BRAMSTON & ASSOCIATES RISK MANAGEMENT

BRIJBASI
HI-TECH UDYOG LTD.

BRONTO SKYLIFT

EXTRA VERSATILE RESCUE PLATFORMS

Wide range of aerial platforms and appliances

Bronto Skylift is the global market leader in truck-mounted hydraulic platforms. Bronto Skylift designs, manufactures, sells and services appliances for rescue and firefighting, as well as for construction work.

Bronto Skylift range includes approximately 50 models with a range of between 17 to 112 meters working height. The advanced modularity also allows numerous client-specific modifications. During the past 50 years, Bronto Skylift has delivered over 6,700 platform units to fire brigades and industrial customers throughout all continents in more than 120 countries.

Bronto Skylift 's headquarters and production plants are situated in Finland, with subsidiaries in Germany, Sweden, Switzerland and the USA. The company is a part of Japan-based Morita Holdings Corporation.

Bronto Skylift solutions are supplied in India, Africa and Western Indian Ocean Islands in partnership by Brijbasi Hi-Tech Udyog and Bramston & Associates.

Bronto Skylift F-RLX/RPX ranges

Extra versatile rescue platforms, with or without ladder

F-RLX


TAMPEREEN ALUEPELASTUSLAITOS
BRONTO SKYLIFT F 37 RLX
T16
TAMPERE
14
09

F-RXP


SCANIA
BRONTO SKYLIFT F70 RPX

PERFORMANCE AND FEATURES

ABOVE ALL

The F-RLX aerial ladder platforms provide reliability and versatility for your different firefighting operations. A spacious rescue cage facilitates rescuing with a stretcher or wheelchair, and a high cage load enables carrying more tools and people. Efficient height to weight ratio and compact design ensure easy transport to rescue sites.

Unit	Max. rescue height	Max. rescue outreach	Max. down reach	Up-and-over capacity	Transp. height	Transp. length	Cage boom	Typical GVW
F32RLX	32 m	23.1 m	4 m	9 m	3.4 m	9 m	Fixed	18 t
F34RLX	34 m	23.1 m	5.6 m	10.5 m	3.4 m	9 m	Telescopic	19 t
F37RLX	37 m	24.2 m	5.9 m	10.5 m	3.6 m	9.95 m	Telescopic	21 t
F42RLX	42 m	22.6 m	4.8 m	9 m	3.6 m	9.95 m	Fixed	22 t
F51RLX	51 m	30.4 m	6.3 m	10.5 m	3.8 m	11.9 m	Telescopic	28 t
F55RLX	55 m	30.4 m	6 m	10.5 m	3.9 m	10.8 m	Telescopic	32 t

F-RLX range key features

- Rescue heights 32-55 meters, outreach up to 30.4 meters
- Stabile rescue ladders
- Very short transport length
- Spacious and versatile rescue cage with 500 kg capacity
- Telescopic cage boom for better versatility and up-and-over reach
- Water capacity of 3,800 l/min

ALL THE SAME BENEFITS AND FEATURES

WITHOUT A LADDER

The F-RPX aerial platforms have the same versatility and benefits as the F-RLX range, but without a ladder. Leaving the ladder out gives more outreach, while keeping the great height to weight ratio.

Unit	Max. rescue height	Max. rescue outreach	Max. down reach	Up-and-over capacity	Transp. height	Transp. length	Cage boom	Typical GVW
F32RPX	32 m	24.3 m	4.4 m	9 m	3.4 m	9 m	Fixed	18 t
F34RPX	34 m	24.3 m	6.7 m	10.5 m	3.4 m	9 m	Telescopic	19 t
F37RPX	37 m	25 m	5.8 m	10.5 m	3.6 m	9.95 m	Telescopic	21 t
F42RPX	42 m	23.6 m	4.8 m	9 m	3.6 m	9.95 m	Fixed	22 t
F52RPX	52 m	30.9 m	6.4 m	10.5 m	3.8 m	11.9 m	Telescopic	26 t
F55RPX	55 m	30.4 m	5.5 m	10.5 m	3.9 m	10.8 m	Telescopic	32 t
F70RPX	70 m	32.7 m	6 m	10.5 m	4 m	12.5 m	Telescopic	36 t

F-RPX range key features

- Rescue heights 32-70meters, outreach up to 32.7 meters
- Very short transport length
- Spacious and versatile rescue cage with 500 kg capacity
- Telescopic cage boom for better versatility and up-and-over reach
- Water capacity of 3,800 l/min

RPX/RLX-ER range key features

- Rescue heights 37-44meters, outreach up to 30.2 meters
- Spacious and versatile rescue cage with 500 kg capacity
- Up-and-over capacity up to 10.5 meters
- Water capacity of 3,800 l/min

ER STANDS FOR

EXTENDED REACH

The ER aerial platforms are customized from F-RLX/RPX ranges. A heavier construction gives more stability, and thus enables reaching further to the side.

Unit	Max. rescue height	Max. rescue outreach	Max. down reach	Up-and-over capacity	Transp. heightt	Transp. length	Cage boom	Typical GVW
F37RLX ER	37 m	29.3 m	4.8 m	9 m	3.7 m	10.01 m	Fixed	26 t
F42RLX ER	42 m	29.3 m	4.8 m	9 m	3.7 m	10.01 m	Fixed	26 t
F44RLX ER	44 m	29.3 m	5.5 m	10.5 m	3.7 m	10.01 m	Telescopic	26 t
F44RPX ER	44 m	30.2 m	6.8 m	10.5 m	3.7 m	10.01 m	Telescopic	26 t

Bronto Skylift

F22RL

Compact Rescue Ladder

The 22 meter F22RL represents one of the smallest and most compact Bronto Skylift aerial ladder platforms. With it's integrated water line, user-friendly control system, one-button automatic leveling, and excellent height to weight ratio it is a handy tool for efficient rescue and firefighting in narrow streets and tight places.

Compact design

Transport length less than 7 m

The 22 meter F22RL represents one of the smallest and most compact Bronto Skylift aerial ladder platforms. With it's integrated water line, user-friendly control system, one-button automatic leveling, and excellent height to weight ratio it is a handy tool for efficient rescue and firefighting in narrow streets and tight places.

BRONTO SKYLIFT F22RL

Unit	Max. rescue height	Max. outreach	Up-and-over	Water capacity	Transp. height (depending on chassis)	Transp. length (depending on chassis)	Total GVW (depending on chassis)
F22RL	22 m	15.5 m	5.9 m	2,500	3.4 m	6.9 m	16t

Bronto Skylift S 236 HLA

Bronto Skylift

F51 RLX

Aerial Ladder Platform

This specification covers an aerial ladder platform unit with maximum working height of 51 meters. As a minimum requirement the design of operational stability and structural strength are based on criteria laid out in EN1777. Compliance with other norms and standards will be stated separately as applicable

AERIAL LADDER PLATFORM

BRONTO SKYLIFT

F51 RLX

MAIN OPERATING DATA

Max. working height (depending on chassis)	51 m
Max. height to working cage bottom (depending on chassis)	49 m
Max. working outreach	30,4 m
Max. working reach below the ground level	7 m
Safe working load (without water discharge)	500 kg
Max. nominal water discharge capacity (with adequate supply pressure)	3800 l/min
Rotation, continuous	360°
Transport height (depending on chassis)	3,9 m
Transport length (depending on chassis)	11,89 m
Transport width	2,5 m
Typical weight with chassis, G.V.W. (standard specification)	28 t


SOS 112
150
HASIČI
SOS 112
150

MAIN FRAME

The main load bearing element of the aerial device is the strong main frame which takes all the loads caused by the operation of the aerial.

The main frame is fixed onto the chassis frame with bolts in such a way that chassis performance and durability are maintained. The front fixing bolts are fitted with springs to allow the chassis frame beams to flex when the outriggers are fully down, thus avoiding any stress concentration in the chassis beams.

The actual main frame is a fully welded steel structure providing high stiffness and thus maximum comfortability and operational safety.

At each end of the main frame there are integrated housings for outriggers.

STABILIZING SYSTEM

The stabilizing system consists of four hydraulically powered outriggers mounted in their housings in the main frame. Each housing is fitted with adjustable guides to provide smooth and accurate movement of the outrigger beam. The outrigger piston rods are completely protected by closed steel profile.

The H-type outriggers have been chosen for their ability to stabilize the vehicle from behind obstacles and to be placed on raised structures as necessary. Each vertical jack is fitted with self-aligning foot plate to spread the load evenly and to allow operation on uneven ground.

As standard feature the stabilizing system is automatic ”one button” variable jacking type. This feature substantially reduces the width required for setting up and operating the aerial yet it provides full working height and working outreach depending on where the jacks has been placed. There are two independent automatically operating and self controlling safety systems to prevent an unsafe configuration. All controls for the entire stabilizing system are located in dust and water proof locker at the rear of the vehicle. The

remote control box has a wander lead which allows the operator to see outriggers at all time. The automatic jacking lifts the tires off from the ground, levels the unit and drives the outriggers back to the transport position with one push to a button.

In the middle of the control panel there are following additional control devices:

- starting of chassis engine
- stopping of chassis engine
- activating the outrigger controls
- outrigger and outreach display with fault finding system
- operating hour and rpm-up gauge in the display
- switch for the battery driven back-up for the hydraulic system
- visual indicators for levelling of the vehicle (longitudinal and transversal)
- emergency stop
- controls for the automatic jacking

The locker containing outrigger controls is fitted with an automatically operating door switch and a light for night operation.

BODYWORK AND EQUIPMENT LOCKERS

The frame for the bodywork is made of aluminium. The elements have been covered by non-slip aluminium plate strong enough to allow free movement of persons on it.

To provide easy access to decking from the ground level there are steps on both sides of the vehicle. Equipment lockers are made of aluminium profiles and aluminium plates and bolted onto decking element for easy removal if necessary. All lockers are fitted with roller shutters, properly sealed to be water and dust proof. All doors are fitted with automatic switches activating the lights as soon as the door is opened and also activating the warning in drivers cab to indicate that all doors are not fully closed.

BOOMS

There are two booms, both with telescopic extension providing direct movement and the second boom additionally with vertical movement of approx. 180 degrees. This configuration results in compact travelling dimensions yet in extreme versatility in operation. The second boom provides

an up-and-over capability of approx. 10,5 m throughout its vertical and horizontal movement.

The booms have been welded by the unique plasma welding method to provide high durability and extreme accuracy. For high strength and minimum flexing of the boom sections only high tensile strength steels are used as load bearing structure.

All telescopic sections of the first boom move synchronized i.e. there are no intermediate jerks when the extension / retracting is operated and also slow down modifications at the beginning of the movement as well as at the end of the movement. All sections are fitted with adjustable guides to provide smooth and accurate movement.

Different maintenance objects are located well at hand either outside the boom or behind easily removable covers.

All booms are internally and externally primed and painted for long life span.

TURNTABLE

The turntable is a fully integrated steel structure. The centre post containing slip rings with double pins for electrical connections, 100 mm corrosion resistant water way and hydraulic pressure and tank lines allows continuous rotation of the turntable.

The centre post is mounted inside of the turntable in such a way that maintenance can be done directly from the turntable.

Rotation reduction gear with automatically operating braking system is installed in the middle, front of the turntable for easy maintenance and adjustment. The hydraulic motor powering the rotation movement is fitted directly into the gear for high reliability. At the left hand side of the turntable there is the lower control station.

WORKING CAGE

The working cage is fixed to the booms with pivoting point about cage floor level to provide highest possible degree of versatility. The cage is made of tubular steel profile, welded together and painted with special paint with high durability.

The dimensions of the working cage are 1,15 m (length) x 2,2 m (width) x 1,1 m (height) and it is fitted with two inward opening doors located at the rear right side and left side to enable safe access to the cage in travelling position. The top railing is part of the left side cage door so entering into the cage without bending oneself is possible. The rescue entrance is located in the front and top railing can be moved to the side for safe and easy access. There are four fitments for safety harnesses in the working cage. Safe working load is 500 kg when no water is discharged and the cage telescope is in retracted position.

WORKING CAGE LEVELLING

The working cage is kept horizontally levelled in any position of the booms. The levelling system is controlled by an automatic hydraulic device with fully automatic and independent safety circuit in case of an uncontrolled levelling failure. There is a master switch for the automatic levelling system, thus it can be isolated and the manually controlled system activated. The levelling movement is powered by a hydraulic cylinder located well protected inside the boom. The cylinder is connected to a mechanical linkage which can carry the entire safe working load.


SCANIA

WORKING CAGE SLEWING

The working cage can be turned 50 degrees to each side from its centre position to provide safety and comfortability in rescue operations. The movement is powered by a hydraulic cylinder with controls in the working cage and at the turntable control panels.

The centre position of the cage is indicated by a visual indication at both control panels.

