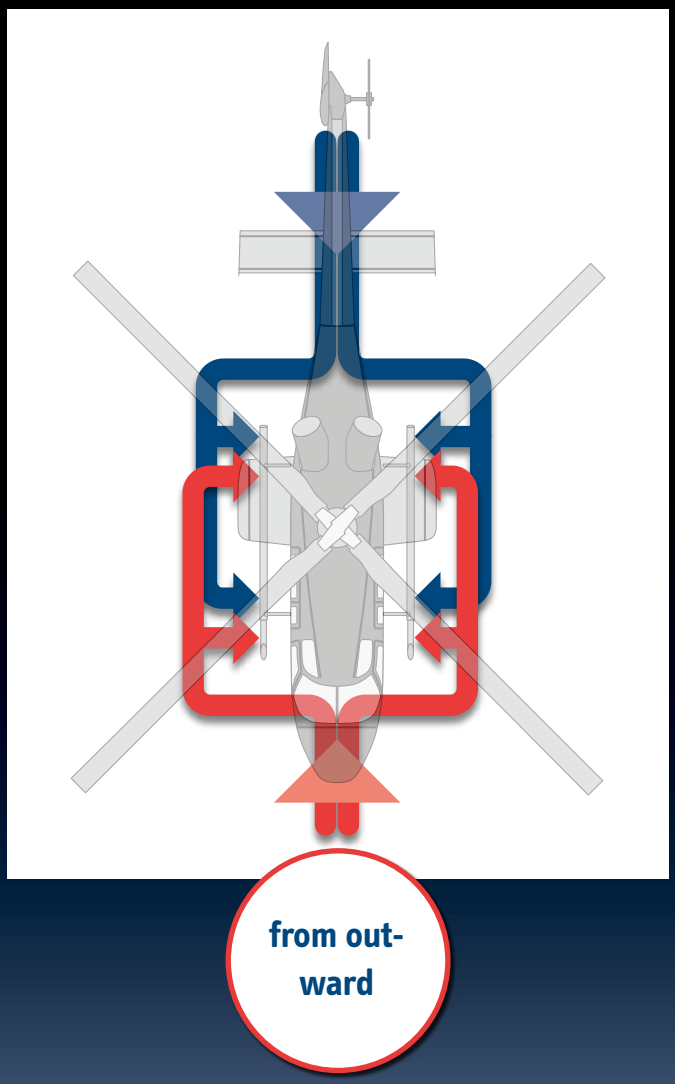
helimo®

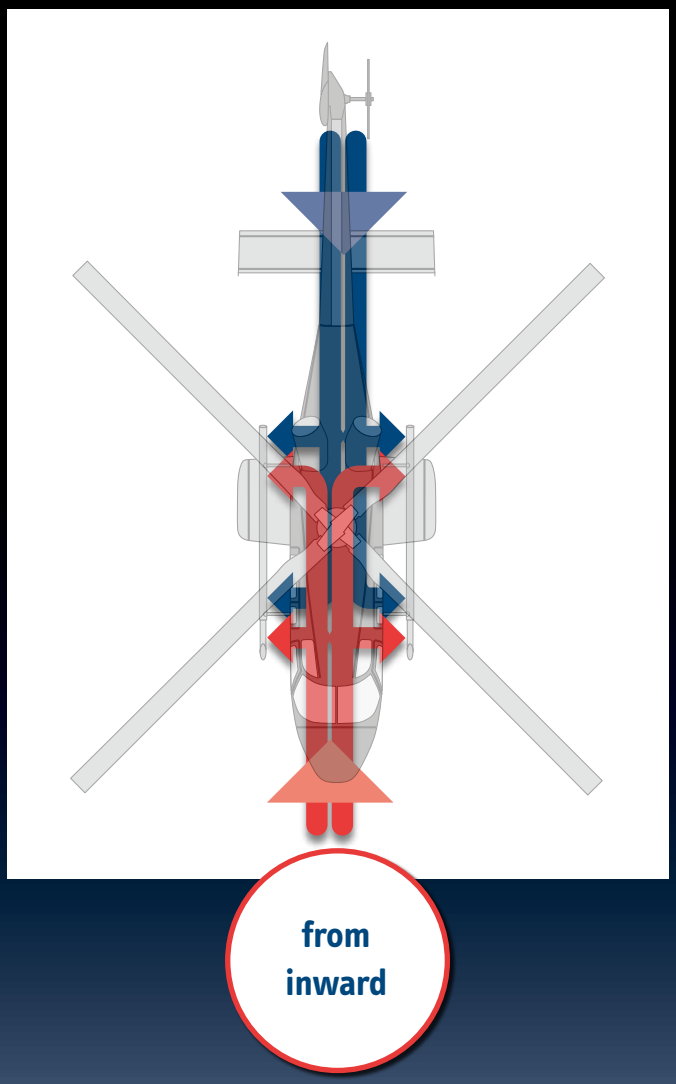
Technical fact sheet
helimo IV

mototok®
easy moving

Maximum Flexibility:
Eight principle ways of loading helicopter.

