

EFG 213-220/216k/218k

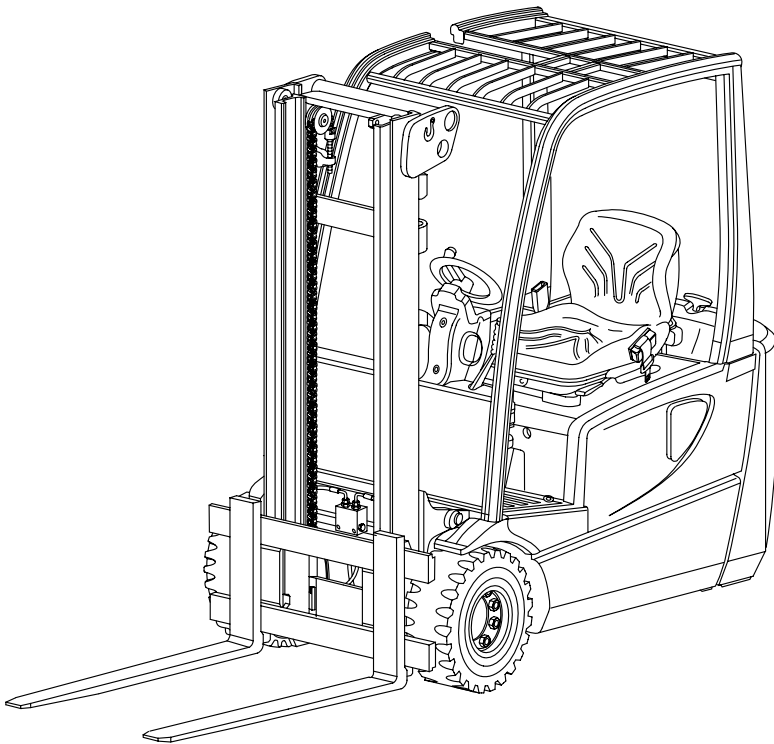
07.98-

Operating instructions



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Foreword

Safe operation of the industrial truck requires specific knowledge which is imparted by the present operating instructions. The information is presented in concise and clearly laid-out form. The individual chapters are arranged in alphabetical order and every chapter starts with page 1. The individual pages are identified by the chapter letter and the page number.

Example: Page B2 is the second page of chapter B.

Various truck variants are described in these operating instructions. During operation and maintenance work, pay attention that the description appropriate to the truck type is used.

Safety instructions and important notes are identified by the following pictograms:



Used before safety instructions that have to be observed in order to prevent danger to personnel.



Used before notes that have to be observed in order to prevent damage to equipment.



Used before general notes and explanations.



Used to indicate standard equipment.



Used to indicate optional equipment.

In the interest of continued development, the manufacturer reserves the right to incorporate modifications (which will not, however, change the essential features of the type of machine described) without updating the present operating instructions at the same time.

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A Correct use and application of the truck

Z The „Guidelines for the Correct Use and Application of Industrial Trucks“ (VDMA) are included in the scope of delivery for this truck. The guidelines are part of these operating instructions and must always be heeded. National regulations are fully applicable.

The fork-lift truck described in these operating instructions is a truck that is suitable for lifting and transporting loads.

It must be used, operated and maintained according to the information in these operating instructions. Any other uses are outside the design envelope and can lead to injury to persons or damage to equipment and property. Above all, overloading caused by excessively heavy or unbalanced loads must be avoided. The max. admissible load to be picked up is indicated on the identification plate or load diagram label shown on the truck. The operator must ensure that damaged and/or poorly readable load diagrams are renewed. The fork-lift truck must not be operated in spaces subject to fire or explosion hazards, or in spaces where corrosive or very dusty atmospheres prevail.

Duties of the user: A „user“ within the meaning of these operating instructions is defined as any natural or legal person who either uses the fork-lift truck himself, or on whose behalf it is used. In special cases (e.g. leasing or renting), the user is considered the person, who, in accordance with existing contractual agreements between the owner and the user of the fork-lift truck, is charged with the observance of the operating duties.

The user must ensure that the truck is not abused and only used within its design limits and that all danger to life and limb of the operator, or third parties, is avoided. In addition to this, it must be ensured that the relevant accident prevention regulations and other safety-related provisions, as well as the operating, servicing and maintenance guidelines, are observed. The user must also ensure that all persons operating the truck have read and understood these operating instructions.

M If these Operating Instruction are not observed the warranty becomes void. The same applies if improper work is carried out on the device by the customer and/or third parties without permission of our Customer Service.

Mounting of attachments: The mounting or installation of any attachments which will interfere with, or supplement, the functions of the truck is permitted only after written approval by the manufacturer has been obtained. If necessary, the approval of local authorities has to be obtained.

Any approval obtained from local authorities does not, however, make the approval by the manufacturer unnecessary.

Trailing and slipping loads: The truck may only be used for trailing or slipping loads for which the truck has been approved.

B Truck description

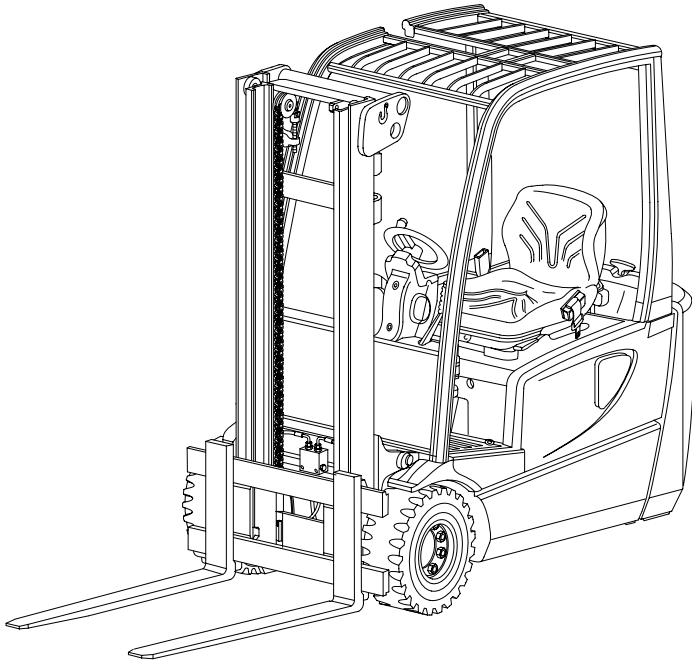
1 Description of application

The EFG is a three-wheel type electric fork-lift truck that is provided with a driver's seat. The truck is a cantilever counterweight stacker which is able to unload trucks by means of the load lifting device mounted to the stacker front and deposit the load on ramps or on stacks. Also closed-ground pallets can be picked up.

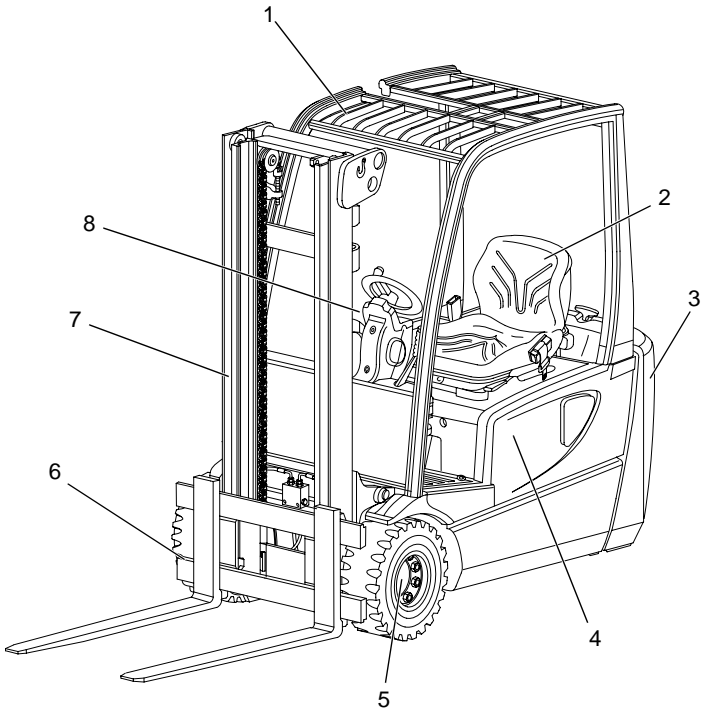
Vehicle types and maximum load capacity:

Model	max. load capacity *)	Load centre
EFG 213	2866.0 lb (1300 kg)	19.7 in (500 mm)
EFG 215	3306.9 lb (1500 kg)	19.7 in (500 mm)
EFG 216k	3527.4 lb (1600 kg)	19.7 in (500 mm)
EFG 216	3527.4 lb (1600 kg)	19.7 in (500 mm)
EFG 218k	3968.3 lb (1800 kg)	19.7 in (500 mm)
EFG 218	3968.3 lb (1800 kg)	19.7 in (500 mm)
EFG 220	4409.2 lb (2000 kg)	19.7 in (500 mm)

*) The capacity labels fixed to the vehicle are binding for the load capacity



2 Description of assemblies and functions



Item		Designation
1	t	Overhead guard
2	t	Driver's seat
3	t	Counterweight
4	t	Batteries
5	t	Drive axle
6	t	Fork carrier
7	t	Hoist frame
8	t	Steering system

2.1 Description of truck

Steering system (8): Low steering forces of 3.4 lbf (15 N) and a good transmission ratio with 5 revolutions of the steering wheel enable comfortable and quick steering. The number of wearing parts has been minimised by means of the rack steering offering the advantage of a compact steering unit. The standard dual twin-tyre equipment reduces the steering forces and increases the service life of the wheels.

Driver's seat (2): The driver's seat is the centre of the fork-lift truck. This is where you find the particular advantages of our vehicles. The Multi-Pilot (option) offers very comfortable operation since it combines all hydraulic functions and even the drive selection switch in just one lever. The truck is equipped with a comfortable seat, an adjustable steering column and places of deposit for the papers and personal things of the driver. The overhead guard (2) is prepared for a driver's cabin which can be retrofitted quickly.

Electrical system/electronics: State-of-the-art shunt technology via CAN bus reducing the number of required looms of cables. Thereby we achieve a lower susceptibility to cable parting and a much quicker fault localisation. The complex control system is simple, safe and built up in a flexible way. Depending on the load and the environment, the driver can select between 5 driving programmes: from heavy duty to energy saving. A very comfortable and especially quick fault analysis and programming can be carried out via PC.

Drive and brake: The 2-motor front wheel drive assures optimum traction results at the driven wheels. Each motor is exactly supplied with the power it requires. The power supply is carried out proportionally to the steering angle. The wheels do not skid and no energy is wasted.

The hydraulically operated oil bath multiple plate brake is virtually maintenance-free as service brake. The encapsulation of the transmission allows operation even in harsh environments. Furthermore the speed of the stacker is reduced by means of the generator drive motors until standstill. Thereby the energy consumption is minimised. The fork-lift truck does not start to move even when standing on a ramp.

Hydraulic system: All functions are to be carried out sensitively, proportionally and simultaneously (if not limiting the safety). In order to achieve higher efficiency one hydraulic aggregate and one steering booster motor work separately. The micro pressure filter can be changed from the upper side (without loss of hydraulic oil).

Hoist frame (7): Our aim is visibility optimisation. The cold-milled, high-strength steel profiles are extraordinary thin with the result of very good visibility on the forks, especially in case of the three-level hoist frame. The same positive results were achieved for the fork carrier.

The hoist rails and the fork carrier run on constantly lubricated and hence maintenance-free angular rollers.

3 Technical data of standard version

	Designation	EFG 213	EFG 215	EFG 216(k)	EFG 218(k)	EFG 220	
h ₁	Height with hoist frame retracted	78.7 (2000)	84.6 (2150)	78.7 (2000)	78.7 (2000)	78.7 (2000)	in (mm)
h ₂	Free lift	5.9 (150)	5.9 (150)	5.9 (150)	5.9 (150)	5.9 (150)	in (mm)
h ₃	Length of lift	118.1 (3000)	129.9 (3300)	118.1 (3000)	118.1 (3000)	118.1 (3000)	in (mm)
h ₄	Height with hoist frame extended	139.8 (3550)	151.6 (3850)	139.8 (3550)	141.1 (3585)	141.1 (3585)	in (mm)
h ₆	Height above protective roof	77.2 (1960)	77.2 (1960)	77.2 (1960)	77.2 (1960)	77.2 (1960)	in (mm)
h ₇	Height of seat	35.0 (890)	35.0 (890)	35.0 (890)	35.0 (890)	35.0 (890)	in (mm)
h ₁₀	Height of clutch	22.0 (560)	22.0 (560)	22.0 (560)	22.0 (560)	22.0 (560)	in (mm)
L ₁	Length including fork	109.7 (2786)	109.7 (2786)	114.1 ²⁾ (2899 ²⁾)	114.1 ²⁾ (2899 ²⁾)	118.4 (3007)	in (mm)
L ₂	Length including fork backing ¹⁾	70.3 (1786)	70.3 (1786)	74.8 ²⁾ (1899 ²⁾)	74.8 ²⁾ (1899 ²⁾)	79 (2007)	in (mm)
b ₁	Total width	41.7 (1060)	41.7 (1060)	41.7 (1060)	44.1 (1120)	44.1 (1120)	in (mm)
e	Fork width	3.9 (100)	3.9 (100)	3.9 (100)	3.9 (100)	3.9 (100)	in (mm)
m ₁	Road clearance with load below hoist frame	3.5 (90)	3.5 (90)	3.5 (90)	3.5 (90)	3.5 (90)	in (mm)
m ₂	Road clearance centre wheel base	3.9 (100)	3.9 (100)	3.9 (100)	3.9 (100)	3.9 (100)	in (mm)
Ast	Width of corridors for pallets 31.5 x 47.2 in (800 x 1200) longitudinal axis	127.7 (3243)	127.7 (3243)	EFG 216k 131.7 (3345) EFG 216 131.7 (3345)	EFG 218k 131.7 (3345) EFG 218 131.1 (3330)	136.0 (3455)	in (mm)
Ast	Width of corridors for pallets 39.4 x 47.2 in (1000 x 1200) transversely	122.6 (3115)	122.6 (3115)	EFG 216k 127.0 (3225) EFG 216 131.1 (3330)	EFG 218k 127.0 (3225) EFG 218 131.1 (3330)	131.1 (3330)	in (mm)
W _a	Turning circle	56.7 (1440)	56.7 (1440)	EFG 216k 60.8 (1545) EFG 216 65.2 (1655)	EFG 218k 60.8 (1545) EFG 218 65.2 (1655)	65.2 (1655)	in (mm)
x	Load spacing ¹⁾	13.7 (347)	13.7 (347)	13.9 (352)	13.9 (352)	13.9 (352)	in (mm)
y	Wheel base	49.2 (1249)	49.2 (1249)	53.4 (1357)	53.4 (1357)	57.7 (1465)	in (mm)

