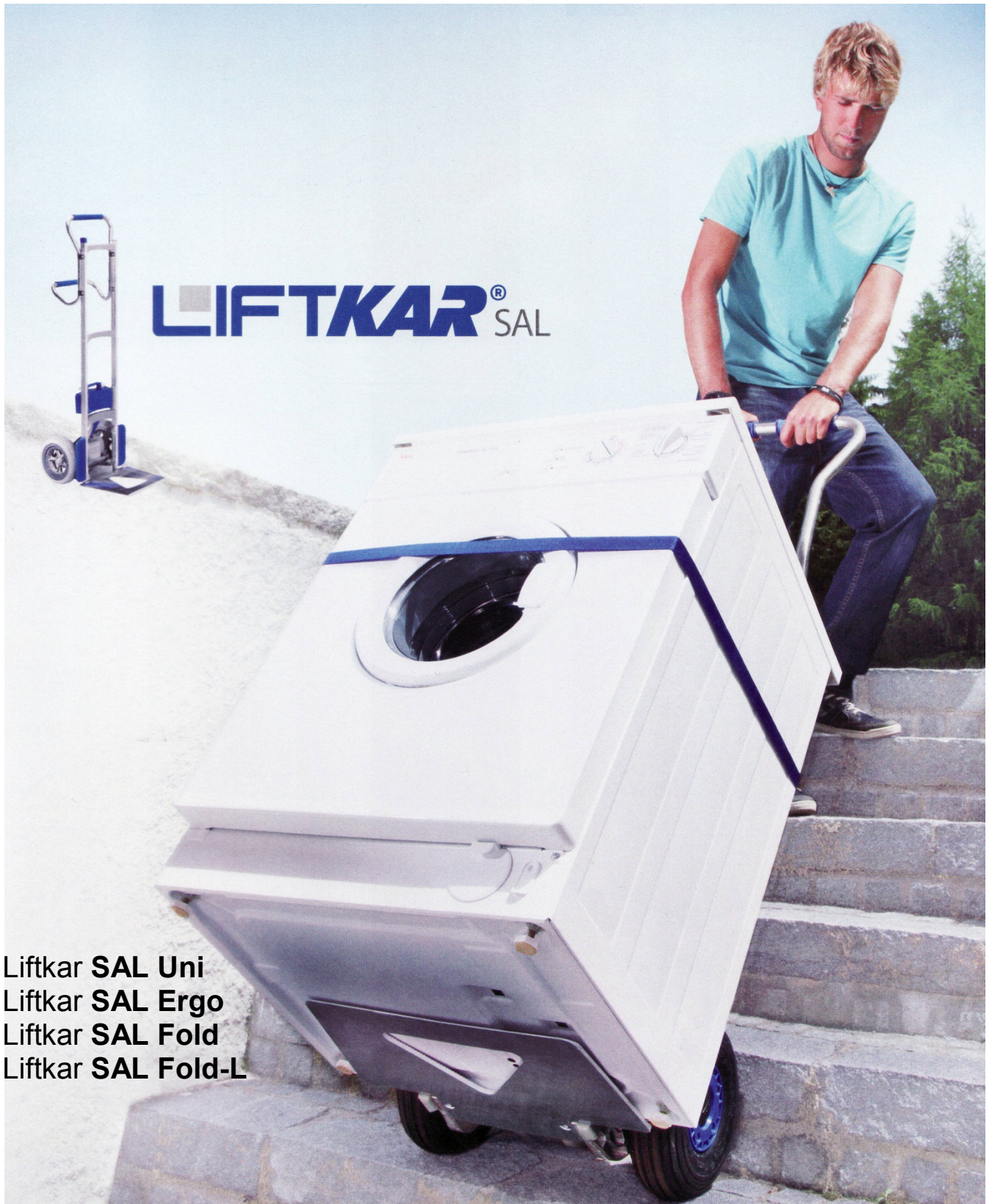


Operator Manual



SANO 
makes life easier.

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1 Introduction and features

Congratulations !

With the new LIFTKAR SAL you have purchased a handy modular–designed sack truck with an unladen weight of only 16kg.

Once you fit the snap-on battery, this simple sack truck becomes a versatile all-rounder: a normal sack truck for general use on level ground and a powered stair climber for use on steps and stairs.

Additional features, such as the wide pneumatic tyres (also available in puncture proof), make this equal to any conventional hand truck for use outdoors and for professional deliveries but with the added bonus of going up steps and stairs as well.

With the SAL Series climbing stairs has been reduced to the essential: The LIFTKAR pulls itself up onto the step above and lifts to only the necessary step height.

During descent, the motor acts like an electric brake and the load is brought down without “bumping”. It is also ideal for winding staircases and across tight landings.

The LIFTKAR SAL has a mechanical clutch which will prevent damage if the unit is used to descend the stairs with the controls in the ascent position.

The unit also features electronic overload protection preventing ascent with too heavy a load.

The Liftkar SAL has two ascending speed settings (slow and fast – with a speed of up to 48 stairs per minute), plus a wide variety of model options, lifting capacities and additional accessories.

In other words, a professional for professionals!

In order to update you about product news as well as technical changes (e.g. options, accessories) we ask you to register your product online.

