



**OPERATING MANUAL  
COMBISTAR SCISSOR LIFTS**

**TYPES:       N-120EL12  
               N-140EL12  
               N-165EL12  
               N-195EL12**

**HOLLAND LIFT INTERNATIONAL B.V.**  
Anodeweg 1, NL-1627 LJ HOORN, The Netherlands  
Tel.: +31-(0)229-285555, Fax.: +31-(0)229-285550  
[www.hollandlift.com](http://www.hollandlift.com)



© 2006, **HOLLAND LIFT INTERNATIONAL B.V.**, Hoorn, Nederland

Warning:

No part of this publication may be reproduced and/or published by means of printing, photocopying, microfilm or in any other way without the prior written consent of **HOLLAND LIFT INTERNATIONAL B.V.**



<b>CONTENTS</b>	<b>Page</b>
<b>1 GENERAL INFORMATION</b>	<b>6</b>
1.1 HOW TO USE THIS MANUAL .....	6
1.2 OTHER DOCUMENTATION .....	6
1.2.1 Parts catalogue.....	6
1.2.2 Electrical installation .....	6
1.2.3 Hydraulic installation.....	6
1.3 GUARANTEE.....	6
1.4 SCOPE OF THIS MANUAL.....	6
1.5 MODIFICATIONS .....	7
1.6 LIABILITY .....	7
1.7 WARNINGS AND SYMBOLS .....	7
<b>2 TECHNICAL DATA</b>	<b>8</b>
2.1 STANDARD EQUIPMENT.....	8
2.2 OPTIONS .....	8
2.3 THE MANUFACTURER DECAL.....	8
2.4 TECHNICAL DATA BY TYPE.....	9
2.4.1 Type N-120EL12.....	9
2.4.2 Type N-140EL12.....	10
2.4.3 Type N-195EL12.....	11
2.4.4 Type N-165EL12.....	112
<b>3 SAFETY REGULATIONS AND MEASURES</b>	<b>13</b>
3.1 IMPORTANT: USE ONLY AS DESIGNATED .....	13
3.2 APPLICATIONS .....	14
3.3 ORGANISATIONAL MEASURES .....	14
3.4 SELECTION OF PERSONNEL AND QUALIFICATIONS .....	15
3.5 SAFETY REGULATIONS IN SPECIFIC OPERATION CONDITIONS.....	16
3.5.1 Normal operation .....	16
3.5.2 Safety during maintenance.....	17
3.5.3 Warnings in respect of specific dangers .....	18
3.5.4 Safety during transport .....	19
<b>4 DESCRIPTION OF THE SCISSOR LIFT</b>	<b>20</b>
4.1 POSITION OF THE SAFETY DEVICES .....	20
4.2 SAFETY DEVCIES .....	21
4.2.1 Emergency stop switch.....	21
4.2.2 Driving alarm, acoustic .....	21
4.2.3 Driving alarm, visual.....	21
4.2.4 Limit switch (high speed).....	21
4.2.5 Tilt alarm .....	21
4.2.6 Driving on slopes.....	22
4.2.7 Overload safety device.....	22
4.2.8 Safety device lift cylinder.....	22
4.2.9 Emergency lowering device .....	23
4.2.10 Piping and hose leak safety device .....	23



4.2.11	<i>Safety prop</i> .....	24
4.2.12	<i>Protective fence</i> .....	24
4.2.13	<i>Anti-tip safety device</i> .....	24
4.2.14	<i>Battery control</i> .....	24
4.2.15	<i>Battery condition meter</i> .....	24
4.3	<b>OTHER COMPONENTS</b> .....	25
<b>5</b>	<b>OPERATION</b> .....	<b>26</b>
5.1	<b>GENERAL</b> .....	26
5.2	<b>POSITION OF THE CONTROLS</b> .....	26
5.3	<b>CONTROLS</b> .....	27
5.3.1	<i>Control box</i> .....	27
5.3.2	<i>Main switch</i> .....	27
5.3.3	<i>Auxiliary switch for lifting/lowering</i> .....	28
5.3.4	<i>Battery charger plug</i> .....	28
5.4	<b>OPERATION</b> .....	29
5.4.1	<i>Preparations</i> .....	29
5.4.2	<i>Operation</i> .....	29
5.4.3	<i>After operation</i> .....	29
5.5	<b>TOWING AND TRANSPORT</b> .....	30
5.5.1	<i>Releasing the brakes</i> .....	30
5.5.2	<i>Transport</i> .....	31
<b>6</b>	<b>MAINTENANCE</b> .....	<b>32</b>
6.1	<b>GENERAL</b> .....	32
6.1.1	<i>Fitting/removing the safety prop</i> .....	32
6.1.2	<i>Lubrication points</i> .....	33
6.2	<b>SCHEDULED MAINTENANCE</b> .....	34
6.2.1	<i>Daily</i> .....	34
6.2.2	<i>Weekly</i> .....	34
6.2.3	<i>Monthly</i> .....	34
6.2.4	<i>Quarterly</i> .....	35
6.2.5	<i>Annually</i> .....	35
6.2.6	<i>Every five years</i> .....	35
6.2.7	<i>Extreme conditions</i> .....	36
6.2.8	<i>Long-term storage</i> .....	36
6.2.9	<i>PLC control battery</i> .....	36
6.2.10	<i>Markings and decals</i> .....	37
6.3	<b>TORQUE SPECIFICATIONS</b> .....	38
<b>7</b>	<b>TROUBLESHOOTING</b> .....	<b>39</b>
<b>8</b>	<b>DISPOSAL OF THE SCISSOR LIFT</b> .....	<b>40</b>
8.1	<b>GENERAL</b> .....	40
8.2	<b>DISPOSAL OF THE SCISSOR LIFT</b> .....	40
<b>9</b>	<b>INDEX</b> .....	<b>41</b>



## LIST OF ILLUSTRATIONS

<b>Fig.</b>	<b>Description</b>	<b>Page</b>
FIG. 1	MANUFACTURER DECAL .....	8
FIG. 2	N-120EL12 .....	9
FIG. 3	N-140EL12 .....	10
FIG. 4	N-165EL12 .....	11
FIG. 5	N-195EL12 .....	12
FIG. 6	SUMMARY OF SAFETY DEVICES .....	20
FIG. 7	CONTROL BOX .....	21
FIG. 8	TILT ALARM .....	21
FIG. 9	HEIGHT STOPS .....	22
FIG. 10	EMERGENCY LOWERING DEVICE .....	23
FIG. 11	PIPE/HOSE LEAK SAFETY DEVICE .....	23
FIG. 12	SAFETY PROP .....	24
FIG. 13	SIDE OF ELECTRICAL BOX .....	25
FIG. 14	SIDE OF HYDRAULIC COMPARTMENT .....	25
FIG. 15	CONTROLS .....	26
FIG. 16	CONTROL BOX PANEL .....	27
FIG. 17	MAIN SWITCH .....	27
FIG. 18	AUXILIARY SWITCH FOR LIFTING/LOWERING .....	28
FIG. 19	BATTERY CHARGER PLUG .....	28
FIG. 20	CONTROL BOX .....	29
FIG. 21	RELEASE MULTIPLE DISC BRAKE .....	30
FIG. 22	LOCATION OF THE TOWING POINT .....	31
FIG. 23	POSITION OF LASHING EYES .....	31
FIG. 24	PLATFORM LOCK .....	31
FIG. 25	SAFETY PROP .....	32
FIG. 26	LUBRICATION POINTS .....	33
FIG. 27	MARKINGS AND DECALS .....	37



## **1 GENERAL INFORMATION**

### **1.1 HOW TO USE THIS MANUAL**

This manual serves as a guide for operating and maintaining the COMBISTAR type N scissor lift safely and properly and for repairing any minor faults yourself. People working on or with the machine must be familiar with the contents of this manual and follow the instructions contained therein. It is mandatory to follow the **sequence** of these instructions to increase the safety of operating staff and bystanders.

The management is obliged to train operating staff using this manual, taking account of all regulations and instructions. The scissor lift may only be operated independently once operators have understood this manual. The manual must be kept in the tube provided in the valve compartment of the scissor lift.

### **1.2 OTHER DOCUMENTATION**

#### **1.2.1 Parts catalogue**

See parts list.

#### **1.2.2 Electrical installation**

See electrical diagram.

#### **1.2.3 Hydraulic installation**

See hydraulic diagram

### **1.3 GUARANTEE**

**HOLLAND LIFT INTERNATIONAL B.V.** supplies its products in accordance with the “Metaalunie” conditions of 1 January 2001.

### **1.4 SCOPE OF THIS MANUAL**

All regulations, provisions and instructions described in this manual apply exclusively to **original model** scissor lifts built and supplied by **HOLLAND LIFT INTERNATIONAL B.V.**



## 1.5 MODIFICATIONS

No modifications may be made to the scissor lift without the written consent of the management of **HOLLAND LIFT INTERNATIONAL B.V.**

The information in this manual is based on data about designs, material properties and working methods that were known to us at the time the manual went to press.

The information is therefore subject to design modifications. For this reason, **HOLLAND LIFT INTERNATIONAL B.V.** reserves the right to amend the content without notice.








## 1.6 LIABILITY

**HOLLAND LIFT INTERNATIONAL B.V.** accepts no liability for:

- damage resulting from the use of the scissor lift
- any printing errors in this manual and the consequences thereof.

## 1.7 WARNINGS AND SYMBOLS

Safety instructions and warnings are marked with the following symbols and pictograms in this manual.