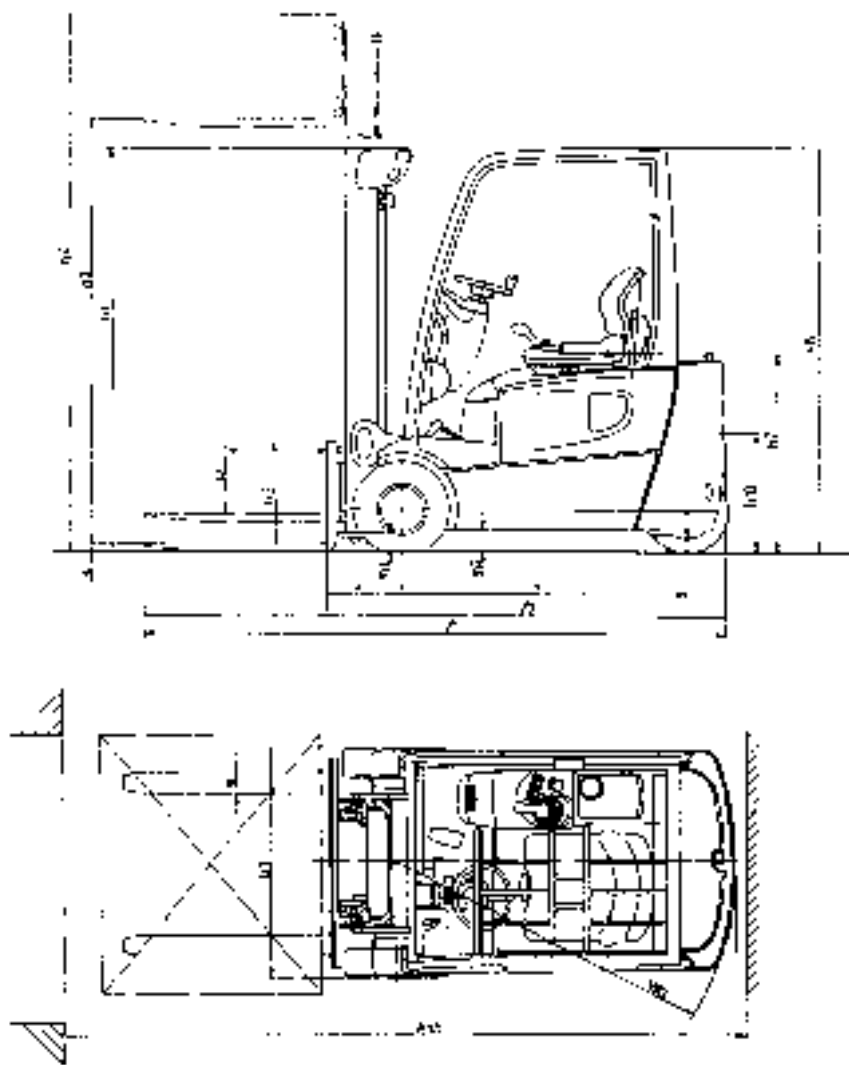
¹⁾ = 1.0 in (+ 25mm) DZ-Mast

²⁾ = EFG 216k/218k; 4.3 in (+108 mm) = EFG 216/218

3.1 Types of hoist frame

(all dimensions in inch/mm)

Lifting mast table EFG 213/215/216k/216/218k/218/220						
VDI 3596 Designation	Lift h_3	Free lift height		Overall height retracted h_1	Overall height extended	
		h_2			h_4	
		EFG 213/ 215/216k/ 216	EFG 218k/ 218/220		EFG 213/ 215/216k/ 216	EFG 218k/ 218/220
ZT	90.6 (2300)	5.9 (150)		65.0 (1650)	112.2 (2850)	113.6 (2885)
	118.1 (3000)	5.9 (150)		78.7 (2000)	139.8 (3550)	141.1 (3585)
	122.0 (3100)	5.9 (150)		80.7 (2050)	143.7 (3650)	145.1 (3685)
	129.9 (3300)	5.9 (150)		84.6 (2150)	151.6 (3850)	153.0 (3885)
	141.7 (3600)	5.9 (150)		90.6 (2300)	163.4 (4150)	164.8 (4185)
	157.5 (4000)	5.9 (150)		98.4 (2500)	179.1 (4550)	180.5 (4585)
	177.2 (4500)	5.9 (150)		110.2 (2800)	198.8 (5050)	200.2 (5085)
	196.8 (5000)	5.9 (150)		120.1 (3050)	218.5 (5550)	219.9 (5585)
216.5 (5500)	5.9 (150)		133.9 (3400)	238.2 (6050)	239.6 (6085)	
ZZ	90.6 (2300)	41.5 (1055)	39.0 (990)	63.2 (1605)	112.2 (2850)	114.8 (2915)
	118.1 (3000)	55.3 (1405)	52.8 (1340)	77.0 (1955)	139.8 (3550)	142.3 (3615)
	122.0 (3100)	57.3 (1455)	54.7 (1390)	78.9 (2005)	143.7 (3650)	146.3 (3715)
	129.9 (3300)	61.2 (1555)	58.7 (1490)	82.9 (2105)	151.6 (3850)	154.1 (3915)
	141.7 (3600)	67.1 (1705)	64.6 (1640)	88.8 (2255)	163.4 (4150)	165.9 (4215)
	157.5 (4000)	75.0 (1905)	72.4 (1840)	96.7 (2455)	179.1 (4550)	181.7 (4615)
DZ	171.3 (4350)	55.3 (1405)	52.8 (1340)	77.0 (1955)	192.9 (4900)	195.5 (4965)
	177.2 (4500)	57.3 (1455)	54.7 (1390)	78.9 (2005)	198.8 (5050)	201.4 (5115)
	189.0 (4800)	61.2 (1555)	58.7 (1490)	82.9 (2105)	210.6 (5350)	213.2 (5415)
	196.8 (5000)	64.2 (1630)	61.6 (1565)	85.8 (2180)	218.5 (5550)	221.1 (5615)
	216.5 (5500)	71.1 (1805)	68.5 (1740)	92.7 (2355)	238.2 (6050)	240.8 (6115)
	236.2 (6000)	78.9 (2005)	76.4 (1940)	100.6 (2555)	257.9 (6550)	260.4 (6615)
	255.9 (6500)	88.8 (2255)	86.2 (2190)	110.4 (2805)	277.6 (7050)	280.1 (7115)



3.2 Performance data

	Designation	EFG 213	EFG 215	EFG 216k/ 216	EFG 218k/ 218	EFG 220	
Q	Load capacity (at C=19.8 in (500 mm) *)	2866.0 (1300)	3307.0 (1500)	3527.4 (1600)	3968.3 (1800)	4409.2 (2000)	lb (kg)
C	Load centre distance	19.7 (500)	19.7 (500)	19.7 (500)	19.7 (500)	19.7 (500)	in (mm)
	Driving speed with without load	9.3/9.9 (15/16)	9.3/9.9 (15/16)	9.3/9.9 (15/16)	9.3/9.9 (15/16)	9.3/9.9 (15/16)	mph (km/h)
	Lifting speed Lifting with / without load	88.6/ 108.3 (0.45/0.55)	82.7/108.3 (0.42/0.55)	82.7/108.3 (0.42/0.55)	70.9/94.5 (0.36/0.48)	60.9/94.5 (0.36/0.48)	ft/min (m/s)
	Lifting speed Lowering with / without load	108.3/108.3 (0.55/0.55)	108.3/ 108.3 (0.55/0.55)	108.3/108.3 (0.55/0.55)	108.3/108.3 (0.55/0.55)	108.3/108.3 (0.55/0.55)	ft/min (m/s)
	Hill climbing ability (30 min) with / without load	7.6/11.5	6.9/11.2	EFG 216k 6.5/10.4 EFG 216 (6.0/9.5)	EFG 218k 5.8/10.0 EFG 218 (5.5/9.5)	5.2/9.3	%
	Max. hill climbing ability (5 min) with / without load	23.1/33.6	21.5/32.6	EFG 216k 20.3/30.7 EFG 216 (19.5/28.9)	EFG 218k 18.5/29.7 EFG 218 (17.9/28.2)	17.0/27.8	%
	Acceleration (393.7 inch (10 m)) with / without load	4.2/3.5	4.3/3.5	EFG 216k 4.4/3.6 EFG 216 (4.2/3.6)	4.4/3.7	4.5/3.8	s

*) with hoist frame in vertical position

3.3 Weights (all weights in lb (kg))

Designation	EFG 213	EFG 215	EFG 216k/ 216	EFG 218k/ 218	EFG 220
Dead weight (including battery)	6084.8 (2760)	6261.1 (2840)	EFG 216k: 6658.0 (3020) EFG 216: 7043.8 (3195)	EFG 218k: 6746.1 (3060) EFG 218: 7087.9 (3215)	7176.0 (3255)
Axle load front (without load)	2777.8 (1260)	2821.9 (1280)	EFG 216k: 3130.6 (1420) EFG 216: 3185.7 (1445)	EFG 218k: 3163.6 (1435) EFG 218: 3229.8 (1465)	3384.1 (1535)
Axle load front (with load)	7583.9 (3440)	8377.5 (3800)	EFG 216k: 8873.6 (4025) EFG 216: 8763.4 (3975)	EFG 218k: 9623.2 (4365) EFG 218: 9501.9 (4310)	10361.7 (4700)
Axle load back (without load)	3306.9 (1500)	3439.2 (1560)	EFG 216k: 3527.4 (1600) EFG 216: 3858.1 (1750)	EFG 218k: 3582.5 (1625) EFG 218: 3858.1 (1750)	3792.0 (1720)
Axle load back (with load)	1344.8 (610)	1190.5 (540)	EFG 216k: 1311.8 (595) EFG 216: 1807.8 (820)	EFG 218k: 1091.3 (495) EFG 218: 1543.2 (700)	1234.6 (560)

3.4 Tyre equipment

Designation	EFG 213	EFG 215	EFG 216k/216	EFG 218k/218	EFG 220
Tyre equipment	SE (L)	SE (L)	SE (L)	SE	SE
Tire size, front wheels	18 x 7-8 (16PR)			200/50-10	
Tire size, back wheels	15 x 4.5-8 (12PR)			15 x 4.5-8	

Tyre pressure for pneumatic tyres: 10 bar

3.5 EN Standards

Permanent sound level: 66 dB(A)

complying to EN 12053 in accordance with ISO 4871.

Z The permanent sound level is an average value determined according to the standard's guidelines and takes into consideration the sound level when driving, lifting and in idle mode. The sound level is measured at the driver's ear.

Vibration: 31.1 in/s² (0.79 m/s²)

according to EN 13059.

Z The vibration acceleration applied to the operator's body is measured according to the standard's guidelines as a linearly integrated, weighted acceleration in vertical direction. The acceleration is measured when driving across bumps at steady speed.

Electromagnetic compatibility (EMC)

The manufacturer confirms compliance with the limit values for electromagnetic emission and interference immunity as well as testing of static electricity discharge according to EN 12895 and the references to other standards contained therein.

Z Electrical or electronic components and their arrangement may only be modified after written approval by the manufacturer has been obtained.

3.6 US standards

M The regulations and requirements of standard ASME B56.1 must be strictly observed and fulfilled.

3.7 Conditions for application

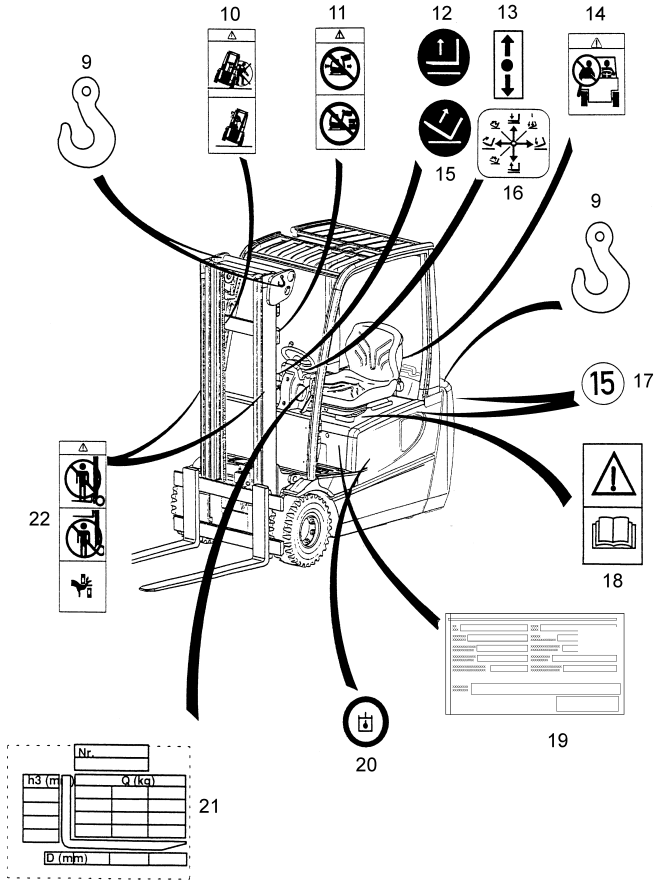
Ambient temperature:

- during operation: -4±F (-20±C) to +104±F (+40±C)

Z Industrial trucks must be specially equipped and approved for continuous use in environments with temperatures below 41±F (5°C) or in cold stores respectively with extreme temperatures or humidity changes.

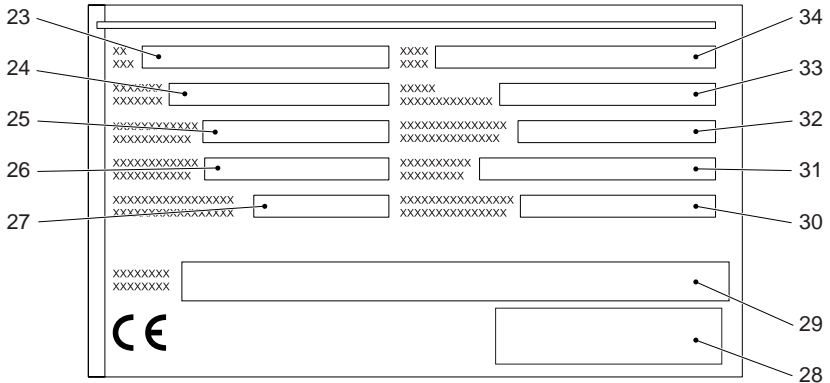
4 Location of instruction labels and identification plates

F Warning and information labels, such as capacity diagrams, attachment points and identification plates, must be readable at all times or be replaced, if necessary.



Item	Designation
9	Label Fit locations
10	Label Warning in case of overturn
11	Label Driving with lifted load, forward inclination of mast with lifted load not permitted
12	Label Lifting/Lowering
13	Label Forward-reverse
14	Label Transport of passengers not permitted
15	Label Tilting
16	Label Hydraulic function (Multi Pilot)
17	Label Maximum speed
18	Label Observe operating instructions
19	Identification plate
20	Label Hydraulic oil
21	Capacity plate
22	Label Not on load, not underneath load, danger of contusion

4.1 Truck identification label, load capacity



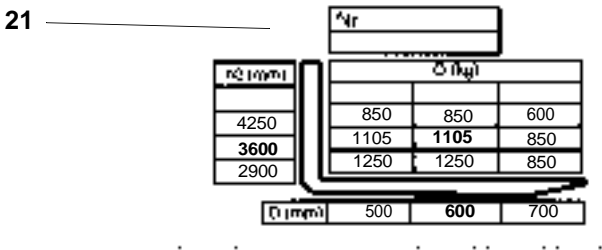
Item	Designation	Item	Designation
23	Type	29	Manufacturer
24	Serial No.	30	Min./max. battery weight in lb (kg)
25	Rated capacity in lb (kg)	31	Drive power in kW
26	Battery: Voltage V	32	Load center distance, inches (mm)
27	Empty weight without battery in lb (kg)	33	Year of manufacture
28	Manufacturer logo	34	Option

Z In the event of queries relating to the truck or spare part orders, please state the serial no. (24) of the truck.

4.2 Capacity label Truck

The capacity Label Truck (21) indicates the load capacity Q of the truck in lb (kg) with hoist frame in vertical position. The maximum load capacity at a specific load centre (D in inch (mm)) and the desired lifting height (H in inch (mm)) is given in a table.

Example:

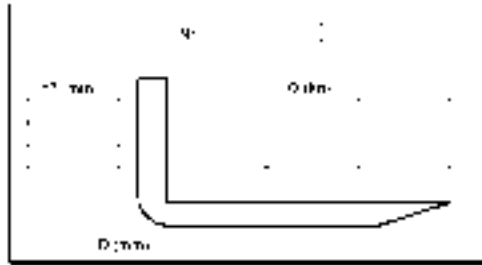


Example for determination of maximum load capacity:

In case of a load centre D of 23.6 inch (600 mm) and a maximum lifting height H of 141.7 inch (3600 mm) the maximum load capacity Q is 2436.1 lb (1105 kg).

4.3 Capacity label Fork tines (basic device)

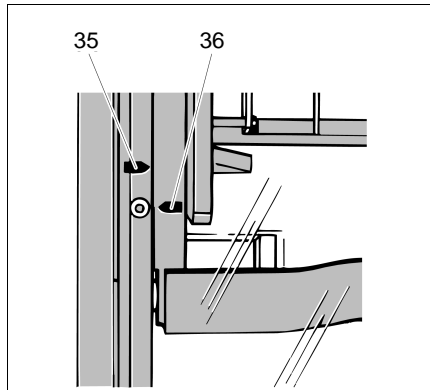
The fork arm load diagram indicates the carrying capacity Q of the truck in lb (kg). The maximum load capacity at different load centers D is given in a diagram (in Inch (mm)).



4.4 Capacity label Attachment

The attachment load diagram indicates the carrying capacity Q of the truck in connection with the respective attachment in kg. The attachment serial number indicated in the load diagram must correspond to the ID plate of the attachment, since the manufacturer must state the carrying capacity specially for each attachment. It is indicated in the same way as the carrying capacity of the truck itself and must be determined accordingly.

