

MODEL DSC501RL

PHALANX® TYPE BARRICADE SYSTEM

SYNOPSIS

This Procurement Specification defines a FULL SCALE CRASH TESTED AND CERTIFIED – PHALANX® TYPE COUNTER TERRORIST BARRIER SYSTEM - Model DSC501RL This system is specifically configured with features that make it uniquely resistant to vandalism or sabotage.

CONFIGURATION

The Model DSC501RL incorporates hydraulic locking devices that lock the Barrier in its guard position. With the Barrier Ramp in the full up position, one or more Ramp Locks are hydraulically positioned, locking it in the guard position. To lower the Barrier Ramp, hydraulic pressure must be applied to the Barrier Ramp lifting cylinders and the Ramp Lock Cylinders in a precise sequence and at pressures within a closely regulated pressure range.

Damage or destruction or disabling of control circuits, pressure lines, cylinders or valves freezes the Barrier Ramp in the locked Guard Position. Once locked, the Barrier Ramp can only be lowered by repairing and or replacing the damaged components, and then applying the specified hydraulic pressure at the prescribed pressure and in the precise sequence. The Ramp Locks are located in the foundation and are accessible only by removing the Barrier Ramp.

In the lowered, 'free passage' position, the Barrier Ramp of this barrier is completely flush with the roadway. Neither buttresses, counterweights nor road plates obstruct authorized pedestrian or vehicular traffic.

CERTIFIED TESTING

This Barricade System was tested in full-scale configuration and certified to the highest United States and International energy standards. Testing by an independent testing laboratory confirmed that it will stop and destroy a heavily loaded truck moving at high speeds.

Further, after being Crash Certified the same DSC501, once cleared of truck debris was subjected to 28,000 full operating cycles. The test laboratory then inspected the DSC501RL and the functionality of the Barrier was found to be 100%.

OPERATION

The Barricade Ramp is raised and lowered to and from the 'guard-locked' position to the 'free passage' position by means of hydraulic cylinders driven by a DELTA Hydraulic Power Unit.

THE PRIME MOVER

The Hydraulic Power Unit can be either a 'Fixed-Hard Plumbed' or a Battery Operated Unit. The Fixed Hard Plumbed Hydraulic Power Unit can be configured to operate one or multiple Barricades and provide pass-through rates suitable for most inspection and identification station requirements. The Battery Powered Hydraulic Power Unit can be hard plumbed in a fixed location to operate one or two Barricades or used as a transportable Power Source. It can be supplied with quick disconnect hydraulic lines for use with multiple Barricades and removed from the site as needed and as the security situation dictates.

CONTROLS

The Barricade(s) can optionally be operated from Master Panels, Master and Slave Panel combinations, as well as a range of optional other inputs such as; vehicle detectors and identification systems, remote-hard line, remote-radio, card reader, key switch, computer or by local guard push button station, etc, or by combinations thereof.

1.0 SCOPE

This specification defines the procurement of a PHALANX® HYDRAULIC BARRICADE SYSTEM, Model DSC501RL, consisting of (one, two, three or four) vehicle Barricade(s) operating (independently or in sets of two, three or four) Barricade(s), a HYDRAULIC POWER SYSTEM, the CONTROLS AND LOGIC CIRCUITS, FEATURES and OPTIONS as defined herein.

2.0 SYSTEM CONFIGURATION

2.1 BARRICADE(S)

2.1.1 Barricade Construction. Barricade shall be a shallow frame below grade assembly that can be cast in a foundation of 18 inches [457 mm] in depth. The assembly shall have a heavy steel ramp weldment capable of being rotated to an above grade position. The guard position shall present a formidable obstacle to approaching vehicles. Upon impact, forces shall be first absorbed by the ramp weldment and then transmitted to the foundation of the unit.

2.1.2 Barricade height. Height of the Barricade shall be 39 inches [1,0 M] inches as measured from the top of the foundation frame to the top of the barrier inclusive of the top road plate.

2.1.4 Barricade Length. Barricade length shall be 108 inches [2,74 M]. (Barricade can be optionally specified to a maximum length of 240 inches [6,1 M] or a minimum length of 60 inches [1,52 M].)