FOLD-DOWN RESCUE PLATFORM

At the front of the working cage there is a rescue platform with automatically operating safety railing to provide additional safety during rescue and fire fighting. The dimensions of the rescue platform are 1,36 m x 0,5 m.

INTERCOM

There is a talk-back intercom system fitted between the turntable and the cage. The combined microphone and loudspeaker for no-hands-operation is located in the cage and at the turntable control station.

RESCUE LADDER

A stable telescopic rescue ladder system is attached onto the right hand side of the booms. Due to the telescopic design the ladder forms a direct continuous rescue way with no cross-over platform or similar obstacle. The cage boom ladder is telescopic and can be used when cage boom telescope is extended.

The ladder is attached onto the boom structure at several points throughout its length resulting in extreme stability even when operated in windy conditions. Extension movement of the ladder is automatically synchronized with the telescopic movement of the first boom requiring no separate control devices.

Both control panels are fitted with visual indication for "safe to climb" position of the ladder.

There is a step at the turntable to provide safe access from the ladder down to the decking. Thus a continuous way from the maximum height down to the ground is provided for high capacity rescue operations.

HYDRAULIC SYSTEM

Hydraulic power is provided by an axial piston pump, which is driven by the vehicle power take-off. The power need is 45...55 kW.

Without any operation of the aerial device, the pump rotates on minimum flow and minimum pressure. When one of the movements is operated the control valve automatically increases the pressure to a pre-set constant level and the oil flow to the amount that is needed for the movements activated.

Thanks to this method the loss of power in the hydraulic system, which normally causes overheating of the hydraulic oil, can be avoided and also the stresses caused to the vehicle transmission and PTO system are minimized. At the same time fuel consumption and exhaust emissions are kept at the minimum.

By operating several movements simultaneously the oil flow will increase automatically according to the need in the system thus making all movement speeds independent on each other.

The constant pressure system with max. pressure setting prevents overloading of the system and its components e.g. cylinders.

In the cage and at the lower valve compartment there are instant couplings for the manometer in the pressure line. The manometer is included as standard equipment. The hydraulic pressure and temperature are shown on displays.

The filtration of the oil consists of suction strainer in the suction line, pressure filters in each pressure circuit, return filter in return line and air filter on the reservoir thus providing maximum reliability by protecting the hydraulics against foreign particles.

The hydraulic cylinders are double acting with hard chrome-plated piston rods and they have been fastened by means of self-aligning ball bearings to prevent lateral forces from damaging the seals or piston rods of the cylinders. Hydraulic oil tank is integrated into the main frame for good protection and transformation of the heat. The tank is fitted with oil level gauge, temperature gauge, suction connections with closing valves for easy maintenance and draining outlet with closing valve.

BACK-UP FOR THE HYDRAULIC SYSTEM

There is a battery driven hydraulic pump which provides an independent means of power in case of failure of the main engine. The system can be started from all control panels thus providing an immediate back-up in a case of a failure at an intense fire or similar immediate emergency.

ELECTRIC SYSTEM

The electric supply is taken from the chassis battery which is kept charged when the engine is running. Voltage of the system is 24 V DC and all circuits have been fitted with their specific fuses. When the main current is switched on, yellow flashing warning lights located at each outrigger and underneath of the working cage are automatically switched on.

SIREN AND PUBLIC ADDRESS SYSTEM

There is an electric siren unit fitted on the front bumper or behind the front grille. Control panel of the system is conveniently located for the driver and it includes switches for fast (yelp), slow (wail) and two tone (Hi-Lo) sounds.

Command microphone, which is fitted with push-to-talk switch, allows the public address message to override the siren function. Operations are controlled by a switch in illuminated non-glare control panel.

ROTATING BEACONS

On each side of the drivers cab roof there are red or blue rotating beacons. The switch for switching the beacons on and off with suitable signal light is fitted inside of the cab in a convenient position for the driver.

CONTROL SYSTEM FOR BOOM AND ROTATION MOVEMENTS

All boom and rotation movements are controlled electro-hydraulically by means of proportional valves. Thanks to the proportional principle the control function is not sensitive to changes of ambient or oil temperature, thus providing smooth, safe and very accurate movements even in most severe operating conditions. All control movements can be performed by the remote control system from both control panels. The side outreach is determined by the position of the

outriggers. The variable system contains also displays at all three control stations. The displays give the real-time information about the outreach and the cage position and also show possible movements according to cage position by animated arrows. There are at least four different views on each display:

- Outreach preview
- Real time outreach and cage position with guidance information
- Main outreach with two views (side and up)
- Fault finding system
- Statistic information
- Tools screen (personal settings)

TURNTABLE AND WORKING CAGE CONTROL PANELS

The turntable control panel incorporating all control levers and safety system indications is fitted with a rotatable arm at the side of the turntable. This feature enables the whole control panel to be placed and locked conveniently in its operating position to provide the officer in charge an excellent view over the different indications of the safety systems. If desired, the control panel can be rotated and locked in a position enabling direct access from the decking of the vehicle into control station. The control station is fitted with convenient adjustable seat to provide comfort even in case of prolonged operation. The platform underneath the control position is covered by non-slip aluminium.

Both control panels have been designed with same layout reducing the risk of confusion amongst operators under stress or even panic. At the turntable control panel there is a change-over switch to select the panel from which the operation is controlled.

The working cage control panel incorporating all control levers and safety system indications is recessed to cage railing to provide the largest cage space as required by the particular operational task. This feature considerably increases the versatility of the unit in actual operation.

Both control panels are fitted as standard with following most important warning, indication and control devices, all marked by clear symbols for easy recognisance.

- joystick control levers for each movement
- buttons for cage slewing
- button for starting and stopping of chassis engine
- button for the battery driven back-up for the hydraulic system
- button for emergency stop
- button for overriding of the automatic working cage levelling system
- button for manual operation for the working cage levelling system
- extra buttons for special features
- button for activating the bleed down system
- button for automatic drive of booms to transport position
- button for approaching speed (lower down speeds of boom movements)
- button for work lights
- intercom system
- integrated water monitor controls
- visual and audible indication for exceeding safe working load
- visual warning for activation of working cage collision guard system
- visual indication for ground pressure of the outriggers
- visual indication diagram containing information on particular movements being restricted or permitted based on real-time information on actual boom configuration
- visual indication for the rescue ladder "safe to climb"
- visual indication for the centre position of the booms
- visual indication for the centre position of the working cage
- visual indication for wind speed
- visual indication for cab protection
- visual indication for tilt alarm
- visual indication for Bronto Telecontrol activated
- visual indication for service time reminder
- visual indication for service counters for chassis motor, electric power, generator and battery pump
- information screen for all important alarms and vital information
- fault finding screen


ALTECH

CONTROLS AND INDICATORS IN DRIVER´S CAB

In addition to chassis standard controls and indicators the following items are installed in drivers cab:

- visual warning for the main current being switched on
- visual warning for outriggers in travelling position
- visual warning for any of the equipment lockers being open
- visual warning for the booms not being fully in transportation position
- switch with visual indication for rotating beacons
- switch with visual indication for siren unit
- microphone for the public address system

SAFETY DEVICES

All load bearing hydraulic cylinders are fitted with lock valves directly integrated into the cylinder structure to prevent the booms, the working cage or the outriggers from retracting in case of a pipe or hose failure.

Retracting of any of the outriggers is automatically prevented as soon as the booms have been lifted from their travelling position.

Similarly lifting of the booms from the travelling position is prevented until the outriggers have reached the ground pressure.

All boom movements have been limited at their most extreme positions thus making it impossible for the operator to reach an unsafe configuration by normal means of operation. The movements having direct influence on the stability of the aerial have all been fitted with two separate limiting circuits, the first one retarding and stopping that particular movement, the second one deactivating the whole electric and hydraulic system should the first circuit not have worked.

All major movements, lifting of the first boom to its maximum elevation, and extending the telescopic movement or lowering the first boom at the maximum outreach have been fitted with slow-down devices to provide smooth deceleration of the movement. Also the starting of the movement is retarded for smooth acceleration.

Starting of the chassis engine from the control panels of the aerial is prevented unless the gear is shifted to neutral.

Inadvertent damaging of the drivers cab by the booms have been prevented by a system preventing lowering of the booms and rotation movement when the booms are near the drivers cab.

An overload warning has been fitted to give and audible and visual warning in case of exceeding the safe working load at all control stations.

A collision guard has been integrated to cage load sensor to provide additional safety when operating in darkness or in dense smoke. This system stops all movements and can be bypassed if needed.

An emergency stop switch is fitted at both boom control panels to provide immediate and complete "freezing" of all systems in case of an unexpected emergency. Activation of the emergency stop is shown on each display.

The control system is fitted with dead man switches to provide additional safety.

There is a "bleed down" system which can be operated from working cage and turntable control panels. By means of this system the booms can be lowered and the working cage brought down onto the ground even if no hydraulic pressure is available. In such a case manual rotation is provided by manual means.

WATER WAY

The water way system is completely made of noncorrosive material. The nominal diameter of the water way is 100 mm. There is one 2½" inlet with a closing valve at each side at the rear of the vehicle from where the line leads through the centre post in the turntable upto the working cage where the water monitor is mounted. Along the lower boom package, the piping is fitted onto the right hand side between the ladders and the booms.

The centre post, which is mounted in the centre line of the turntable, provides continuous rotation even if water supply is simultaneously used.
The piping is protected from possible overpressure by means of at least one relief valve mounted underneath of the turntable.
On the side of both booms there are telescopic water pipes, which are made of noncorrosive material. Moving sections of this pipe are designed to provide reliable function and long life span.
Seals between the sections are of low friction type and can be easily tightened if so required. At boom pivoting points flexible, specially reinforced pressure hose is used. All hoses are fixed to the pipe with reliable span-lock connections.
Piping ends at the left hand side at the front of the working cage where the water monitor is placed. A 75 mm (3") valve is fitted in the cage to isolate the monitor if required.
There are additional outlets with 65 mm (2½") closing valves and couplings for water supply from the cage through an extension hose.
There are drain cocks fitted in the piping to enable it to be drained after use.
On the front of the cage there are nozzles of water spray curtain system to protect cage occupants from radiant heat.

WATER MONITOR

Water monitor is connected onto the piping system and it is placed at the front of the cage on the left hand side just outside of the railing. Due to the fact that the monitor is placed outside of the cage the entire cage floor area can be fully utilized in extreme rescue situations. The monitor is made of light alloy and fitted with jet/fog nozzle with maximum nominal capacity of 3800 l/min.

PAINTING

Before painting all surfaces of steel structures have been carefully shoot blasted after which they have been primed. After the final top paint the dry film thickness of the paint coat is 100 microns. All booms have been painted from inside.

To provide very high corrosion resistance hollow structures such as steel profiles of the working cage, cage boom and outrigger beams and housings are treated with anti-corrosion protection agent.

Paint tones used for standard units are:

Working cage	pearl light grey	RAL 9022
Working cage support, boom sections, turntable and related cylinders	white	RAL 9010
Mainframe, outriggers and bodywork	red	RAL 3000
Outrigger cylinders	grey	RAL 7046
Chassis frame touch-ups	chassis original tone	