The arrow-shaped markings (35 and 36) at the inner and outer mast indicate the lifting height limits that are prescribed in the load diagram.

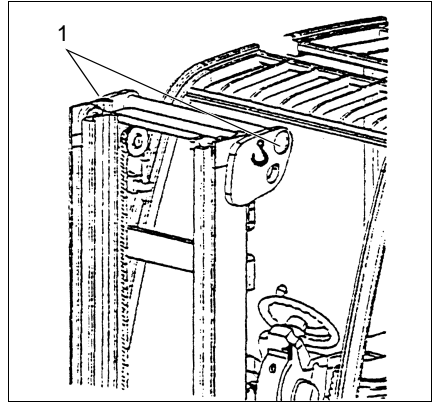


C Transportation and commissioning

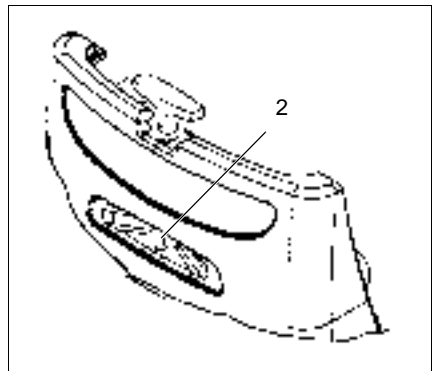
1 Transportation by crane

M Only use lifting equipment with sufficient carrying capacity (loading weight = own weight + battery weight; see identification plate of the truck).

- Park the truck and render it safe (refer to chapter E).
- Attach the lifting gear to the cross member of the hoist frame (1) and to the tow bar (2).



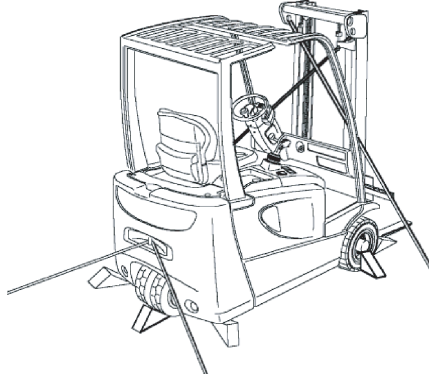
M The lifting gear must be attached to the attachment points in such a manner that it absolutely cannot slip and cannot come into contact with any attachments or the overhead guard of the truck when the truck is lifted.



2 Securing the truck during transport

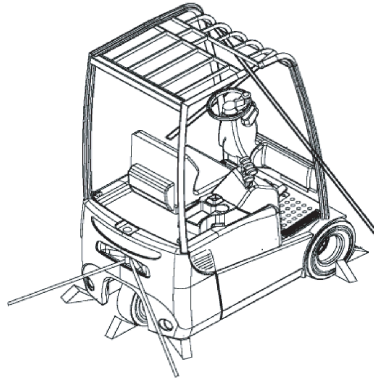
M The fork lift truck must be properly secured with wedges and restraints during transport on a lorry or trailer. The lorry or trailer must be equipped with lashing rings and a wooden floor. Perform loading with suitably trained specialist staff according to the recommendations of VDI 2700 and VDI 2703 guidelines. Correct dimensioning and implementation of load securing measures is required for every separate case.

- Z To lash down the fork lift truck with the lifting mast installed use the eyes on the top cross beam of the mast and the trailer coupling pin.

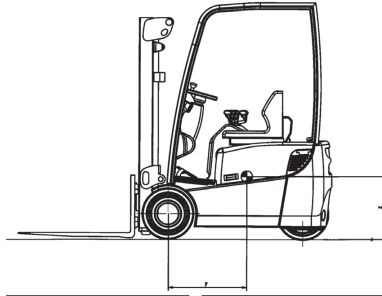


Lashing and wedging with the lifting mast installed

- Z To transport the fork lift truck without lifting mast perform lashing across the overhead guard front.



Lashing and wedging without lifting mast



Approximate centre of gravity

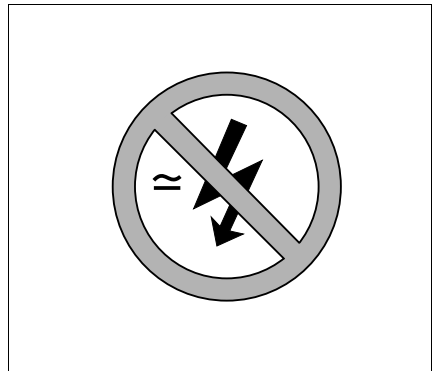
3 First commissioning

F Commissioning and instruction of the driver must only be carried out by personnel with appropriate training. If several trucks are delivered it must be assured that only load suspension devices, hoist frames and basic trucks with identical series number are assembled.

M Drive truck with battery power only. Rectified alternate current will damage the electronics. Cables connected to the battery (towing cable) must be less than 236.2 in (6 m) in length.

In order to prepare the truck for work following delivery or transportation, the following operations must be performed:

- Check equipment for completeness.
- Check the battery connections.
- Check torque of wheel nuts (refer to chapter F).
- Commission truck as specified (refer to chapter E).



4 Moving of the truck without own drive

If the truck must be put on tow, proceed as follows:

- Connect tow-bar or tow to the trailer coupling of the recovery vehicle and to the truck to be recovered.
- Remove battery plug (refer to chapter D).
- Release parking brake.

F A person must sit on the driver`s seat of the truck on tow in order to do the steering. Do not drive the truck on tow faster than walking pace.

Z Since the truck's steering booster is switched off, a higher expenditure of force is necessary to steer the truck.

D Battery - Servicing, recharging, replacing

1 Safety regulations governing the handling of lead-acid batteries

The truck must be parked and rendered safe, before any operations on batteries are to be undertaken (refer to chapter E).

Maintenance staff: Recharging, servicing and replacing of batteries must only be performed by qualified personnel. The instructions contained in this operating manual and the instructions that are supplied by the manufacturer of battery and battery recharging station are to be observed, when performing the following operations.

Fire protection measures: Smoking and naked flames are not permitted when handling batteries. No inflammable substances or spark-generating materials must be present or stored within a distance of 78.7 in (2 m) of the truck parked for battery recharging. The location must be well ventilated. Fire fighting equipment must be kept ready.

Battery maintenance: The battery cell screw caps must be kept dry and clean. Terminals and cable shoes must be clean, lightly greased with pole grease and must be securely tightened.

Disposal of the battery: Batteries must only be disposed of as stipulated in the national environmental protection regulations or waste disposal provisions. The manufacturer's specifications for the disposal must be heeded.

M Before closing the battery hood, make sure that the battery cable cannot be damaged.

F Batteries contain dissolved acid, which is toxic and caustic. For this reason protective clothing and goggles must be worn whenever work is undertaken on batteries. Avoid physical contact with battery acid.
If clothing, skin or eyes have accidentally come into contact with battery acid, liberally flush the affected parts with clean water. Consult a doctor, when skin or eyes have come into contact with battery acid.
Spilled battery acid must be immediately neutralised.

M Only batteries with closed battery trough may be used.

2 Battery types

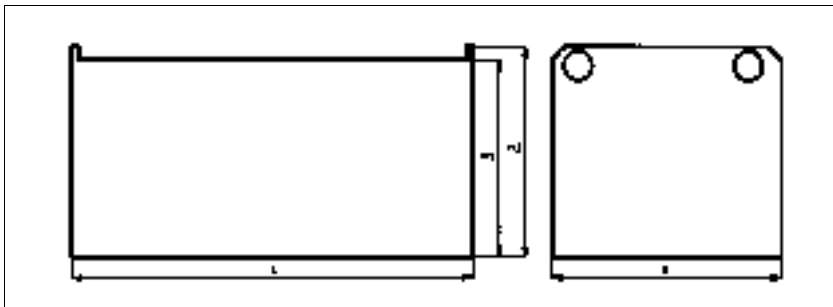
In dependence on the application, the truck is equipped with different battery types. The following table shows which standard combinations are possible, similar to DIN 43535, with indication of the capacity.

EFG 213/215	48 V - 4PzS - Battery 440L Ah 48 V - 4 PzV - Battery 400 Ah 48 V - 4 PzW - Battery 400 Ah 48 V - 4 PzS - Battery 480HX Ah
EFG 216k/218k	48 V - 5PzS - Battery 550L Ah 48 V - 5 PzV - Battery 500 Ah 48 V - 5 PzW - Battery 500 Ah 48 V - 5 PzS - Battery 600HX Ah
EFG 216/218/220	48 V - 6PzS - Battery 660L Ah 48 V - 6PzV - Battery 600 Ah 48 V - 6 PzW - Battery 600 Ah 48 V - 6 PzS - Battery 720HX Ah

The battery weight is indicated on the rating plate of the battery.

F Battery weight and dimensions have a considerable influence on the stability of the truck. For this reason, the dimensions and weight of the batteries must correspond to the following table and drawing. Operation of the truck with non-conforming batteries is only allowed with prior approval by the manufacturer.

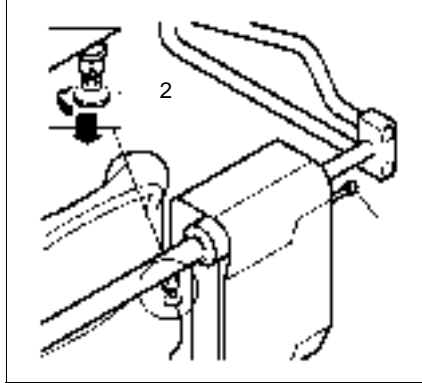
Drive battery 48 V						similar to DIN 43535
Truck	Dimension (inches (mm))				Nom. weight (-5/+8%) in lb (kg)	
	L max.	B max.	H1 +/-0.08 (2)	H2 +/-0.08 (2)		
EFG 213/215	32.7 (830)	20.6 (522)	24.1 (612)	24.7 (627)	1560.9 (708)	400 - 480 Ah
EFG 216k/ 218k	32.7 (830)	24.8 (630)	24.1 (612)	24.7 (627)	1887.2 (856)	500 - 630 Ah
EFG 216/ 218/220	32.7 (830)	29.1 (738)	24.1 (612)	24.7 (627)	2233.3 (1013)	600 - 720 Ah



3 Opening the battery hood with support system (optional)

M If the truck is equipped with a support system, the battery hood can only be opened when the safety straps are swivelled downwards.

- In case of the automatic support system, lock the stop knob (2) and swivel the straps downwards.



4 Open battery hood

F Park the truck and render it safe (see chapter E).

- Release lock of the steering column (1) push steering column forward and secure it in this position.

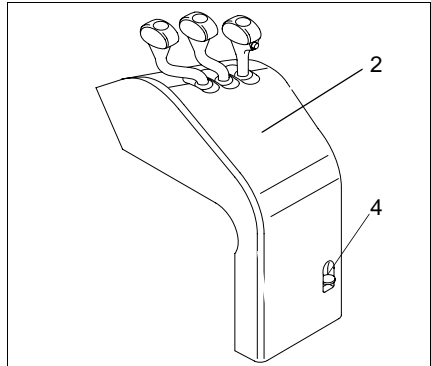
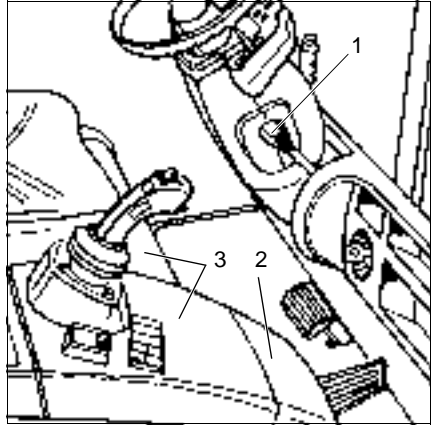
F Pay special attention when locking and unlocking the hood of the control valve.

With Multi-Pilot (option):

- Pull control valve cover (2) forward until it engages.
- Carefully fold back battery cover with driver's seat (3).

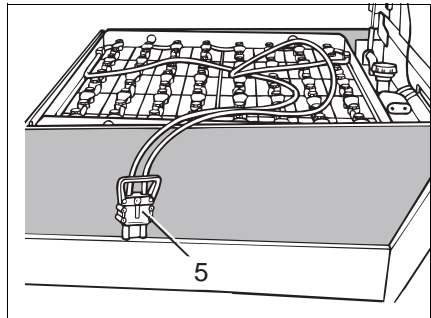
With Solo-Pilot:

- Unlatch control valve cover (2) by pressing lever (4) and swivel forward.
- Carefully fold back battery cover with driver's seat (3).



- Withdraw the battery connector (5).
- Remove insulation mat from battery, if necessary.

F The battery connector and the socket must only be connected or disconnected with the master switch and the battery charger switched off.



5 Charging the battery

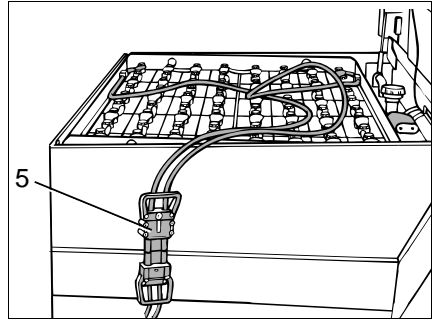
– Open the battery hood.

F The battery and the charger must only be connected or disconnected with the battery charger switched off. The surface of the battery cells must be exposed to provide sufficient ventilation. Metal objects must not be placed on the battery.

M Prior to starting the recharging operation, check all cable connections and plugged connections for visible damage.

– Connect charging cable to battery charger by means of the battery connector (5).

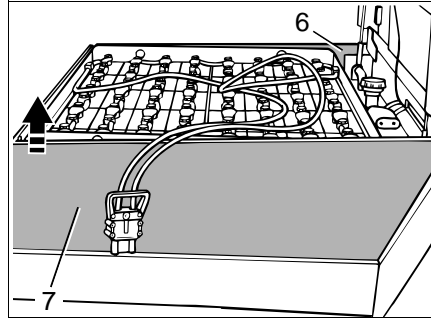
– Switch on the battery charger and charge battery according to the specifications of the battery supplier and the battery charger supplier.



F The safety instructions provided by the battery supplier and battery charger supplier must be strictly observed. It is absolutely necessary to keep the battery hood open during the charging process to ensure evaporation of gases formed during charging. Smoking or naked flames are strictly forbidden when handling batteries. Explosion hazard!

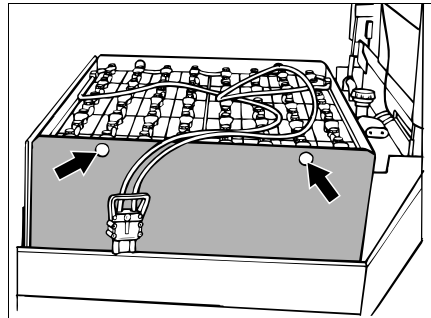
6 Removing and installing the battery

- Open battery hood
- Pull out side door (6,7).



F Batteries with exposed terminals or connectors must be covered with a rubber mat to prevent short-circuits. When changing the battery with the aid of a lifting gear ensure that the lifting gear is of adequate capacity (the battery weight is indicated on the battery identification plate at the battery trough). The lifting gear is led through the opening of the overhead guard and must pull in a vertical direction to prevent damage to the battery trough. Lifting hooks must be applied in such a way to the battery lifting eyes that, with the lifting gear slack, they will not drop on to the battery cells.

- Attach lifting gear to the battery trough.
- Lift battery over the frame on the right side and pull it to the side.



- Installation is in the reverse order.

F When replacing batteries, ensure that a battery of the same type is fitted. After reinstallation of the battery, visually check all leads and connectors for damage. All hoods and side doors must be securely locked.

F During replacement/installation of the battery, pay attention that the battery is tight in the battery box of the truck.

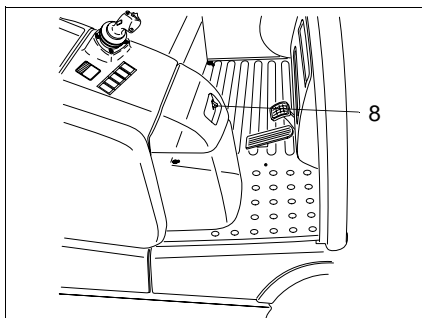
7 Closing battery cover

With Multi-Pilot (option):

- Pull control valve cover forward and simultaneously unlatch it by pressing lever (8). Control valve cover moves back by itself.