- A business procedure, circumstance etc. requiring extra attention.  
**WARNING / NOTE!**  
 A **WARNING** highlights potential injuries to the user or serious material damage to the machine if the user fails to follow the business procedures at all or sufficiently carefully.  
**NOTE!** Particular information regarding actions that must be taken or are prohibited to prevent damage.
-  Risk of electrical voltage
-  Failure to follow the instructions can lead to serious or fatal injuries.
-  Risk of catching
-    Wear and use the necessary safety equipment while working
-  Flammable substances
- The scissor lift has decals at the appropriate places with instructions for safe and proper use.



## 2 TECHNICAL DATA

### 2.1 STANDARD EQUIPMENT

- Control panel with plug-in connection on platform
- Auxiliary switch on the chassis for lifting/lowering
- Proportional drive

### 2.2 OPTIONS

- 230 V AC connection
- Flashing lights in addition to acoustic driving alarm
- Travel at full height

### 2.3 THE MANUFACTURER DECAL



**NOTE:**  
Never remove the manufacturer decal!

Specific details of the scissor lift can be seen on the manufacturer decal.

<b>HOLLAND LIFT</b>	
Holland Lift International BV • Anodeweg 1 • NL 1627 LJ Hoorn • Tel. **-(31)-229-285555	
Model / Modell	Totaal / Total  Kg
Chassis nr. / no.	Bouwjaar / Year of manufacture / Baujahr
Nominaal vermogen / Nominal power / Nominale Wirkungsgrad kW	
-  Ingeschoven / Retracted / Eingeschoben	Kg (  +  )
-  Uitgeschoven / Extended / Ausgeschoben	Kg (  +  )
Max. horizontale kracht / man. sideforce / Seitenkraft 400 N	Max.  °
Max. windsnelheid / wind speed / Windgeschwindigkeit	Max.  °
Max.  hoogte / height / Höhe	Max. rijhoogte / driving height / Fahrhöhe m
Min. temp. / all. temp. / Zul. Tiefsttemp. -15° C	Max. bedr. dr. / work. pres. / Betr. dr. Bar

TYPEPLAAT 01

Fig. 1 Manufacturer decal

247





## 2.4 TECHNICAL DATA BY TYPE

### 2.4.1 Type N-120EL12

Suitable for indoor use	Yes
Suitable for outdoor use	No
Max. wind speed	n/a
Working height approx.	13,7 m
Max. platform height approx.	11,7 m
Min. platform height	1,8 m
Platform (retracted)	3,38 x 1,16 m
Platform (extended)	4,88 x 1,16 m
Platform extension	1,50 m
Transport height with railings	2,96 m
Transport dimensions	3,74 x 1,20 m
Transport height railings down	2,34 m
Wheel base	2,67 m
Ground clearance (centre)	235 mm
Turning radius (outside) approx.	3,92 m
Solid tyres	22 x 9 x 16

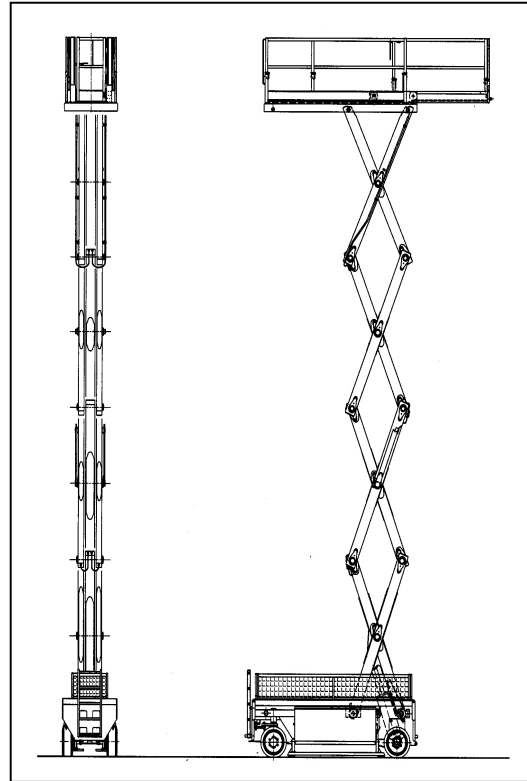


Fig. 2 N-120EL12

440

Max. load capacity (platform retracted)	1.000 kg (2 pers. + 840 kg)
Max. load capacity (platform extended)	1.000 kg (2 pers. + 840 kg)
Lift/lowering time (max. load) approx.	68/52 s
Driving speed, high	2,0 km/h
Driving speed, low	0,5 km/h
Grade ability (platform lowest position)	25%
Max. inclination grade/slope	2°/1,8° (Key switch position "0", travel up to 8 m)
Max. inclination grade/slope	1°/1° (Key switch position "1", travel up to 11,7 m)
Operating weight (standard machine)	7.000 kg
Max. wheel pressure (at max. inclination and height)	6.276 kg (use 18,03 kg /cm <sup>2</sup> , nominal ground pressure with safety of +25%; 22,54 kg /cm <sup>2</sup> )
Max. towing speed	2,0 km/h (0,56 m/s)



## 2.4.2 Type N-140EL12

Suitable for indoor use	Yes
Suitable for outdoor use	No
Max. wind speed	n/a
Working height approx.	16,0 m
Max. platform height approx.	14,0 m
Min. platform height	2,02 m
Platform (retracted)	3,38 x 1,16 m
Platform (extended)	4,88 x 1,16 m
Platform extension	1,50 m
Transport height with railings	3,18 m
Transport dimensions	3,74 x 1,20 m
Transport height railings down	2,56 m
Wheel base	2,67 m
Ground clearance (centre)	235 mm
Turning radius (outside) approx.	3,92 m
Solid tyres	22 x 9 x 16

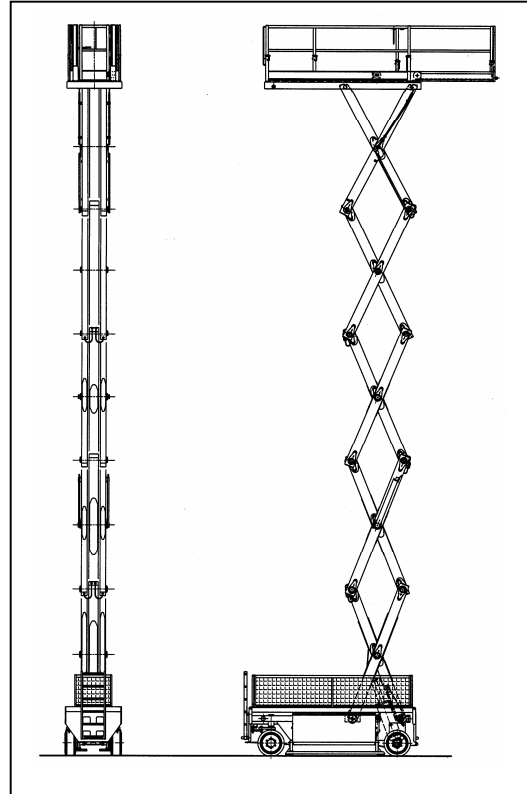


Fig. 3 N-140EL12

384

Max. load capacity (platform retracted)	750 kg (2 pers. + 590 kg)
Max. load capacity (platform extended)	750 kg (2 pers. + 590 kg)
Lift/lowering time (max. load) approx.	67/43 s
Driving speed, high	2,0 km/h
Driving speed, low	0,5 km/h
Grade ability (platform lowest position)	25%
Max. inclination grade/slope	2°/1.8° (Key switch position "0", travel up to 8 m)
Max. inclination grade/slope	1°/1° (Key switch position "1", travel up to 14,0 m)
Operating weight (standard machine)	7.550 kg
Max. wheel pressure (at max. inclination and height)	6.500 kg (use 18,68 kg /cm <sup>2</sup> , nominal ground pressure with safety of +25%; 23,35 kg /cm <sup>2</sup> )
Max. towing speed	2,0 km/h (0,56 m/s)



### 2.4.3 Type N-165EL12

Suitable for indoor use	Yes
Suitable for outdoor use	No
Max. wind speed	n/a
Working height approx.	18,5 m
Max. platform height approx.	16,5 m
Min. platform height	2,24 m
Platform (retracted)	3,38 x 1,16 m
Platform (extended)	4,88 x 1,16 m
Platform extension	1,50 m
Transport height with railings	3,40 m
Transport dimensions	3,74 x 1,20 m
Transport height railings down	2,78
Wheel base	2,67 m
Ground clearance (centre)	235 mm
Turning radius (outside) approx.	3,92 m
Solid tires	22 x 9 x 16