RAL 9022

RAL 9010

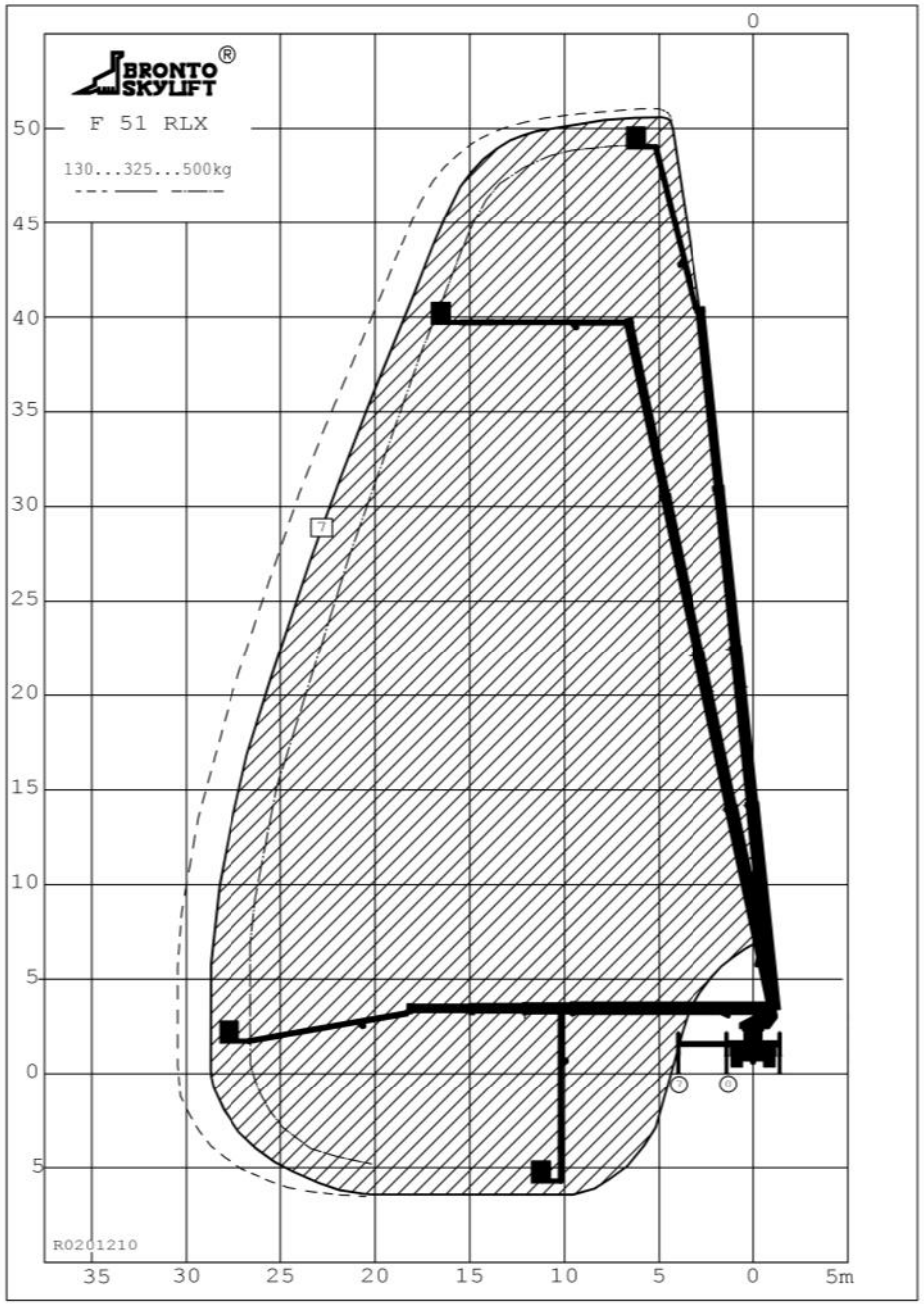
RAL 3000

RAL 7046

ACCESSORIES

- 4 pc Wooden outrigger ground pads with brackets
- 2 pc Working range diagrams, one at the turntable, one at the turntable, one in the cage
- 1 pc Marking of safe working load in the cage
- 2 pc Unit type marked at the boom
- 1 set Warning labels and instruction plates
- 2 sets Operation and maintenance manuals
- 1 pc Plug for 24 V working light at the turntable and in the working cage
- 1 pc Lifting loop under the working cage, capacity 500 kg
- 1 pc Hydraulic pressure gauge

NOTE1: F 52 RPX pohjalta
NOTE2: GVW 28 ton
REMARKS: PRELIMINARY



TECHNICAL DATA

Safe working load max. Waterpipe and ladder	: 500 kg
Max. permitted wind speed	: 12.5 m/s
Typical GVW	: 28.0 ton
operating weight min.	: 26.5 ton
Outrigger width and length c/c	
- normal jacking	: 8.0/7.5 m
- one side jacking	: 5.4/7.5 m
- narrow jacking	: 2.8/7.5 m
Calculation code	:

PRELIMINARY

ULOTTUVUUSKAAVIO
RÄCKVIDDSDIAGRAM
OUTREACH DIAGRAM
ARBEITSDIAGRAM
DIAGRAMA DE TRABAJO
РАБОЧАЯ СХЕМА

1:200 (A3)	BRONTO SKYLIFT F 51 RLX		
code: O	OUTREACH DIAGRAM	DRAWN	KKe 2012-12-20
	SAFE WORKING LOAD 500 KG	APPVD	
BRONTO SKYLIFT OY AB FINLAND	LAYER	DWG NUMBER R0201210 BRONTOCAD	REV

HANDLING ON CAD SYSTEM ONLY

Bronto Skylift

F53RL

Aerial Ladder Platform

This specification covers an aerial ladder platform unit with maximum working height of 53 meters. As a minimum requirement the design of operational stability and structural strength are based on criteria laid out in EN1777 and DIN 15120. Compliance with other norms and standards will be stated separately as applicable.

AERIAL LADDER PLATFORM

BRONTO SKYLIFT

F53RL

MAIN OPERATING DATA

Max. working height (depending on transportation height)	53 m
Max. height to working cage bottom (depending on transportation height)	51 m
Max. height to the top of the ladder (depending on transportation height)	51,7 m
Max. working outreach	24,1 m
Max. working reach below the ground level	5,1 m
Safe working load (without water discharge)	400 kg
Max. nominal water discharge capacity (with adequate supply pressure)	3800 l/min
Rotation, continuous	360°
Transport height (depending on chassis)	3,9 m
Transport length (depending on chassis)	11,9 m
Transport width	2,5 m
Typical weight with chassis, G.V.W. (standard specification)	32,0 t

MAIN FRAME

The main load bearing element of the aerial device is the strong main frame which takes all the loads caused by the operation of the aerial. The main frame is fixed onto the chassis frame with bolts in such a way that chassis performance and durability are maintained. The front fixing bolts are fitted with springs to allow the chassis frame beams to flex when the outriggers are fully down, thus avoiding any stress concentration in the chassis beams. The actual main frame is a fully welded steel structure providing high stiffness and thus maximum comfortability and operational safety. At each end of the main frame there are integrated housings for outriggers.

STABILIZING SYSTEM

The stabilizing system consists of four hydraulically powered outriggers mounted in their housings in the main frame. Each housing is fitted with adjustable guides to provide smooth and accurate movement of the outrigger beam. The outrigger piston rods are completely protected by closed steel profile. The H-type outriggers have been chosen for their ability to stabilize the vehicle from behind obstacles and to be placed on raised structures as necessary. Each vertical jack is fitted with self-aligning foot plate to spread the load evenly and to allow operation on uneven ground. As standard feature the stabilizing system is automatic "one button" variable jacking type. This feature substantially reduces the width required for setting up and operating the aerial yet it provides full working height and working outreach depending on where the jacks has been placed. There are two independent automatically operating and self controlling safety systems to prevent an unsafe configuration. The stabilizing system also includes a rear axle locking system in such cases where the chassis is equipped with air suspension. All controls for the entire stabilizing system are located in dust and water proof locker at the rear of the vehicle. The remote control box has a wander lead which allows the operator to see outriggers at all time. The automatic jacking lifts the tyres off from the ground, levels the unit and drives the outriggers back to the transport position with one push to a button.

In the middle of the control panel there are following additional control devices:

- starting of chassis engine
- stopping of chassis engine
- activating the outrigger controls
- outrigger and outreach display with fault finding system
- operating hour and rpm-up gauge in the display
- switch for the battery driven back-up for the hydraulic system
- visual indicators for levelling of the vehicle (longitudinal and transversal)
- emergency stop
- controls for the automatic jacking

The locker containing outrigger controls is fitted with an automatically operating door switch and a light for night operation. The locker is made of glassfibre reinforced plastic (GRP).

BODYWORK AND EQUIPMENT LOCKERS

The frame for the bodywork is made of aluminium. The elements have been covered by non-slip aluminium plate strong enough to allow free movement of persons on it. To provide easy access from the ground level there are recessed steps on both sides of the vehicle and equipment lockers made of aluminium profiles and aluminium plates, painted and finally bolted onto decking element for easy removal if necessary. All lockers are fitted with roller shutters, properly sealed to be water and dust proof. All doors are fitted with automatic switches activating the lights as soon as the door is opened and also activating the warning in drivers cab to indicate that all doors are not fully closed.

BOOMS

There are two booms, the first boom with telescopic extension providing direct movement and the second boom with vertical movement of approx. 180 degrees. This configuration results in compact travelling dimensions yet in extreme versatility in operation. The second boom provides an up-and-over capability of approx. 9,0 m throughout its vertical movement.

The booms have been welded by the unique plasma welding method to provide high durability and extreme accuracy. For high strength and minimum flexing of the boom sections only high tensile strength steels are used as load bearing structure. All telescopic sections of the first boom move synchronized i.e. there are no intermediate jerks when the

extension / retracting is operated and also slow down modifications at the beginning of the movement as well as at the end of the movement. All sections are fitted with adjustable guides to provide smooth and accurate movement.

Different maintenance objects are located well at hand either outside the boom or behind easily removable covers.

All booms are internally and externally primed and painted for long life span.

TURNTABLE

The turntable is a fully integrated steel structure. The centre post containing slip rings with double pins for electrical connections, 100 mm corrosion resistant water way and hydraulic pressure and tank lines allows continuous rotation of the turntable.

The centre post is mounted inside of the turntable in such a way that maintenance can be done directly from the turntable.

Rotation reduction gear with automatically operating braking system is installed in the middle, front of the turntable for easy maintenance and adjustment. The hydraulic motor powering the rotation movement is fitted directly into the gear for high reliability. At the left hand side of the turntable there is the lower control station.

WORKING CAGE

The working cage is fixed to the booms with pivoting point about one meter above the cage floor to provide highest possible degree of natural safety. The cage is made of tubular steel profile, welded together and painted with special paint with high durability. The dimensions of the working cage are 1,0 m (length) x 2,0 m (width) x 1,1 m (height) and it is fitted with an inward opening door located at the rear left side to enable safe access to the cage in travelling position. The top railing is part of the cage door so entering into the

cage without bending oneself is possible. The rescue entrance is located in the front and top railing is formed for safe and easy access . There are two fitments for safety belts in the working cage. Safe working load is 400 kg when no water is discharged.

WORKING CAGE LEVELLING

The working cage is kept horizontally levelled in any position of the booms. The levelling system is controlled by an

automatic hydraulic device with fully automatic and independent safety circuit in case of an uncontrolled levelling failure. There is a master switch for the automatic levelling system, thus it can be isolated and the manually controlled system activated. The levelling movement is powered by a hydraulic cylinder located well protected inside the boom. The cylinder is connected to a mechanical linkage which can carry the entire safe working load.

WORKING CAGE SLEWING

The working cage can be turned 45 degrees to each side from its centre position to provide safety and comfortability in rescue operations. The movement is powered by a hydraulic cylinder with controls in the working cage and at the turntable control panels. The centre position of the cage is indicated by a visual indication at both control panels.

FOLD-DOWN RESCUE PLATFORM

At the front of the working cage there is a rescue platform with automatically operating safety railing to provide additional safety during rescue and fire fighting. The dimensions of the rescue platform are 1,36 m x 0,5 m.

INTERCOM

There is a talk-back intercom system fitted between the turntable and the cage. The combined microphone and loudspeaker for no-hands-operation is located in the cage and at the turntable control station.

RESCUE LADDER

A stable telescopic rescue ladder system is attached onto the right hand side of the booms. Due to the telescopic design the ladder forms a direct continuous rescue way with no cross-over platform or similar obstacle. The ladder is attached onto the boom structure at several points throughout its length resulting in extreme stability even when operated in windy conditions. Extension movement of the ladder is automatically synchronized with the telescopic movement of the first boom requiring no separate control devices. Both control panels are fitted with visual indication for "safe to climb" position of the ladder. There is a step at the turntable to provide safe access from the ladder down to the decking or to a fly ladder. Thus a continuous way from the maximum height down to the ground is provided for high capacity rescue operations.

HYDRAULIC SYSTEM

Hydraulic power is provided by a axial piston pump, which is driven by the vehicle power take-off. The power need is 45...55 kW.

Without any operation of the aerial device, the pump rotates on minimum flow and minimum pressure. When one of the movements is operated the control valve automatically increases the pressure to a pre-set constant level and the oil flow to the amount that is needed for the movements activated. Thanks to this method the loss of power in the hydraulic system, which normally causes overheating of the hydraulic oil, can be avoided and also the stresses caused to the vehicle transmission and PTO system are minimized. At the same time fuel consumption and exhaust emissions are kept at the minimum.

By operating several movements simultaneously the oil flow will increase automatically according to the need in the system thus making all movement speeds independent on each other.

The constant pressure system with max. pressure setting prevents overloading of the system and its components e.g. cylinders.

In the cage and at the lower valve compartment there are instant couplings for the manometer in pressure line. The manometer is included as a standard equipment. The hydraulic pressure and temperature are shown on displays.

The filtration of the oil consists of suction strainer in the suction line, pressure filters in each pressure circuit, return filter in return line and air filter on the reservoir thus providing maximum reliability by protecting the hydraulics against foreign particles.

The hydraulic cylinders are double acting with hard chrome-plated piston rods and they have been fastened by means of self-aligning ball bearings to prevent lateral forces from damaging the seals or piston rods of the cylinders.

Hydraulic oil tank is integrated into the main frame for good protection and transformation of the heat. The tank is fitted with oil level gauge, temperature gauge, suction connections with closing valves for easy maintenance and draining outlet with closing valve.