With Solo-Pilot:

- After closing the battery cover, swivel control valve cover to the back until it engages.



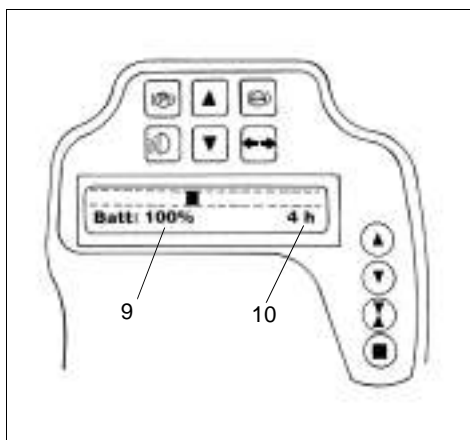
8 Battery discharge indicator, battery discharge monitor, operating hour meter

Battery discharge indicator: The loading status of the battery (9) is indicated in steps of 10% on the information and service indicator (100% = battery capacity 100%, display 0% = battery capacity 20%).

M The manufacturer setting of the battery discharge indicator / discharge monitor is standard batteries.

If maintenance-free batteries are used, the indicator must be adjusted in such a way that the T symbol appears behind the percent specification. If this setting is not selected the battery may be damaged due to a complete discharge. Contact the customer service of the truck manufacturer if you need to adjust the instrument.

It is required to recharge the battery, if the residual capacity amounts to 20% for standard batteries or 40% for maintenance-free batteries.



Battery discharge monitor: If the residual capacity falls below the specified minimum value, the lifting function is switched off. A corresponding message is displayed in the information and service indicator.

Z The lifting function will only then be released, if the connected battery is reloaded by min. 40%.

Operating hour meter: The operating hours (10) are indicated next to the loading status of the battery. The operating hour meter indicates the total time of all riding and lifting movements.

E Operation

1 Safety instructions for floor conveyor operation

Driving permission: The floor conveyor must only be operated by personnel that have been adequately trained and have proved to the persons in charge or their representatives their ability to handle the truck correctly and who have been explicitly entrusted with the operation of the truck.

Rights, duties and conduct of the driver: The driver must have been informed about his rights and duties and must have been trained in the operation of the floor conveyor. In addition, it is required that he knows the contents of these operating instructions. All necessary rights must be granted to him. If the floor conveyor is operated with a person accompanying the truck it is required to wear protective shoes.

Prohibition of unauthorised use: The driver is responsible for his floor conveyor during working time. He must forbid unauthorised persons to drive or operate the truck. The transport or lifting of persons is forbidden.

Damage and defects: Damage or defects noted on the floor conveyor or on the attachments must immediately be brought to the notice of the person in charge. Trucks that cannot be safely operated (e.g. due to worn tires or defective brakes) must not be used until they have been properly repaired.

Repairs: Without specific training and expressed authorisation the driver is not allowed to perform any repairs or modifications on the floor conveyor. Under no circumstances must the driver change the setting of switches or safety installations, or render them ineffective.

Hazardous area: The hazardous area is defined as the area in which persons are endangered by the travelling or lifting movements of the floor conveyor or its load lifting devices (e.g. fork or attachments), or by the loads being transported. This includes also the area within reach of dropping loads or dropping truck attachments.

F Unauthorised persons must be asked to leave the danger area. The driver must give a warning signal, whenever a situation presenting danger to persons might develop. The truck must immediately be brought to a standstill, if persons, although asked, do not leave the danger area.

Safety devices and warning labels: The safety devices, warning labels and warning notes described in the present operating instructions must always be heeded.

M The regulations and requirements of standard ASME B56.1 must be strictly observed and fulfilled.

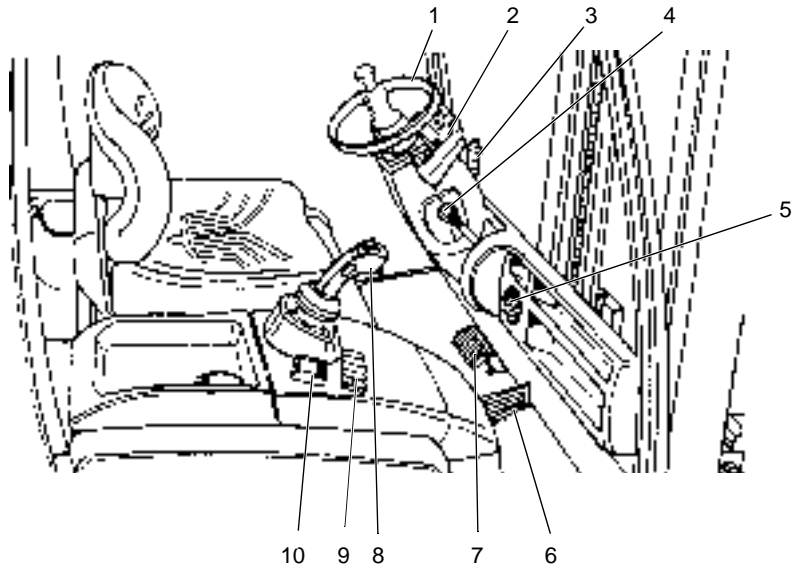
2 Description of the operating controls and indicators

Item	Operating control or indicator		Function
1	Steering wheel	t	Steering of the truck with 6 revolutions of the steering wheel from the left to the right.
2	Information and service indication	t	Indication of the important drive and lift parameters, warnings, information about operation faults and service indicators.
3	Parking brake	t	Secures the truck at standstill.
4	Steering column lock	t	The steering column is adjusted to the desired distance and locked.
5	Key switch	t	Switches the control current on and off. When the key is removed from the key switch, the truck cannot be operated by unauthorised persons.
6	Accelerator pedal	t	The driving speed is continuously controlled.
7	Brake pedal	t	The truck is decelerated.
8	Driving direction switch Multi Pilot Horn	o	Selection of the desired drive direction. Controls the lift mast functions. Trigger warning signal.
9	Switch lever for special equipment	o	e.g. indication whether the working lights are switched on
10	Master switch Emergency Stop	t	Switch electric power supply on and off.
11	Dual-pedal control Driving pedal „Backward“	o	Truck drives backwards when actuated. Driving speed is controlled continuously.
12	Dual-pedal control Brake pedal	o	Truck is decelerated.
13	Dual-pedal control Driving pedal „Forward“	o	Truck drives forwards when actuated. Driving speed is controlled continuously.
14	Driving direction switch	t	Selection of the desired drive direction.
15	Horn	t	Trigger warning signal.
16	Solo Pilot Lifting - lowering	t	The fork is lifted or lowered.
17	Control lever Hoist frame - lowering	t	The fork is inclined to the front or to the back.
18	Control lever Auxiliary hydraulics (ZH1) e. g. side shifting device	o	The fork is moved to the right or left.
19	Control lever Supplementary hydraulic system (ZH2)	o	Intended for hydraulic attachments.
20	Changeover switch Supplementary hydraulic system (ZH3)	o	Change over from ZH2 to ZH3

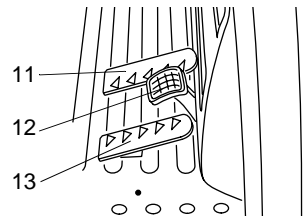
t = Standard equipment

o = Optional equipment

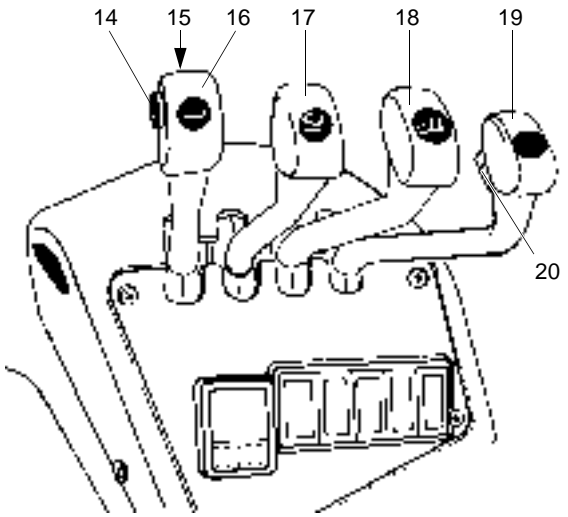
Truck with Multi Pilot (option)







Dual-pedal control (option)








Vehicle with Solo Pilot and control levers



2.1 Dashboard switches

Function	
	Anti-collision light switch
 	Switch „360° warning light/parking light“
	Switch „Windshield wiper and washing system“ Position 1 „Windshield wiper ON“ Position 2 „Windshield washer ON“

2.2 Operating console switches

Function	
	Override switch „Lift switch-off“
	Switch „Creep speed“
	Switch „Seat heater“
	Switch „Truck lighting“ (parking light/dimmed headlights)
	Switch „Working lights“

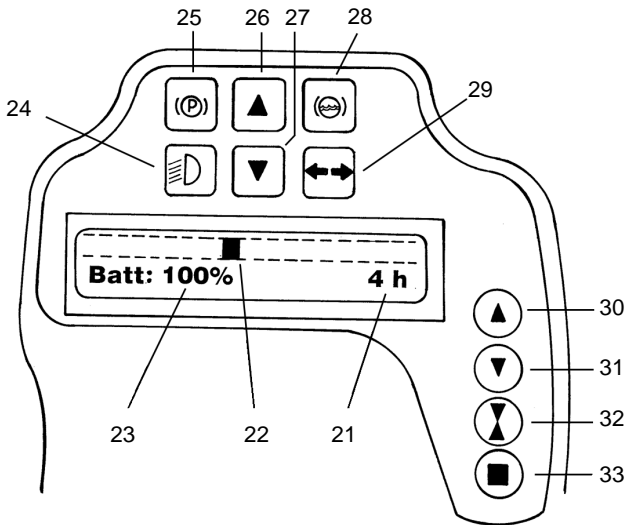
3 Information and service indication

On the LCD of the information and service indicator the following data are displayed: Operating data, battery loading status, operating hours and service and diagnostic data. Six LEDs, (24) to (29), are positioned above the indicator for indicating warning messages. The keyboard, four keys, (30) to (33), is needed to select, read or modify truck parameters.

- Z** The truck is supplied with two different keys:
 for the operator key code: 702 (red):
 Truck operation possible, the driver can choose between 5 driving programs.
 for service / workshop key code: 738 (grey):
 Truck operation possible, LISA can be used to change truck parameters in the operator mode.

F In the service mode, only authorised personnel of the manufacturer service may perform modifications!







3.1 Information indication







Item	Indication
21	Operating hours / time
22	Wheel position indication
23	Battery capacity indicator

3.2 LED warning indicators

Six lit LED warning indicators show the following states:

Item	Function
24	 Lighting switched on (green LED)
25	 Parking brake applied (red LED)
26	 Driving direction forward (direction of the drive) (green LED)
27	 Driving direction backwards (direction of the load) (green LED)
28	 Brake fluid level too low (red LED)
29	 Direction indicator (green LED)

3.3 Keyboard assignment

Item	Function
30	 Double function – Increase of the selected program in steps – Selection of the individual menu items in upward direction
31	 Double function – Decrease of the selected program in steps – Selection of the individual menu items in downward direction
32	 Double function – Release of a selection menu from the main menu – Confirmation of a question with „NO“ -> „x“
33	 Quadruple function – Quitting a selected menu item – Saving the changed program – Confirmation of a question with „YES“ -> „q“ – Change between „operating hours“ and „time“ indication

3.4 Plain text alarm messages in the display

The alarm indication of the vehicle is displayed in the display of this menu.
From the „driving programs“ display you can changeover to the alarm indication with the „C“ (33) key.

3.5 Indication of driving programs

F The driving behaviour of the truck is changed by selctiing single driving programs. This is to be taken into consideration during start-up!
Parameters may only be modified with the truck parked and while it is not performing any lifting movements.

Driving programs may only be selected with the truck parked and while it is not performing any lifting movements.

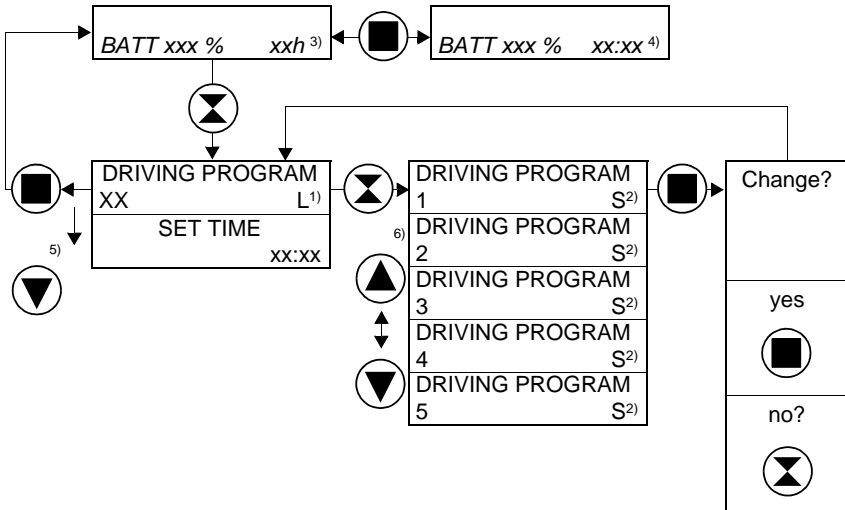
- Taking the truck into operation (see section 4),
put the key into the key switch and turn it as far as possible to the right.

The operator menu is displayed for approx. 3 sec., indicating the truck designation. Then, the battery loading status and the operating hours are indicated.

- Press selection menu key (32).

The selected driving program is shown on the display.

- Please follow the below mentioned diagram when changing the driving program. With the 5 programs the truck can be accelerated and decelerated from slowly to maximum.



- 1) L = Driving program read out (read mode)
- 2) S = Change driving program (write mode)
- 3) „Operating hours“ indicator
- 4) „Time“ indicator
- 5) Selecting parameters
- 6) Modifying driving program

3.6 Display indicators

The display shows operating data and error messages. The following driving parameters can be set via the user menu.

Here, the time between maximum actuation of the drive switch and 100% position control of the electronics is set.

		A	C	C	E	L	E	R	A	T	I	O	N		
															L



When releasing the drive pedal, the drive current control initiates the braking process. The value is between 0% (coasting) and a maximum value that is equal to the minimum value for reverse braking.

		C	O	A	S	T	I	N	G					B	R	A	K	E		
																				L



The setting of the reversing brake influences the deceleration for a directional change. The actual deceleration for a direction change is also dependent on the position of the driving pedal.

		R	E	V	E	R	S	I	N	G									B	R	A	K	E		
																									L



Support for mechanical brake. The braking pressure is controlled depending on the setting.

						P	E	D	A	L									B	R	A	K	E		
																									L



Setting the maximum reverse speed.

						S	P	E	E	D									R	E	V	E	R	S	E		
																											L



Setting the maximum reverse speed, when the creep switch is actuated.

		C	R	E	E	P				S	P	E	E	D					R	E	V	.				
																										L



Setting the maximum forward speed.

						S	P	E	E	D																
																										L



Setting the maximum forward speed, when the creep switch is actuated.

		C	R	E	E	P				S	P	E	E	D												
																										L



Sounds an acoustic alarm for maloperation.

						B	U	Z	Z	E	R															
																										L



Preset values can be recalled and set.

						B	A	S	I	C				S	E	T	T	I	N	G					
																									L

3.7 Changing truck parameters

F The truck behaviour is changed by changing the truck parameters. This must be observed when bringing the truck into service!
Parameters must only be changed when the truck is at standstill and not performing any lifting movements.