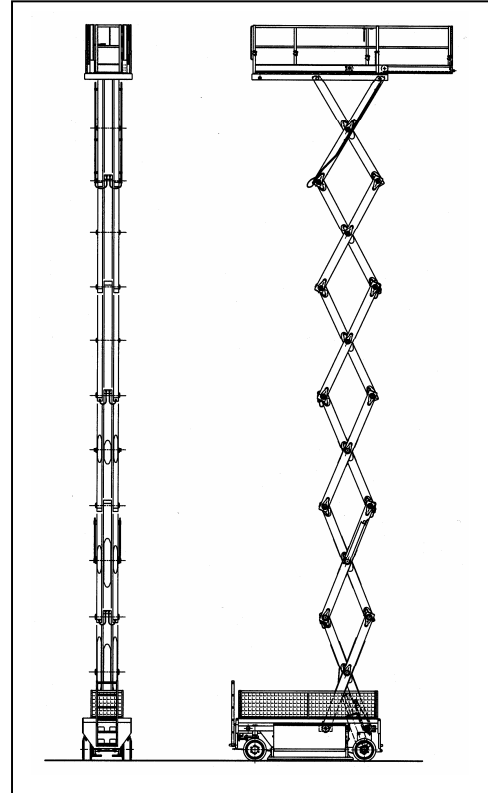


Fig. 4 N-165EL12

385

Max. load capacity (platform retracted)	500 kg (2 pers. + 340 kg)
Max. load capacity (platform extended)	500 kg (2 pers. + 340 kg)
Lift/lowering time (max. load) approx.	95/52 s
Driving speed, high	2,0 km/h
Driving speed, low	0,5 km/h
Grade ability (platform lowest position)	25%
Max. inclination grade/slope	2°/1,8° (Key switch position "0", travel up to 8 m)
Max. inclination grade/slope	1°/1° (Key switch position "1", travel up to 16,5 m)
Operating weight (standard machine)	7.985 kg
Max. wheel pressure (at max. inclination and height)	6.659 kg (use 19,14 kg /cm <sup>2</sup> , nominal ground pressure with safety of +25%; 23,92 kg /cm <sup>2</sup> )
Max. towing speed	2,0 km/h (0,56 m/s)



## 2.4.4 Type N-195EL12

Suitable for indoor use	Yes
Suitable for outdoor use	No
Max. wind speed	n/a
Working height approx.	21,5 m
Max. platform height approx.	19,5 m
Min. platform height	2,60 m
Platform (retracted)	3,38 x 1,16 m
Platform (extended)	4,88 x 1,16 m
Platform extension	1,50 m
Transport height with railings	3,76 m
Transport dimensions	3,74 x 1,20 m
Transport height railings down	3,14
Wheel base	2,67 m
Ground clearance (centre)	235 mm
Turning radius (outside) approx.	3,92 m
Solid tires	22 x 9 x 16

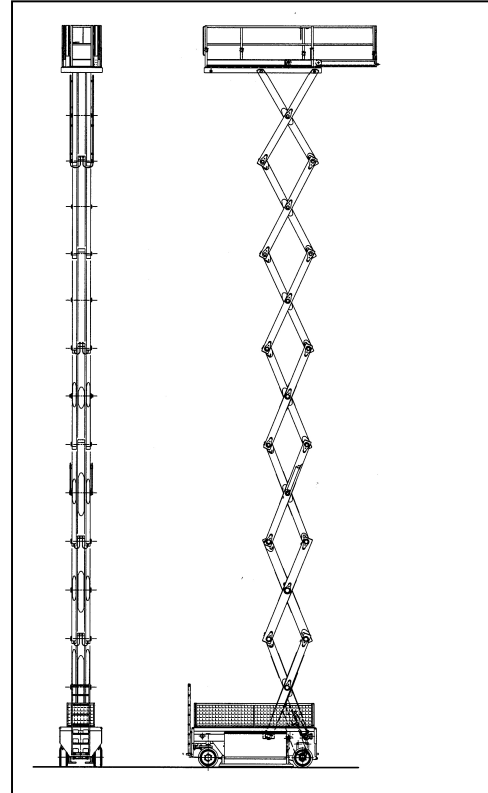


Fig. 5 N-195EL12

399

Max. load capacity (platform retracted)	500 kg (2 pers. + 340 kg)
Max. load capacity (platform extended)	500 kg (2 pers. + 340 kg)
Lift/lowering time (max. load) approx.	106/69 s
Driving speed, high	1,9 km/h
Driving speed, low	0,5 km/h
Grade ability (platform lowest position)	25%
Max. inclination grade/slope	2°/1,2°
Operating weight (standard machine)	9.120 kg
Max. wheel pressure (at max. inclination and height)	8.096 kg (use 23,27 kg /cm <sup>2</sup> , nominal ground pressure with safety of +25%; 29,09 kg /cm <sup>2</sup> )
Max. towing speed	1,9 km/h (0,53 m/s)



### 3 SAFETY REGULATIONS AND MEASURES

#### 3.1 IMPORTANT: USE ONLY AS DESIGNATED

- 1 The scissor lift is built in compliance with the current safety guidelines.
- 2 Use the scissor lift only:
  - in correct technical condition;
  - as designated;
  - in compliance with the instructions in this manual.



**Never use the scissor lift in places at risk of dust or gas explosions!**



**NEVER** use the scissor lift for work on or near electrical power lines or installations.

3



The machine is intended only for working at height. The specified maximum capacity and number of persons may not be exceeded. Other uses, for instance supporting or lifting constructions, are not in compliance with the designated use. **HOLLAND LIFT INTERNATIONAL B.V.** accepts no liability for any damage resulting from incorrect use.

4



Proper use of the operating manual and compliance with the instructions for inspection and maintenance are part of the intended use of the machine.

5



If you choose to drive the machine at full height (\* m), this is only permissible on a firm, level surface. The user must be instructed in this use. An extra safety requirement is that work must always be performed with two people, one on the platform and one on the ground. They should keep in contact by means of walkie-talkies. Under the conditions, the 8 meter height stop must work. Position “0” (using the key switch) is mobile up to 8 meters and position “1” is mobile up to \* meters at a speed of no more than 0,5 km/h. The key switch is located on the electrical box.

\*) N-120EL12 = 12,0 m  
 N-140EL12 = 14.0 m  
 N-165EL12 = 16.5 m  
 N-195EL12 = 19,5 m



## 3.2 APPLICATIONS

The type N-120EL12, N-140EL12, N-165EL12 and N-195EL12 scissor lift is suitable for indoor use only with an ambient temperature between  $-15^{\circ}\text{C}$  and  $+40^{\circ}\text{C}$ .

The floor needs to be sufficiently firm, level and free of snow and ice. Any obstacles must be removed from the working area.

Specific details of the machine can be found on the manufacturer decal (Fig. 1).

The frequency-weighted quadratic average rate of acceleration (due to vibrations) to which the operator will be exposed during use of the machine will not exceed  $2.5 \text{ m/s}^2$ .

The noise produced by the machine in the workplace at a distance of 7 meters and at maximum load will not exceed 75 dB(A).

Exposure to the noise for extended periods of time without wearing ear protection may damage the hearing.

## 3.3 ORGANISATIONAL MEASURES

- 1 The operating manual must be within easy reach of the operator of the scissor lift at all times in the tube provided in the valve compartment. **HOLLAND LIFT INTERNATIONAL B.V.** can supply a new copy of the manual if required.
- 2 The operator of the scissor lift must be familiar with the contents of this manual. Special attention must be given to the SAFETY REGULATIONS AND MEASURES section.
- 3 Observe all instructions on the scissor lift for safe and proper use. Keep the decals in a legible condition.
- 4 Modifications to the construction of the machine may only be performed with the written consent of the management of **HOLLAND LIFT INTERNATIONAL B.V.**
- 5 Parts may only be replaced by parts supplied by **HOLLAND LIFT INTERNATIONAL B.V.**, or parts of equal quality. **HOLLAND LIFT INTERNATIONAL B.V.** reserves the right to assess whether these parts are of equal quality. The manufacturer accepts no liability unless a written statement has been made.
- 6 Adhere to the prescribed intervals for inspections and checks.
- 7 Keep all handles, steps, handrails and the platform surface free of dirt, snow and ice.
- 8 Inspections, tests, repairs or modifications must be recorded in the service schedule supplied with the machine.



### 3.4 SELECTION OF PERSONNEL AND QUALIFICATIONS

- 1 The scissor lift may only be operated by persons aged 18 and above who are familiar with the regulations and operating instructions for the machine supplied by **HOLLAND LIFT INTERNATIONAL B.V.**
- 2 Only maintenance work described in this manual may be carried out by the user.
- 3 Maintenance work that is not described in this manual, as well as repairs and replacement of parts, may only be carried out by specially trained personnel.
- 4 Persons who are under the influence of alcohol, drugs or medication that affect their abilities are not permitted to operate the machine.

***N.B.:** It is recommended that operators obtain the “Scissor lift safety certificate” recognized by the Stichting Toezicht Certificatie Verticaal Transport (TCVT – institute for vertical transport supervision certificate).*



## 3.5 SAFETY REGULATIONS IN SPECIFIC OPERATION CONDITIONS

### 3.5.1 Normal operation

- 1 Avoid any operation that could jeopardize safety.
- 2 Use and operate the scissor lift only if all the safety devices are functioning properly.
- 3 Do not exceed the maximum workload.
- 4 Keep the driving and working area clear of obstacles.
- 5 Make sure the machine is operated on a firm and level surface (see 2.4).
- 6 Enter and leave the platform only through the access gate with the platform in its lowest position.
- 7 To prevent unauthorized use of the scissor lift, remove the control box after operation. Also turn the main switch to off and possibly take the key with you.
- 8 It is **strictly forbidden** to:
  - carry overhanging loads
  - fix banners or billboards to the platform or scissor mechanism
  - increase the size of the platform
  - stand on the platform railings
  - raise the platform floor
  - use the scissor lift on or near to electrical lines or installations
  - tow the scissor lift on public roads
  - modify the safety devices
  - change the settings or controls
  - operate the scissor lift with the control box from the ground except for transport and maintenance purposes.
- 9 Make sure that the area in the direction of travel is clearly visible. If necessary, install extra lighting in the work area.
- 10 During normal use, the covers on the battery and hydraulic compartments must be in place and locked.
- 11 Avoid contact with obstacles and make sure there is sufficient distance between the scissor lift and other moving parts.
- 12 **CAUTION!**
  - Avoid contact with moving and hinged parts (scissor mechanism and steering gear).
  - Keep out of the working area of the scissor lift while lowering the platform.
  - Avoid danger caused by falling parts from the platform.
- 13 The driver of the scissor lift should ensure that no unauthorized persons are in the working area of the scissor lift.
- 14 If tools that could cause a fire are used on the platform, a fire extinguisher must be carried to prevent the platform floor catching fire.
- 15 If gases are formed (hydrogen) during loading, this must be performed in a well-ventilated area where smoking and open flames are strictly prohibited (risk of explosion).





