

## **MODEL DSC501- K54 PHALANX™ TYPE BARRICADE SYSTEM**

### **SYNOPSIS**

#### **SECOND STRIKE CAPABILITY**

- The DSC501– K54 Barricade System has been tested in full scale configuration and has demonstrated its ability to stop and destroy a fast moving heavily loaded truck (weigh 65,000 pounds –collision speed 50 MPH). The Barricade System survived the **K54** impact with all major elements intact – the Barricade System was repaired and operating in 3 hours.

#### **U.S. DEPARTMENT OF STATE CRASH TEST CERTIFICATION**

- The DSC501-K12 Barricade System has been tested and certified to the highest United States Department of State and International energy standards and has a K12 and a K12-L3 rating.

#### **UNITED KINGDOM CRASH TEST**

- The DSC501 has been tested to the United Kingdom BSI Standard PAS:68 2007 Crash Test. 7.5 Tonne EU truck at 80 kph. Zero penetration and fully functional after the vehicle was removed. Second attack readiness demonstrated. Passed Test.

#### **FUNCTIONALITY - POST K 12 CERTIFICATION CRASH TEST**

- Following the K12 Certification Test the DSC501–K50 was operated 27,000 full cycles and then inspected by the independent test laboratory. Functionality of the Barrier was found to be 100% with no measurable wear.

#### **HIGH SPEED EMERGENCY DEPLOYMENT**

- The DSC501-K54 Barrier Ramp can be deployed from the open position to the full guard position in less than 1.0 second.

#### **OPERATIONAL LIFE**

- Extensive supervised testing as well as field reports demonstrate that the DSC501-K54 properly maintained and serviced will operate many millions of cycles. Over a three year period one commercial site has several systems, each averaging over 30,000 cycles per month (1,080,000 cycles over three years).

## **1.0 SCOPE**

This specification defines the procurement of a PHALANX™ HYDRAULIC BARRICADE SYSTEM, Model DSC501–K54, 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 (Deployed). 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.

2.1.3 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].).

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

2.1.5 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 inches (457 mm). The Safety Visibility Panel shall have yellow/white (alternately yellow/black) diagonal stripes.

2.1.5.1 Serviceability of Safety / Visibility Panel. The panel and side skirts, mounted on the Ram Weldment shall be readily removable to facilitate Barrier Maintenance and Service using standard hand tools.

Finish. The roadway plates shall be painted white [specify optional color(s)]. Finish. Coatings shall be checked against ordering information and shall be workmanlike in appearance.

## 2.1.6 2.2 HYDRAULIC POWER UNIT (HPU)

- 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. 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 site 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

The following circuits 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 (optionally 24 VDC). An internally mounted transformer shall reduce this to 24 VDC for all external control stations.
- 2.3.1.2 Power Consumption. The control circuit power consumption shall not exceed 150 watts basic load watts for each Barricade of the array.
- 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 (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. The alarm is reset when the Barricades are returned to the up position.

### **3.0 ACCESSORY EQUIPMENT** (Any or all of the following may be selected):

- 3.1 Enhanced Emergency Fast Operate Circuit. 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 (less than 1.0 seconds), 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. The Barricade shall remain in the up and locked position (normal up/down buttons inoperable) until the EFO condition is reset. (Reference Section 5.2 for standard Emergency Fast Operation.)
- 3.2 Enhanced Power Off Capability. The hydraulic accumulator shall be sized to provide \_\_\_\_ half cycle operations of a single Barricade (or sets of Barricades).
- 3.3 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 to 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.
- 3.4 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.

- 3.5 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).
- 3.6 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.
- 3.7 Weather Resistant HPU Enclosure. 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].
- 3.8 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 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].

#### 4.0 PERFORMANCE

- 4.1 Experience. Barricade and auxiliaries shall be of proven design. Manufacturer shall have had 11,000 Phalanx™ type Barricades in field operation for a minimum of 10 years with documented field experience for all major components and design features.
- 4.2 Qualification Tests. Barricade design shall have successfully passed multiple full scale crash tests conducted by qualified independent agencies.
- 4.3 Performance Evaluation. The Barricade shall have successful performance evaluations based on full scale testing of vehicles as either defined by the agency or as set forth in the specifications noted in 4.4 and 4.5.
- 4.4 U.S. Department of State.