2.1.5 Ramp Locks. The Ramp Lock module(s) consisting of the Ramp attachments, bolt mechanism, hydraulic actuator sub-module, etc. shall be located at the hinge end of the Barricade and well protected from casual or aggravated attack.

2.1.5.1 With the Ramp in the full up position and the Ramp Locks deployed, the Ramp Locks shall be able to withstand a static vertical load imposed on the Barrier Ramp of 40,000 pounds. Once released from the load the Ramp Locks shall be functional.

2.1.5.2 In normal operational mode the Ramp will be locked when the Barrier Ramp is raised to the full guard position. At the option of the operator the Ramp Locks can be deactivated at the HPU.

2.1.6 Foundation Depth. The frame of the Barrier shall be 18 inches [457 mm].

2.1.7 Safety Visibility Panel. Descending from the front edge of the Barrier Ramp shall be a rigid panel containing three or more red warning lights. The panel shall be continuous across the full width of the Barrier Ramp. The height of the panel shall be 18.0 inches (457 mm). The

- Safety Visibility Panel shall have yellow/white (alternately yellow/black) diagonal stripes.
- 2.1.8 Serviceability. The panel and side skirts, mounted on the Ramp shall be readily removable to facilitate Barrier Maintenance and Service using standard hand tools.
- 2.1.9 Finish. The roadway plates shall be painted white and shall have a non-skid surface.
- 2.2 HYDRAULIC POWER UNIT Hard Plumbed Fixed Location (HPU-FL) (Select 2.4 If Battery Driven Hydraulic Power System is desired)
- 2.2.1 Hydraulic Circuit. Circuit shall incorporate the design concepts as described by US Patent # 4,490,068. Unit shall consist of an electrically driven hydraulic pump, which shall pressurize a high-pressure manifold connected to a hydraulic accumulator. Electrically actuated valves shall be installed on the manifold to allow oil to be directed to the hydraulic cylinders to raise and lower the Barricade, lock and unlock the Ramp Lock(s). The hydraulic circuit shall include all necessary control logic devices, interconnect lines and valves to override and lock out the normal speed control valve(s) for emergency fast operation of the Barricade(s).
- 2.2.2 Main Power. The electric motor driving the hydraulic pump shall be fed from (specify actual sit voltage, phase and frequency, i.e. 230/3/60). Motor shall be sufficiently sized for the expected number of Barricade operations.
- 2.2.3 Power Off Operation. The accumulator shall be sized to allow _____(specify number of half-cycle operations required) of a single Barricade in the event of a power outage. Enhanced power off capability can be selected as an option. The control valves shall also be manually operable in this case.
- 2.2.4 Manual Operation. A hand pump shall be furnished to allow the Barricades to be raised manually in the event of a prolonged power interruption.
- 2.2.5 Construction. The hydraulic power unit and accessories shall be mounted and wired on an integral steel skid. The HPU shall fit in an envelope 60 inches W x 36 inches D x 60 inches H [1524 mm W x 914 mm D x 1524 mm H]. The HPU shall be mounted indoors or in an optional weather resistant enclosure.
- 2.3 CONTROL AND LOGIC CIRCUITS
(Select 2.6. If Battery Driven Hydraulic Power System is Desired)

The following circuits, logic devices and control stations shall be furnished:

- 2.3.1 Control Circuit. A control circuit shall be provided to interface between all Barricade control stations and the hydraulic power unit. This circuit shall contain all relays, timers and other devices necessary for the Barricade operation.
- 2.3.1.1 Voltage. The control circuit shall operate from a 120/240 volt, 50/60 Hz supply. An internally mounted transformer shall convert this to 24 VDC for all external control stations.
- 2.3.1.2 Power Consumption. The control circuit power consumption shall not exceed 250

watts basic load, plus 200 watts for each Barricade in the system.

- 2.3.1.3 Construction. The control circuit shall be mounted in a general purpose enclosure. All device interconnect lines shall be run to terminal strips.

(The following control station(s) can be specified)

- 2.3.2 Remote Control Panel. A remote control panel shall be supplied to control the Barricade operation. This panel shall have a key lockable main switch with "main power on" and "panel on" lights. Buttons to raise or lower each Barricade (or sets of Barricades) shall be provided. Barricade up and down indicator lights shall be included for each Barricade (or set). The emergency fast operate (EFO) feature shall be operated from a covered toggle switch (optionally a push button larger than the normal controls). The EFO shall also be furnished with EFO active light and reset button.

