Embassy of the United States of America

Lisbon, Portugal
April 6, 2011

Dear Prospective Offeror:

Subject: **Solicitation Number SPO500-11-R-0014**

The Embassy of the United States of America invites you to submit a proposal for the removal and installation of security barriers. Attached is a Solicitation, Offer and Award document for this purpose. If you would like to submit a proposal, **carefully** follow the instructions in Section L of the Solicitation, complete the required portions of the document, and submit to the address shown on the cover page of the Solicitation.

The Embassy intends to conduct a pre-proposal conference at the site. We strongly recommend that all prospective offerors attend this meeting (maximum of two persons per company). The drawings for this project will be distributed at the pre-proposal conference. The meeting will be held on **May 4, 2011 at 10:00 a.m.** at the American Embassy, Av. das Forças Armadas, Lisbon. Offerors are invited to submit written questions regarding the Solicitation in advance to the Procurement Section by e-mail to LisbonProcure@state.gov. Prospective offerors must notify the Procurement Section (21 770 2507 / 21 770 2181) or by e-mail of the names of their representatives who will be attending **the meeting no later than April 27, 2011** so access to the Embassy can be arranged.

Submit your proposal in a sealed envelope marked "Proposal Enclosed" to Carlos I. Figueroa, Contracting Officer, American Embassy, Av. das Forças Armadas, 1649-044 Lisbon **on or before 4:00 p.m. local time on May 13, 2011. No proposal will be accepted after this time.**

In order for a proposal to be considered, you must also complete and submit the following:

1. SF-1442;
2. Section B and Attachment 4, Proposal Breakdown by Divisions;
3. Section K, Representations and Certifications;
4. Bar Chart illustrating sequence of work to be performed;
5. Additional information as required in Section L.

The contract completion date is specified in Section F of the solicitation.

Direct any questions regarding this solicitation to Carlos I. Figueroa, Contracting Officer, by letter, e-mail (figueroaci@state.gov) or by telephone 21 770 2500 during regular business hours.

Sincerely,

Carlos I. Figueroa
Contracting Officer

OMB APPROVAL NO. 2700-0042

SOLICITATION, OFFER, AND AWARD *(Construction, Alteration, or Repair)*	1. SOLICITATION NO.	2. TYPE OF SOLICITATION	3. DATE ISSUED	PAGE OF PAGES
	SPO500-011-R-0014	☐ SEALED BID (IFB) [x] NEGOTIATED (RFP)	April 6, 2011	1 of 75

IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO.	6. PROJECT NO.

7. ISSUED BY CODE	8. ADDRESS OFFER TO
American Embassy Av. das Forças Armadas 1649-044 Lisboa	American Embassy c/o Contracting Officer Av. das Forças Armadas 1649-044 Lisboa

9. FOR INFORMATION CALL:	A. NAME	B. TELEPHONE NO. *(Include area code)* ***(NO COLLECT CALLS)***
➔	Carlos I. Figueroa	21 770 2507

SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder."

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS *(Title, identifying no., date):*

Section A – SF-1442, Solicitation, Offer and Award
Section B – Supplies or Services and Prices/Costs
Section C – Description/Specs/Work Statement
Section D – Packaging and Marking
Section E – Inspection and Acceptance
Section F – Deliveries or Performance
Section G – Contract Administration Data
Section H – Special Contract Requirements
Section I – Contract Clauses
Section J – List of Documents, Exhibits and Other Attachments
Section K – Representations , Certifications, and Other Statements of Offerors
Section L – Instructions, Conditions and Notices to Offerors
Section M – Evaluation Factors for Award

11. The Contractor shall begin performance within **7** calendar days and complete it within **30 c**alendar days after receiving ☐ award, **X** ☐ notice to proceed. This performance period is ☐ mandatory, ☐ negotiable. *(See _____.)*

12A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? *(If "YES," indicate within how many calendar days after award in Item 12B.)*	12B. CALENDAR DAYS
X☐ YES ☐ NO	**10 days**

13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and __3__ copies to perform the work required are due at the place specified in Item 8 by **4:00p.m.** local time **May 13, 2011**. If this is a sealed bid solicitation, offers must be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

B. An offer guarantee ☐ is, **X**☐ is not required.

C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.

D. Offers providing less than _60____ calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

OFFER *(Must be fully completed by offeror)*

14. NAME AND ADDRESS OF OFFEROR *(Include ZIP Code)*	15. TELEPHONE NO. *(Include area code)*
	16. REMITTANCE ADDRESS *(Include only if different than Item 14)*
CODE FACILITY CODE	

17. The offeror agrees to perform the work at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government within _60____ calendar days after the date offers are due. *(Insert any number equal to or greater than the minimum requirement stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.*

AMOUNTS →

18. The offeror agrees to furnish any required performance and payment bonds.

19. ACKNOWLEDGMENT OF AMENDMENTS

The offeror acknowledges receipt of amendments to the solicitation -- give number and date of each

AMENDMENT NO.										
DATE										

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER *(Type or print)*	20B. SIGNATURE	20C. OFFER DATE

AWARD *(To be completed by Government)*

21. ITEMS ACCEPTED:

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA

24. SUBMIT INVOICES TO ADDRESS SHOWN IN *(4 copies unless otherwise specified)* →	ITEM	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO ☐ 10 U.S.C. 2304(c)( ) ☐ 41 U.S.C. 253(c)( )
26. ADMINISTERED BY CODE		27. PAYMENT WILL BE MADE BY

CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

☐ 28. NEGOTIATED AGREEMENT *(Contractor is required to sign this document and return ____ copies to issuing office.)* Contractor agrees to furnish and deliver all items or perform all work, requisitions identified on this form and any continuation sheets for the consideration slated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications or incorporated by reference in or attached to this	☐ 29. AWARD *(Contractor is not required to sign this document.)* Your offer on this solicitation is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.
30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN *(Type or print)*	31A. NAME OF CONTRACTING OFFICER *(Type or print)*

30B. SIGNATURE	30C. DATE	31B. UNITED STATES OF AMERICA BY	31C. AWARD DATE

SECTION B - SUPPLIES OR SERVICES AND PRICES/COSTS

B.1 CONTRACT PRICE

The Contractor shall supply, deliver, and complete all work, including furnishing all labor, material, equipment and services, unless otherwise specified herein, required under this contract for the following fixed unit prices. These prices shall include all labor, materials, overhead (excluding cost of Workers' Compensation and War-Hazard Insurance, for U.S. citizens, which shall be a direct reimbursement) and profit.

B.1.1 Basic Contract Requirement. B.1.4, contract line item 01 is removal of existing barrier.

B.1.2 Additional Contract Requirement. B.1.4, contract line item 02, is for installation of the barrier. Section I.2, FAR 52.217-7 for details relating to this option exercise.

B.1.3 Defense Base Act Insurance. If the Contractor will be required to purchase Defense Base Act (DBA) Insurance, it shall not be included in the firm-fixed price of installation. The Government will reimburse the Contractor directly for DBA Insurance that is required and obtained in accordance with Section I, DOSAR 652.228-71, "Worker's Compensation Insurance (Defense Base Act) - Services" and FAR 52.228-3, "Worker's Compensation Insurance (Defense Base Act)".

(Note: The Department of State has received from the Department of Labor a waiver of DBA for non-U.S. citizens. See FAR 52.228-4 in Section I for insurance required for non-U.S. citizens, which shall be included in the contract price and not separately reimbursed.)

When the contract is awarded, the Contractor shall contact the Contracting Officer and request the name of the insurance broker under contract to the Department of State. After paying the DBA insurance premium, the Contractor shall submit the certification of coverage from the carrier and a voucher for payment to the Contracting Officer. A paid invoice must support the voucher. The Contractor shall submit the certification to the Contracting Officer before the Notice to Proceed (see Section F).

The cost of DBA insurance is paid on an annual basis.

B.1.4 Pricing.

Line Item	Description	Unit	Unit Price	Quantity	Total Price
01	Removal of Existing Barrier	Each	_____	1	_____
02	Installation of New Barrier	Each	_____	1	_____
03	DBA Insurance (if required)				_____
				Total Price	_____

B.2 TYPE OF CONTRACT

This is a firm-fixed price contract payable entirely *in* (X) local, ( ) U.S. currency. The Government will not pay additional sums due to any escalation in the cost of materials, equipment or labor, or the contractor's failure to properly estimate or accurately predict the cost or difficulty of achieving the results required. The Government will also not adjust the contract price due to fluctuations in the currency exchange rates. The Government may make changes in the contract price or time to complete only due to changes made by the Government in the work to be performed, or by delays caused by the Government.

SECTION C - DESCRIPTION/SPECIFICATIONS
STATEMENT OF WORK

Entrance Front Side, Lisbon JOB # 7585

1.0 OBJECTIVE.

1.1 Remove existing Nasatka model NMSB-IIIB vehicle arrest system and replace with a new Delta model DSC2000-5 vehicle arrest system.

2.0 BACKGROUND.

2.1 Six plus years of service and environmental conditions have proven a degradation toll lending to costly mechanical failures thereby creating a need for replacement.

3.0 REQUIREMENTS.

3.1 Scope. The general scope of the project will be as follows:

Removal. (Old Barrier System)

3.1.1 The barrier system removal process shall consist of the following paragraphs as shown from 3.1.1 through 3.1.17. One (1) Nasatka model NMSB-IIIB vehicle arrest system located at the front side entrance. Customer Number: N/A

3.1.2 One (1) Nasatka model NMSB-IIIB vehicle arrest barrier located at the front side entrance. Customer Number: N/A

3.1.3 Concrete foundation removal and disposal of all waste concrete, barrier road plate(s), reinforcing steel rebar(s), PVC conduit piping, electrical wiring, and waste materials associated with the Nasatka model NMSB-IIIB vehicle arrest system. Customer Number: N/A

3.1.4 All hydraulic lines, electrical wiring, and PVC conduit piping as connected underground from the Nasatka model NMSB-IIIB vehicle arrest barrier and back to the hydraulic pumping unit. Customer Number: N/A

3.1.5 Hydraulic pumping unit, associated concrete foundation, and all hydraulic lines, electrical wiring, and PVC conduit piping as connected underground and back to the Nasatka model NMSB-IIIB vehicle arrest barrier. Customer Number: N/A

3.1.6 Enclosure that houses the hydraulic pumping unit. Customer Number: N/A

3.1.7 Vehicle Stop/Go signal light assemblies, associated concrete foundation, all electrical wiring, and PVC conduit piping as connected underground and back to the

control circuits for the Nasatka model NMSB-IIIB vehicle arrest system. Customer Number: N/A

3.1.8 Vehicle detector circuits, associated concrete foundation, all electrical wiring, and PVC conduit piping as connected underground and back to the control circuits for the Nasatka model NMSB-IIIB vehicle arrest system. Customer Number: N/A

3.1.9 Vehicle barrier drainage water sump-pump system (See 3.2.16) including all associated electrical wiring and PVC conduit piping as connected underground from the Nasatka model NMSB-IIIB vehicle arrest barrier and back to the sump-pump unit. Customer Number: N/A

3.1.10 Existing water drainage piping as required for the rerouting flow of water drainage through and/or around the vehicle barrier construction site. Customer Number: N/A

3.1.11 Existing fresh water piping as required for the rerouting of fresh water and piping through and/or around the vehicle barrier construction site. Customer Number: N/A

3.1.12 Existing gas piping (See 3.1.13) as required for the rerouting of gas and piping through and/or around the vehicle barrier construction site. Customer Number: N/A

3.1.13 Notice of Construction and/or Repair (See 6.1.21) for any gas line must be submitted to the local oil and gas commission before the start of any construction or repairs. Construction and/or repairs must be under the authority and supervision of the local oil and gas commission. Customer Number: N/A

3.1.14 Electrical lines or wiring (See 3.1.15) as required for the rerouting of electrical lines or wiring through and/or around the vehicle barrier construction site. Customer Number: N/A

3.1.15 Notice of Construction and/or Repair (See 6.1.22) for any electrical line must be submitted to the local electric co-op before the start of any construction or repairs. Construction and/or repairs must be under the authority and supervision of the local electric co-op. Customer Number: N/A

3.1.16 The contractor shall provide for damage restoration improvements as associated with the vehicle arrest system removal process. Customer Number: N/A

3.1.17 The contractor shall identify and address any anomalies of concern. Customer Number: N/A

3.2 **Excavation. (New Barrier System)**

3.2.1 The barrier system excavation process shall consist of the following paragraphs as shown from 3.2.1 through 3.2.18. One (1) Delta model DSC2000-5 vehicle arrest system located at the front side entrance. JOB # 7585

3.2.2 One (1) Delta model DSC2000-5 vehicle arrest barrier located at the front side entrance. JOB # 7585

3.2.3 All hydraulic lines, electrical wiring, and PVC conduit piping as required underground connecting from the Delta model DSC2000-5 vehicle arrest barrier and back to the hydraulic pumping unit. JOB # 7585

3.2.4 Hydraulic pumping unit. JOB # 7585

3.2.5 All hydraulic lines, electrical wiring, and PVC conduit piping as required underground connecting from the hydraulic pumping unit and back to the DSC2000-5 vehicle arrest barrier. JOB # 7585

3.2.6 Enclosure that houses the hydraulic pumping unit. JOB # 7585

3.2.7 Vehicle Stop/Go signal light assemblies, associated concrete foundation, all electrical wiring, and PVC conduit piping as connected underground and back to the control circuits for the Delta model DSC2000-5 vehicle arrest system. JOB # 7585

3.2.8 Vehicle detector circuits, associated concrete foundation, all electrical wiring, and PVC conduit piping as connected underground and back to the control circuits for the Delta model DSC2000-5 vehicle arrest system. JOB # 7585

3.2.9 Vehicle barrier water drainage sump-pump system to include the appropriate disposal of water to the nearest water drainage or sewer including all associated electrical wiring and PVC conduit piping as required underground and connecting from the Delta model DSC2000-5 vehicle arrest barrier and back to the sump-pump and water drainage or sewer system. JOB # 7585

3.2.10 Water drainage piping as required for the rerouting flow of water drainage through and/or around the vehicle barrier construction site. JOB # 7585

3.2.11 Fresh water piping as required for the rerouting of fresh water and piping through and/or around the vehicle barrier construction site. JOB # 7585

3.2.12 Gas piping (See 3.2.13) as required for the rerouting of gas and piping through and/or around the vehicle barrier construction site. JOB # 7585

3.2.13 Notice of Construction and/or Repair (See 6.1.21) for any gas line must be submitted to the local oil and gas commission before the start of any construction or

repairs. Construction and/or repairs must be under the authority and supervision of the local oil and gas commission. JOB # 7585

3.2.14 Electrical lines (See 3.2.15) or wiring as required for the rerouting of electrical lines or wiring through and/or around the vehicle barrier construction site. JOB # 7585

3.2.15 Notice of Construction and/or Repair (See 6.1.22) for any electrical line must be submitted to the local electric co-op before the start of any construction or repairs. Construction and/or repairs must be under the authority and supervision of the local electric co-op. JOB # 7585

3.2.16 Sump-pump well as required for the installation of a sump-pump system. JOB # 7585

3.2.17 The contractor shall provide for damage restoration improvements as associated with the vehicle arrest system removal process. JOB # 7585

3.2.18 The contractor shall identify and address any anomalies of concern. JOB # 7585

3.3 Installation. (New Barrier System)

3.3.1 The barrier system installation process shall consist of the following paragraphs as shown from 3.3.1 through 3.3.19. One (1) Delta model DSC2000-5 vehicle arrest system located at the front side entrance per manufacture instructions. JOB # 7585

3.3.2 One (1) Delta model DSC2000-5 vehicle arrest barrier located at the front side entrance per manufacture instructions. JOB # 7585

3.3.3 Delta model DSC2000-5 installation to include the concrete foundation, reinforcing steel rebar, and aggregate materials, as required per manufacture instructions. JOB # 7585

3.3.4 All new hydraulic lines, electrical wiring, and PVC conduit piping as required underground and connecting from the Delta model DSC2000-5 vehicle arrest barrier and back to the hydraulic pumping unit per manufacture instructions. JOB # 7585

3.3.5 Hydraulic pumping unit per manufacture instructions. JOB # 7585

3.3.6 All hydraulic lines, electrical wiring, and PVC conduit piping as required underground connecting from the hydraulic pumping unit and back to the DSC2000-5 vehicle arrest barrier per manufacture instructions. JOB # 7585

3.3.7 Enclosure that houses the hydraulic pumping unit per manufacture instructions. JOB # 7585

3.3.8 Vehicle Stop/Go signal light assemblies, associated concrete foundation, all electrical wiring, and PVC conduit piping as connected underground and back to the control circuits for the Delta model DSC2000-5 vehicle arrest system per manufacture instructions. JOB # 7585

3.3.9 Vehicle detector circuits, associated concrete foundation, all electrical wiring, and PVC conduit piping as connected underground and back to the control circuits for the Delta model DSC2000-5 vehicle arrest system per manufacture instructions. JOB # 7585

3.3.10 Vehicle barrier drainage water sump-pump system to include the appropriate disposal of water to the nearest water drainage or sewer including all associated electrical wiring and PVC conduit piping as required underground and connecting from the Delta model DSC2000-5 vehicle arrest barrier and back to the sump-pump and water drainage or sewer system. JOB # 7585

3.3.11 Water drainage piping as required for the rerouting flow of drainage water through and/or around the vehicle barrier construction site. JOB # 7585

3.3.12 Fresh water piping as required for the rerouting of fresh water and piping through and/or around the vehicle barrier construction site. JOB # 7585

3.3.13 Gas piping (See 3.3.14) as required for the rerouting of gas and piping through and/or around the vehicle barrier construction site. JOB # 7585

3.3.14 Notice of Construction and/or Repair (See 6.1.21) for any gas line must be submitted to the local oil and gas commission before the start of any construction or repairs. Construction and/or repairs must be under the authority and supervision of the local oil and gas commission. JOB # 7585

3.3.15 Electrical lines (See 3.3.16) or wiring as required for the rerouting of electrical lines or wiring through and/or around the vehicle barrier construction site. JOB # 7585

3.3.16 Notice of Construction and/or Repair (See 6.1.22) for any electrical line must be submitted to the local electric co-op before the start of any construction or repairs. Construction and/or repairs must be under the authority and supervision of the local electric co-op. JOB # 7585

3.3.17 Sump-pump well as required for the installation of a sump-pump system. JOB # 7585

3.3.18 The contractor shall provide for damage restoration improvements as associated with the vehicle arrest system installation process. JOB # 7585

3.3.19 The contractor shall identify and address any anomalies of concern. JOB # 7585

3.4 **Trucking & Equipment.**

3.4.1 The trucking and equipment process shall consist of the following paragraphs as shown from 3.4.1 through 3.4.9. The contractor shall provide for concrete mixer trucking and delivery of concrete as required for the installation of one (1) Delta model DSC2000-5 vehicle arrest system to include the concrete foundation for the vehicle barrier, hydraulic pumping unit and enclosure, vehicle detector circuits, the Stop/Go signal light assemblies, and the water sump-pump system as required for the installation project per manufacture instructions. JOB # 7585

3.4.2 The contractor shall provide for the trucking and delivery of reinforcing steel rebar(s) as required for the installation of one (1) Delta model DSC2000-5 vehicle arrest system to include the concrete foundation for the vehicle barrier, hydraulic pumping unit, vehicle Stop/Go signal light assemblies, and water sump-pump system as required for the installation project per manufacture instructions. JOB # 7585

3.4.3 The contractor shall provide for the trucking and delivery of aggregate materials as required for the installation of one (1) Delta model DSC2000-5 vehicle arrest system to include the concrete foundation for the vehicle barrier, hydraulic pumping unit, vehicle detector circuits, the Stop/Go signal light assemblies, and the water sump-pump system as required for the installation project per manufacture instructions. JOB # 7585

3.4.4 The contractor shall provide for the rental and/or use of all heavy duty equipment (i.e., forklift, front loader, excavator with hoe ram and bucket attachments) and/or other equipment as required for the removal and installation process to include the concrete foundation, reinforcing steel rebar and excavation necessary to the installation project per manufacture instructions. JOB # 7585

3.4.5 The contractor shall provide as required for the rental and/or use, pickup and delivery of a dumpster(s) as necessary to the project cleanup and waste removal. JOB # 7585

3.4.6 The contractor shall provide for a vehicle arrest barrier(s) as required to ensure construction site security. The arrest barrier(s) must be approved by the Post RSO or PSO. JOB # 7585

3.4.7 The contractor shall provide for pedestrian fencing and/or netting as required for pedestrian safety and access control. JOB # 7585

3.4.8 The contractor shall provide for a construction site portable restroom as required for contractor personnel. JOB # 7585

3.4.9 The contractor shall identify and address any anomalies of concern. JOB # 7585

3.5 **Tasks. (Remove)**

3.5.1 The contractor shall remove one (1) Nasatka model NMSB-IIIB vehicle arrest system located at the front side entrance. Customer Number: N/A

3.5.2 The contractor shall remove one (1) Nasatka model NMSB-IIIB vehicle arrest barrier located at the front side entrance. Customer Number: N/A

3.5.3 The contractor shall remove the concrete foundation, reinforcing steel rebar(s), aggregate material, all hydraulic lines, electrical wiring, and conduit piping as required underground connecting from the Nasatka model NMSB-IIIB vehicle arrest barrier and back to the hydraulic pumping unit. Customer Number: N/A

3.5.4 The contractor shall remove the hydraulic pumping unit, associated concrete foundation, reinforcing steel rebar(s), all hydraulic lines, electrical wiring, and conduit piping as required underground and connecting back to the Nasatka model NMSB-IIIB vehicle arrest barrier. Customer Number: N/A

3.5.5 The contractor shall remove the enclosure that houses the hydraulic pumping unit. Customer Number: N/A

3.5.6 The contractor shall remove the vehicle Stop/Go signal light assemblies, associated concrete foundation, all electrical wiring, and PVC conduit piping as connected underground and back to the control circuits for the Nasatka model NMSB-IIIB vehicle arrest system. Customer Number: N/A

3.5.7 The contractor shall remove the vehicle detector circuits, associated concrete foundation, all electrical wiring, and PVC conduit piping as connected underground and back to the control circuits for the Nasatka model NMSB-IIIB vehicle arrest system. Customer Number: N/A

3.5.8 The contractor shall remove the vehicle barrier water drainage sump-pump system including all associated electrical wiring and PVC conduit piping as connected underground and back to the Nasatka model NMSB-IIIB vehicle arrest barrier. Customer Number: N/A

3.5.9 The contractor shall remove water drainage piping as required for the rerouting flow of drainage water through and/or around the vehicle barrier construction site. Customer Number: N/A

3.5.10 The contractor shall remove fresh water piping as required for the rerouting of fresh water and piping through and/or around the vehicle barrier construction site. Customer Number: N/A

3.5.11 The contractor shall remove gas piping (See 3.5.12) as required for the rerouting of gas and piping through and/or around the vehicle barrier construction site. Customer Number: N/A

3.5.12 Notice of Construction and/or Repair (See 6.1.21) for any gas line must be submitted to the local oil and gas commission before the start of any construction or repairs. Construction and/or repairs must be under the authority and supervision of the local oil and gas commission. Customer Number: N/A

3.5.13 The contractor shall remove electrical lines (See 3.5.14) or wiring as required for the rerouting of electrical lines or wiring through and/or around the vehicle barrier construction site. Customer Number: N/A

3.5.14 Notice of Construction and/or Repair (See 6.1.22) for any electrical line must be submitted to the local electric co-op before the start of any construction or repairs. Construction and/or repairs must be under the authority and supervision of the local electric co-op. Customer Number: N/A

3.5.15 The contractor shall identify and address any anomalies of concern. Customer Number: N/A

3.6 **Tasks. (Install)**

3.6.1 The contractor shall install one (1) Delta model DSC2000-5 vehicle arrest system located at the front side entrance as required per manufacture instructions. JOB # 7585

3.6.2 The contractor shall install one (1) Delta model DSC2000-5 vehicle arrest barrier located at the front side entrance as required per manufacture instructions. JOB # 7585

3.6.3 The contractor shall install as required for the Delta model DSC2000-5 installation of a concrete foundation, reinforcing steel rebar(s), and aggregate materials, as required per manufacture instructions. JOB # 7585

3.6.4 The contractor shall install all hydraulic lines, electrical wiring, and PVC conduit piping as required underground connecting from the Delta model DSC2000-5 vehicle arrest barrier and back to the hydraulic pumping unit per manufacture instructions. JOB # 7585