<http://www.sano.at/en/product-registration>

1.1 General safety instructions

- Always ensure that there is no one beneath the load
- Always secure the load with the appropriate straps or other accessories
- Always wear skid-proof shoes. Some stairs can be extremely slippery
- Always wear shoes with steel caps
- Never reach into the lifting mechanism with your hands if the battery is inserted
- At first practice using Liftkar SAL either unladen or with a light load of 20 – 30 kgs
- For transportation remove battery to lighten the unit and to prevent accidental operation in transit

1.2 Technical data of the LIFTKAR SAL standard model

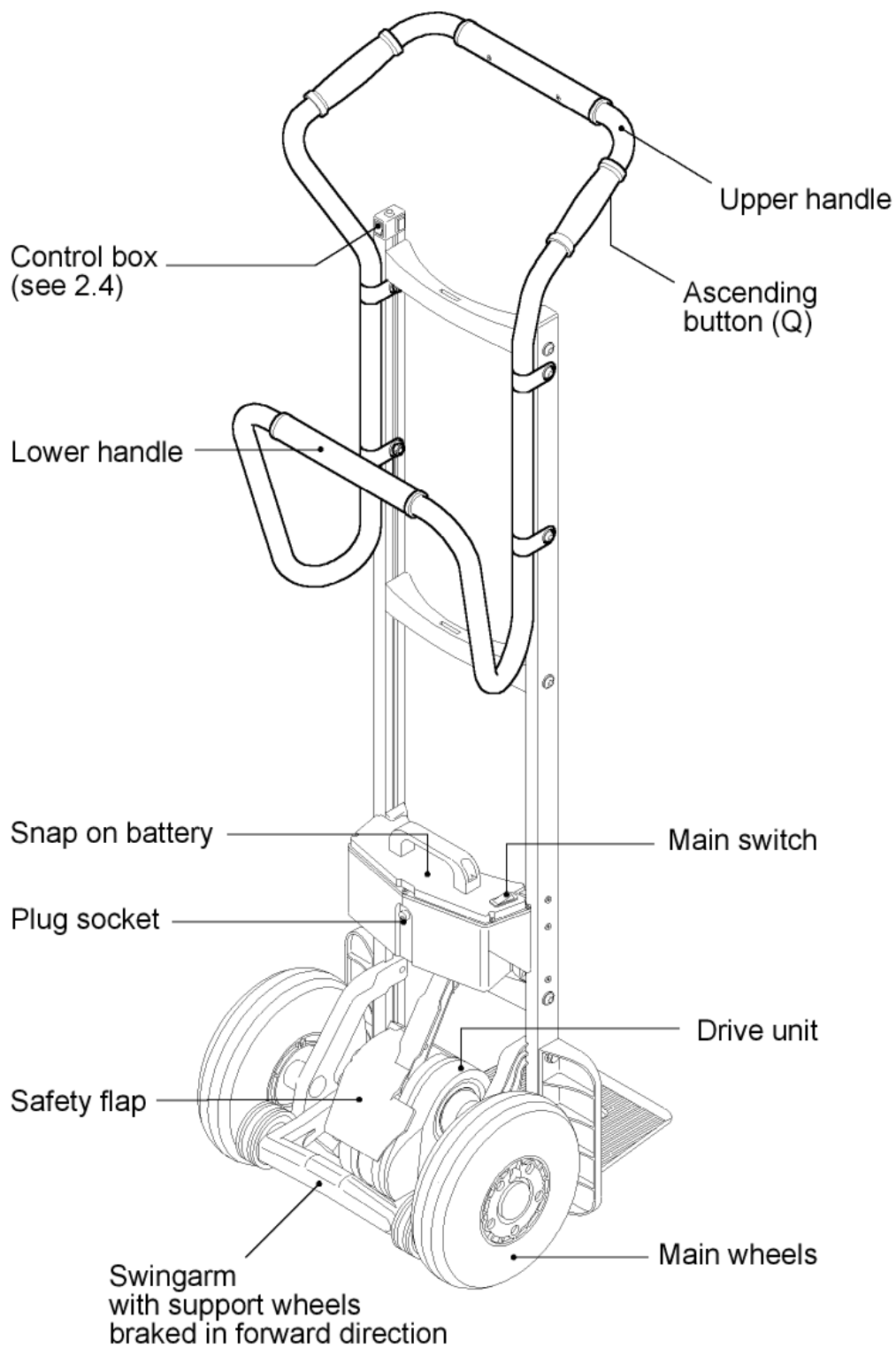
Model ... ERGO/UNI/FOLD	SAL 110	SAL 140	SAL 170
Capacity	110 kg	140 kg	170 kg
Maximum climbing speed	48 steps/min	35 steps /min	29 steps /min
Weight		16 kg	
Maximum step height		210 mm	