- 2.3.2.1 Voltage. The remote control panel shall operate on 24 VDC.

- 2.3.2.2 Construction. The remote control station shall be a standard 19 inch electronics rack type surface mount panel with all devices wired to a terminal strip on the back.

- 2.3.2.3 (Option) Panel shall be equipped with a timer circuit to notify the operator via an annunciator "squealer" that the Barricade has been left in the down position for too long a time period. The time interval shall be customer selectable.

(Select Control Panel 2.3.3 instead of 2.3.2 if Slave Panel 2.3.4 is desired.)

- 2.3.3 Remote Control Master Panel. A remote control master panel shall be supplied to control Barricade function. This panel shall have a key lockable main switch with "main power on" and "panel on" lights. Buttons to raise and lower each Barricade (or set) shall be provided. Barricade "up" and "down" indicator lights shall be included for each Barricade (or set). The emergency fast operate circuit (EFO) feature shall be operated from a covered toggle switch (optionally a push button larger than the normal controls). The EFO shall be furnished with EFO active light and reset button. The remote control master panel shall have a key lockable switch to arm or disarm the remote slave panel(s). An indicator light shall show if the slave panel is armed.

- 2.3.3.1 Voltage. The remote control panel shall operate on 24 VDC.

- 2.3.3.2 Construction. The remote control station shall be a standard 19 inch electronics rack type surface mount panel with all devices wired to a terminal strip on the back.

- 2.3.3.3 (Option) Panel shall be equipped with a timer circuit to notify the operator via an annunciator "squealer" that the Barricade has been left in the down position for too long a time period. The time interval shall be customer selectable.

- 2.3.4 Remote Control Slave Panel. A remote control slave panel shall also be supplied to control the Barricade operation. This panel shall have a "panel on" light that is lit when enabled by a switch on the remote control master panel. Buttons to raise or lower each Barricade (or set) shall be provided. Barricade "up" and "down" indicator lights shall be included for each Barricade (or set). The emergency fast operate (EFO) feature shall be operated from a

push button larger than the normal controls (optionally a covered toggle switch). When the slave panel EFO is pushed, an EFO "active" lamp will light and operation of the Barricade(s) will not be possible until reset at the master panel.

- 2.3.4.1 Voltage. The remote control panel shall operate on 24 VDC.
 - 2.3.4.2 Construction. The remote control station shall be a standard 19 inch electronics rack type surface mount panel with all devices wired to a terminal strip on the back.
 - 2.3.4.3 Panel shall be equipped with a timer circuit to notify the operator via an annunciator "squealer" that the Barricade has been left in the down position for too long a time period. The time interval shall be 20 seconds. The alarm is reset when the Barricades are returned to the up position.(Option)
- 2.4 BATTERY DRIVEN HYDRAULIC POWER SYSTEM (BAT-HPU) (Select 2.2. If Hard Plumbed Fixed Location Hydraulic Pumping Unit is Desired)
- 2.4.1 Hydraulic Circuit: Unit shall consist of an electrically driven hydraulic pump, which shall provide hydraulic oil under pressure to operate the Barricade. The hydraulic circuit shall include all necessary control logic, motor controls, flow control valves and couplings required to control the interconnected Barricade and Ramp Lock(s)
 - 2.4.2 Power Source: The direct current electric motor driving the hydraulic pump shall be powered from an internal rechargeable battery.
 - 2.4.3 The BAT-HPU shall be enclosed in a weather resistant, lockable enclosure.
 - 2.4.4 The enclosure shall have _____(specify fixed or quick disconnect) external hydraulic fittings for the interconnection of hydraulic lines to the Barricade.
 - 2.4.5 The enclosure shall have all necessary external terminals, plug-in connectors for Barrier controls, solar panels, local power sources, Booster Battery Packs, etc. mounted external of the unit.
 - 2.4.6 Internal Rechargeable Battery. Battery: The Battery shall be a High-Energy, Deep-Discharge unit suitable for long-life heavy operation
 - 2.4.6.1 The Internal Rechargeable Battery will be sized to operate the Delta Barricade at a through put rate of 60 full operating cycles per hour.
 - 2.4.6.2 The time to lift the Barricade from a full down position to up and locked will be 10 seconds or less.
 - 2.4.6.3 Performance. A fully charged battery shall be sized to operate a single the DSC501RL 75 full operating cycles without external charging or supplemental power.