BACK-UP FOR THE HYDRAULIC SYSTEM

There is a battery driven hydraulic pump which provides an independent means of power in case of failure of the main engine. The system can be started from all control panels thus providing an immediate back-up in a case of a failure at an intense fire or similar immediate emergency.

ELECTRIC SYSTEM

The electric supply is taken from the chassis battery which is kept charged when the engine is running. Voltage of the system is 24 V DC and all circuits have been fitted with their specific fuses. When the main current is switched on, yellow flashing warning lights located at each outrigger and underneath of the working cage are automatically switched on.

SIREN AND PUBLIC ADDRESS SYSTEM

There is an electric siren unit fitted on the front bumper or behind the front grille. Control panel of the system is conveniently located for the driver and it includes switches for fast (yelp) ,slow (wail) and two tone (Hi-Lo) sounds.

Command microphone, which is fitted with push-to-talk switch, allows the public address message to override the siren function. Operations are controlled by a switch in illuminated non-glare control panel.

ROTATING BEACONS

On each side of the drivers cab roof there are red or blue rotating beacons. The switch for switching the beacons on and off with suitable signal light is fitted inside of the cab in a convenient position for the driver.

CONTROL SYSTEM FOR BOOM AND ROTATION MOVEMENTS

All boom and rotation movements are controlled electro-hydraulically by means of proportional valves. Thanks to the proportional principle the control function is not sensitive to changes of ambient or oil temperature, thus providing smooth, safe and very accurate movements even in most severe operating conditions. All control movements can be performed by the remote control system from both control panels. The side outreach is performed by the position of the

outriggers. The variable system contains also displays at all three control stations. The displays give real-time information about the outreach and the cage position and also show possible movements according to cage position by animated arrows. There are at least four different views on each display:

- Outreach preview
- Real time outreach and cage position with guidance information
- Main outreach with two views (side and up)
- Fault finding system
- Statistic information

TURNTABLE AND WORKING CAGE CONTROL PANELS

The turntable control panel incorporating all control levers and safety system indications is fitted with a rotatable arm at the side of the turntable. This feature enables the whole control panel to be placed and locked conveniently in its operating position to provide the officer in charge an excellent view over the different indications of the safety systems. If desired, the control panel can be rotated and locked in a position enabling direct access from the decking of the vehicle into control station.

The control station is fitted with convenient adjustable seat to provide comfort even in case of prolonged operation. The platform underneath the control position is covered by non-slip aluminium.

Both control panels have been designed with same layout reducing the risk of confusion amongst operators under stress or even panic.

At the turntable control panel there is a change-over switch to select the panel from which the operation is controlled.

The working cage control panel incorporating all control levers and safety system indications is fitted with an easily removable bracket to enable the panel to be placed whether at the left front of the cage or in the front middle it as required by the particular operational task. This feature considerably increases the versatility of the unit in actual operation.

Both control panels are fitted with following most important warning, indication and control devices, all marked by clear symbols for easy recognisance.

- visual and audible indication for exceeding safe working load
- visual warning for activation of working cage collision guard system
- visual indication for ground pressure of the outriggers
- visual indication for the rescue ladder "safe to climb"
- visual indication for the centre position of the booms
- visual indication for the centre position of the working cage
- starting and stopping of chassis engine
- switch for the battery driven back-up for the hydraulic system
- joystick control levers for each movement
- membrane buttons for cage slewing
- emergency stop button
- overriding of the automatic working cage levelling system
- manual operation for the working cage levelling system
- switches for activating the bleed down system

CONTROLS AND INDICATORS IN DRIVERS CAB

In addition to chassis standard controls and indicators the following items are installed in drivers cab:

- visual warning for the main current being switched on
- visual warning for outriggers in travelling position
- visual warning for any of the equipment lockers being open
- visual warning for the booms not being fully in transportation position
- switch with visual indication for rotating beacons
- switch with visual indication for siren unit
- microphone for the public address system

SAFETY DEVICES

All load bearing hydraulic cylinders are fitted with lock valves directly integrated into the cylinder structure to prevent the booms, the working cage or the outriggers from retracting in case of a pipe or hose failure.

Retracting of any of the outriggers is automatically prevented as soon as the booms have been lifted from their travelling position.

Similarly lifting of the booms from the travelling position is prevented until the outriggers have reached the ground pressure.

All boom movements have been limited at their most extreme positions thus making it impossible for the operator to reach an unsafe configuration by normal means of operation. The movements having direct influence on the stability of the aerial have all been fitted with two separate limiting circuits, the first one retarding and stopping that particular movement, the second one deactivating the whole electric and hydraulic system should the first circuit not have worked.

All major movements, lifting of the first boom to its maximum elevation, and extending the telescopic movement or lowering the first boom at the maximum outreach have been fitted with slow-down devices to provide smooth deceleration of the movement. Also the starting of the movement is retarded for smooth acceleration.

Starting of the chassis engine from the control panels of the aerial is prevented unless the gear is shifted to neutral.

Inadvertent damaging of the drivers cab by the booms have been prevented by a system preventing lowering of the booms and rotation movement when the booms are near the drivers cab.

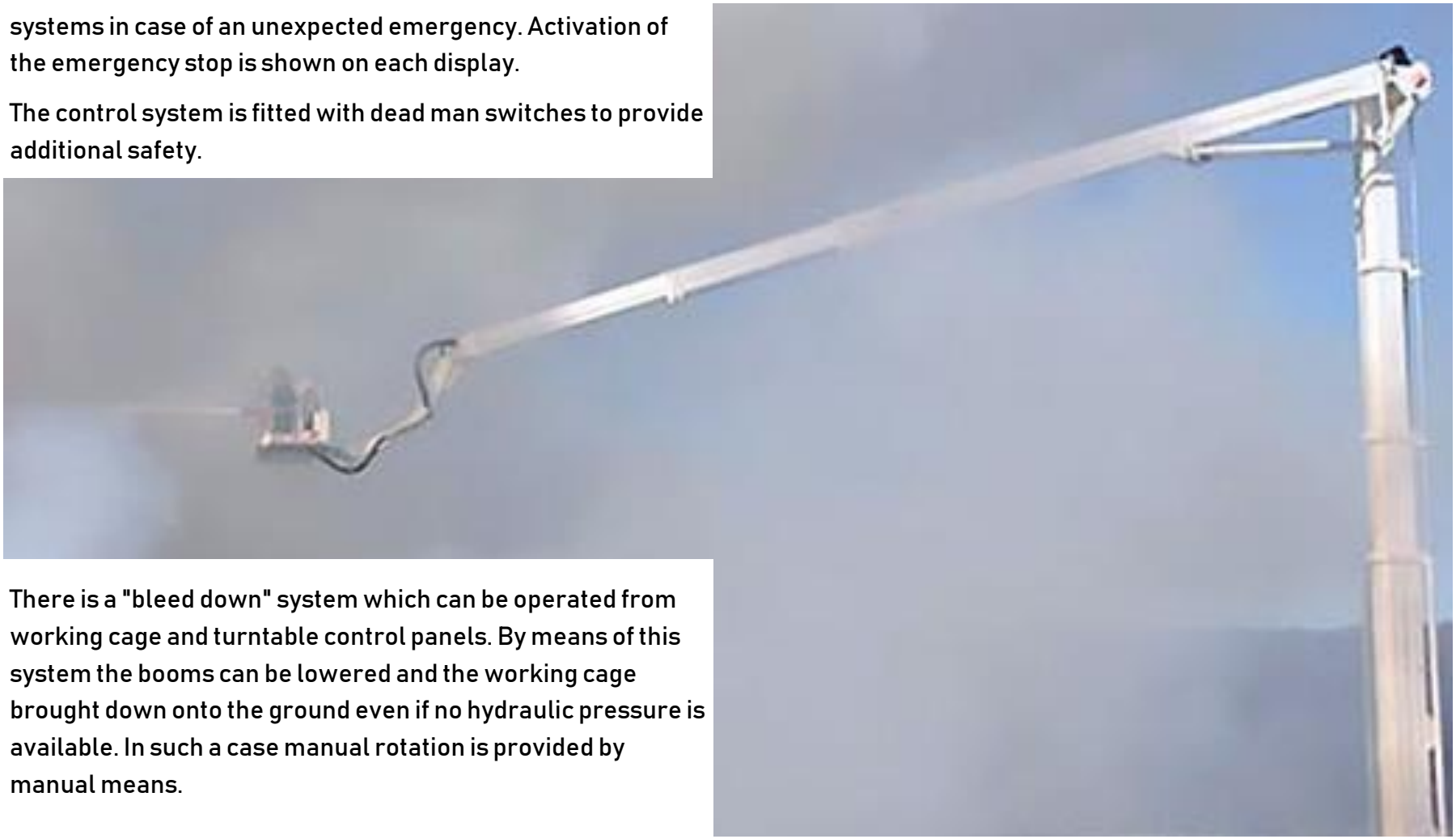
An overload warning has been fitted to give and audible and visual warning in case of exceeding the safe working load at all control stations.

A collision guard has been integrated to cage load sensor to provide additional safety when operating in darkness or in dense smoke. This system stops all movements and can be bypassed if needed.

An emergency stop switch is fitted at both boom control panels to provide immediate and complete "freezing" of all

systems in case of an unexpected emergency. Activation of the emergency stop is shown on each display.

The control system is fitted with dead man switches to provide additional safety.



There is a "bleed down" system which can be operated from working cage and turntable control panels. By means of this system the booms can be lowered and the working cage brought down onto the ground even if no hydraulic pressure is available. In such a case manual rotation is provided by manual means.

WATER WAY

The water way system is completely made ofnoncorrosive material. The nominal diameter of the water way is 100 mm. There is one 2½" inlet with a closing valve at each side at the rear of the vehicle from where the line leads through the centre post in the turntable upto the working cage where the water monitor is mounted. Along the booms, the piping is fitted onto the left hand side.

The centre post, which is mounted in the centre line of the turntable, provides continuous rotation even if water supply is simultaneously used.

The piping is protected from possible overpressure by means of at least one relief valve mounted underneath of the turntable.

On the side of the first boom there is a telescopic water pipe, which is made of aluminium. Moving sections of this pipe are designed to provide reliable function and long life span.

Seals between the sections are of low friction type and can be easily tightened if so required. On the side of the second boom a fixed noncorrosive pipe is installed and in boom pivoting points flexible, specially reinforced pressure hose is used. All hoses are fixed to the pipe with reliable span-lock connections.

Piping ends at the left hand side at the front of the working cage where the water monitor is placed. A 75 mm (3") valve is fitted in the cage to isolate the monitor if required.

There is an additional outlet with 65 mm (2½") closing valve and coupling for water supply from the cage through an extension hose. There are drain cocks fitted in the piping to enable it to be drained after use. On the front of the cage there are nozzles of water spray curtain system to protect cage occupants from radiant heat.

WATER MONITOR

Water monitor is connected onto the piping system and it is placed at the front of the cage on the left hand side just outside of the railing. Due to the fact that the monitor is placed outside of the cage the entire cage floor area can be fully utilized in extreme rescue situations. The monitor is made of light alloy and fitted with jet/fog nozzle with maximum nominal capacity of 3800 l/min.

PAINTING

Before painting all surfaces of steel structures have been carefully shoot blasted after which they have been primed. After the final top paint the thickness of the paint film is 100 microns. All booms have been painted from inside.

To provide very high corrosion resistance hollow structures such as steel profiles of the working cage, cage boom and outrigger beams and housings are treated with anti-corrosion protection "TECTYL".

