snorkel

400S



CE

OPERATOR'S MANUAL

ANSI/CSA/CE/AS/NZS
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General Specifications

Aerial Platform

Working height	46' (14.02 m)
Maximum platform height	40' (12.19 m)
Horizontal reach	35' (10.66 m)
Main boom	
Articulation	-16° to +72°
Extension	15' (4.57 m)
Turntable rotation	360° continuous
Turning radius, outside	16' 5" (5.0 m)
Turning radius, inside	6' 9" (2.05 m)
Tail swing	34.5" (87.6 cm)
Wheelbase	7' 7" (2.3 m)
Ground clearance	12.5" (31.75 cm)
Maximum wheel load	7,060 lb (3,209 kg)
Maximum ground bearing pressure	75 psi (5.22 kg/cm²)
Maximum distributed floor load	247 psf (1,205 kg/m²)
Tread contact patch	94.75 in² (611 cm²)
Level sensor setting – ANSI/CSA	5 degrees
Level sensor setting – CE/AS/NZS	
Dual capacity	5 degrees
Single capacity	3.5 degrees
Weight, EVW approximate	15,470 lbs (7,032 kg)
Maximum allowable manual force (side pull)	
Per occupant	45 lb (200 N)
Maximum allowable manual force (side pull)	
Two occupants total	90 lb (400 N)
Width	
Overall width	7' 7" (2.31 m)
Transport width – wheels flipped	6' 10" (2.08 m)
Stowed length	
Overall length	24' 10" (7.56 m)
Transport length	24' 10" (7.56 m)
Stowed height	7' 10" (2.38 m)

Platform

Dimensions	
Standard	39" x 96" (99 cm x 243 cm)
Rated load capacity, standard unrestricted	600 lb (272 kg)
Rated load capacity, restricted	1,000 lb (454 kg)
Rotation	150 degrees
Maximum number of occupants	2 people
Optional AC generator	110 V
Optional AC generator	208 V, 3-phase, 7.5 kw
Optional AC generator	220 V, 3-phase, 10 kw

Function Speed

Turntable rotation	
Booms retracted – ANSI	85 to 95 seconds
Booms retracted – CE/AS/NZS	140 to 150 seconds
Main boom	
Up – ANSI	32 to 38 seconds
Up – CE/AS/NZS	50 to 55 seconds
Down – ANSI	32 to 38 seconds
Down – CE/AS/NZS	50 to 55 seconds
Extend	30 to 45 seconds
Retract	30 to 45 seconds
Platform rotation	12 to 16 seconds
Platform leveling	
Up – ANSI	12 to 22 seconds
Up – CE/AS/NZS	50 to 55 seconds
Down – ANSI	12 to 22 seconds
Down – CE/AS/NZS	50 to 55 seconds
Drive	
High, boom down/retracted – ANSI/CE/AU/NZS	
Forward – Deutz engines	4.25 mph (6.8 km/h)
Forward – Kubota engines	3.75 mph (6.0 km/h)
Reverse	2.75 mph (4.4 km/h)
Low, boom up/extended	
ANSI	0.75 mph (1.2 km/h)
CE/AU/NZS	0.5 mph (0.80 km/h)

Drive System

Standard	4WD
Gradeability	45%
Axle	front oscillating
Vertical wheel travel	8" (20.32 cm)
Maximum drive height	40' (12.19 m)

Tires

Foam filled	355/55 D625, 14 ply
Mass	427.5 lbf (194.3 kg)
Flotation air filled – non-directional	33/16LL500
Minimum weight with wheel	150 lb (68.2 kg)

Electrical System

Voltage	12 V DC negative chassis ground
Source	One - 12 V 1000 CCA battery

Hydraulic System

Pressure	
System maximum	4,500 psi (31,026 kPa)
Boom circuit maximum	2,900 psi (19994 kPa)
Reservoir capacity	30 US gal (113.5 l)
System capacity	40 US gal (151.4 l)
Maximum operating temperature	200°F (93°C)
Hydraulic fluid recommended	
Above -12°C (10°F)	ISO VG32
Below -12°C (10°F)	ISO VG15

Engine

Diesel	Deutz D2.9 L4
Output	49 hp (36.5kw)
Diesel	Kubota V1505-TE

Fuel Tank Capacity

Diesel	28 US gal (105.9 l)

Ambient Air Temperature Operating Range

Fahrenheit	0°F to 110°F
Celsius	-18°C to 43°C

Maximum Manual Force

Per occupant	45 lb (200 N)
Two occupants	90 lb (400 N)

Maximum Wind Speed

Gust or steady	28 mph (12.5 m/s)

Vibration

Hand/arm	less than 2.5 m/sec²
Body	less than 0.5 m/sec²

Sound Pressure Level

At work station	below 110 dB(A)

Sound Power Level

80 dB LWAd

Group Classification

Heavy Duty – intended life	100,000 load cycles

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⚠Danger

Pinch points may exist between moving components. Death or serious injury will result from becoming trapped between components, buildings, structures, or other obstacles. Make sure all personnel stand clear while operating the aerial platform.