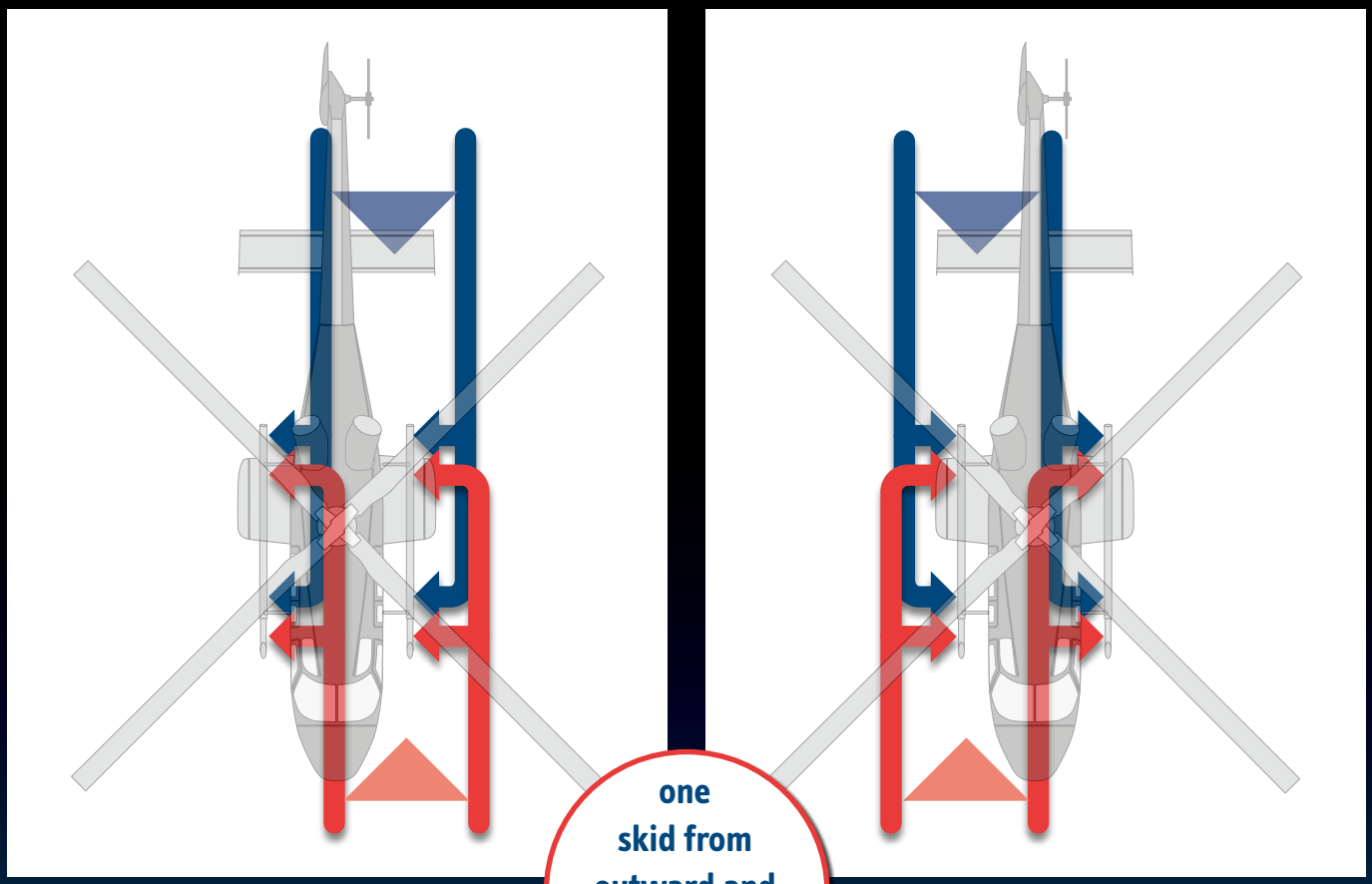


from out-
ward



from
inward

respectively → from the front or → from the back



one skid from outward and one from inward

Methods of loading a helicopter with skids
(depends on mounted systems below the helicopter)

	loading from INSIDE		loading from OUTSIDE	
	loading from behind	loading from front	loading from behind	loading from front
floats	X	X	X	X
landing lights inside	X		X	X
loudspeaker inside	X		X	X
winch inside / outside	X	X	X	X
downlink antenna			X	X
wire strike protection system	X	X	X	X
radar			X	X
weapons	X	X		
flir system			X	X
snow skis			X	X

Technical Data

HELIMO IV		
Use for		**skidded helicopter** 
lifting capacity		6 t 13228 lbs
dimensions / overall max	lenght	6800 mm 267.72 inch
	width	5760 mm 226.77 inch
	height	650 mm 25.59 inch
dimensions / overall min (load area)	lenght	6600 mm 259.84 inch
	width	2300 mm 90.55 inch
	height	250 mm 9.84 inch
length of the extension arms		3960 mm 155.91 inch
cantilever arms	lenght	300 mm 11.81 inch
	width	150 mm 5.91 inch
Ground clearance		100 mm 3.94 inch
unladen weight		2.7 t 5952 lbs
voltage		48 V
Speed		6 km/h 3.73 mph
Tyres: Puncture-proof tyres		
Radio remote control (with safety features, waterproof, certification of conformity), worldwide safety approval, including airports (TÜV certified)		TÜV CERT
24/28V Groundpower inclusive for engine start and updates		
Yellow flashlight inclusive		
Mistakes and technical alterations reserved / Date 02.2013		

Mode of operation:

The HELIMO has two 4-metre long forks, like those on a fork-lift truck. The device is driven underneath the helicopter from in front or behind or driven up next to the helicopter with the forks right and left. The forks are lowered by means of a hydraulic system. The forks are here lowered until they are just above the ground. With the aid of two hydraulic cylinders, the forks (each fork separately) are driven up to the helicopter skid. With four skid clamps, applied by hand, which can be hung over the whole length of the fork, the skid is pressed against the supports onto the adjustable rubber on the fork. Since the skids are gripped from the inside or the outside and lifted, floats, antennae, floodlights, camera pods or other attachments on the skid landing gear or any equipment attached underneath the helicopter can remain in position. For lifting, the forks and the landing gear of the helicopter, which is fastened to the forks, are raised again hydraulically by pressing the remote control button. The HELIMO has a load-bearing capacity of 5.5 t (12,125 lbs).