1.3 Technical data of the snap on battery

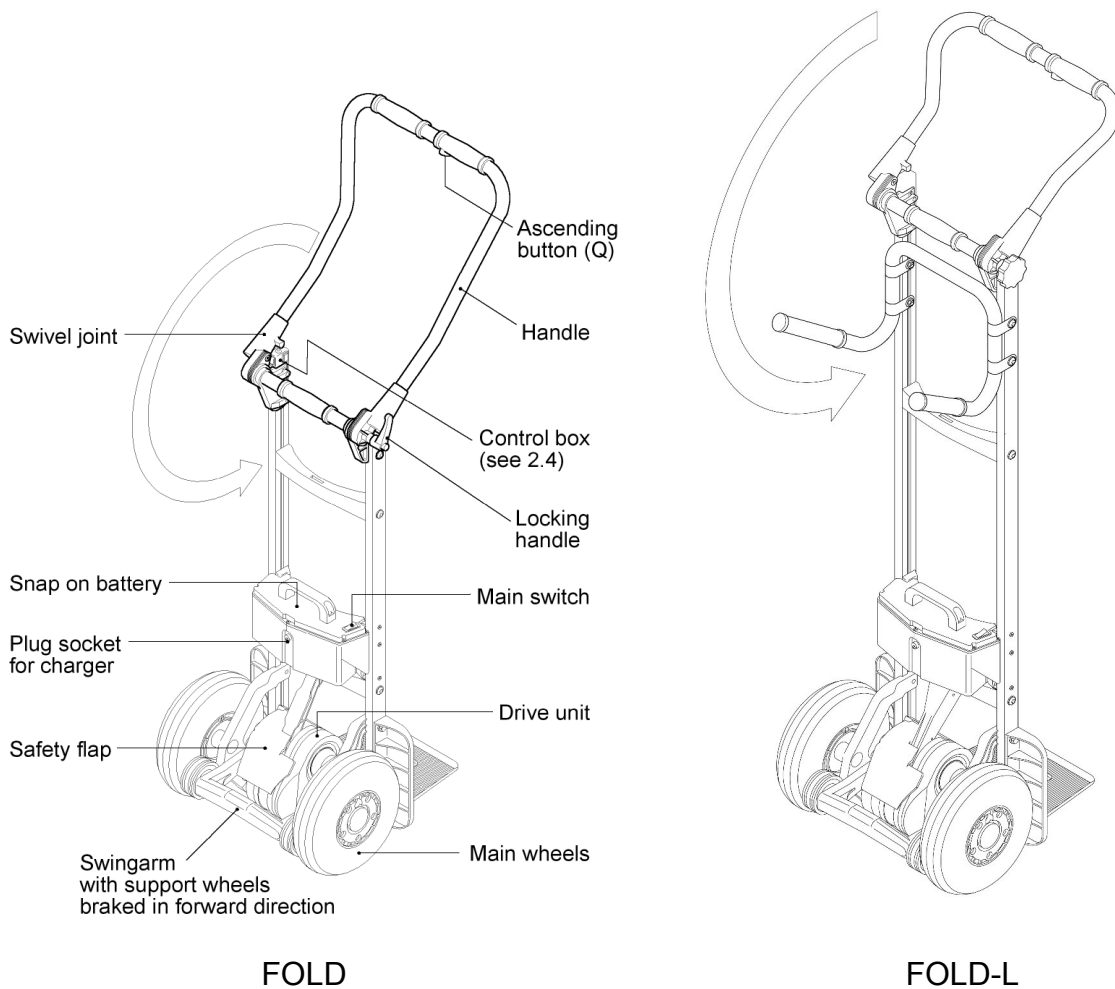
Fuse:	Internal blow-out fuse (30 amps)
Plug-socket for charger:	DC jack ø 2.1 x 9.5
Weight:	4 kg
Capacity:	5 Ah
Voltage:	24 VDC (2 x 12 VDC – 5 Ah)
Battery cells:	Sealed lead-acid maintenance free and approved for air travel by DOT and IATA

2 Controls

2.1 Model ERGO



2.2 Model FOLD / FOLD-L



2.2.1 The swivel joint

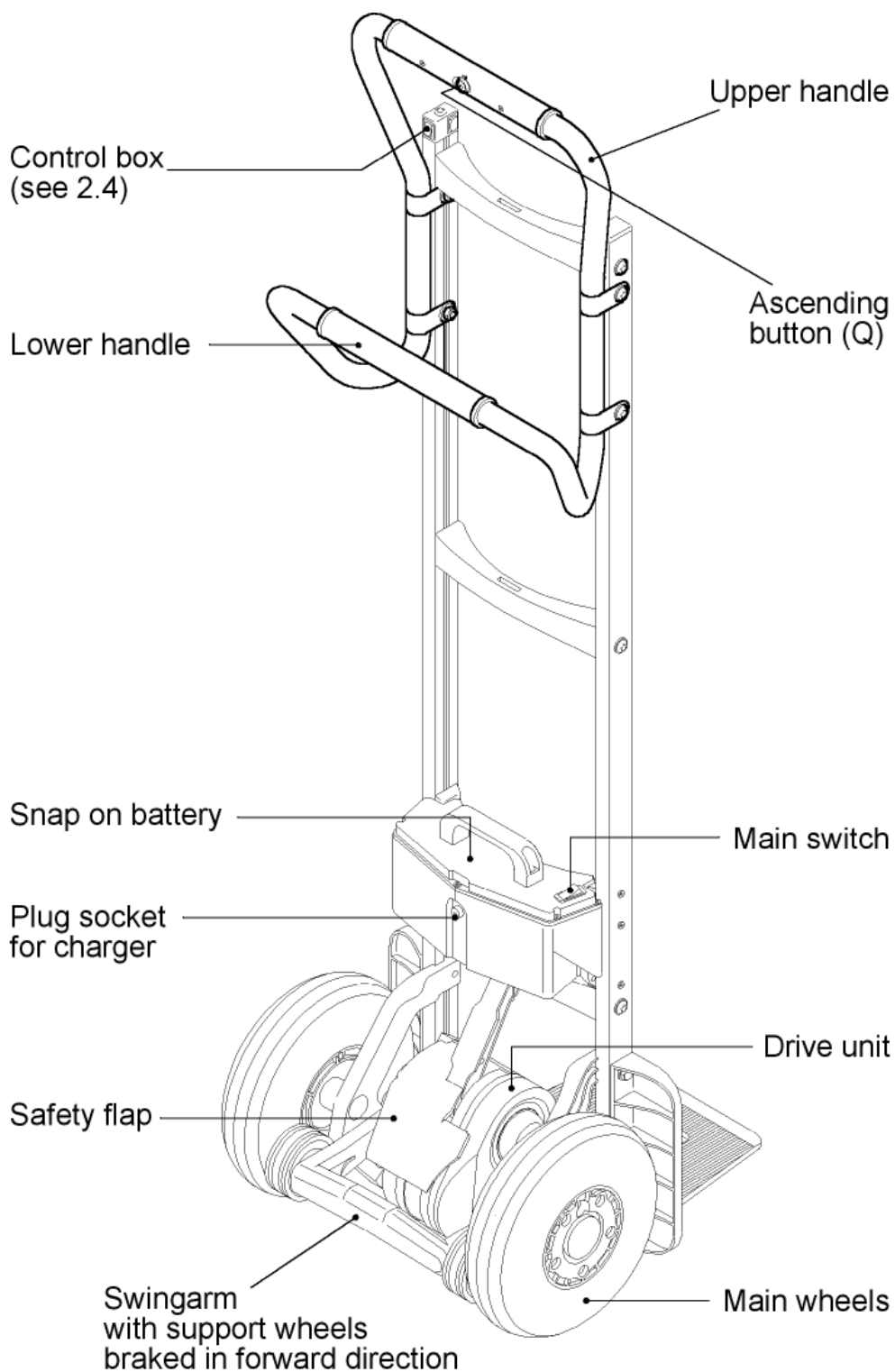
The necessary friction for the rotary joint is obtained through multiple friction disks, which are compressed simultaneously on the left and right sides. The lock must be tightened sufficiently to avoid movement in use.