- Controls to position the platform are located on the lower control panel on the turntable and on the upper control panel in the platform.
- Controls to drive the aerial platform are located on the upper control panel only.

Battery Disconnect Switch

The battery disconnect is located behind the cowling door on the right side of the turntable (refer to Figure 6.1).

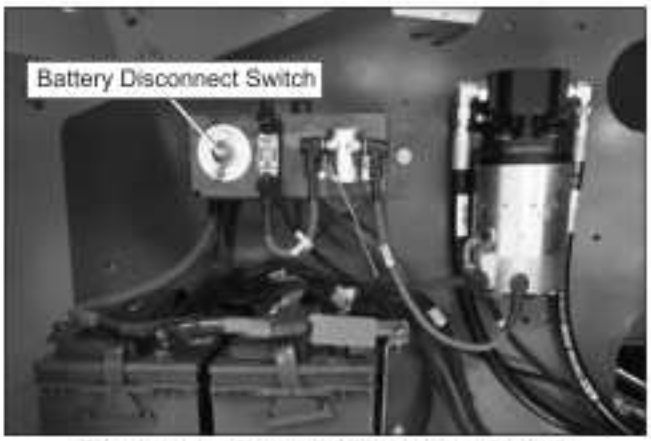


Figure 6.1 – Battery Disconnect Switch

The battery disconnect removes electrical power from all electrically controlled functions when in the off position.

- Place the switch in the on position to electrically connect the batteries to the electrical system.

⚠Caution

Only authorized personnel should operate the aerial platform. Unqualified personnel may cause injury to coworkers or property damage. Lock the battery disconnect switch in the off position before leaving the aerial platform unattended.

- Place the switch in the off position to prevent unauthorized use of the aerial platform. If so equipped, lock the battery disconnect switch in the off position.

Lower Controls

The lower controls (refer to Figure 6.2) are located on the left side of the turntable. Boom and platform functions can be operated from the lower controls. The following are located on the lower control panel:

- Start/emergency power/ground operation switch
- Emergency stop button
- Controls selector switch
- Rotation switch
- Boom elevation switch
- Boom extension switch
- Platform level switch
- Platform rotation switch
- Platform overload/tilt warning light
- Hydraulic system warm-up switch (option)

Start/Emergency Power/Ground Operation Switch

This switch (refer to Figure 6.2) is used to operate three machine functions. Engine start, activation of the emergency power system, and enable of the machine functions from the lower controls are all controlled with this switch.

Engine Start

The start switch (refer to Figure 6.2) function works like an automobile ignition switch.

An alarm sounds when the switch is turned on to warn others that the machine engine is being started.

- Before starting the engine, check the Diagnostic Center LCD display window. WAIT TO START will be displayed if the engine is cold and the engine heater is on. The message may appear for 1 to 12 seconds, depending on the engine and ambient air temperature.
- Do not start the engine until the wait message is no longer displayed.
- If the engine turns over but does not start while the WAIT TO START message is displayed, turn the control selector switch to the middle/off position and back to the lower controls position. Do not start the engine until the wait message is no longer displayed.
- Hold the switch downward until the engine starts, then release it to on.
- If the engine dies, the controls switch must be turned to off before the engine can be restarted.

Emergency Power

The emergency power function is used to operate turntable, boom, and platform functions using the emergency power system when the engine is off/disabled. The switch is spring returned to the engine position for aerial platform engine operation.

⚠Caution

The emergency power system is for emergency lowering and stowing only. The length of time the pump can be operated depends on the capacity of the batteries. Do not use this system for normal operation.