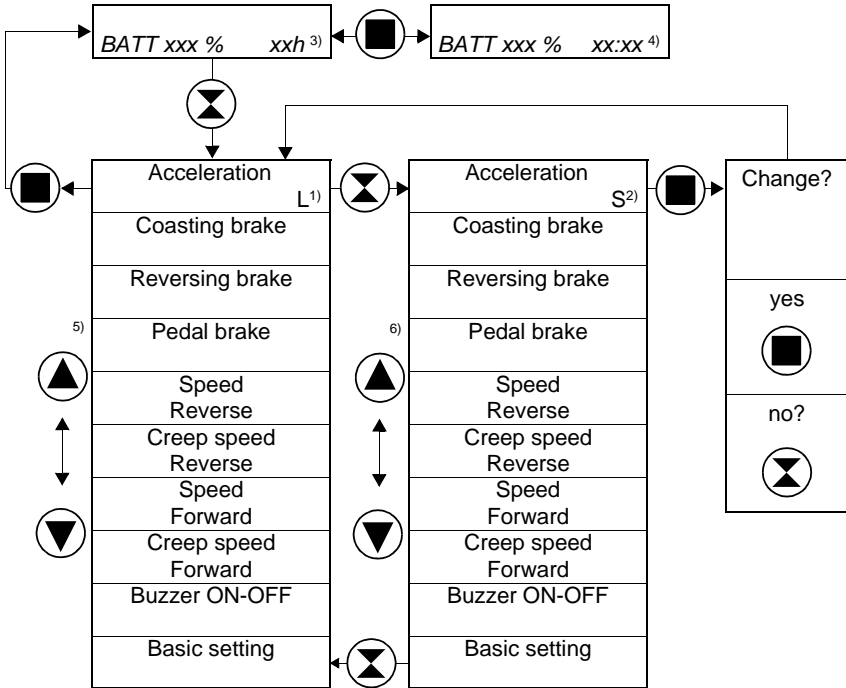
- Bringing the truck into service,
insert key (gray) into the lock and turn clockwise to the limit.

For approx. 3s the display shows the user menu with the truck name, then current steering angle, battery charging condition, and operating hours are displayed.

- Press selection menu switch (32).

The display shows „acceleration“ and the corresponding parameter.

- Proceed according to the following diagram to view or change the truck parameters.
- Use pushbuttons (30) and (31) to toggle between the 10 setting parameters.



- 1) L = Read operation parameter (read mode)
- 2) S = Change operation parameter (write mode)
- 3) Display „operating hours“
- 4) Display „time of day“
- 5) Selecting parameters
- 6) Changing parameters

4 Commissioning the truck

F Before starting or operating the truck, or before lifting any loads, the driver has to make sure that nobody is within the danger area.

4.1 Checks and actions before routine start-up

- Visual inspection for damages of the whole truck (especially tires and load carrying devices).
- Check whether the load chains are tightened evenly.
- Visual inspection of battery fixing and cable connections.

4.2 Adjustment of driver's seat

Z The driver's seat must be adjusted to the driver's weight in order to achieve an optimum damping of the seat.

The driver's seat must be load-free when adjusting to the driver's weight!

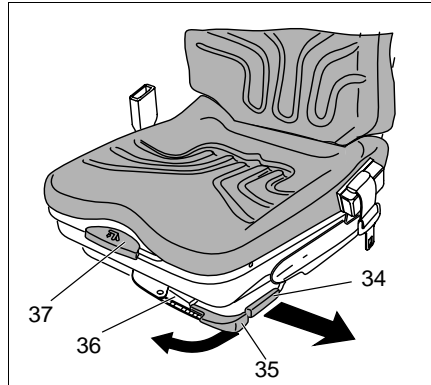
Adjusting the driver's weight:

- Pull weight adjustment „Driver's seat“ (35) in arrow direction until stop and release again.

Z The previous weight adjustment is set back to the minimum value. Adjusting range of seat damping from 110.2 lb (50 kg) to 286.6 lb (130 kg).

- Pull weight adjustment „Driver's seat“ (35) in arrow direction again until the appropriate weight is indicated on the weight display „Driver's seat“ (36). Push weight adjustment „Driver's seat“ back again.

- Sit down on the driver's seat.



Backrest adjustment:

- Pull backrest adjustment (37) up and adjust backrest inclination.
- Release backrest adjustment (37), backrest locks in.

Adjusting the seat position:

- Pull locking of driver's seat (34) out and adjust the desired seat position by moving the seat forward or backward.
- Release locking of driver's seat (34) to arrest the seat.

F The driver's seat locking must be securely arrested in the adjusted position. The driver's seat adjustment must not be changed while driving the truck!

Z The driver's seat adjustment relates to the standard equipment. Use the adjustment instructions of the supplier if the truck equipment deviates from the standard. When adjusting the seat you have to make sure that all operating controls can be easily reached.

4.3 Adjusting the steering column

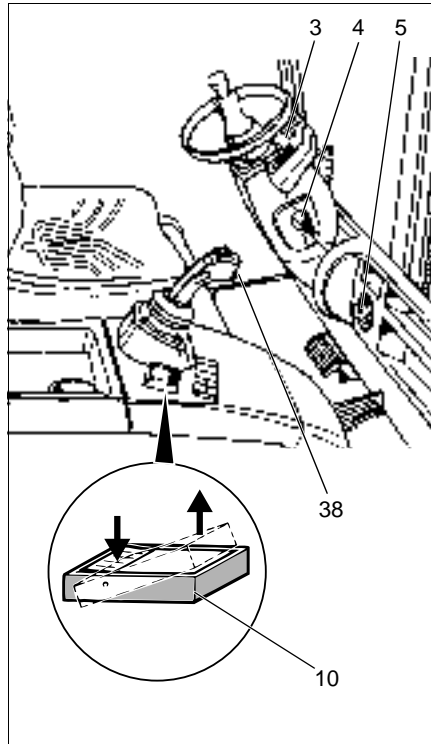
- Release steering column lock (4) and push or pull steering column to the desired position.
- Tighten steering column lock again.

4.4 Provide operability

- Unlock master switch (10).
To do this:
Push rocker (s) in and pull it upward (r) until you notice that the master switch locks in.
- Put key into the key switch (5) and turn right until stop to position „I“.
- Check function of horn key (38).

F Check function of electric and hydraulic brake and parking brake.

The truck is now operative. The battery discharge and error indicator (3) displays the available battery capacity.



4.5 Setting the time

- Press key X (32).

The menu is displayed.

- Press key 30 or 31 until „SET TIME“ is displayed.
- Change over between hour and minute with the X (32) key. The changeable value is flashing.
- Change the value with the keys 30/31.
- Confirm time with the „q“ (33) key.
- Save changes with the „q“ (33) key and delete changes with the „X“ (32) key.

4.6 Safety belt

F Fasten safety belt before using the industrial truck.
The belt protects you from serious injuries!

Protect safety belt from dirt (e.g. cover during standstill) and clean it in regular intervals. Thaw out and dry frozen belt lock or belt winder to prevent them from freezing up again.

Z The dry temperature of the warm air must not exceed 140°F (+60°C)!

F Do not change anything at the safety belt!
Increased danger because of malfunctions.

- Replace safety belts after each accident.
- Only original spare parts must be used for retrofitting and repairs.

F Damaged or inoperative safety belts must be replaced by appointed retailers or branches.

Behaviour in exceptional situations

F Never loose the belt and never alight if the industrial truck threatens to overturn. Jumping down increases the danger of injuries!

Proper behaviour:

- Bend trunk over the steering wheel.
- Hold steering wheel tight with both hands and support with feet.
- Bend body against the falling direction.



Safety belt instructions

Before starting the industrial truck, pull belt out of the winder slowly, place it over your thighs tight to your body and close the lock.



- F** The belt must not be twisted when fastening it!

When operating the industrial truck (e.g. driving, lifting, lowering, etc.), the driver must be seated with the back at the backrest.



The automatic blocking system of the belt winder gives you sufficient freedom of movement on the seat.

- F** Sitting on the front edge of the seat reduces the protection because of the long belt.



- Z** The belt must only be used to protect one person.



– Press red key after use and place lock tongue back to the winder with your hand.

- Z** The automatic blocking system may be released if the lock tongue hits the housing. In this case the belt cannot be pulled out.

Release blocking:

- Pull belt 0.4 to 0.6 in (10 to 15 mm) out of the housing with increased power.
- Let the belt move in again to release the automatic blocking system.

Belt can be pulled out again.

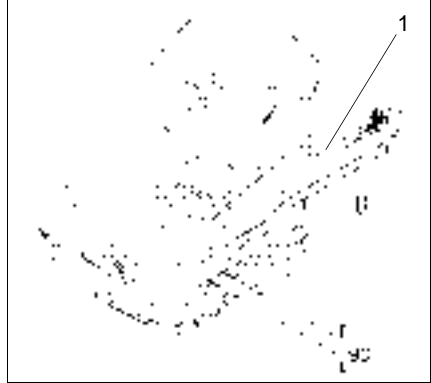
Behaviour when starting the industrial truck on a slope

The automatic blocking system blocks the belt extension if the industrial truck is tilted too much. The belt cannot be pulled out of the winder anymore.

- Z** Carefully drive industrial truck out of the slope and fasten belt.

4.7 Automatic/Mechanical Support System (optional)

- F Never use the truck without functional support system.
- F Have the support system checked after each accident by authorised specialist personnel.
- F Do not modify the support system.
- F With loaded driver's seat, the dimension 3.5 Inch (90 mm) between strap (1) and seat must be observed to ensure safe working conditions.



Behaviour in the event of unusual situations

- F If the truck is in danger of tipping over, under no circumstances try to jump off. Jumping off considerably increases the danger of injury.

Correct behaviour

- Bend the upper part of the body over the steering wheel.
- Hold the steering wheel with both hands and support yourselves with the feet.
- Lean the body against the direction of fall.

Operating Instructions for the (Automatic) Support System

F Before travel starts, the function of the support system must be checked.

The stop knob (2) must not be locked.

- Sit down
- Turn the switch key to „On“.

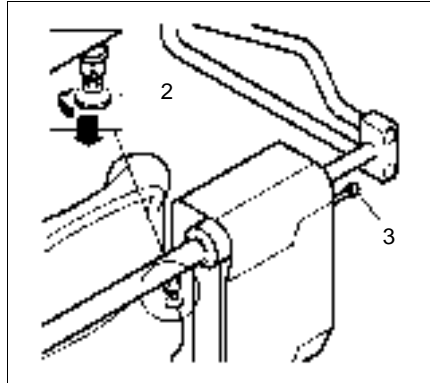
After having released the parking brake, both safety straps on the left and right side close and lock automatically.

Pay attention that the safety straps can freely move.

After having parked the truck and applied the parking brake, the safety straps open automatically.

Only turn the switch key to „0“ and take it out after the safety straps have opened.

In the event of a power failure, the support system can be unlocked by means of pulling knob (3). The safety straps can then be swivelled backwards manually.



Operating Instructions for the (Mechanical) Support System

F Before travel starts, the function of the support system must be checked.

For opening, press the left retaining strap inwards and swivel it upwards simultaneously, after having released the strap, it automatically swivels downwards and locks.

5 Working with the floor conveyor

5.1 Safety regulations applicable when driving the truck

Driving lanes and work areas: Only lanes and routes that are specially allocated for truck traffic may be used. Unauthorised persons must stay away from work areas. Loads may only be stored at places specially provided for this purpose.

Driving conduct: The driving speed must be adapted to the prevailing local conditions. The truck must be driven at slow speed when negotiating bends or narrow passages, when passing through swing doors and at blind spots. The driver must always observe an adequate braking distance between his truck and the vehicle in front and he must be in control of his truck at all times. Sudden stopping (except in emergencies), rapid U-turns and overtaking at dangerous or blind spots is not permitted. It is prohibited to lean or grab out of the working and operating range.

Visual conditions during driving: The driver must look in the travel direction and must always have a clear view of the route ahead. When loads are transported which are obstructing the driver's view, the truck must travel with the load at the rear. If this is not possible, a second person must give suitable warnings.

Driving on slopes and inclines: Driving on slopes and inclines is only permitted, when the relevant routes are suitable for traffic, when they are clean and non-slipping, and when the technical specification of the truck permits safe driving on slopes or inclines. Loads must always be carried at that end of the truck facing uphill. U-turns, cutting obliquely over slopes or inclines and parking of the truck on slopes or inclines is not permitted. Inclines may only be accessed at slow speed with the driver ready to brake at any moment.

Riding in lifts or on loading ramps: The truck must enter lifts with the load in front and must take up a position which does not allow it to come into contact with the walls of the lift shaft. The truck must enter lifts with the load in front and must take up a position which does not allow it to come into contact with the walls of the lift shaft. Persons riding in the lift together with the truck must only enter the lift after the floor conveyor has come safely to a standstill, and must leave the lift before the floor conveyor.

Characteristics of the loads to be transported: The driver must verify the proper condition of the load unit. Only loads that have been securely fastened according to the regulations may be transported. Never transport any loads that have been staked higher than the top of the fork carrier or the load backrest.

Towing of trailers or other vehicles is only allowed occasionally and on paved, level driveways with a maximum deviation of +/-1% and a maximum speed of 5 km/h. While towing, loads are not allowed on the forks. Permanent trailer operation is not permitted.

The maximum trailer load given for the fork lift truck for braked and/or unbraked trailers must not be exceeded. The indicated trailer load is only valid for the auxiliary coupling at the fork lift truck counterweight. The trailer load must be properly secured and must not exceed the dimensions permitted for the driving routes. Also heed the instructions of the coupling manufacturer if the genuine trailer coupling is replaced by another make.

After attaching the trailer but before starting driving, the driver must check that the trailer coupling is secured against detaching.

Towing fork lift trucks must be operated in such a manner that safe driving and braking of the truck and the trailer is guaranteed for all driving movements.

5.2 Driving

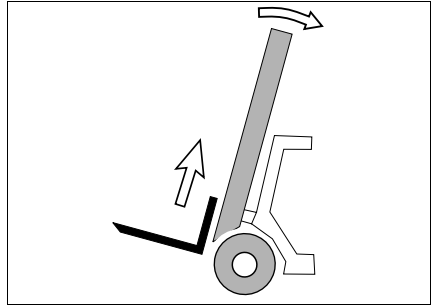
F During operation in electromagnetic fields beyond the admissible limit values uncontrolled driving motion can occur.
Press EMERGENCY STOP (master switch) immediately, decelerate truck with the service brake and pull the parking brake.
Determine the cause of the malfunction and inform the supplier's service, if necessary.

Safety switch, driver's seat

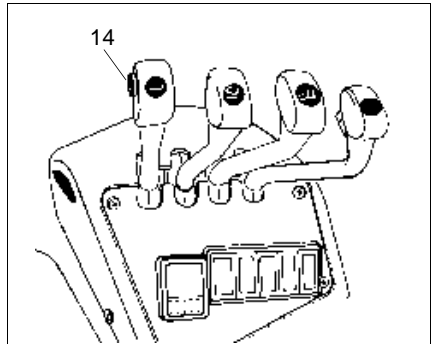
Z If the driver's seat is free or if the driver's weight is set too high, the driving function is interrupted by the safety switch (see chapter E, section „Adjusting the driver's weight“).

F Do not drive the truck unless the hoods are closed and locked in the stipulated manner.
The lanes and routes must be free from any obstacles.
The driving speed must be adapted to the load and the prevailing local conditions of the routes, lanes and working areas!

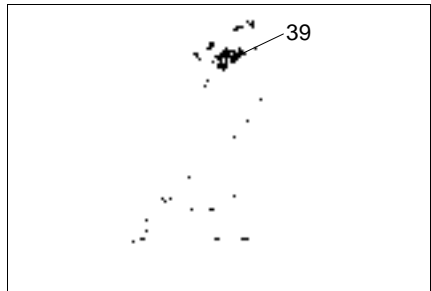
- Lift fork carrier approx. 7.9 in (200 mm) so that the fork tines are lifted above the ground.
- Incline hoist frame backward.



M Depending on the truck version, the driving direction switch can be located at the Solo Pilot (14) or



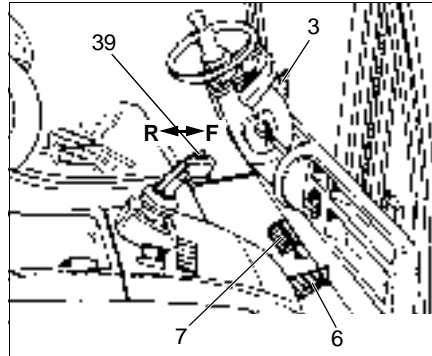
at the Multi Pilot (39).



Forward motion (single-pedal)

F Make sure that the driving area is free from obstacles.

- Release parking brake (3).
- Push direction switch (39) at the Multi pilot or at the Solo pilot (14) in forward direction.
- Slowly actuate driving pedal (6)

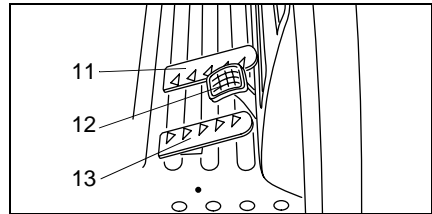


Forward motion (dual-pedal)

F Make sure that the driving area is free from obstacles.