As a rule: The lock will be sufficiently tightened if a single operator can tilt back the load from the upright position without any handle movement.

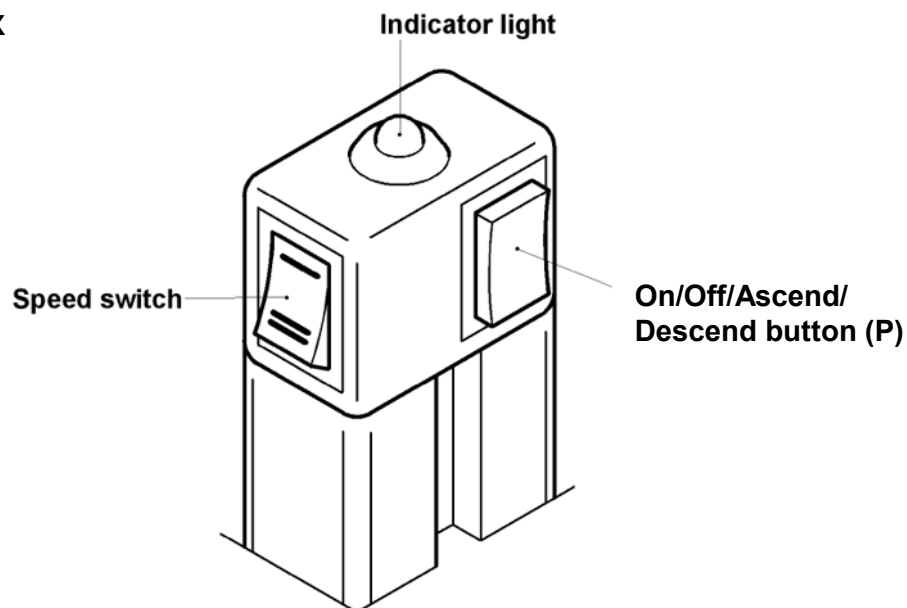


Safety instruction: With heavy loads (over 100 kg) ensure the lock is tightened especially firmly.

2.3 Model UNI



2.4 Control box



2.4.1 Button (P) for ascending / descending

- Briefly press the push button to switch the LIFTKAR SAL to ascent mode or descent mode. See section 4.1 Operation.
- If the button is pressed for more than 3 seconds, the LIFTKAR SAL will switch off.

2.4.2 Indicator light

- Shines green: The LIFTKAR SAL is in ascent mode. (In the ascent mode the push button Q in the handle bar is active. The lifting mechanism operates when the push button Q is pressed and stops when released (refer also chapter Operation [4.1])
- Flashing green: The LIFTKAR is in descent mode. (The push button Q is not active now – refer also to chapter Operation [4.2])
- Constantly red: The LIFTKAR is in descent mode and the support wheels move (fast) to the descend position (takes a max. of 0.5 seconds – refer also to chapter Operation [4.2])
- Flashing red: The LIFTKAR is overloaded. (Flashes for 3 seconds and goes out – see also chapter Operation [4.3.3])
- Alternating red and green: the battery pack is running low and urgently needs to be recharged. The stairclimber will certainly manage another flight of stairs, but it is recommended that you move down stairs and either change the battery pack or recharge it with the quick charger supplied

2.4.3 Beep feature

This is a people warning feature for transports in public areas.

How to activate the Beep feature: Turn on the device and hold down the On-/Off-/Ascend-/Descend – button (P) for about 30 seconds until you can hear a beep signal. Now the recurring beep signal is available while you are driving with the SAL.

How to disable the Beep feature: Turn on the device and hold down the On-/Off-/Ascend-/Descend – button (P) for about 30 seconds until you can hear a beep signal. Afterwards you can drive without the recurring beep signal.

2.4.4 Speed switch

Use the speed switch to select either high or low speed – this can only be used in ascent mode. (In descent mode the descending speed is permanently set so that optimum braking will always be secured – refer also chapter Operation [4.2])

Low speed is advisable for: training, heavy loads and in awkward locations.

2.5 Ascend button in upper handle

This button [Q] is only active in the ascent mode and switches the lifting mechanism on and off.

