SIMON SNORKEL FIRE – SERIES
SST330; SST410; SST560

COLOUR CODE

SST RANGE - BLACK
SST330 - RED
SST410 - BLUE
SST560 - MAGENTA

GENERAL DATA
OPERATIONAL DATA

SIMON SNORKEL FIRE – SERIES
SST330; SST410; SST560

SST330		
Maximum working height		33m
Maximum Cage Floor Height		31m
Maximum working outreach	@ 80KG SWL	23m
Maximum working outreach	@ 400KG SWL	22m
Maximum downreach		6.5m
Jacks extended - overall width		6.0m
Cage Size (overall)		1.0 x 2.0 x 1.1m
Cage rail height		1.1m
Cage floor area (overall)		2.0m²
Rotating cage		50°L & 100°R
Turntable rotation		360° continuous
SST410		
Maximum working height		41.0m
Maximum cage floor height		39m
Maximum working outreach @ 80KG SWL		23m
Maximum working outreach @ 200KG SWL		20.5m
Maximum downreach		6.5m
Jacks extended - overall width		6.0m
Cage Size (overall)		1.0 x 2.0 x 1.1m
Cage rail height		1.1m
Cage floor area (overall)		2.0m²
Rotating cage		50°L & 100°R
Turntable rotation		360° continuous
SST560		
Maximum working height		56.0m
Maximum cage floor height		54m
Maximum working outreach @ 80 KG SWL		23m
Maximum working outreach @ 400Kg SWL		21.5m
Jacks retracted - overall width		2.5m
Maximum downreach		6.5m
Jacks extended - overall width		6m
Cage Size (overall)		1 x 2.0 x 1.1m
Cage rail height		1.1m
Cage floor area (overall)		2.0m²
Rotating cage		50°L & 100°R
Turntable rotation		360° continuous
TRAVELLING DIMENSIONS		**Metres**
SST330		
Length		10.6m
Width		2.5m
Height *		3.65m
SST410		
Length		11.5m
Width		2.5m
Height *		3.8m
SST560		
Length		12m
Width		2.5m
Height *		3.9m

* Dependant on Chassis

SIMON SNORKEL FIRE – SERIES

SST330; SST410; SST560

SST330	
Typical gross vehicle weight (approx.)	24000 KG
Cage safe working load (dry monitor)	400 KG
Cage safe working load (monitor operating)	260 KG
Cage lifting eye	as S.W.L.
Boom lifting eye (outer telescopic boom)	1000 KG
SST410	
Typical gross vehicle weight (approx.)	26500 KG
Cage safe working load (dry monitor)	400 KG
Cage safe working load (monitor operating)	260 KG
Cage lifting eye	as S.W.L.
Boom lifting eye (outer telescopic boom)	1000 KG
SST560	
Typical gross vehicle weight (approx.)	34500 KG
Cage safe working load (dry monitor)	400 KG
Cage safe working load (monitor operating)	260 KG
Cage lifting eye	as S.W.L.
Boom lifting eye (outer telescopic boom)	1000 KG

SST330	
JACK LOADS	
Maximum jack load	15000 KGs
Maximum jack foot pressure	7.7 KGs/cm²
OPERATING SPEEDS	**Seconds**.
No.1 boom - Full stroke	80
Telescopic - Full stroke	40
Tip boom - Full stroke	60
All jacks down	25
Ground to full height	
360° rotation	100
WATER SYSTEM	
Cage monitor discharge	3800 LPM
Inlet pressure at base collecting head (maximum)	12 bar
SST410	
JACK LOADS	
Maximum jack load	
Maximum jack foot pressure	
OPERATING SPEEDS	**Seconds**.
All jacks down	25
Ground to full height	110
360° rotation	100
WATER SYSTEM	
Cage monitor discharge	3800 LPM
Inlet pressure at base collecting head (maximum)	13.5 bar
SST560	
JACK LOADS	
Maximum jack load	
Maximum jack foot pressure	
OPERATING SPEEDS	**Seconds**.
All jacks down	25
Ground to full height	125
360° rotation	100
WATER SYSTEM	
Cage monitor discharge	3800 LPM
Inlet pressure at base collecting head (max.)	14 bar

SST RANGE
STANDARD MONITOR RANGE OF MOVEMENT.
The standard manual light alloy monitor with a capacity of 3800 L/pm at 7 bar will be mounted at the front of the cage and is operable hand. It is possible to take the full flow of water throughout the monitors full range of movement as specified below.

