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POWER TUG OPERATION AND SERVICE MANUAL



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SAFE OPERATION

This machine should only be operated by staff, who have been trained in its use and are familiar with the controls, attachments and features.

Power Tug is intended for pedestrian control. Riding on the Power Tug is not permitted.

Suitable for use in well illuminated areas only.

COMMISSIONING

Prior to use for the first time the machine should be visually inspected.

Should any faults be noticed the machine must be returned to the Distributor.

When connecting batteries, ensure that the key switch is "out" or "off" .

It is recommended that the batteries are given an initial overnight charge.

HAZARDS

Although the batteries supplied with the machine are of a "sealed for life" type there is a small possibility that acid leakage may occur if the casings have been damaged. Use of protective clothing and eye protection is recommended when handling batteries.

The energy levels that can be delivered by these batteries can cause fire.

Metal objects must not be allowed to bridge the battery terminals.

Explosive hydrogen gas may be liberated. Do not allow naked lights near to batteries.

MAINTENANCE

The PowerTug contains few user serviceable parts.

User servicing is limited to tyre inspection, lubrication and battery exchange.

The machine should be returned to the distributor for any major repairs.



Safety:

- Do not use this machine in explosive atmospheres.
- Ensure visibility. Use only in well-illuminated areas.
- Isolate the batteries prior to mechanical adjustments.
- Keep metal objects away from battery terminals
- Remove batteries if machine is placed in storage
- Use protective clothing when handling batteries
- Ensure safe practices are employed if changing attachments.

MAINTENANCE & ROUTINE CHECKS - INSPECTION OF MECHANICAL PARTS

1) DAILY :

The machine should be given a brief visual inspection. Any defects noted should be rectified prior to use. The handlebar control assembly includes a throttle return spring. Freedom of movement and return to centre (off) position should be established prior to switching the machine on.

2) EVERY WEEK:

The "Belly switch" anti-trap function must be tested by moving the machine towards the operator and depressing the switch. The machine must move away from the operator and stop. No movement may then be possible until the machine has been re-set.

Note: this test must be performed with good clearance behind the operator.

3) PERIODIC :

Certain parts are liable to wear in normal use. These are :

- a. Main drive wheel tyre
- b. Front fixed wheel
- c. Stabilising Castors

These items should be examined for wear and replaced if this becomes excessive. Examination should take place at a minimum of 6 months for the above.

The lid of the PowerTug allows access to batteries and the charger, this may be removed by removing the 6 fixing screws.

BATTERIES: removal, replacement and re-charging

BATTERIES SHOULD ONLY BE REPLACED BY A SIMILAR TYPE.

Standard fitment is: (2x) Sonnenschein A512C "DRYFIT" 60Ah 12V Sealed, Valve regulated Gel Lead Acid.



CAUTION! Each battery weighs approximately 12Kg. Use safe lifting practice.



Lead Acid Batteries must be handled with care. Use protective clothing and eye protection when handling batteries.



Batteries under charge may liberate EXPLOSIVE HYDROGEN GAS.

Note: If batteries are to be charged in a dedicated charging area, or room, a "NO SMOKING" sign should be displayed.

Life expired batteries must be disposed of in an environmentally safe manner. If in doubt, consult your local authorities regarding safe disposal.

The Power Tug is fitted with a GUEST 2620 battery charger. This is intended for connection to a 230V ac supply.

FUSES



Fuses must only be replaced by the same type and rating.

1. (UK 220V) mains plug is fitted with a 3A fuse.
2. Battery charger output fuses are 35A.
3. DC control fuse 1.25" 3A