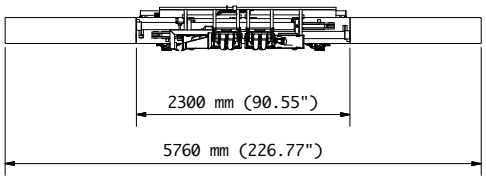
Technical information

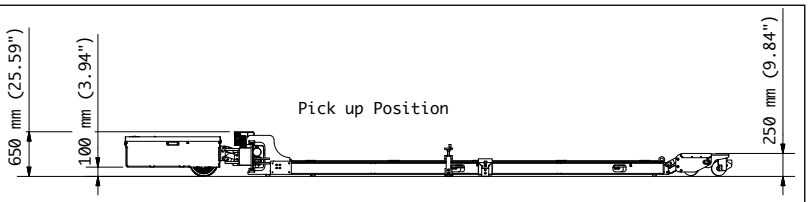
Dimensions of the machine
Length: 6600 mm (259.84") with expanded cantilever arms
6800 mm (268") with folded cantilever arms
Width: 2300 mm (90.55") when starting, 5760 mm (226.77") when deployed
Height: fork chassis 248 mm (10"), drive end 481 (19") mm
Weight: 2700 kg (5952 lbs)

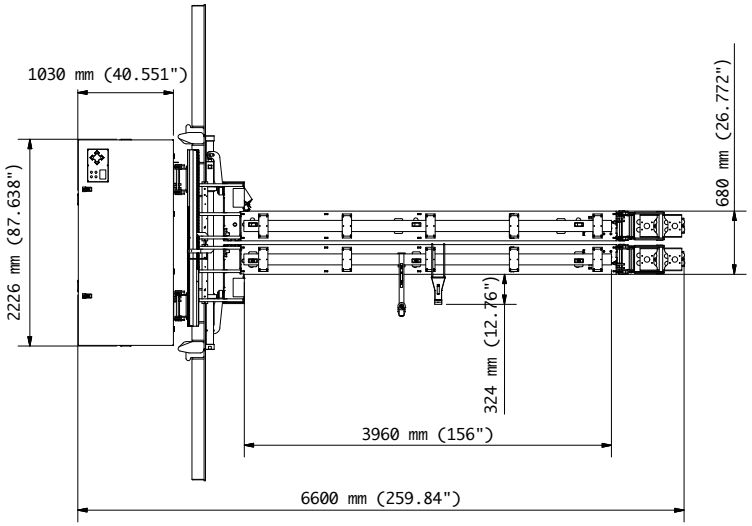
Drives and braking system:
All devices are driven by electro-gear hub drives with a start-up torque of up to 6000 Nm. Steering is by means of the two variable-speed electro-motors. The drives are governed by two micro-processor controllers. These contain complex software which took 6 years to develop so that all drive conditions are covered, in particular for towing aircraft. The device stops immediately if there is a malfunction in the wiring, in the remote control or in one or both of the controllers.

Batteries and ground power supply:
Power supply for almost all Mototok vehicles is achieved by means of maintenance-free, cycling-resistant lead gel accumulators, which, when used correctly, allow for more than 700 full discharges. This means an approximate life of 5 to 6 years with normal air traffic. A special high-frequency charger is responsible for charging, making it possible for 80% of battery capacity to again be available after four hours' loading time.
All Mototoks can be used as GPUs (Ground Power Units) i.e. they deliver the ground-power current for starting the propulsion units up to 1200 A 120 seconds at 25.6 V. This power supply can also be used for updates to on-board electronics.

Dimensions



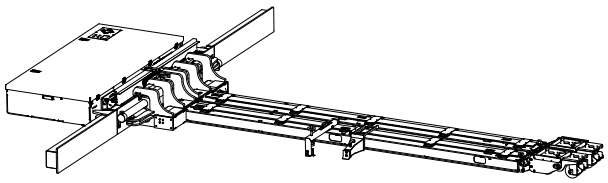




Ausleger Hub / arm approx.: 160 mm (6.3")
Ausleger max. Breite / arm width max: 3828 mm (150.7")

Abmessungen ohne Antenne, Handgriffe, etc.
Dimensions without Antenna, Hand grips, etc.