Rotation	60° left from centre
	60° right from centre
Elevation	+50 ° from horizontal
Depression	-50° from horizontal

Optional Remote Control Monitor

A light alloy remote control monitor with a capacity of 3800 L/pm at 7 bar. The monitor will be mounted at the front of the cage in place of the manual monitor. The monitor will be hydraulically controlled. Controls for the monitor are provided at the cage and turntable control stations. These take the form of:

1) a joystick that controls the elevation and rotation of the monitor.
2) two stainless steel buttons to control the jet/fog action of the nozzle.

The full flow of water can be passed through the remote monitor throughout the full range of movement as specified below.

Rotation	60° left from centre
	60° right from centre
Elevation	+45° from horizontal
Depression	-45° from horizontal

SST RANGE
THE MAIN FRAME

FRAME
The purpose of the frame is to support the Platform, and during operation transfer the forces on to the stabiliser jacks, thus reducing stresses on the vehicle chassis frame.

The hydraulic reservoir is built into the main frame so that any heat generated in the hydraulic system can be quickly dissipated through the structure. It is treated internally to prevent corrosion and two large inspection covers give good internal access.

MOUNTING
Mounting to a recommended vehicle is carried out on an individual basis due to the wide variation in chassis frame height, width and strength, in addition to wheelbase, cab height and type of bodywork required.

In general, the mounting position has to take into account:
- axle loading
- overall height, which is largely dependent on vehicle cab height
- compliance with local road traffic regulations, particularly with regard to front and rear overhang
- approach and departure clearance angles.

CHASSIS TYPES SUITABLE FOR MOUNTING SST UNITS
Table 1.1 demonstrates each of the types of chassis for Fire Ranger SST design engineers have carried out drawings, done calculations and concluded that it is possible to mount an SST unit.

Table 1.1

SST330	SSST410	SSST560
Scania P93HL 6x4	**Volvo** FL10/6x4	**Volvo** FL10 8X4
Scania P93HL 6x2	**Steyr** 36 S 32/P36/8x4	**Steyr** 36 S 32/P36/8x4
ERF EC 8.30 MU3L 6x4 Chassis	**Mercedes** 2631/45/6x4	**Mercedes** 2631/45/8x4
Mercedes Benz 2531 6x4 Chassis	**Renault** G300.26 6x4	**Renault** G300.26 6x4
Volvo FL10 6x4 Chassis	**Renault** G340.40 8x4	**Renault** G340.40 8x4
	Iveco MP 340 E34H 8x4x4	**Iveco** MP 340 E34H 8x4x4
	Iveco MP 260 E42 6x4	
	Scania P 94 GB 6x2NZ	
	MAN TGS 8x4	**MAN** TGS 8x4

SST RANGE HYDRAULIC SYSTEM

Hydraulic power to the unit (when mounted to the vehicle chassis as an appliance) is provided by a hydraulic pump driven by the vehicle power take-off and mounted generally on the mainframe.

An automatic engine speed regulator is fitted as standard and engine speed is automatically increased when:

(i) jack's operation is selected
(h) a boom control is operated

The hydraulic circuits are fitted with full flow suction and pressure line filters, the latter giving protection down to 6 microns absolute and incorporating an electrical element condition indicator.

A D.C. Motor driven standby system driving an auxiliary hydraulic pump is provided on the appliance. This will provide reduced speed operation of the machine in the event of main vehicle engine or pump failure. The standby pump can also be used to retract the jacks so that the appliance can be returned to its original travelling position.