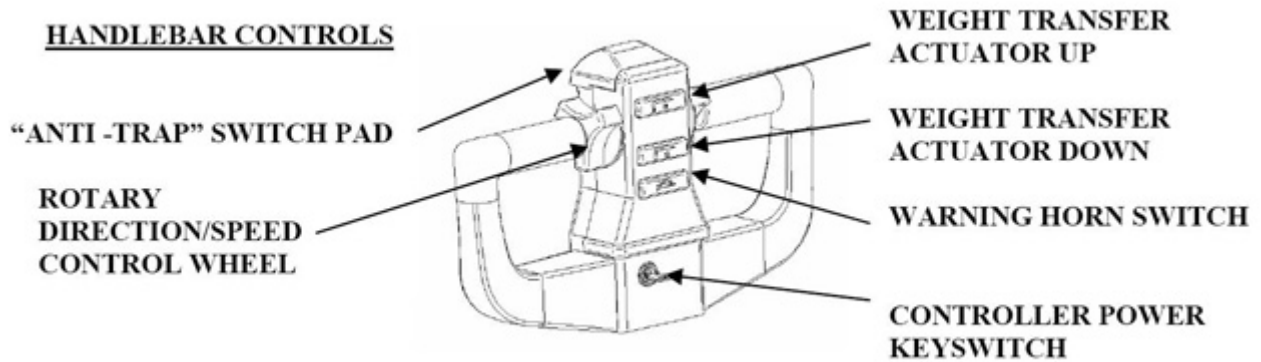
CLEANING

Avoid excessive penetration of water into the handlebar control assembly and electronics.

Remove heavy soil with a soap/water solution.

Do not use pressure washers.

CONTROLS AND OPERATION



MAIN DC POWER SWITCH

Controller Power Keyswitch

The key switch immediately in front of the handlebar assembly controls supply of power to the control electronics. This controller supply key switch must be turned to the on position before the machine will function.

! REMOVE THIS KEY IF THE MACHINE IS TO BE LEFT "OUT OF SERVICE".

Turn "off" while the machine is not being used.

ROTARY CONTROLS – SPEED & DIRECTION OF MOVEMENT

Forward and reverse movement of the PowerTug is controlled by the rotary thumbwheels positioned inboard of the handles. These are spring loaded to automatically return to the stop position.

The thumbwheels are connected internally – movement of either wheel will initiate movement.

Machine Speed is dependant on the amount of rotation.

Rotate the thumbwheel in a forward motion (away from the operator) to make PowerTug move forwards. (away from the operator) Reverse rotation (towards to operator) will make PowerTug move backwards. (towards the operator)

WEIGHT TRANSFER ACTUATOR

The two buttons on the headset marked with a 'fork' and an arrow operate the electric actuator which is built into the machine, the moving bracket that protrudes from the front of the machine can be used for mounting attachments on which have been designed to suit the load. The lift is then operated by the buttons on the headset to connect and disconnect the machine from the load.

The actuator has a built in electronic stop which will cut power to the actuator at the top and the bottom of its stroke.

Note: The actuator is not designed for lifting, only for weight transfer.

POWER INDICATOR and Low Battery “lock-out” function

A 5 LED battery state indicator (clock) is fitted in the PowerTug
4 green LEDs indicate full charge. A reduced number of LEDs lit through to RED indicate progressive discharge.

Note: An optionally fitted “lock out “ signal from this indicator to the control processor will **prevent machine operation** if the batteries are in an excessively discharged state.

This indicator should illuminate once the key switch is turned on. PowerTug can be used while green indication is shown.

Note: The electronic control unit fitted to PowerTug contains a power saving timer. If the power switch has been turned on, but the machine has not been used for 25 minutes or more the circuit will shut down. To use the machine again the keyswitch must be turned OFF then ON again.
The keyswitch should be turned to the “off” position if machine is “in use” but with no demand.

ANTI-CRUSHING SAFETY FEATURE: (“BELLY SWITCH”)

A switch pad is fitted in the handlebar assembly facing the operator. Should the machine be reversing towards the operator, gentle depression of this switch will immediately cause PowerTug to switch to a forward motion, and **stop** when the (switch) pressure is removed.

This is to prevent the operator being accidentally crushed by PowerTug and the load while reversing.

AUDIBLE ALERT

The PowerTug is fitted with an “automotive type” electric horn for warning of approach. The horn switch is placed at the centre/top of the handlebar assembly. Press to sound.

ANTI - RUNAWAY FEATURE

The motor controller fitted to PowerTug is able to detect movement due to the “Back EMF” created by the dc motor. Should the voltage increase to a certain level the controller will apply an opposite voltage to stop the movement.

This occurs even when the power switch is OFF (or no batteries are fitted)

FAULTS

In the event of the battery indicator not illuminating when the batteries are known to be in a “good” condition, check the fuses.