Änderungen vorbehalten
Subject to change without prior notice



Batteries

mototok	helimo IV
Batteries (maintenance-free, deep cycle gel batteries)	4 batteries x 12 V / 200 Ah

Nominal Voltage	12 V
Nominal Capacity C_{20} | 1,75V/C | 20°C	200 Ah
Discharge current I_{20}	10000 A
Max. load with suitable matching contacts	approx. 770 A
Length	518 mm
Width	274 mm
Height up to top cover	216 mm
Height over Terminals	242 mm
Weight	approx. 70 kg
Internal resistance acc. to IEC 896-2	3,5 Ohm
Short circuit current acc. to IEC 896-2	3606 A
Terminal	A-Terminal

Constant current discharge

1,85 V/C Discharge in A at 20°C	
5'	329,0
10'	274,0
20'	196,0
30'	160,0
1h	104,0
3h	46,5
5h	31,0
8h	20,4
10h	16,7

1,80 V/C Discharge in A at 20°C	
5'	381,0
10'	313,0
20'	222,0
30'	176,0
1h	110,0
3h	48,5
5h	32,0
8h	21,1
10h	17,3

1,75 V/C Discharge in A at 20°C	
5'	437,0
10'	349,0
20'	237,0
30'	183,0
1h	115,0
3h	49,7
5h	32,3
8h	21,5
10h	17,7

1,70 V/C Discharge in A at 20°C	
5'	486,0
10'	380,0
20'	251,0
30'	191,0
1h	117,0
3h	50,6
5h	32,8
8h	21,8
10h	17,7

1,65 V/C Discharge in A at 20°C	
5'	531,0
10'	395,0
20'	262,0
30'	198,0
1h	120,0
3h	51,0
5h	30,6
8h	19,1
10h	15,3

1,60 V/C Discharge in A at 20°C	
5'	581,0
10'	411,0
20'	269,0
30'	202,0
1h	121,0
3h	51,1
5h	30,6
8h	19,1
10h	15,3

Constant power discharge

1,85 V/C Discharge in W/bloc at 20°C	
3'	4690,0
5'	4102,0
10'	3449,0
15'	2843,0
20'	2375,0
30'	1800,0
45'	1408,0
60'	1135,0
90'	875,0

1,80 V/C Discharge in W/bloc at 20°C	
3'	5268,0
5'	4695,0
10'	3815,0
15'	3040,0
20'	2580,0
30'	1928,0
45'	1449,0
60'	1191,0
90'	912,0

1,75 V/C Discharge in W/bloc at 20°C	
3'	5932,0
5'	5092,0
10'	3941,0
15'	3201,0
20'	2700,0
30'	2002,0
45'	1484,0
60'	1223,0
90'	933,0

1,70 V/C Discharge in W/bloc at 20°C	
3'	6350,0
5'	5446,0
10'	4034,0
15'	3302,0
20'	2774,0
30'	2048,0
45'	1512,0
60'	1245,0
90'	948,0

1,65 V/C Discharge in W/bloc at 20°C	
3'	6786,0
5'	5736,0
10'	4142,0
15'	3369,0
20'	2825,0
30'	2081,0
45'	1533,0
60'	1264,0
90'	959,0

1,60 V/C Discharge in W/bloc at 20°C	
3'	7189,0
5'	5957,0
10'	4218,0
15'	3413,0
20'	2860,0
30'	2104,0
45'	1548,0
60'	1279,0
90'	969,0

Motor / Braking System

Motor

The drive motors are permanent magnet motors that are fitted with revolution sensors. The cooling of the motors is effected by a fan wheel mounted on the armature. An additional continuous cooling comes from an external electrical cooling fan. This has the advantage that even at low revolutions a large flow of air is available to cool the coils. Moreover, the spools can cool down completely while the motor is stopped.

Typ	MTRAC11
Wheel Diameter	300 mm
Voltage	34 V
Power	2500 W
Nominal speed	5 Km/h
Gear Ratio	1/27
Isolation	Cl. F
Duty	S3 30%
Protection	IP44
Brake	12 Nm

Braking System

The Mototok has three braking systems:

- Regenerative braking system
- Deceleration by reversing direction
- Electromagnetic disc-brake System

The regenerative braking system is the main braking system. When decelerating, the drive motor is used as generator. The current produced is stored back into the batteries (additional load).