SST RANGE
STABILISING JACKS

Four jacks of the horizontal and vertical type having the vertical jack cylinders mounted on the ends of steel box sections which slide laterally in housings integral with the main frame. They are driven directly by hydraulic cylinders. Both the vertical and the horizontal jack cylinders are hydraulically locked in position when extended.

When retracted fully each jack is retained in position horizontally and vertically by hydraulic lock valves.

Large swivelling feet spread the load evenly on uneven ground and limit damage to road surfaces. The base of the feet are manufactured with tread pattern or studs to prevent slippage in icy conditions.

The jacks are capable of levelling the unit to operational status on a transverse slope of 11° or a longitudinal slope of 7°.

Dimensions (Applicable for SST330, SST410 & SST560)

Fully retracted:	2.5 m width overall (2.3 m centres)
Fully extended:	6 m width overall (5.5 m centres)

Controls: The electric, push button, jacking controls are coupled in various combinations to provide the easiest and fastest method for jacking the unit.

The horizontal extension and retraction of the jacks is controlled by individual buttons on the appropriate sides of the. unit to ensure that movements are safely visible to the operator. The movements can be made simultaneously.

Individual buttons are provided to vertically extend:

- All four jacks simultaneously.
- The front pair.
- The rear pair.
- The L.H. side pair.
- The R.H. side pair.

The speed of each jack is automatically controlled so that on level ground the jacking procedure is very simple and fast. On slopes the paired control buttons facilitate quick levelling.

All four vertical jacks are retracted simultaneously by pressing a single button.

Safety features

The jacks/boom interlock system is electro hydraulic and the system is designed to ensure that at least two faults would have to occur before the unit could be operated unsafely.

However, there are certain conditions relating to primary structural components in machinery of this type which cannot be embraced by this design philosophy. For example, the catastrophic fracture of a boom structure or major hydraulic cylinder defect. In these instances, the approach to safety is to adopt rigorous quality control techniques during manufacture. This includes extensive testing both as a separate assembly and after installation in the machine, prior to shipment.

Horizontal extension of the jacks is signalled by duplicated switching circuits, both circuits have to signal that each jack is in position before jacking can proceed.

The jacks are provided with ground pressure sensors which must be correctly actuated before the booms will operate.

The circuits and valves which activate the boom hydraulics when the jacking conditions are satisfied are duplicated and both must operate correctly before the booms can be used.

The jacking system is isolated hydraulically and electrically when the booms are elevated with an electrical interlock preventing reinstatement until the booms are housed.

The unit is provided with a spirit level and an electronic level sensor which measures both fore and aft and sideways inclination of the unit and gives audible warning at cage and ground level if permitted inclinations are exceeded. The level sensor remains active during operation of the booms and would warn the operator of the development of unsafe inclination due to the ground sinking beneath the jacks or any other reason.

SST RANGE
NARROW JACKING

The system will allow the booms to be elevated and slewed between fixed limits when the unit is jacked at less than full jack spread.

When booms are fully elevated (80°) the unit fixed limits are deactivated and the unit may then rotate 360° continuously.

The limits operate only on the side of the unit which has less than full jack spread extension, full movement is allowed on the side having full spread.

When both sides have full jack spread all of the limits cancel, permitting the full range of machine movements.

The control system detects the jack horizontal extension and automatically controls the working parameters of the booms and prevent operations in unstable positions.

There is one telescoping section comprising of three extending boom sections and one fixed length section. The telescopic section pivots about the tumtable, the second fixed length boom section pivots about the free end of the telescopic section and has the cage pivot mounted at the other end.

The configuration of the booms allows the second boom section with cage to pivot 175' about the free end of the telescope section and the first boom section to pivot about the tumtable giving +80° -10° from the horizontal. This arrangement allows the second boom with cage to be pivoted back under the first boom which in turn can be pivoted to a horizontal position along the length of the vehicle to give a travelling length of approx. 11.5 metres.

All booms are constructed in high strength steel. First and second boom pivoting is actuated by hydraulic cylinders which have integral lock and flow restrictor valves. The lock valves prevent cage 'drift' and also ensure that the booms remain firmly in position, even in the event of a burst pipe or hydraulic failure.