### 3.5.2 Safety during maintenance

- 1 Only perform maintenance and repairs when the scissor lift is standing on a firm, level surface.  
Use chocks to prevent the machine rolling away.
- 2 If the scissor lift is completely switched off during maintenance or repair, the machine must be secured against unexpected or accidental activation.
  - Lock the main switch or make it inaccessible by removing the key
    - Make sure that the precautions cannot be reversed by third parties. If the machine cannot be locked adequately, place a clear warning sign with the words “**DO NOT SWITCH ON**”. State the date and time so that warnings cannot be thought not to apply.
- 3 The scissor lift may only be cleaned with water, steam or other liquids and detergents if all the components that must not be penetrated by liquids have been sealed or protected properly.
- 4 After cleaning, carefully remove the covers on the components.
- 5 Safety devices that must be removed for maintenance or repair must be carefully replaced and adjusted immediately after the work is completed.



#### **CAUTION!**

This work may only be carried out by authorized personnel.

- 6 Make sure that oil, grease and other environmentally harmful substances will be processed in a safe and environmentally friendly way.
- 7 After carrying out repairs, always perform a functional test before using the machine again.



### 3.5.3 Warnings in respect of specific dangers

#### *Electrical installation*



- Follow the instructions below in the event of contact with electrical lines.
- Stay on the platform
  - Move the scissor lift out of the danger zone
  - Warn others not to touch the machine
  - Disconnect the power from the line in question
  - Do not leave the machine until the power has been disconnected.

The scissor lift is not protected against lightning strike. The lift must not be used in the open air during storms.

Scissor lifts fitted with non-marking tires may become charged with static electricity.

#### *Hydraulic system*



- 1 Hydraulic oil **may** become hot during use. Avoid skin contact with hot hydraulic oil.



- 2 Keep away from pressurized hydraulic lines.



- 3 Pressurized hydraulic oil can penetrate the skin and cause fatal injuries. Never look for leaks manually!



- 4 Release the pressure from the system before connecting or disconnecting a pressure hose.



- 5 Leaking hydraulic oil can cause fire.

- 6 If hydraulic oil has penetrated the skin, seek immediate medical help from a doctor who is familiar with this type of injury.



- 7 Wear and use the necessary safety equipment while working.



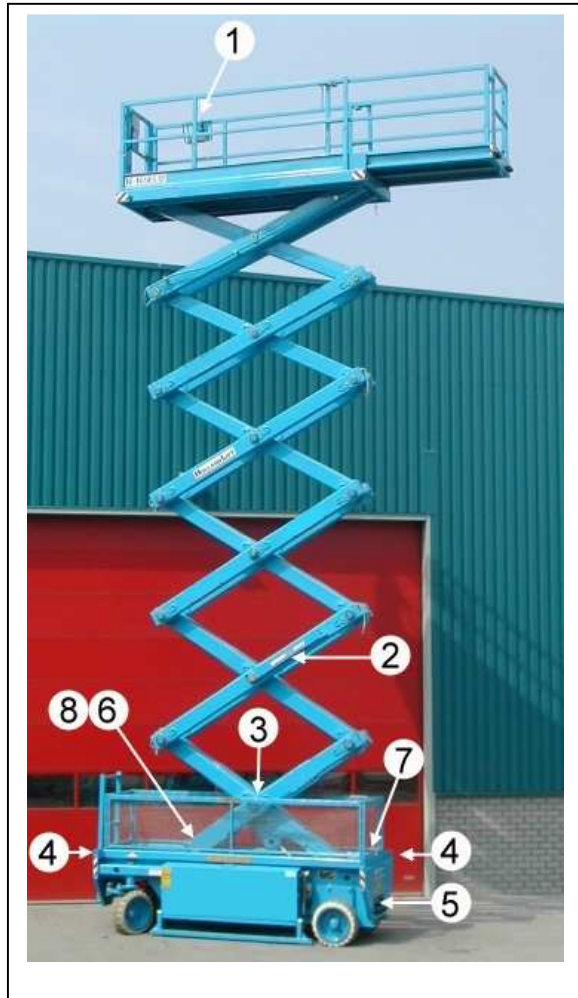
### 3.5.4 Safety during transport

- 1 The scissor lift may only be loaded, unloaded and transported in accordance with the instructions in this manual.
- 2 When towing the machine, comply with the regulations on transport position, permissible speed and transport route (see 5.5).
- 3 When (re)commissioning the scissor lift, work only in accordance with the instructions in this manual.
- 4 The platform must be retracted during transport.
- 5 Important provisions when traveling on slopes of up to 25%.
  - max. platform load 80 kg (1 person);
  - platform in lower position
  - drive wheels at the bottom end of the slope
  - no sharp steering movements during travel
  - slopes only permitted in the longitudinal direction of the machine.
- 6 Only travel on slopes in excess of 25% with a reliable winch!
- 7 Note the weight and dimensions of the scissor lift (see 2.4)



## 4 DESCRIPTION OF THE SCISSOR LIFT

### 4.1 POSITION OF THE SAFETY DEVICES



**Fig. 6 Summary of safety devices**

386

1. Emergency stop switch
2. Safety prop
3. Protective fence
4. Driving alarm, visual
5. Emergency lowering valve
6. Driving alarm, acoustic
7. Limit switches
8. Tilt alarm



## 4.2 SAFETY DEVCIES

### 4.2.1 Emergency stop switch

On the control box there is a red emergency stop button (Fig. 7-1). **Pushing in** the emergency stop button deactivates all functions. **Pulling out** the emergency stop button re-activates all functions with a 10-second delay.

### 4.2.2 Driving alarm, acoustic

The scissor lift is fitted as standard with and acoustic driving alarm that sounds while it is moving.

### 4.2.3 Driving alarm, visual

Instead of an acoustic driving alarm, the scissor lift can optionally be fitted with two flashing lights which are automatically activated when moving.

### 4.2.4 Limit switch (high speed)

If the platform is higher than 2 meters, the slow drive speed is automatically engaged. Over 8 meters, driving and steering are automatically disabled. Driving and steering are automatically enabled again when the platform height is lower than 8 meters. Scissor lifts with the option to drive at full height can release the block on slow driving and steering by setting the key switch to position "1".

### 4.2.5 Tilt alarm

If the maximum tilt is exceeded with a platform height of over 3 meters, a warning signal sounds and all movement functions are disabled with the exception of the lowering function and retraction of the platform. To restart the machine, the platform should be lowered fully and a more level surface should be found (Fig. 8).

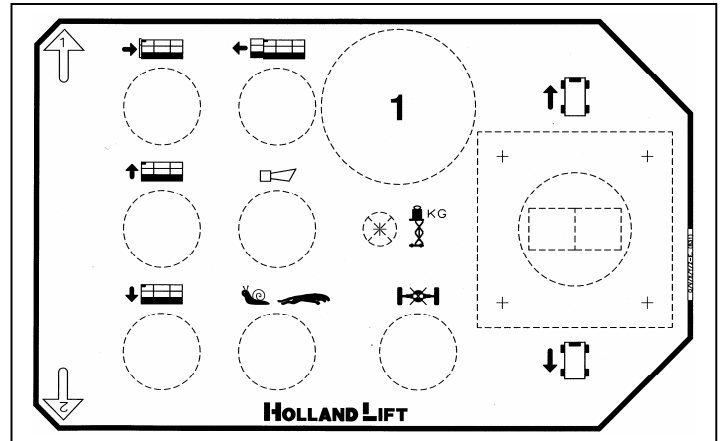


Fig. 7 Control box

1. Emergency stop button

382



Fig. 8 Tilt alarm

346



#### 4.2.6 Driving on slopes

Before driving the scissor lift on a slope, the selector switch for the driving speed must be set to the 0 position (low speed). When driving on a slope of up to 25%, the platform should be in its lowest position and no sharp steering movements should be made while driving. The scissor lift can only travel on a slope in a longitudinal direction. When driving on a slope over 25%, a reliable winch must be used! (Consider the weight of the machine, see 2.4)

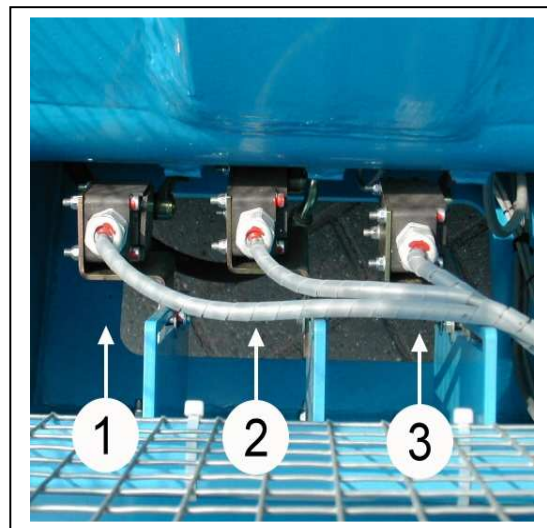
#### 4.2.7 Overload safety device

The scissor lift is fitted with an overload safety device. A warning signal sounds three times and the overload light flashes when 80% of the permissible working load is reached (Fig. 14-12). If the permissible working load is exceeded (between 100-120%), all movement functions on the scissor lift will be disabled. An acoustic signal also sounds continuously and the overload light is illuminated (Fig. 14-12). If the overload safety is triggered, the excess load must be removed after which the movement functions of the scissor lift can be reactivated. It is advisable to take some means of communication onto the platform in case of a fault.