If the regenerative braking is not sufficient to bring the vehicle to a stop within the pre-set delay, a deceleration can be executed by reversing direction. The drive motors are hereby polarized by the controllers in the opposite direction and supplied with the necessary power.

At the moment when the electromotor comes to a stop, the electromagnetic disc brake is put into operation to block the drive. The switch-on delay is adjustable in the controllers by tenths of seconds.

The brake values are adjusted by a programming device which is plugged into the controller. This insertion may be done only by authorised persons.

Example of possible brake unit settings.

9	Dbrake	250 A
10	Nbrake	250 A
11	Fbrake	250 A
12	DBrkRamp	0.5 Sec
13	DBrkEnd	0.1 Sec
14	NBrkRamp	0.2 Sec
15	NBrkEnd	0.5 Sec

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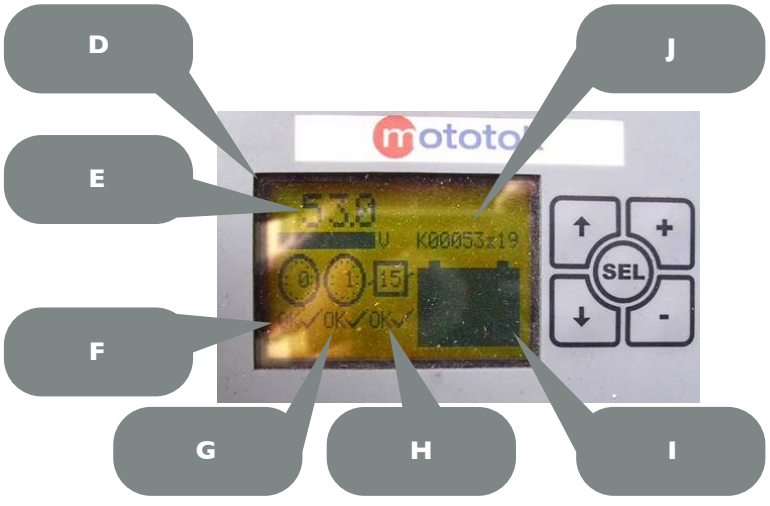
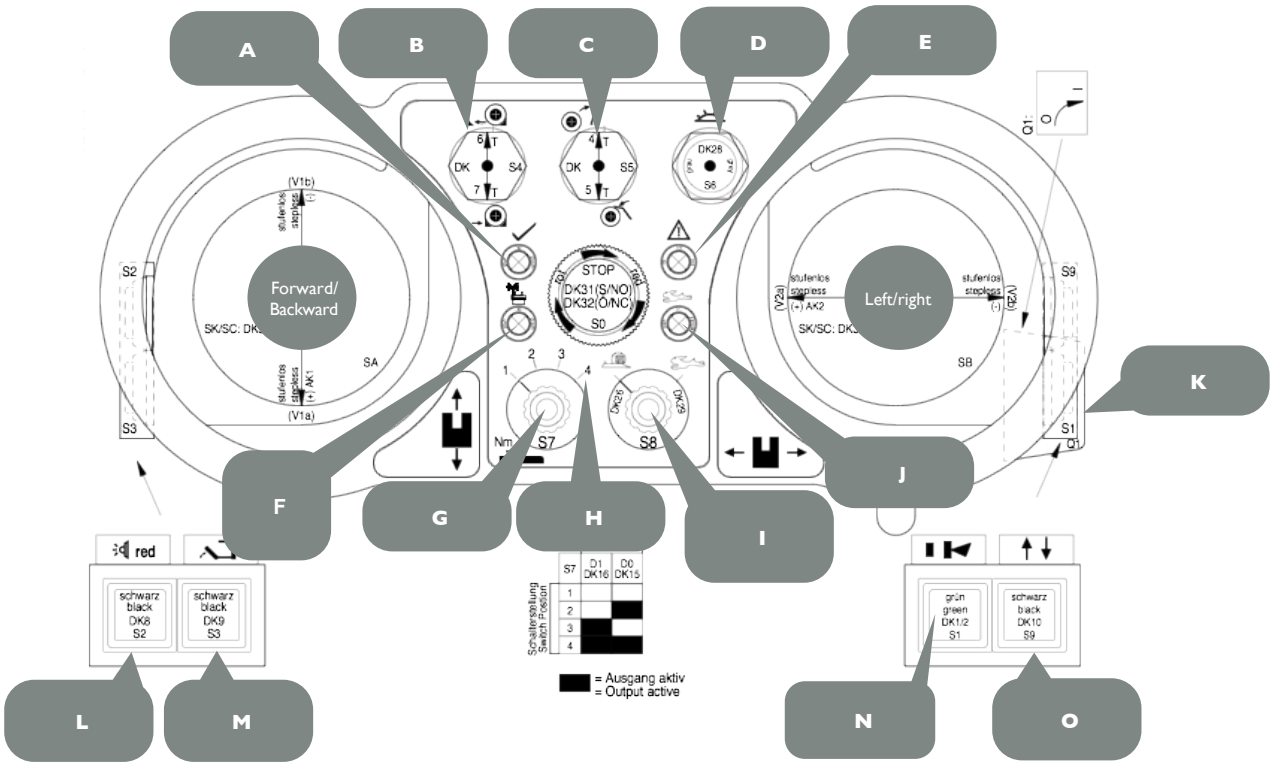
Panel

