### **ARJOHUNTLEIGH GETINGE GROUP**

## CARINO (2010) MAINTENANCE AND REPAIR MANUAL



For internal use only!

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...with people in mind

CE

#### NOTE

Before using this Manual you must have taken part of and understood the Safety Precautions.

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### Preventive Maintenance Schedule (PMS)

#### WARNING

The points on this checklist are the minimum the manufacturer recommends. In some cases due to heavy use of the product and exposure to aggressive environment, more frequent inspections should be carried out. Continuing to use this product without conducting regular inspections or continuing to use this product when a fault is found will seriously compromise the user and residents safety. Local regulations and standards may be higher than the manufacturers. Preventive maintenance specified in this manual can prevent accidents.

#### NOTE

All caregiver obligations according to *Operating and Product Care Instructions* are to be checked when performing the Qualified personnel Service

#### **Caregiver obligations**

PMS Carino		
Action/check	Every day	Every week
Cleaning/Disinfection	х	
Visually check lifting strap	х	
Visually check safety strap		х
Visually check all exposed parts		х
Visually check mechanical attachments		х
Check handcontrol and cable		х
Check/clean castors		х
Check cushions/pillows		х
Visually check battery charger and battery		х
Perform functionality test		х

#### **Qualified personnel actions**

PMS Carino				
Action/check	Every year	Every 5:th year	Service procedure	Page
Check that the latest updates have been imple- mented	х		1	5
Check all vital parts for corrosion and damage	х		2	6
Check mechanical attachments	х		3	7
Perform a safe working load test (Local require- ment)	х		4	8
Clean rollers inside covers Check the armrest hinges	х		5	9
Check the leg rest hinges	х		6	10
Check/clean foot supports,	х		7	11
Check function of emergency lowering	х		8	12
Check the safety stop function	х		9	13
Inspect castors	x		10	14
Perform full feature functionality test	х		11	16

#### Additional procedures not included in PMS:

SP 12	Replace lift motor	Page 17
SP 13	Replace lift strap	Page 19
SP 14	Setting of Potentiometer	Page 20

### Service Procedures

# SP 1. Check that the latest updates have been implemented

Check if there are any *Field Safety Notices or Technical Advisory Notices* (FSN:s and TAN:s) that have been published since the last service.

*Field Safety Notice:* information notice informing of what actions must be taken in a safety issue (FSCA).

*Technical Advisory Notices* are divided in three classes:

- A: Field Safety Corrective Action (FSCA) Information about what technical interventions to be made in order to remedy safety related issues described by the *Field Safety Notice (FSN)*
- *B*: Information about **non-safety** related changes
- *C*: Information about administrative issues

The check must be done to keep the product up to date according to safety and product improvements.



Example of a published Technical Advisory Notice B

## SP 2. Check all vital parts for corrosion and damage

This check is to preserve the safety and performance of the product.

Check:

- a. Pillow/cushions
- **b.** Foot supports
- c. Seat
- **d.** Back rest
- e. Safety strap
- **f.** Plastic covers with buttons
- g. Handcontrol and cable
- **h.** Lifting unit cover and emergency stop button
- i. Lift strap
- j. Castors:

See "SP 10. Inspect Castors" on page 14 and Operating and Product Care Instructions

- k. Leg rests, attachments and hinges: See "SP 7. Check/clean foot supports" on page 11
- **l.** Armrests
- m.Chassis
- n. Seat frame
- **o.** Battery See *Operating and Product Care Instructions*





## SP 3. Check mechanical attachments

This check is to preserve the safety and performance of the product.

Check:

- **a.** Lift strap attachment
- **b.** Attachment of seat, backrest, arm rests, leg rests to seat frame
- c. Attachment of knob for safety strap
- **d.** Hinges for leg rests and arm rests
- e. Castors
- **f.** Attachment of pillows for seat, back and neck
- g. Attachment of handcontrol cable

#### NOTE

Screws and bolts attached with Loctite should not be checked by tools but manually to test if the jointing/component is securely fitted.