First boom telescopic movements are hydraulically actuated together with a duplicated chain system. A "cat track" arrangement is mounted to one side and outside the telescopic boom section for easy maintenance. This is utilised to convey electrics, hydraulics and services up to the cage and to cater for the extension and retraction of the telescoping action. All pivot pins have grease nipples provided as standard.
A built in lifting-eye is positioned on the end of the outer telescope boom with a capacity of 1000 Kg.

SST RANGE
CONTROL AND SAFETY

The cage and turntable controls are identical for familiarity and ease/safety of operation.

The cage and turntable joystick controls are connected directly to the machine logic controller together with limit switches and load sensors.

The special pressure compensated directional control valves give infinitely variable operating speeds and several can be used simultaneously without any reduction in boom speeds.

The control system is the result of several man years testing and refinement. Consequently, the machine is particularly easy to operate having "soft" start-stop joystick functions on all movements both at end of stroke conditions and at intermediate positions, providing protection from clumsy operation. The position of the joystick lever determines the output flow of the valve, this allows the operational speeds to be infinitely variable from creep to full speed with instant response.

A load moment sensing system provides an input to the control system which will ramp down any friction tending to increase overturning moment when 93% of the machine's rated capacity is reached and will stop the machine at 100%. If the machine is subjected to conditions where 100% overturning moment capacity is exceeded (e.g. cage payload exceeded at high outreach rescue conditions), only functions which will reduce this condition are enabled. If 105% overturning moment is reached, the control system invokes an emergency stop and the machine must be controlled manually at the hydraulic valves in the turntable. A secondary system is supplied providing a second switch at 105%.

A visual display positioned at each control position indicates the proportion of payload remaining prior to safety stop operation.

Pre-set deceleration/acceleration is provided as standard:
a) At the end of stroke of the cylinders (closed and fully open).
b) At the point of safety stop actuation.

The following priority/override facilities are fitted as standard.
a) Cage controls can be isolated at the cage.
b) Cage controls can be isolated at the turntable,
c) Turntable controls can be isolated at the turntable.

Note: The control valves positioned at the turntable include hand levers for emergency use. Emergency stop in the form of a panic button positioned at the cage and turntable console will instantly stop the machine.

SST RANGE
LADDERS

A comprehensive aluminium ladder system is provided giving direct access from the ground to the cage.

This system will consist of;

i. Ground to turntable ladder 0.5 m between stiles.

ii. Turntable to telescopic access ladder 0.4m between stiles.

iii. Telescopic 3 part (SST330) 4 part (SST410), 5 part (SST560) ladder system with handrails running up the main booms.

iv. A tip boom ladder with folding handrail.

All ladders have a rung spacing of 295 mm between centres and the rungs are purpose designed with a round section and a non slip pattern on all sides.

A “rungs in line” indication is shown on the cage and turntable operators consoles.

The system can Facilitate up to 8 people evenly distributed along its length plus one person in the cage (80 Kg per person).

SST RANGE
PLATFORM LEVELLING AND RESTRAINT SYSTEM

Powered cage levelling and restraint is provided, employing a direct acting rotary hydraulic actuator and electronic level system.

Smooth continuous movement in either direction with infinitely variable speed and hydraulic brake system are some of the features of the rotation mechanism.

SST RANGE

TURNTABLE AND ROTATION

Smooth continuous rotation in either direction with infinitely variable speed and hydraulic brake system are some of the principle features of the rotation mechanism.

TURNTABLE

The turntable carries the boom assemblies and distributes the loads imposed evenly over the slewing ring.

SLEWRING

The slewing ring is positioned between the turntable and main frame which are both machined to give good face to face contact over the entire slewing ring surface area. The double row ball bearings with grease lubricated flame hardened tracks give smooth rotary movement.

ROTATION DRIVE

The slewing ring gear meshes with a pinion on the output shaft of a Hepicyclic gearbox which is close coupled to a hydraulic motor. The motor has a high starting torque and ample power to rotate the Platform in any position with full payload in the cage.