3.6.5 The contractor shall install all hydraulic lines, electrical wiring, and PVC conduit piping as required underground connecting from the hydraulic pumping unit and back to the DSC2000-5 vehicle arrest barrier per manufacture instructions. JOB # 7585

3.6.6 The contractor shall install the hydraulic pumping unit and all associated wiring and PVC conduit piping per manufacture instructions. JOB # 7585

3.6.7 The contractor shall install the enclosure that houses the hydraulic pumping unit per manufacture instructions. JOB # 7585

3.6.8 The contractor shall install the vehicle Stop/Go signal light assemblies, associated concrete foundation, all electrical wiring, and PVC conduit piping as connected underground and back to the control circuits for the Delta model DSC2000-5 vehicle arrest system per manufacture instructions. JOB # 7585

3.6.9 The contractor shall install the vehicle detector circuits, associated concrete foundation, all electrical wiring, and PVC conduit piping as connected underground and back to the control circuits for the Delta model DSC2000-5 vehicle arrest system per manufacture instructions. JOB # 7585

3.6.10 The contractor shall install the vehicle barrier water drainage sump-pump system to include the appropriate disposal of water to the nearest water drainage or sewer including all associated electrical wiring and PVC conduit piping as required underground and connecting from the Delta model DSC2000-5 vehicle arrest barrier and back to the sump-pump and water drainage or sewer system. JOB # 7585

3.6.11 The contractor shall install water drainage piping as required for the rerouting flow of water drainage through and/or around the vehicle barrier construction site. JOB # 7585

3.6.12 The contractor shall install fresh water piping as required for the rerouting of fresh water and piping through and/or around the vehicle barrier construction site. JOB # 7585

3.6.13 The contractor shall install gas piping (See 3.6.14) as required for the rerouting of gas and piping through and/or around the vehicle barrier construction site. JOB # 7585

3.6.14 Notice of Construction and/or Repair (See 6.1.21) for any gas line must be submitted to the local oil and gas commission before the start of any construction or repairs. Construction and/or repairs must be under the authority and supervision of the local oil and gas commission. JOB # 7585

3.6.15 The contractor shall install electrical lines (See 3.6.16) or wiring as required for the rerouting of electrical lines or wiring through and/or around the vehicle barrier construction site. JOB # 7585

3.6.16 Notice of Construction and/or Repair (See 6.1.22) for any electrical line must be submitted to the local electric co-op before the start of any construction or repairs. Construction and/or repairs must be under the authority and supervision of the local electric co-op. JOB # 7585

3.6.17 The contractor shall install a sump-pump well as required for the installation of a sump-pump system. JOB # 7585

3.6.18 The contractor shall identify and address any anomalies of concern. JOB # 7585

3.7 **Tasks. (Waste Disposal)**

3.7.1 The contractor shall remove and dispose of all waste materials including concrete, aggregate materials, reinforcing steel rebar(s), steel barrier road plate(s), conduit piping, and all electrical wiring associated with the removal and installation process pertaining to the Nasatka NMSB-IIIB, and the Delta model DSC2000-5 vehicle arrest barrier to include associated system parts. JOB # 7585

3.7.2 The contractor shall identify and address any anomalies of concern. JOB # 7585

4.0 GOVERNMENT FURNISHED EQUIPMENT AND MATERIALS.

4.1 The government will provide the following;

4.1.1 The government will provide the Delta model DSC2000-5 vehicle arrest barricade(s). JOB # 7585

4.1.2 The government will provide the Delta control panel(s). JOB # 7585

4.1.3 The government will provide the Delta hydraulic power unit(s). (HPU) JOB # 7585

4.1.4 The government will provide the Delta enclosure(s), (for the hydraulic pumping unit(s)). JOB # 7585

4.1.5 The government will provide the Delta Stop/Go signal assemblies. JOB # 7585

4.1.6 The government will provide the vehicle detector circuit(s). JOB # 7585

4.1.7 The government will provide the sump-pump unit(s). JOB # 7585

4.1.8 The government will provide the hydraulic oil. 46 Grade. JOB # 7585

4.1.9 The government will provide the dry nitrogen, 2000 PSI. JOB # 7585

4.1.10 The government will provide the spray paint, safety yellow. JOB # 7585

4.1.11 The government will provide the spray paint, gloss black. JOB # 7585

4.1.12 The government will provide all of the hydraulic hoses, hose fittings, PVC/EMT conduit, conduit fittings, water drainage piping, fresh water piping, gas piping, HPU electrical wiring, control wiring, biodegradable grease cleaner, and miscellaneous parts associated with the installation. JOB # 7585

4.1.13 The contractor shall identify and address any anomalies of concern. JOB # 7585

5.0 CONTRACTOR FURNISHED EQUIPMENT AND MATERIALS.

5.1 The contractor shall provide the following;

5.1.1 The contractor shall provide all concrete required for the foundation installation of the Delta model DSC2000-5 vehicle barrier per manufacture instructions. JOB # 7585

5.1.2 The contractor shall provide all concrete required for the foundation installation of the hydraulic pumping unit to include the enclosure that houses the hydraulic pumping unit per manufacture instructions. JOB # 7585

5.1.3 The contractor shall provide all concrete and aggregate materials required for the foundation installation of the vehicle detector circuits, and the Stop/Go signal light assemblies per manufacture instructions. JOB # 7585

5.1.4 The contractor shall provide all concrete required for the foundation installation of the sump-pump system per manufacture instructions. JOB # 7585

5.1.5 The contractor shall provide all concrete required for the foundation installation of the water drainage piping. JOB # 7585

5.1.6 The contractor shall provide all concrete required for the foundation installation of the fresh water piping. JOB # 7585

5.1.7 The contractor shall provide all concrete required for the foundation installation of the gas piping (See 5.1.8). JOB # 7585

5.1.8 Notice of Construction and/or Repair (See 6.1.21) for any gas line must be submitted to the local oil and gas Commission before the start of any construction or repairs. Construction and/or repairs must be under the authority and supervision of the local oil and gas commission. JOB # 7585

5.1.9 The contractor shall provide all concrete required for the foundation installation of the electrical lines or wiring (See 5.1.10). JOB # 7585

5.1.10 Notice of Construction and/or Repair (See 6.1.22) for any electrical line must be submitted to the local electric co-op before the start of any construction or repairs.

Construction and/or repairs must be under the authority and supervision of the local electric co-op. JOB # 7585

5.1.11 The contractor shall provide all aggregate materials required for the foundation installation of the DSC2000-5 vehicle barrier per manufacture instructions. JOB # 7585

5.1.12 The contractor shall provide all aggregate materials required for the foundation installation of the hydraulic pumping unit and enclosure that houses the hydraulic pumping unit per manufacture instructions. JOB # 7585

5.1.13 The contractor shall provide all aggregate materials required for the foundation installation of the sump-pump unit per manufacture instructions. JOB # 7585

5.1.14 The contractor shall provide all aggregate materials required for the foundation installation of the water drainage piping. JOB # 7585

5.1.15 The contractor shall provide all aggregate materials required for the foundation installation of the fresh water piping. JOB # 7585

5.1.16 The contractor shall provide all aggregate materials required for the foundation installation of the gas piping (See 5.1.17). JOB # 7585

5.1.17 Notice of Construction and/or Repair (See 6.1.21) for any gas line must be submitted to the local oil and gas Commission before the start of any construction or repairs. Construction and/or repairs must be under the authority and supervision of the local oil and gas commission. JOB # 7585

5.1.18 The contractor shall provide all aggregate materials required for the foundation installation of the electrical lines or wiring (See 5.1.19). JOB # 7585

5.1.19 Notice of Construction and/or Repair (See 6.1.22) for any electrical line must be submitted to the local electric co-op before the start of any construction or repairs. Construction and/or repairs must be under the authority and supervision of the local electric co-op. JOB # 7585

5.1.20 The contractor shall provide all reinforcing steel rebar(s) required for the foundation installation of the DSC2000-5 vehicle barrier per manufacture instructions. JOB # 7585

5.1.21 The contractor shall provide all reinforcing steel rebar(s) required for the foundation installation of the hydraulic pumping unit and enclosure that houses the hydraulic pumping unit per manufacture instructions. JOB # 7585

5.1.22 The contractor shall provide all reinforcing steel rebar(s) required for the foundation installation of the sump-pump unit per manufacture instructions. JOB # 7585

5.1.23 The contractor shall provide all reinforcing steel rebar(s) required for the foundation installation of the water drainage piping. JOB # 7585

5.1.24 The contractor shall provide all reinforcing steel rebar(s) required for the foundation installation of the fresh water piping. JOB # 7585

5.1.25 The contractor shall provide all reinforcing steel rebar(s) required for the foundation installation of the gas piping (See 5.1.26). JOB # 7585

5.1.26 Notice of Construction and/or Repair (See 6.1.21) for any gas line must be submitted to the local oil and gas Commission before the start of any construction or repairs. Construction and/or repairs must be under the authority and supervision of the local oil and gas commission. JOB # 7585

5.1.27 The contractor shall provide all reinforcing steel rebar(s) required for the foundation installation of the electrical lines or wiring (See 5.1.28). JOB # 7585

5.1.28 Notice of Construction and/or Repair (See 6.1.22) for any electrical line must be submitted to the local electric co-op before the start of any construction or repairs. Construction and/or repairs must be under the authority and supervision of the local electric co-op. JOB # 7585

5.1.29 The contractor shall provide a dumpster(s) as required for the cleanup and disposal of all waste materials. JOB # 7585

5.1.30 The contractor shall provide all excavation and installation equipment required (i.e. forklift, front loader, excavator with hoe ram and bucket attachments, handheld breaker hammer, arc welding equipment, cutting torch, ground tamper, wheel barrow(s), powered saw for concrete cutting, steel rake(s), pick axe(s), flat head shovel(s), spade shovel(s), push broom(s), water hose w/spray attachments, pressure washer, large handheld grinder with cutoff and masonry wheels, electrical extension cord(s), concrete vibrator(s), chain slings, etc. JOB # 7585

5.1.31 The contractor shall provide all excavation materials (i.e. masonry blocks, lumber for formwork, concrete to concrete expansion joints, plastic sheeting for concrete curing, string line, nails, expandable spray foam, etc.). JOB # 7585

5.1.32 The contractor shall provide all small handheld tools, drills, drill bits, wrenches, screwdrivers, knockout hole punch set, hole saw kit, fish tape, handheld hydraulic oil fluid pump, large funnel spout, etc. as required for the installation project. JOB # 7585

5.1.33 The contractor shall provide manhole covers as required for the project installation. The manhole covers shall meet or exceed a 25 ton load test capacity. JOB # 7585

5.1.34 The contractor shall provide vehicle arrest barrier(s) as required to ensure construction site security. The arrest barrier(s) must be approved by the Post RSO or PSO. JOB # 7585

5.1.35 The contractor shall provide pedestrian fencing and/or netting as required for pedestrian safety and access control. JOB # 7585

5.1.36 The contractor shall provide a construction site Portable Restroom as required for contractor personnel. JOB # 7585

5.1.37 The contractor shall identify and address any anomalies of concern. JOB # 7585

6.0 CONTRACTOR RESPONSIBILITIES.

6.1 The contractor shall conform to the following;

6.1.1 The contractor shall conform to the manufacture guidelines and installation specifications. JOB # 7585

6.1.2 The contractor shall verify and be responsible for all dimensions and conditions at the job site. JOB # 7585

6.1.3 The contractor shall verify that the foundation concrete will be placed directly into neat excavations. And where sides of the excavation are not stable the contractor shall provide shoring. Type and method of shoring shall be at the contractor's option. JOB # 7585

6.1.4 The contractor shall ensure the excavation is kept dry at all times. JOB # 7585

6.1.5 The contractor shall ensure the concrete is laboratory designed, machine mixed, producing 3,000 PSI (20,68 MPA) at 7 days. JOB # 7585

6.1.6 The contractor shall ensure the cement is tested Portland cement conforming to ASTM C150, Type II Only. JOB # 7585

6.1.7 The contractor shall ensure the aggregates conform to ASTM C33 & B GRADE per standard specifications. Maximum size of aggregate shall be 1-1/2 inches (38mm). JOB # 7585

6.1.8 The contractor shall ensure the reinforcing steel to be deformed bars conforming to ASTM A615, grade 60 (60,000 PSI or 413.7MPA). JOB # 7585

6.1.9 The contractor shall ensure that all hooks and bends conform to ACI STANDARD 318. Latest revision. Inside diameter of hooks and bends shall be at least six (6) bar diameters. JOB # 7585

6.1.10 The contractor shall provide spacer bars, chairs, spreaders, blocks, etc. as required to positively hold the steel in place before concrete is poured. JOB # 7585

6.1.11 The contractor shall ensure the concrete is conveyed from the mixer to final deposit by methods that will prevent separation or loss of materials. JOB # 7585

6.1.12 The contractor shall ensure the concrete is thoroughly consolidated by suitable means during placement and shall be thoroughly worked around reinforcement and embedded fixtures and corners of forms. JOB # 7585

6.1.13 The contractor shall ensure the concrete is maintained above 50°F (10°C) and in a moist condition for at least seven (7) days after placement. And that adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or near freezing weather. JOB # 7585

6.1.14 The contractor shall ensure that where exterior wall face requires shoring and/or forming, the forms shall be substantial and sufficiently tight to prevent leakage, and that forms shall not be removed until the concrete is seven (7) days old. JOB # 7585

6.1.15 The contractor shall ensure that backfilling will be done by depositing and tamping into place clean sand or pouring lean concrete to 95% percent compaction. Water jetting shall not be allowed. JOB # 7585

6.1.16 The contractor shall ensure that conduit and pipes of aluminum are not allowed. JOB # 7585

6.1.17 The contractor shall ensure that construction joints that are not indicated on the drawings shall not be allowed. And that where a construction joint is to be made, the surface of the concrete shall be thoroughly cleaned and all laitance and standing water removed. JOB # 7585

6.1.18 The contractor shall be responsible for the protection of all adjacent areas against damage and shall repair all damaged areas to match existing improvements. JOB # 7585

6.1.19 The contractor shall be responsible for the protection of all electrical lines and/or wiring located in the adjacent areas against damage and shall repair all damaged electrical lines and/or wiring. JOB # 7585

6.1.20 The contractor shall be responsible for the protection of all water, gas, and sewage lines located in the adjacent area against damage and shall repair all damaged water, gas and/or sewage lines. JOB # 7585

6.1.21 The contractor shall be responsible for notifying the local Oil and Gas Commission before the commencement of any construction and/or repairs of gas lines. JOB # 7585

6.1.22 The contractor shall be responsible for determining the location of underground power lines, water, gas, and sewer mains to prevent damage during construction. This is very responsible work protecting City utilities from dig-ins", which could result in death, injury and considerable liability. JOB # 7585

6.1.23 The contractor shall keep the construction area clean at all times and at completion of work remove all surplus materials, equipment and debris leaving the premises in a clean condition acceptable to the owner or owners representative. JOB # 7585

6.1.24 The contractor shall perform damage restoration improvements as associated with the vehicle arrest system installation. JOB # 7585

6.1.25 The contractor shall identify and address any anomalies of concern. JOB # 7585

7.0 DELIVERY REQUIREMENTS.

7.1 The contractor shall provide the following;

7.1.1 The contractor shall provide daily written progress reports to the government project representative. JOB # 7585

7.1.2 The contractor shall provide daily verbal progress reports as requested by the government project representative. JOB # 7585

7.1.3 The contractor shall identify and address any anomalies of concern. JOB # 7585

8.0 ADDITIONAL WORK REQUIREMENTS.

8.1 Additional Information.

8.1.1

_____

_____

_____

SECTION D - PACKAGING AND MARKING

D.1 PLACE OF DELIVERY

All deliverables shall be delivered to the following address:

American Embassy
Av. das Forças Armadas
1649-044 Lisboa

D.2 PACKING AND MARKING

Materials delivered to the site shall be export packed for surface shipment and marked as follows:

American Embassy
Av. das Forças Armadas
1649-044 Lisboa

SECTION E - INSPECTION AND ACCEPTANCE

E.1 52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at:

http://acquisition.gov/far/index.html or, http://farsite.hill.af.mil/search.htm

These addresses are subject to change. If the Federal Acquisition Regulation (FAR) is not available at the locations indicated above, use the Dept. of State Acquisition Website at http://www.statebuy.state.gov/ to see the links to the FAR. You may also use an Internet "search engine" (e.g., Yahoo, Excite, Alta Vista, etc.) to obtain the latest location of the most current FAR.

The following Federal Acquisition Regulation clauses are incorporated by reference:

FEDERAL ACQUISITION REGULATION (48 CFR CH. 1)

Clause	Title and Date
52.246-02	Inspection of Supplies – Fixed Price (AUG 96)
52.246-12	Inspection of Construction (AUG 1996)*
	*applicable if installation option is exercised

E.2 QUALITY ASSURANCE

The Contractor shall institute an appropriate inspection system including:

(1) creation of checklists of duties to be carried out;
(2) periodic inspections to ensure that these duties are carried out by the supervisory staff and senior employees; and,
(3) weekly inspections to determine whether the various services are being performed according to the contract requirements.

The contractor shall provide copies of the daily inspection reports to the COR.

The contractor shall promptly correct and improve upon any areas of shortcomings and/or substandard conditions noted in such inspections. The contractor shall bring to the attention of the Contracting Officer or COR, for disposition, any conditions uncovered which are not the responsibility of the Contractor.

E.2.1 Inspection by Government: The COR or his/her authorized representatives will periodically inspect the services being performed and supplies being furnished, to determine that all services are being performed in an acceptable manner, and that all supplies are of acceptable quality and standards.

The Contractor shall be responsible for any countermeasures or corrective action, within the scope of this contract, which may be required by the Contracting Officer as a result of such inspection.

E.4 FINAL COMPLETION AND ACCEPTANCE

E.4.1 Definitions

(a) "Final completion and acceptance" - the stage in the progress of the work, as determined by the Contracting Officer and confirmed in writing to the Contractor, at which all work required under the contract has been completed in a satisfactory manner in accordance with contract requirements, subject to the discovery of defects after final completion and except for items specifically excluded in the notice of final acceptance.

(b) "Date of final completion and acceptance"- the date determined by the Contracting Officer on which final completion of the work occurs, as indicated by written notice to the Contractor.

E.4.2 Final Inspection and Tests

The Contractor shall give the Contracting Officer at least five (5) calendar days advance written notice prior to the date the work will be fully completed and ready for final inspection and tests. Final inspection and tests will be started not later than the date specified in the aforesaid notice unless the Contracting Officer determines that the work is not ready for final inspection and so informs the Contractor.

E.4.3 Final Acceptance

The Contracting Officer shall issue to the Contractor a notice of final acceptance and make final payment as required by the contract upon:

(1) satisfactory completion of all required tests;
(2) verification by the Contracting Officer on the basis of a final inspection that all items listed in the Schedule of Defects have been completed or corrected and that the work is finally complete, subject to the discovery of defects after final completion;
(3) submittal by the Contractor of all documents and other items required upon completion of the work, including a final request for payment, and;
(4) determination by the Contracting Officer that the work under the contract is complete and the contract has been fully performed, with the exception of continuing obligations thereunder.

SECTION F - DELIVERIES OR PERFORMANCE

F.1 52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at:

http://acquisition.gov/far/index.html or, http://farsite.hill.af.mil/search.htm

These addresses are subject to change. If the Federal Acquisition Regulation (FAR) is not available at the locations indicated above, use the Dept. of State Acquisition Website at http://www.statebuy.state.gov/ to see the links to the FAR. You may also use an Internet "search engine" (e.g., Yahoo, Excite, Alta Vista, etc.) to obtain the latest location of the most current FAR.

The following Federal Acquisition Regulation clauses are incorporated by reference:

FEDERAL ACQUISITION REGULATION (48 CFR CH. 1)

Clause	Title and Date
52.242-15	Stop Work Order (AUG 1989)
52.242.17	Government Delay of Work (APR 1984)
52.242-14	Suspension of Work (APR 1984)*

*applicable if installation option is exercised

F.2 INSTALLATION CLAUSES – These clauses are only applicable to the installation portion of the work, presuming the installation option is exercised.

F.2.1 52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to (a) commence work under this contract within **7** calendar days after the date the Contractor receives the Notice to Proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than **30** calendar days after the date of the Notice to Proceed. The time stated for completion shall include final cleanup of the premises and completion of punch-list items.

F.2.2 52.211-12 LIQUIDATED DAMAGES - CONSTRUCTION (SEP 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, or any extension, the Contractor shall pay liquidated damages to the Government in the amount of $602.00 or equivalent in Euros for each calendar day of delay until the work is completed or accepted.

(b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

F.2.3 Contractor's Submission Of Construction Schedules

(a) The time for submission of the schedules referenced in Section I, 52.236-15, "Schedules for Construction Contracts", paragraph (a), is hereby modified to reflect the due date for submission as "7 calendar days after receipt of an executed contract".

(b) These schedules shall include the time by which shop drawings, product data, samples and other submittals required by the contract will be submitted for approval.

(c) The Contractor shall revise such schedules (1) to account for the actual progress of the work, (2) to reflect approved adjustments in the performance schedule, and (3) as required by the Contracting Officer to achieve coordination with work by the Government and any separate contractors employed by the Government. The Contractor shall submit a schedule that sequences work so as to minimize disruption at the job-site.

(d) All deliverables shall be in the English language, unless otherwise provided hereunder, and any system of dimensions (i.e., English or metric) shown shall be consistent with that used in the contract. No extension of time shall be allowed due to delay by the Government in approving such deliverables if the Contractor has failed to act promptly and responsively in submitting its deliverables. Each deliverable shall be identified as required by the contract.

F.2.4 Acceptance Of Schedule

When the Government has accepted any time schedule, this acceptance shall be binding upon the Contractor. The completion date is fixed and may be extended only by a written contract modification signed by the Contracting Officer. Acceptance or approval of any schedule or revision thereof by the Government shall not:

(1) extend the completion date or obligate the Government to do so;
(2) constitute acceptance or approval of any delay, nor;
(3) excuse or relieve the Contractor of its obligation to maintain the progress of the work and achieve final completion by the established completion date.

F.2.5 Notice Of Delay

In the event the Contractor receives a notice of any change in the work, or if any other conditions arise which are likely to cause or are actually causing delays which the Contractor believes may result in completion of the project after the completion date, the Contractor shall:

(1) notify the Government of such change or other conditions upon the approved schedule, and;
(2) shall state in what respects, if any, the relevant schedule or the completion date should be revised.

Such notice shall be given promptly, and not more than ten (10) calendar days following the first occurrence of event giving rise to the delay or prospective delay. Revisions to the approved time schedule shall only be made with the approval of the Contracting Officer.

F.2.6 Notice To Proceed

(a) The Contracting Officer will issue a Notice to Proceed with barrier installation, following:

- receipt from the Contractor and acceptance by the Government of evidence of bonding and insurance within the time specified in Section H of this contract.

(b) The Contractor shall then prosecute the work required hereunder, commencing and completing performance not later than the time period established in **F.2.1.**

F.3 Excusable Delays

The Contractor shall be allowed time, not money, for excusable delays as defined in FAR 52.249-10, "Default". Examples of such cases include:

(l) acts of God or of the public enemy;
(2) acts of the United States Government in either its sovereign or contractual capacity;
(3) acts of the government of the host country in its sovereign capacity;
(4) acts of another contractor in the performance of a contract with the Government;
(5) fires;
(6) floods;
(7) epidemics;
(8) quarantine restrictions;
(9) strikes;
(10) freight embargoes;
(11) delays in delivery of Government furnished equipment, and;
(12) unusually severe weather.

In each instance, the failure to perform shall be beyond the control and without the fault or negligence of the Contractor, and the failure to perform furthermore:

(1) shall be one that the Contractor could not have reasonably anticipated and taken adequate measures to protect against;
(2) cannot be overcome by reasonable efforts to reschedule the work, and;
(3) directly and materially affects the date of final completion of the project.

F.4. DELIVERABLES

The Contractor shall deliver the following items under this contract in accordance with the delivery dates identified below. Bonds/Insurance, Safety Plan, Quality Assurance Plan, Construction Schedule, Submittal Schedule and Bios on Personnel shall be submitted prior to issuance by the Government of the Notice to Proceed.

