1221616	Screw, PH, M6X16, SST		3
12	7000248	Fuse,15A		1
13	7000246	Fuse,5A		1
14	1123507	Nut,Lock,SS,M5		8
15	7000245	Fuse Holder		1
16	1421510	Washer,Plain, $\phi$ 5.3X $\phi$ 10X1		6
17	7000789	Control Unit		1
18	1021530	Screw, RHM, M5X30, SST		2
19	1221314	Screw, RHM, M3X14, SST		2
20	8310708A	Buzzer		1
21	1123305	Nut,Lock,SS,M3		2
22	1021516	Screw, RHM, M5X16, SST		6
23	7000184	Li_ion Battery Charge,220V,16A		1
	8134610	Li_ion Battery Charge,110V,16A		1
24	1621624	Washer,Plain, $\phi$ 6.6X $\phi$ 22X2		4
25	1422616	Washer, Lock, $\phi$ 6		4
26	1021616	Screw, RHM, M6X16, SST		4
27	7000321	Snap Bushing		2
28	1021610	Screw, RHM, M6X10, SST		3
29	1421409	Washer,Plain, $\phi$ 4.3X $\phi$ 9X0.8		2
30	7000273	Grommet		2
31	8112030	Powr cord,Battery charger ,US (Optional)		1
	8112040	Powr cord,Battery charger, EU (Optional)		1
	8112050	Powr cord,Battery charger, JP (Optional)		1
	8112060	Powr cord,Battery charger, CH (Optional)		1
	8112070	Powr cord,Battery charger, UK (Optional)		1
32	7000322	Snap Bushing		1
33	7000247	Fuse,3A		1

## BATTERY GROUP



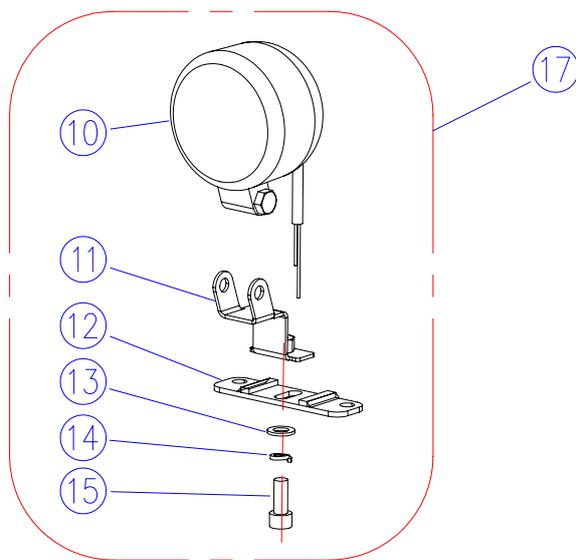
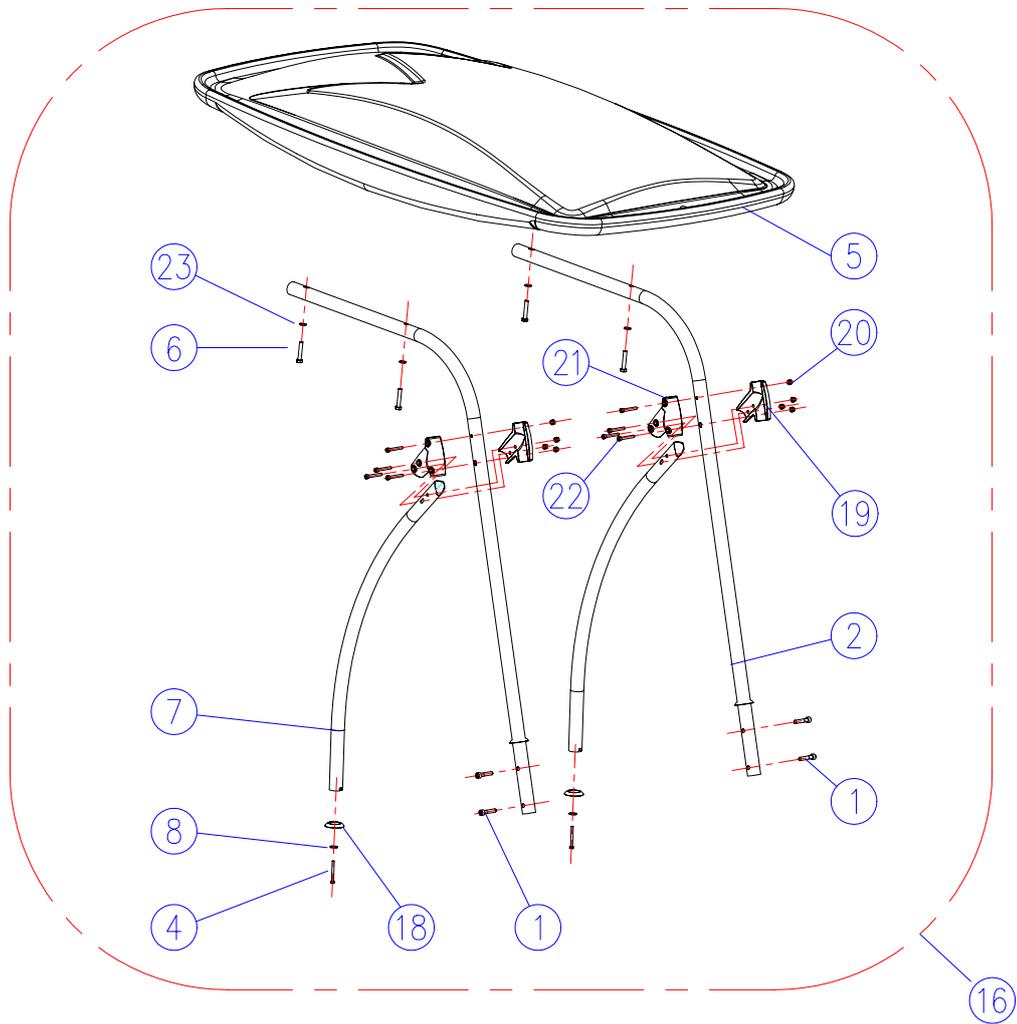
## PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	7000169	Battery Container		1
2	N240170	<del>Lithium-ion Battery, 24VDC ,100Ah</del>	<del>60152100101-60152100283</del>	<del>4</del>
	N241170	24V 120Ah,Lithium bat	60152100284-	1