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Annual Maintenance – Every 500 Hours

Item	Procedure	Information	P/F/R
90 day or 150 hour maintenance	Perform maintenance per schedule	Retain copy of checklist	
Hydraulic oil reservoir	Clean and replace fluid	Above 10° F (-13° C) ISO VG32 Below 10° F (-13° C) ISO VG15	
Hydraulic return filter	Replace	After first 50 hours, then at recommended interval	
Hydraulic high pressure filter	Clean and reinstall		
Hydraulic pressures	Pump setting	System pressure: 4,500 psi	
	Function pressures	Boom up: 2,900 psi	
		Boom down: 1,800 psi	
		Steer: 2,900 psi	
		Level: 2,900 psi	
		Extend: 2,200 psi	
		Retract: 2,900 psi	
		Swing: 1,450 – 1,550 psi	
Gear hubs	Replace fluid	Gear lubricant SAE grade 80W-90	
Swing drive	Replace fluid	Gear lubricant SAE grade 80W-90	
Engine coolant	Check condition	See engine owner's manual	

Maintenance Table Key: P = Pass, F = Fail, R = Repaired

Performed by: _____ Date: _____

Model Number: _____ Serial Number: _____

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SAFETY RULES

⚠Warning

All personnel shall carefully read, understand and follow all safety rules and operating instructions before operating or performing maintenance on any Snorkel aerial work platform.

Electrocution Hazard	Tip Over Hazard	Collision Hazard	Fall Hazard
			
THIS MACHINE IS NOT INSULATED!	**NEVER** elevate the platform or drive the machine while elevated unless the machine is on a firm, level surface	**NEVER** position the platform without first checking for overhead obstructions or other hazards.	**NEVER** climb, stand, or sit on platform guardrails or midrail.

USE OF THE AERIAL WORK PLATFORM: This aerial work platform is intended to lift persons and his tools as well as the material used for the job. It is designed for repair and assembly jobs and assignments at overhead workplaces (ceilings, cranes, roof structures, buildings etc.). Uses or alterations to the aerial work platform must be approved by **Snorkel**.

THIS AERIAL WORK PLATFORM IS NOT INSULATED! For this reason it is imperative to keep a safe distance from live parts of electrical equipment!

Exceeding the specified permissible maximum load **is prohibited!** See "Platform Capacity" for details.

The use and operation of the aerial work platform as a lifting tool or a crane **is prohibited!**

NEVER exceed the manual force allowed for this machine. See "Manual Force" for details.

DISTRIBUTE all platform loads evenly on the platform.

NEVER operate the machine without first surveying the work area for surface hazards such as holes, drop-offs, bumps, curbs, or debris; and avoiding them.

OPERATE machine only on surfaces capable of supporting wheel loads.

NEVER operate the machine when wind speeds exceed this machine's wind rating. See "Beaufort Scale" for details.

Do not operate the aerial platform in windy or gusty conditions. Do not add anything to or take anything into the aerial platform that will increase the wind loading such as billboards, banners, flags, etc.

IN CASE OF EMERGENCY push EMERGENCY STOP switch to deactivate all powered functions.

IF ALARM SOUNDS while platform is elevated, STOP, carefully lower platform. Move machine to a firm, level surface.

Climbing up the railing of the platform, standing on or stepping from the platform onto buildings, steel or prefab concrete structures, etc., **is prohibited!**

Dismantling the entry gate or other railing components **is prohibited!** Always make certain that the entry gate is closed!

It is prohibited to keep the entry gate in an open position when the platform is raised!

To extend the height or the range by placing of ladders, scaffolds or similar devices on the platform **is prohibited!**

NEVER perform service on machine while platform is elevated without blocking elevating assembly.

INSPECT the machine thoroughly for cracked welds, loose or missing hardware, hydraulic leaks, loose wire connections, and damaged cables or hoses before using.

VERIFY that all labels are in place and legible before using.

NEVER use a machine that is damaged, not functioning properly, or has damaged or missing labels.

To bypass any safety equipment **is prohibited** and presents a danger for the persons on the aerial work platform and in its working range.

NEVER charge batteries near sparks or open flame. Charging batteries emit explosive hydrogen gas.

Modifications to the aerial work platform **are prohibited** or permissible only at the approval by **Snorkel**.

AFTER USE, secure the work platform from unauthorized use by turning the keyswitch off and removing key.

The driving of MEWP's on the public highway is subject to national traffic regulations.

Certain inherent risks remain in the operation of this machine despite utilizing proper design practices and safeguarding.

Harness attachment points are provided in the platform and the manufacturer recommends the usage of a fall restraint harness, especially where required by national safety regulations.