- Release parking brake (3).
- Slowly actuate right driving pedal (13).

F Do not move Multi Pilot for driving.



Changing the drive direction (single-pedal)

F Before starting to drive in opposite direction you have to make sure, that the rear driving area is free from obstacles.

- Release foot from accelerator pedal (6).
- Decelerate truck with the brake pedal (7) until standstill.
- Set driving direction switch (39) or (14) via the neutral position to the desired direction.
- Carefully press accelerator pedal until the desired speed is reached.

Changing the drive direction (dual-pedal)

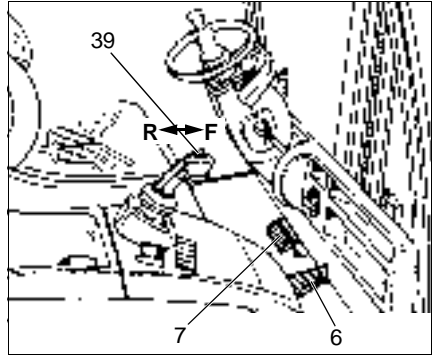
F Before starting to drive in opposite direction you have to make sure, that the rear driving area is free from obstacles.

- Release foot from the actuated driving pedal (13).
- Decelerate truck with the brake pedal (12) until standstill.
- Slowly actuate driving pedal (11), until the desired driving speed has been reached.

Backward motion (single-pedal)

F Make sure that the rear driving area is free from obstacles.

- Switch driving direction switch (39) on the Multi Pilot or at the Solo pilot (14) backward (R).
- Slowly press accelerator pedal (6) until the desired speed is reached.



Backward motion (dual-pedal)

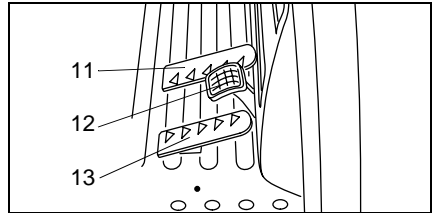
F Make sure that the rear driving area is free from obstacles.

- Slowly actuate left driving pedal (11) until the desired driving speed has been reached.

F Do not move Multi Pilot for driving.

Accelerating the truck (single-pedal)

- Slowly press accelerator pedal (6) until the truck starts to move.
- Press accelerator pedal (6) further down. Engine speed and riding speed increase in relation to the actuation travel.



Accelerating the truck (dual-pedal)

- Slowly actuate driving pedal (11 or 13) depending on selected driving direction, until the vehicle starts moving.
- Press down driving pedal (11/13) further. Motor speed and driving velocity increase in relation to the actuation.

Decelerating the truck

F The braking effect of the truck is mainly dependent on the road surface. This must be taken into account by the driver for his driving behaviour. Decelerate the truck carefully so that the load does not slip.
When driving with trailed loads the resulting longer braking path must be kept in mind.

- Take your foot from the accelerator pedal (6) (11/13) and press down lightly the brake pedal (7/12), if required.

5.3 Steering

M The power to be applied for steering is very low due to the hydrostatic steering system. Therefore the steering wheel must be turned very carefully.

Driving a right turn

- Turn the steering wheel clockwise according to the desired radius of the turn.

Driving a left turn

- Turn the steering wheel counter-clockwise according to the desired radius of the turn.

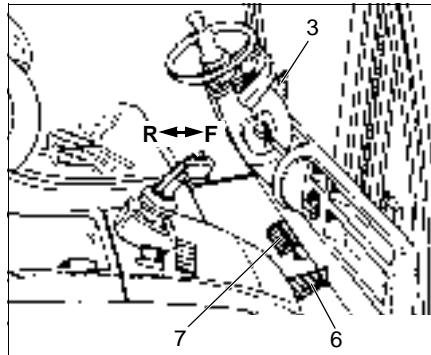
5.4 Braking

There are four possibilities available to decelerate the truck:

- Service brake
- Coasting brake
- Reverse brake
- Parking brake

Service brake:

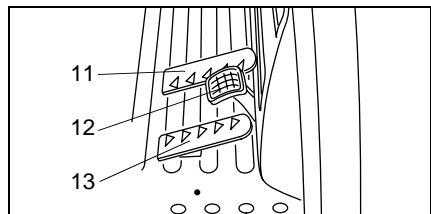
- Press brake pedal (7/12) down until you feel brake pressure.



Z The driven wheels are decelerated by means of multiple discs.

Coasting brake:

- Release foot from accelerator pedal (6) (11/13). The truck is slowed down generatively by means of the drive current control system.



Z This operating mode decreases the energy consumption.

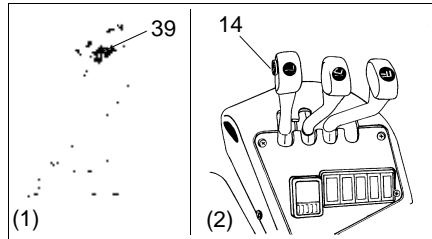
Reverse brake (single-pedal):

- Switch driving direction switch (39) or (14) to opposite driving direction while driving. The truck is decelerated generatorically by means of the drive current control system until the truck starts to travel in the opposite direction.

F

Depending on the truck type, the driving direction switch can be located

- at the Multi Pilot, (figure 1) or
- at the adjustment lever, (figure 2).



Locking brake:

- Pull back locking brake (3). The locking brake is engaged and the locking brake lever is locked into this position.
- Press the locking knob of the locking brake (3) and press lever forward, in order to release the locking brake.

Z

The driven wheels are mechanically decelerated by means of multiple discs. When travelling with engaged parking brake a warning signal is triggered.

F

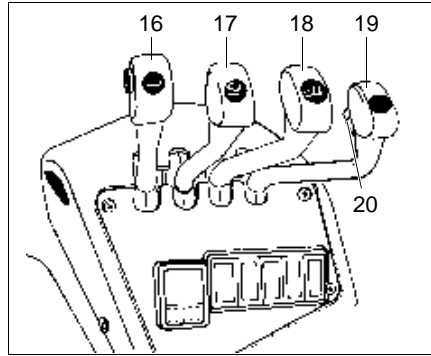
The parking brake holds the truck with the highest admissible load and clean lane on an incline of 15 %.

5.5 Operating the lifting device and attachments (control lever)

F The control lever must only be operated while the driver is sitting on his seat. The driver must be instructed in the operation of the lifting device and attachments!

Lifting/lowering fork carrier

- Pull Solo Pilot (16) backward to lift the fork carrier.
- Press Solo Pilot (16) to the front to lower the fork carrier.



Inclining of hoist frame

F Keep your body parts out of the gap between mast and front wall when inclining the mast backward.

- Pull control lever (17) backward to incline hoist frame backward.
- Push control lever (17) forward to incline hoist frame forward.

Controlling attachments

F Observe load capacity of the attachment.

- Auxiliary hydraulic system control lever ZH 1 (18) (e. g. side shifting device).
- Control lever ZH2 (19) for controlling the attachment, pull to the back or press to the front.
- The control lever ZH2 (20) can be switched over to the auxiliary hydraulic system (ZH3) with key (19).

The lifting speed of the hydraulic cylinder is controlled by the excursion of the control lever.

When the control lever is released, it jumps back to neutral position automatically and the attachment remains in the current position.

M Use control lever very sensitively and do not jerk it. When the stop of the attachment is reached, let control lever loose immediately.

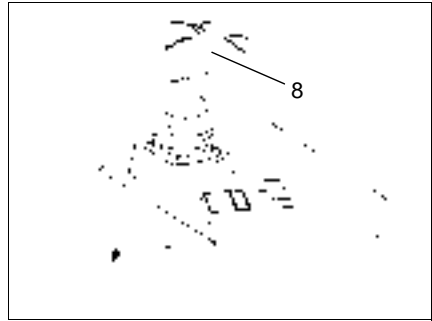
F Lifting persons with the lifting device is not allowed.



5.6 Operating the lifting device and attachments (Multi Pilot)

F The Multi Pilot must only be operated while the driver is sitting on his seat. The driver must be instructed in the operation of the lifting device and attachments!

Push the Multi Pilot to the respective direction according to the hydraulic function.

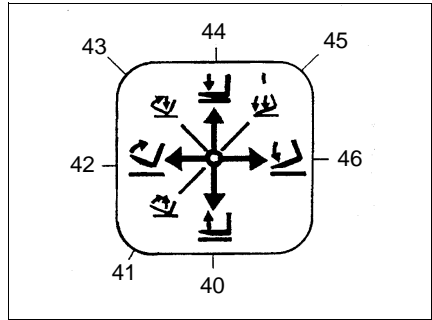


Lifting/lowering fork carrier

- Press Multi Pilot (8) to the back (40) to lift the fork carrier.
- Press Multi Pilot (8) to the front (44) to lower the fork carrier.

Inclining of hoist frame

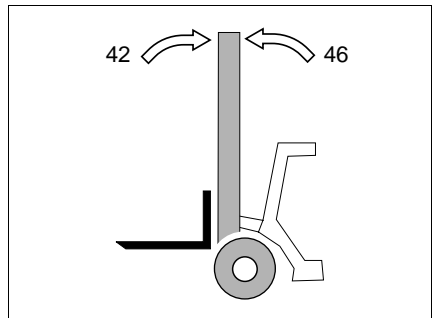
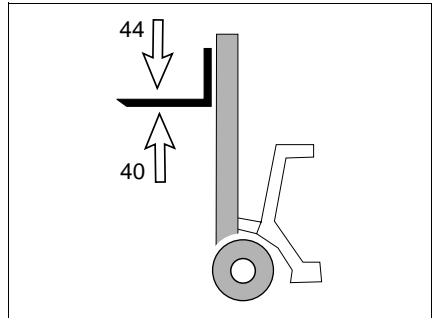
F Keep your body parts out of the gap between mast and front wall when inclining the mast backward.



- Press Multi Pilot (8) to the left (42) to incline the hoist frame to the back.
- Press Multi Pilot (8) to the right (46) to incline the hoist frame to the front.

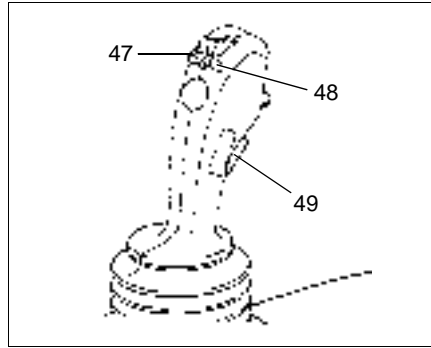
Combined function

- In order to lower the fork carrier and to incline the hoist frame forward at the same time, push Multi Pilot forward and to the right (45).
- In order to lift the fork carrier and to incline the hoist frame to the back at the same time, push Multi Pilot back and to the left (41).
- In order to lower the fork carrier and to incline the hoist frame backward simultaneously, push Multi Pilot forward and to the left (43).



**Additional Control I
(Integrated side shifting device)**

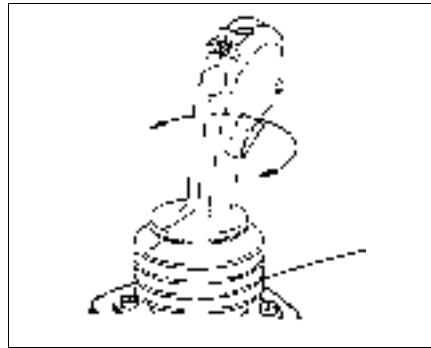
- Press key (47) on the Multi Pilot to push fork carrier to the left.
- Press key (48) on the Multi Pilot to push fork carrier to the right.



Additional control II

Z The Multi Pilot can be turned for the operation of a hydraulic attachment. When operating attachments the operating instructions of the respective suppliers have to be observed.

F Observe load capacity of the attachment.



Additional control III

Press key III (49) on the Multi Pilot for the additional control (e.g. locking mechanism).

Speed control of the attachments

The speed of the hydraulic cylinders is controlled by the excursion of the Multi Pilot.

When the control lever is released, it jumps back to neutral position automatically and the attachment remains in the current position.

M Use control lever very sensitively and do not jerk it. When the stop of the attachment is reached, let Multi Pilot loose immediately.

F Lifting persons with the lifting device is not allowed.



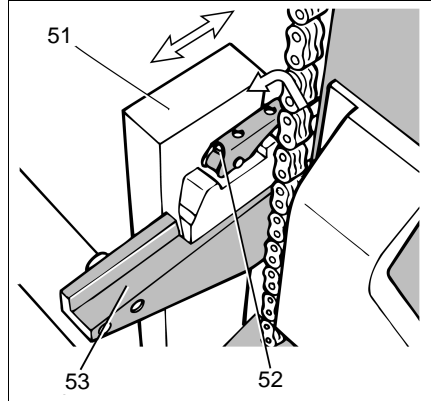
5.7 Picking up, transporting and setting down of loads

M Before a load unit is taken up the driver has to make sure, that it is correctly palettised and that the load capacity of the truck is not exceeded. Observe capacity label!

Adjusting fork tines

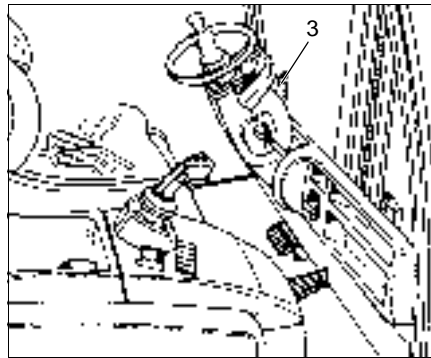
F The fork tines must be adjusted so that both tines have the same distance to the outer edges of the fork carrier. The load centre must be centred between the fork tines.

- Swivel locking lever (51) upward.
- Push fork tines (52) on the fork carrier (53) to the correct position.
- Swivel locking lever downward and push fork tine until it is arrested in the groove.

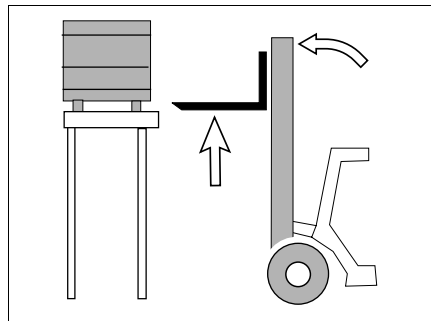


Taking up load

- Drive carefully close to the load to be lifted.
- Pull parking brake (3).



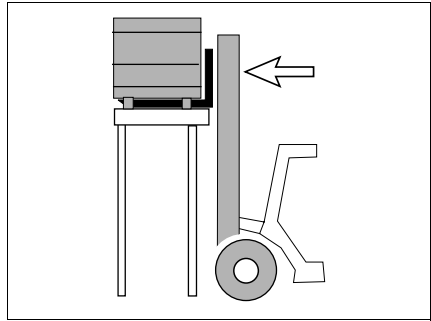
- Put hoist frame into vertical position.
- Lift fork tines to the correct height of the load.



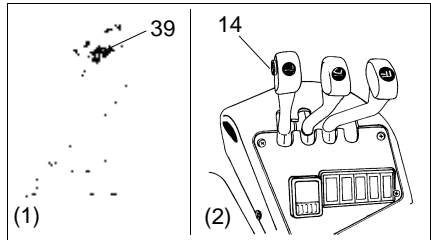
- Drive the truck with the fork tines as far as possible below the load unit.

F The fork tines must be under the load with at least two third of their lengths.

- Pull parking brake (3). Lift fork carrier until the load is lying freely on the fork tines.
- Switch driving direction switch (39/14) to reverse driving and release the parking brake.

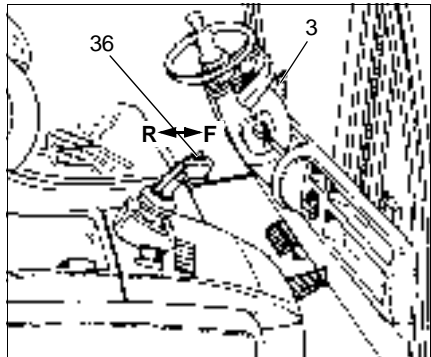


M Depending on the truck type, the driving direction switch can be located at the Multi Pilot, (figure 1), or at the Solo Pilot, (figure 2).



F Make sure that the way to the rear is free from obstacles.

- Drive carefully backward until the load is outside of the storage area.