Paint tones used for standard units are:

Working cage	pearl light grey	RAL 9022
Working cage support, boom sections, turntable and related cylinders	white	RAL 9010
Mainframe, outriggers and bodywork	red	RAL 3000
Outrigger cylinders	grey	RAL 7046
Chassis frame touch-ups	chassis original tone	

RAL 9022

RAL 9010

RAL 3000

RAL 7046

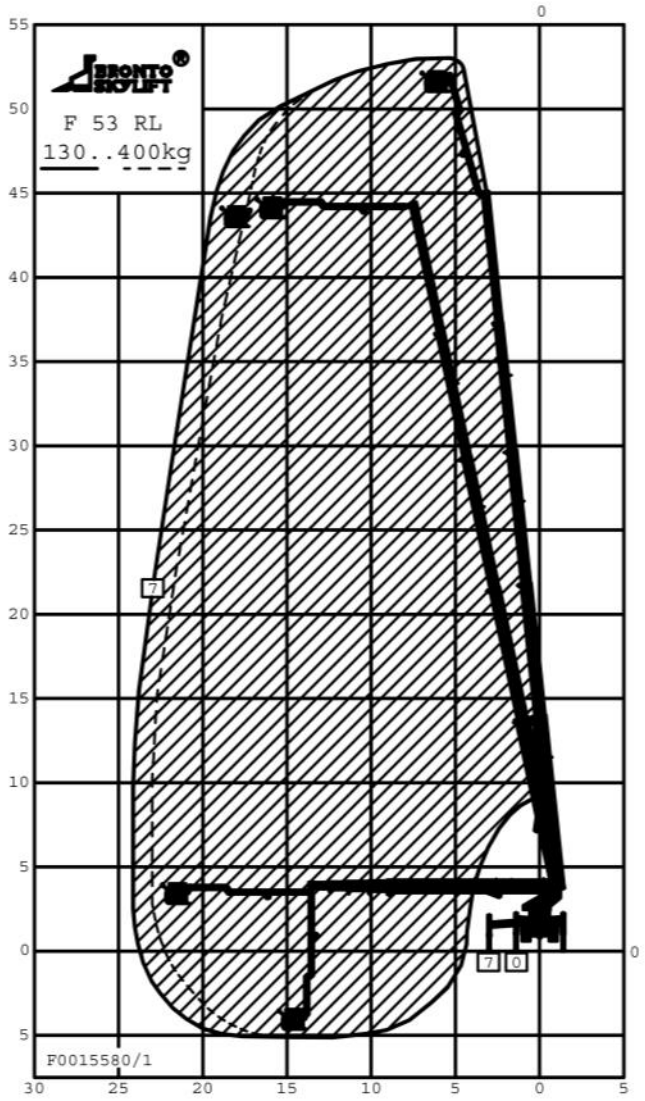
ACCESSORIES

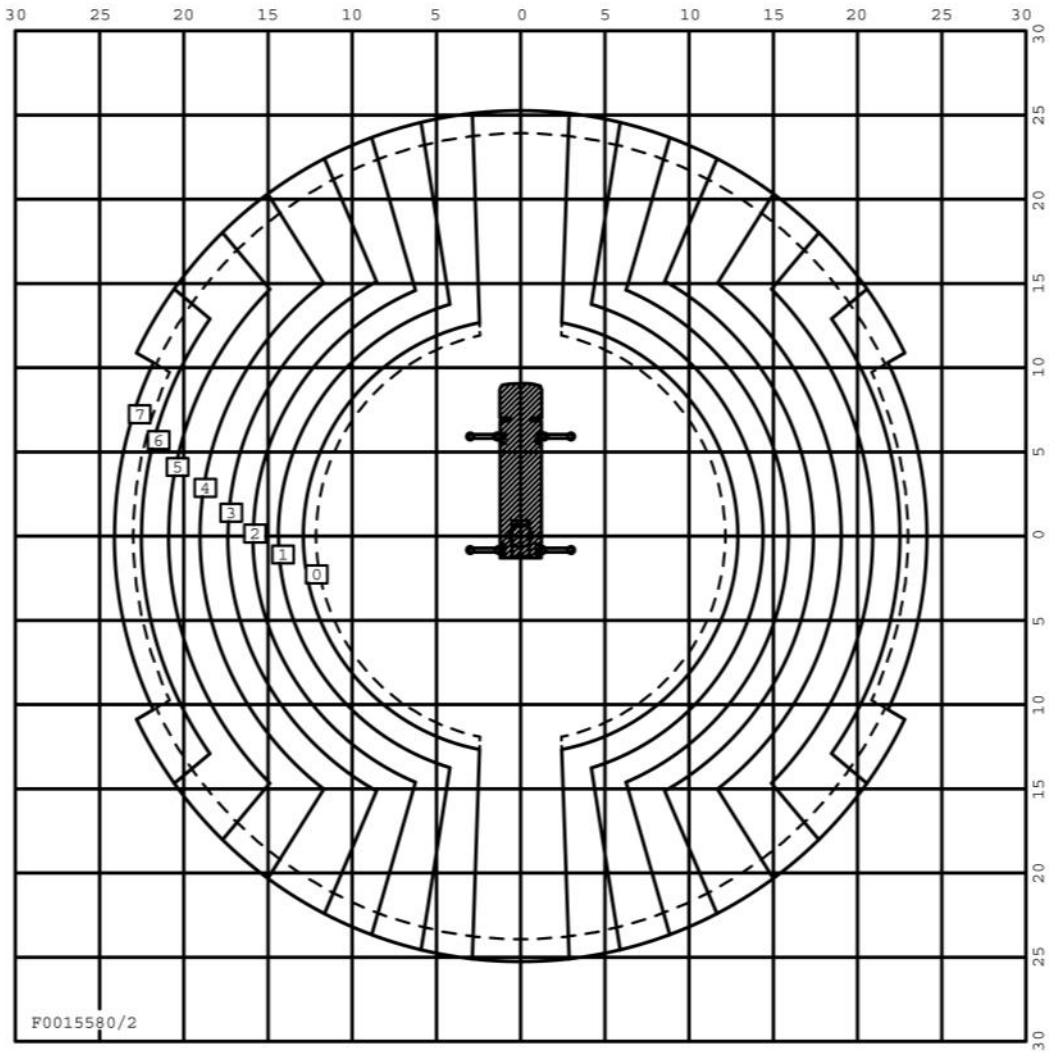
- 4 pc Wooden outrigger ground pads with brackets
- 2 pc Working range diagrams, one at the turntable, one at the turntable, one in the cage
- 1 pc Marking of safe working load in the cage
- 2 pc Unit type marked at the boom
- 1 set Warning labels and instruction plates
- 2 sets Operation and maintenance manuals
- 1 pc Plug for 24 V working light at the turntable and in the working cage
- 1 pc 24 V / 70 W working light with universal bracket
- 1 pc Lifting loop under the working cage, capacity 400 kg
- 1 pc Hydraulic pressure gauge

OPERATOR AIDS

- Remote control for the water monitor
- 4 sets of safety harnesses
- Combustion engine driven back-up
- System for the main hydraulic circuit

NOTE1 :DEMO
NOTE2 :
REMARKS :GVW 32t





TECHNICAL DATA

Safe working load max.	: 400 kg
Rescue ladder and water pipes	
Max. permitted wind speed	: 12.5 m/s
Typical GVW	: 32.0 ton
min. operating weight	: 31.0 ton
Outrigger width and lenght c/c	
- normal jacking	: 6.0/6.75 m
- one side jacking	: 4.4/6.75 m
- narrow jacking	: 2.8/6.75 m
Calculation code	:

b	Ylänäkymä lisätty, lopullinen versio	2000-04-14 MAh
a	Lisätty 130 kg käyrä,one-side 4.3 m	2000-02-24 MAh

:225 (A3)	BRONTO SKYLIFT F 53 MDT B2+		
code.	OUTREACH DIAGRAM	DRAWN	KKe 1999-08-09
O	SAFE WORKING LOAD MAX 400 kg	APP'V'D	

BRONTO SKYLIFT OY AB FINLAND | LAYER | DWG NUMBER F0015580 | REV b

BRONTOCAD

HANDLING ON CAD SYSTEM ONLY

Bronto Skylift

F54HDT

Aerial Ladder Platform

This specification covers an aerial ladder platform unit with maximum working height of 54 m. As a minimum requirement the design of operational stability and structural strength are based on criteria laid out in EN1777 and DIN 15120. Compliance with other norms and standards will be stated separately as applicable.

AERIAL LADDER PLATFORM

BRONTO SKYLIFT

F54HDT

MAIN OPERATING DATA

Max. working height (depending on transportation height)	54 m
Max. height to working cage bottom (depending on transportation height)	51,8 m
Max. height to the top of the ladder (depending on transportation height)	53,0 m
Max. working outreach	21,5 m
Max. working reach below the ground level	5,0 m
Safe working load (without water discharge)	400 kg
Max. nominal water discharge capacity (with adequate supply pressure)	3800 l/min
Rotation, continuous	360E
Transport height (depending on chassis)	3,9 m
Transport length (depending on chassis)	12,8 m
Transport width 2,5 m	
Typical weight with chassis, G.V.W. (standard specification of aerial, chassis to be specified)	32,0 t

MAIN FRAME

The main load bearing element of the aerial device is the strong main frame which takes all the loads caused by the operation of the aerial. The main frame is fixed onto the chassis frame with bolts in such a way that chassis performance and durability are maintained. The front fixing bolts are fitted with springs to allow the chassis frame beams to flex when the outriggers are fully down, thus avoiding any stress concentration in the chassis beams. The actual main frame is a fully welded rectangular steel structure providing high stiffness and thus maximum comfortability and operational safety.

STABILIZING SYSTEM

The stabilizing system consists of four hydraulically powered outriggers mounted in their housings in the main frame. Each housing is fitted with adjustable guides to provide smooth and accurate movement of the outrigger beam. The horizontal beam is a completely closed steel profile enclosing the hydraulic cylinder for the horizontal movement and the hydraulic hoses for the cylinder of the vertical movement thus completely protecting those devices from external damage. The H-type outriggers have been chosen for their ability to stabilize the vehicle from behind obstacles and to be placed on raised structures as necessary. Each vertical jack is fitted with self-aligning foot plate to spread the load evenly and to allow operation on uneven ground. As standard feature the stabilizing system can be used in "one sided" mode requiring only whether the left or the right hand side outriggers to be fully extended horizontally where as the outriggers on the opposite side remain within the width of the vehicle. This feature substantially reduces the width required for setting up and operating the aerial yet it provides full working height and full working outreach when operated on the fully supported side of the vehicle. There are two independent automatically operating and self controlling safety systems to prevent an unsafe configuration to be reached when the "one sided mode" is in use. The stabilizing system also includes a rear axle locking system in such cases where it is required for meeting the stability criteria. All controls for the entire stabilizing system are located in dust and water proof locker at the rear of the vehicle. The control levers are arranged in such a way that the outriggers are always visible to the

operator when operating each side separately. All control levers permit infinitely variable speed of each function separately or all together for easy and fast stabilizing procedure, also when operated on uneven ground. In the middle of the control panel there are following additional control devices:

- starting of chassis engine
- stopping of chassis engine
- activating hydraulic pressure
- visual indication for fully extended left outriggers
- visual indication for fully extended right outriggers
- visual indication for applied rear axle locking (if the feature is installed)
- visual indication for main current being switched on
- operating hour gauge
- indications for the fault finding system
- switch for the battery driven back-up for the hydraulic system
- visual indicators for levelling of the vehicle (longitudinal and transversal)

The locker containing outrigger controls is fitted with automatically operating door switch and light for night operation.

BODYWORK AND EQUIPMENT LOCKERS

The frame for the bodywork is made of aluminium. The frame has been covered by non-slip aluminium plate strong enough to allow free movement of persons on it. To provide easy access from the ground level there are recessed steps on both sides of the vehicle and equipment lockers made of aluminium profiles and aluminium plates, painted and finally bolted onto decking element for easy removal if necessary. All lockers are fitted with roller shutters, properly sealed to be water and dust proof. All doors are fitted with automatic switches activating the lights as soon as the door is opened and also activating the warning in drivers cab to indicate that all doors are not fully closed.

BOOMS

There are two booms, the first boom with telescopic extension providing direct movement and the second boom with vertical movement of approx. 180 degrees. This configuration results in compact travelling dimensions yet in extreme versatility in

operation. The second boom provides an up-and-over capability of approx. 8 m throughout its vertical movement. The booms have been welded by the unique plasma welding method to provide high durability and extreme accuracy. For high strength and minimum flexing of the boom sections only high tensile strength steels are used as load bearing structure. All telescopic sections of the first boom move synchronized ie. there are no intermediate jerks when the extension / retracting is operated. All sections are fitted with adjustable guides to provide smooth and accurate movement. Different maintenance objects are located well at hand either outside the boom or behind easily removable covers. All booms are internally and externally primed and painted for long life span.

TURNTABLE

The turntable is a fully integrated steel structure. The centre post containing slip rings with double pins for electrical connections, 100 mm stainless steel water way and hydraulic pressure and tank lines allows continuous rotation of the turntable.

The centre post is mounted inside of the turntable in such a way that maintenance can be done directly from the turntable. Rotation reduction gear with automatically operating braking system is installed at the front of the turntable for easy maintenance and adjustment. The hydraulic motor powering the rotation movement is fitted directly into the gear for high reliability. At the left hand side of the turntable there is the lower control station and at the right hand side the rescue ladder.

WORKING CAGE

The working cage is fixed to the booms with pivoting point at the level of the railing to provide highest possible degree of natural safety. The cage is made of tubular steel profile, welded together and painted with special paint with high durability. The dimensions of the working cage are 1,0 m (length) x 2,0 m (width) x 1,1 m (height) and it is fitted with two inwards opening doors, one located at the rear to enable safe access from the decking in travelling position and the other one located at the front for safe access in case of a rescue. Safe working load is 400 kg when no water is discharged.