**N.B.:** When the machine is started, the overload system must perform a RAM check. This means the machine may not operate for 10 seconds after switching on the main switch and the emergency stop button. This is indicated by the overload signal sounding continuously.

#### 4.2.8 Safety device lift cylinder

A limit switch prevents an internal mechanical stop in the lift cylinder just before the maximum stroke is reached (Fig. 9-2).



**Fig. 9 Height stops**

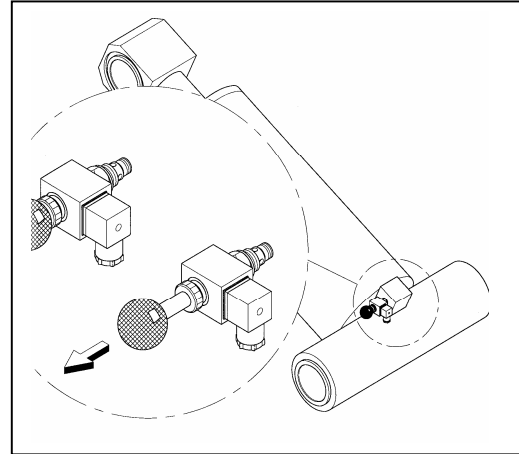
387

1. 3 meter height stop
2. Max. height stop
3. 8 meter height stop



#### 4.2.9 Emergency lowering device

In the event of an emergency, the platform can be lowered by opening an emergency lowering valve on the lift cylinder. This is activated by pulling out the knob on the valve. If the platform is still extended, it should be retracted first.

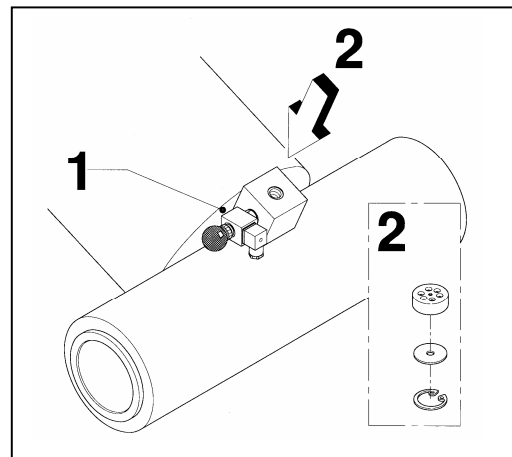


**Fig. 10 Emergency lowering device**  
1. Emergency lowering valve 82

#### 4.2.10 Piping and hose leak safety device

The lift cylinder is fitted with an electrically controlled valve. Lowering is only possible with a control signal from the control box, even in the event of a hose leak (Fig. 11-1).

The maximum lowering speed is limited by a throttle in the cylinder.



**Fig. 11 Pipe/hose leak safety device**  
1. Pipe/hose leak valve 83



#### 4.2.11 Safety prop

Work on or between the scissor arms may only be carried out when the scissor mechanism is secured with the safety prop (Fig. 12-1).

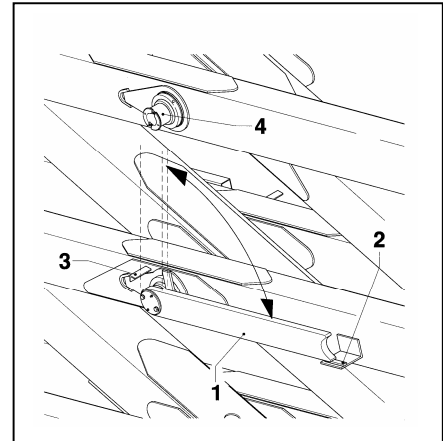
The scissor lift must not have any load when the safety prop is in use.

#### 4.2.12 Protective fence

A protective fence on the chassis prevents parts of the body getting caught between the moving scissor arms.



The machine must not be used unless the protective fence is fitted and working properly.



**Fig. 12 Safety prop**

1. Safety prop
2. Lock
3. Stop plate
4. Pin

47

*If the protective fence is removed during maintenance work, it must be replaced correctly once the work is finished.*

#### 4.2.13 Anti-tip safety device

The scissor lift is fitted as standard with an anti-tip safety device for use while moving at full height. This safety device prevents the machine falling over if it drives over a hole. It is only possible to drive at high speed with the platform in its lowest position. If the platform is raised (> 3 m), the anti-tip safety device is automatically unfolded. At the same time, low speed is automatically engaged. When the platform is returned to its lowest position, the anti-tip safety device is automatically retracted and it is once again possible to drive at high speed.

#### 4.2.14 Battery control

The scissor lift cannot be operated while the batteries are charging. The battery control automatically deactivates all functions.

#### 4.2.15 Battery condition meter

The default battery condition meter has three colored Led's which indicate the battery voltage.

- Green: Battery voltage OK
- Orange: Battery voltage sufficient, charging required shortly
- Red: Battery voltage too low, all control functions will be switched off automatically in  $\pm 10$  minutes. Charge batteries





### 4.3 OTHER COMPONENTS

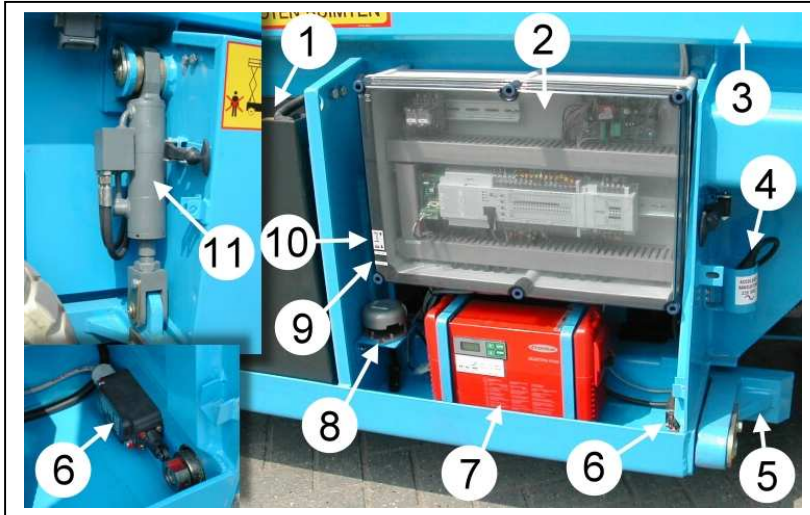


Fig. 13 Side of electrical box

388

- |                            |                                  |   |
|----------------------------|----------------------------------|---|
| 1. Battery                 | 5. Anti-tip safety device        | 9. Steering power fuses                   |
| 2. Terminal box            | 6. Anti-tip safety device switch | 10. Auxiliary switch for lifting/lowering |
| 3. Battery condition meter | 7. Battery charger               | 11. Anti-tip safety device cylinder       |
| 4. Battery charger plug    | 8. Tilt alarm                    |   |

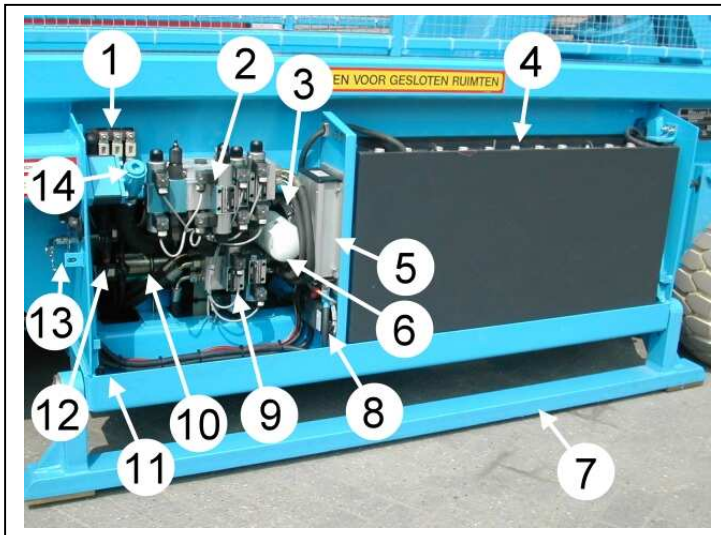


Fig. 14 Side of hydraulic compartment

389

- |                    |                                |                                    |
|--------------------|--------------------------------|------------------------------------|
| 1. Main fuses      | 6. Hydraulic filter            | 11. Anti-tip safety device switch  |
| 2. Main manifold   | 7. Anti-tip safety device.     | 12. Main relay                     |
| 3. Hydraulic tank  | 8. 48/24 V transformer         | 13. Main switch                    |
| 4. Battery         | 9. Driving manifold            | 14. Hydraulic tank filling opening |
| 5. Motor regulator | 10. Electric motors with pumps |                                    |



## 5 OPERATION

### 5.1 GENERAL

The safety regulations must be observed at all times when operating the scissor lift. See chapter 3.