Description	Quantity	Delivery Date	Deliver to:
H.1.2. Bonds/Insurance	1	10 days after award	Contracting Officer
H.11.1 Safety Plan	1	10 days after award	COR
E.2. Quality Assurance/Control Plan	1	10 days after award	COR
F.3 Construction Schedule	1	7 days after award	COR
H.14.1 Submittal Register	1	10 days after award	COR
H.1.2.3.Bios on Personnel	1	10 days after award	COR
E.2. Inspection Reports	1	7 days after end of weekly period being reported	COR
G.3. Payment Request	1	last calendar day of each month	COR
I.1 Updates to Construction Schedule (52.236-15)	1	last calendar day of each month	COR
E.3 Request for Final Acceptance	1	5 days before inspection	COR

SECTION G - CONTRACT ADMINISTRATION DATA

G.1. MONITORING OF THE CONTRACTOR

G.1.1. 652.242-70 CONTRACTING OFFICER'S REPRESENTATIVE (COR) (AUG 1999)

(a) The Contracting Officer may designate in writing one or more Government employees, by name or position title, to take action for the Contracting Officer under this contract. Each designee shall be identified as a Contracting Officer's Representative (COR). Such designation(s) shall specify the scope and limitations of the authority so delegated; provided, that the designee shall not change the terms or conditions of the contract, unless the COR is a warranted Contracting Officer and this authority is delegated in the designation.

(b) The COR for this contract is the DS/FSE/FSB Representative.

G.1.2 Duties

The COR is responsible for inspection and acceptance of services. These duties include review of Contractor invoices, including the supporting documentation required by the contract. The COR may provide technical advice, substantive guidance, inspections, invoice approval, and other purposes as deemed necessary under the contract. The COR is designated as the authority to act for the Contracting Officer in matters concerning technical clarification, random inspection of Contractor performance to ensure compliance with contract specifications and acceptance of the Contractor's performance under this contract. The COR will coordinate all work with the Contractor during the term of this contract. The COR is not authorized to alter the contract's terms, or conditions, including the design to budget parameter. Such changes must be authorized by the Contracting Officer in a written modification to the contract. Reference to the project architect within documents incorporated into this contract shall be read to mean COR.

G.2 INVOICING INSTRUCTIONS FOR FURNISHING ANTI-RAM BARRIERS.

G.2.1 Number of Copies and Location. The Contractor shall submit invoice(s) to the designated billing official, in an original and three (3) copies at the following address (designated office only for purpose of submitting invoices):

American Embassy
c/o FMO
Av. das Forças Armadas
1649-044 Lisboa

G.2.2 The Contractor shall submit a single invoice for furnishing of the anti-ram barriers. This invoice shall be submitted in accordance with FAR 52.233-25.

G.3 PAYMENT - CLAUSE APPLICABLE ONLY IF THE BARRIER INSTALLATION OPTION IS EXERCISED

G.3.1 General: The Contractor's attention is directed to Section I, 52.232-5, "Payments Under Fixed-Price Construction Contracts". The following subsections elaborate upon the information contained therein.

G.3.2 Detail of Payment Requests: Each application for payment shall be made no more frequently than monthly, unless otherwise provided herein, and shall cover the value of labor and materials completed and in place, including a prorated portion of overhead and profit.

G.3.3 Payments to Subcontractors: The Contractor shall make timely payment to his subcontractors and suppliers from the proceeds of the progress or final payment for which request is being made, in accordance with the Contractor's contractual arrangements with them.

G.3.4 Evaluation by the Contracting Officer: Following receipt of the Contractor's request for payment, and on the basis of an inspection of the work, the Contracting Officer will make a determination as to the amount which, in his/her opinion, is then due. In the event the Contracting Officer does not approve payment of the full amount applied for, less the retainage addressed in 52.232-5, the Contracting Officer shall advise the Contractor of the reasons for the reduction.

G.3.5 Additional Withholding: Independently of monies retained by the Government under 52.232-5, or otherwise as permitted to be retained under this contract, the Government may withhold from payments due the Contractor any amounts as may be considered necessary to cover

(1) Wages or other amounts due the Contractor's employees on this project;
(2) Wages or other amounts due employees of subcontractors on this project;
(3) Amounts due suppliers of materials or equipment for this project; and
(4) Any other amounts for which the Contractor may be held liable under this contract, including but not limited to the actual or prospective costs of correction of defective work and prospective liquidated damage when the Contractor has failed to make adequate progress.

G.3.6. Payment: In accordance with 52.232-27(a) the 14-day period identified in FAR 52.232-27(a)(1)(i)(A) is hereby changed to 30 days.

G.4 The Contractor shall identify Value Added Tax (VAT) as a separate line item in Attachment 4, Breakdown of Proposal Price. The Contractor shall also reflect VAT as a separate charge on invoices submitted.

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SECTION H - SPECIAL CONTRACT REQUIREMENTS

H.1 THROUGH H.18 ARE APPLICABLE ONLY IF INSTALLATION OPTION IS EXERCISED

H.1 BOND REQUIREMENTS

H.1.1 Bonds Required: The Contractor shall furnish (1) a performance and guaranty bond and a payment bond on forms provided by and from sureties acceptable to the Government, each in the amount of 20% of the contract price, or (2) comparable alternate performance security approved by the Government such as letter of credit shown in Section J.

H.1.2 Time for Submission: The Contractor shall provide the bonds required by paragraph H.1.1 above within ten (10) calendar days of contract award. Failure to timely submit (1) the required bonds or other security acceptable to the Government; (2) bonds from an acceptable surety; or (3) bonds in the required amount, may result in rescinding or termination of the contract by the Government. Should the contract be terminated, the contractor shall be liable for those costs as described in FAR 52.249-10, "Default (Fixed-Price Construction), which is included in Section I of this contract.

H.1.3 Coverage

The bonds or alternate performance security shall guarantee:

(1) the Contractor's execution and completion of the work within the contract time;
(2) the correction of any defects after completion as required by this contract;
(3) the payment of all wages and other amounts payable by the Contractor under its subcontracts or for labor and materials, and;
(4) the satisfaction or removal of any liens or encumbrances placed on the work.

H.1.4 Duration of Coverage: The required performance and payment securities shall remain in effect in the full amount required until final acceptance of the project by the Government, at which time the penal sum of the performance security, only, shall be reduced to 10% of the contract price. The performance security shall remain in effect for one year after the date of final completion and acceptance, and the Contractor shall pay any premium required for the entire period of coverage. The requirement for payment security terminates at final acceptance.

H.1.5 52.228-2 ADDITIONAL BOND SECURITY (OCT 1997)

The Contractor shall promptly furnish additional security required to protect the Government and persons supplying labor or materials under this contract if –

(a) Any surety upon any bond, or issuing financial institution for other security, furnished with this contract becomes unacceptable to the Government;

(b) Any surety fails to furnish reports on its financial condition as required by the Government; or

(c) The contract price is increased so that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer; or

(d) An irrevocable letter of credit (ILC) used as security will expire before the end of the period of required security. If the contractor does not furnish an acceptable extension or replacement ILC, or other acceptable substitute, at least 30 days before an ILC's scheduled expiration, the Contracting Officer has the right to immediately draw on the ILC.

H.2 INSURANCE

H.2.1 Amount of Insurance: The Contractor's attention is directed to Section I, 52.228-5, "Insurance - Work on a Government Installation". As required by this clause, the Contractor is required to provide whatever insurance is legally necessary. The Contractor, shall, at its own expense, provide and maintain during the entire performance period the following insurance amounts:

General Liability (includes premises/operations, collapse hazard, products, completed operations, contractual, independent contractors, broad form property damage, personal injury)

1. Bodily Injury on or off the site stated in US Dollars:
   Per Occurrence $ 250,000.00
   Cumulative $ 250,000.00
2. Property Damage on or off the site in US Dollars:
   Per Occurrence $ 250,000.00
   Cumulative $ 250,000.00

The foregoing types and amounts of insurance are the minimums required. The Contractor shall obtain any other types of insurance required by local law or that are ordinarily or customarily obtained in the location of the work. The limit of such insurance shall be as provided by law or sufficient to meet normal and customary claims.

The Contractor agrees that the Government shall not be responsible for personal injuries or for damages to any property of the Contractor, its officers, agents, servants, and employees, or any other person, arising from and incident to the Contractor's performance of this contract. The Contractor shall hold harmless and indemnify the Government from any and all claims arising therefrom, except in the instance of gross negligence on the part of the Government.

The Contractor shall obtain adequate insurance for damage to, or theft of, materials and equipment in insurance coverage for loose transit to the site or in storage on or off the site.

H.2.2 Government as Additional Insured: The general liability policy required of the Contractor shall name "the United States of America, acting by and through the Department of State", as an additional insured with respect to operations performed under this contract.

H.2.3 Insurance-Related Disputes: Failure to agree to any adjustment contemplated under this contract regarding insurance shall be a dispute within the meaning of the clause in Section I, 52.233-1, Alternate I, "Disputes". However, nothing in this clause shall excuse the Contractor from proceeding with the work, including the repair and/or replacement as herein above provided.

H.2.4 Time for Submission of Evidence of Insurance: The Contractor shall provide evidence of the insurance required under this contract within ten (10) calendar days after contract award. Failure to timely submit this evidence, in a form acceptable to the Contracting Officer, may result in rescinding or termination of the contract by the Government.

H.3 DEFINITIONS

In addition to the definitions provided in Section I, FAR 52.202-1 and DOSAR 652.202-70, the following definitions shall apply when used in connection with this contract:

(a) Contract Drawings or Drawings, where indicated by the context, means those drawings specifically listed in the executed construction contract or as later incorporated into the contract by contract modification or change order.

(b) Day means a calendar day unless otherwise specifically indicated.

(c) Host Country means the country in which the project is located

(d) Material means all materials, fixtures and other articles incorporated in , or which are intended to remain with, the project.

(e) Notice to Proceed means a written notice to the Contractor from the Contracting Officer authorizing the Contractor to incur obligations and proceed with the work under the contract as of a date set forth in the Notice.

(f) Other Submittals includes progress schedules, setting drawings, testing and inspection reports, and other information required by the contract to be submitted by the Contractor for information or approval by the Government.

(g) Project Data includes standard drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract.

(h) Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the work will be judged.

(i) Schedule of Defects means the list of items, prepared in connection with substantial completion of the work or early occupancy or utilization of a portion thereof, which the

Contracting Officer has designated as remaining to be performed, completed or corrected before the work will be accepted by the Government.

(j) Separate Contractor means a contractor, other than the Contractor or any of its subcontractors, to whom the Government has awarded a contract for construction of a portion of the project.

(k) Work means any and all permanent construction that is intended to be incorporated into the finished project and required to be performed or otherwise provided by the Contractor under this contract, unless otherwise indicated by the context.

H.4 OWNERSHIP AND USE OF DOCUMENTS

H.4.1 Ownership and Use of Drawings, Specifications and Models

(a) Ownership. All specifications, drawings, and copies thereof, and models, are the property of the Government.

(b) Use and Return. Unless otherwise provided in the contract, the documents described in (a) above are not to be used by other than the Contractor on other work and, with the exception of the signed contractor set, additional copies thereof provided to or made by the Contractor are to be returned or suitably accounted for by the Contractor upon final completion of the work.

H.4.2 Supplemental Documents: The Contracting Officer shall furnish from time to time such detailed drawings and other information as is considered necessary, in the opinion of the Contracting Officer, to interpret, clarify, supplement, or correct inconsistencies, errors or omissions in the Contract documents, or to describe minor changes in the work not involving an increase in the contract price or extension of the contract time. The Contractor shall comply with the requirements of the supplemental documents. Unless prompt objection is made by the Contractor within 20 days, issuance of the aforementioned documents shall not provide for any claim for an increase in the Contract price or an extension of contract time.

H.4.3 Record Documents: The Contractor shall maintain at the project site a current marked set of Contract drawings and specifications indicating all interpretations and clarification, contract modifications, change orders, or any other departure from the contract requirements approved by the Contracting Officer, and a complete set of record shop drawings, product data, samples and other submittals as approved by the Contracting Officer.

H.4.4 "As-Built" Documents: After final completion of the work, but before final acceptance thereof, the Contractor shall provide complete sets of "as-built" drawings, based upon the record set of drawings, marked to show the details of construction as actually accomplished, and record shop drawings and other submittals, in the number and form as required by the specifications.

H.5 GOVERNING LAW

The contract and its interpretation shall be governed by the laws of the United States.

H.6 LANGUAGE PROFICIENCY

The manager assigned by the contractor to superintend the work on-site, as required by Section I, 52.236-6, "Superintendence by the Contractor", shall be fluent in written and spoken English.

H.7 LAWS AND REGULATIONS

H.7.1 Compliance Required: The Contractor shall, without additional expense to the Government, be responsible for complying with all laws, codes, ordinances, and regulations applicable to the performance of the work, including those of the host country, and with the lawful orders of any governmental authority having jurisdiction. Host country authorities may not enter the construction site without the permission of the Contracting Officer. Unless otherwise directed by the Contracting Officer, the Contractor shall comply with the more stringent of the requirements of such laws, regulations and orders and of the contract. In the event of a conflict among the contract and such laws, regulations and orders, the Contractor shall promptly advise the Contracting Officer of the conflict and of the Contractor's proposed course of action for resolution by the Contracting Officer.

H.7.2 Labor, Health and Safety Laws and Customs: The Contractor shall comply with all local labor laws, regulations, customs and practices pertaining to labor, safety, and similar matters, to the extent that such compliance is not inconsistent with the requirements of this contract.

H.7.3 Subcontractors: The Contractor shall give written assurance to the Contracting Officer that all subcontractors and others performing work on or for the project have obtained all requisite licenses and permits.

H.7.4 Evidence of Compliance: The Contractor shall submit at such times as directed by the Contracting Officer, proper documentation and evidence satisfactory to the Contracting Officer of compliance with this clause.

H.8 RESPONSIBILITY OF CONTRACTOR

H.8.1 Damage to Persons or Property: The Contractor shall be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence, and shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others.

H.8.2 Responsibility for Work Performed: The Contractor shall be responsible for all materials delivered and work performed until final completion and acceptance of the entire work, except for any completed unit of work which may have been accepted in writing under the contract.

H.9 CONSTRUCTION OPERATIONS

H.9.1 Operations and Storage Areas

(a) Confinement to Authorized Areas. The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Contracting Officer.

(b) Vehicular Access. The Contractor shall, and in accordance with any regulations prescribed by the Contracting Officer, use only established site entrances and roadways.

H.9.2 Use Of Premises

(a) Occupied Premises. If the premises are occupied, the Contractor, its subcontractors, and their employees shall comply with the regulations promulgated by the Government governing access to, operation of, and conduct while in or on the premises and shall perform the work required under this contract in such a manner as not to unreasonably interrupt or interfere with the conduct of Government business.

(b) Requests from occupants. Any request received by the Contractor from occupants of existing buildings to change the sequence of work shall be referred to the Contracting Officer for determination.

(c) Access limited. The Contractor, its subcontractors and their employees shall not have access to or be admitted into any building or portion of the site outside the areas designated in this contract except with the permission of the Contracting Officer.

H.10 TEMPORARY FACILITIES AND SERVICES

Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor, the cost of which is included in the contract price. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.

H.11 SAFETY

652.236-70 ACCIDENT PREVENTION (APR 1999)

(a) General. The Contractor shall provide and maintain work environments and procedures which will (1) safeguard the public and Government personnel, property, materials,

supplies, and equipment exposed to Contractor operations and activities; (2) avoid interruptions of Government operations and delays in project completion dates; and (3) control costs in the performance of this contract. For these purposes, the Contractor shall—

(1) Provide appropriate safety barricades, signs and signal lights;
(2) Comply with the standards issued by any local government authority having jurisdiction over occupational health and safety issues;
(3) Ensure that any additional measures the Contracting Officer determines to be reasonably necessary for this purpose are taken.
(4) Since personnel shall be in trench, which should be approx. 1.5 M deep, it is necessary that the excavation, and adjacent areas, be inspected by a "competent person". A "competent person" is one who is familiar with this type of work, can identify trenching hazards, and has authority to stop work in the event hazardous conditions develop. He or she shall inspect it daily, after any rainy storm, other source of water entering trench, or other energy source (such as vibration, presence of utility lines) which might weaken the side walls of the trench or otherwise hazard the employees in the trench. If there is evidence that the excavation presents a hazard to workers, remove the workers immediately.
(5) When excavation is under 1.5 meters, and the "competent person" judges that there is no potential for cave in shoring may be removed.

(b) Records. The Contractor shall maintain an accurate record of exposure data on all accidents incident to work performed under this contract resulting in death, traumatic injury, occupational disease, or damage to or theft or loss of property, materials, supplies, or equipment. The Contractor shall report this data in the manner prescribed by the Contracting Officer.

(c) Subcontracts. The Contractor shall be responsible for its subcontractors' compliance with this clause.

(d) Written Program. Before commencing the work, the Contractor shall—
(1) Submit a written proposal for implementing this clause; and
(2) Meet with the Contracting Officer to discuss and develop a mutual understanding relative to administration of the overall safety program.

(e) The Contracting Officer shall notify the Contractor of any non-compliance with these requirements and the corrective actions required. This notice, when delivered to the Contractor or the Contractor's representative at site, shall be deemed sufficient notice of the non-compliance and corrective action required. After receiving the notice, the Contractor shall immediately take correction action. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order suspending all or part of the work until satisfactory corrective action has been taken. The Contractor shall not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any suspension of work issued under this clause.

H.12 SUBCONTRACTORS AND SUPPLIERS

H.12.1 Claims and Encumbrances: The Contractor shall satisfy as due all lawful claims of any persons or entities employed by the Contractor, including subcontractors, material men and laborers, for all labor performed and materials furnished under this contract, including the applicable warranty or correction period, unless the Government shall be directly liable therefore by contract. The Contractor shall not at any time permit any lien, attachment, or other encumbrance to be entered against or to remain on the building(s), or the premises, whether public or private, or any portion thereof, as a result of nonperformance of any part of this contract.

H.12.2 Approval of Subcontractors

(a) Review and consent. The Government reserves the right to review proposed subcontractors for a period of five (5) calendar days before providing notice of consent or rejection of any or all subcontractors.

(b) Rejection of subcontractors. The Government reserves the right to reject any or all subcontractors proposed if their participation in the project, as determined by the Contracting Officer, may cause damage to the national security interests of the United States. The Contractor agrees to promptly replace any subcontractor rejected by the Government under this clause.

H.13 CONSTRUCTION PERSONNEL

H.13.1 Removal of Personnel: The Contractor shall maintain discipline at the site and at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst those employed at the site and for the preservation of peace and protection of persons and property in the neighborhood of the project against the same. The Contracting Officer may require, in writing, that the Contractor remove from the work any employee that the Contracting Officer deems incompetent, careless, insubordinate or otherwise objectionable, or whose continued employment on the project is deemed by the Contracting Officer to be contrary to the Government's interests.

H.13.2 Construction Personnel Security: After award of the contract, the Contractor has ten (10) calendar days to submit to the Contracting Officer a list of workers and supervisors assigned to this project for the Government to conduct all necessary security checks. It is anticipated that security checks will take fifteen (15) days to perform. For each individual the list shall include:

Form OF 174 (provided by U.S. Embassy)
Photocopy of Identification Card
Criminal Record (less than 90 days)
Letter from Contractor stating the name of worker(s)
Five references (three individuals and two commercial)
Authorization to release information

Failure to provide any of the above information may be considered grounds for rejections and/or resubmittal of the application. Once the Government has completed the security screening and approved the applicants a badge will be provided to the individual for access to the site. This badge may be revoked at any time due to the falsification of data, or misconduct on site.

H.14 MATERIALS AND EQUIPMENT

H.14.1 Selection and Approval of Materials

(a) Standard of quality. All materials and equipment incorporated into the work shall be new and for the purpose intended, unless otherwise specified, and all workmanship shall be of good quality and performed in a skillful manner as determined by the Contracting Officer.

(b) Selection by Contractor. Where the contract permits the Contractor to select products, materials or equipment to be incorporated in the work, or where specific approval is otherwise required by the contract, the Contractor shall furnish to the Contracting Officer, for approval, the names of the manufacturer, model number, and source of procurement of each such product, material or equipment, together with other pertinent information concerning the nature, appearance, dimensions, performance, capacity, and rating thereof, unless otherwise required by the Contracting Officer. Such information shall be provided in a sufficiently timely manner to permit evaluation by the Government against the requirements of the contract. In order to ensure a timely review the Contractor shall provide a submittal register ten days after contract award showing when shop drawings, samples, or submittals shall be made. When directed to do so, the Contractor shall submit samples for approval at the Contractor's expense, with all shipping charges prepaid. Installation or use of any products, materials or equipment without the required approval shall be at the risk of subsequent rejection.

H.14.2 Custody of Materials: The Contractor shall be responsible for the custody of all materials received for incorporation into the project, including Government furnished materials, upon delivery to the Contractor or to any person for whom it is responsible, including subcontractors. The Contractor shall deliver all such items to the site as soon as practicable. If required by the Contracting Officer, the Contractor shall clearly mark in a manner directed by the Contracting Officer all items of which the Contractor has custody but which have not been delivered or secured at the site, clearly indicating the use of such items for this U.S. Government project.

H.14.3 Basis of Contract Price: The contract price is based on the use of the materials, products and equipment specified in the contract, except for substitutions or "Or-Equal" items proposed by the Contractor which have been specifically approved by the Government at the time of execution of the contract. Any substitution approved by the Government after execution of the contract shall be subject to an appropriate adjustment of the contract price.

H.14.4 Substitutions

(a) Prior approval required. Before substitutions (1) proposed by the Contractor but not yet approved at the time of execution of the contract, or (2) proposed by the Contractor after execution of the contract may be used in the project, the Contractor shall receive approval in writing from the Contracting Officer. Any substitution request shall be accompanied by sufficient information to permit evaluation by the Government, including but not limited to the reasons for the proposed substitution and data concerning the design, appearance, performance, composition, and relative cost of the proposed substitute. Requests for substitutions shall be made in a timely manner to permit adequate evaluation by the Government. If, in the Contracting Officer's opinion, the use of such substitute items is not in the best interests of the Government, the Contractor shall obtain the items originally specified with no adjustment in the contract price or completion date.

(b) Approval through shop drawings. The Contractor may propose substitutions of materials in the submittal of shop drawings, provided such substitution is specifically requested in writing in the transmittal of the shop drawings to the Contracting Officer. Such substitution requests shall be made in a timely manner and supported by the required information.

(c) Final approval on delivery. Acceptance or approval of proposed substitutions under the contract are conditioned upon approval of items delivered at the site or approval by sample. Approval by sample shall not limit the Government's right to reject material after delivery to the site if the material does not conform to the approved sample in all material respects.

H.14.5 "Or-Equal Clause": References in the Specifications/Statement of Work to materials, products or equipment by trade name, make, or catalog number, or to specific processes, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may propose for approval or rejection by the Contracting Officer the substitution of any material, product, equipment or process that the Contractor believes to be equal to or better than that named in the Specifications/Statement of Work, unless otherwise specifically provided in this contract.

H.14.6 Use and Testing of Samples

(a) Use. Approved samples not destroyed in testing will be sent to the Contracting Officer. Those which are in good condition will be marked for identification and may be used in the work. Materials and equipment incorporated in the work shall match the approved samples within any specified tolerances. Other samples not destroyed in testing or not approved will be returned to the Contractor at its expense if so requested.

(b) Failure of Samples. Failure of any material to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the

same brand or make of that material or equipment which previously has proved unsatisfactory in service.

(c) Taking and testing of samples. Samples of various materials or equipment delivered on the site or in place may be taken by the Contracting Officer for additional testing by the Government outside of those required by the Contract documents. Samples failing to meet contract requirements will automatically void previous approvals of the items tested. The Contractor shall replace such materials or equipment found not to have met contract requirements, unless the Contracting Officer determines it to be in the Government's interest to accept the non conforming materials or equipment with an appropriate adjustment of the Contract price as determined by the Contracting Officer.

(d) Cost of additional testing by the Government. Unless otherwise specified, when additional tests are made, only one test of each sample proposed for use will be made at the expense of the Government. Samples which do not meet contract required will be rejected. Further testing of additional samples, if required, will be made at the expense of the Contractor.

H.15 SPECIAL WARRANTIES

H.15.1 Special Warranty Obligations: Any special warranties that may be required under the contract shall be subject to the stipulations set forth in Section I, 52.246-21, "Warranty of Construction", insofar as they do not conflict with the provisions of such special warranties.

H.15.2 Warranty Information: The Contractor shall obtain and furnish to the Government all information which is required in order to make any subcontractor's, manufacturer's, or supplier's guarantee or warranty legally binding and effective, and shall submit both the information and the guarantee or warranty to the Government in sufficient time to permit the Government to meet any time limit requirements specified in the guarantee or warranty, but not later than completion and acceptance of all work under this contract.