WORKING CAGE LEVELLING

The working cage is kept horizontally levelled in any position

Bronto Skylift F104 HLA

of the booms. The levelling system is controlled by an automatic horizon monitoring device with two fully automatic and independent safety circuits in case of an uncontrolled levelling failure. There is a master switch for the automatic levelling system, thus it can be isolated and the manually controlled system activated.

The levelling movement is powered by a hydraulic cylinder located well protected inside the second boom. The cylinder is connected to a double mechanical linkage of which each alone can carry the entire safe working load.

WORKING CAGE SLEWING

The working cage can be turned 45 degrees to each side from its centre position. The movement is powered by a hydraulic cylinder with controls in the working cage and at the turntable control panels. The centre position of the cage is indicated by a visual indication at both control panels.

FOLD DOWN RESCUE PLATFORM

At the front of the working cage there is a rescue platform with automatically operating safety railing to provide additional safety during rescue and fire fighting. The dimensions of the rescue platform are 1,45 m x 0,45 m.

INTERCOM

There is a fully transistorized talk-back intercom system fitted between the turntable and the cage.

The main station with a loudspeaker and movable microphone is fitted in a water proof box at the turntable. The combined microphone and loudspeaker for no-hands-operation is located in the cage.

RESCUE LADDER

A stable telescopic rescue ladder system is attached onto the right hand side of the booms. Due to the telescopic design the ladder forms a direct continuous rescue way with no cross-over platform or similar obstacle.

The ladder is attached onto the boom structure at several points throughout its length resulting in extreme stability even when operated in windy conditions. Extension movement of the ladder is automatically synchronized with the telescopic movement of the first boom requiring no separate control devices.

Both control panels are fitted with visual indication for "safe to climb" position of the ladder.

There is a step at the turntable to provide safe access from the ladder down to the decking. Thus a continuous way from the maximum height down to the ground is provided for high capacity rescue operations.

HYDRAULIC SYSTEM

Hydraulic power is provided by a double axial piston pump, which is driven by the vehicle power take-off. The power need is about 30...50 kW depending on the size of the unit.

Without any operation of the aerial device, the pump rotates on minimum flow and minimum pressure. When one of the movements is operated the control valve automatically increases the pressure to a pre-set constant level and the oil flow to the amount that is needed for the movements activated.

Thanks to this method the loss of power in the hydraulic system, which normally causes overheating of the hydraulic oil, can be avoided and also the stresses caused to the vehicle transmission and P.T.O. system are minimized. At the same time fuel consumption and exhaust emissions are kept at the minimum.

By operating several movements simultaneously the oil flow will increase automatically according to the need in the system thus making all movement speeds independent on each other.

The constant pressure system with max. pressure setting prevents overloading of the system and its components e.g. cylinders.

Inside of the turntable and at the lower valve compartment there are instant couplings for the manometer in each pressure line. The manometer is fitted as a standard equipment.

The filtration of the oil consists of suction strainer in the suction line, pressure filters with visual indicators in each pressure circuit, return filter in return line and air filter on the reservoir thus providing maximum reliability by protecting the hydraulics against foreign particles.

The hydraulic cylinders are double acting with hard chrome-plated piston rods and they have been fastened by means of

Bronto Skylift F112HLA

self-aligning ball bearings to prevent lateral forces from damaging the seals or piston rods of the cylinders.

Hydraulic oil tank is integrated into the main frame for good protection and transformation of the heat. The tank is fitted with oil level gauge, temperature gauge, suction connections with closing valves for easy maintenance and draining outlet with closing valve. At each end of the main frame there are integrated housings for outriggers.

BACK-UP FOR THE HYDRAULIC SYSTEM

There is a battery driven hydraulic pump which provides an independent means of power in case of failure of the main engine. The system can be started from all control panels thus providing an immediate back-up in a case of a failure at an intense fire or similar immediate emergency.

ELECTRIC SYSTEM

The electric supply is taken from the chassis battery which is kept charged when the engine is running. Voltage of the system is 24 V DC and all circuits have been fitted with their specific fuses. When the main current is switched on, yellow flashing warning lights located at each outrigger boom pivoting point and underneath of the working cage are automatically switched on.

SIREN AND PUBLIC ADDRESS SYSTEM

There is an electric siren unit fitted on the front bumper or behind the front grille. Control panel of the system is conveniently located for the driver and it includes switches for fast (yelp), slow (wail) and two tone (Hi-Lo) sounds.

Command microphone, which is fitted with push-to-talk switch, allows the public address message to override the siren function. Operations are controlled by a switch in illuminated non-glare control panel.

ROTATING BEACONS

On each side of the drivers cab roof there are rotating beacons in the colour specified by the customer. The switch for switching the beacons on and off with suitable signal light is fitted inside of the cab in a convenient position for the driver.

CONTROL SYSTEM FOR BOOM AND ROTATION MOVEMENTS

All boom and rotation movements are controlled electro-hydraulically by means of servo valves. Thanks to the servo principle the control function is not sensitive to changes of ambient or oil temperature, thus providing smooth, safe and very accurate movements even in most severe operating conditions. All control movements can be performed by the remote control system from both control panels.

TURNTABLE AND WORKING CAGE CONTROL PANELS

The turntable control panel incorporating all control levers and safety system indications is fitted with a rotatable arm at the side of the turntable. This feature enables the whole control panel to be placed and locked conveniently in its operating position to provide the officer in charge with an excellent view over the different indications of the safety systems. If desired, the control panel can be rotated and locked in a position enabling direct access from the decking of the vehicle into control station.

The control station is fitted with convenient seat to provide comfort even in case of prolonged operation. The platform underneath the control position is covered by non-slip aluminium.

The working cage control panel incorporating all control levers and safety system indications is fitted with an easily removable bracket to enable the panel to be placed whether at the front of the cage or at the side of it as required by the particular operational task. This feature considerably increases the versatility of the unit in actual operation.

Both control panels are exactly alike thus considerably reducing the risk of confusion amongst operators under stress or even panic.

At the turntable control panel there is a change-over switch to select the panel from which the operation is controlled.

Both control panels are fitted with following most important warning, indication and control devices, all marked by clear symbols for easy recognisance.

visual and audible indication for exceeding safe working load

- visual warning for activation of working cage collision

guard system
- visual indication for fully extended left outriggers
- visual indication for fully extended right outriggers
- visual indication for the rescue ladder "safe to climb"
- visual indication for the centre position of the booms
- visual indication for the centre position of the working cage
- starting and stopping of chassis engine
- switch for the battery driven back-up for the hydraulic system
- joystick control levers for each movement
- control lever for cage slewing
- emergency stop button
- overriding of the automatic working cage levelling system
- manual operation for the working cage levelling system
- switches for activating the bleed down system

CONTROLS AND INDICATORS IN DRIVERS CAB

In addition to chassis standard controls and indicators the following items are installed in drivers cab:

- visual warning for the main current being switched on
- visual warning for any of the equipment lockers being open
- visual warning for the booms not being fully in travelling position
- visual warning for the rear axle being locked (if the feature is installed)
- visual warning for the outriggers not being fully in travelling position
- switch with visual indication for rotating beacons (optional)
- switch with visual indication for siren unit
- microphone for the public address system

SAFETY DEVICES

All load bearing hydraulic cylinders are fitted with lock valves directly integrated into the cylinder structure to prevent the booms, the working cage or the outriggers from retracting in case of a pipe or hose failure.

Retracting of any of the outriggers is automatically prevented as soon as the booms have been lifted from their travelling position. Similarly lifting of the booms from the travelling position is prevented until the outriggers have reached the

Bronto Skylift F54HDT

support width and ground pressure.

All boom movements have been limited at their most extreme positions thus making it impossible for the operator to reach an unsafe configuration by normal means of operation. The movements having direct influence on the stability of the aerial have all been fitted with two separate limiting circuits, the first one stopping that particular movement, the second one deactivating the whole electric and hydraulic system should the first circuit not have worked.

The major movements, lifting of the first boom to its maximum elevation, and extending the telescopic movement or lowering the first boom at the maximum outreach have been fitted with slow-down devices to provide smooth deceleration of the movement.

Starting of the chassis engine from any of the control panels of the aerial is prevented unless the gear is shifted to neutral.

Inadvertent damaging of the drivers cab by the first boom has been prevented by a system preventing lowering of the first boom and rotation movement when the first boom is near the drivers cab.

An overload warning has been fitted to give and audible and visual warning in case of exceeding the safe working load.

A collision guard has been fitted to provide additional safety when operating in darkness or in dense smoke. This system stops all movements and gives visual warning when activated.

An emergency stop switch is fitted at both boom control panels to provide immediate and complete "freezing" of all systems in case of an unexpected emergency.

The control system is fitted with RPM switches to provide additional safety.

There is a "bleed down" system which can be operated from working cage and turntable control panels. By means of this system the booms can be lowered and the working cage brought down onto the ground even if no hydraulic pressure is available. In such a case manual rotation is provided by manual means.

WATER WAY

The water way system is completely made of noncorrosive material. The nominal diameter of the water way is 100 mm. There is one 2½" inlet with a closing valve at each side at the rear of the vehicle from where the line leads through the centre post in the turntable up into the working cage where the water monitor is mounted. Along the booms, the piping is fitted onto the right hand side in a well protected position between the boom and the rescue ladder.

The centre post, which is mounted in the centre line of the turntable, provides continuous rotation even if water supply is simultaneously used. The piping is protected from possible overpressure by means of two relief valves mounted underneath of the turntable.

On the side of the first boom there is a telescopic water pipe, which is made of noncorrosive material. Moving sections of this pipe are designed to provide reliable function and long life span. Seals between the sections are of low friction type and can be easily tightened if so required. At boom pivoting points flexible, specially reinforced pressure hose is used. All hoses are fixed to the pipe with reliable span-lock connections. Piping ends at the right hand side at the front of the working cage where the water monitor is placed. A 75 mm valve is fitted in the cage to isolate the monitor if required. There is an additional outlet with 65 mm (2½") closing valve and coupling for water supply from the cage through an extension hose. All fire hose couplings are according to customer's requirements. There are drain cocks fitted in the piping to enable it to be drained after use. On the front underneath of the cage there are nozzles of water spray curtain system to protect cage occupants from radiant heat. Control valve of water spray curtain system is conveniently located inside of the cage.

WATER MONITOR

Water monitor is connected onto the piping system and it is placed at the front of the cage on the right hand side just outside of the railing. Due to the fact that the monitor is placed outside of the cage the entire cage floor area can be fully utilized in extreme rescue situations. The monitor is made of light alloy and fitted with jet/fog nozzle with maximum nominal capacity of 3800 l/min.

PAINTING

Before painting all surfaces of steel structures have been carefully shoot blasted after which they have been primed. After the final top paint the thickness of the paint film is 100 microns. All booms have been painted from inside.

To provide very high corrosion resistance hollow structures such as steel profiles of the working cage, cage boom and outrigger beams and housings are treated with anti-corrosion protection "TECTYL".

Paint tones used for standard units are:

Working cage	pearl light grey	RAL 9022
Working cage support, boom sections, turntable and related cylinders	white	RAL 9010
Mainframe, outriggers and bodywork	red	RAL 3000
Outrigger cylinders	grey	RAL 7046
Chassis frame touch-ups	chassis original tone	