A. Emergency Stop
B. Driving direction indicator lights
C. Electric switch on/off
D. Display
E. Battery Voltage
F. Display of the left drive / Left drive error code
G. Display of the right drive / Right drive error code
H. Error code of the control board
I. Battery level
J. Operating time indicator



Remote Control



A. Green LED shows that the main instrument is switched on.

B. Switch for lateral movement of the left extension arm to the right or to the left.

C. Switch for lateral movement of the right extension arm to the right or to the left.

D. Touch switch for headlights and working lights.

E. Indicates the CANBUS set-up.

F. Green control light to indicate that the transmitter is connected to the receiver and is communicating (rapid blinking).

G. Rotary selection switch: The sensitivity of the steering joystick can be altered. Position 1 is the lowest sensitivity. The steering reacts sluggishly. Position 2, here the sensitivity is raised by a further 10%. Position 3, here the sensitivity is raised by 20%. Position 4, here the sensitivity is raised by 30%.

H. Rotary selection switch: Vehicles with automatic track guiding, all models. Rotary selection switch in position 4, track guiding system is switched on. Rotary selection switch in position 3, vehicle drives at the same speed as it does with track guiding, but without track guiding. Position 2, vehicle drives with lowered platform at normal fast speed and with raised platform at slow speed. Position 1 normal speed as preselected with switch I.

I. Rotary switch for setting the speed slow and fast (rabbit or snail)

J. Green control LED to indicate that the fastest speed has been selected.

K. On/off switch for remote control. By turning the black rotary knob the vehicle is switched on. The black rotary knob can be pulled out and is a key.

L. Button for the runner safety arm. When pressing the button, the receiver plate to which the runner safety arm is attached moves to left or right, depending on what position the receiver plate was in previously. The receiver plate stops at the factory default pressure.

M. Button for the runner safety arm. When pressing the button, the receiver plate to which the runner safety arm is attached moves to left or right, depending on what position the receiver plate was in previously. The receiver plate stops at the factory default pressure.

N. The green button must always be pushed after switching on the remote control. It is used for controlling the safety systems. The safety systems have to go through a function test before every start-up.

O. Button for lifting or lowering. The extension arms are lifted by clicking it twice within 0.5 seconds as you would a computer mouse button.