The spring actuated hydraulically released brake holds the Platform in position when hydraulic power is removed.

SST RANGE
THE WATER SYSTEM

The light alloy monitor with a capacity of 3800 litre/min at 7 bar is mounted at the front of the cage. A jet/fog nozzle is supplied as a standard fitting. controls for the monitor are provided at the cage and turntable control stations. These comprise of;

a) a joystick that controls the elevation and rotation of the monitor.
b) two push buttons to control the jet/fog action of the nozzle.

It is possible to take the full flow of water throughout the monitors full range of movement and with any position of the booms. A landing valve connection is fitted at the monitor for standard branches and hoses.

A water curtain nozzle, capable of producing a circular spray for protecting the occupants of the cage from heat, is fitted under the cage. It can be controlled by a quick action lever valve at the monitor controls.

A light alloy water pipe is fitted externally to the booms so that they do not obstruct boom movements. A swivel joint under the turntable allows continuous rotation. A rigid pipe passes along the base and terminates at a collecting head positioned at the rear of the vehicle.

Drain taps are fitted where necessary.

SST RANGE
ELECTRICAL EQUIPMENT.

Slip rings are provided at the turntable to allow continuous rotation. Each slip ring is conservatively rated at I0A/24V - DC dual metallic brushes and springs are used for each ring.

The platform circuits are protected by miniature circuit breakers (M.C.B.'s) positioned at 3 convenient locations (rear of base, turntable control console, cage control console) to enable prompt action in the event of a fault.

An audible alarm signal is duplicated at both the turntable and cage controls, alarm are provided for:

a) Jack sinking into soft ground or other cause for excessive inclination
b) Any optional alarms

Illumination is provided for:

a) all controls
b) instruction plates
c) levelling indicator

Power feed from the electrical system provides power for the vehicles sirens, beacons etc.

SST RANGE
SNORKEL CAGE

CONSTRUCTION

The Snorkel cage is of high strength steel, corrosion protected construction. The floor area can easily accommodate five adults and is constructed from steel mesh panel which allows rapid water drainage. Toe boards prevent any tools or equipment from being accidentally knocked out of the cage. Tubular steel welded handrails give extra security for the operators and a safety rail is provided at the side entrance.

Access is convenient from the bodywork level when the machine is in the travelling position. Access apertures are provided on both sides and on the front of cage for complete flexibility during operation. Cage rotation of 50° movement is powered by a hydraulic direct drive actuator. A directional valve positioned at the rear of the cage gives control of cage rotational position.

The cage drop rescue platform along the front of the cage, and hand rail on the snorkel version are secured in the vertical position by quick release devices enabling them to be lowered instantly to form a bridge between the cage and building windows. This is particularly effective and important for a fire fighting or rescue application. The rescue flap also provides a speedy and safe refuge for rescued persons without the need for them to enter the cage itself.

ANCILLARIES

INSTRUCTION PLATES
All instruction plates and other markings will be supplied.

PAINT FINISH
The Snorkel will be finished painted white enamel to BS4800 00 E 55

MACHINE TOOL KIT
Comprising of:

1) Special tools required to service the Snorkel.

2) Electrical servicing equipment - test lamp, jump leads, spare bulbs etc.

WORKSHOP MANUALS
One SST Series Operating and Maintenance Manual is provided as standard with the Snorkel. This provides general data, operating instructions, servicing, testing and adjustment details and a complete list of spares.

QUALITY ASSURANCE
Modern engineering and manufacturing and testing facilities are used to ensure the highest quality standards are achieved.

All structures are designed generally in accordance with relevant international standards. Designs are engineered employing state of the art CAD technologies.

High tensile steels are used for supporting structures and are factory certified. Fabrications are produced by certified welders and are random controlled by with NDT tests. Supporting bearing surfaces are precision machined on boring mills.

Each unit is individually tested with maximum static and dynamic overload in accordance with the specified safety regulations. Jacking load tests, in all boom positions, assure that stability corresponds to the safety regulations applied.

THE SST RANGE
OPERATOR.