If spanning is needed and Loctite is previously used new Loctite must be applied. Proceed according to the Loctite manufactures instructions.

See also "Locking, Lubrication and Torque" on page 21



## SP 4. Perform a safe working load test (Local Requirement)

Applicable load test:

- Model: Carino
- SWL:140 kg (309 lb.)
- **Test load:**140 kg (309 lb.)

General load test procedure is not ready. Please refer to local requirements.

#### SP 5. Clean rollers inside covers/Check the armrest hinges

- 1. Remove the battery
- 2. Remove the covers unscrewing the blue plastic knobs (*a*).
- 3. Clean the four rollers (*b*) with water or ArjoClean dilution and a brush.
- 4. Wipe dry.
- 5. If a roller needs to be removed add lubrication on the shaft holding the roller. Specification of lubrication see page 21
- 6. Check the locking nut (*c*) holding the armrest. The force needed to raise the armrest must be in accordance with torque on page 21.



#### SP 6. Check the leg rest hinge

- 1. Check the leg rest hinge for damage.
- 2. If the leg rest hinge is damaged, replace the complete leg rest hinge including: plate (a) cover (b), spring (c), screw (d) and bearing (e).
- 3. Assemble the leg rest



## SP 7. Check/clean foot supports

Without removing the castor:

- Clean foot-support (a), leg (b), foot (c), washer (d) and examine for damage. Especially important is the area where the foot support is fixed to the chassis. Use water or ArjoClean dilution.
- 2. If the foot-support is damaged and must be replaced follow "SP 10. Inspect Castors" on page 14



## SP 8. Check function of emergency lowering

- 1. With battery attached:Remove the plug (*a*) covering the hole in bottom of the motor casing
- 2. Press on the switch located in the bottom of the motor casing, indicated with an arrow (b)
- 3. The chair shall lower as long as the switch is pressed

#### If not:

4. Snap off he backrest and open the motor casing by removing the five screws (*c*)

#### NOTE

Support the back cover of the lifting unit

#### CAUTION

To protect the EPROM from static electricity (ESD): Ground yourself when working.

- 5. Check switch connection on PCB for damage, if damaged replace PCB (see SP 14 on page 20 for setting of potentiometer)
- 6. Reassemble and check function





## SP 9. Check the safety stop function

- 1. Lower the seat using the handcontrol at the same time holding an armrest to stop the motion.
- 2. The lift shall stop.
- 3. If not snap off the back rest

#### NOTE

Support the back cover of the lifting unit

- 4. Remove the five screws holding the cover together and open the cover (*a*)
- 5. Check that the pin  $(\mathbf{b})$  can move freely

#### CAUTION

To protect the EPROM from static electricity (ESD): Ground yourself when working.

6. If the pin is OK check the microswitch cable harness (*c*) to PCB position J3.





#### SP 10. Inspect Castors

Do a validation concerning wear, movement of every swivel/ wheel and appearance as follows.

#### NOTE

The castors must be properly cleaned according to the customer obligations before starting.

- Lie the product down onto a flat surface. Protect areas in contact with the ground so as avoid damage to sensitive components. Place in a position that will allow all of the castors to rotate freely without obstructions (*this may require repositioning of the product during checks*)
- 2. Check ease of swivel action by rotating the castor upwards (*a*) and let it fall by gravitational force from both sides: There must be no resistance during full motion and the end position must be down.
- 3. Check ease of motion of wheel by slightly rotating the wheel: **The wheel must continue to rotate when released and without excessive bearing noise.** (*b*)
- 4. Check the wheel tread: Check for splits/ cracks, flat spots, missing sections or any visible damage. Replace if any of the before mentioned is found.
- 5. Place the product upright for further testing.
- 6. Check function of brakes (if applicable) by applying the brakes and push the product forward: **The brakes must lock the wheels and the brake lever must function on/off**
- 7. Apply load to the product (approx. 80 kg) and carry out a manoeuver ability test:
  It must be possible to manoeuver in all directions requiring little effort.