For any other fault condition consult the supplier.

BATTERY CHARGING

The PowerTug is fitted with an EU Compliant Guest model 220 24V output battery charger intended for 230V ac; 50/60Hz operation. Charging this unit in any manner other than by the charger provided may result in serious damage.

For the UK market, the charger is supplied fitted with a UK 3 pin (BS1368A) plug which has a 3 Amp fuse installed. Replace fuse or damaged plug only with the same type and rating.

(In other countries local electrical regulations apply.)

During charging the mains lead to the charger will be connected to the socket at the rear of the machine. Once the mains lead is connected to the machine and the lead is connected to a 230V power source then the machine will not operate.

Batteries supplied with PowerTug are of a heavy-duty sealed valve regulated type. Life and performance depends upon keeping them charged at all times. They should not be stored in a discharged condition.

CHARGER



The above photograph shows the Guest 2620 charger as installed in the PowerTug. It is located under the lid of the battery compartment. In-line 15A fuses are fitted. Only use replacements of the same type and rating.

! DO NOT ATTEMPT TO MOVE THE POWERTUG WHILST "ON-CHARGE"
USE OF AN EARTH FAULT PROTECTED MAINS SUPPLY IS REQUIRED.
REPLACE FUSES ONLY WITH THE SAME TYPE AND RATING

Led indicators are provided for both 12V batteries, which are connected in series to supply the Power Pusher. These batteries are individually connected to the two charger outputs.

When the RED Led is illuminated the battery is discharged. The charger is recharging at the "Bulk" charging rate of 10A. Voltage is between 11.8 and 14 volts

When both LEDs are illuminated the charger is recharging at an absorption rate between 3 and 6 amperes. Voltage will be approximately 14V.

In either case if the LEDs remains ON for more than 48Hrs refer to the troubleshooting section.

With only the green LED illuminated the battery has reached almost full charge and the charger is delivering "top-up" at less than 3 Amperes.

The charger circuitry is designed to prevent overcharging.