Care must be taken to ensure that the machines meets the requirements of stability during use, transportation, assembly, dismantling when out of service, testing, or foreseeable breakdowns.

In the event of an accident or breakdown see "Emergency Operation." Do not operate the aerial platform if it is damaged or not functioning properly. Qualified maintenance personnel must correct the problem before putting the aerial platform back into service.

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Minimum Safe Approach Distance – AS/NZS

Minimum safe approach distances to energized power lines and their associated parts must be observed while operating the aerial platform.

⚠Danger

The aerial platform is not electrically insulated. Death or serious injury will result from contact with, or inadequate clearance from, an energized conductor. Do not go closer than the minimum safe approach distance as defined by national safety regulations.

AS/NZS 2550.10:2006 define minimum distances that must be observed when working near overhead power lines on poles and overhead power lines on towers. Refer to the clearance requirements decals on the machine to determine safe approach distances (refer to Figure 1).

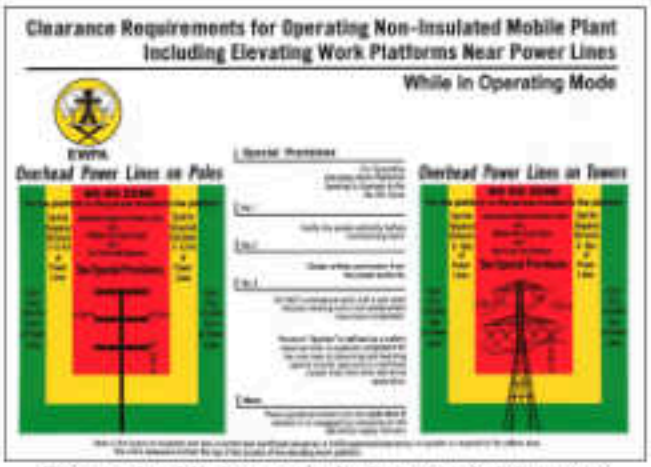


Figure 1 – Minimum Safe Approach Distance

Platform Capacity

Two people and their work materials may occupy the platform.

⚠Danger

The aerial platform can tip over if it becomes unstable. Death or serious injury will result from a tip-over accident. Do not exceed the capacity values indicated on the machine decals, placards, and in the machine specifications in this manual.

The maximum unrestricted rated load capacity and the maximum number of occupants for the aerial platform are stated on machine decals, placards, and in the machine specifications in this manual.

Manual Force

Manual force is the force applied by the occupants to objects such as walls or other structures outside the work platform.

⚠Danger

The aerial platform can tip over if it becomes unstable. Death or serious injury will result from a tip-over accident. Do not exceed the maximum allowable manual force indicated on the machine decals, placards, and in the machine specifications in this manual.

The maximum allowable manual force is limited to 45 lbs (200 N) of force per occupant, with a maximum of 90 lbs (400 N) for two occupants.

Wind Speeds

Do not add anything to the aerial platform that will increase the wind loading such as billboards, banners, flags, etc.

⚠Danger

The aerial platform can tip over if it becomes unstable. Death or serious injury will result from a tip-over accident. Do not operate the machine in wind speeds of 28 mph (12.5 m/s) or greater.

Do not operate the aerial platform in windy conditions with wind gusts or steady wind speeds of 28 mph (12.5 m/s) or greater. Refer to Figure 2.

Prestart Inspection

Perform a prestart inspection before each shift as described in Chapter 7. Do not use the aerial platform on the job unless you are trained and authorized to do so.

Work Place Inspection and Practices

Do not use the aerial platform as a ground connection when welding.

- The welding ground clamp must be attached to the same structure that is being welded.

BEAUFORT RATING	WIND SPEED				GROUND CONDITIONS
	m/s	km/h	ft/s	mph	
3	3,4~5,4	12,25~19,4	11.5~17.75	7.5~12.0	Papers and thin branches move, flags wave.
4	5,4~8,0	19,4~28,8	17.75~26.25	12.0~18	Dust is raised, paper whirls up, and small branches sway.
5	8,0~10,8	28,8~38,9	26.25~35.5	18~24.25	Shrubs with leaves start swaying. Wave crests are apparent in ponds or swamps.
6	10,8~13,9	38,9~50.0	35.5~45.5	24.5~31	Tree branches move. Power lines whistle. It is difficult to open an umbrella.
7	13,9~17.2	50,0~61,9	45.5~56.5	31.~38.5	Whole trees sway. It is difficult to walk against the wind.

Figure 2 – Beaufort Scale

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