H.16 EQUITABLE ADJUSTMENTS

H.16.1 Basis for Equitable Adjustments: Any circumstance for which the contract provides an equitable adjustment, that causes a change within the meaning of paragraph (a) of the "Changes" clause shall be treated as a change under that clause; provided, that the Contractor gives the Contracting Officer prompt written notice within a limit of 20 days stating (a) the date, circumstances, and applicable contract clause authorizing an equitable adjustment and (b) that the Contractor regards the event as a changed condition for which an equitable adjustment is allowed under the contract.

H.16.2 Differing Site Condition Notice: The Contractor shall provide written notice of a differing site condition within 10 calendar days of occurrence in accordance with additional information provided in FAR 52.236-4, Differing Site Condition.

H.16.3 Documentation of Proposals for Equitable Adjustments

(a) Itemization of proposals and requests. Any request for equitable adjustment in the contract price, including any change proposal submitted in accordance with the "Changes" clause, shall be submitted in the form of a lump sum proposal supported with an itemized breakdown of all increases and decreases in the contract price in at least the detail required by the Contracting Officer, and shall include all costs and delays related to or arising out of the change or event giving rise to the proposed adjustment, including any delay damages and additional overhead costs.

(b) Proposed time adjustments. The Contractor shall submit with any request for an equitable adjustment or change proposal a proposed time extension (if applicable), and shall include sufficient information to demonstrate whether and to what extent the change will delay the contract in its entirety.

(c) Release by Contractor. The price and time adjustment made in any contract modification issued as a result of a change proposal or request for an equitable adjustment shall be considered to account for all items affected by the change or other circumstances giving rise to an equitable adjustment. Upon the issuance of such contract modification, the Government shall be released from any and all liability under this contract for further equitable adjustments attributable to the facts and circumstances giving rise to the change proposal or request for equitable adjustment.

H.17 NONCOMPLIANCE WITH CONTRACT REQUIREMENTS

In the event the Contractor, after receiving written notice from the Contracting Officer of noncompliance with any requirement of this contract, fails to initiate promptly such action as may be appropriate to comply with the specified requirement within a reasonable period of time, the Contracting Officer shall have the right to order the Contractor to stop any or all work under the contract until the Contractor has complied or has initiated such action as may be appropriate to comply within a reasonable period of time. The Contractor will not be entitled to any extension of contract time or payment for any costs incurred as a result of being ordered to stop work for such a cause. See FAR 52.252-14, Suspension of Work in Section I.

H.18 ZONING APPROVALS AND BUILDING PERMITS

The Government shall be responsible for obtaining proper zoning or other land use control approval for the project, for obtaining the approval of the Contracting Drawings and Specifications, for paying fees due for the foregoing, and for obtaining and paying for the initial building permits.

H.19 ASSIGNMENT

The Contractor shall not assign the contract or any part thereof without the written consent of the Contracting Officer, nor shall the Contractor assign any moneys or other benefits due or to become due to him hereunder, without the previous written consent of the Contracting Officer.

SECTION I - CONTRACT CLAUSES

I.1 FAR 52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at:

http://acquisition.gov/far/index.html or, http://farsite.hill.af.mil/search.htm

These addresses are subject to change. If the Federal Acquisition Regulation (FAR) is not available at the locations indicated above, use the Dept. of State Acquisition Website at http://www.statebuy.state.gov/ to see the links to the FAR. You may also use an Internet "search engine" (e.g., Yahoo, Excite, Alta Vista, etc.) to obtain the latest location of the most current FAR.

The following Federal Acquisition Regulation clauses are incorporated by reference:

FEDERAL ACQUISITION REGULATION (48 CFR CH. 1)

Clause	Title and Date
52.202-1	DEFINITIONS (MAY 2001) ALTERNATE I (DEC2001)
52.203-3	GRATUITIES (APR 1984)
52.203-5	COVENANT AGAINST CONTINGENT FEES (APR 1984)
52.203-6	RESTRICTIONS ON SUBCONTRACTOR SALES TO THE GOVERNMENT (SEP 2006)
52.203-7	ANTI-KICKBACK PROCEDURES (OCT 2010)
52.203-8	CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)
52.203-10	PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)
52.203-12	LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (OCT 2010)
52.204-4	PRINTING/COPYING DOUBLE-SIDED ON RECYCLED PAPER (AUG 2000)
52.204-9	PERSONAL VERIFICATION OF CONTRACTOR PERSONNEL (JAN 2011)
52.209-6	PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT (SEP 2006)
52.204-7	CENTRAL CONTRACTOR REGISTRATION (APR 2008)

52.204-10	REPORTING EXECUTIVE COMPENSATION AND FIRST-TIER SUBCONTRACT AWARDS (JUL 2010)
52.215-2	AUDIT AND RECORDS - NEGOTIATION (OCT 2010)
52.215-8	ORDER OF PRECEDENCE--UNIFORM CONTRACT FORMAT (OCT 1997)
52.215-11	PRICE REDUCTION FOR DEFECTIVE CERTIFIED COST OR PRICING DATA – MODIFICATIONS (OCT 2010)
52.215-13	SUBCONTRACTOR CERTIFIED COST OR PRICING DATA – MODIFICATIONS (OCT 2010)
52.215-21	REQUIREMENTS FOR COST OR PRICING DATA OR PRICING DATA OR INFORMATION OTHER THAN COST OR PRICING DATA-MODIFICATIONS (OCT 2010)
52.219-8	UTILIZATION OF SMALL BUSINESS CONCERNS (OCT 99) **
52.222-1	NOTICE TO THE GOVERNMENT OF LABOR DISPUTES (FEB 1997)
52.222-19	CHILD LABOR – COOPERATION WITH AUTHORITIES AND REMEDIES (AUG 2010)
52.222-20	WALSH-HEALEY PUBLIC CONTRACTS ACT (DEC 1996)
52.222-21	PROHIBITION OF SEGREGATED FACILITIES (FEB 1999) **
52.222-26	EQUAL OPPORTUNITY (FEB 1999)**
52.222-29	NOTIFICATION OF VISA DENIAL (FEB 1999)**
52.222-35	AFFIRMATIVE ACTION FOR DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA (APR 1998)**
52.222-36	AFFIRMATIVE ACTION FOR WORKERS WITH DISABILITIES (JUN 1998)**
52.222-37	EMPLOYMENT REPORTS ON DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA (JAN 1999) **
52.222-50	COMBATING TRAFFIKING IN PERSONS (FEB 2009)
52.223-6	DRUG FREE WORKPLACE (JAN 97) **
52.223-18	CONTRACTOR POLICY TO BAN TEXT MESSAGING WHILE DRIVING (SEP 2010)
52.225-13	RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (JUN 2008)
52.225-14	INCONSISTENCY BETWEEN ENGLISH VERSION AND TRANSLATION OF CONTRACT (FEB 2000)
52.228-3	WORKERS' COMPENSATION INSURANCE (DBA)(APR 1984)* **
52.228-4	WORKERS' COMPENSATION AND WAR-HAZARD INSURANCE OVERSEAS (APR 1984)*
52.228-5	INSURANCE - WORK ON A GOVERNMENT INSTALLATION (JAN 1997)*
52.228-11	PLEDGES OF ASSETS (FEB 1992)*
52.228-13	ALTERNATIVE PAYMENT PROTECTION (JUL 2000)*
52.228-14	IRREVOCABLE LETTER OF CREDIT (DEC 1999)*
52.229-6	TAXES - FOREIGN FIXED-PRICE CONTRACTS (JUN2003)
52.232-1	PAYMENTS (MAY 2001)

52.232-5	PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (SEP 2002)*
52.232-17	INTEREST (OCT 2010)
52.232-18	AVAILABILITY OF FUNDS (APR 1984)
52.232-24	PROHIBITION OF ASSIGNMENT OF CLAIMS (JAN 1986)
52.232-25	PROMPT PAYMENT (OCT 2008) (B)(2). . .30TH DAY
52.232-27	PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS (SEP 2005)*
52.232.34	PAYMENT BY ELECTRONIC FUNDS TRANSFER – OTHER THAN CENTRAL CONTRACTOR REGISTRATION (MAY 1999)
52.233-1	DISPUTES (JUL 2002) ALTERNATE I (DEC 1991)
52.233-3	PROTEST AFTER AWARD (AUG 1996)
52.233-4	APPLICABLE LAW FOR BREACH OF CONTRACT CLAIM (OCT 2004)
52.236-2	DIFFERING SITE CONDITIONS (APR 1984)*
52.236-3	SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK (APR 1984)*
52.236-5	MATERIAL AND WORKMANSHIP (APR 1984)*
52.236-6	SUPERINTENDENCE BY THE CONTRACTOR (APR 1984)*
52.236-7	PERMITS AND RESPONSIBILITIES (NOV 1991)*
52.236-8	OTHER CONTRACTS (APR 1984)*
52.236-9	PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984)*
52.236-10	OPERATIONS AND STORAGE AREAS (APR 1984)*
52.236-11	USE AND POSSESSION PRIOR TO COMPLETION (APR 1984)*
52.236-12	CLEANING UP (APR 1984)*
52.236-14	AVAILABILITY AND USE OF UTILITY SERVICES (APR 1984)*
52.236-15	SCHEDULES FOR CONSTRUCTION CONTRACTS (APR 1984)*
52.236-21	SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)*
52.236-26	PRECONSTRUCTION CONFERENCE (FEB 1995)
52.242-13	BANKRUPTCY (JUL 1995)
52.243-4	CHANGES (JUNE 2007)*
52.243-5	CHANGES AND CHANGED CONDITIONS (APR 1984)*
52.244-6	SUBCONTRACTS FOR COMMERCIAL ITEMS (OCT 2010)
52.245-9	USE AND CHARGES (JUNE 2010)
52.246-19	WARRANTY OF SYSTEM AND EQUIPMENT UNDER PERFORMANCE SPECIFICATIONS OR DESIGN CRITERIA (DEC 1989)
52.246-21	WARRANTY OF CONSTRUCTION (MAR 1994)*
52.246-25	LIMITATION OF LIABILITY – SERVICES (FEB 1997)*
52.247-63	PREFERENCE FOR U.S.- FLAG CARRIERS (JUN2003)
52.247-64	PREFERENCE FOR PRIVATELY OWNED U.S. - FLAG COMMERCIAL VESSELS (APR 2003)
52.248-1	VALUE ENGINEERING (FEB 2000)

52.248-3	VALUE ENGINEERING - CONSTRUCTION (OCT 2010)*
52.249-2	TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) (MAY 2004) ALTERNATE I (SEP 1996)
52.249-8	DEFAULT (FIXED PRICE SUPPLY AND SERVICE) (APR 1984)
52.249-10	DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984)*
52.250-2	SAFETY ACT COVERAGE NOT APPLICABLE (FEB 2009)

52.244-6 Subcontract for Commercial Items (APR 2010)

I.2 FAR FULL TEXT CLAUSES

52.209-1 QUALIFICATION REQUIREMENTS (FEB 1995)

(a) Definition. "Qualification requirement," as used in this clause, means a Government requirement for testing or other quality assurance demonstration that shall be completed before award.

(b) One or more qualification requirements apply to the supplies or services covered by this contract. For those supplies or services requiring qualification, whether the covered product or service is an end item under this contract or simply a component of an end item, the product, manufacturer, or source shall have demonstrated that it meets the standards prescribed for qualification before award of this contract. The product, manufacturer, or source must be qualified at the time of award whether or not the name of the product, manufacturer, or source is actually included on a qualified products list, qualified manufacturers list, or qualified bidders list. Offerors should contact the agency activity designated below to obtain all requirements that they or their products or services, or their subcontractors or their products or services, must satisfy to become qualified and to arrange for an opportunity to demonstrate their abilities to meet the standards specified for qualification.

(Name) _____

(Address) _____

(c) If an offeror, manufacturer, source, product or service covered by a qualification requirement has already met the standards specified, the relevant information noted below should be provided.

Offeror's Name _____

Manufacturer's Name _____

Source's Name _____

Item Name _____

Service Identification _____

Test Number _____ (to the extent known)

(d) Even though a product or service subject to a qualification requirement is not itself an end item under this contract, the product, manufacturer, or source must nevertheless be qualified at the time of award of this contract. This is necessary whether the Contractor or a subcontractor will ultimately provide the product or service in question. If, after award, the Contracting Officer discovers that an applicable qualification requirement was not in fact met at the time of award, the Contracting Officer may either terminate this contract for default or allow performance to continue if adequate consideration is offered and the action is determined to be otherwise in the Government's best interests.

(e) If an offeror, manufacturer, source, product or service has met the qualification requirement but is not yet on a qualified products list, qualified manufacturers list, or qualified bidders list, the offeror must submit evidence of qualification prior to award of this contract. Unless determined to be in the Government's interest, award of this contract shall not be delayed to permit an offeror to submit evidence of qualification.

(f) Any change in location or ownership of the plant where a previously qualified product or service was manufactured or performed requires reevaluation of the qualification. Similarly, any change in location or ownership of a previously qualified manufacturer or source requires reevaluation of the qualification. The reevaluation must be accomplished before the date of award.

52.217-7 OPTION FOR INCREASED QUANTITY – SEPARATELY PRICED LINE ITEM (MAR 1989)

The Government may require performance of the contract line item, identified in the Schedule (Section B) as an option item, at the price stated in the Schedule. If the option is to be exercised, the Contracting Officer will exercise the option item at time of contract award.

52.228-15 PERFORMANCE AND PAYMENT BONDS - CONSTRUCTION (OCT 2010)
*only applicable if the installation option is exercised

(a) As used in this clause-Contract-
"Original contract price" means the award price of the contract; or, for requirements contracts, the price payable for the estimated quantity; or, for indefinite-delivery type contracts, the price payable for the specified minimum quantity. Original contract price does not include the price of any options, except those options exercised at the time of contract award.

(b) Amount of required bonds. Unless the resulting contract price is $150,000 or less, the successful offeror shall be required to furnish performance and payment bonds to the Contracting Officer as follows:

(l) Performance Bonds (Standard Form 25). The penal amount of performance bonds at the time of contract award shall be 20 percent of the original contract price.

(2) Payment Bonds (Standard Form 25A) The penal amount of payment bonds shall be 20 percent of the original contract price.

(3) Additional bond protection. (i) The Government may require additional performance and payment bond protection if the contract price is increased. The increase in protection generally will equal 20% of the increased in contract price.

(ii) The Government may secure the additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

(c) Furnishing executed bonds. The Contractor shall furnish all executed bonds, including any necessary reinsurance agreements, to the Contracting Officer, within the time period specified in the Bid Guarantee provision of the solicitation, or otherwise specified by the Contracting Officer, in any event, before starting work.

(d) *Surety or other security for bonds*. The bonds shall be in the form of firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, individual sureties, or by other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or bonds or notes of the United States. Treasury Circular 570 is published in the Federal Register or Department of Treasury, Financial Management Service, Surety Bond Branch, 3700 East West Highway, Room 6F01, Hyattsville, MD 20782. Or via the internet at http:://www.fms.treas.gov/c570/.

(e) Notice of subcontractor waiver of protection (40 U.S.C. 3133(c). Any waiver of the right to sue on the payment bond is void unless it is in writing, signed by the person whose right is waived, and executed after such person has furnished labor or material for use in the performance of the contract.

I.3 DOSAR FULL TEXT CLAUSES

652.204-70 DEPARTMENT OF STATE PERSONAL IDENTIFICATION CARD ISSUANCE PROCEDURES (AUG 2007)

(a) The Contractor shall comply with the Department of State (DOS) Personal Identification Card Issuance Procedures for all employees performing under this contract who require frequent and continuing access to DOS facilities, or information systems. The Contractor shall insert this clause in all subcontracts when the subcontractor's employees will require frequent and continuing access to DOS facilities, or information systems.

(b) The DOS Personal Identification Card Issuance Procedures may be accessed at http://www.state.gov/m/ds/rls/rpt/c21664.htm .

(End of clause)

CONTRACTOR IDENTIFICATION (JULY 2008)

Contract performance may require contractor personnel to attend meetings with government personnel and the public, work within government offices, and/or utilize government email.

Contractor personnel must take the following actions to identify themselves as non-federal employees:

1) Use an email signature block that shows name, the office being supported and company affiliation (e.g. "John Smith, Office of Human Resources, ACME Corporation Support Contractor");

2) Clearly identify themselves and their contractor affiliation in meetings;

3) Identify their contractor affiliation in Departmental e-mail and phone listings whenever contractor personnel are included in those listings; and

4) Contractor personnel may not utilize Department of State logos or indicia on business cards.

652.225-71 SECTION 8(A) OF THE EXPORT ADMINISTRATION ACT OF 1979, AS AMENDED (AUG 1999)

(a) Section 8(a) of the U.S. Export Administration Act of 1979, as amended (50 U.S.C. 2407(a)), prohibits compliance by U.S. persons with any boycott fostered by a foreign country against a country which is friendly to the United States and which is not itself the object of any form of boycott pursuant to United States law or regulation. The Boycott of Israel by Arab League countries is such a boycott, and therefore, the following actions, if taken with intent to comply with, further, or support the Arab League Boycott of Israel, are prohibited activities under the Export Administration Act:

(1) Refusing, or requiring any U.S. person to refuse to do business with or in Israel, with any Israeli business concern, or with any national or resident of Israel, or with any other person, pursuant to an agreement of, or a request from or on behalf of a boycotting country;
(2) Refusing, or requiring any U.S. person to refuse to employ or otherwise discriminating against any person on the basis of race, religion, sex, or national origin of that person or of any owner, officer, director, or employee of such person;
(3) Furnishing information with respect to the race, religion, or national origin of any U.S. person or of any owner, officer, director, or employee of such U.S. person;
(4) Furnishing information about whether any person has, has had, or proposes to have any business relationship (including a relationship by way of sale, purchase, legal or commercial representation, shipping or other transport, insurance, investment, or supply) with or in the State of Israel, with any business concern organized under the laws of the State of Israel, with any Israeli national or resident, or with any person which is known or believed to be restricted from having any business relationship with or in Israel;
(5) Furnishing information about whether any person is a member of, has made contributions to, or is otherwise associated with or involved in the activities of any charitable or fraternal organization which supports the State of Israel; and,

(6) Paying, honoring, confirming, or otherwise implementing a letter of credit which contains any condition or requirement against doing business with the State of Israel.

(b) Under Section 8(a), the following types of activities are not forbidden ``compliance with the boycott," and are therefore exempted from Section 8(a)'s prohibitions listed in paragraphs (a)(1)-(6) above:

(1) Complying or agreeing to comply with requirements:
  (i) Prohibiting the import of goods or services from Israel or goods produced or services provided by any business concern organized under the laws of Israel or by nationals or residents of Israel; or,
  (ii) Prohibiting the shipment of goods to Israel on a carrier of Israel, or by a route other than that prescribed by the boycotting country or the recipient of the shipment;

(2) Complying or agreeing to comply with import and shipping document requirements with respect to the country of origin, the name of the carrier and route of shipment, the name of the supplier of the shipment or the name of the provider of other services, except that no information knowingly furnished or conveyed in response to such requirements may be stated in negative, blacklisting, or similar exclusionary terms, other than with respect to carriers or route of shipments as may be permitted by such regulations in order to comply with precautionary requirements protecting against war risks and confiscation;

(3) Complying or agreeing to comply in the normal course of business with the unilateral and specific selection by a boycotting country, or national or resident thereof, of carriers, insurance, suppliers of services to be performed within the boycotting country or specific goods which, in the normal course of business, are identifiable by source when imported into the boycotting country;

(4) Complying or agreeing to comply with the export requirements of the boycotting country relating to shipments or transshipments of exports to Israel, to any business concern of or organized under the laws of Israel, or to any national or resident of Israel;

(5) Compliance by an individual or agreement by an individual to comply with the immigration or passport requirements of any country with respect to such individual or any member of such individual's family or with requests for information regarding requirements of employment of such individual within the boycotting country; and,

(6) Compliance by a U.S. person resident in a foreign country or agreement by such person to comply with the laws of that country with respect to his or her activities exclusively therein, and such regulations may contain exceptions for such resident complying with the laws or regulations of that foreign country governing imports into such country of trademarked, trade named, or similarly specifically identifiable products, or components of products for his or her own use, including the performance of contractual services within that country, as may be defined by such regulations.

652.228-71 WORKERS' COMPENSATION INSURANCE (DEFENSE BASE ACT)--SERVICES (JUN 2006)

652.229-71 PERSONAL PROPERTY DISPOSITION AT POSTS ABROAD (AUG 1999)

Regulations at 22 CFR Part 136 require that U.S. Government employees and their families do not profit personally from sales or other transactions with persons who are not themselves entitled to exemption from import restrictions, duties, or taxes. Should the contractor experience importation or tax privileges in a foreign country because of its contractual relationship to the United States Government, the contractor shall observe the requirements of 22 CFR Part 136 and all policies, rules, and procedures issued by the chief of mission in that foreign country.

652.242-73 AUTHORIZATION AND PERFORMANCE (AUG 1999)

(a) The contractor warrants the following:
(1) That is has obtained authorization to operate and do business in the country or countries in which this contract will be performed;
(2) That is has obtained all necessary licenses and permits required to perform this contract; and,
(3) That it shall comply fully with all laws, decrees, labor standards, and regulations of said country or countries during the performance of this contract.

(b) If the party actually performing the work will be a subcontractor or joint venture partner, then such subcontractor or joint venture partner agrees to the requirements of paragraph (a) of this clause.

652.243-70 NOTICES (AUG 1999)

Any notice or request relating to this contract given by either party to the other shall be in writing. Said notice or request shall be mailed or delivered by hand to the other party at the address provided in the schedule of the contract. All modifications to the contract must be made in writing by the contracting officer.

PART III - LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS

SECTION J - LIST OF ATTACHMENTS

ATTACHMENT NO.	DESCRIPTION OF ATTACHMENT	NO.PAGES
Attachment 1	Standard Form 25, "Performance and Guaranty Bond"	2
Attachment 2	Standard Form 25A, "Payment Bond"	2
Attachment 3	Sample Bank Letter of Guaranty	1
Attachment 4	Breakdown of Proposal Price by Divisions of Specifications (for installation option only)	2
Attachment 5	Instruction Manual	122

PART IV - REPRESENTATIONS AND INSTRUCTIONS

SECTION K - REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFERORS OR QUOTERS

K.1 52.203-02 CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985)

(a) The offeror certifies that:

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to - (i) Those prices; (ii) The intention to submit an offer; or (iii) The methods or factors used to calculate the prices offered;

(2) The prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory that the signatory -

(1)Is the person in the offeror's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraph (a)(1) through (a)(3) above; or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above ***[insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the offeror's organization]***; and

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the offeror deletes or modifies subparagraph (a)(2) above, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

K.2 52.203-11 CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (SEP 2007)

(a) Definitions. As used in this provision – “Lobbying contact” has the meaning provided at 2 USC 1602(8). The terms “agency”, “influencing or attempting to influence”,

"officer or employee of an agency", "person", "reasonable compensation", and "regularly employed" are defined in the FAR clause of this solicitation entitled Limitation on Payments to Influence Certain Federal Transactions (52.203-12).

(b) Prohibition. The prohibition and exceptions contained in the FAR clause of this solicitation entitled "Limitation on Payments to Influence Certain Federal Transactions" (52.203-12) are hereby incorporated by reference in this provision.

(c) Certification. The offeror, by signing its offer, hereby certifies to the best of his or her knowledge and belief that no Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a member of Congress on its behalf in connection with the awarding of this contract.

(d) Disclosure. If any registrants under the Lobbying Disclosure Act of 1995 have made a lobbying contract on behalf of the offeror with respect to this contract, the offeror shall complete and submit, with its officer, OMB Standard Form LLL, Disclosure of Lobbying Activities, to provide the name of the registrants. The offeror need not report regularly employed officers or employees of the offeror to whom payments of reasonable compensation were made.

(e) Penalty. Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by 31 USC 1352. Any persons who makes an expenditure prohibited under this provision or who fails to file or amend the disclosure required to be filed or amended by this provision, shall be subject to a civil penalty of not less than $10,000, and not more than $150,000, for each failure.

K.3 52.204-3 TAXPAYER IDENTIFICATION (OCT 98)

(a) Definitions.

"Common parent", as used in this provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

"Taxpayer Identification Number (TIN)", as used in this provision, means the number required by the IRS to be used by the offeror in reporting income tax and other returns. The TIN may be either a Social Security Number or an Employer Identification Number.