2.6 Safety flap

To start tilting a load, it may be necessary to use your foot to assist in tilting. The axle of the conventional sack truck is normally used for this purpose. With the LIFTKAR SAL, the swing arm with the support wheels, a wheel, or the drive unit may be used to support by foot. The safety flap is installed to prevent your foot getting jammed in by the swing arm. If you press onto the lower part of the flap with your foot all functions will be stopped.



Safety instructions

You avoid all risk if you switch on only after tilting the load.

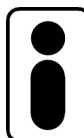
2.7 Main switch

The main switch is situated on the battery cover.. The power supply is switched on or off by way of the main switch.

2.8 Switching off

Battery power is removed:

- By switching off the main switch on the battery unit
- By removing the battery
- By pressing button (P) for 3 seconds
- Automatically after 10 minutes

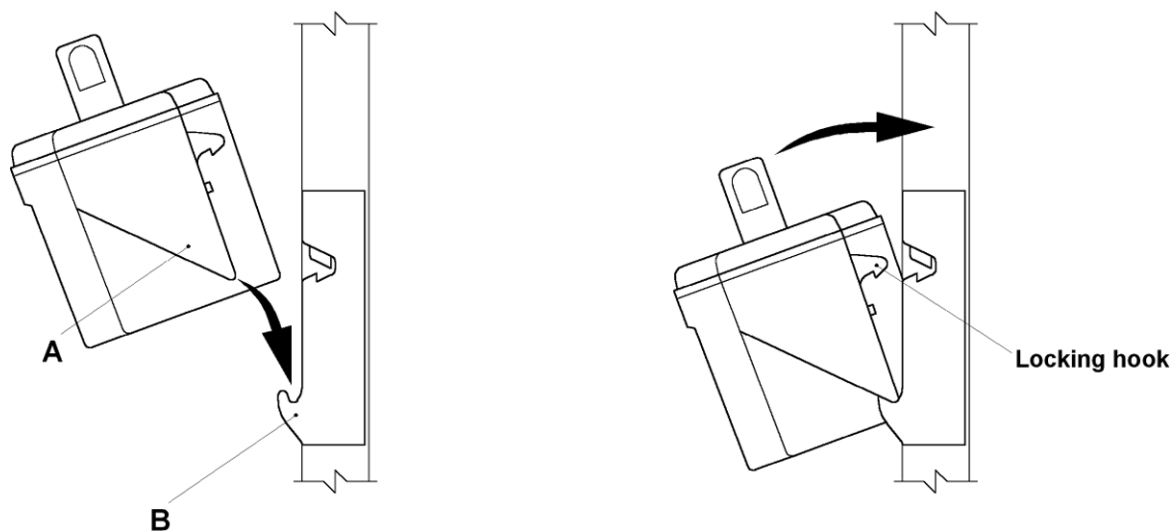


The main switch or removal of the battery provide a higher degree of safety than switching off with the button P or with the timer cut-out, as button P may be touched inadvertently.

3 Fitting and removing the battery

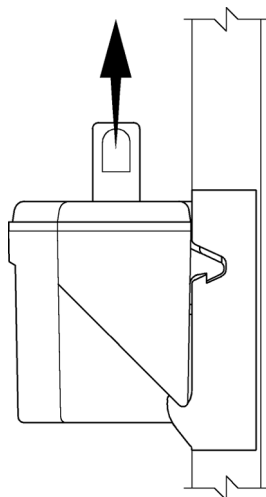
3.1 Fitting the battery

- (1) Locate corner "A" on both sides into hook "B" on frame
- (2) Snap battery forward to engage locking hooks



3.2 Removing the battery

Battery must be lifted vertically to disengage locking hook. Do not hinge back.



4 Operation

4.1 Ascending stairs

Press button (P) briefly until the indicator light shines green continuously.

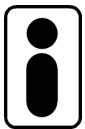
The LIFTKAR is now in the UP MODE.

Pressing button (Q) in the upper handle, will operate the support wheels and will lift the LIFTKAR over the step continuing until the button is released.



Important:

On each cycle, immediately the main wheels rest on the tread, pull the LIFTKAR back to touch the rise of the next step up.

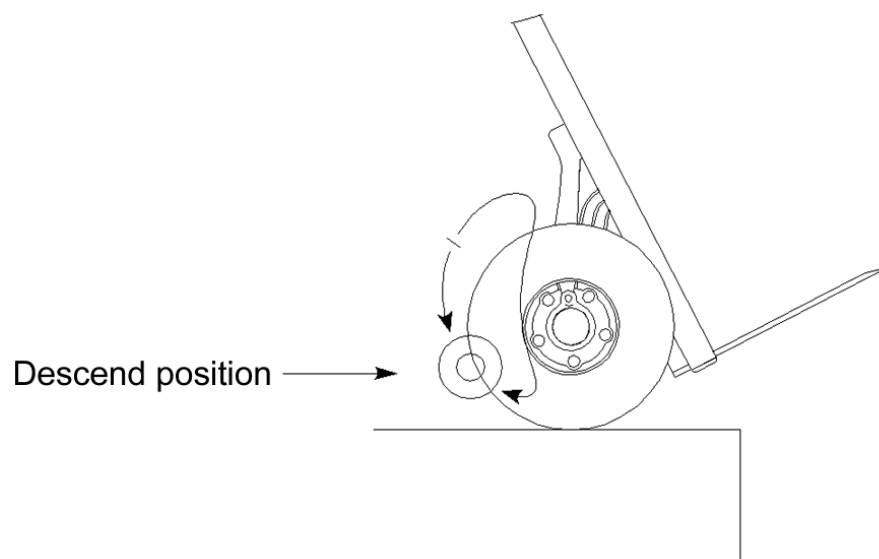


Holding the LIFTKAR too flat, on stairs with open risers, can also result in the support wheels being partially trapped under the tread. This may result in excessive pressure on the drive unit, causing it to go into overload mode, and shutting down. Press button (P) to reset.