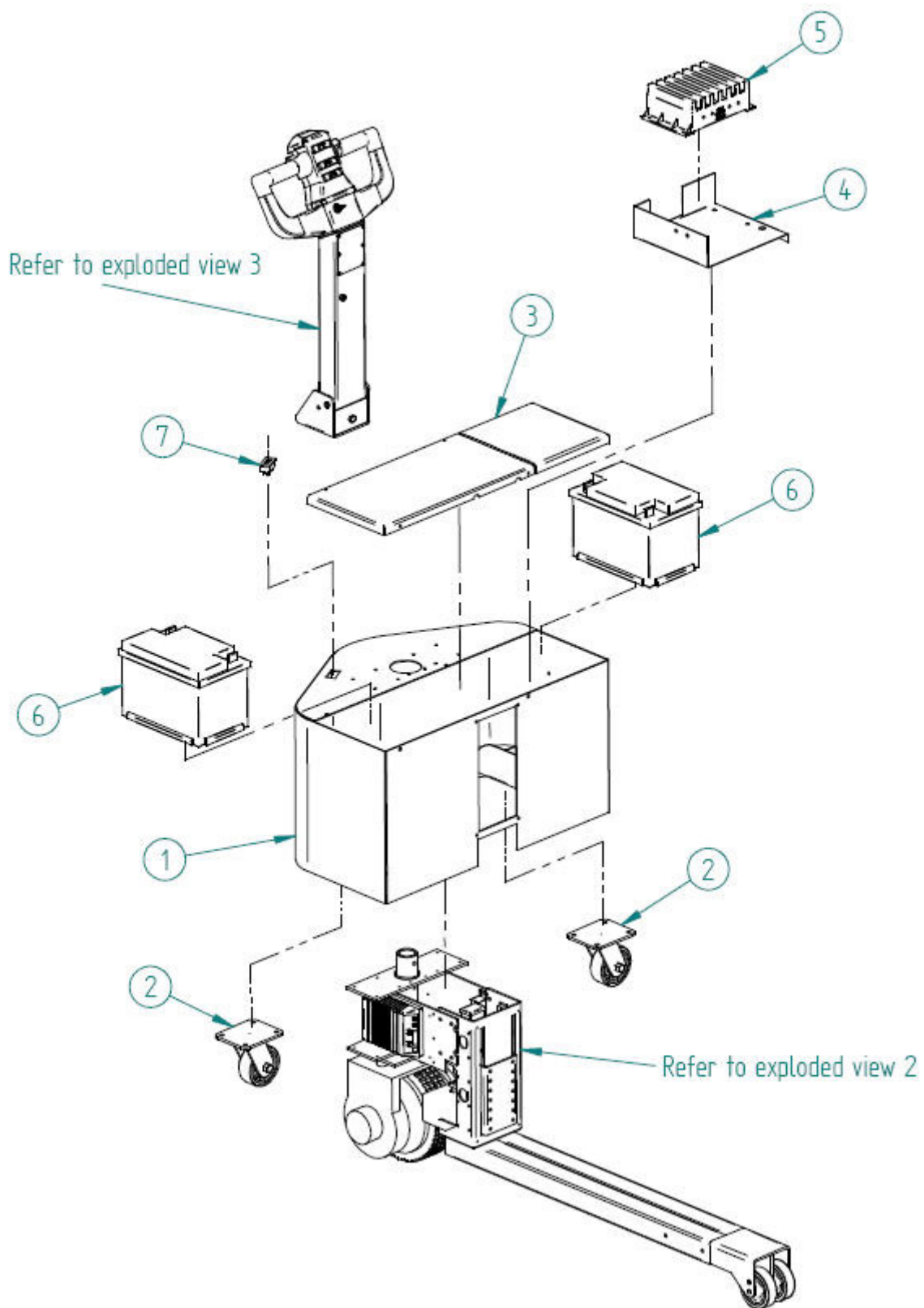
CHARGER TROUBLESHOOTING

Symptom / possible cause	Solution
1) LEDs do not illuminate	
No mains supply	Check supply and mains fuse
Charger fault	Return charger to Supplier.
2) LEDs illuminate but batteries do not charge.	
Batteries may be defective	Replace if necessary
Loose connections	Check and tighten
Charger output shut down due to overload or short circuit Fuses Blown	Eradicate cause & replace blown fuses, with same type and rating
3) Charging time excessive in hot weather	
Charger has shut down due to overheating	Move machine to a cooler environment with better ventilation
4) Red LED permanently ON (48Hrs+)	
Dead short or overload	
Remove mains and then isolate the batteries from the charger. Green LED should illuminate when Mains is restored. If not the charger may be defective. Defective battery or excessive demand	Return Charger to supplier. Change battery. Do not attempt to charge additional or larger batteries.
5) Green LED permanently ON (48Hrs+)	
Fuse(s) blown	If fuses and connections are sound, return charger to supplier.
Faulty connection	If fuses and connections are sound, return charger to supplier.
6) Red & Green LEDs permanently ON (48Hrs+)	
Battery damaged or unable to reach full charge. Poor electrolyte or cell damage.	Check and replace battery