- 2.4.7 Local Power Battery Charging System: The system shall be supplied with an internal Battery Charger operating from domestic power sources (5 amps @ 120/220 VAC 50/60 Hz.) that will maintain the Internal Battery and meet the performance requirements, continuously.
- 2.4.8 Solar Array Re-Charging System: The system shall be supplied with a Solar Array for maintaining the Battery pack at working levels.
- 2.4.8.1. Recharging Rate: The Solar Array shall be sized so that for each standard solar day (defined as 5 hours continuous sunlight) the Barricade system can be operated 30 full cycles without depleting the overall battery charge level. (Optionally available – Solar Array with capacity to operate 60 full cycles without depleting the overall battery charge level)
- 2.4.8.2 The Solar Array shall be provided with a mounting post and frame for local placement or mounting. An interconnecting electric cable 10 feet long shall be provided.
- 2.4.9 Booster Battery Pack (Optionally available): Field interchangeable rechargeable battery pack can be used independently or in parallel with the internal battery.
- 2.4.9.1 The System shall be supplied with _____(customer specified) Booster Battery Packs.
- 2.4.9.2 When fully charged, the Booster Battery Pack will independently operate a Barrier 25 full cycles without recharging.
- 2.4.9.3 Each Rechargeable Battery Pack shall have a built-in battery charging circuit that will operate from 120/240 VAC 50/ 60 Hz. It will have its own attached utility power cord. Battery Pack shall have Indicators showing battery status and condition.

2.5 EXTENDED OPERATING OPTIONS (BAT-HPU)

- 2.5.1 The System shall be provided with internal circuitry so that other sources of external power can be used to supplement the internal battery. These conditions could include the need to operate the system at higher throughput rates or for faster recharging the internal battery.
- 2.5.2 External power connection points shall be provided on the Power Unit to facilitate connecting a range of external power sources. These include standard 12V automobile batteries with jumpers, DC power takeoffs, standard vehicle cigarette lighter ports, the output of auxiliary engine generators, or the output of motor vehicle generators directly.
- 2.5.3 A manual hand cranked pump system shall be incorporated in the System so as to be available for independent use or to operate in parallel with the Battery Driven Hydraulic Power Unit. (BAT-HPU)(Option).
- 2.5.4 Operating Temperature Range: 10 to 115° F. Note: Specification values herein are based on a new battery, operating in a temperature range of 50 to 115°F. As the internal

temperature of a battery is reduced there is a change in its operating characteristics. At 32°F a typical battery will develop approximately 65% of its capacity. As a battery ages there is some decrease in overall performance.

- 2.6. **CONTROLS. HYDRAULIC POWER UNIT** Controls (BAT-HPU). The following control and logic circuits shall be furnished. (Select 2.3 If Hard Plumbed- Fixed Hydraulic Power Unit is Desired HPU-FL).
- 2.6.1 Control Circuit: A control circuit shall be provided to operate the Power Unit to open and close the Barricade(s) and to lock and unlock the Ramp Locks.
- 2.6.2 This circuit shall contain all relays, timers, and other logic device necessary to operate the Barricade(s) and the Ramp Locks.
- 2.6.3 Standard Control Station: A standard control station shall be supplied to control the Barrier operation. This panel shall have a key lockable main switch. Buttons to raise or lower the barrier shall be provided. The Control Station shall have provisions for firmly mounting to the Hydraulic Power Unit or other structure within 10 feet of the Power Unit.
- 2.6.4 Construction: The control station shall be mounted in a weather resistant, minimum rating NEMA 4 electrical enclosure.