## NOTES:

DIA NO.2, N240170 and N241170, which are different in the antenna and Communication board.  
N241170 uses 4G configuration. Future shipments are all configured with N241170.

ACCESSORIES



## PARTS LIST

DIA NO	PART NUMBER	DESCRIPTION	SERIAL NUMBER	NO REQ'D
1	1521840	Socket Head, M8X40, SST		4
2	7000617	Bracket, Back		2
3	<del>1421510</del>	<del>Washer, Plain, <math>\phi</math> 5.3X <math>\phi</math> 10X1</del>	60152100101-60152100273	2
4	1221550	Screw, PH, M5X50, SST		2
5	7000616	Roof Protection		1
6	1022845	Screw, RHM, M8X45, SST		4
7	7000618	Bracket, Front		2
8	1421518	Washer, Plain, $\phi$ 5X $\phi$ 18X2		2
9	<del>1422513</del>	<del>WASHER LOCK <math>\phi</math> 5</del>	60152100101-60152100273	2
10	7000413A	Led Worklamp		1
11	7000114	Support, Led Worklamp		1
12	7000148	Bracket		1
13	1421824	Washer, Plain, $\phi$ 8X $\phi$ 24X2		1
14	1422821	Washer, Lock, $\phi$ 8		1
15	1521820	Socket Head, M8X20, SST		1
16	7000610	Kit Protection Roof (Optional)		1
17	7000630	Kit Working Light		1
18	7000619	Cap, Rubber		4
19	7000608	Right Bracket	60152100274-	2
20	1123608	LOCK NUT M6	60152100274-	8
21	7000607	Left Bracket	60152100274-	2
22	1521645	Socket Head, M6X45, SST	60152100274-	8
23	1421816	Flat Washer, M8x16x1.6	60152100274-	4

## NOTES:

1. DIA NO. 3 is deleted, because of optimal design needs;
2. DIA NO. 9 is deleted, because of optimal design needs;
3. DIA NO. 19—23 are additional parts.

WEAR&TEAR PARTS

DIA NO	PART NUMBER	DESCRIPTION	NO REQ'D
1	7000083A	Side Brush Assembly(Poly),2PCS 7000083	1
2	7000071	Main Brush Assembly(Poly)	1
3	7000127	Front Skirt	1
4	7000130	Rear Skirt	1
5	7000134	Side Skirt	1
6	7000048	Panel Filter	1

ORDINARY MAINTENANCE

DIA NO	PART NUMBER	DESCRIPTION	NO REQ'D
1	7000192	Belt	1
2	7000508	Cable,Front Skirt Lift-up	1
3	7000513	Cable,Main Brush	1
4	7000503	Cable,Right Side Brush	1
5	7000504	Cable,Left Side Brush	1
6	7000291	Gasket	1
7	7000047	Gasket(Short)	2
8	7000046	Gasket(Long)	2
9	7000265	Gasket	1
10	7000271	Gasket	2
11	7000270	Gasket	1
12	8310480	Fuse,150A	1
13	7000246	Fuse,5A	1
14	7000247	Fuse,3A	1
15	7000248	Fuse,15A	1

## CERTIFICATE OF QUALIFIED

MODEL : \_\_\_\_\_  
INSPECTOR : \_\_\_\_\_

SERIAL NO. : \_\_\_\_\_  
DATE : \_\_\_\_\_

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