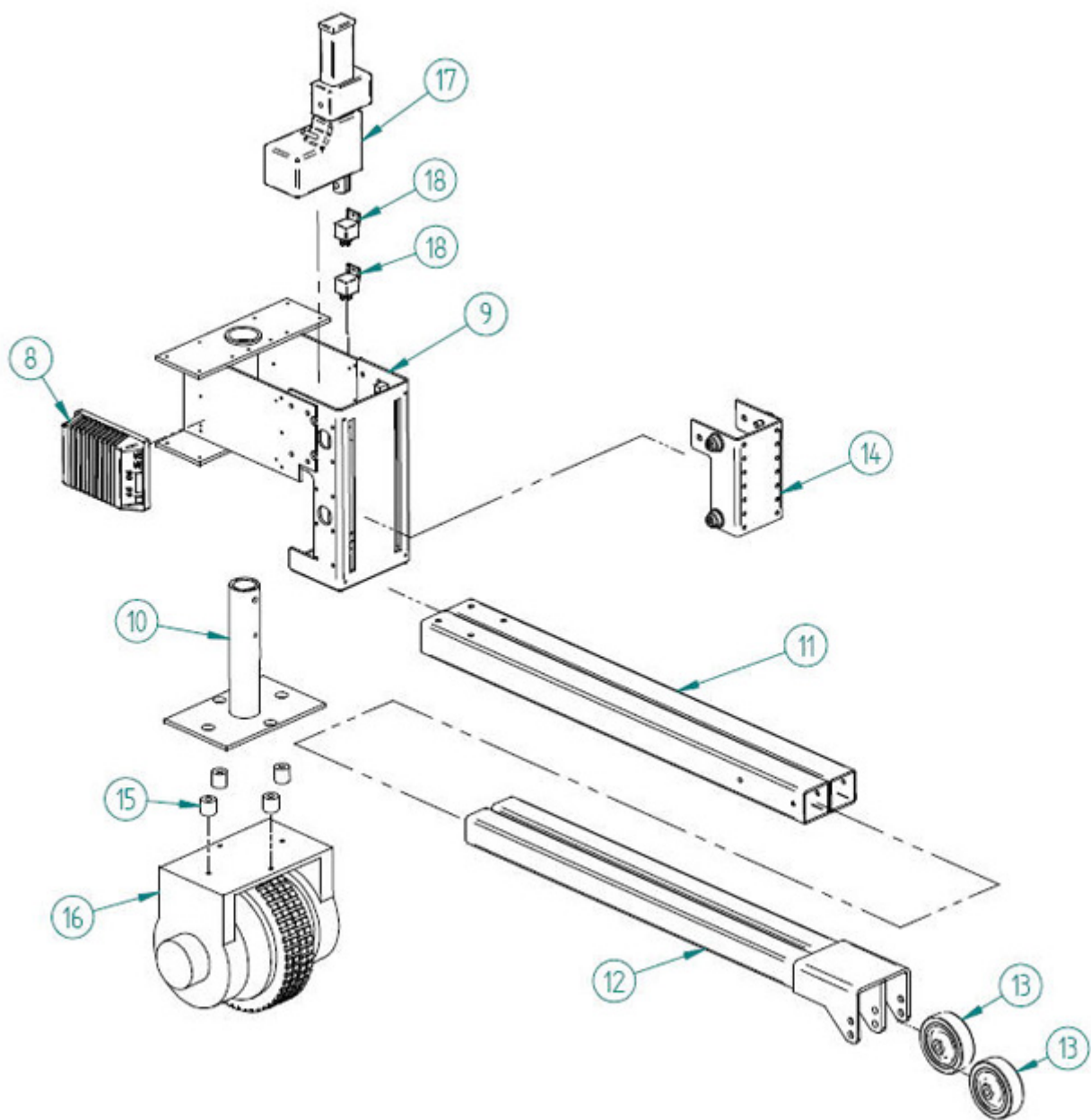
PARTS LIST REFERRING TO EXPLODED DRAWINGS

Item No.	Part No.	Description
1	UK100010	Body, Main – PowerTug
2	UK100011	100mm H/D Stabilizing Castor
3	UK100008	Cover / Lid
4	UK100001	Battery Charger Mount Bracket
5	UK100006	Battery Charger 230V / 24V 10A
6	UK100007	Battery 58Ah 12V
7	UK100009	Battery Discharge Indicator 803
8	UK100012	Motor Control Board
9	200057	Chassis Frame
10	200048	Motor Mount Spigot
11	UK100003	Twin Leg Outer
12	UK100004	Twin Leg Inner
13	UK100014	100mm Front Wheel (fixed)
14	UK100005	Lift Bracket Assembly
15	200061	Motor Mount Spacer
16	200062	Drive Motor P/M 600W
17	200012	Linear Actuator
18	200063	24 Volt Relay
19	UK100015	CH5 Headset
20	UK100016	Handle Body
21	UK100017	Handle Support Bracket
22	UK100018	Handle Pivot Pin
23	UK100019	Gas Spring
24	UK100020	Gas Spring retaining pin
25	UK100021	Gas Spring Spacer Tube (large)
26	UK100022	Gas Spring Spacer Tube (small)
27	UK100023	M12 Ext Circlip
28	UK100024	Gas Spring Bar Split Pin
29	M10x90HH	Bolt M10 x 90mm
30	NUTM10	Nut M10
31	WSHRM10	Washer M10
32	NUTM8	Gas Spring Retaining nut
33	UK100025	Rubber Cover
34	UK100026	Cover Retaining Plate (upper)
35	UK100027	Cover Retaining Plate (lower)