(b) All offerors must submit the information required in paragraphs (d) through (f) of this provision in order to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325 (d), reporting requirements of 26 USC 6041, 6041A, and 6050M and implementing regulations issued by the Internal Revenue Service (IRS). If the resulting contract is subject to the reporting requirements described in FAR 4.904, the failure or refusal by the offeror to furnish the information may result in a 31 percent reduction of payments otherwise due under the contract.

(c) The TIN may be used by the Government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (3l USC 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904,

the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.

(d) Taxpayer Identification Number (TIN).
TIN: _____
___ TIN has been applied for.
___ TIN is not required because:
__ Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the U.S. and does not have an office or place of business or a fiscal paying agent in the U.S.;
__ Offeror is an agency or instrumentality of a foreign government;
__ Offeror is an agency or instrumentaltiy of the Federal Government.

(e) Type of Organization.
__ Sole Proprietorship;
__ Partnership:
__ Corporate Entity (not tax exempt);
__ Corporate Entity (tax emempt);
__ Government entity (Federal, State, or local);
__ Foreign government;
__ International organization per 26 CFR 1.6049-4;
__ Other _____

(f) Common Parent.
___ Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this clause.
___ Name and TIN of common parent;
Name _____
TIN _____

K.4 RESERVED

K.5 52.204-8 Annual Representations and Certifications. JAN 2011

ANNUAL REPRESENTATIONS AND CERTIFICATIONS (JAN 2011)

(a)(1) The North American Industry Classification System (NAICS) code for this acquisition is 212321.

(2) The small business size standard is 500.

(3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b)(1) If the clause at 52.204-7, Central Contractor Registration, is included in this solicitation, paragraph (d) of this provision applies.

(2) If the clause at 52.204-7 is not included in this solicitation, and the offeror is currently registered in CCR, and has completed the ORCA electronically, the offeror may choose to use paragraph (d) of this provision instead of completing the corresponding individual representations and certifications in the solicitation. The offeror shall indicate which option applies by checking one of the following boxes:

[ ] (i) Paragraph (d) applies.

[ ] (ii) Paragraph (d) does not apply and the offeror has completed the individual representations and certifications in the solicitation.

(c)(1) The following representations or certifications in ORCA are applicable to this solicitation as indicated:

(i) 52.203-2, Certificate of Independent Price Determination. This provision applies to solicitations when a firm-fixed-price contract or fixed-price contract with economic price adjustment is contemplated, unless—

(A) The acquisition is to be made under the simplified acquisition procedures in Part 13;

(B) The solicitation is a request for technical proposals under two-step sealed bidding procedures; or

(C) The solicitation is for utility services for which rates are set by law or regulation.

(ii) 52.203-11, Certification and Disclosure Regarding Payments to Influence Certain Federal Transactions. This provision applies to solicitations expected to exceed $150,000.

(iii) 52.204-3, Taxpayer Identification. This provision applies to solicitations that do not include the clause at 52.204-7, Central Contractor Registration.

(iv) 52.204-5, Women-Owned Business (Other Than Small Business). This provision applies to solicitations that—

(A) Are not set aside for small business concerns;

(B) Exceed the simplified acquisition threshold; and

(C) Are for contracts that will be performed in the United States or its outlying areas.

(v) 52.209-5, Certification Regarding Responsibility Matters. This provision applies to solicitations where the contract value is expected to exceed the simplified acquisition threshold.

(vi) 52.214-14, Place of Performance—Sealed Bidding. This provision applies to invitations for bids except those in which the place of performance is specified by the Government.

(vii) 52.215-6, Place of Performance. This provision applies to solicitations unless the place of performance is specified by the Government.

(viii) 52.219-1, Small Business Program Representations (Basic & Alternate I). This provision applies to solicitations when the contract will be performed in the United States or its outlying areas.

(A) The basic provision applies when the solicitations are issued by other than DoD, NASA, and the Coast Guard.

(B) The provision with its Alternate I applies to solicitations issued by DoD, NASA, or the Coast Guard.

(ix) 52.219-2, Equal Low Bids. This provision applies to solicitations when contracting by sealed bidding and the contract will be performed in the United States or its outlying areas.

(x) 52.222-22, Previous Contracts and Compliance Reports. This provision applies to solicitations that include the clause at 52.222-26, Equal Opportunity.

(xi) 52.222-25, Affirmative Action Compliance. This provision applies to solicitations, other than those for construction, when the solicitation includes the clause at 52.222-26, Equal Opportunity.

(xii) 52.222-38, Compliance with Veterans' Employment Reporting Requirements. This provision applies to solicitations when it is anticipated the contract award will exceed the simplified acquisition threshold and the contract is not for acquisition of commercial items.

(xiii) 52.223-1, Biobased Product Certification. This provision applies to solicitations that require the delivery or specify the use of USDA–designated items; or include the clause at 52.223-2, Affirmative Procurement of Biobased Products Under Service and Construction Contracts.

(xiv) 52.223-4, Recovered Material Certification. This provision applies to solicitations that are for, or specify the use of, EPA–designated items.

(xv) 52.225-2, Buy American Act Certificate. This provision applies to solicitations containing the clause at 52.225-1.

(xvi) 52.225-4, Buy American Act—Free Trade Agreements—Israeli Trade Act Certificate. (Basic, Alternate I, and Alternate II) This provision applies to solicitations containing the clause at 52.225-3.

(A) If the acquisition value is less than $25,000, the basic provision applies.

(B) If the acquisition value is $25,000 or more but is less than $50,000, the provision with its Alternate I applies.

(C) If the acquisition value is $50,000 or more but is less than $67,826, the provision with its Alternate II applies.

(xvii) 52.225-6, Trade Agreements Certificate. This provision applies to solicitations containing the clause at 52.225-5.

(xviii) 52.225-20, Prohibition on Conducting Restricted Business Operations in Sudan—Certification. This provision applies to all solicitations.

(xix) 52.225-25, Prohibition on Engaging in Sanctioned Activities Relating to Iran-Certification. This provision applies to all solicitations.

(xx) 52.226-2, Historically Black College or University and Minority Institution Representation. This provision applies to—

(A) Solicitations for research, studies, supplies, or services of the type normally acquired from higher educational institutions; and

(B) For DoD, NASA, and Coast Guard acquisitions, solicitations that contain the clause at 52.219-23, Notice of Price Evaluation Adjustment for Small Disadvantaged Business Concerns.

(2) The following certifications are applicable as indicated by the Contracting Officer:

__ (i) 52.219-22, Small Disadvantaged Business Status.

__ (A) Basic.

__ (B) Alternate I.

__ (ii) 52.222-18, Certification Regarding Knowledge of Child Labor for Listed End Products.

__ (iii) 52.222-48, Exemption from Application of the Service Contract Act to Contracts for Maintenance, Calibration, or Repair of Certain Equipment Certification.

__ (iv) 52.222-52, Exemption from Application of the Service Contract Act to Contracts for Certain Services–Certification.

__ (v) 52.223-9, with its Alternate I, Estimate of Percentage of Recovered Material Content for EPA–Designated Products (Alternate I only).

__ (vi) 52.223-13, Certification of Toxic Chemical Release Reporting.

__ (vii) 52.227-6, Royalty Information.

__ (A) Basic.

__ (B) Alternate I.

__ (viii) 52.227-15, Representation of Limited Rights Data and Restricted Computer Software.

(d) The offeror has completed the annual representations and certifications electronically via the Online Representations and Certifications Application (ORCA) website at http://orca.bpn.gov. After reviewing the ORCA database information, the offeror verifies by submission of the offer that the representations and certifications currently posted electronically that apply to this solicitation as indicated in paragraph (c) of this provision have been entered or updated within the last 12 months, are current, accurate, complete, and applicable to this solicitation (including the business size standard applicable to the NAICS code referenced for this solicitation), as of the date of this offer and are incorporated in this offer by reference (see FAR 4.1201); except for the changes identified below [***offeror to insert changes, identifying change by clause number, title, date***]. These amended representation(s) and/or certification(s)

are also incorporated in this offer and are current, accurate, and complete as of the date of this offer.

FAR CLAUSE #	TITLE	DATE	CHANGE
_____	_____	_____	_____

Any changes provided by the offeror are applicable to this solicitation only, and do not result in an update to the representations and certifications posted on ORCA.

(End of provision)

K.6 52.209-5 CERTIFICATION REGARDING RESPONSIBILITY MATTERS (APR 2010)

(a)(1) The Offeror certifies, to the best of its knowledge and belief, that—

(i) The Offeror and/or any of its Principals—

(A) Are [ ] are not [ ] presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have [ ] have not [ ], within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) contract or subcontract; violation of Federal or State antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, violating Federal criminal tax laws, or receiving stolen property (if offeror checks "have", the offeror shall also see 52.209-7, if included in this solicitation);

(C) Are [ ] are not [ ] presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision;

(D) Have [ ], have not [ ], within a three-year period preceding this offer, been notified of any delinquent Federal taxes in an amount that exceeds $3,000 for which the liability remains unsatisfied.

(1) Federal taxes are considered delinquent if both of the following criteria apply:

(i) *The tax liability is finally determined*. The liability is finally determined if it has been assessed. A liability is not finally determined if there is a pending administrative or judicial challenge. In the case of a judicial challenge to the liability, the liability is not finally determined until all judicial appeal rights have been exhausted.

(ii) *The taxpayer is delinquent in making payment*. A taxpayer is delinquent if the taxpayer has failed to pay the tax liability when full payment was due and required. A taxpayer is not delinquent in cases where enforced collection action is precluded.

(2) *Examples*.

(i) The taxpayer has received a statutory notice of deficiency, under I.R.C. § 6212, which entitles the taxpayer to seek Tax Court review of a proposed tax deficiency. This is not a delinquent tax because it is not a final tax liability. Should the taxpayer seek Tax Court review, this will not be a final tax liability until the taxpayer has exercised all judicial appeal rights.

(ii) The IRS has filed a notice of Federal tax lien with respect to an assessed tax liability, and the taxpayer has been issued a notice under I.R.C. § 6320 entitling the taxpayer to request a hearing with the IRS Office of Appeals contesting the lien filing, and to further appeal to the Tax Court if the IRS determines to sustain the lien filing. In the course of the hearing, the taxpayer is entitled to contest the underlying tax liability because the taxpayer has had no prior opportunity to contest the liability. This is not a delinquent tax because it is not a final tax liability. Should the taxpayer seek tax court review, this will not be a final tax liability until the taxpayer has exercised all judicial appeal rights.

(iii) The taxpayer has entered into an installment agreement pursuant to I.R.C. § 6159. The taxpayer is making timely payments and is in full compliance with the agreement terms. The taxpayer is not delinquent because the taxpayer is not currently required to make full payment.

(iv) The taxpayer has filed for bankruptcy protection. The taxpayer is not delinquent because enforced collection action is stayed under 11 U.S.C. 362 (the Bankruptcy Code).

(ii) The Offeror has [ ] has not [ ], within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) "Principal," for the purposes of this certification, means an officer, director, owner, partner, or a person having primary management or supervisory responsibilities within a business entity (*e.g.*, general manager; plant manager; head of a division or business segment; and similar positions).

This Certification Concerns a Matter Within the Jurisdiction of an Agency of the United States and the Making of a False, Fictitious, or Fraudulent Certification May Render the Maker Subject to Prosecution Under Section 1001, Title 18, United States Code.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

(End of provision)

K.7 52.225-18 Place of Manufacture (Sept 2006)

(a) *Definitions.* As used in this clause—

" Manufactured end product" means any end product in Federal Supply Classes (FSC) 1000-9999, except—

(1) FSC 5510, Lumber and Related Basic Wood Materials;
(2) Federal Supply Group (FSG) 87, Agricultural Supplies;
(3) FSG 88, Live Animals;
(4) FSG 89, Food and Related Consumables;
(5) FSC 9410, Crude Grades of Plant Materials;
(6) FSC 9430, Miscellaneous Crude Animal Products, Inedible;
(7) FSC 9440, Miscellaneous Crude Agricultural and Forestry Products;
(8) FSC 9610, Ores;
(9) FSC 9620, Minerals, Natural and Synthetic; and
(10) FSC 9630, Additive Metal Materials.

"Place of manufacture" means the place where an end product is assembled out of components, or otherwise made or processed from raw materials into the finished product that is to be provided to the Government. If a product is disassembled and reassembled, the place of reassembly is not the place of manufacture.

(b) For statistical purposes only, the offeror shall indicate whether the place of manufacture of the end products it expects to provide in response to this solicitation is predominantly—

(1) **[ ]** In the United States (Check this box if the total anticipated price of offered end products manufactured in the United States exceeds the total anticipated price of offered end products manufactured outside the United States); or

(2) **[ ]** Outside the United States.

K.8 AUTHORIZED CONTRACT ADMINISTRATOR

If the offeror does not fill-in the blanks below, the official who signed the offer will be deemed to be the offeror's representative for Contract Administration, which includes all matters pertaining to payments.

Name: _____

Address: _____

_____

Telephone Number: _____

K.9 652.225-70 ARAB LEAGUE BOYCOTT OF ISRAEL (AUG 1999)

(a) Definitions. As used in this provision:

Foreign person means any person other than a United States person as defined below.

United States person means any United States resident or national (other than an individual resident outside the United States and employed by other than a United States person), any domestic concern (including any permanent domestic establishment of any foreign concern), and any foreign subsidiary or affiliate (including any permanent foreign establishment) of any domestic concern which is controlled in fact by such domestic concern, as provided under the Export Administration Act of 1979, as amended.

(b) Certification. By submitting this offer, the offeror certifies that it is not:
(1) Taking or knowingly agreeing to take any action, with respect to the boycott of Israel by Arab League countries, which Section 8(a) of the Export Administration Act of 1979, as amended (50 U.S.C. 2407(a)) prohibits a United States person from taking; or,
(2) Discriminating in the award of subcontracts on the basis of religion.

K.10 RESERVED

K.11 52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (FEB 1999)

The offeror represents that--

(a) It **[ ]** has, **[ ]** has not participated in a previous contract or subcontract subject either to the Equal Opportunity clause of this solicitation, the clause originally contained in Section 310 of Executive Order No. 10925, or the clause contained in Section 201 of Executive Order No. 11114;

(b) It **[ ]** has, **[ ]** has not filed all required compliance reports; and

(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

K.12 52.222-25 AFFIRMATIVE ACTION COMPLIANCE (APR 1984)

The offeror represents that--

(a) It [ ] has developed and has on file, [ ] has not developed and does not have on file, at each establishment, affirmative action programs required by the rules and regulations of the Secretary of Labor (41 CFR 60-1 and 60-2); or

(b) It [ ] has not previously had contracts subject to the written affirmative action programs requirement of the rules and regulations of the Secretary of Labor.

K.13 652.228-70 DEFENSE BASE ACT – COVERED CONTRACTOR EMPLOYEES (JUN 2006)

(a) Bidders/offerors shall indicate below whether or not any of the following categories of employees will be employed on the resultant contract, and, if so, the number of such employees:

Category	**Yes/No**	**Number**
(1) United States citizens or residents		
(2) Individuals hired in the United States, regardless of citizenship		
(3) Local nationals or third country nationals where contract performance takes place in a country *where there are no* local workers' compensation laws		**Local nationals: _____** **Third Country Nationals: _____**
(4) Local nationals or third country nationals where contract performance takes place in a country where there *are* local workers' compensation laws		**Local nationals: _____** **Third Country Nationals: _____**

(b) The contracting officer has determined that for performance in the country of **Portugal**.

☒ Workers' compensation laws exist that will cover local nationals and third country nationals.

☐ Workers' compensation laws do not exist that will cover local nationals and third country nationals.

(c) If the bidder/offeror has indicated "yes" in block (a)(4) of this provision, the bidder/offeror shall not purchase Defense Base Act insurance for those employees. However, the bidder/offeror shall assume liability toward the employees and their beneficiaries for war-hazard injury, death, capture, or detention, in accordance with the clause at FAR 52.228-4.

(d) If the bidder/offeror has indicated "yes" in blocks (a)(1), (2), or (3) of this provision, the bidder/offeror shall compute Defense Base Act insurance costs covering those employees pursuant to the terms of the contract between the Department of State and the Department's Defense Base Act insurance carrier at the rates specified in DOSAR 652.228-74, Defense Base Act Insurance Rates – Limitation. If DOSAR provision 652.228-74 is not included in this solicitation, the bidder/offeror shall notify the contracting officer before the closing date so that the solicitation can be amended accordingly.

K.14 52.225-20 Prohibition on Conducting Restricted Business Operations in Sudan—Certification (AUG 2009)

(a) *Definitions*. As used in this provision—

"Business operations" means engaging in commerce in any form, including by acquiring, developing, maintaining, owning, selling, possessing, leasing, or operating equipment, facilities, personnel, products, services, personal property, real property, or any other apparatus of business or commerce.

"Marginalized populations of Sudan" means—

(1) Adversely affected groups in regions authorized to receive assistance under section 8(c) of the Darfur Peace and Accountability Act (Pub. L. 109-344) (50 U.S.C. 1701 note); and

(2) Marginalized areas in Northern Sudan described in section 4(9) of such Act.

"Restricted business operations" means business operations in Sudan that include power production activities, mineral extraction activities, oil-related activities, or the production of military equipment, as those terms are defined in the Sudan Accountability and Divestment Act of 2007 (Pub. L. 110-174). Restricted business operations do not include business operations that the person conducting the business can demonstrate—

(1) Are conducted under contract directly and exclusively with the regional government of southern Sudan;

(2) Are conducted pursuant to specific authorization from the Office of Foreign Assets Control in the Department of the Treasury, or are expressly exempted under Federal law from the requirement to be conducted under such authorization;

(3) Consist of providing goods or services to marginalized populations of Sudan;

(4) Consist of providing goods or services to an internationally recognized peacekeeping force or humanitarian organization;

(5) Consist of providing goods or services that are used only to promote health or education; or

(6) Have been voluntarily suspended.

(b) *Certification*. By submission of its offer, the offeror certifies that it does not conduct any restricted business operations in Sudan.

K.**15. 52.209-2 Prohibition on Contracting with Inverted Domestic Corporations – Representations (July 2009)**

(a) Definition. Inverted domestic corporation means a foreign incorporated entity which is treated as an inverted domestic corporation under 6 USC 395 (b), i.e. a corporation that used to be a partnership in the United States but now is incorporated in a foreign country, or is a subsidiary whose parent corporation is incorporated in a foreign country that meets the criteria specified in 6 USC 395 (b), applied in accordance with rules and definitions of criteria 6 USC 395 (c).

(b)Relation to Internal Revenue Code. A foreign entity that is treated as an inverted foreign entity that is treated as an inverted domestic corporation for purposes of the Internal Revenue Code at 26 USC 7874 (or would be except that the inversion transactions were completed on or before March 4, 2003), is also an inverted domestic corporation for purposes of 6 USC 395 and for this solicitation provision (see FAR 9.108)

(c)Representation. By submission of its offer, the offer represents that it is not an inverted domestic corporation and is not a subsidiary of one.

K.16. 52.209-5 Certificate Regarding Responsibility Matters (APR 2010)

(a)(1) The Offeror certifies, to the best of its knowledge and belief, that—

(i) The Offeror and/or any of its Principals—

(A) Are o are not o presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have o have not o, within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) contract or subcontract; violation of Federal or State antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, violating Federal criminal tax laws, or receiving stolen property (if offeror checks "have", the offeror shall also see 52.209-7, if included in this solicitation);

(C) Are o are not o presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision;

(D) Have o, have not o, within a three-year period preceding this offer, been notified of any delinquent Federal taxes in an amount that exceeds $3,000 for which the liability remains unsatisfied.

(1) Federal taxes are considered delinquent if both of the following criteria apply:

(i) *The tax liability is finally determined*. The liability is finally determined if it has been assessed. A liability is not finally determined if there is a pending administrative or judicial challenge. In the case of a judicial challenge to the liability, the liability is not finally determined until all judicial appeal rights have been exhausted.

(ii) *The taxpayer is delinquent in making payment*. A taxpayer is delinquent if the taxpayer has failed to pay the tax liability when full payment was due and required. A taxpayer is not delinquent in cases where enforced collection action is precluded.

(2) *Examples*.

(i) The taxpayer has received a statutory notice of deficiency, under I.R.C. § 6212, which entitles the taxpayer to seek Tax Court review of a proposed tax deficiency. This is not a delinquent tax because it is not a final tax liability. Should the taxpayer seek Tax Court review, this will not be a final tax liability until the taxpayer has exercised all judicial appeal rights.

(ii) The IRS has filed a notice of Federal tax lien with respect to an assessed tax liability, and the taxpayer has been issued a notice under I.R.C. § 6320 entitling the taxpayer to request a hearing with the IRS Office of Appeals contesting the lien filing, and to further appeal to the Tax Court if the IRS determines to sustain the lien filing. In the course of the hearing, the taxpayer is entitled to contest the underlying tax liability because the taxpayer has had no prior opportunity to contest the liability. This is not a delinquent tax because it is not a final tax liability. Should the taxpayer seek tax court review, this will not be a final tax liability until the taxpayer has exercised all judicial appeal rights.

(iii) The taxpayer has entered into an installment agreement pursuant to I.R.C. § 6159. The taxpayer is making timely payments and is in full compliance with the agreement terms. The taxpayer is not delinquent because the taxpayer is not currently required to make full payment.

(iv) The taxpayer has filed for bankruptcy protection. The taxpayer is not delinquent because enforced collection action is stayed under 11 U.S.C. 362 (the Bankruptcy Code).

(ii) The Offeror has o has not o, within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) “Principal,” for the purposes of this certification, means an officer, director, owner, partner, or a person having primary management or supervisory responsibilities within a business entity (*e.g.*, general manager; plant manager; head of a division or business segment; and similar positions).

This Certification Concerns a Matter Within the Jurisdiction of an Agency of the United States and the Making of a False, Fictitious, or Fraudulent Certification May Render the Maker Subject to Prosecution Under Section 1001, Title 18, United States Code.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

(End of provision)

K.17 52.225-25 Prohibition on Engaging in Sanctioned Activities Relating to Iran – Certification (SEP 2010)

(a) *Definition.*

"Person"—

(1) Means—

(i) A natural person;

(ii) A corporation, business association, partnership, society, trust, financial institution, insurer, underwriter, guarantor, and any other business organization, any other nongovernmental entity, organization, or group, and any governmental entity operating as a business enterprise; and

(iii) Any successor to any entity described in paragraph (1)(ii) of this definiation; and

(2) Does not include a government or governmental entity that is not operating as a business enterprise.

(b) *Certification*. Except as provided in paragraph (c) of this provision or if a waiver has been granted in accordance with FAR 25.703-2(d), by submission of its offer, the offeror certifies that

the offeror, or any person owned or controlled by the offeror, does not engage in any activities for which sanctions may be imposed under section 5 of the Iran Sanctions Act of 1996. These sanctioned activities are in the areas of development of the petroleum resources of Iran, production of refined petroleum products in Iran, sale and provision of refined petroleum products to Iran, and contributing to Iran's ability to acquire or develop certain weapons.

(c) *Exception for trade agreements*. The certification requirement of paragraph (b) of this provision does not apply if—

(1) This solicitation includes a trade agreements certification (*e.g.*, 52.225-4, 52.225-11 or comparable agency provision); and

(2) The offeror has certified that all the offered products to be supplied are designated country end products or designated country construction material.

(End of provision)

SECTION L - INSTRUCTIONS, CONDITIONS, AND NOTICES TO OFFERORS OR QUOTERS

L.1 52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at:

http://acquisition.gov/far/index.html/ or http://farsite.hill.af.mil/search.htm

These addresses are subject to change. If the FAR is not available at the locations indicated above, use of an Internet "search engine" (e.g., Yahoo, Infoseek, Alta Vista, etc.) is suggested to obtain the latest location of the most current FAR provisions.

The following Federal Acquisition Regulation solicitation provisions are incorporated by reference:

FEDERAL ACQUISITION REGULATION (48 CFR CH. 1)

FAR REFERENCE	DATE	TITLE
52.204-6	APR 2008	Data Universal Numbering System (DUNS) Number
52.214-34	APR 1991	Submission of Offers in English Language
52.215-1	JAN 2004	Instructions to Offerors—Competitive Acquisition*
52.236-28	OCT 1997	Preparation of Proposals - Construction

* Offerors are reminded that this provision states that the Government may award a contract based on initial proposals, without holding discussions.

L.2 SOLICITATION PROVISIONS IN FULL TEXT

52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a firm fixed price contract resulting from this solicitation. (End of provision)

52.232-2 SERVICE OF PROTEST (AUG 1996)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining

written and dated acknowledgment of receipt from American Embassy, Av. das Forças Armadas, 1649-044 Lisboa.

