



## **SPECIFICATION FOR MODEL 775 (-E, -H, or -M Series) CRASH ARM VEHICLE BARRICADE**

### **PART I - GENERAL**

#### **1.1 WORK INCLUDED IN THIS SECTION**

- A. Furnish labor, materials, inspections, supervision, etc., necessary for the complete installation and operation of vehicle crash arm barrier as shown on the plans and specified herein. Work includes furnishing all items and accessories required or necessary for the correct operation of the vehicle crash arm barrier as shown on plans and/or specified herein.

#### **1.2 QUALITY ASSURANCE**

- A. The Company shall specialize in manufacturing of the type barriers specified, with a minimum ten (10) years' experience.
- B. The installer shall have a minimum five (5) years installation experience of similar equipment.

#### **1.3 SUBMITTALS**

- A. Submittals shall contain sufficient plans, elevations, sections, and schematics to clearly describe the apparatus. All conduit runs, controls and similar drawings shall be included.
- B. Submittals shall include (but not necessarily limited to) the following:
  - 1. All high/low voltage and signal conduit runs.
  - 2. Mounting and/or foundation dimensions and locations.
  - 3. Details of electronic equipment, electrical equipment or any other apparatus deemed necessary by the Owner or Owners representative.
- C. Installer shall provide two (2) copies of submittal packages.

#### **1.4 INSPECTIONS**

Procure all the necessary and usual inspections and certificates for all work to be installed. Deliver same to the Owner/Owners representative before final acceptance.

## PART II – PRODUCTS

### 2.1 CRASH ARM VEHICLE BARRIER

#### A. Application

1. Vehicle barrier shall contain a rigid, reinforced crash arm hinged at one end, raised and lowered by the use of an electro linear (non-hydraulic) actuator (-Ex Series designation), electro hydraulic (-Hx Series designation) cylinder or by manual counterbalance (-Mx Series designation), to an angle of  $90^{\circ} \pm 5^{\circ}$ . When in the down position the beam shall present an obstacle to approaching vehicles. Upon vehicle impact, the force shall first be absorbed by the beam assembly and then transmitted to the concrete foundations of the unit.

#### B. Features

1. Height of the barrier shall be 35 inches (889 mm) as measured from the roadway surface to the center line of the barrier arm.
2. The standard clear opening shall be 144 inches (3.66m) as measured inside to inside of the buttress supports. *(The Barrier can be specified with a clear opening from 144 inches (3.66 m) to 360 inches (9.14 m).*
3. The drive side assembly will be constructed of structural steel stanchions with internal serviceable bearings on a single stainless steel hinge pin allowing the aluminum arm free movement to the fully raised position.
4. The receiver stanchion will be constructed of two steel weldments, which are designed to direct the landing of the arm and securely contain the arm during impact.
5. The receiver and drive stanchions shall bolt to B&B ARMR supplied anchors cast in a 60 inch x 60 inch x 48 inch (1.5 m x 1.5 m x 1.2 m) minimum subterranean foundation pour. No above grade concrete shall be acceptable. Concrete wedge anchors, fasteners, epoxy or any other means of securing bolts shall not be acceptable.
6. The barrier stanchion supports shall be hot-dip galvanized, coated in black Macropoxy® 646 and finished with Acrolon™ 218 acrylic polyurethane, for superior corrosion protection.
7. Barrier arm shall be constructed of an extruded aluminum arm, painted in white Macropoxy® 646 and finished with Acrolon™ 218. The arm shall be furnished with high intensity reflective red and white safety sheeting, alternating colors on 16" (406 mm) wide strips according to MUTCD.
8. The barrier arm shall be equipped with an integral, self-contained arrestor system that is not subject to deterioration due to environmental conditions.
9. Barrier arms shall contain all the necessary mounts and interface points to attach electro linear, electro hydraulic or manual counterbalance drive systems. Manual counter balance units shall also include side arm assemblies complete with counterweights.
10. The electric or hydraulic drive control enclosure shall be of a lockable, weather resistant type, classified to a minimum NEMA 4 rating. The drive control enclosure shall be permanently mounted to the drive stanchion, with an available remote mount unit optional. The control enclosure shall be coated in black Macropoxy® 646 and finished with Acrolon™ 218 for superior corrosion resistance. A marshalling box, with matching finish, shall be supplied to enclose the area between the control enclosure and the foundation.
11. The electro linear or hydraulic drive system shall be rated for continuous use and not require the use of springs, shocks or counterweights for arm deployment. Manual counterbalanced operated units shall be operated by appropriate personnel and include mechanical locks for positively locking the barrier arm into the up or down position.