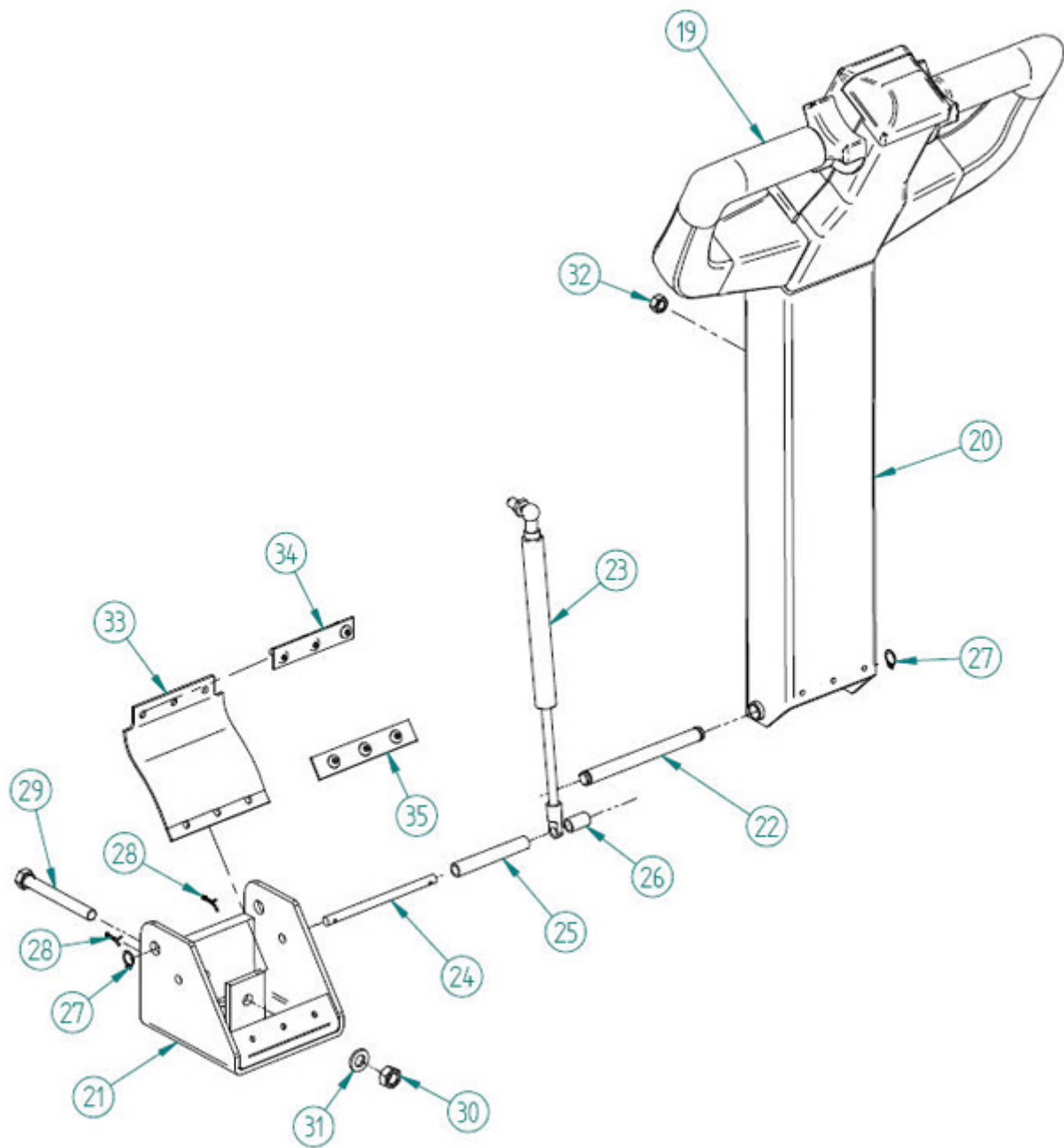
Exploded View 1



Exploded View 2



Exploded View 3



Exploded View 4