3.0 ACCESSORY EQUIPMENT Any or all of the following may be selected

- 3.1 Auxiliary Emergency Fast Operate Circuit. (HPU-FL only). A separate hydraulic circuit consisting of a pressure reserve source, operating control logic and interconnect lines and valves shall be supplied. This circuit shall provide an available source of power to operate the Barricade(s) at emergency fast speed (as specified in 4.6.3, even after power off or manual operation or high frequency operation has depleted the normal reserve capacity. This system will operate in conjunction with and from normal EFO controls.
- 3.2 Electro-Mechanical Signal Gate. An electrically operated wood arm signal gate shall be supplied to alert vehicle drivers of the Barricade position. The gate operate shall interface with the Barricade at the control circuit. The control circuit shall close the gate at the Barricade "up" command and remain closed until the Barricade is fully lowered. The wood arm shall be ___ foot (6, 8, 10 or 12 foot can be specified) long and be striped with reflective yellow/black tape. The gate assembly shall be mountable directly to the roadway surface.
- 3.3 Stop/Go Traffic Lights. Red/Green 8 inch stand alone traffic lights shall be supplied to alert vehicle drivers of the Barricade position. The green light shall indicate that the Barricade is fully down. All other positions shall cause the light to show red. Brackets shall be supplied to allow light(s) to be located on a (3.5 inch OD post) (wall) (3.5 inch OD post - back to back). The light operating voltage shall be 120 Volt (alternately 240 Volt), power consumption 40 watts per light.
- 3.4 Sump Pump. A self priming sump pump shall be supplied to drain water collected in the Barricade foundation. The pump shall have the capacity to remove ___ inches per minute of rainfall a distance of _____ feet to customer supplied discharge drain. Pump

operating voltage shall be 120/1/50-60 (alternately 240/1/50-60).

- 3.5 Safety Interlock Detector. A vehicle detector safety loop shall be supplied to prevent the Barricade from being accidentally raised under an authorized vehicle. The detector shall utilize digital logic have fully automatic tuning for stable and accurate long term reliability. The output of the detector shall delay any Barricade rise signal (except for EFO command) when a vehicle is over the loop.
- 3.6 Enhanced Power Off Capability. (HPU-FL only)The hydraulic accumulator shall be sized to provide ____ half cycle operations of a single Barricade (or sets of Barricades).
- 3.7 Weather Resistant HPU Enclosure.(HPU-FL only). A lockable weather resistant enclosure shall be provided for the HPU. The design shall provide for easy access to the HPU for maintenance and emergency operation of the hydraulic system. Enclosure shall be provided with a corrosion resistant coating and shall be 60 inches W x 36 inches D x 60 inches H [1524 mm W x 914 mm D x 1524 mm H].Heavy Duty Weather Resistant HPU Enclosure. A lockable weather resistant enclosure shall be provided for the HPU fabricated from not less than 0.25 inch [6,35mm] steel plate. The design shall provide for easy access to the HPU for maintenance and emergency operation of the hydraulic system. Enclosure shall be provided with a corrosion resistant coating.

4.0 PERFORMANCE

- 4.1 Experience. Barricade and auxiliaries shall be of proven design. Manufacturer shall have had 4,000 Phalanx type Barricades in field operation for a minimum of 5 years with documented field experience for all major components and design features.
- 4.2 Qualification Test. Barricade design shall have successfully passed an actual full scale crash test conducted by a qualified independent agency.
- 4.3 Performance Evaluation. The Barricade shall have a performance evaluation per DOS Specification SD-SDT-02.01 (Rev A Dated March 2003) of K12.
- 4.4 Post Crash Test Functionality. The Barricade, immediately following certification as per paragraph 4.3 shall be fully functional. Such results shall have been observed and certified by an independent testing facility.
- 4.5 STOPPING CAPACITY.
- 4.5.1 Normal Operation. Barricade(s) shall provide excellent security and positive control of normal traffic in both directions by providing an almost insurmountable obstacle to non-armored or non-tracked vehicles. The Barricade system shall be designed to stop a vehicle attacking from either direction and continue to operate when the vehicle is within the weight and velocity characteristics as defined in paragraph 4.3.1.1, minor repairs excepted.
- 4.5.2 Barricade shall be designed to be fully operational after successfully stopping vehicle(s), in the priority direction.
- 15,000 pounds at 70 mph [66,7 kN @ 113 kph]
20,000 pounds at 62 mph [88,9 kN @ 100 kph]

4.5.3 High Energy Attack. Barricade(s) shall be designed to stop and immobilize non-armored or non-tracked vehicles with weight and velocity characteristics as defined in paragraph 4.5.3.1. The Barricade system shall be designed to destroy the front suspension system, steering linkage, engine crank case and portions of the drive train. Significant damage to the Barricade system is probable at these levels.