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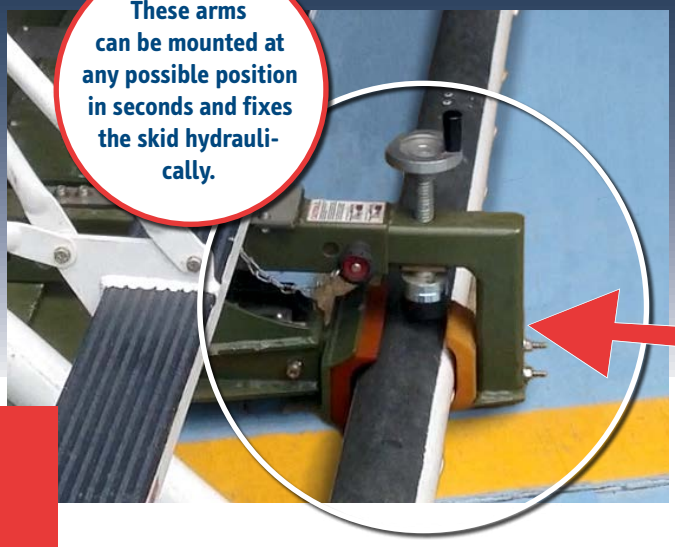
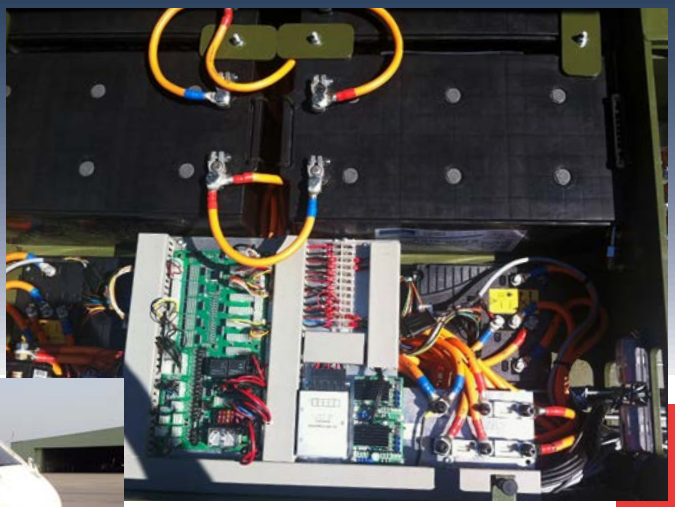
The Power of Engineering – Made in Germany



These arms can be mounted at any possible position in seconds and fixes the skid hydraulically.



Remote control the mototok from inside the Aircraft

mototok.

Big advance. Compact design.

About Mototok

With the Mototok, logistical tasks at Aircraft Production Line Facilities, MRO, FBO and Airport Operations can now be solved in more effective, safe and economical manner.

Whatever logistical requirement, the Mototok's ability to generate more space safely and precisely with the added advantage of a complete hands free connection to the nosewheel, hydro-pneumatic suspension system and a free roaming 100% visibility anywhere around the aircraft have put them in a class of their own.

Only the Mototoks can maneuver an aircraft's nose, tail section or wing just a few millimeters away from a hangar wall or the next aircraft body part. By simply applying the creeper snail mode speed feature on the remote control, the operator can slowly inch the aircraft safely and effectively to its final resting place in the production line, maintenance stand, hangar corner or parking area.

Mototok has primarily self-developed this innovative wireless transmission control dual-motor-principal technology which applies proven digital control engineering mostly used the automotive and truck industries.

Due to a decentralized alignment of the Mototok's standardized CAN bus components, the need of cable complexities is no longer an issue. Because of this unique ability, we have convinced the world's foremost Aerospace companies including AIRBUS, The BOEING Company, CASSIDIAN, DASSAULT, EMBRAER, BOMBARDIER and PILATUS who operate Mototoks in their day to day operations and know firsthand the major advantages they have to offer.

Learn more about Mototok at www.mototok.com.

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