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

L.3 QUALIFICATIONS OF OFFERORS

Offerors must be technically qualified and financially responsible to perform the work described in this solicitation. At a minimum, each Offeror must meet the following requirements:

(1) Be able to understand written and spoken English;
(2) Have an established business with a permanent address and telephone listing;
(3) Be able to demonstrate prior construction experience with suitable references;
(4) Have the necessary personnel, equipment and financial resources available to perform the work;
(5) Have all licenses and permits required by local law;
(6) Meet all local insurance requirements;
(7) Have the ability to obtain a performance and guarantee bond and a payment bond, or to post adequate performance security, such as irrevocable letters of credit or guarantees issued by a reputable financial institution;
(8) Have no adverse criminal record;
(9) Have no political or business affiliation which could be considered contrary to the interests of the United States; and
(10) Provide warranty information

L.4 REVIEW OF DOCUMENTS

Each Offeror is responsible for:
(1) Obtaining a complete set of contract drawings and specifications;
(2) Thoroughly reviewing such documents and understanding their requirements;
(3) Visiting the project site and becoming familiar with all working conditions, local laws and regulations; and
(4) Determining that all materials, equipment and labor required for the work are available.

Offerors shall report any ambiguity in the solicitation, including specifications and contract drawings immediately to the Contracting Officer. Any prospective Offeror who requires a clarification, explanation or interpretation of the contract requirements must make a request to the Contracting Officer not less than five working days before the closing date of the solicitation. Offerors may rely upon written interpretations by the Contracting Officer.

L.5 SUBMISSION OF OFFERS

L.5.1 General: This solicitation is for furnishing the deliverables and installation of same, if the installation option is exercised, as further described in Section C and the Exhibits which are a part of this solicitation.

L.5.2 Summary of Instructions: Each offer must consist of the following physically separate volumes:

Volume	Title	No. of Copies*
1	Executed Standard Form 1442, "Solicitation, Offer and Award (Construction, Alteration, or Repair)", and completed Section K - REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFERORS.	3
2	Price Proposal and completed Section B - SUPPLIES OR SERVICES AND PRICES/COSTS. The price proposal shall include a completed Section J, Attachment 4, "BREAKDOWN OF PROPOSAL PRICE BY DIVISIONS OF SPECIFICATIONS.	3
3	Performance schedule in the form of a bar chart and Business Management/Technical Proposal.	3

The complete offer shall be submitted at the address indicated at Block 7 of Standard Form (SF) 1442, if mailed, or the address set forth below, if hand delivered (if this is left blank, the address is the same as that in Block 7 of SF 1442).

_____
_____
_____
_____

Offerors shall identify, explain and justify any deviations, exceptions, or conditional assumptions taken regarding any of the instructions or requirements of this solicitation.

* The total number of copies includes the original as one of the copies.

L.5.3 Detailed Instructions

L.5.3.1 Volume I: Standard Form (SF) 1442 and Section K. Complete blocks 14 through 20C of the SF 1442 and all of Section K.

L.5.3.2 Volume II: Price proposal and Section B.

The price proposal shall consist of completion of Section B and Section J, Attachment 4, "BREAKDOWN OF PROPOSAL PRICE BY DIVISIONS OF SPECIFICATIONS for installation option only. The offeror shall complete all applicable portions of this form in each relevant category (e.g., labor, materials, etc.).

L.5.3.3 Volume III: Performance Schedule and Business Management/Technical Proposal.

(a) The offeror shall present the performance schedule in the form of a "bar chart" indicating when the various portions of the work will be commenced and completed within the required contract completion schedule. This bar chart shall be in sufficient detail to clearly show each segregable portion of work and its planned commencement and completion date.

(b) The Business Management/Technical Proposal shall be in two parts, including the following information:

Proposed Work Information - Provide the following:

(1) A list of the names, addresses and telephone numbers of the owners, partners, and principal officers of the Offeror;
(2) The name and address of the Offeror's field superintendent for this project; and
(3) A list of the names, addresses, and telephone numbers of subcontractors and principal materials suppliers to be used on the project, indicating what portions of the work will be performed by them.
(4) Bar chart indicating various portions of the work; when work will commence and be completed in each section

Experience and Past Performance - List all contracts and subcontracts your company has held over the past three years for the same or similar work. Provide the following information for each contract and subcontract:

(1) Customer's name, address, and telephone numbers of customer's lead contract and technical personnel;
(2) Contract number and type;
(3) Date of the contract award place(s) of performance, and completion dates;
(4) Contract dollar value;
(5) Brief description of the work, including responsibilities;
(6) Comparability to the work under this solicitation;
(7) Brief discussion of any major technical problems and their resolution;
(8) Method of acquisition (fully competitive, partially competitive, or noncompetitive), and the basis for award (cost/price, technical merit, etc.);
(9) Percent turnover of contract key technical personnel per year; and

(10) Any terminations (partial or complete) and the reason (convenience or default).

L.6 52.236-27 SITE VISIT (FEB 1995)

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.

(b) An organized site visit has been schedule for **May 4, 2011 at 10:00 a.m.**

(c) Participants will meet at **American Embassy, Av. das Forças Armadas, Lisboa.**

L.7 652.206-70 COMPETITION ADVOCATE/OMBUDSMAN (AUG 1999) (DEVIATION)

(a) The Department of State's Competition Advocate is responsible for assisting industry in removing restrictive requirements from Department of State solicitations and removing barriers to full and open competition and use of commercial items. If such a solicitation is considered competitively restrictive or does not appear properly conducive to competition and commercial practices, potential offerors are encouraged to first contact the contracting office for the respective solicitation. If concerns remain unresolved, contact the Department of State Competition Advocate on (703) 516-1693, by fax at (703) 875-6155, or write to: U.S. Department of State, Competition Advocate, Office of the Procurement Executive (A/OPE), Suite 900, SA-27, Washington, DC 20522-2712.

(b) The Department of State's Acquisition Ombudsman has been appointed to hear concerns from potential offerors and contractors during the pre-award and post-award phases of this acquisition. The role of the ombudsman is not to diminish the authority of the contracting officer, the Technical Evaluation Panel or Source Evaluation Board, or the selection official. The purpose of the ombudsman is to facilitate the communication of concerns, issues, disagreements, and recommendations of interested parties to the appropriate Government personnel, and work to resolve them. When requested and appropriate, the ombudsman will maintain strict confidentiality as to the source of the concern. The ombudsman does not participate in the evaluation of proposals, the source selection process, or the adjudication of formal contract disputes. Interested parties are invited to contact the contracting activity ombudsman. For an American Embassy or overseas post, refer to the numbers below for the Department Acquisition Ombudsman. Concerns, issues, disagreements, and recommendations which cannot be resolved at a contracting activity level may be referred to the Department of State Acquisition Ombudsman at (703) 516-1693, by fax at (703) 875-6155, or write to: Department of State, Acquisition Ombudsman, Office of the Procurement Executive (A/OPE), Suite 900, SA-27, Washington, DC 20522-2712.

652.228-74 DEFENSE BASE ACT INSURANCE RATES – LIMITATION (JUN 2006)

(a) The Department of State has entered into a contract with an insurance carrier to provide Defense Base Act (DBA) insurance to Department of Sate covered contactor employees at a contracted rate. For the purposes of this provision, "covered contractor employees" includes the following individuals:

(1) United States citizens or residents;

(2) Individuals hired in the United States or its possessions, regardless of citizenship; and

(3) Local nationals and third country nationals where contract performance takes place in a country where there are no local workers' compensation laws.

(b) In preparing the cost proposal, the bidder/offeror shall use the following rates in computing the cost for the DBA insurance:

Services @ $3.60 per $100.00 of employee compensation; or

Construction @ $4.95 per $100.00 of employee compensation.

(c) Bidders/Offerors shall compute the total compensation (direct salary plus differential, but excluding per diem, housing allowances) to be paid to covered contractor employees and the cost of DBA insurance in their bid/proposal using the foregoing rate. Bidders/offerors shall include the estimated DBA insurance costs in their proposed fixed price or estimated cost. However, the DBA insurance costs shall be identified in a separate line item in the bid proposal."

. SECTION M - EVALUATION FACTORS FOR AWARD

M.1 EVALUATION OF PROPOSALS

M.1.1. General: To be acceptable and eligible for evaluation, proposals must be prepared following Section L and must meet all the requirements in the other sections of this solicitation.

M.1.2. Basis For Award: The Government intends to award a contract resulting from this solicitation to the lowest priced, technically acceptable offeror who is a responsible contractor. The evaluation process will follow the procedures below:

(a) Initial Evaluation: The Government will evaluate all proposals received will be evaluated to ensure that each proposal is complete in terms of submission of each required volume, as specified in Section L. The Government may eliminate proposals that are missing a significant amount of the required.

(b) Technical Acceptability: After the initial evaluation, the Government will review the remaining proposals to determine technical acceptability. Technical acceptability will include a review of the Proposed Work Information described in Section L to ensure that the offeror's proposed project superintendent and subcontractors are acceptable to the Government. The Government may also contact references provided as part of the Experience and Past Performance information described in Section L to verify quality of past performance. The end result of this review will be a determination of technical acceptability or unacceptability.

(c) The Government will determine responsibility by analyzing whether the apparent successful offeror complies with the requirements of FAR 9.1, including:

(1) adequate financial resources or the ability to obtain them;
(2) ability to comply with the required performance period, taking into consideration all existing commercial and governmental business commitments;
(3) satisfactory record of integrity and business ethics;
(4) necessary organization, experience, and skills or the ability to obtain them;
(5) necessary equipment and facilities or the ability to obtain them; and
(6) otherwise qualified and eligible to receive an award under applicable laws and regulations.

The Government reserves the right to reject proposals that are unreasonably low or high in price. Unsuccessful offerors will be notified in accordance with FAR 15.503.

M.1.3 Award Selection: The Government will review the prices of all technically acceptable firms and the award selection will go to the lowest priced, technically acceptable, responsible offeror. As described in FAR 52.215-1, incorporated by reference in Section L, the Government may award may based on initial offers, without discussions.

M.2 Reserved

M.3 52.217-4 EVALUATION OF OPTIONS EXERCISED AT TIME OF CONTRACT AWARD (JUL 1988)

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate the total price for the basic requirement together with any option(s) exercised at the time of award.

M.4 SEPARATE CHARGES

Separate charges, in any form, are not solicited. For example, any charges for failure to exercise an option are unacceptable.

Attachment 1

PERFORMANCE BOND *(See instructions on reverse)*	DATE BOND EXECUTED *(Must be same or later than date of contract)*	OMB No.: 9000-0045

Public reporting burden for this collection of information is estimated to average 25 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the FAR Secretariat (MVR), Federal Acquisition Policy Division, GSA, Washington, DC 20405

PRINCIPAL *(Legal name and business address)*	TYPE OF ORGANIZATION *("X" one)* ☐ INDIVIDUAL ☐ PARTNERSHIP ☐ JOINT VENTURE ☐ CORPORATION STATE OF INCORPORATION
SURETY(IES) *(Name(s) and business address(es))*	PENAL SUM OF BOND MILLION(S) | THOUSAND(S) | HUNDRED(S) | CENTS
	CONTRACT DATE | CONTRACT NO.

OBLIGATION:

We, the Principal and Surety(ies), are firmly bound to the United States of America (hereinafter called the Government) in the above penal sum. For payment of the penal sum, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally. However, where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us. For all other purposes, each Surety binds itself, jointly and severally with the Principal, for the payment of the sum shown opposite the name of the Surety. If no limit of liability is indicated, the limit of liability is the full amount of the penal sum.

CONDITIONS:

The Principal has entered into the contract identified above.

THEREFORE:

The above obligation is void if the Principal -

(a)(1) Performs and fulfills all the undertakings, covenants, terms, conditions, and agreements of the contract during the original term of the contract and any extensions thereof that are granted by the Government, with or without notice to the Surety(ies), and during the life of any guaranty required under the contract, and (2) performs and fulfills all the undertakings, covenants, terms conditions, and agreements of any and all duly authorized modifications of the contract that hereafter are made. Notice of those modifications to the Surety(ies) are waived.

(b) Pays to the Government the full amount of the taxes imposed by the Government, if the said contract is subject to the Miller Act, (40 U.S.C. 270a-270e), which are collected, deducted, or withheld from wages paid by the Principal in carrying out the construction contract with respect to which this bond is furnished.

WITNESS:

The Principal and Surety(ies) executed this performance bond and affixed their seals on the above date.

PRINCIPAL

SIGNATURE(S)	1. (Seal)	2. (Seal)	3. (Seal)	Corporate Seal
NAME(S) & TITLE(S) *(Typed)*	1.	2.	3.	

INDIVIDUAL SURETY(IES)

SIGNATURE(S)	1. (Seal)	2. (Seal)
NAME(S) *(Typed)*	1.	2.

CORPORATE SURETY(IES)

SURETY A	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $
	SIGNATURE(S)	1.	2.	Corporate Seal
	NAME(S) & TITLE(S) *(Typed)*	1.	2.	

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STANDARD FORM 25 (REV. 5-96)
Prescribed by GSA-FAR (48 CFR) 53.228(b)

Attachment 1, pag. 2.

CORPORATE SURETY(IES) *(Continued)*

SURETY B	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY C	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY D	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY E	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY F	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY G	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		

BOND PREMIUM	RATE PER THOUSAND ($)	TOTAL ($)

INSTRUCTIONS

1. This form is authorized for use in connection with Government contracts. Any deviation from this form will require the written approval of the Administrator of General Services.

2. Insert the full legal name and business address of the Principal in the space designated "Principal" on the face of the form. An authorized person shall sign the bond. Any person signing in a representative capacity (e.g., an attorney-in-fact) must furnish evidence of authority if that representative is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved.

3. (a) Corporations executing the bond as sureties must appear on the Department of the Treasury's list of approved sureties and must act within the limitation listed therein. Where more than one corporate surety is involved, their names and addresses shall appear in the spaces (Surety A, Surety B, etc.) headed "CORPORATE SURETY(IES)." In the space designated "SURETY(IES)" on the face of the form, insert only the letter identification of the sureties.

(b) Where individual sureties are involved, a completed Affidavit of Individual Surety (Standard Form 28) for each individual surety, shall accompany the bond. The Government may require the surety to furnish additional substantiating information concerning their financial capability.

4. Corporations executing the bond shall affix their corporate seals. Individuals shall execute the bond opposite the word "Corporate Seal", and shall affix an adhesive seal if executed in Maine, New Hampshire, or any other jurisdiction requiring adhesive seals.

5. Type the name and title of each person signing this bond in the space provided.

STANDARD FORM 25 (REV. 5-96) **BACK**

Attachment 2

PAYMENT BOND *(See instructions on reverse)*	DATE BOND EXECUTED *(Must be same or later than date of contract)*	OMB No.:9000-0045

Public reporting burden for this collection of information is estimate to average 25 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the FAR Secretariat (MVR), Federal Acquisition Policy Division, GSA, Washington, DC 20405

PRINCIPAL *(Legal name and business address)*	TYPE OF ORGANIZATION *("X" one)* ☐ INDIVIDUAL ☐ PARTNERSHIP ☐ JOINT VENTURE ☐ CORPORATION STATE OF INCORPORATION
SURETY(IES) *(Name(s) and business address(es))*	PENAL SUM OF BOND MILLION(S) | THOUSAND(S) | HUNDRED(S) | CENTS CONTRACT DATE | CONTRACT NO.

OBLIGATION:

We, the Principal and Surety(ies), are firmly bound to the United States of America (hereinafter called the Government) in the above penal sum. For payment of the penal sum, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally. However, where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us. For all other purposes, each Surety binds itself, jointly and severally with the Principal, for the payment of the sum shown opposite the name of the Surety. If no limit of liability is indicated, the limit of liability is the full amount of the penal sum.

CONDITIONS:

The above obligation is void if the Principal promptly makes payment to all persons having a direct relationship with the Principal or a subcontractor of the Principal for furnishing labor, material or both in the prosecution of the work provided for in the contract identified above, and any authorized modifications of the contract that subsequently are made. Notice of those modifications to the Surety(ies) are waived.

WITNESS:

The Principal and Surety(ies) executed this payment bond and affixed their seals on the above date.

PRINCIPAL				
SIGNATURE(S)	1. (Seal)	2. (Seal)	3. (Seal)	Corporate Seal
NAME(S) & TITLE(S) *(Typed)*	1.	2.	3.	

INDIVIDUAL SURETY(IES)		
SIGNATURE(S)	1. (Seal)	2. (Seal)
NAME(S) *(Typed)*	1.	2.

CORPORATE SURETY(IES)				
SURETY A	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $
	SIGNATURE(S)	1.	2.	Corporate Seal
	NAME(S) & TITLE(S) *(Typed)*	1.	2.	

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STANDARD FORM 25A (REV. 10-98)
Prescribed by GSA FAR (48 CFR) 53.228(c)

Attachment 2, pag 2.

CORPORATE SURETY(IES) *(Continued)*

SURETY B	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY C	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY D	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY E	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY F	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		
SURETY G	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		

INSTRUCTIONS

1. This form, for the protection of persons supplying labor and material, is used when a payment bond is required under the Act of August 24, 1935, 49 Stat. 793 (40 U.S.C. 270a-270e). Any deviation from this form will require the written approval of the Administrator of General Services.

2. Insert the full legal name and business address of the Principal in the space designated "Principal" on the face of the form. An authorized person shall sign the bond. Any person signing in a representative capacity (e.g., an attorney-in-fact) must furnish evidence of authority if that representative is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved.

3. (a) Corporations executing the bond as sureties must appear on the Department of the Treasury's list of approved sureties and must act within the limitation listed therein. Where more than one corporate surety is involved, their names and addresses shall appear in the spaces (Surety A, Surety B, etc.) headed "CORPORATE SURETY(IES)." In the space designated "SURETY(IES)" on the face of the form, insert only the letter identification of the sureties.

(b) Where individual sureties are involved, a completed Affidavit of Individual Surety (Standard Form 28) for each individual surety, shall accompany the bond. The Government may require the surety to furnish additional substantiating information concerning their financial capability.

4. Corporations executing the bond shall affix their corporate seals. Individuals shall execute the bond opposite the word "Corporate Seal", and shall affix an adhesive seal if executed in Maine, New Hampshire, or any other jurisdiction requiring adhesive seals.

5. Type the name and title of each person signing this bond in the space provided.

STANDARD FORM 25A (REV. 10-98) **BACK**

Attachment 3

SAMPLE LETTER OF BANK GUARANTY

Place [ ]
Date [ ]

Contracting Officer
U.S. Embassy, [Post name]
[Mailing Address]

Letter of Guaranty No. _____

SUBJECT: Performance and Guaranty

The Undersigned, acting as the duly authorized representative of the bank, declares that the bank hereby guarantees to make payment to the Contracting Officer by check made payable to the Treasurer of the United States, immediately upon notice, after receipt of a simple written request from the Contracting Officer, immediately and entirely without any need for the Contracting Officer to protest or take any legal action or obtain the prior consent of the Contractor to show any other proof, action, or decision by an other authority, up to the sum of [Amount equal to 20% of the contract price in U.S. dollars during the period ending with the date of final acceptance and 10% of the contract price during contract guaranty period], which represents the deposit required of the contractor to guarantee fulfillment of his obligations for the satisfactory, complete, and timely performance of the said contract [contract number] for [description of work] at [location of work] in strict compliance with the terms, conditions and specifications of said contract, entered into between the Government and [name of contractor] of [address of contractor] on [contract date], plus legal charges of 10% per annum on the amount called due, calculated on the sixth day following receipt of the Contracting Officer's written request until the date of payment.

The undersigned agrees and consents that said contract may be modified by Change Order or Supplemental Agreement affecting the validity of the guaranty provided, however, that the amount of this guaranty shall remain unchanged.

The undersigned agrees and consents that the Contracting Officer may make repeated partial demands on the guaranty up to the total amount of this guaranty, and the bank will promptly honor each individual demand.

This letter of guaranty shall remain in effect until 3 months after completion of the guaranty period of Contract requirement.

Depository Institution: [Name]
Address: Location: _____
Representative(s): _____ _____ State of Inc.: _____
_____ _____ Corporate Seal:
_____ _____

Certificate of Authority is attached evidencing authority of the signer to bind the bank to this document.

Attachment 4

UNITED STATES DEPARTMENT OF STATE
BREAKDOWN OF PRICE BY DIVISIONS OF SPECIFICATIONS

(1)DIVISION/DESCRIPTION (2)LABOR (3)MATERIALS (4)OVERHEAD (5)PROFIT (6)TOTAL

---

1 General Requirements
2. Site Work

---

3. Concrete
4. Masonry

---

5. Metals
6. Wood and Plastic

---

7. Thermal and Moisture
8. Doors and Windows

---

9. Finishes
10. Specialties

---

11. Equipment
12 Furnishings

---

13. Special Construction
14. Conveying Systems

---

15. Mechanical
16. Electrical

TOTAL:

[Note to Contracting Officer: Contracting Officer must identify currency]
Allowance Items:

PROPOSAL PRICE
TOTAL: ***[Note to Contracting Officer: Contracting Officer must identify currency]***

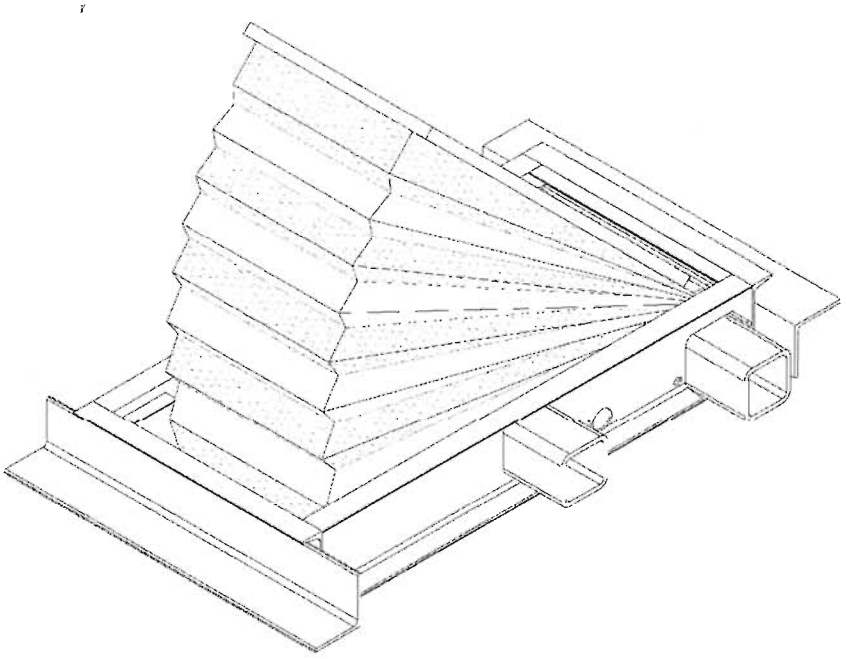
Alternates (list separately do not total)

Offeror: ***Date***

PRICE BREAKDOWN BY DIVISION OF SPECIFICATION ITEMS

INSTRUCTION MANUAL — MODEL DSC2000 W/B1212 DEBRIS SCREEN

- TERMS AND CONDITIONS / WARRANTY
- INSTALLATION
- HOOKUP
- MECHANICAL THEORY
- STARTUP
- HYDRAULIC TROUBLE SHOOTING
- ELECTRICAL TROUBLE SHOOTING
- MAINTENANCE
- DRAWINGS
- OPERATION



DOCUMENT DSC2000 WITH B1212 DEBRIS SCREEN — JOB 7585 LISBON

DELTA SCIENTIFIC CORPORATION

CORPORATE HEADQUARTERS
40355 Delta Lane
Palmdale, California 93551
Phone: (661) 575-1100
Fax: (661) 575-1109
Email: info@deltascientific.com
www.deltascientific.com

EASTERN REGION U.S.A.
125 Wyatt Lane
Fredericksburg, VA 22406
Phone: (703) 541-9114-5-6
Fax: (703) 541-9117
Email: deltava@aol.com

DELTA
SCIENTIFIC CORPORATION

TERMS AND CONDITIONS OF PRODUCT SALE

THIS PURCHASE CONTRACT ("CONTRACT") SETS FORTH THE TERMS AND CONDITIONS FOR THE SALE BY DELTA SCIENTIFIC CORPORATION ("DELTA") TO THE BUYER SPECIFICED HEREIN ("BUYER") OF THE PRODUCTS SPECIFIED IN THE QUOTATION IDENTIFIED BELOW (THE "PRODUCTS"). THIS CONTRACT DOES NOT CONSTITUTE ACCEPTANCE OF ANY OFFER BY BUYER, WHETHER ORAL OR WRITTEN, INCLUDING BUT NOT LIMITED TO ANY PURCHASE ORDER, LETTER, E-MAIL, MEMO, OR ANY OTHER FORM. SALES OF THE PRODUCTS ARE LIMITED SOLELY TO THIS CONTRACT.