The cage is designed for efficiency in action and the operator is provided with a number of aids, conveniently placed to assist him / her including:-

1. Control levers giving precise and immediate control over all boom and rotation movements. Operating speeds are infinitely variable and several movements can be engaged simultaneously without decreasing operating speeds.

   A boom cenetring control push button will automatically rotate the turntable/boom assembly in line with the boom rest ready for stowage. This facility operates when the booms are rotated within 30° of travel position.

   Instruction plates bearing simple pictorial illustrations for correct identification of controls are fitted to the console panel. The controls are illuminated for night use.

2. An isolator switch to immediately neutralise all controls, eliminating unauthorised use or accidental operation during rescue operations.

3. Emergency stop in the form of a panic button positioned at the cage and turntable consoles will instantly stop the machine.

4. Two 127 mm (5") diameter, 60 watt swivel mounted spot lights with individual switches, one on each side of cage.

5. A water resistant electric socket connected to vehicle electric system. This is suitable for wander lead fight or other electrical equipment.

6. A monitor, complete with jet/fog action nozzle and capable of a wide range of movement, mounted in front of the cage.

   The water system also incorporates monitor shut oil valve, 2” gated outlet (for hose connection), water curtain spray and control. (See section on Water System for further details).

7. A useful shackle type lifting eye located under cage, capable of carrying a freely suspended load up to the permitted platform payload.

8. Two safety harness attachment points are provided at the rear of the cage rated at 200 Kg each.

SST RANGE
ADDITIONAL OPTIONS AVAILABLE - Quoted For use in conjunction with SST330, SST410 & SST560

a) Camera System
A CCTV system can be supplied, consisting of a camera mounted in the cage and a TV monitor mounted at the turntable. This enhances the positional capabilities of the SST in a rescue scenario, through being able to manoeuvre "at sight"

b) Fire Pump,
A chassis mounted water/foam pump can be supplied in line with power capabilities and customer specification. The unit would be mounted integral with the bodywork and have a basic pump control panel unit mounted on the side of the appliance.

c) BA Line (ST3193/C) - This will run along the length of the booms from the ground to the cage and facilitate the use of breathing apparatus in the cage.

d) 220Volt Powerline to cage - This facilitates the operation of electric powered tools from the cage.

e) 1,000W Floodlights fitted at cage - These ensure that increased lighting can be directed onto the working area from height, thereby reducing danger to operators.

f) Stretcher Mounting Kit - Stretcher attachment points will be provided on the cage. Type of stretcher dictates the exact mounting points.

g) 110 Volt Hydraulic Generator - A hydraulically driven generator will be mounted on the turntable. The generator will be rated at 110Volt 3.5KVA. A power cable will be provided running from the generator up the booms terminating in a socket at the cage.

h) Moveable Cage Console - The cage control console will be provided with a simple hook / clamp arrangement. This will allow the console to be moved from its normal position at the front of the cage, to either one side or the cage rear.

i) Ladder lighting - The ladder will be provided with lighting along its entire length to assist operational safety.

SST RANGE
ADDITIONAL OPTIONS AVAILABLE - Quoted For use in conjunction with SST330, SST410 & SST560

j) **Jack / Outrigger lighting** - Additional “white” lighting to illuminate the jack leg areas as an aid to setting up at night.

k) **Flashing Jack Marker Lights** - “Amber flashing jack marker lights mounted on the end of each jack outrigger. these light will automatically switched on when the jacks/outriggers are operated.

l) **Proximity Alarm -** A radar proximity detector positioned at the cage providing audible and visual warning as the cage becomes close to buildings or other obstructions.

m) **Additional Cage Spotlights -** These can be supplied and fitted to the under side of the cage floor. The wattage of the lights is dependant upon customer specification.

n) **Wind Speed Indicator** - A windspeed indicator can be fitted to the cage and is supplied with a digital readout. This will assist in ensuring the safe deployment of the booms.

o) **Intercom - 2 way Radio,** communication points at both cage and turntable control consoles allow continual communication between operators at both ground and elevated levels.