### 5.2 POSITION OF THE CONTROLS



Fig. 15 Controls

390

- |                                     |  |
|-------------------------------------|--|
| 1. Control box                      | 4. Battery charger plug                  |
| 2. Wall socket, operation, platform | 5. Auxiliary switch for lifting/lowering |
| 3. Main switch                      | 6. Wall socket, operation, chassis       |



## 5.3 CONTROLS

### 5.3.1 Control box

All the functions of the scissor lift are operated with a control box mounted on the platform. The machine may only be operated by persons **on** the platform. The top of the control box has a panel with buttons and related symbols (Fig. 16).

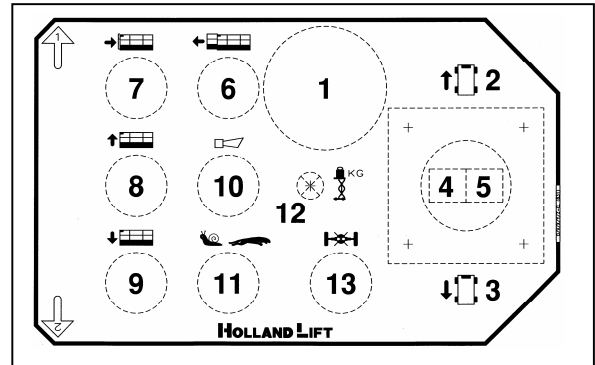


Fig. 16 Control box panel

383

The valve compartment also includes a connection for the control box plug. This may only be used during transport and maintenance/repair work.

- |                          |                                 |
|--------------------------|---------------------------------|
| 1. Emergency stop button | 8. Lifting                      |
| 2. Drive, forwards       | 9. Lowering                     |
| 3. Drive, reverse        | 10. Horn                        |
| 4. Steer left            | 11. Drive speed selector switch |
| 5. Steer right           | 12. "Overload" light            |
| 6. -                     | 13. Possible lock function      |
| 7. -                     |                                 |

### 5.3.2 Main switch

The main switch (Fig. 17) switches the power to the machine on and off. Insert the key in the main switch and turn it 90° clockwise to switch on the power. Turn it 90° anti-clockwise to switch off the power.



Fig. 17 Main switch

396

1. Main switch
2. Key (main switch)



### 5.3.3 Auxiliary switch for lifting/lowering

On the electrical switchbox in the hydraulic compartment is an auxiliary switch for lifting and lowering with an automatic zero position (Fig. 18-1). This switch can be used during maintenance work and in an emergency.



**Fig. 18 Auxiliary switch for lifting/lowering**

1. Auxiliary switch

395

### 5.3.4 Battery charger plug

The battery charger plug (Fig. 19-1) is located in a plug holder on the side of the battery compartment. The plug should only be connected to an earthed socket.



**Fig. 19 Battery charger plug**

1. Plug

391



## 5.4 OPERATION

### 5.4.1 Preparations

Check:

- correct operation of all functions
- correct operation of all safety equipment
- the scissor lift for visible damage (do not forget the tires)
- the hydraulic system for leaks
- the hydraulic oil level, if necessary top up with Shell tellus T32.
- correct operation of all safety devices
  - tilt the tilt alarm (Fig. 5) until the acoustic alarm sounds
  - not possible to drive and steer above 8 meters
  - not possible to drive at high speed above 3 meters
  - raise to 12,0 / 14,0 / 16,5 / 19,5 meters respectively
  - emergency stop button and main switch.

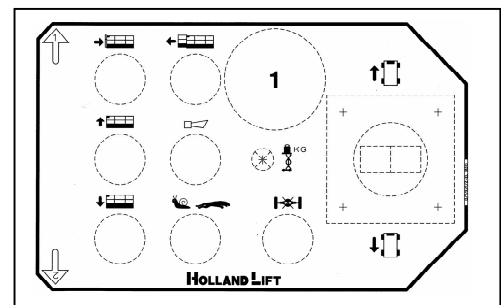
### 5.4.2 Operation

- 1 Take the battery charger plug (Fig. 19-1) out of the 230 V socket and put it in the plug holder.
- 2 Turn the main switch on (turn the handle a quarter turn to the right)



**WARNING**  
Enter the platform only via the access gate.

- 3 Hang the control box on the railing at the front of the platform and plug the connector into the socket on the platform.
- 4 Pull out the emergency stop button (Fig. 20-1) on the control panel (turn to the right). The overload signal will sound for 10 seconds (do not activate any operating functions during this period since this is the RAM check by the overload system) after which the controls are released.
- 5 The scissor lift can now be operated with the control buttons.



**Fig. 20 Control box**

1. Emergency stop button

382

### 5.4.3 After operation

- 1 Lower the platform to its lowest position.
- 2 Push in the emergency stop button (Fig. 20-1).
- 3 Remove the control box.
- 4 Turn the main switch off (turn the handle a quarter turn to the left).
- 5 Connect the battery charger plug (Fig. 19-1) to an earthed 230 V socket and charge the batteries. (only charge in a well-ventilated area where smoking and open flames are prohibited – risk of explosion)

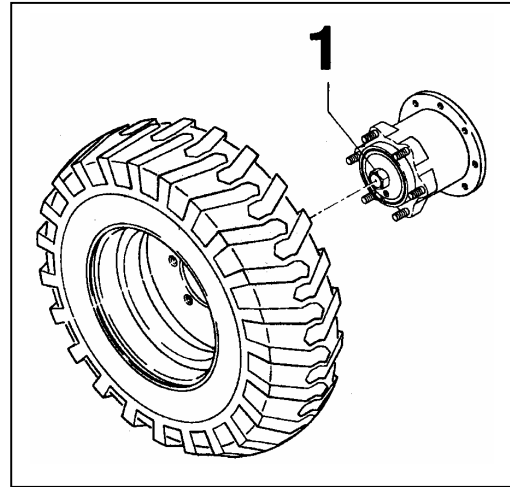


## 5.5 TOWING AND TRANSPORT

The brakes of the scissor lift are activated whenever the machine is stopped. The brakes must be released to tow the scissor lift. The towing speed must **never** exceed the maximum driving speed in the specifications for the scissor lift (see 2.4).

### 5.5.1 Releasing the brakes

The scissor lift has a gearbox with a built-in multiple disc brake (Fig. 21-1).



**Fig. 21 Release multiple disc brake**

1. Towing option

97

To release the multiple disc brake, undo the central bolt with a spanner width of 30 mm by  $\pm 10-14$  mm until you feel the stop (last turns by hand).  
*Do not undo beyond the stop.*

The scissor lift can now be towed. The towing speed must **never** exceed the maximum driving speed in the specifications for the scissor lift (see 2.4).



### **CAUTION!**

**The scissor lift no longer has any braking function once the brakes have been released as above. The brakes must be reapplied immediately after towing.**

***N.B.:** Before releasing the brakes it is advisable to take precautions to prevent the machine moving. Place blocks or wedges in front of and behind a wheel.*



## 5.5.2 Transport

When moving the scissor lift with some other means of transport, the following must be taken into account:

- If the gradient is greater than 25%, the scissor lift should be moved using a winch. The winch should be secured to the tow hooks on the front or back (Fig. 22-1-2).

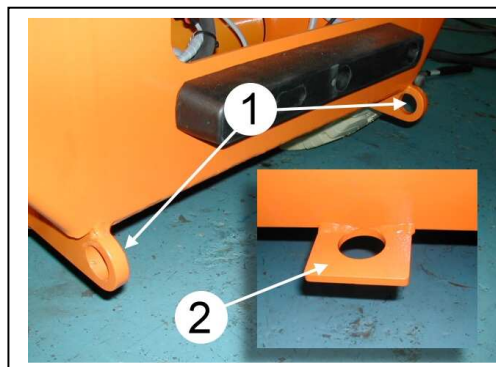


Fig. 22 Location of the towing point

393

- If the scissor lift is lifted onto the transport vehicle, use the lifting eyes (Fig. 23-1) on each corner of the scissor lift.

**HOLLAND LIFT INTERNATIONAL B.V.** advises you not to lift the scissor lift without special tools. Contact Holland Lift International B.V.

- The weight of the scissor lift is shown on the manufacturer decal (Fig. 1). Take account of this when selecting the means of transport.
- During transport, the chassis must be secured to the means of transport such that no unintentional movement is possible in any direction. Use the lashing eyes (Fig. 23-1).
- The platform must be retracted and locked with a transport pin during transport Fig. 24-1.

1. Tow hooks back
2. Tow hook front

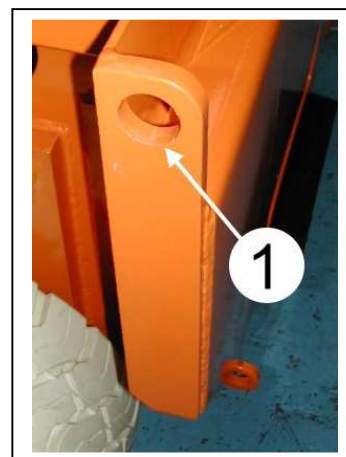


Fig. 23 Position of lashing eyes

392

1. Lashing/lifting eyes

- Always check that the brakes are working properly **before** loading the scissor lift.
- If the railings have been folded down during transport, they must be replaced correctly (including locks) before using the scissor lift.