## C. Functional Specifications

### 775-E: Electric actuated unit.

1. Unit shall consist of an electrically driven linear actuator. The linear actuator system shall be designed to push the barrier arm upward when the up command is given, and pull the arm downward when a down command is given. The electric control circuit shall include all necessary control logic, power supplies, variable frequency drives, input and outputs needed to control the arm in a standalone system.
  - a. The electric actuator shall have a manual overdrive for the brake and shall allow manual operation of the barrier arm in the event of power loss. Manual operation shall be accomplished by use of a cordless drill or other rotary handle to drive the arm up or down.
  - b. A lockable weather resistant EPU (Electric Power Unit) enclosure shall be mounted to the drive stanchion. An optional remote mount drive system shall be available. The design shall provide for easy access to the electric control circuit for maintenance and emergency operation of the system. Enclosure shall be a NEMA 4 enclosure.
2. Power System
  - a. The electric linear actuator shall be capable of producing a minimum 5,600 lbs. of force.
  - b. The unit shall be made available as 120/208/240 single phase or 208/240/480 three-phase AC voltage. The actuator shall be a continuous duty, industrial type, protected by either a thermal or current sensing overload device.
3. Control Circuitry
  - a. A built-in PLC controller shall interface between the barrier control stations and the Electric Control unit. The PLC shall include all necessary inputs, outputs, timers and logic necessary for barrier operation, including sensors, lights and safety devices. Relays or proprietary control boards shall not be acceptable.
  - b. The control circuit inputs shall operate from a 24 volts DC. An internal transformer and rectifier shall provide 24 volts DC for the control panel and customer dry contacts.
  - c. An auxiliary convenience outlet shall be supplied in the control cabinet for accessories requiring 120 volts AC power.
  - d. The control circuit shall be mounted in the EPU enclosure. The enclosure shall be of sufficient size and rating to accommodate accessory devices. All accessory device wiring shall connect to the included terminal strips.
  - e. The PLC is designed to accept dry contact inputs from various types of devices.
  - f. A VFD (variable Frequency Drive) shall be included in the EPU to drive the linear actuator. The VFD shall convert incoming AC power to an inverted AC output.

### 775-H: Hydraulically actuated unit.

1. Unit shall consist of an electrically driven hydraulic pump that powers a push/pull hydraulic cylinder. The hydraulic pump/cylinder system shall be designed to push the barrier arm upward when the up command is given, and pull the arm downward when a down command is given. Hydraulic systems that rely on gravity to lower the barrier when a down command is given, shall not be an acceptable drive system. The hydraulic

circuit shall include all necessary control logic, interconnect lines and valves to override and lock out the normal speed control valve for emergency close operation of the barricade.

- a. A hand pump shall be furnished to allow the barricades to be raised manually in the event of a power failure.
- b. A lockable weather resistant HPU (Hydraulic Pumping Unit) enclosure shall be mounted to the drive stanchion. An optional remote mount drive system shall be available. The design shall provide for easy access to the HPU for maintenance and emergency operation of the hydraulic system. Enclosure shall be a NEMA 4 enclosure.

## 2. Power System

- a. The electric motor shall be capable of producing a minimum 1 horsepower.
- b. The unit shall be made available as 120/208/240 single phase or 208/240/480 three-phase AC voltage. The motor shall be of high starting torque, continuous duty, and industrial type, protected by either a thermal or current sensing overload device.