4.2 Descending stairs

Press button (P) briefly again until the indicator light flashes green. The LIFTKAR is now in the DOWN-MODE and the support wheels will move to the descend position automatically.

The ascending button Q is now out of function.



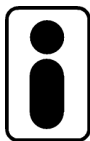
With the support wheels in the descend position the LIFTKAR can be rolled over the step margin and the support wheels will, under controlled conditions, lower the machine onto the next step down. When the main wheels land on the lower step, the support wheels automatically rotate to the descend position for the descent onto the next step down, all within approx. half a second.

During the descent movement the indicator light changes to constant red. After reaching the descend position the light changes back to flashing green.

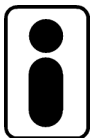


Important:

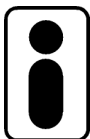
As soon as the LIFTKAR rolls off the tread, ensure the main wheels are kept against the rise until the support wheels reach the descend position.



Just before the suspension arm reaches the descending position, the support wheels reach the upper edge of the stair and lift the LIFTKAR approximately 10 mm. This is normal and is used as an advance signal by experienced drivers. As a matter of fact, you may already advance while the support wheels are in contact with the floor. This results in smooth continuous down-the-stairs motion.



In the case of closed stairs with short step, for instance on the inside of narrow circular staircases, the support wheels may touch the stair step and the LIFTKAR can move approximately 8 to 9 cm forward. This also is normal since the LIFTKAR will then be ready for advancing again anyway.



If the load is under 15 kg or the driver holds back the load, the automatic movement to the descend position will be slowed down.

Unlike all other stairclimbers the operator does not need to control the electrics to descend, as the support wheels operate automatically.

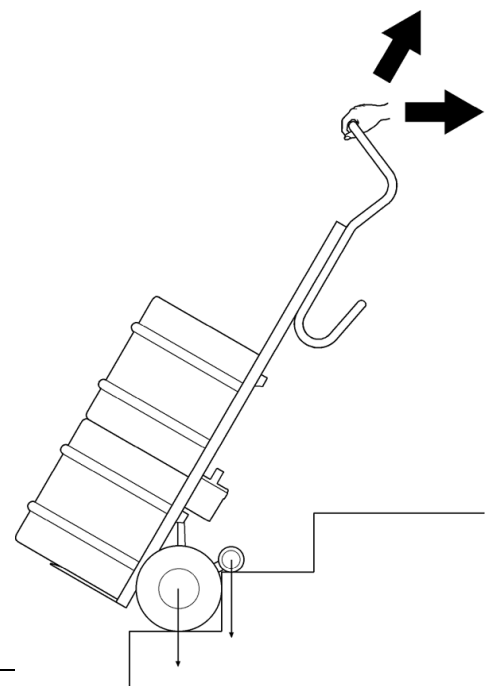
4.3 Please pay attention to

4.3.1 Shift of balance

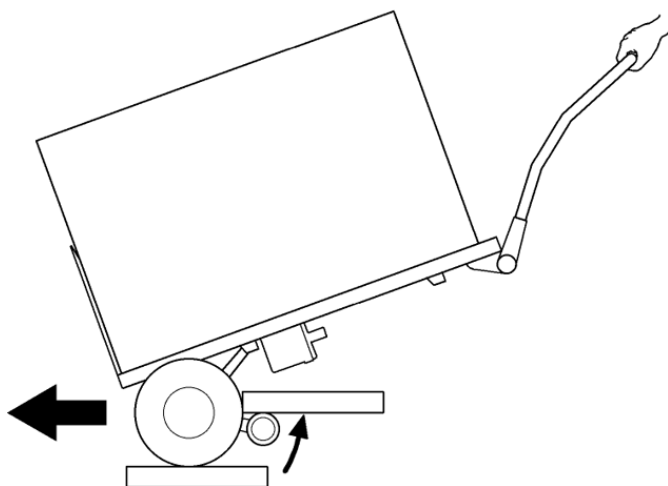
When ascending the balance of the load changes as soon the support wheels start lifting the load. Operators quickly become accustomed to this and compensate by tilting the handle.

Initially, before this operation becomes automatic, care should be taken at the point where the support wheels take the load when ascending. There is a forward movement of the machine which is easily compensated for by tilting the handle backwards.

Lowering backwards by 10° to 20° before the support wheels start to lift eliminates any major forward movement.



4.3.2 Hooking in underneath the step

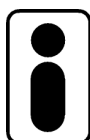


Under normal operating conditions, with the load in a well-balanced position, the moving support arm is always clear of the underside of the upper step. If the LIFTKAR is laid back too far, the support arm will be tripped by touching the tread it is on, causing it to rotate under the upper tread. The electronics will go into overload mode and will need to be reset.

