

**MODEL DSC2000EM-3  
Electromechanical  
THREE MODULE PHALANX® TYPE BARRICADE SYSTEM**

This Procurement Specification defines a FULL SCALE CRASH TESTED AND CERTIFIED – PHALANX® TYPE COUNTER TERRORIST BARRIER SYSTEM - Model DSC2000EM-3. A System consists of an Array of Three Barrier Modules operating as a Single unit.

**SYNOPSIS**

- CERTIFICATION TEST(S)

United States: The Model DSC2000 Barrier System has been tested in full scale configuration in accordance with the Department of State *Certification Standard Test Method for Vehicle Crash Testing of Perimeter Barriers and Gates*, SD-STD-02.01, Revision A, March 2003. The rating is **K12**.

United Kingdom. The Model DSC2000 was tested to the United Kingdom BSI Standard PAS:68:2007 Crash Test. 7,500 kg mass EU truck at 80 kph. Two Meter penetration. Center Module partially functional after attack. Outer modules - operational. Second attack readiness demonstrated. The rating is **Pass**.

- The DSC2000EM-3 is designed to withstand serious attack and continue to operate - unlike **'bed frame' barriers** which are susceptible to being put out of action by an incidental bump, from a small low speed passenger car.
- The DSC2000EM-3 System consists of an array of three Barrier modules that are positioned across a traffic-way to be protected. All modules are positioned by a single electro-mechanical power unit (EMPU) which is located in one of the modules. (A single array can have as many as 6 modules.)
- For emergency situations an array can be raised to a guard position in **two seconds (EFO)**. Normal operating times can be customized to accommodate traffic and inspections situations (5 to 12 seconds).
- In the lowered, 'free passage' position, the Barrier modules are completely flush with the roadway. There are no buttresses, raised plates, counterweights, back braces or bolt heads that might trip pedestrians or impede authorized vehicular traffic.

- The DSC2000EM-3 Barrier System requires a foundation depth of only **17 inches (432mm)**.
- To simplify installation the individual Barrier Modules do not have to be disassembled for interconnection, positioning or casting in place.
- Fully assembled Individual Barrier Modules weigh 1,300 lbs. (590 kg), and modules containing the drive unit weigh 2100 lbs.
- Complete Barrier Modules can be stacked four high for shipping and handling. Individual Modules are 84 in. long 30 in. wide and 16 in. deep (1.520mm X 760mm X 254mm).
- A complete range of Prime Movers, Control Options, Interface Packages, Sensors, Signal Lights, Safety Provisions etc. are available.

## 1.0 SCOPE

This specification defines the procurement of a MODULAR PHALANX® BARRICADE SYSTEM Model DSC2000EM-3. Each System consists of three Barrier Modules an ELECTRO-MECHANICAL POWER SYSTEM, the CONTROLS AND LOGIC CIRCUITS, FEATURES and OPTIONS as defined herein.

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## 2.0 SYSTEM CONFIGURATION

### 2.1 BARRICADE(S)

- 2.1.1 Barricade Configuration. The individual Modules shall be interconnected by a structural link provided by the manufacturer.
- 2.1.2 Barricade Construction. Each Barricade Module shall be a shallow frame, grade flush assembly that can be cast in a foundation of 17 inches [432mm] in depth. Each module in the array 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 weldments and then transmitted to the foundation of the unit.
- 2.1.3 Barricade Modules Height. In the full guard position the height of the Barricade Modules shall be 36 inches [914mm] as measured from the top of the foundation frame to the top of the barrier Ramp.

- 2.1.4 Barricade Array Length. An array of three Barrier Modules shall have a length of 123 inch [3.12m]. Individual Barrier Modules are 24 inches [609mm] long, 39 inches [990mm] for the drive unit, – the spacing between ramps will be 18 inches [457mm].
- 2.1.5 Frame / Foundation Depth. The frame of the Barrier Module shall be 16 inches [406mm] deep. The foundation depth is 17.0 inches [432mm].
- 2.1.6 Safety / Visibility Panel. Descending from the front edge of the Barrier Ramp shall be a rigid panel containing a red reflective lens. (A red warning light may be specified) The height of the panel shall be 5.25 inches [133mm].
- 2.1.7 The Safety/Visibility Panel shall have yellow/white (alternately yellow/black) diagonal stripes.
- 2.1.8 Serviceability of Safety / Visibility Panel. The panel and side skirts, mounted on the Ramp Weldment shall be readily removable to facilitate Barrier Maintenance and Service using standard hand tools.
- 2.1.9 Finish. The roadway plates shall have yellow/white (alternately yellow/black) diagonal stripes and have a non-skid surface.