Acceptance. Buyer accepts these terms and conditions when the first of the following occurs: Buyer (a) signs or makes a written acceptance of this Contract; (b) authorizes production or shipment of any part of the Products; or c) accepts Delta's Product submittals. Acceptance is expressly limited to all terms and conditions hereof without any addition, modification or exception, and Delta expressly rejects any additional or inconsistent terms, conditions, contingencies or covenants previously or hereafter proposed by Buyer. This Contract, when accepted by Delta at its corporate offices in California, constitutes the entire agreement between Delta and Buyer, superseding any prior agreement or understanding between the parties with respect to the subject matter hereof.

1. **Shipment and Delivery**. Buyer acknowledges that this Contract, and any additional Buyer orders accepted by Delta hereunder, are firm and non--cancelable. Deliveries of the Products will be made F.O.B. Delta's plant at Palmdale, California. Delta will arrange for shipment. Buyer will bear all costs of shipment and insurance and will reimburse all such costs incurred by Delta when invoiced. Upon Delta's delivery of the Products at Delta's plant to any carrier or Buyer's representative, Buyer assumes all risk of loss and damage with respect to the Products. Buyer shall promptly inspect each shipment upon receipt, and shall promptly inform Delta in the event all Products listed in Delta's shipping documents do not arrive as scheduled or are damaged or defective.
2. **Payment Terms**. If credit is approved in advance by Delta, payment terms are net thirty (30) days from the date of invoice. If credit is not approved in advance, Buyer shall make payment in full prior to delivery. Delta's invoice will be issued and dated upon date of shipment of Products. All payments shall be made at Palmdale, California. Unpaid invoices shall bear interest at the maximum lawful rate or 1.5% per month, whichever is less, commencing upon the date payment is due. Buyer shall be responsible for all costs of collection, including but not limited to reasonable attorneys' fees and expenses.
3. **Taxes and Similar Charges**. Buyer shall bear all applicable federal, state, municipal and other taxes (such as sales, use, excise, ad valorem and similar taxes), customs duties and charges. The lack of any such tax or charge on the invoice shall not affect Buyer's tax liability.
4. **Use and Permits**. Buyer will be responsible for operation of Products, including, but not limited to, obtaining all use and export permits, building permits, licenses, certificates and the like, required by any regulatory body for installation and use of the Products. If Buyer wishes for Delta to install any Products purchased hereunder, the terms and conditions of installation shall be set forth in a separate agreement.
5. **Limited Warranty; Limitation of Liability.** Delta warrants that during the warranty period applicable to the product, the Products will be free from defect in material and workmanship. Delta's sole obligation under this warranty shall be to repair (or at Delta's option, to replace), FOB Palmdale, California any defective product, without charge to Buyer, provided that: (a) Buyer gives Delta written notice of any claimed defect within the applicable limited warranty period; (b) the Products, if installed, were installed correctly and in accordance with any instructions provided by Delta, (c) the Products have not been altered, subjected to misuse, negligence or accident, or used with parts not authorized by Delta, (d) the Products have been properly and timely maintained by Buyer in accordance with the preventive maintenance instructions provided, and (e) the replaced Product(s) and or part(s) is/are properly removed and returned to Delta, using the Material Return Authorization (MRA) number and information provided by Delta. Product and Product part troubleshooting, diagnosis and/or replacement, and the cost of such replacement installation and/or related remedial services, are the sole responsibility of Buyer. The duration of the applicable Product warranty is ninety (90) days for guard booths, gates, traffic items and spare parts and one (1) year for Delta's Barricade/Barrier Systems, from date of shipment. Primer, paint and other surface coatings are excluded from warranty. FAILURE BY BUYER TO MAKE TIMELY PAYMENT IN FULL FOR THE PRODUCTS, AND/OR FAILURE BY BUYER TO PROPERLY AND TIMELY CONDUCT PREVENTIVE MAINTENANCE, FAILURE TO FOLLOW DELTA'S INSTRUCTIONS FOR PROBLEM TROUBLESHOOTING AND/OR DIAGNOSIS, AND/OR FAILURE TO PROPERLY INSTALL, REMOVE AND/OR RE-INSTALL A PRODUCT OR PART THEREOF, INVALIDATES THIS WARRANTY. IN THE EVENT A PRODUCT PROBLEM IS NOT THE RESULT OF A PRODUCT DEFECT, BUYER SHALL BE RESPONSIBLE FOR MAINTENANCE CHARGES AT DELTA'S STANDARD TIME AND MATERIALS RATES. NO OTHER WARRANTY IS EXPRESSED AND NONE SHALL BE IMPLIED, INCLUDING WITHOUT LIMITATION THE WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR USE OR FOR A PARTICULAR PURPOSE. THE FOREGOING STATES DELTA'S ENTIRE LIABILITY WITH RESPECT TO THE PRODUCTS. IN NO EVENT SHALL DELTA BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHICH RESULT FROM THE USE OF THE PRODUCTS BY BUYER OR ANY OTHER PARTY, AND IN NO EVENT SHALL DELTA'S LIABILITY EXCEED THE PRICE OF THE PARTICULAR PRODUCT UNIT(S) INVOLVED IN ANY CLAIM.
6. **Disclaimer and Indemnification.** Buyer acknowledges that the Products, designed for control of vehicular traffic, inherently involve a trade off of risk versus benefit. Buyer must devote careful consideration to the selection, placement and design of a barricade installation. To ensure approaching vehicles and 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. It is strongly recommended that the Buyer consult an architect and/or a traffic and/or safety engineer prior to installation of a Barricade/Barrier system. Delta does not purport to offer either architectural, traffic or safety engineering information. Buyer also concedes that, beyond its written installation, maintenance and operation instructions, Delta has no control as to how the Products will be utilized, or how persons in the vicinity of the Products, including but not limited to drivers, bicyclists and/or pedestrians, will act. Therefore, Buyer shall hold harmless, indemnify and defend Delta from and against all claims, demands, judgments and awards resulting from Buyer's use or misuse of the Products, including, but not limited to, claims for personal injury, wrongful death and damage to real or personal property. However, in no event shall this indemnification provision apply where Delta's sole negligence resulted in the claim, judgment or award. Each party shall give the other party prompt written notice of any claim or suit for which such other party is responsible hereunder. The responsible party shall control the defense and/or settlement of such claim; provided that neither party has the authority to enter into a settlement, make an admission, or undertake any obligation or liability without the other party's written consent.
7. **General.** Delta shall not be liable for any delays or failure of performance, beyond the reasonable control of Delta, that affect Delta or any of Delta's suppliers; including, but not limited to, those caused by acts of God, acts of public enemy, acts or omissions of Buyer or its contractors and sub-contractors, fire, strike, riot, flood, governmental interference, unavailability or shortage of materials, labor, fuel or power through normal commercial channels, or failure or destruction of plant or equipment arising from any cause whatsoever. In the event of delay, the date of delivery shall be extended for a period equal to the time lost by such delay, and this Contract shall remain in full force and effect. This Contract may be modified only in writing. This Contract shall be governed by and construed in accordance with the laws of the state of California. Neither this Contract nor any rights or benefits hereunder are assignable by Buyer without prior written consent of Delta. Any such prohibited assignment shall be null and void. Notices shall be given in writing, via certified or overnight mail with proof of deliver, to an authorized representative or officer of a party.

ACCEPTED BY: _____	DELTA SCIENTIFIC CORP	QUOTE NO: _____
NAME: _____	NAME: _____	REV / DATE: _____
DATE: _____	DATE: _____	

DELTA
SCIENTIFIC CORPORATION

WARRANTY AND LIMITATION OF LIABILITY

Delta Scientific Corporation warrants that during the first one year (365) days after delivery, the Products will be free from defect in material and workmanship. Delta's sole obligation under this warranty shall be to repair (or at Delta's option, to replace), FOB: Valencia, California, any defective product, without charge to Buyer, provided that, (a). Buyer gives Delta written notice of any such claimed defect within such period of one year (365) days, (b). The Products, if installed, were installed by a Delta authorized installer, (c). The Products have not been altered, subjected to misuse, negligence or accident, or used with parts not authorized by Delta, and (d). The Products have been maintained in accordance with the instructions provided. NO OTHER WARRANTY IS EXPRESSED AND NONE SHALL BE IMPLIED, INCLUDING WITHOUT LIMITATION THE WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR USE OR FOR A PARTICULAR PURPOSE. THE FOREGOING STATES DELTA'S ENTIRE LIABILITY WITH RESPECT TO THE PRODUCTS. IN NO EVENT SHALL DELTA BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHICH RESULT FROM THE USE BY BUYER OR ANY OTHER PARTY, OF THE PRODUCTS, AND IN NO EVENT SHALL DELTA'S LIABILITY EXCEED THE AMOUNTS PAID BY BUYER FOR THE PRODUCTS HEREUNDER.

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 vehicles 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.

INTELLECTUAL PROPERTY, DRAWINGS, SPECIFICATIONS AND TECHNICAL DATA

The drawings and/or data included with this equipment unless otherwise noted remain the confidential property and trade secret of Delta Scientific Corporation. They shall not be disclosed, reproduced or used for manufacture, design or construction without the express authorization of Delta Scientific Corporation. The recipient by accepting these drawings and/or data, assumes custody thereof and under the above terms agrees not to allow the use of by unauthorized persons.

24901 West Avenue Stanford \ Valencia, California 91355, USA \ Phone: (661) 257-1800 \ FAX (661) 257-0617

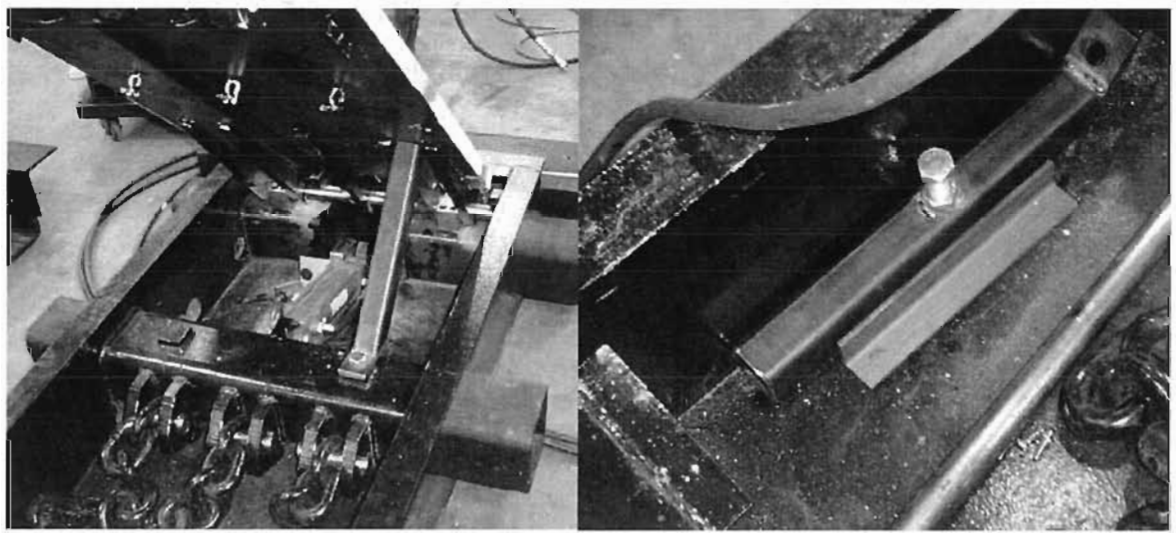
www.deltascientific.com

MECHANICAL INSTALLATION INSTRUCTIONS
DELTA MODEL DSC2000 PHALANX® BARRIER SYSTEMS

Safety Precautions

At all times observe good safety practices when working on either the electrical or mechanical system. Particular attention should be paid to the danger of working on the Barrier when the power is on. Barriers are powerful hydraulic presses that can easily crush anything in their way. Keep hands free of the mechanism when the power is on or the HPU is up to pressure. Turn off the electric power and bleed the hydraulic pressure down to zero before working on any part of the system. Traffic should be controlled around the Barrier during any work so that vehicular accidents do not occur if the Barrier should happen to rise. After work is complete, do not allow traffic over the Barrier until all control and safety functions have been verified to be properly working.

A Barrier ramp brace is provided with each Barrier in the system. The Barrier ramp brace should be in place and firmly bolted in position when working under the Barrier ramp. The Barrier ramp brace is stowed in the Barrier frame when not in use. This makes the brace readily available for use at all times.



Photos 1 and 2 - Ramp brace in position for work under the Barrier.
Storage position for the ramp brace.

Particular attention should be paid to the rigging and lifting equipment used when installing, moving, removing, relocating or servicing any of the heavy elements of the Barrier system. The rigging and lifting gear should be properly sized and attached when lifting heavy components in all instances.

Each Barrier ramp has two attachment points (threaded 3/4"-10 for heavy eye bolts) that are located on the front and rear edges of the ramp and in line with the center of gravity of the ramp. The rear axle lugs can be also be used to attach the lifting gear to the ramp rear edge. The

attachment means between the Barrier ramp and the lifting gear must be sized or designed to take into consideration both the vertical lift as well as side loading conditions.

The Barrier ramp attachment points *cannot* be used to lift the entire Barrier assembly.

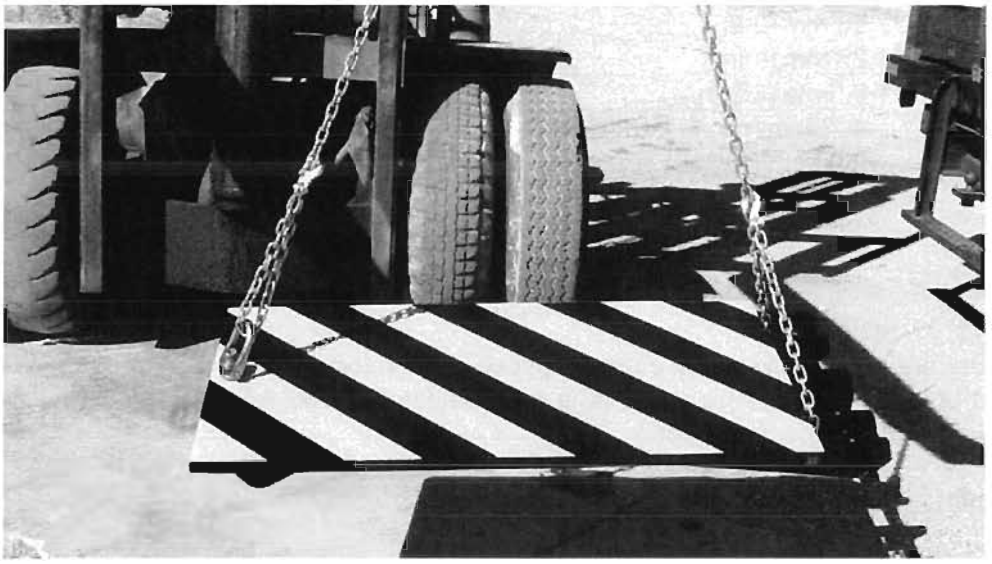


Photo 3 - Safely lifting the DSC2000 ramp plate.

Installation Scheme

The Barrier foundation frames are to be cast in place. The outside of the Barrier foundation frames are the forms; no additional flashing or forming should be necessary. The installation may performed with the Barriers assembled or by removing the Barrier ramps prior to placing the foundation frames into position in the foundation excavation. See the above precautions about working under the Barrier. Disassembly of the Barriers is outlined in the Maintenance section of this manual.

The excavation for the foundation frame for the tested configuration is shown on the Foundation Specification drawing, 91130. Other Barrier spacings are possible but the U.S Department of State certification is based on the 42 inch [107 cm] centers as shown.

The foundations shown on Delta drawings, unless specially noted, are designed on a soil load-bearing factor of 1.5 tons/ft2 [14,600 kg/m2]. The soil should be low-cohesive, well-graded crushed stone or broken gravel of a particle size comparable to Table 1. Soil depth should be at least the foundation depth and 1.5 times embedment depth behind the installation or 2 feet [0.6 meters], whichever is greater up to a maximum of 6 feet. Soil should be compacted to a density of not less than 90 percent maximum dry density.

Care should be taken to mount the Barriers in an area that is not subject to flooding. Additionally, the roadway should be crowned in the area of the Barriers to prevent standing water from draining into the Barrier foundation frames. It is not necessary for the Barriers to be level or plumb to

operate. If the roadway is not level the Barrier may be placed to match the contour; however, be sure the appearance factor is considered. An installation where the equipment is not level even if it follows the terrain can be distracting.

Sieve Size	Mass Percentage Passing
50 mm (2 in.)	100
25 mm (1 in.)	75-95
9.5mm (3/8 in.)	40-75
4.75mm (no. 4)	30-60
2.00mm (no. 10)	20-45
0.425mm (no. 40)	15-30
0.075mm (no. 200)	5-20

Table 1

The Barriers are set directly on the compacted soil of the excavation, or if desired a mud slab can be poured beneath the Barriers (but this is not mandatory). The Barriers should be restrained from floating during the concrete pour.

Environmental Control

Delta Scientific Corporation's vehicle Barrier systems can be used in all geographical areas. Since the early 1980's, Delta Barriers have been successfully installed in locations just south of the Arctic Circle (Oslo and Stockholm), in extremely cold areas of the United States such as Idaho Falls and Grand Forks, and in all the capital cities of Europe. Tropical installations include more than thirty locations within ten degrees latitude of the Equator. In between, installations run from temperate areas to Middle East desert sands.

Heating

Cold climate installations require the use of heaters to maintain proper oil viscosity and to eliminate the possibility of snow or ice blocking the Barrier mechanism. Depending on the hydraulic power unit size and rating, Delta supplies heaters ranging from 60 to 500 watts @ 120/240 volts for the oil reservoirs. The hydraulic hoses to the Barriers are to be run below the frost line where temperatures are a relatively constant 45 to 55°F [7 to 13°C]. If desired, the ducts carrying these hoses can be heat traced at time of installation.

The Barriers themselves may require heaters. Ratings in the range of 400 to 600 watts are common.

Delta strongly recommends that the entire roadway in the immediate vicinity of the Barriers be heat traced. This is to minimize the chance that a vehicle could lose control or traction in front of the Barriers. Also, in many cases, guard and/or inspection personnel will need to work on a vehicle in front of the Barriers. The heat tracing will reduce the personnel dangers of working on snow and ice.

Roadways containing Barriers should not be plowed. The snow plows will damage the Barrier paint and non skid finish. Additionally, the plow blade may catch the front edge of the Barrier and pull it

to the guard position. This will damage the plow and possibly severely injure the operator. Only hand clear snow around the Barriers. Snow removing chemicals such as salt should also not be used around the Barriers, as the corrosion of the steel components will be greatly accelerated.

Drainage provisions in Barriers subject to freezing will also need some consideration. Heat tracing of the drain lines and/or sump well heaters may be needed to help remove the melted snow and ice from the Barrier foundations.

Cooling

Barrier installations in areas where the temperatures are frequently above 100°F [38°C] should have the hydraulic power units located in temperature controlled equipment rooms or be equipped with oil coolers. The simplest but least effective method is an air cooled heat exchanger. Very large surface areas are required to cool oil to 160°F [71°C] when only 130°F [55°C] cooling air is available. A more compact installation can be realized if a water cooled heat exchanger is located in the reservoir tank. Typically, less than one gallon per minute [4 liters per minute] of water at 100°F [38°C] or less is required. If the water stream can be returned to a cooling tower or other closed loop system, no waste of water is incurred.

Sand and Dust

Barrier locations in sand or dust areas require a few additional precautions. The hydraulic power units should be mounted in equipment rooms that can be pressurized to maintain positive air flow out of the room. This minimizes the accumulation of sand, dust and other abrasive materials on the hydraulic equipment where it could find its way into the oil and sensitive mechanical devices. Filter and fluid changes may be more frequent than at other installations.

Barriers in sand swept areas may need to have the foundation tubes cleaned frequently. This is usually accomplished by using an industrial type vacuum to sweep out the accumulated debris. Sand accumulation can be minimized by placement of suitable fences or walls around the Barrier area.

Drainage

Drainage and protection against subsurface water is important. A bed of aggregate under the Barrier(s) will handle rain water in most circumstances. Especially wet locations should have the Barrier provided with a drain line plumbed to a sump well or sewer as appropriate.

While the machine is designed for harsh environments, prolonged submersion will eventually cause both appearance and operating deterioration.

The location of the drain line is up to the installer. This allows the drain to be placed in the low point of the Barrier frame depending upon whether the Barrier is placed flat or sloped in any direction. A drain hole is punched in the low side of the Barrier and a drain tube at least 2 inches [50 mm] (preferably 3 or 4 inches [75 or 100 mm]) in diameter and 18 inches 45 cm] long is inserted into the aggregate bed. The french drain (or 'soak-a-way') should utilize a perforated pipe from the Barrier into the gravel bed to distribute the water. Otherwise plumb the drain to the sewer or a sump well using suitable materials.

Corrosion

Very occasionally a site is both wet and unfriendly, i.e., either highly acid or basic. In these cases, anodic protection is recommended. Delta will be happy to review specific job locations and make suitable recommendations where such protection is needed.

Interconnect

Provisions for electrical and hydraulic feed should be made prior to pouring the foundation of the Barrier.

The Barrier is provided with three 2.5" [64 mm] holes to allow the hydraulic conduit ducts to be run to each Barrier in series. The hydraulic ducts should be located on the side of the Barriers that is nearest the HPU. We recommend that a 2" [50 mm] PVC pipe be run from the hydraulic power unit to each Barrier to provide a conduit through which hoses can be pulled. Alternately, rigid steel pipe can be run from the HPU to the Barrier directly buried in the ground. See the Mechanical System section of this manual for a discussion of the various ways to interconnect the Barrier with the HPU. Block out any unused hydraulic connection holes.

The (optional) fully up and fully down limit switch conduit is also located on Barrier. Units with heaters will require a conduit for the Barrier heaters. Rigid metallic conduit or equal is to be run to these. Be sure that appropriate fittings are used that will allow wire to be pulled. It is too late to correct this error after the concrete is poured!

Connection

The hydraulic hoses are to be terminated directly on the hydraulic cylinders. The hydraulic cylinder will have to be re-oriented depending on which side the hoses enter the Barrier.

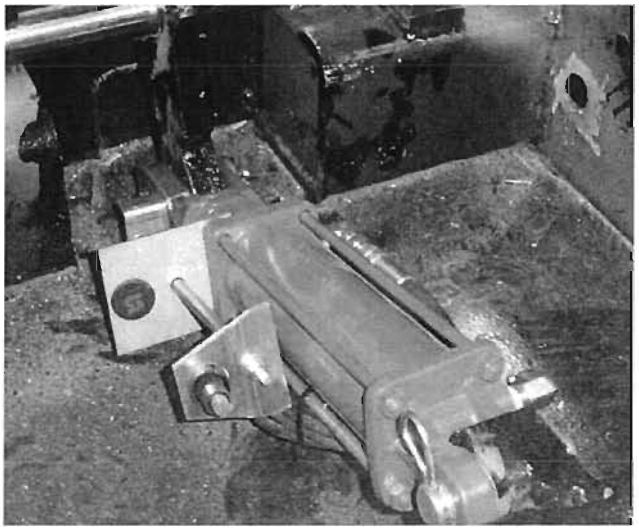


Photo 4 - Hydraulic cylinder installed for hoses to enter from the right, limit switch on left.
(View from the front facing rearward)

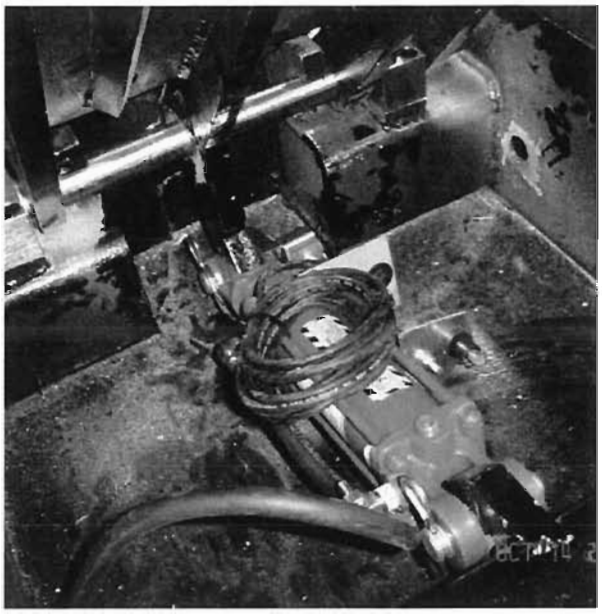


Photo 5 - Hydraulic cylinder installed for hoses to enter from the left, limit switch on right.
(View from the front facing rearward)

The hydraulic cylinders are re-oriented by pulling both cylinder clevis pins and turning the cylinder 180 degrees around its longitudinal axis. The cylinder rod clevis needs to stay in the original position (clevis clamp down for clearance). Thus the limit switch bracket will need to be moved to match the side with the limit switch magnet. Reinsert the clevis pins and securely cotter them.