### If any of these criteria are not met the complete castor/s must be replaced.

8. The decision must be made by the service technician as to the replacement of the castors. When replacement is not carried out the technician must state in the service notes







that the castors will remain safe until the next scheduled service.

#### NOTE

All castors must be of the same brand. It's not permitted to use different versions of castors on the same product.

#### **Replacement new castor**

 Unscrew the castor (a) including o-ring (b), foot support (c) washer (d) or protection ring (e). Use special tool. First attach socket (1) to screw then attach the extension (2) otherwise it will not fit.



Special tool

- 2. Remove old Loctite in chassis (Refer to Loctite instructions)
- Assemble the new castor with new o-ring (torque and lubrication see page 21). See "SP 7. Check/clean foot supports" on page 11 concerning the foot supports.
- 4. Check the function of the new castor.

#### Reassembling of castor without replacement (only in connection with replacement of damaged foot support/protection ring/washer)

See "SP 7. Check/clean foot supports" on page 11 concerning the foot supports.

- Unscrew the castor (a) including o-ring (b) and foot support (c), washer (d) or protection ring (e). Use special tool. First attach socket (1) to screw then attach the extension (2) otherwise it will not fit.
- 2. Remove old Loctite in chassis and on screw (Refer to Loctite instructions)
- 3. Apply Loctite on screw (Refer to Loctite instructions)
- 4. Assemble the old castor with new o-ring (*b*) (torque and lubrication see page 21)
- 5. Check the function of the castor.





## SP 11. Perform full feature functionality test

Check functions according to the following table:

Function	Activation	Demands for approval
Arm rests	Manual	Free movement, no gaps See SP 7
Battery warning	Lift up <21,5V battery voltage	When lifting up a buzzer will beep for about 10 seconds. (Test with discharged battery)
Bed pan		No damage
Brakes	Manual	Activation/deactivation
Emergency lowering	Button	Activation/deactivation See SP 8
Emergency stop	Button	Activation/deactivation
Foot supports	Manual	Free movement, no gaps, See SP 7
Handcontrol	Buttons	Activation/deactivation
Leg rests	Manual	Free movement, no gaps See SP 6
Lift strap		No damage, correct fixation
Lift up/down	Buttons	Activation/deactivation
Pillows, cushion		No damage, correct fixation
Rotation and swivelling of castors	Manual	See SP 10
Safety stop	Microswitches	Activation/deactivation See SP 9
Safety strap		No damage, correct fixation

#### SP 12. Replace lift motor

- 1. Remove handcontrol and battery
- 2. Unsnap the back rest
- 3. Loosen the five screws (*a*) holding the lift unit together.

#### NOTE

Support the lifting unit

#### CAUTION

To protect the EPROM from static electricity (ESD): Ground yourself when working.

4. Detach back cover with all cabling to PCB and let the front cover (*b*) slide on the lift strap and rest on the seat

#### NOTE

Before the strap shaft **(c)** is pulled out support the seat frame as it otherwise will fall down

- 5. Pull out the strap shaft (*c*) from the strap to get better access to the motor
- 6. Remove the four screws (*d*) holding the bearing house and remove it (*e*)
- 7. Remove the four screws (*f*) with washers holding the motor

- 8. Pull off the motor (g) from the strap drum (h)
- 9. Pulling off the motor will release the strap drum and the washers on each side of the drum
- 10.Cut straps and detach electrical connection on PCB together with resistance glued on cover



#### Assembly

- 1. Replace bearing house (*f*) with bearing and washers (*b*,*c*) (included in motor kit) if needed.
- 2. Remove old Loctite from screws
- 3. Lubricate spline on the new motor shaft (a)
- 4. Attach drum washer (b) strap roll (c) and washer (d) inside the attachment and push the motor shaft through all parts and out on the other side
- 5. Attach the four screws with washers (*e*) holding the motor with Loctite