## 3. Control Circuitry

- a. A built-in PLC controller shall interface between the barrier control stations and the hydraulic power unit. The PLC shall include all necessary inputs, outputs, timers and logic necessary for barrier operation, including sensors, lights and safety devices. Relays or proprietary control boards shall not be acceptable.
- b. The control circuit inputs shall operate from a 24 volts DC. An internal transformer and rectifier shall provide 24 volts DC for the control panel and customer dry contacts.
- c. There shall be 120 volts AC power available in the control cabinet for accessories requiring 120 volts.
- d. The control circuit shall be mounted in the HPU enclosure with the hydraulic pumping unit. The enclosure shall be of sufficient size and rating to accommodate accessory devices. All accessory device wiring shall connect to the included terminal strips.
- e. The PLC is designed to accept dry contact inputs from various types of devices.

### **775-M: Manual Counterbalance unit.**

1. Unit shall consist of a hinge and receiver stanchion, a constructed drop arm barrier and be neutrally balanced with counterweights to assist in the manual raising and lowering of the arm.
  - a. To secure the arm in the up position, a mechanical latch shall be included that automatically engages the arm when it reaches the full open position.
  - b. A mechanical latch shall automatically engage the arm in the fully down position.
  - c. A pad-lockable pin, shall be included to lock the free end of the crash arm securely to the receiver stanchion to prevent unauthorized use of the barrier.

## **2.2 CONTROL PANELS**

*(Any or all of the following control panels may be specified)*

### **A. Remote Control Panel**

1. 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 shall be provided. "Up" and "down" indicator lights shall be included for each barricade. The Emergency Close Operation (ECO) feature shall be operated from a larger push button designated as ECO. The ECO shall also be furnished with ECO active light and reset switch.
  - a. The remote control panel shall operate on 24 volts.
  - b. The remote control station shall be a standard 19 inch electronics rack type surface mount panel or desktop console type with all devices wired to a terminal strip on the back.

### **B. Remote Control Master Panel**

1. A remote control master panel shall be supplied to control barricade operation. This panel shall have a key lockable main switch with "main power on" and "panel on" lights. Buttons to raise and lower each barricade shall be provided. "Up" and "Down" indicator lights shall be included for each barricade. The Emergency Close Operate circuit (ECO) feature shall be operated from a larger push button designated as ECO. The ECO shall be furnished with an active light and reset switch. The remote control master panel shall have a switch to arm or disarm the remote slave panel. An indicator light shall show if the slave panel is armed.
  - a. The remote control panel shall operate on 24 volts.
  - b. The remote control station shall be a standard 19 inch electronics rack type surface mount panel or desktop console type with all devices wired to a terminal strip on the back.

### **C. Remote Control Slave Panel**

1. A remote control slave panel shall also be supplied to control 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 shall be provided. Barricade "up" and "down" indicator lights shall be included for each barricade. The Emergency Close Operation (ECO) feature shall be operated from a larger push button designated as ECO. When the slave panel ECO is pushed, an ECO "active" lamp will light and operation of the barricade will not be possible until reset at the master panel.
  - a. The remote control panel shall operate on 24 volts.
  - b. The remote control station shall be a standard 19 inch electronics rack type surface mount panel or desktop console type with all devices wired to a terminal strip on the back.

## **2.3 ACCESSORY DEVICES**

*(Any or all of the following may be specified)*

### **A. Traffic Signals**

1. 8 inch traffic lights shall be supplied to alert vehicles of the barricade position. The (specify color) light shall indicate that the barricade is fully down. All other positions shall cause the light to show (specify color). The traffic lights shall be supplied with a stanchion mount 3.5 inch OD mounting post. An optional 6 foot tall 3.5 inch OD mounting post shall be available. The operating voltage shall be 24 volt DC and the lights shall be of type LED.