**N.B.:** Please refer to chapter 3.5.4 in relation to safety during transport.

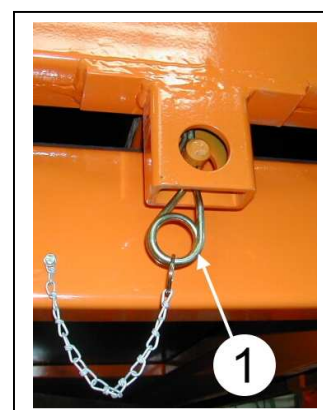


Fig. 24 Platform lock

394

1. Transport lock



## 6 MAINTENANCE

Before performing maintenance or repair work on the scissor lift, the maintenance mechanic must be fully aware of the regulations in this manual and have specific knowledge of the operation and construction of the scissor lift manufactured by **HOLLAND LIFT INTERNATIONAL B.V.** Any guarantees and liability shall be void if the maintenance instructions are not observed.

### 6.1 GENERAL

Turn off the main switch in case of failures in the electrical system. Only use original fuses with the amperage specified in the parts list. All piping, hoses and couplings should be checked regularly for leaks and obvious external damage. Repair any damage immediately. Leaking oil can result in injuries and could cause a fire.



Avoid personal injuries and prevent damage to the scissor lift; carry out the prescribed maintenance work carefully and in good time. The safety prop must be fitted when carrying out work on the scissor lift if the platform is raised.

#### 6.1.1 Fitting/removing the safety prop

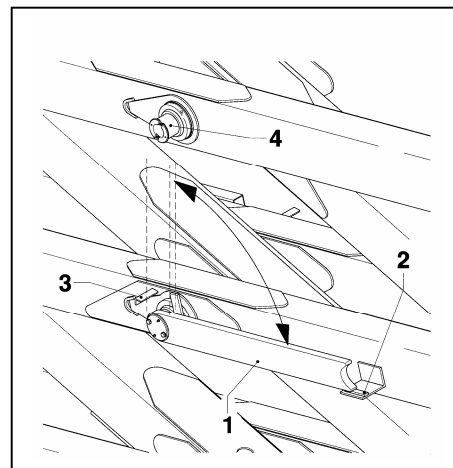
The platform must be unloaded when the safety prop is fitted or removed.

*Fitting the safety prop:*

- 1 Lift the platform.
- 2 Lift the safety prop out of the lock (Fig. 25-1) and turn it a quarter turn to the right
- 3 Hook the prop into the recess and allow the bearing roller of the bottom scissor arm to rest on the prop.

*Removing the safety prop:*

- 1 Lift the platform.
- 2 Lift the safety prop out of the recess (Fig. 25-1)
- 3 Turn the prop back a quarter turn and push it into the lock.



**Fig. 25 Safety prop**

1. Safety prop
2. Lock
3. Stop plate
4. Pin

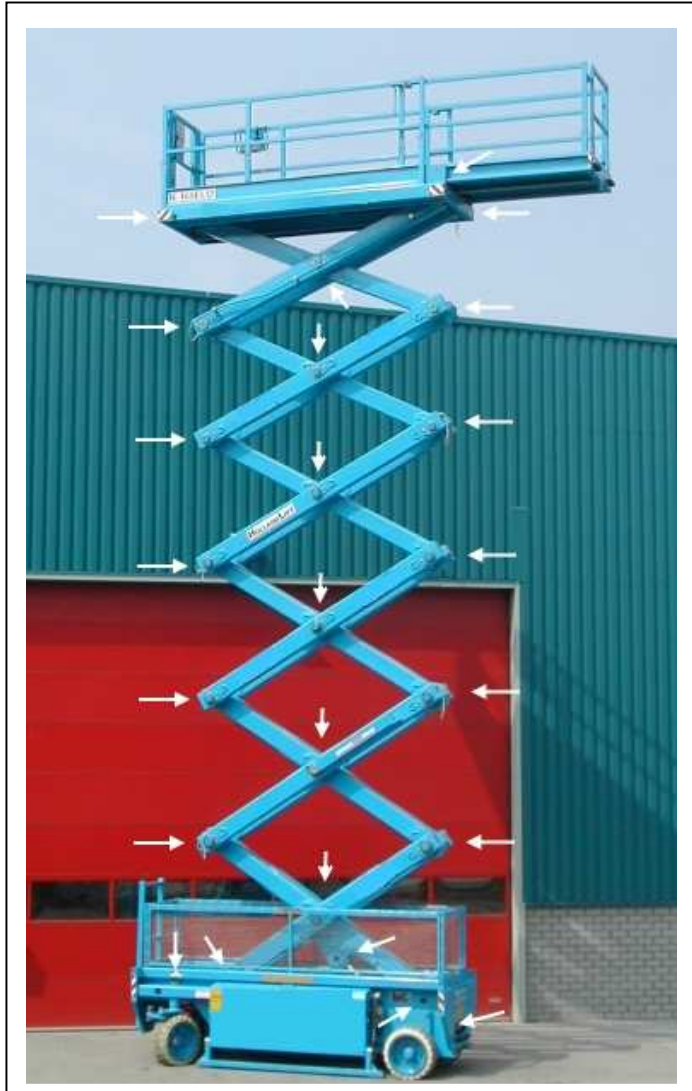
47





## 6.1.2 Lubrication points

All lubrication points must be lubricated with teflon-based grease at least once a month (art. code: VETPATROON).



**Fig. 26 Lubrication points**

397

The lubrication points are:

- all hinge points on the scissor
- on the swivel pins
- the pins connecting the scissor and lift cylinder to the chassis (both sides)

*The protective fence on the side of the grease nipples must be removed before lubrication. Make sure that the fence is replaced properly before the machine is used again.*



## 6.2 SCHEDULED MAINTENANCE

### 6.2.1 Daily

- Check the hydraulic system for leaks
- Check that all safety devices are working properly (see 4.1).
- Check the overall operation
- Check the scissor lift for damage (with particular attention to the tires)
- Check that the decals are legible and replace if necessary (see 6.2.9)

### 6.2.2 Weekly

Check the fluid levels of the batteries; top up with distilled water if necessary.



**CAUTION!**

**This does NOT apply to machine with maintenance-free batteries!**

- Check all hoses, piping, couplings and other components in the hydraulic system for damage
- Check the proper operation and adjustment of the height stop limit switches.
- Check the hydraulic oil level and top up if necessary. **Note!:** first undo the communication hose (on top of the tank) between the two tanks to allow air into the tank. Fill to a maximum of half of the level indicated on the gauge.



**CAUTION!**

**These checks should be performed with the platform in its lowest position (apart from the height stops)!**

### 6.2.3 Monthly

- All lubrication points should be greased according to the lubrication schedule. Only use the specified grease (see 6.1.2).



#### 6.2.4 Quarterly

- Check all the bolts for the correct torque according to the “Torque specifications” table (see 6.3)
- Replace the filter element in the hydraulic system.
- Check the locking and attachment of the pins in the scissor mechanism and the lift cylinder.
- Check that the tilt alarm is working properly by tilting it manually longitudinally and latitudinally (it should beep)
- Check that adjustments verified with a paint pen are unbroken.
- Check the carbon brushes in the electric motors for wear. Replace them if necessary and clean the collector.
- Tighten the wheel nuts using chapter 6.3 “Torque specifications”.
- Check the maximum permissible lifting pressure at maximum workload and maximum driving pressure (the maximum permissible values are shown in the documentation). If the maximum pressures are exceeded, please consult the manufacturer.

#### 6.2.5 Annually

- Change the hydraulic oil. Only use the specified type of oil.
- Have the scissor lift inspected by an expert.

#### 6.2.6 Every five years

Check all scissor hinge points for play, wear and damage. The scissor mechanism must be dismantled for this. Check all surfaces of the bearings and pins. If the pin and bearing surfaces have an area of roughness larger than 1,0  $\mu\text{m}$  they must be replaced. This also applies if the chrome layer is worn through. Check the pins for any damage and replace if necessary. The play between the pin and bearing must not exceed the limits in the table. The minimum depth of the bearing grease chamber must be 0,40 mm. If one of these two rejection thresholds is passed, the bearing (and pin if necessary) must be replaced. Pins that are judged to be stuck or not to have been lubricated properly must be replaced. These checks should be carried out by an expert and must be recorded in the service schedule. If in doubt, contact **Holland Lift International B.V.**

Pin diameter (mm)	Fit size f7 (DIMENSIONS IN $\mu\text{M}$ )	Bearing internal diameter	Fit size H9 (DIMENSIONS IN $\mu\text{M}$ )
120 f7	- 43 - 83	120 H9	+ 100 0
100 f7	- 36 - 71	100 H9	+ 87 0
90 f7	- 36 - 71	90 H9	+ 87 0
75 f7	- 30 - 60	75 H9	+ 74 0
60 f7	- 30 - 60	60 H9	+ 74 0



**CAUTION!** After a major repair, the scissor lift should be subjected to another overload test by an expert. In the event of major modifications and repairs affecting the stability, strength and performance of the scissor lift, the machine must be inspected and tested by **HOLLAND LIFT INTERNATIONAL B.V.** Major repairs should also be recorded in the service schedule otherwise the declaration of conformity will be invalidated.

### 6.2.7 Extreme conditions

- In the event of extreme exposure to dust, algae, bacteria, salt attack etc., the maintenance frequency must be increased accordingly.

### 6.2.8 Long-term storage

- If the scissor lift is stored for more than 14 days, the batteries should be charged every 14 days.
- When the machine is used again, perform the checks in 6.2.1.
- In the event of long-term storage, use trestles to lift the tires off the ground to prevent flat edges.