## **2.2 ELECTRO-MECHANICAL POWER UNIT (EMPU).**

- 2.2.1 A single electro-mechanical prime mover shall be located in one Module of each array. The EMPU shall be of a proven design and sized to meet all requirements of this specification.
- 2.2.2 The operating and EFO speeds of the EMPU shall be programmable to meet site traffic, safety and security parameters.
- 2.2.3 Main Power. Single or three phase 50 or 60 Hz. (Optionally available operating on a 24/48 VDC battery power pack.)
- 2.2.4 Power Off Operation. The Barricade shall have provisions for Manual Operation in the event of a prolonged power-out situation or in an emergency. Manual operation is accessed through the road level EMPU door.
- 2.2.5 The EMPU shall be accessible through a road level access door.

## 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 EMPU. This circuit shall contain all relays, timers, logic circuits and other devices necessary for the Barricade operation.

2.3.1.1 Voltage. The control circuit shall operate from a 120 volt, 50/60 Hz, 10 amp supply (optionally 220 volt, 50/60 Hz). An internally mounted power supply shall convert this to 24 VDC for logic functions, external control stations and indicator lights.

2.3.1.2 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 Master Panel (No Slave Panel). A remote control master panel shall be supplied to control Barricade functions. This panel shall have a key lockable main switch with "main power on" and "panel on" lights. Buttons to raise and lower each Barricade Array (or set[s]) shall be provided. Barricade Array "up" and "down" indicator lights shall be included for each Barricade Array (or set[s]).

(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. (With Slave Panel[s]) 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 Array (or set[s]) shall be provided. Barricade "up" and "down" indicator lights shall be included for each Barricade Array (or set[s]). 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.

2.3.4 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 Array (or set) shall be provided. Barricade "up" and "down" indicator lights shall be included for each Barricade Array (or set).

2.3.4.1 Voltage. The remote control panel(s) shall operate on 24 VDC.

2.3.4.2 Construction. The remote control station(s) shall be housed in 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(s) shall be equipped with a timer circuit to notify the operator via an annunciator "squealer" that the Barricade array(s) has been left in the down position for too long a time period. 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 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 Array(s) at the control circuit. The control circuit shall close the gate at the Barricade array "up" command and remain closed until the Barricade Array is fully lowered. The wood arm shall be \_\_\_ foot (6, 8, 10 or 12 foot can be specified) long and be striped white and black. The gate assembly shall be mountable directly to the roadway surface.

3.2 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 mount) (3.5 inch OD post - back to back). The light operating voltage shall be 120 Volt (alternately 240 Volt), power consumption 40 watts per incandescent light. (Alternatively, LED lights may be specified.)

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 Array rise signal (except for EFO command) when a vehicle is over the loop.

#### 4.0 PERFORMANCE

- 4.1 Experience. Barricade Systems and auxiliaries shall be of proven design. Manufacturer shall have had 13,000 Phalanx type Barricade Systems in field operation for a minimum of 15 years with documented field experience for all major components and design features.
- 4.2 Qualification Test. Barricade System design shall have successfully passed an actual full scale crash test conducted by a qualified independent agency.
- 4.3 Performance Evaluation. The Barricade System shall have a performance evaluation per:
- United States - DOS Specification SD-SDT-02.01, Revision A (dated March 2003) of **K12**. (15,000 pound vehicle at 50 mph.)
- United Kingdom - BSI Standard PAS 68:2007 Crash Test. 7,500 kg mass EU truck at 80 kph, 2 meter penetration, **Pass** rating.
- 4.4 Normal Operation. Barricade Array(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.
- 4.5 High Energy Attack. A Barricade Array shall be designed to stop and immobilize non-armored or non-tracked vehicles with weight and velocity characteristics as defined in paragraph 4.5.1. The Barricade System shall be designed to destroy the front suspension system, steering linkage, engine crankcase and portions of the drive train. Significant damage to the Barricade System is probable at these levels
- 4.5.1 The Barricade System shall be capable of stopping and destroying a vehicle weighing:
- 20,000 pounds at 52.5 mph [88.9 KN at 84.5 kph]  
32,000 pounds at 41.3 mph [142 KN at 66.4 kph]
- 4.6 SPEED OF OPERATION.
- 4.6.1 Normal Operation. Each array shall be capable of being raised or lowered in 5 seconds when operated at a repetition rate not greater than specified in paragraph 4.5. Barricade Ramp direction shall be instantly reversible at any point in its cycle from the control stations.
- 4.6.2 Emergency Operation. In the event of an emergency the EFO can be used to raise the barrier in 2 seconds.

4.7 FREQUENCY OF OPERATION. Barricade Array(s) shall be capable of \_\_\_\_ (specify up to 60 cycles per hour) complete up/down cycles per hour. Contact factory for higher cycle rates.

4.8 Power Off Operation. The Barricade shall have provisions for Manual Operation in the event of a power out situation. Manual operation is initiated at the EMPU through the road level access door

**5.0 ENVIRONMENTAL DATA** (Please supply the following):  
Barricade 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 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

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

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

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 DSC2000EM-3** Modular Phalanx ® Type Barricade System shall be purchased from:

### **DELTA SCIENTIFIC CORPORATION**

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