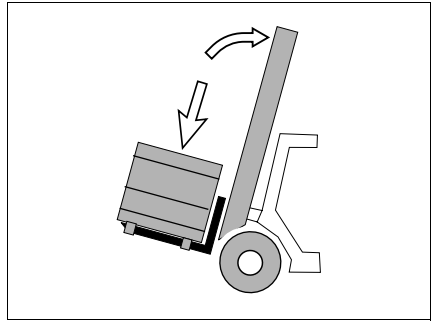


F Persons are not permitted to stay underneath the lifted load!
Do not put your hands through the hoist frame.

- Incline hoist frame carefully backward.
- Lower the load as far as possible for the transport (road clearance approx. 5.9...7.9 in (150...200 mm)).



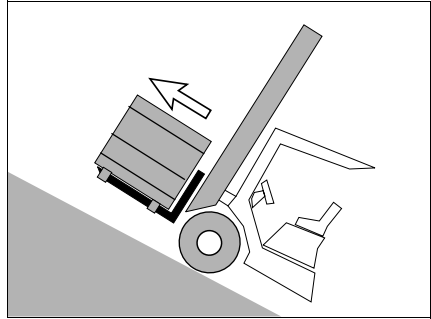
F When moving loads the hoist frame must be inclined backward and the fork tines must be lowered as far as possible.



Transporting a load

F If the load is stacked so high that the view in forward direction is impeded, you have to drive backward.

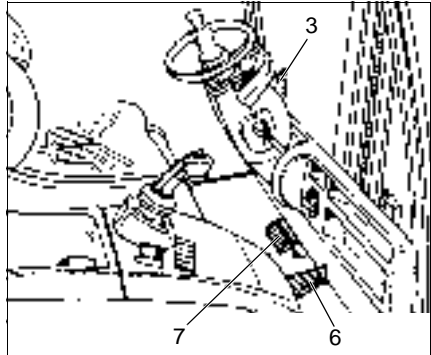
- Accelerate truck carefully with the accelerator pedal (6). Decelerate the truck carefully by means of the brake pedal (7). Make sure that you can stop the truck at any time.
- Choose the speed with respect to the conditions of lanes and the load to be moved.
- Observe other traffic at crossroads and passages.
- Use the help of a second person if areas are unclear.



F When negotiating slopes and inclines the load must always be carried at that end of the truck facing uphill. U-turns and cutting obliquely over inclines or slopes is not permitted.

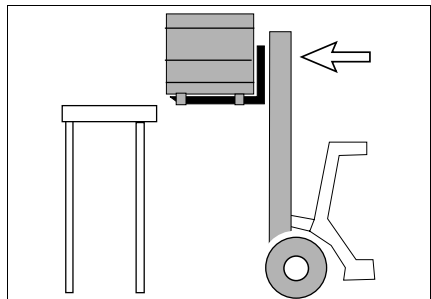
Setting down a load

- Drive the truck carefully to the load.
- Pull parking brake (3).
- Put hoist frame in vertical position.
- Lift fork tine to the correct height of the load suspension device.
- Release parking brake.
- Drive the fork tines carefully below the load carrying device.
- Lower the tines slowly until they come free.



M Avoid pancaking the load, in order to prevent damaging the load and the load lifting device.

F Bending forward with lifted load-carrying unit only in front of or above the stack.



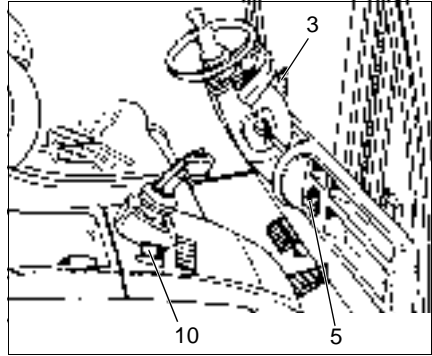
5.8 Safe parking of the truck

F If the truck is left unattended, even for only short periods of time, it must be rendered safe.

- Driving the truck on even ground.
- Pull parking brake (3).
- Lower forks completely and incline hoist frame forward.

F Never park the truck or leave it unattended while a load is lifted.

- Press down the master switch (10).
- Switch the key in the key switch (5) to position „0“.
- Remove the key from the key switch (5).

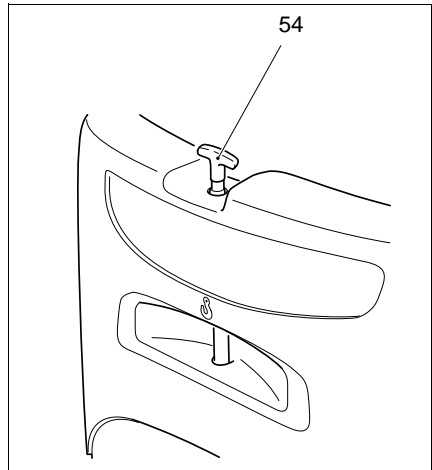


5.9 Trailer towing

The truck may be used for occasional towing of trailers on dry, level and smooth surfaces.

Coupling the trailer

- Push the socket pin (54) down and turn it by 90 degrees.
- Pull the socket pin upward and insert the trailer drawbar into the opening.
- Insert the socket pin, push it down, turn it by 90 degrees until it engages.



5.10 Trailer loads

M The driver must make sure not to exceed the maximum permissible trailer load prior to coupling the trailer.

Maximum trailer load

Truck	Dead weight	Pulling force	Trailer loads
	(kg)	(N)	(kg)
EFG 213n	2800	9100	8400
EFG 215n	2990	9100	8970
EFG 216kn	2990	9100	8970
EFG 216n	3185	9100	9555
EFG 218kn	3100	8800	9300
EFG 218n	3170	8800	9510
EFG 220n	3205	8700	9615

6 Fault location

This chapter enables the operator to locate and rectify minor faults and malfunctions, or the effect of operating errors. The order of the work stated in the table must be observed for fault location.

Fault	Possible cause	Remedy
Truck does not move	– Battery connector not connected	– Check the battery connector and connect if necessary
	– Master switch depressed	– Unlock main switch
	– Key switch in position „0“	– Set the key switch to position „I“
	– Battery exhausted	– Check the charging condition of the battery and recharge if necessary
	– Faulty fuse	– Check fuses
Load cannot be lifted	– Truck not operative	– Perform all remedial actions listed under the fault "Truck does not move"
	– Hydraulic oil level too low	– Check hydraulic oil level
	– Faulty fuse	– Check fuses

M If it is not possible to rectify the fault by performing the indicated „remedial actions“, please contact the Customer Service, as more intricate faults can only be rectified by specially trained and qualified service personnel.

6.1 Temperature monitoring

If one of the temperature switches emits the appropriate signal, the performance of the truck will be reduced in relation to the temperature development:
while driving in the low-speed mode,
with the hydraulic function „Half lifting speed“ being activated,
with the control function „Permanent performance adjustment“ being activated.

F Maintenance of the truck

1 Operating safety and environmental protection

The checks and servicing operations in this chapter must be performed in accordance with the intervals as indicated in the servicing checklists.



Modifications of floor conveyor assemblies, especially of the safety installations, are not permitted. On no account must the operating speeds of the floor conveyor be changed.



Only original spare parts have been passed by our quality assurance service. To ensure safe and reliable truck operation, only spare parts of the manufacturer must be used. Old parts, oils and fuels must be disposed of in accordance with the applicable environmental protection regulations. The Oil Change Service of the manufacturer is available for oil changes.

Upon completion of any checks and servicing activities, the operations contained in the section "Recommissioning" must be performed (refer to chapter F).

2 Safety regulations applicable to truck maintenance

Servicing and maintenance personnel: The fork-lift truck must only be serviced and maintained by trained personnel of the manufacturer. The Service Organization of the manufacturer has service engineers available that have been specifically trained for these tasks. We therefore advise to conclude a maintenance contract with the manufacturer's Service Base responsible for the area.

Lifting and jacking up: When a fork-lift truck is to be lifted, the lifting gear must only be secured to the points specially provided for this purpose. When the truck is to be jacked up, suitable measures must be taken to prevent the truck from slipping or tipping over (use of chocks, wooden blocks). Work underneath the raised load lifting device must only be carried out when the fork is immobilised and supported by a chain of adequate strength.



When work has to be performed under the raised fork or under the jacked up truck, suitable measures must be taken to prevent any dropping, tilting or slipping of the fork or truck. When lifting the truck, the instructions contained in chapter „Transportation and commissioning“ have to be observed. When performing work on the parking brake, the truck must be secured against moving.

Cleaning operations: No inflammable liquids must be used when cleaning the industrial truck. Prior to the commencement of cleaning operations, all safety measures have to be taken as are required to prevent sparking (e.g. by short-circuits). The battery plug must be disconnected. Only weak indraft, weak compressed air and non-conducting, antistatic brushes must be used for the cleaning of electric or electronic assemblies.



If the fork-lift truck is to be cleaned using a water jet or a high-pressure cleaner, all electric and electronic components must be carefully covered beforehand because moisture can lead to incorrect functioning. Steamcleaning is not permitted.

Upon the completion of cleaning work the operations detailed in section „Recommissioning“ have to be performed.

Work on the electric system: Work on the electric system of the truck must only be performed by personnel specially trained for such operations. Before commencing any work on the electric system, all measures required to prevent electric shocks have to be taken.

For battery-operated fork-lift trucks, the truck must also be depowered by removing the battery plug.

Welding operations: To prevent any damage to electric or electronic components, these have to be removed from the fork-lift truck before any welding operations are undertaken.

Settings: When repairing or replacing hydraulic, electric or electronic components or assemblies, all truck-specific settings have to be retained.

Tire equipment: The quality of the tires greatly affects the stability and the driving behaviour of the fork-lift truck. Modifications must only be carried out after discussion with the manufacturer. When replacing wheels or tires, it must be ensured that the truck remains level (tires and wheels must always be replaced in pairs, i.e. left and right together).

Lift chains: The lift chains wear rapidly if not lubricated. The intervals stated in the service checklist apply for use in normal environment. For applications in aggravated conditions (dust, temperature), frequent re-lubrication must be performed. The specified chain spray must be used as specified. Applying grease to the outside and heavy external dirt accumulation prevent the lubricant to penetrate into the joints.

The chain tensioners must be adjusted in such a manner that they can adapt themselves to the pulling direction of the chain. Pretensioning the tensioner head against the mounting is not allowed. A minimum distance of 0.8 in (20 mm) must be kept.

Hydraulic hoses: The hoses must be renewed every six years. When replacing hydraulic components, you should also replace the hydraulic hose lines in the corresponding hydraulic system.

3 Servicing and inspection

Thorough and expert servicing is one of the most important preconditions for safe operation of the fork-lift truck. The neglect of regular servicing intervals can lead to fork-lift failure and constitutes a potential hazard to personnel and operation.



The indicated servicing intervals are based on single-shift operation under normal operating conditions. For applications in dusty environments, or involving large temperature fluctuations or multiple-shift operation, the servicing intervals must be shortened accordingly.

The following servicing checklist indicates the operations to be performed and the respective intervals to be observed. The servicing intervals are defined as follows:

W1 = every 50 operating hours, but at least once per week
M6 = every 1000 operating hours, but at least every 6 months
M12 = every 2000 operating hours, but at least every 12 months
M24 = every 4000 operating hours, but at least every 24 months



The maintenance intervals W1 are to be performed by the customer.

In the running-in phase of the truck, the following additional operations have to be carried out:

After the first 50 - 100 operating hours, after 2 months atl.:

- Tighten pole screws of battery and check condition of the cell connectors.
- Perform visual inspection of the electronic and mechanic components.
- Check brake fluid.
- Check brake system for leakage and for free installation of the brake lines.
- Check lift chains for equal tension.
- Check arresting and limitation of the fork tines.
- Check transmission for leakages.
- Check screw connections and mechanical safety retentions for tight fit.
- Check the wheel nuts for security and retighten, if required.
- Change hydraulic oil filter.

After the first 100 operating hours:

- Check the hydraulic connections for leakages and retighten, if required.

After change of hydraulic pump:

- Clean hydraulic system with rinsing aggregate and renew hydraulic oil.

4 Maintenance check list for EFG 213/215/216k/216/218k/218/220

		Maintenance intervals				
		Standard = ●	W	M	M	M
			1	6	12	24
Chassis/ superstruct.:	1.1	Check all load bearing elements for damage		●		
	1.2	Check all bolted connections		●		
	1.3	Check tow bar		●		
	1.4	Check overhead guard for damages and proper fixing		●		
	1.5	Check safety belt for damages and function	●			
	1.6	Check retaining system (option) for damages and function	●			
	1.7	Check if labels are present, readable, and valid		●		
	1.8	Check overhead guard seating for pre-tension and re-new, if necessary				●
Drive unit:	2.1	Check the transmission for noises and leakage		●		
	2.2	Check the transmission oil level		●		
	2.3	Check pedal mechanism and adjust and grease, if necessary		●		
	2.4	Change the gear oil (at least once every 12 months)		●		
Wheels:	3.1	Check for wear and damage	●			
	3.2	Check air pressure	●			
	3.3	Check seating and fixing l)		●		
	3.4	Renew grease filling of wheel bearings of the front and rear wheels and re-adjust wheel bearings.		●		
Steering:	4.1	Check hydraulic components for leakage and proper function b)		●		
Brake system:	5.1	Check for correct function and adjustment		●		
	5.2	Check the brake linkage; adjust and grease, if necessary		●		
	5.3	Check the brake lines, connections and brake fluid level		●		
	5.4	Change the brake fluid				●

Maintenance intervals				
Standard = ●	W	M	M	M
	1	6	12	24

Hydr. system:			Maintenance intervals			
			W	M	M	M
			1	6	12	24
	6.1	Check all connections for leakage and damage b)		●		
	6.2	Check aeration and deaeration filters at the hydraulic tank		●		
	6.3	Check the oil level		●		
	6.4	Check hydraulic cylinders for leakage, damage and secure attachment		●		
	6.5	Check the hose line for correct functioning and damage		●		
	6.6	Change filter cartridge (hydraulic oil and deaeration filter)		●		
	6.7	Change hydraulic oil				●
	6.8	Check the pressure relief valves for correct functioning			●	

b) Hydraulic connections to be first checked for leakage after approx. 100 operating hours; tighten, if necessary.

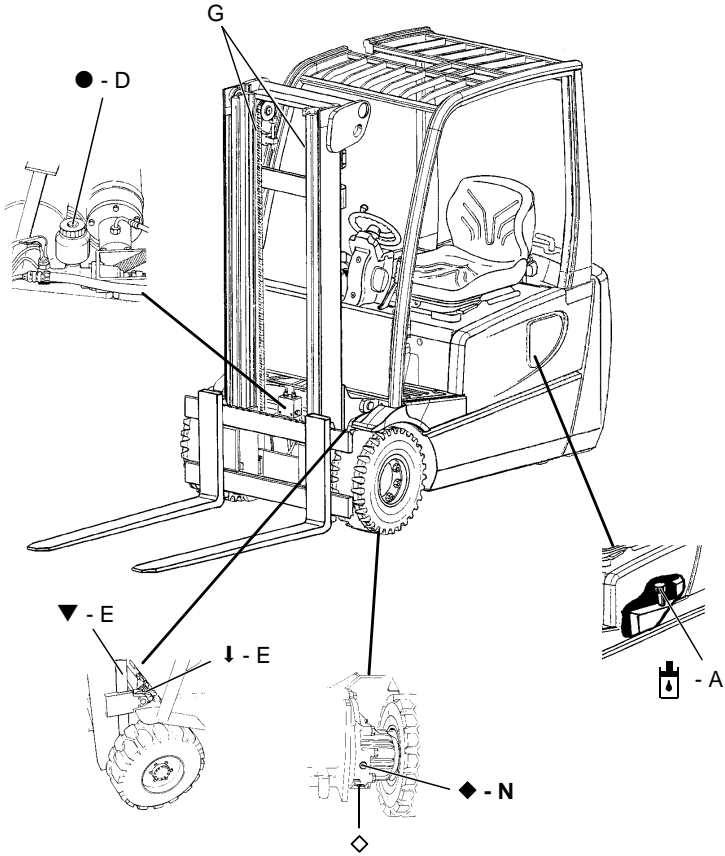
l) First check of the wheel nuts after approx. 50 operating hours for tight fit. Re-tighten if necessary.



The maintenance intervals refer to normal service conditions. In case of aggravated conditions, the intervals must be reduced as required.