K12/L3.0 Specification SD-SDT-02.01 (Dated April 1985)  
K12 Specification SD-SDT-02.01 (REV A March 2003)

4.5 T.S.W.G. Test, Technical Working Group

K54 equivalent or (H50 ASTM F2656-7)  
Vehicle Weight 65,000 lbs. (29,480 kg)  
Vehicle Velocity 50 MPH (nominal) (80.6 KPH)

4.6 Second Strike Capability. The Barricades shall have been evaluated by an Independent Laboratory immediately following a full scale High Energy Test and found to be capable of withstanding a second high-energy impact.

4.6.1 BSI Standard PAS:68 2007 Crash Test. 7.5 Tonne EU truck at 80 kph. Zero penetration and fully functional after the test. Vehicle second attack readiness demonstrated with EU truck.

4.6.2 High Energy Test. Barricade(s) shall be designed to destroy a non-armored or non-tracked vehicle at energy levels of up to 5,400,000 foot –pounds (7,340,000 Joules) K54, i.e. -

65,000 pounds at 50 mph (29,500 kg at 80 Kph)  
50,000 pounds at 67 mph (22,680 kg at 108 Kph]

Following the collision the Barricade shall have be found, after minor repairs and replacement of damaged or destroyed components (no structural or foundation elements) to be operational and capable of absorbing a Second Strike at the same energy level.

**5.0 SPEED OF OPERATION.**

5.1 Normal Operation. Each Barricade (or set) shall be capable of being raised or lowered in 3 to 15 seconds (customer adjustable) when operated at a repetition rate not greater than specified in paragraph 4.5. Barricade direction shall be instantly reversible at any point in its cycle from the control stations.

5.2 Emergency Fast Operation. Barricade shall rise to the guard position from fully down in 2.0 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 4.5. 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 < 1.0 second).

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

**6.0 ENVIRONMENTAL DATA** (Please supply the following):

Barricade shall operate satisfactorily under the following environmental conditions:

6.1 Extremes in temperature

Yearly maximum drybulb temp \_\_\_\_\_ f/c

Yearly minimum drybulb temp \_\_\_\_\_ f/c



6.2 Rainfall

Yearly average \_\_\_\_\_ inches

Maximum expected hourly rate \_\_\_\_\_ inches/hour

6.3 Snowfall

Maximum expected hourly rate \_\_\_\_\_ inches/hour

Roadway will be (mechanically/manually/chemically) cleared \_\_\_\_\_.

**7.0 QUALITY ASSURANCE PROVISIONS**

7.1 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:

7.1.1 Identification. A nameplate with manufacturer's name, model number, serial number and year built shall be located on the hydraulic pumping unit.

7.1.2 Workmanship. The Barricade and subsystems shall have a neat and workmanlike appearance.

7.1.3 Dimensions. Shall be checked against drawings and ordering information.

7.1.4 Finish. Coatings shall be checked against ordering information and shall be workmanlike in appearance.

**8.0 PREPARATION FOR SHIPMENT**

8.1 The Barricade system shall be crated or mounted on skids as necessary to prevent damage from handling. Lifting points shall be of sufficient structural integrity to enable the assembly to be lifted and transported by overhead crane or forklift without failure.

**9.0 MANUFACTURER'S DATA**

9.1 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).

## 10.0 DISCLAIMER

10.1 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.

## 11.0 PROCUREMENT SOURCE

11.1 The **Model DSC501- K54** Phalanx™ Barricade System shall be purchased from:

**DELTA SCIENTIFIC CORPORATION**  
40355 Delta Lane  
Palmdale, California, 91355, USA  
Phone (661)575-1100  
FAX (661)575-1109  
Email [info@deltascientific.com](mailto:info@deltascientific.com)  
[www.deltascientific.com](http://www.deltascientific.com)

Phalanx™ is a registered trademark of Delta Scientific Corporation, Palmdale, California