### **B. Vehicle Detection Loop**

1. A vehicle loop detector shall be supplied to prevent the drop arm barrier from being lowered onto an authorized vehicle. The detector shall utilize digital logic have fully automatic tuning for stable and accurate long term reliability. The detector shall delay any barricade lower signal (except for EFC command) when a vehicle is over the loop.

### **C. Mag Lock**

1. A magnetic lock shall be supplied to provide an electromagnetic locking force capable of holding the crash arm in the down position when activated. The magnetic lock shall be positioned on the arm to interface with the receiver stanchion and shall prevent unauthorized manual upward movement of the arm while activated. The mag lock shall be capable of a minimum of 1200 lbs of holding force and operate on a 12 or 24 VDC circuit, controlled by the EPU or HPU PLC controller. Upon a raise signal command, the control circuit sequence shall de-energize the magnetic lock for a period of time before the drive system is engaged.

### **D. IR**

1. An IR beam (photo eye) shall be supplied to prevent the arm from being closed when an obstruction is detected. The IR beam shall be a retroreflective type and consist of a transmitter and reflector, rated for distances up to 30' (9.14m).

### **E. Bump Strip/Safety edge**

1. Bump strip detectors shall be supplied and attached to the underside edge of the barrier arm. The bump strip shall stop the arm from continuing to close when an object contacts the underside of the arm. The bump strip detector shall run the length of the arm.

### **F. Battery Backup**

1. A battery backup shall be supplied to retain full functionality during an AC power outage. The battery backup shall include an AC to DC inverter/charger to charge/condition backup batteries during normal use and supply the barrier system with control circuit and operational power during a loss of incoming AC power. The battery backup shall be able to fully cycle the 775 barrier a minimum of 300 cycles. Batteries shall be of type AGM, 110Ah, 12VDC each, 5200Wh. The battery backup system shall be self-contained housed in a minimum NEMA 4 enclosure, epoxy painted with a polyurethane overcoat.

## **2.4 PERFORMANCE**

### **A. Evaluation**

1. The barrier shall be engineered to contain an impact rating at the M50 test level as defined by ASTM F2656-15 standard method of test. The rating shall correspond to the project engineered clear opening.

### **B. Stopping Capacity**

1. The barrier system shall be designed to impede a vehicle approaching from either direction.
2. The barrier system shall be capable of stopping a vehicle weighing 15,000 pounds (6,803 kg) traveling at 50 mph (80.5 km/hr) with no more than 3.3 ft. (< 1 m) of measurable penetration.

### **C. Normal Operating Speed**

1. Barricade shall be capable of being raised or lowered in 7-15 seconds under normal operating conditions and shall contain field adjustable speed controls with limitations determined by arm length.

#### **D. Emergency Fast Close (EFC) Operation**

1. When the Emergency Fast Close Operation button is depressed, the barricade shall move to the fully down position at a rate 1.5 times faster than normal operation. Barricade shall remain in the secure position. All safety interlocks shall be overridden and normal up/down buttons shall remain inoperable until the EFC has been reset.

### **2.5 QUALITY ASSURANCE**

#### **A. Factory Testing**

1. Upon completion, the barricade system will be fully tested for proper operation by manufacturer prior to shipment. A nameplate with manufacturer's name, model number, and serial number shall be located on the unit or within the control enclosure (-E and -H Series).
2. All critical dimensions shall be checked for accuracy against customer approved shop drawings.

### **2.6 PROCUREMENT SOURCE**

The barrier system shall be model 775 as manufactured by **B&B ARMOR (800-367-0387), 5900 South Lake Forest Drive, Suite 230, McKinney, Texas 75070.**

## **PART III – EXECUTION**

### **3.1 INSTALLATION**

- A. Installation shall be performed according to the manufacturer's instructions. Verify all component locations with contract drawings and shop drawings.
- B. Any disagreement between the Plans, Specifications, and Ordinances, must be called to same before signing of the shop drawings. After the shop drawings have been signed, the Contractor is responsible for having all work meet requirements of the governing ordinances.