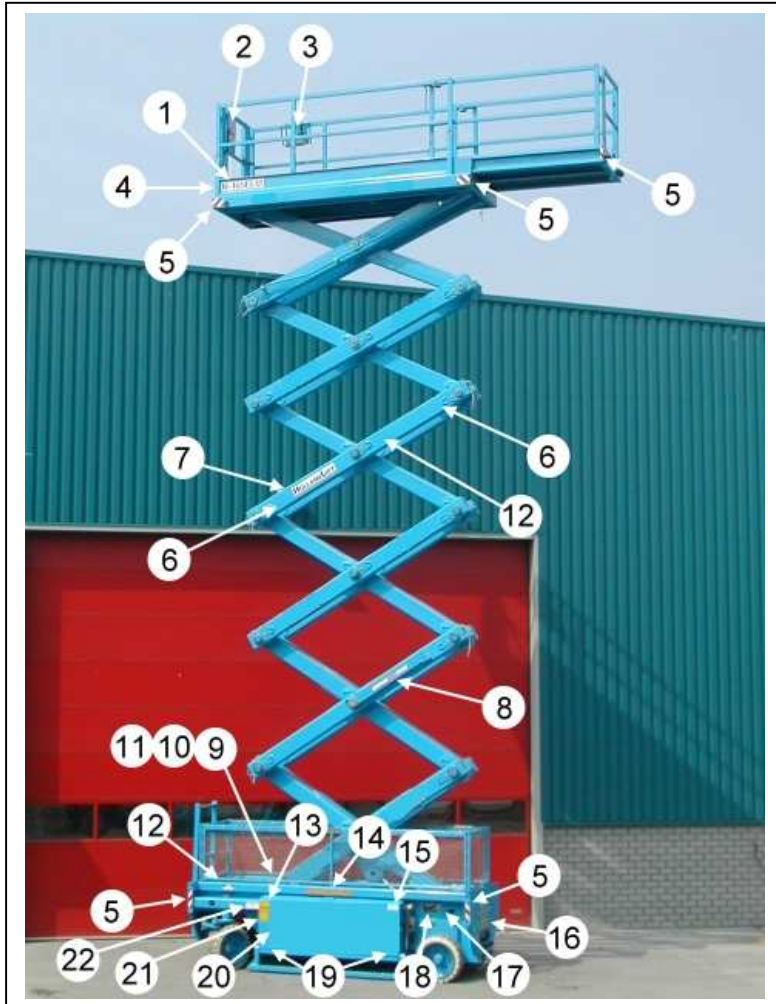
### 6.2.9 PLC control battery

- The PLC control is located in the electrical system of the scissor lift. This battery should be replaced every 4 years to keep the program in the memory.

***N.B.:** Only replace the battery for the PLC when the PLC is powered (by switching on the main switch).*



### 6.2.10 Markings and decals



**Fig. 27** Markings and decals

398

- |  |  |
|--|--|
| 1. Type designation (both sides)             | 12. Lubrication advice (both sides)      |
| 2. Brief usage instructions                  | 13. Stay out of danger zone (both sides) |
| 3. "Only lower with retracted platform"      | 14. "Indoor use only"                    |
| 4. Max. lifting capacity                     | 15. "Fuse in valve compartment"          |
| 5. Reflex foil (both sides)                  | 16. Emergency lowering procedure         |
| 6. Danger of trapping (hand)                 | 17. Inspection                           |
| 7. "Holland Lift" (both sides)               | 18. Manufacturer decal                   |
| 8. Use safety prop (both sides)              | 19. Danger of trapping (foot)            |
| 9. "Check battery level weekly"              | 20. "Tellus 32"                          |
| 10. Instructions for battery condition meter | 21. Main switch symbol                   |
| 11. "230V"                                   | 22. "Main switch"                        |



### 6.3 TORQUE SPECIFICATIONS

Track rod to swivel pin	50 Nm
Steering cylinder to track rod	50 Nm
Steering cylinder to chassis	50 Nm
Rear axle to chassis	725 Nm
Wheel nuts	200 Nm
Gearbox on swivel pin	210 Nm



## 7 TROUBLESHOOTING

This chapter covers the main faults, listing possible causes and remedies.

Problem	Possible cause	Actions to be taken
Scissor lift does not function	Main switch is not on Emergency stop button on the control panel is activated Short-circuit/defective fuse	Turn on main switch Release emergency stop button Find cause and replace fuse
Red LED is flashing	Battery is running low	Charge the batteries immediately
Electric motor is running but scissor lift does not function	Hydraulic pump is not working so the system is not building up any pressure - hydraulic oil level too low - hydraulic pump is defective	Call our technical department. <b>Perform these checks in ground position!</b> - top up hydraulic oil if necessary - replace hydraulic pump
Scissor lift does not move with elevated platform or platform does not lift	Maximum tilt has been exceeded, tilt alarm has been triggered.	Lower the platform to ground position and move to a more level surface.
Scissor lift does not lift or lower	Platform is overloaded	Reduce the load on the platform (see 2.4)
Driving at high speed is not possible	Platform is higher than 3 m.	Lower the platform to below 3 m.
Driving with elevated platform is not possible	Platform is higher than 8 m.	Lower the platform to below 8 m.
Scissor lift does not brake	Brake has not been reset after towing. Brake pattern setting is incorrect. Multiple disc brake is worn out.	Reset brake. Reset brake pattern setting. Fit new multiple disc brake.
Platform cannot be lowered.	Safety prop is blocking the scissor mechanism. Electrical system has failed.	Remove safety prop. Lower platform with emergency lowering valve and check electrical system.
Persistent fault:		Contact <b>HOLLAND LIFT INTERNATIONAL B.V.</b>



## **8 DISPOSAL OF THE SCISSOR LIFT**

### **8.1 GENERAL**

If the scissor lift is to be disposed of, it should be in an environmentally friendly way.

The possible options include:

- Trade in when purchasing a new scissor lift.
- Delivery to a recycling company.

### **8.2 DISPOSAL OF THE SCISSOR LIFT**

- Drain the oil from the hydraulic system and deliver it to an authorized company.
- If necessary, dismantle the reusable parts.
- Deliver the parts that can no longer be used (remains) to a waste disposal company.
  - Batteries are chemical waste!





## 9 INDEX

	Page
<b>A</b>	
Access gate .....	29
Amperage .....	32
Anti-tip safety device cylinder.....	25
Anti-tip safety device switch .....	25
Anti-tip safety device.....	24, 25
Auxiliary switch for lifting/lowering .....	25
<b>B</b>	
Battery .....	25
Battery charger .....	25
Battery charger plug .....	25, 29
Battery condition meter .....	25
<b>C</b>	
Carbon brushes .....	35
Collector .....	35
Control box.....	29
Control panel .....	21
<b>D</b>	
Decals .....	37
Disposal of the scissor lift.....	40
Drive at full height.....	13
Driving alarm.....	21
Driving alarm, acoustic.....	20, 21
Driving alarm, visual .....	20
Driving speed (low).....	9, 10, 11, 12
Driving speed (normal).....	9, 10, 11, 12
<b>E</b>	
Electric motor .....	35
Electric motors with pumps.....	25
Electrical diagram .....	6
Emergency lowering valve .....	20, 23
Emergency stop button .....	21, 29
Emergency stop switch.....	20
<b>F</b>	
Faults .....	39
Filter element.....	35
Flashing lights .....	21
Fuses.....	32
<b>G</b>	
Gas formation .....	16
Grade ability .....	9, 10, 11, 12



**H**

Hose leak .....23  
 Hydraulic compartment .....28  
 Hydraulic diagram .....6  
 Hydraulic filter .....25  
 Hydraulic oil .....34, 35  
 Hydraulic tank filling opening .....25  
 Hydrogen .....16

**L**

**Liability** .....7  
 Lift cylinder .....23, 35  
 Lift/lowering time .....9, 10, 11, 12  
 Limit switch .....22  
 Limit switches .....20, 34  
 Load .....11, 12  
 Lubrication points .....33, 34

**M**

Main fuses .....25  
 Main manifold .....25  
 Main relay .....25  
 Main switch .....17, 25, 29, 32  
 Maintenance work .....15, 28  
 Manufacturer decal .....8  
 Metaalunie conditions .....6  
 Modifications .....7  
 Motor oil .....36  
 Motor regulator .....25  
 Multiple disc brake .....30

**N**

Noise .....14

**O**

Oil level .....34  
 Operating weight .....9, 10  
 Operation .....26  
 Overload safety device .....22

**P**

Parts list .....6  
 Pictograms .....7  
 Platform load .....9, 10  
 Protective fence .....20

**R**

Repairs .....17  
 Rotating lights .....8

**S**

Safety prop .....20



Safety regulations .....	32
Scissor mechanism .....	35
Solid tyres .....	9, 10
Steering power fuses.....	25
Swivel pins .....	33
Symbols .....	7
<b>T</b>	
Terminal box .....	25
Tilt alarm .....	20, 21, 25, 35
Tow hooks .....	31
Towing speed.....	9, 10, 30
Transformer .....	25
<b>V</b>	
Vibrations .....	14
Volume .....	14
<b>W</b>	
Warning signal.....	21
Warnings.....	17
Waste disposal company .....	40
Wheel pressure .....	9, 10
Wind speed .....	9, 10
Working height.....	9, 10, 11, 12