RAL 9022

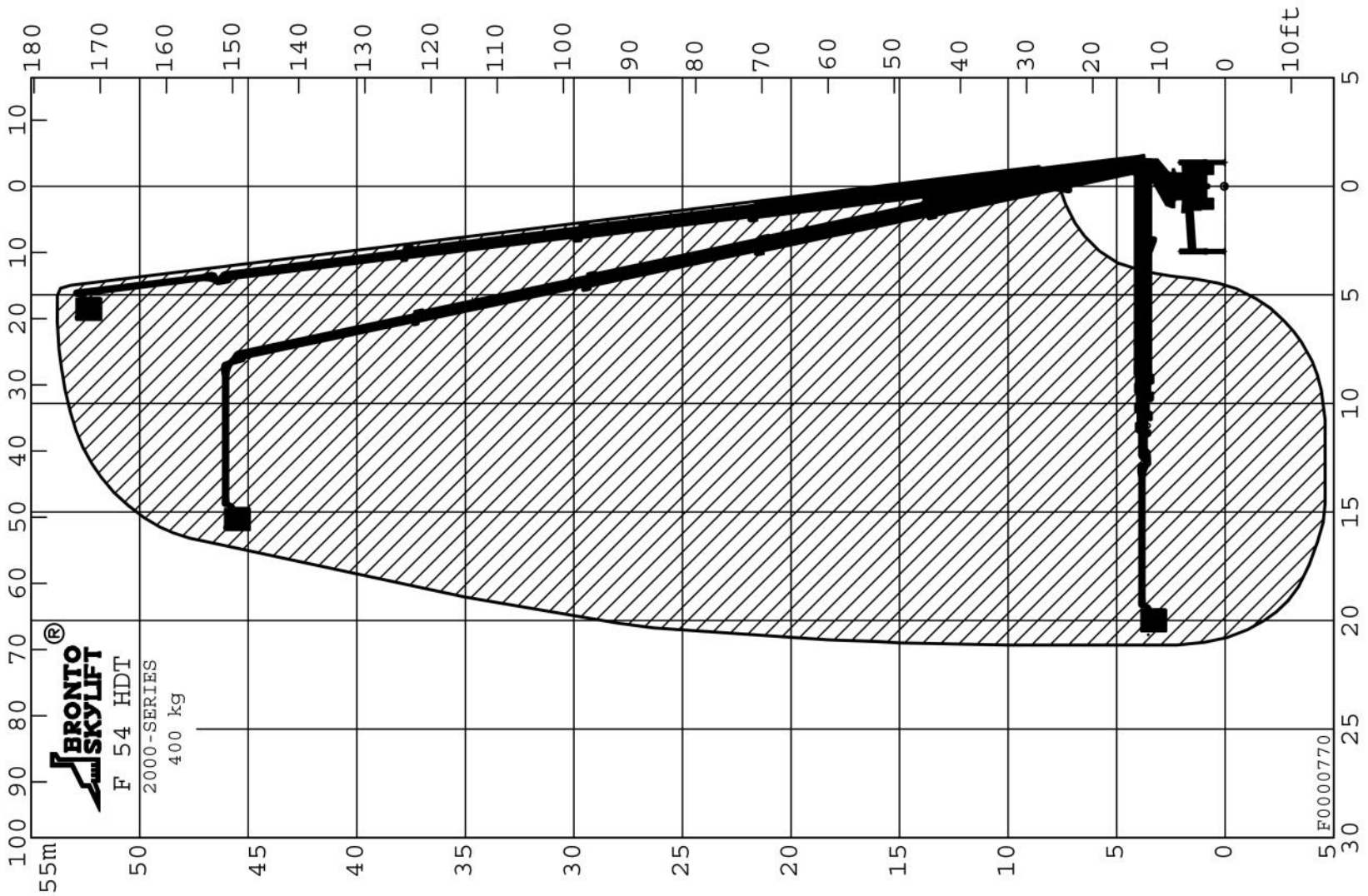
RAL 9010

RAL 3000

RAL 7046

Bronto Skylift F42 RLX

F 52 HDT (39152)



Taso 25: SI-mitat, variantti 0
Taso 26: US-mitat, variantti A

TECHNICAL DATA

Safe working load	: 400 kg
Max. permitted wind speed	: 12.5 (14) m/s
Typical min. GVW	: 32.0 ton
Outrigger width and lenght c/c	
- normal jacking	: 6.0/7.0 m
- one side jacking	: 4.1/7.0 m
Calculation code	:

ULOTTUVUUSKAAVIO
RÄCKVIDDSDIAGRAM
OUTREACH DIAGRAM
ARBEITSDIAGRAM
DIAGRAMA DE TRABAJO
RABO˜AQ SHEMA

b	07.04.98 KKe	Lisätty variantti A (US mitat)	
a	19.12.96 PNi	Muutettu 'vakiotuuli' 14->12.5 m/s	
1 : 200 (A3)	F 54 HDT	2000-SERIES	BRONTOCAD
CODE: OS	OUTREACH DIAGRAM	Tek. PNi	1998-04-07
	SAFE WORKING LOAD 400 KG	Hyv.	
FINLAND BRONTO SKYLIFT	F0000770 b		

Bronto Skylift

F55RLX

Aerial Ladder Platform

This specification covers an aerial ladder platform unit with maximum working height of 55 meters. As a minimum requirement the design of operational stability and structural strength are based on criteria laid out in EN1777. Compliance with other norms and standards will be stated separately as applicable.

AERIAL LADDER PLATFORM

BRONTO SKYLIFT

F55RLX

MAIN OPERATING DATA

Max. working height (depending on transportation height)	55 m
Max. height to working cage bottom (depending on transportation height)	53 m
Max. height to the top of the ladder (depending on transportation height)	53 m
Max. working outreach	30.5 m
Max. working reach below the ground level	7,0 m
Safe working load (without water discharge)	500 kg
Max. nominal water discharge capacity (with adequate supply pressure)	3800 l/min
Rotation, continuous	360^0
Transport height (depending on chassis)	3,9 m
Transport length (depending on chassis)	11 m
Transport width	2,5 m
Typical weight with chassis, G.V.W. (standard specification of aerial, chassis to be specified)	32 t

MAIN FRAME

The main load bearing element of the aerial device is the strong main frame which takes all the loads caused by the operation of the aerial.

The main frame is fixed onto the chassis frame with bolts in such a way that chassis performance and durability are maintained. The front fixing bolts are fitted with springs to allow the chassis frame beams to flex when the outriggers are fully down, thus avoiding any stress concentration in the chassis beams. The actual main frame is a fully welded steel structure providing high stiffness and thus maximum comfortability and operational safety.

At each end of the main frame there are integrated housings for outriggers.

STABILIZING SYSTEM

The stabilizing system consists of four hydraulically powered outriggers mounted in their housings in the main frame. Each housing is fitted with adjustable guides to provide smooth and accurate movement of the outrigger beam. The outrigger piston rods are completely protected by closed steel profile.

The H-type outriggers have been chosen for their ability to stabilize the vehicle from behind obstacles and to be placed on raised structures as necessary. Each vertical jack is fitted with self-aligning foot plate to spread the load evenly and to allow operation on uneven ground.

As standard feature the stabilizing system is automatic ”one button” variable jacking type. This feature substantially reduces the width required for setting up and operating the aerial yet it provides full working height and working outreach depending on where the jacks has been placed. There are two independent automatically operating and self controlling safety systems to prevent an unsafe configuration. All controls for the entire stabilizing system are located in dust and water proof locker at the rear of the vehicle. The remote control box has a wander lead which allows the operator to see outriggers at all time. The automatic jacking lifts the tyres off from the ground, levels the unit and drives the outriggers back to the transport position with one push to a button.

In the middle of the control panel there are following additional control devices:

- starting of chassis engine
- stopping of chassis engine
- activating the outrigger controls
- outrigger and outreach display with fault finding system
- operating hour and rpm-up gauge in the display
- switch for the battery driven back-up for the hydraulic system
- visual indicators for levelling of the vehicle (longitudinal and transversal)
- emergency stop
- controls for the automatic jacking

The locker containing outrigger controls is fitted with an automatically operating door switch and a light for night operation.

BODYWORK AND EQUIPMENT LOCKERS

The frame for the bodywork is made of aluminium. The elements have been covered by non-slip aluminium plate strong enough to allow free movement of persons on it.

To provide easy access to decking from the ground level there are steps on both sides of the vehicle. Equipment lockers are made of aluminium profiles and aluminium plates and bolted onto decking element for easy removal if necessary. All lockers are fitted with roller shutters, properly sealed to be water and dust proof. All doors are fitted with automatic switches activating the lights as soon as the door is opened and also activating the warning in drivers cab to indicate that all doors are not fully closed.

BOOMS

There are two booms, both with telescopic extension providing direct movement and the second boom additionally with vertical movement of approx. 180 degrees. This configuration results in compact travelling dimensions yet in extreme versatility in operation. The second boom provides an up-and-over capability of approx. 10,5 m throughout its vertical and horizontal movement.

The booms have been welded by the unique plasma welding method to provide high durability and extreme accuracy. For high strength and minimum flexing of the boom sections only high tensile strength steels are used as load bearing structure.

Bronto Skylift S46 XDT

All telescopic sections of the first boom move synchronized i.e. there are no intermediate jerks when the extension / retracting is operated and also slow down modifications at the beginning of the movement as well as at the end of the movement. All sections are fitted with adjustable guides to provide smooth and accurate movement.

Different maintenance objects are located well at hand either outside the boom or behind easily removable covers.

All booms are internally and externally primed and painted for long life span.

TURNTABLE

The turntable is a fully integrated steel structure. The centre post containing slip rings with double pins for electrical connections, 100 mm corrosion resistant water way and hydraulic pressure and tank lines allows continuous rotation of the turntable.

The centre post is mounted inside of the turntable in such a way that maintenance can be done directly from the turntable.

Rotation reduction gear with automatically operating braking system is installed in the middle, front of the turntable for easy maintenance and adjustment. The hydraulic motor powering the rotation movement is fitted directly into the gear for high reliability. At the left hand side of the turntable there is the lower control station.

WORKING CAGE

The working cage is fixed to the booms with pivoting point about cage floor level to provide highest possible degree of versatility. The cage is made of tubular steel profile, welded together and painted with special paint with high durability. The dimensions of the working cage are 1,15 m (length) x 2,2 m (width) x 1,1 m (height) and it is fitted with two inward opening doors located at the rear right side and left side to enable safe access to the cage in travelling position. The top railing is part of the left side cage door so entering into the cage without bending oneself is possible. The rescue entrance is located in the front and top railing can be moved to the side for safe and easy access. There are four fitments for safety harnesses in the working cage. Safe working load is 500 kg when no water is discharged and the cage telescope is in retracted position.

WORKING CAGE LEVELLING

The working cage is kept horizontally levelled in any position of the booms. The levelling system is controlled by an automatic hydraulic device with fully automatic and independent safety circuit in case of an uncontrolled levelling failure. There is a master switch for the automatic levelling system, thus it can be isolated and the manually controlled system activated.

The levelling movement is powered by a hydraulic cylinder located well protected inside the boom. The cylinder is connected to a mechanical linkage which can carry the entire safe working load.

WORKING CAGE SLEWING

The working cage can be turned 50 degrees to each side from its centre position to provide safety and comfortability in rescue operations. The movement is powered by a hydraulic cylinder with controls in the working cage and at the turntable control panels. The centre position of the cage is indicated by a visual indication at both control panels.

FOLD-DOWN RESCUE PLATFORM

At the front of the working cage there is a rescue platform with automatically operating safety railing to provide additional safety during rescue and fire fighting. The dimensions of the rescue platform are 1,36 m x 0,5 m.

INTERCOM

There is a talk-back intercom system fitted between the turntable and the cage.

The combined microphone and loudspeaker for no-hands-operation is located in the cage and at the turntable control station.

RESCUE LADDER

A stable telescopic rescue ladder system is attached onto the right hand side of the booms. Due to the telescopic design the ladder forms a direct continuous rescue way with no cross-over platform or similar obstacle. The cage boom ladder is telescopic and can be used when cage boom telescope is extended.

The ladder is attached onto the boom structure at several points throughout its length resulting in extreme stability even when operated in windy conditions. Extension movement of the ladder is automatically synchronized with the telescopic movement of the first boom requiring no separate control devices.

Both control panels are fitted with visual indication for "safe to climb" position of the ladder.

There is a step at the turntable to provide safe access from the ladder down to the decking. Thus a continuous way from the maximum height down to the ground is provided for high capacity rescue operations.

HYDRAULIC SYSTEM

Hydraulic power is provided by an axial piston pump, which is driven by the vehicle power take-off. The power need is 45...55 kW.

Without any operation of the aerial device, the pump rotates on minimum flow and minimum pressure. When one of the movements is operated the control valve automatically increases the pressure to a pre-set constant level and the oil flow to the amount that is needed for the movements activated.

Thanks to this method the loss of power in the hydraulic system, which normally causes overheating of the hydraulic oil, can be avoided and also the stresses caused to the vehicle transmission and PTO system are minimized. At the same time fuel consumption and exhaust emissions are kept at the minimum.

By operating several movements simultaneously the oil flow will increase automatically according to the need in the system thus making all movement speeds independent on each other.

The constant pressure system with max. pressure setting prevents overloading of the system and its components e.g. cylinders.

In the cage and at the lower valve compartment there are instant couplings for the manometer in the pressure line. The manometer is included as standard equipment. The hydraulic pressure and temperature are shown on displays.

The filtration of the oil consists of suction strainer in the suction line, pressure filters in each pressure circuit, return filter in return line and air filter on the reservoir thus providing maximum reliability by protecting the hydraulics against foreign particles.

The hydraulic cylinders are double acting with hard chrome-plated piston rods and they have been fastened by means of self-aligning ball bearings to prevent lateral forces from damaging the seals or piston rods of the cylinders.

Hydraulic oil tank is integrated into the main frame for good protection and transformation of the heat. The tank is fitted with oil level gauge, temperature gauge, suction connections with closing valves for easy maintenance and draining outlet with closing valve.

BACK-UP FOR THE HYDRAULIC SYSTEM

There is a battery driven hydraulic pump which provides an independent means of power in case of failure of the main engine. The system can be started from all control panels thus providing an immediate back-up in a case of a failure at an intense fire or similar immediate emergency.