6. Attach washer and bearing house (*f*) with the four screws (*g*) using Loctite

- 7. Lift up the front cover together with the strap and attach it to the chassis
- 8. Attach the strap shaft (*h*) to the strap and put it in place. Add lubrication. See page 22 for specification
- 9. Connect cabling to PCB (*i*) and attach new self-adhesive resistance (*j*) inside cover
- 10.Lift up the back cover (k) (you can use a screw to hang up the back cover in the front cover) Strap cabling (l) to avoid damage
- 11.Attach the battery and test the motor
- 12.Attach back cover with five screws and snap on the back rest



#### SP 13. Replace lift strap

#### Follow SP12 Replace lift motor then:

1. Remove the pin (*a*) holding the strap (*b*)

2. Remove the locking nuts (*c*) for the lower strap attachment: pin (*d*) and roll (*e*) and remove strap with protection cover (*f*)



#### Reassembling

- Pull new strap through the cover (*a*), protection cover (*b*) around the roll and up (*c*) in the cover according to picture. Attach strap with new locking nuts to the lower attachment (*d*)
- 2. Attach new strap to drum with pin (*e*). Be sure the seam (*f*) is towards the drum

#### NOTE

Check that the strap has been fixed with the pin (e) in the drum.

3. Follow *SP12 Replace lift motor:* Assembly on previous page 18.

## SP 14. Setting of Potentiometer

#### CAUTION

To protect the PCB from static electricity (ESD); Ground yourself before proceeding.

1. Turn the potentiometer gently clockwise to end position (*a*) using a small screwdriver.

2. Turn it counterclockwise back to horizontal position according to picture 2.





### Locking, Lubrication and Torque

For specification of lockings, lubrication and tools refer to the Parts List.

#### **Chassis/Seat**



#### Lifting Unit





### Trouble Shooting

#### NOTE

Before any further actions are taken: Check that the battery is OK and fully charged.

Part	Problem	Cause	Action	Service procedure
Castors	Bad rolling	Dirt/wear	Clean/replace castors	10
	Bad swivel- ling	Dirt/wear	Clean/replace castors	10
Seat frame	Seat frame will not lift/ lower	Battery discharged/ defect	Charge/replace battery/ battery connector/battery charger	
		Too great friction/ current limit reached	Check seat frame mobil- ity	
		Handcontrol	Check/replace handcon- trol	
		Connection fault	Check cable connections on PCB /check all cables for damage	12
		Microswitch fault	Check function of safety stop	9
		Fuse broken	Check/replace fuse	
		Electronic fault	Check/replace PCB	12
		Motor fault	Check/replace motor	12
	Seat frame will lift but	Handcontrol	Check/replace handcon- trol	
	not lower	Microswitch defect	Check/replace micro- switch harness	
Seat frame will lift/ lower but makes	Seat frame will lift/ lower but	Bad attachment/ wear	Check rollers in carriage: clean/replace	5
	Strap defect	Replace strap	12	
noises		Motor worn out	Check motor/replace	12
		Carriage cover makes contact to frame	Check/replace carriage cover	5

Part	Problem	Cause	Action	Service procedure
Emer- gency	Does not work	Malfunction, bad connection	Check/replace button and cables to PCB	12
stop		Electronic fault	Check/replace PCB	12
Emer- gency lowering	Does not work	Bad contact/Button damaged	Replace PCB	12
Leg sup- port arm	Will not stay in place	Damage on internal parts in hinge	Replace parts	6
Armrest	Will not stay in posi- tion up	Too low torque on nut in carriage	Check attachment torque and o-ring	5
Making noise and		O-ring damaged	Check o-rings; lubricate or replace	5
	hard to move	Too high torque on nut in carriage	Check nuts	5

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