4.3.3 Overload

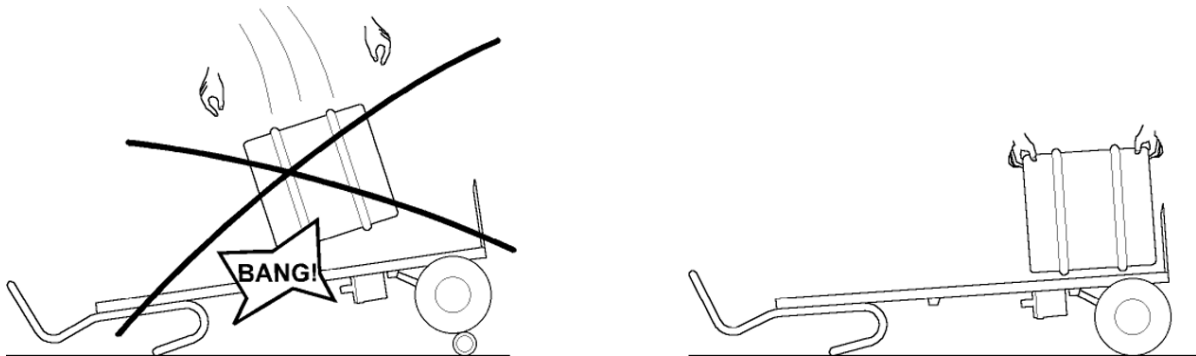
Do not overload.

Exceeding the load capacity will activate overload mode causing the operation to stop, lowering the main wheels slowly to the lower step. The indicator lamp flashes red for about 3 seconds after which the ascend/descend button will need to be reset.



Once the battery has been discharged the unit will go into overload even with loads below the specified capacity.

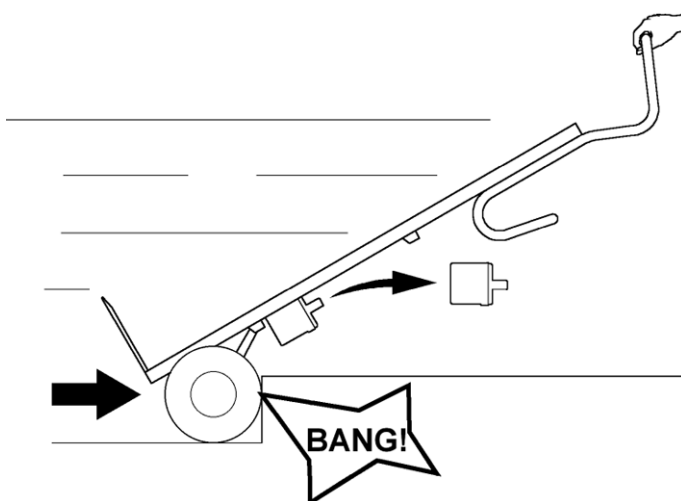
4.3.4 LIFTKAR is not a rubber pad



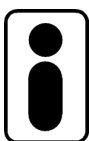
In the beverage industry drums are sometimes directly thrown from the truck onto the hand truck instead of a rubber pad or old tyre.

This is not possible with the LIFTKAR when the support wheels are in the descending position. The impact will be transmitted to the connecting bar via the drive unit, which may result in fracture. With the support wheels raised between the main wheels, throwing barrels on the unit is possible in principle since the pneumatic tyres would absorb part of the impact, it is nevertheless not recommended as it detrimental to service life.

4.3.5 Inadvertent battery ejection



For all normal operations the battery is held securely by locking hooks. A strong pull is required to remove it. Abuse of the LIFTKAR by moving backwards very quickly, and striking a high step, or similar, will result in the battery being ejected from its location.



Depending on the drivestyle of the user it might be an ongoing problem. For this we offer as an option a battery-blocker (nr. 930 140).

4.3.6 Failure to negotiate steps "square-on"

Failure to negotiate steps "square-on" will result in damage to the underside of the drive unit.

4.3.7 Driving on a winding staircase

When you have to drive on a winding staircase please pay attention to the following:

When ascending, the LIFTKAR (or any other handtruck) tends to move to the inside of the staircase (any step a few cm depending on the angle of the winding).

Therefore start as far as possible at the outside when ascending.

When descending, the LIFTKAR tends to move to the outside of the staircase.

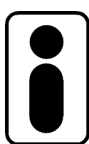
Therefore start as far as possible at the inside when descending.

However if the winding staircase is still too narrow it is possible to move sideways by reversing, preferably at one of the wider steps.

5 Charging the battery

The battery-cells within the battery housing are maintenance-free, sealed and rechargeable. Their durability largely depends on the charge/discharge cycles. It is possible for instance to extract far more than 1,000 partial discharges from lead-acid batteries if total discharge is avoided.

- For this reason avoid total discharge. Recharge as often as possible.
- Lead-acid batteries are subjected to 'self-discharge'. For this reason the snap-on battery should be recharged after a maximum of three weeks of disuse.
- The charger automatically switches to trickle charging so overcharging is not possible.
- Do not leave the battery discharged or half discharged. Always charge immediately after use.
- If the batteries should become damaged it is possible to have them replaced in any reputable mechanical workshop. The old lead batteries are fully recyclable and are not to be disposed of.
- The optimum temperature for charging is 20 – 25 °C. Too cold or too warm has a negative effect on the capacity.