4.5.3.1 The Barricade shall be capable of stopping and destroying a vehicle(s) weighing:
13,200 pounds at 85 mph [58,7 KN at 137 kph]
20,000 pounds at 70 mph [88,9 KN at 113 kph]

4.6 SPEED OF OPERATION (Hard Plumbed Hydraulic Pumping Unit. HPU-FL)

4.6.1 Normal Operation. Each Barricade (or set) shall be capable of being raised or lowered in 3.5 to 15 seconds (customer adjustable) when operated at a repetition rate not greater than specified in paragraph 4.7. Barricade direction shall be instantly reversible at any point in its cycle from the control stations.

4.6.2 Note operating speeds and EFO speeds include full implementation of the Ramp Lock. Slightly faster speeds can be expected with the Ramp Lock disengaged.

4.6.3 Emergency Fast Operation. Barricade shall rise to the guard position and locked, from fully down in 2.5 seconds maximum when the emergency fast operate button is pushed provided the system has not previously been exhausted by power off or manual operation or high speed cycle rates exceeding that specified in paragraph 4.7. Barricade shall remain in the up and locked position (normal up/down buttons inoperable) until the EFO condition is reset. (See 3.1 for auxiliary emergency fast operate system option).

4.7 FREQUENCY OF OPERATION. Barricade shall be capable of ____ (specify up to 120 cycles per hour) complete up/down cycles per hour.

5.0 ENVIRONMENTAL DATA (Please supply the following):

Barricade System shall operate satisfactorily under the following environmental conditions:

5.1 Extremes in temperature

Yearly maximum drybulb temp _____ f/c

Yearly minimum drybulb temp _____ f/c

5.2 Rainfall

Yearly average _____ inches

Maximum expected hourly rate _____ inches/hour

5.3 Snowfall

Maximum expected hourly rate _____ inches/hour

Roadway will be (mechanically/manually/chemically) cleared _____.

6.0 QUALITY ASSURANCE PROVISIONS

- 6.1 Testing. Upon completion, the Barricade System will be fully tested in the manufacturer's shop. In addition to complete cycle testing to verify function and operating speeds, the following checks shall be made:
 - 6.1.1 Identification. A nameplate with manufacturer's name, model number, serial number and year built shall be located within the maintenance access area.
 - 6.1.2 Workmanship. The Barricade System and its subsystems shall have a neat and workmanlike appearance.
 - 6.1.3 Dimensions. Principal dimensions shall be checked against drawings and ordering information.
 - 6.1.4 Finish. Coatings shall be checked against ordering information and shall be workmanlike in appearance.

7.0 PREPARATION FOR SHIPMENT

- 7.1 The Barricade system shall be crated or mounted on skids as necessary to prevent damage from handling. The shipping container(s) shall be of sufficient structural integrity to enable the assembly to be lifted and transported by overhead crane or forklift without failure.

8.0 MANUFACTURER'S DATA

- 8.1 Drawings and installation data. The Barricade system drawings and installation, maintenance and operating manuals shall be sent to purchaser within 4 weeks of order. ___ additional copies shall be supplied (1 copy supplied at no cost).

9.0 DISCLAIMER

- 9.1 Please note - careful consideration must be devoted to the selection, placement and design of a Barricade installation. Just as in the case of any Barricade system, perimeter security device or security gate that blocks a roadway or drive, care must be taken to ensure that approaching vehicle as well as pedestrians are fully aware of the Barricades and their operation. Proper illumination, clearly worded warning signs, auxiliary devices such as semaphore gates, stop-go signal lights, audible warning devices, speed bumps, flashing lights, beacons, etc. should be considered. Delta has information available on many such auxiliary safety equipment not specifically listed herein. It is strongly recommended that an architect and or a traffic and or safety engineer be consulted prior to installation of a Barricade system. Delta will offer all possible assistance in designing the operating equipment, controls and the overall system but we are not qualified nor do we purport to offer either traffic or safety engineering information.

10.0 PROCUREMENT SOURCE

The Model DSC501RL Phalanx Surface Mount Barricade System shall be purchased from:

DELTA SCIENTIFIC CORPORATION

40355 Delta Lane

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Phone (661)575-1100

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