			Maintenance intervals				
			Standard = ●	W	M	M	M
			1	6	12	24	
Electr. system:	7.1	Check the instrument and indicators for correct functioning	●				
	7.2	Check all cables for secure connection and damage		●			
	7.3	Check the cable runs for correct functioning and damage		●			
	7.4	Check functioning of warning devices and safety circuits		●			
	7.5	Check contactors and replace wearing parts, if necessary		●			
	7.6	Check the fuses for correct amperage				●	
	7.7	Clean impulse control				●	
Electric motors:	8.1	Check wear of carbon brushes		●			
	8.2	Check the motor for secure attachment		●			
	8.3	Suck out engine block, check wear of collector		●			
Battery:	9.1	Check the battery cables for damage and replace, if necessary	●				
	9.2	Check acid density, acid level and cell voltage	●				
	9.3	Check the terminals for secure attachment and apply pole grease		●			
	9.4	Clean battery connections, check for tight fit		●			
Hoist frame:	10.1	Apply grease to running paths and side run areas of idler pulleys in the hoist frame profiles.	●				
	10.2	Apply grease to all greasing points of the idler pulleys of the hoist frame and the fork carrier.	●				
	10.3	Check lift chains and chain guide for wear, adjust and grease them.		●			
	10.4	Lubricate lifting chains and chain guides.	●				
	10.5	Check secure attachment of hoist frame		●			
	10.6	Check bearing of inclination cylinder and fixing		●			
	10.7	Check fork tines and fork carrier for wear and damage		●			
	10.8	Visual check of rollers, slide pieces and stops		●			
	10.9	Check angle of inclination of hoist frame. Check uniform extension of both tilting cylinders.				●	
	10.10	Check mast play and adjust lateral play by means of shims, if necessary.				●	
General measurements:	11.1	Check the electrical system for a grounding fault. VDI 2511				●	
	11.2	Check driving speed and braking distance				●	
	11.3	Check lifting and lowering speed				●	
Demonstration:	12.1	Perform a trial run under a nominal load		●			
	12.2	Demonstrate the truck to a person charged with inspection upon completion of the maintenance of the truck		●			

5 Lubrication plan for EFG 213/215/216k/216/218k/218/220



- | | |
|-----------------------------|---------------------------|
| ▼ Slide faces | ◆ Filler neck gear oil |
| ↓ Grease nipple | ◇ Drain plug gear oil |
| 🔋 Filler neck hydraulic oil | ● Filler neck brake fluid |
| ☆ Drain plug hydraulic oil | |

5.1 Consumption type materials

Handling operating agents: Operating agents must always be used with regard to their proper usage and according to the manufacturer specifications.



Improper handling is injurious to health, life, and environment. Consumption type materials must be stored in adequate containers. They might be inflammable and, therefore, must not come into contact with hot components or open fire.

When filling in consumption type materials, use clean containers only. It is prohibited to mix consumption type materials of different grades or qualities, except if mixing is expressly prescribed in these operating instructions. This regulation may only be ignored if mixing is explicitly prescribed in these operating instructions.

Avoid spilling. Spilled liquid must be removed immediately using a suitable binding agent, and the mixture of consumption type material and binding agent is to be disposed of according to the regulations.

Code	Order-no.	Qty	Designation	Used for:
A	50062046	4.8 gal (18 l)	H-LPD 32 ¹⁾	Hydraulic system
	50023243		H-LPD 22 ²⁾	
	50124051		HV 68 ³⁾	
D	29201580	0.07 gal (0,25 l)	Brake fluid SEA J 1703 ⁴⁾ FMVSS 116 DOT 4 and DOT 4	Hydraulic brake system
E	50157382		Grease K-L 3N ³⁾	Front and rear wheel - wheel bearings
G	29201280		Chain spray	Chains
N	50124052	2 x 0.09 gal (2 x 0,35 l)	Gear oil ATF/Dex- ron-II D	Transmission

Grease standard values

Code	Type of Saponification	Drop point °F (°C)	Walkpenetration at 77°F (25 °C)	NLG1 Class	Service- temperature °F (°C)
E	Lithium	365 (185)	509 - 563 (265 - 295)	2	-31/+248 (-35/+120)

¹⁾ valid at temperature +23/+86 °F (-5/+30 °C)

²⁾ valid at temperature -4/+23 °F (-20/-5 °C)

³⁾ valid at temperature +86/122 °F (+30/+50 °C)

⁴⁾ Brake fluid DOT 4 should be favourably used.

6 Description of servicing operations

6.1 Preparation of the truck for servicing and maintenance operation

All required safety measures must be taken to prevent any accidents in the course of the servicing and maintenance operations. The following preparatory operations must be performed:

- Uncover batteries (see chapter D).

6.2 Open rear cover

- Remove two screws, push rear cover down and remove it.

The fuses, the hydraulic pump and the electric aggregates are now accessible.

6.3 Check fixing of the wheels

- Park the truck and render it safe (see chapter E).
- Tighten wheel nuts (1) cross-wise with a torque wrench.

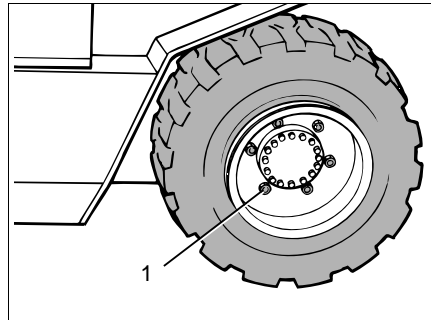
Torque

Driven wheels

$M_A = 125.4 \text{ ft/lb (140 Nm)}$

Rear wheels

$M_A = 110.6 \text{ ft/lb (135 Nm)}$



6.4 Desired condition of rear wheels

The rear wheels must not differ in diameter more than 0.6 inch (15 mm).

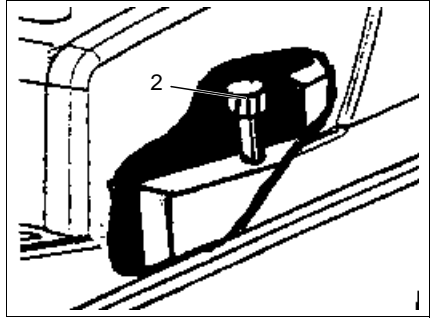
The tyres may only be replaced in pairs. Only tyres with identical make, type, and tread are allowed.

6.5 Check hydraulic oil level



The load lifting device must be completely lowered.

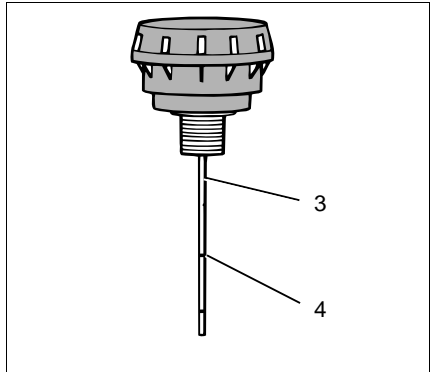
- Prepare truck for maintenance and service operations.
- Unscrew air cleaner with level plunger (2).



- Visual check of hydraulic oil level on the level plunger (3).



The reading of the hydraulic oil level must be at the upper mark (4) when the tank is sufficiently filled.



- If required, top up with hydraulic oil until the prescribed filling level is reached (0.4 in (10 mm) at the dipstick (3) correspond to approx. 0.26 gal (1 l) hydraulic oil).



Do not fill hydraulic tank higher than the upper mark. This can cause disturbances and damage of the system.

Changed consumption type materials must be disposed of in accordance with the applicable environmental protection regulations.

6.6 Check the transmission oil level



Gear oil must not run into the ground. To prevent this, put an oilpan underneath the gear box.

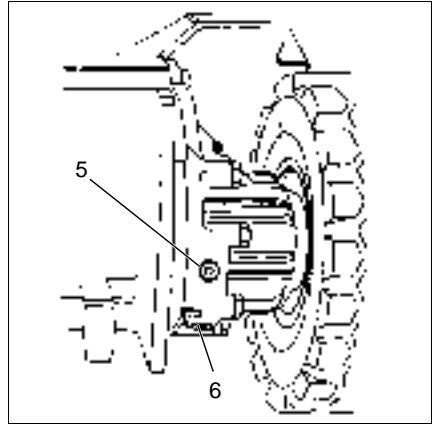
- Park the truck and render it safe (see chapter E).
- Unscrew oil filler screw (5).
- Check the gear oil level and top up, if required.



The filling height must reach the lower edge of the oil filler opening.



Changed consumption type materials must be disposed of in accordance with the applicable environmental protection regulations.



6.7 Let off oil

- Let off oil at service temperature.
- Use an oil pan.
- Unscrew waste oil screw (6) and let off gear oil.

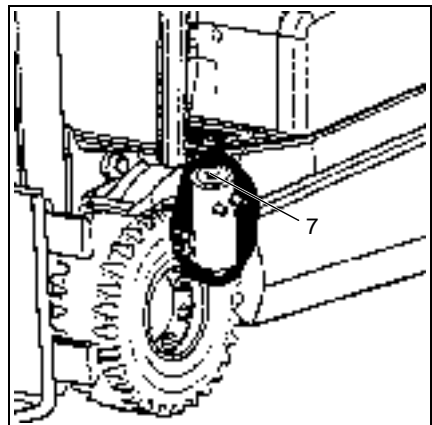
6.8 Refill oil

- Screw in waste oil screw.
- Fill in fresh gear oil with the oil filler screw (5) unscrewed.

6.9 Changing of hydraulic oil filter

The hydraulic oil filter is located at the left side of the tilting cylinder and is accessible when the bottom plate is removed.

- Unscrew the closing cap of the hydraulic filter (7).
- Change filter cartridge; if the O-ring is damaged, it must also be changed. Lubricate O-ring slightly when installing the filter.
- Screw in closing cap again.

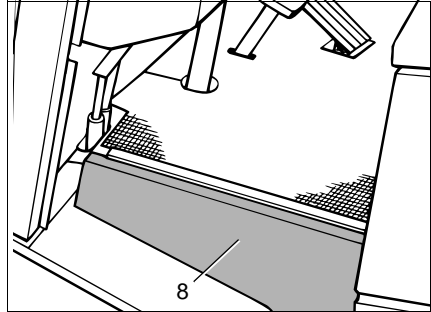


6.10 Checking the brake fluid



Brake fluid is poisonous and must only be stored in closed original containers.

- Park the truck and render it safe (see chapter E).
- Remove floor mats.
- Unscrew fixing screw and remove bottom plate (8).



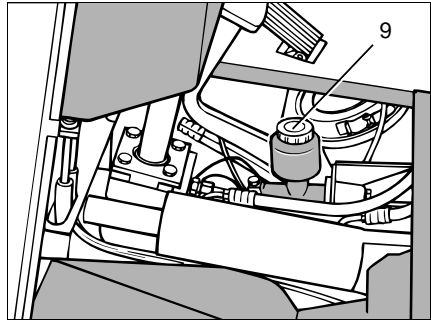
- Visually check the brake fluid level at the equalizing reservoir for the brake fluid (9) and top up with brake fluid, if necessary.



The brake fluid level must be visible between the marks „Min.“ and „Max.“.



Changed consumption type materials must be disposed of in accordance with the applicable environmental protection regulations.



6.11 Safety belt maintenance

Daily inspections of the condition and operability of the safety belt should be carried out by the driver before using the industrial truck. A malfunction can only be detected at an early stage by regular inspection.

- Pull belt out completely and check on unravelling
- Check operability of belt lock and faultless drawing in of the belt into the winder
- Check cover on damages

Automatic blocking system test:

- Park industrial truck horizontally
- Pull out belt jerky



The automatic system must block the belt.

- Open hood by approx. 30 degree



The automatic system must block the belt



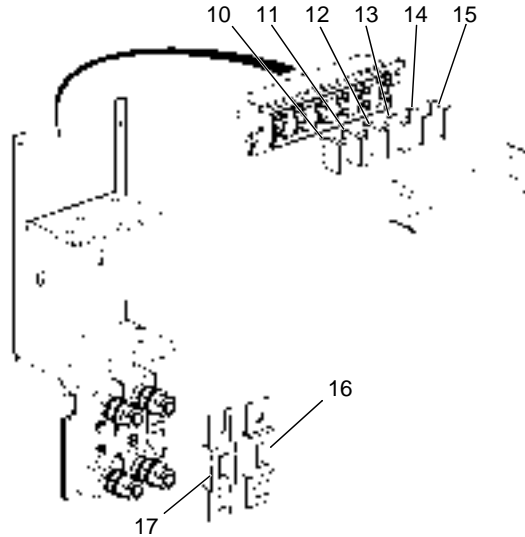
Do not operate industrial truck with defective safety belt but have it replaced immediately!

6.12 Checking the electric fuses

- Preparation of the truck for servicing and maintenance operation.
- Open rear cover.
- Unscrew cover (11).
- Check fuses according to table for correct rating and damage.



In order to prevent damage to the electric system, only fuses with the respectively specified ratings must be used.



Item	Description	Circuit	Rating / Type
10	A F3.1	Voltage transformer supply relay StVZO	10 A
11	B F3.1	Voltage transformer supply relay StVZO	10 A
12	C 5F3	Reversing light	10 A
13	D 5F2	Transformer control fuse	10 A
14	E 4F1	Horn control fuse	10 A
15	1 F	Electronic system control fuse	10 A
16	F1	Drive motor	355 A
17	2F1	Pump motor	250 A

6.13 Recommissioning the truck

Recommissioning of the truck following the performance of cleaning or maintenance work is permitted only after the following operations have been performed:

- Check the horn for proper functioning.
- Check the main switch for correct function.
- Check the brake for correct function.

7 Decommissioning the truck

If the floor conveyor is to be decommissioned for more than two month, it must be parked in a frost-free and dry location and all measures to be taken before, during and following decommissioning must be performed as detailed below.



During decommissioning, the floor conveyor must be jacked up ensuring that the wheels are clear of the ground. Only this measure will ensure that wheels and wheel bearings do not suffer damage.

If the truck is to be decommissioned for more than 6 months, additional measures must be discussed with the Service Department of the manufacturer.

7.1 Operations to be performed prior to decommissioning

- Thoroughly clean the floor conveyor.
- Check the brakes.
- Check hydraulic oil level and refill, if necessary.
- Apply a thin film of oil or grease to all parts not protected by a paint coating.
- Grease truck according to lubrication schedule.
- Recharge the battery (see chapter D).
- Disconnect and clean the battery. Apply pole grease to the battery terminals.



In addition to this, all instructions as given by the battery supplier have to be observed.

- Spray all exposed electrical contacts with a suitable contact spray.

7.2 Measures to be taken during decommissioning

Every 2 months: Recharge the battery (refer to chapter D).



For battery-driven floor conveyors:

Regular recharging of the battery is very important. Otherwise, excessive depletion of the battery would occur caused by self-discharging, which will result in the destruction of the battery caused by sulphatization.

7.3 Recommissioning the floor conveyor

- Thoroughly clean the floor conveyor.
- Grease floor conveyor according to lubrication plan
- Clean the battery. Grease the terminal screws using pole grease and reconnect the battery.
- Recharge the battery (see chapter D).
- Check if the transmission oil contains condensed water and change, if required.
- Check if the hydraulic oil contains condensed water and change, if required.
- Start up the floor conveyor (refer to chapter E).



For battery-driven floor conveyors:

If switching troubles are experienced in the electric system, spray the exposed contacts with contact spray and remove any oxide layer on the contacts of the operating controls by repeated operation.



Upon recommissioning of the truck perform several brake tests immediately.

8 Safety checks to be performed at regular intervals and following any untoward incidents

At least once yearly, or after any special incident, the floor conveyor has to be checked by a qualified inspector. The inspector must assess the condition of the truck from a standpoint purely concerned with safety aspects, uninfluenced by any company or economic circumstances. The inspector must be adequately informed and experienced to be able to assess the condition of the floor conveyor and the effectiveness of the safety installations based on the technical rules and principles governing the inspection of floor conveyors.

The inspection must comprise a comprehensive check of the technical condition of the floor conveyor with regard to accident prevention aspects. Apart from this, the floor conveyor must be thoroughly inspected for damage possibly caused by incorrect use of the floor conveyor. The inspection results must be recorded in an inspection report. The report must be kept available for a period spanning at least the next two inspection intervals.

The user has to ensure that all defects are eliminated without delay.