ELECTRIC SYSTEM

The electric supply is taken from the chassis battery which is kept charged when the engine is running. Voltage of the system is 24 V DC and all circuits have been fitted with their specific fuses. When the main current is switched on, yellow flashing warning lights located at each outrigger and underneath of the working cage are automatically switched on.

SIREN AND PUBLIC ADDRESS SYSTEM

There is an electric siren unit fitted on the front bumper or behind the front grille. Control panel of the system is conveniently located for the driver and it includes switches for fast (yelp), slow (wail) and two tone (Hi-Lo) sounds.

Command microphone, which is fitted with push-to-talk switch, allows the public address message to override the siren function. Operations are controlled by a switch in illuminated non-glare control panel.

ROTATING BEACONS

On each side of the drivers cab roof there are red or blue

Bronto Skylift F112 HLA

rotating beacons. The switch for switching the beacons on and off with suitable signal light is fitted inside of the cab in a convenient position for the driver.

CONTROL SYSTEM FOR BOOM AND ROTATION MOVEMENTS

All boom and rotation movements are controlled electro-hydraulically by means of proportional valves. Thanks to the proportional principle the control function is not sensitive to changes of ambient or oil temperature, thus providing smooth, safe and very accurate movements even in most severe operating conditions. All control movements can be performed by the remote control system from both control panels. The side outreach is determined by the position of the outriggers. The variable system contains also displays at all three control stations. The displays give the real-time information about the outreach and the cage position and also show possible movements according to cage position by animated arrows. There are at least four different views on each display:

- Outreach preview
- Real time outreach and cage position with guidance information
- Main outreach with two views (side and up)
- Fault finding system
- Statistic information
- Tools screen (personal settings)

TURNTABLE AND WORKING CAGE CONTROL PANELS

The turntable control panel incorporating all control levers and safety system indications is fitted with a rotatable arm at the side of the turntable. This feature enables the whole control panel to be placed and locked conveniently in its operating position to provide the officer in charge an excellent view over the different indications of the safety systems. If desired, the control panel can be rotated and locked in a position enabling direct access from the decking of the vehicle into control station.

The control station is fitted with convenient adjustable seat to provide comfort even in case of prolonged operation. The platform underneath the control position is covered by non-slip aluminium.

Both control panels have been designed with same layout reducing the risk of confusion amongst operators under stress or even panic.

At the turntable control panel there is a change-over switch to select the panel from which the operation is controlled.

The working cage control panel incorporating all control levers and safety system indications is recessed to cage railing to provide the largest cage space as required by the particular operational task. This feature considerably increases the versatility of the unit in actual operation.

Both control panels are fitted as standard with following most important warning, indication and control devices, all marked by clear symbols for easy recognisance.

- joystick control levers for each movement
- buttons for cage slewing
- button for starting and stopping of chassis engine
- button for the battery driven back-up for the hydraulic system
- button for emergency stop
- button for overriding of the automatic working cage levelling system
- button for manual operation for the working cage levelling system
- extra buttons for special features
- button for activating the bleed down system
- button for automatic drive of booms to transport position
- button for approaching speed (lower down speeds of boom movements)
- button for work lights
- intercom system
- integrated water monitor controls
- visual and audible indication for exceeding safe working load
- visual warning for activation of working cage collision guard system
- visual indication for ground pressure of the outriggers
- visual indication diagram containing information on particular movements being restricted or permitted based on real-time information on actual boom configuration
- visual indication for the rescue ladder "safe to climb"
- visual indication for the centre position of the booms
- visual indication for the centre position of the working cage

- visual indication for wind speed
- visual indication for cab protection
- visual indication for tilt alarm
- visual indication for Bronto Telecontrol activated
- visual indication for service time reminder
- visual indication for service counters for chassis motor, electric power, generator and battery pump
- information screen for all important alarms and vital information
- fault finding screen

CONTROLS AND INDICATORS IN DRIVER´S CAB

In addition to chassis standard controls and indicators the following items are installed in drivers cab:

- visual warning for the main current being switched on
- visual warning for outriggers in travelling position
- visual warning for any of the equipment lockers being open
- visual warning for the booms not being fully in transportation position
- switch with visual indication for rotating beacons
- switch with visual indication for siren unit
- microphone for the public address system

SAFETY DEVICES

All load bearing hydraulic cylinders are fitted with lock valves directly integrated into the cylinder structure to prevent the booms, the working cage or the outriggers from retracting in case of a pipe or hose failure.

Retracting of any of the outriggers is automatically prevented as soon as the booms have been lifted from their travelling position.

Similarly lifting of the booms from the travelling position is prevented until the outriggers have reached the ground pressure.

All boom movements have been limited at their most extreme positions thus making it impossible for the operator to reach an unsafe configuration by normal means of operation. The movements having direct influence on the stability of the aerial have all been fitted with two separate limiting circuits, the first one retarding and stopping that particular movement, the second one deactivating the whole electric and hydraulic system should the first circuit not have worked.

All major movements, lifting of the first boom to its maximum elevation, and extending the telescopic movement or lowering the first boom at the maximum outreach have been fitted with slow-down devices to provide smooth deceleration of the movement. Also the starting of the movement is retarded for smooth acceleration.

Starting of the chassis engine from the control panels of the aerial is prevented unless the gear is shifted to neutral.

Inadvertent damaging of the drivers cab by the booms have been prevented by a system preventing lowering of the booms and rotation movement when the booms are near the drivers cab.

An overload warning has been fitted to give and audible and visual warning in case of exceeding the safe working load at all control stations.

A collision guard has been integrated to cage load sensor to provide additional safety when operating in darkness or in dense smoke. This system stops all movements and can be bypassed if needed.

An emergency stop switch is fitted at both boom control panels to provide immediate and complete "freezing" of all systems in case of an unexpected emergency. Activation of the emergency stop is shown on each display.

The control system is fitted with dead man switches to provide additional safety.

There is a "bleed down" system which can be operated from working cage and turntable control panels. By means of this system the booms can be lowered and the working cage brought down onto the ground even if no hydraulic pressure is available. In such a case manual rotation is provided by manual means.

WATER WAY

The water way system is completely made of noncorrosive material. The nominal diameter of the water way is 100 mm. There is one 2½" inlet with a closing valve at each side at the rear of the vehicle from where the line leads through the centre post in the turntable upto the working cage where the water monitor is mounted. Along the lower boom package, the piping is fitted onto the right hand side between the ladders and the booms.

New & old Wellington Bronto Skylifts

The centre post, which is mounted in the centre line of the turntable, provides continuous rotation even if water supply is simultaneously used. The piping is protected from possible overpressure by means of at least one relief valve mounted underneath of the turntable. On the side of both booms there are telescopic water pipes, which are made of noncorrosive material. Moving sections of this pipe are designed to provide reliable function and long life span. Seals between the sections are of low friction type and can be easily tightened if so required. At boom pivoting points flexible, specially reinforced pressure hose is used. All hoses are fixed to the pipe with reliable span-lock connections. Piping ends at the left hand side at the front of the working cage where the water monitor is placed. A 75 mm (3") valve is fitted in the cage to isolate the monitor if required. There are additional outlets with 65 mm (2½") closing valves and couplings for water supply from the cage through an extension hose. There are drain cocks fitted in the piping to enable it to be drained after use. On the front of the cage there are nozzles of water spray curtain system to protect cage occupants from radiant heat.

WATER MONITOR

Water monitor is connected onto the piping system and it is placed at the front of the cage on the left hand side just outside of the railing. Due to the fact that the monitor is placed outside of the cage the entire cage floor area can be fully utilized in extreme rescue situations. The monitor is made of light alloy and fitted with jet/fog nozzle with maximum nominal capacity of 3800 l/min.

ACCESSORIES

4 pc Wooden outrigger ground pads with brackets
2 pc Working range diagrams, one at the turntable, one at the turntable, one in the cage
1 pc Marking of safe working load in the cage
2 pc Unit type marked at the boom
1 set Warning labels and instruction plates
2 sets Operation and maintenance manuals
1 pc Plug for 24 V working light at the turntable and in the working cage
1 pc Lifting loop under the working cage, capacity 500 kg
1 pc Hydraulic pressure gauge

PAINTING

Before painting all surfaces of steel structures have been carefully shoot blasted after which they have been primed. After the final top paint the thickness of the paint film is 100 microns. All booms have been painted from inside.

To provide very high corrosion resistance hollow structures such as steel profiles of the working cage, cage boom and outrigger beams and housings are treated with anti-corrosion protection "TECTYL".

Paint tones used for standard units are:

Working cage	pearl light grey	RAL 9022
Working cage support, boom sections, turntable and related cylinders	white	RAL 9010
Mainframe, outriggers and bodywork	red	RAL 3000
Outrigger cylinders	grey	RAL 7046
Chassis frame touch-ups	chassis original tone	

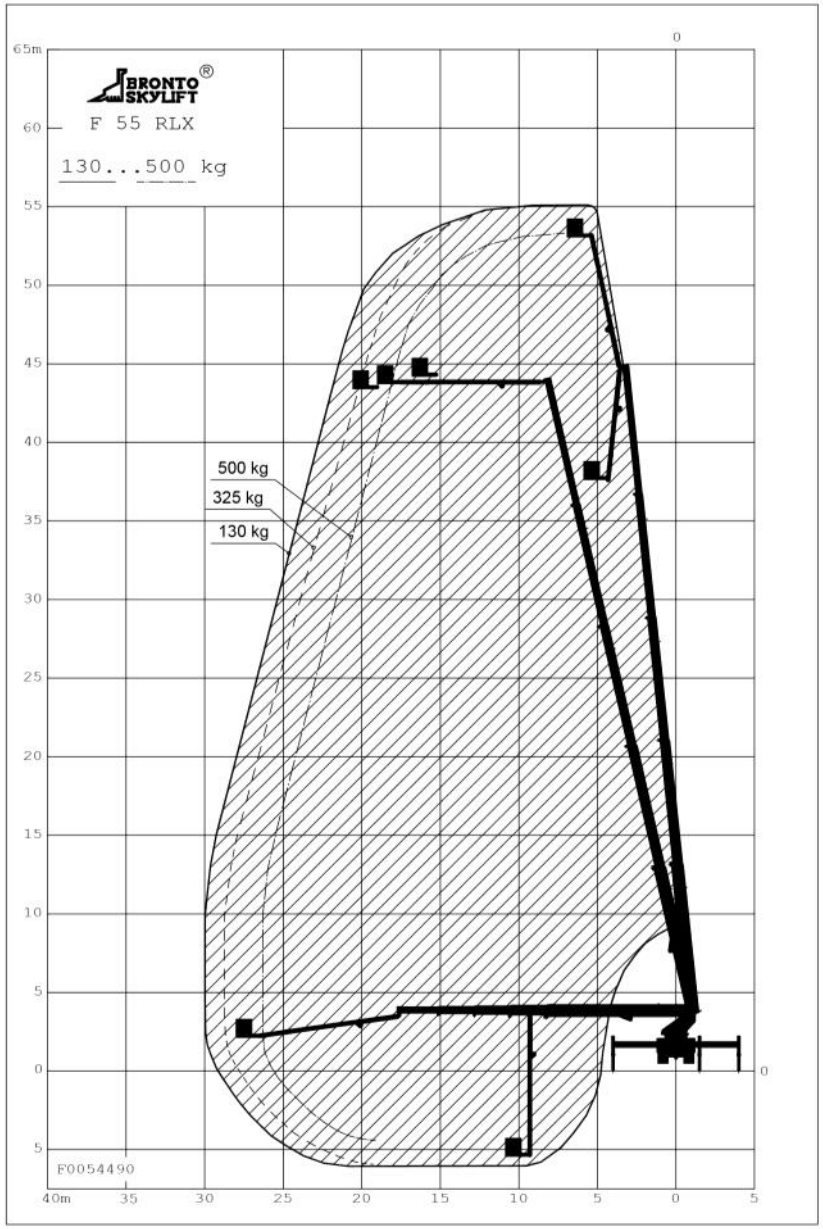
RAL 9022

RAL 9010

RAL 3000

RAL 7046

NOTE1 :
NOTE2 :
REMARKS :PRELIMINARY



TECHNICAL DATA	
Safe working load max.	: 500 kg
Max. permitted wind speed	: 12.5 m/s
Typical GVW	: 32.0 ton
min. operating weight	: 30.0 ton
Outrigger width and length c/c	
- normal jacking	: 8.0/7.1 m
- one side jacking	: 5.5/7.1 m
- narrow jacking	: 3.0/7.1m
Calculation code	:

PRELIMINARY

1 : 225 (A2)

BRONTO F 55 RLX

OUTREACH DIAGRAM

SAFE WORKING LOAD MAX 500 kg

DRAWN KKe 2008-05-02

APP'V'D

CODE: O

BRONTO SKYLIFT OY AB FINLAND

LAYER

DWG NUMBER F0054490

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