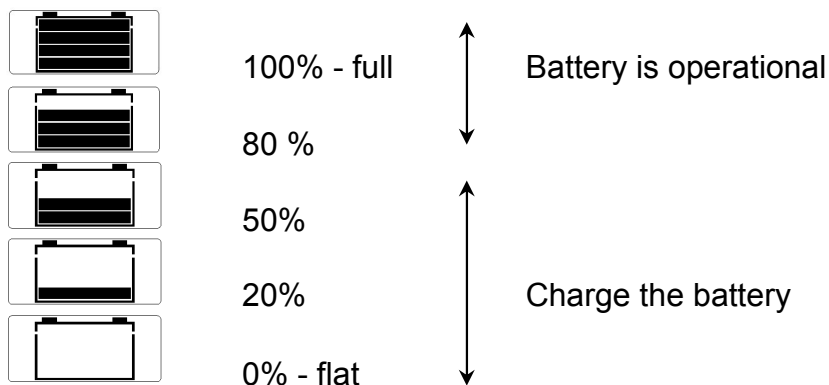
If the battery has not been fully charged or tends to lose charge too rapidly, this will not only reduce the speed of the LIFTKAR but also reduce the capacity. It may move into the overload mode as a result, even with light loads. See Operation [4.3.3]

5.1 Battery charger

High performance is achieved by 2-step automatic und digital control engineering. This allows for quick charging in the first step, then compensation/trickle charging in the second step. It is possible to check the condition of the battery.
With LCD display and revolving mains plug.

5.1.1 Testing

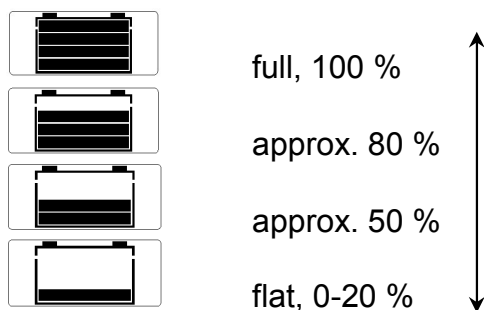
Connect the battery charger with the battery (without plugging into the mains)
After approximately 9 seconds the test result is displayed (off-load voltage of the battery)



5.1.2 Charging

1. Connect the charging unit to the battery
2. The off-load voltage of the battery is shown on the display
3. Plug the charging unit into the mains
4. The charging operation begins

The present charge status of the battery is symbolized by progress bars:

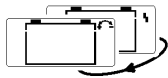




Compensation/Trickle charging





Once the battery is fully charged, the charging unit switches over to compensation/trickle charge. On the display, the battery symbol is shown with 4 bars and remains solid.

If charging does not begin, there are two possible reasons:



Display:  and  symbols blink alternately indicating **polarity reversal**



Display:  and  symbols blink alternately indicating a **break in connection** to battery, contact-fault check charging clips, cables, contacts, battery-pole terminals etc.

5.1.3 Protective features, technical data

Protective features

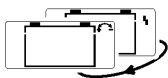
- Protection if the charging clips are short-circuited





An electronic protection circuit prevents damage if the charging clips are short-circuited.

Display: The first bar blinks

- Protection from charging-cable polarity reversal



An electronic protection circuit prevents damage if the charging cables are connected with reversed polarity.

Display: The  and  symbols blink alternately

- Protection against the charger overheating

If the room temperature increases, the charger will reduce the charging current and interrupt the charging operation if necessary. As soon as the unit cools, charging resumes.

Safety cut-out



If the battery fails to reach a certain voltage value within a pre-determined time, the charger automatically cuts out

What to do after a safety cut-out:

1. Unplug the charger from the mains
2. Disconnect the charger from the battery
3. Investigate the reason for the safety cut-out

Technical data

Mains voltage (50/60 Hz, +/-15 %)	100-230 V AC
Open-circuit power consumption	max. 1,5 W
Rated power output	48 W
Charging voltage	24 V DC
Arithmetic charging current with 230 V / 50 Hz	2,0 A
Degree of protection	IP30
Time until safety cut-out	4,5 h

The charger has been function tested

- in a temperature range from -20°C to +50°C
- in atmospheric humidity ranging from 5-85 %

Component specification: Climatic category B

5.1.4 Safety rules

Utilisation for intended purpose only

- This battery charger is designed to charge **lead storage batteries filled with liquid, gel and AGM (absorbed glass mat) electrolytes** only.
- This battery charger should never be used to charge NiCd and NiMH batteries and primary cells.

Only use the unit if

- it is protected from direct sunlight and kept dry, and
- cooling air can flow through the ventilation slots unhindered.

CE marking

This battery charger meets the fundamental requirements of the Low-Voltage and Electromagnetic Compatibility Directive and is thus CE-marked.

6 Accessories and options

A continuously growing list of accessories and options is available. For instance different toeplate sizes, securing straps, in-transit charger, different frame heights, fixed or hinged toeplate.

7 Warranty and liability

7.1 Warranty

The warranty period for the LIFTKAR is 12 months (6 months for batteries) from the date of purchase and covers defective material and production faults

Not included in the warranty are:


- Normal wear and tear on parts
- Damage resulting from abnormal load
- Damage due to the exertion of force
- Unadmissible modifications to the unit or accessory parts

7.2 Liability

SANO Transportgeräte GmbH as manufacturer is not responsible for the safety of the LIFTKAR SAL if:

- the LIFTKAR SAL is used other than is intended,
- the LIFTKAR SAL is not regularly (once a year) maintained by an authorized workshop
- the instructions in these Operating Instructions are not observed,
- non-original parts are installed or connected with the LIFTKAR SAL,
- original parts are removed.

8 CE declaration of conformity

 SANO Transportgeräte GmbH declares that the LIFTKAR SAL stair trolley corresponds to the applicable basic safety and health requirements of the EC guidelines for machines 2006/42/EEC, appendix IIA. This declaration will lose its validity if changes are performed on the unit without our approval.


Ing. Jochum Bierma, General Manager

9 Design protection by patents

The lifting system of the SAL series is protected by international patent applications for Europe, USA and Japan. The modular structure of the basic frame is also protected by a patent application. Also for the rotary joint of the FOLD model patent is pending.



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