Concrete Notes and Specifications Note, these are *minimum* requirements only. You may exceed these requirements with no reduction in the rating of the equipment.

1) Contractor shall verify and be responsible for all dimensions and conditions at the job site.

2) Foundation concrete may be placed directly into neat excavations, provided the sides of the excavation are stable. Where caving occurs, provide shoring. Type and method of shoring shall be at the contractor's option.

3) The excavation shall be kept dry at all times. Groundwater, if encountered, shall be pumped from the excavation.

4) Concrete shall be laboratory designed, machine mixed, producing 3,000 psi [20,68 Mpa] at 28 days.

5) Cement shall be tested Portland cement conforming to ASTM C150, Type I or II.

6) Aggregates shall conform to ASTM C33. Maximum size of aggregate shall be 1.5 inch [38 MM].

7) Reinforcing steel shall be deformed bars conforming to ASTM A615, Grade 60 (60,000 psi [413,7 Mpa]).

8) Hooks and bends shall conform to AIC Standard 318, latest revision. Inside diameter of hooks and bends shall be at least 6 bar diameters.

9) Provide spacer bars, chairs, spreaders, blocks, etc, as required to positively hold the steel in place. All dowels shall be firmly wired in place before concrete is poured.

10) Concrete shall be conveyed from the mixer to final deposit by methods that will prevent separation or loss of materials. Troughs, buckets or the like may be used to convey concrete. In no case shall concrete be allowed to free drop more than 5 feet [1,5 M].

11) Concrete shall be thoroughly consolidated by suitable means during placement and shall be thoroughly worked around reinforcement, embedded fixtures and into corners of forms.

12) Concrete shall be maintained above 50°F [10°C] and in a moist condition for at least 7 days after placement. Adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or near freezing weather.

13) Where exterior wall face requires shoring and/or forming, the forms shall be substantial and sufficiently tight to prevent leakage. Forms shall not be removed until the concrete is 7 days old.

14) Backfilling shall be done by depositing and tamping into place clean sand or pouring lean concrete. Water jetting shall not be allowed.

15) Conduits and pipes of aluminum shall not be embedded in concrete unless effectively coated or covered to prevent aluminum/concrete reaction or electrolytic action between aluminum and steel.

16) Construction joints not indicated on the drawings shall not be allowed. Where a construction joint is to be made, the surface of concrete shall be thoroughly cleaned and all laitance and standing water removed.

17) Contractor shall be responsible for the protection of all adjacent areas against damage and shall repair or patch all damaged areas to match existing improvements.

18) Contractor shall keep the construction area clean at all times and at completion of work remove all surplus materials, equipment and debris and leave the premises in a clean condition acceptable to the owner or owner's representative.

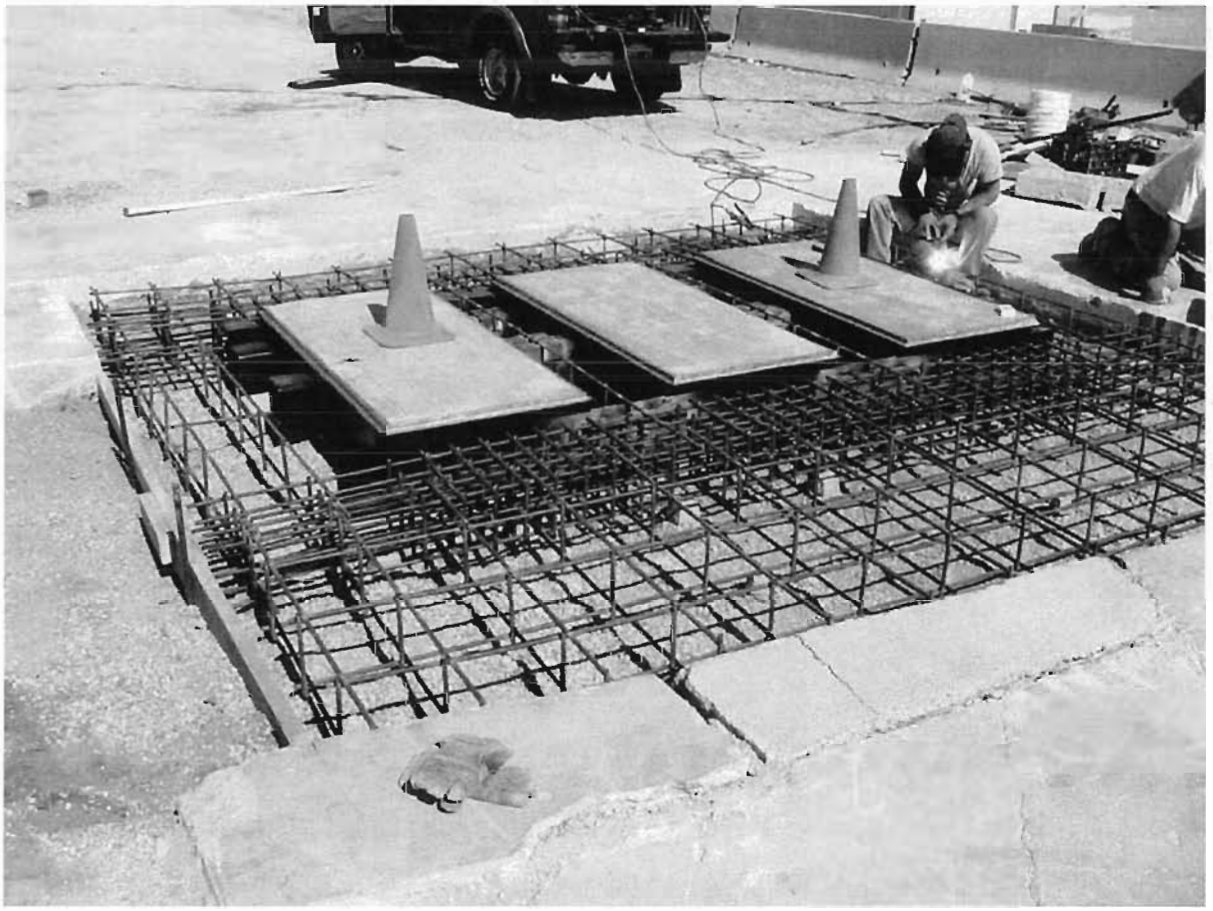


Photo 6 - Three DSC2000 Phalanx Barriers installed on U.S. Department of State spacing of 42 inches [107 cm]. The two rebar beams have been installed and the lighter outer rebar placed about them. All bars are size 4 (0.5 inch [13 mm]). Note that the Barriers are placed directly in the 11 inch [28 cm] deep excavation. Plywood has be placed on the ramp plates to protect the finish from the concrete pour.

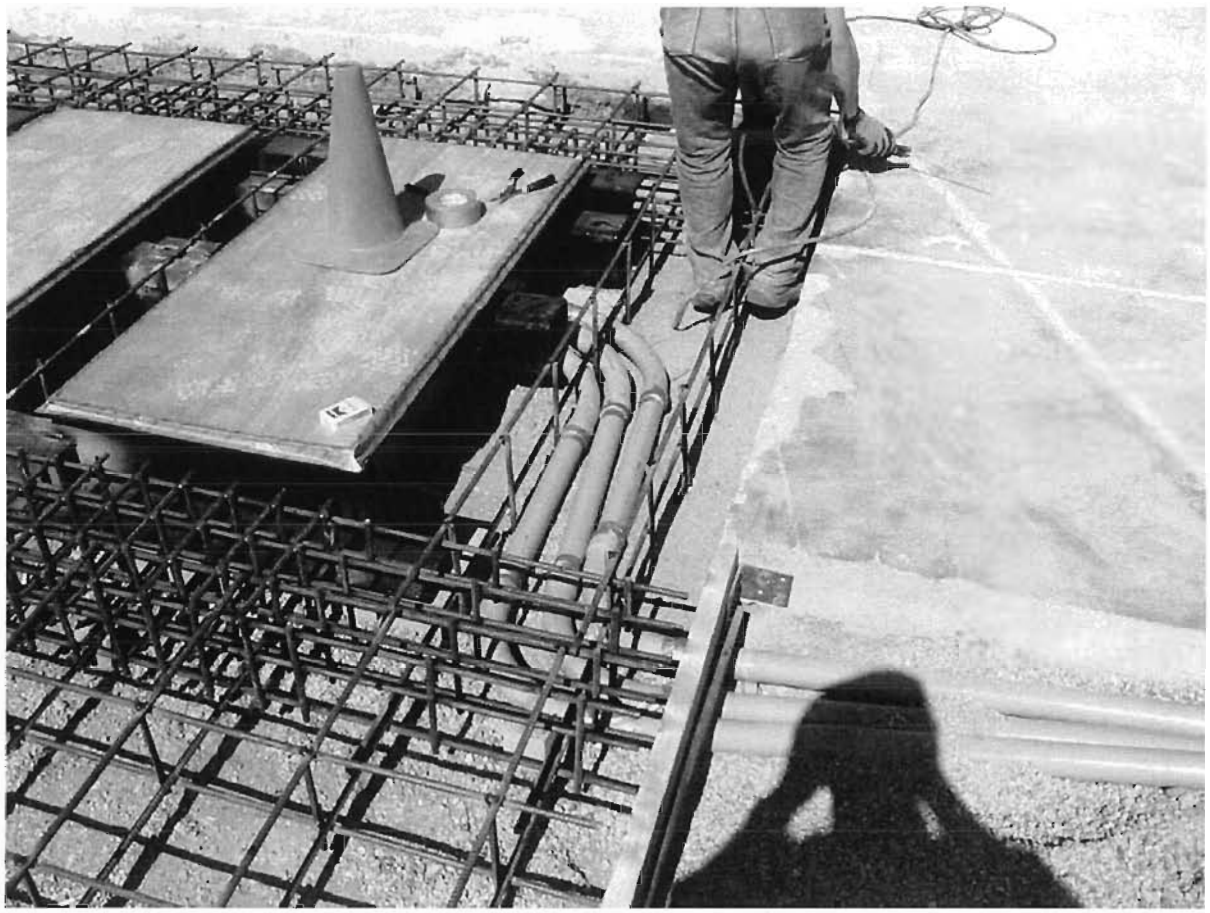


Photo 7 - Three PVC conduits have been installed for the hydraulic hose interconnect. Two of these will run straight through the first Barrier on the way to the second and third Barriers. These ducts should be run in the most direct route possible to the hydraulic power unit.

Photo 8 - 3000 psi [20.68 Mpa] transit mixed concrete is being distributed during the pour. All hydraulic hose ducts and electrical conduits have been installed by this point in the installation.

Photo 9 - The concrete has been screeded and tamped. Additional concrete has been poured to patch the other excavations necessary for a complete installation.

Photo 10 - The concrete has is cured and the protective covers have been removed. These units have been instrumented for the crash test.

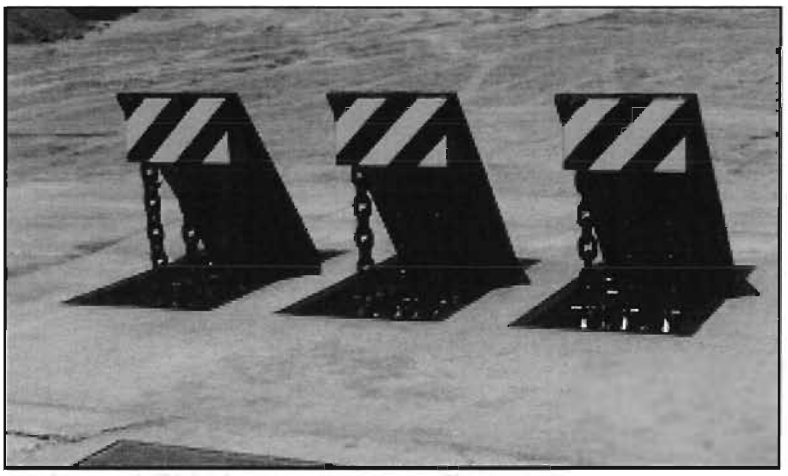


Photo 11 - Delta Model DSC2000 Phalanx in the guard position from the attack side.

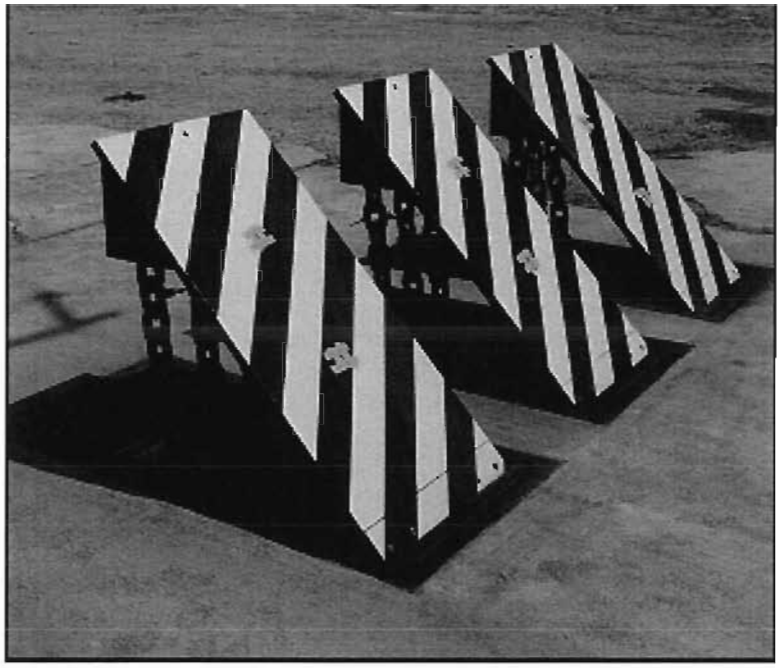


Photo 12 - Delta Model DSC2000 Phalanx in the guard position from the protected side. (The blue tape patches are to secure instrumentation for the crash test.)

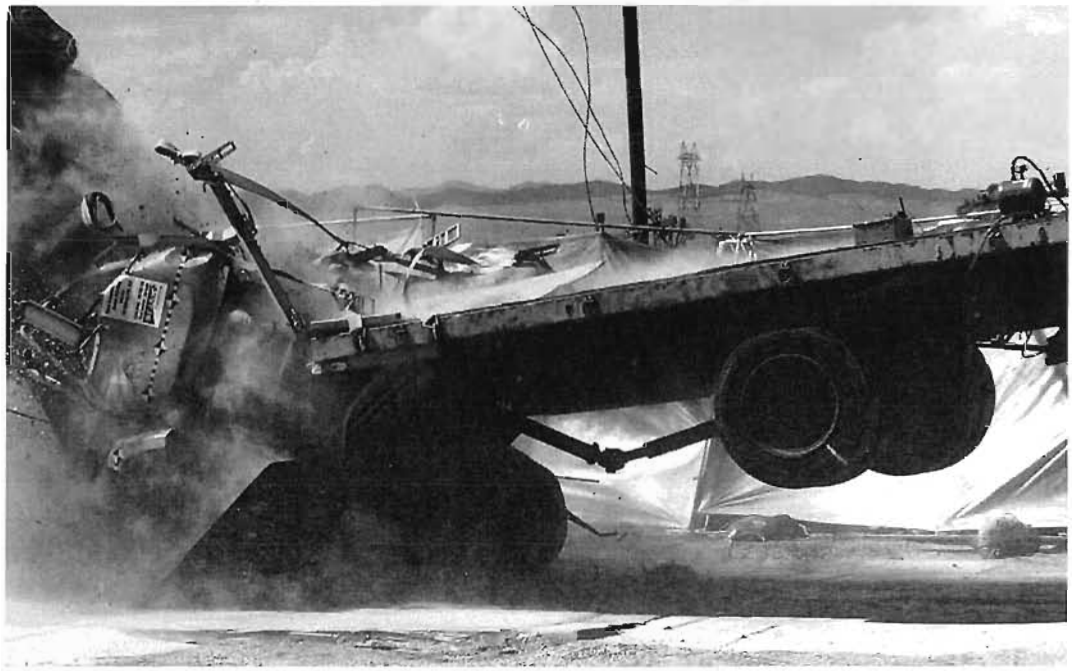


Photo 13 - Delta Model DSC2000 Phalanx at the moment of impact by a vehicle weighing 15,000 pounds [6,800 Kg] traveling at 50 mph [80 kph].

DELTA SCIENTIFIC MODEL B1212
MODEL DSC2000 DEBRIS SCREEN INSTALLATION

Safety Precautions

At all times observe good safety practices when working on either the electrical or mechanical system. Particular attention should be paid to the danger of working on the Barrier when the power is on. Barriers are powerful hydraulic presses that can easily crush anything in their way. Keep hands free of the mechanism when the power is on or the HPU is up to pressure. Turn off the electric power and bleed the hydraulic pressure down to zero before working on any part of the system. Traffic should be controlled around the Barrier during any work so that vehicular accidents do not occur if the Barrier should happen to rise. After work is complete, do not allow traffic over the Barrier until all control and safety functions have been verified to be properly working.

A Barrier ramp brace is provided with each Barrier in the system. The Barrier ramp brace should be in place and firmly bolted in position when working under the Barrier ramp. The Barrier ramp brace is stowed in the Barrier frame when not in use. This makes the brace readily available for use at all times.

Particular attention should be paid to the rigging and lifting equipment used when installing, moving, removing, relocating or servicing any of the heavy elements of the Barrier system. The rigging and lifting gear should be properly sized and attached when lifting heavy components in all instances.

Each Barrier ramp has two attachment points (threaded 3/4"-10 for heavy eye bolts) that are located on the front and rear edges of the ramp and in line with the center of gravity of the ramp. The rear axle lugs can be also be used to attach the lifting gear to the ramp rear edge. The attachment means between the Barrier ramp and the lifting gear must be sized or designed to take into consideration both the vertical lift as well as side loading conditions.

The Barrier ramp attachment points *cannot* be used to lift the entire Barrier assembly.

Installation

Unpack all items and check that everything is present.
- 1 folding screen
- 6 steel rods, 20" long
- 4 steel rods, 23" long
- 2 steel rods, 40" long
- 2 pieces of 1.25" wide flat bar, 16" long
- 6 pieces of 1.25" wide flat bar, 4" long
- 2 pieces of 1.25" wide flat bar, 15" long
- 15 sets of 1/4"-20 bolts and washers.
- 1 sheet metal panel with included reflector
- 3 angle brackets, 3" long, with one 1/4"-20 threaded insert in each
- 1 angle bracket, 19.5" long, with three 1/4"-20 threaded inserts
- 3 cable-ties, 1/2" wide, black
- 1 safety bar for use with debris screen with 3/8"-16 bolt, lock washer, and flat washer
- Assembly typically requires two or more people

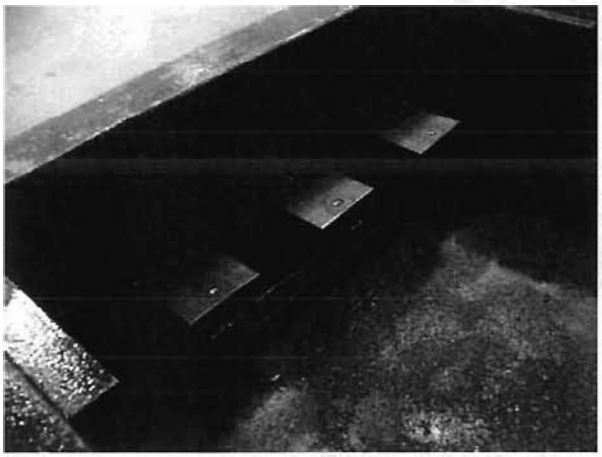
Raise the DSC2000 Phalanx ramp to the Closed position.

Set the Barrier ramp brace in place and bolt it securely. Hydraulic pressure may now be bled from the Hydraulic Power Unit. See drawing 11431, Section A-A, for details on the safety bar bolt location on the Barrier ramp.

Remove the front visibility panel from the Barrier ramp. The sheet metal panel will not be re-installed with this kit, but it may be stored for future use.

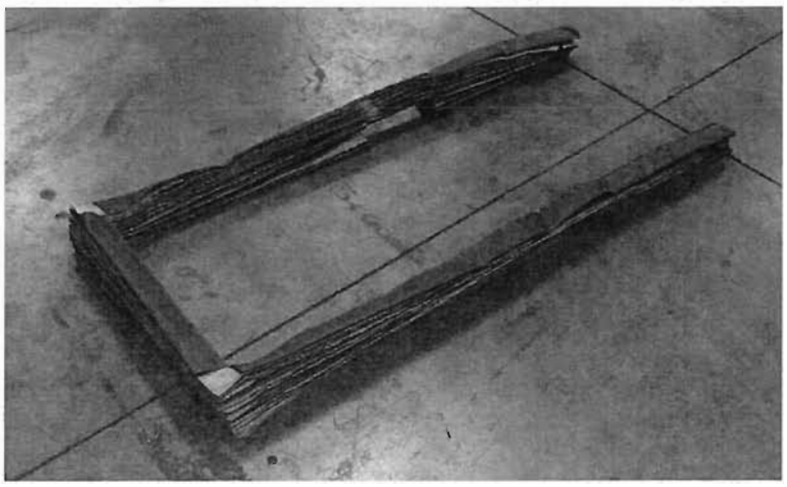
Now is a good opportunity to make any routine maintenance inspections of the barricade interior that may be necessary and to remove any accumulated debris.

Attach the three angle brackets to one of the two 16" flat bars that have 3 slots. Clamp or have another person hold the bar and attached angles as shown in the tab placement drawing, #11431. Tack weld each angle bracket into place starting with the center bracket and working outward. Use small welds to avoid heat distortion of the bar. Alternatively, drill appropriate holes and use concrete screws or anchors to secure the angles.



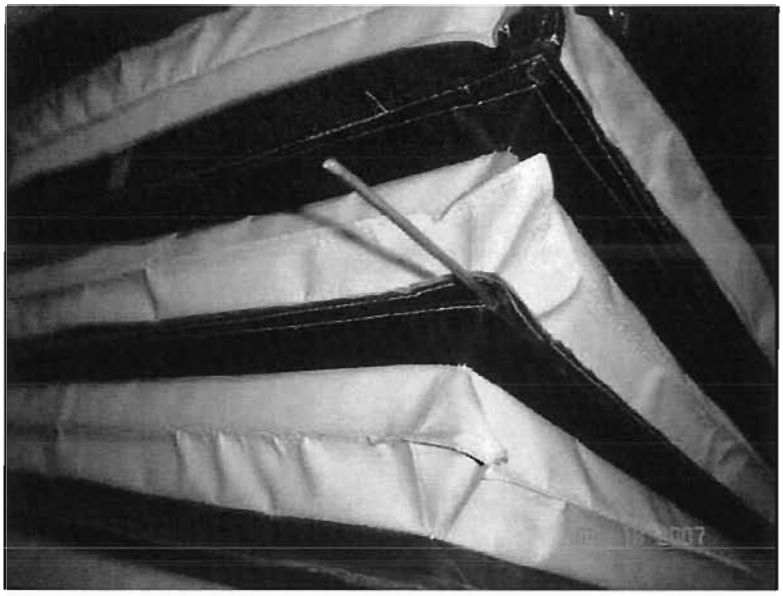
Remove the flat bar from the angle brackets. If welds are being used, perform final welds on each angle bracket.

Mount the long angle bracket, with three threaded inserts, by welding it in place below the existing, similar bracket at the front edge of the barrier plate. This is shown on Drawing #11431, Item #4. This will be the mounting point for the debris screen while the existing mounting points will hold the new reflector.



Stretch the vinyl material on the ground in its natural shape. Remove any twists or folds so the cover lays with its pleats folded neatly.

On the underside of the corner of every two convolutions is a small hole where the steel rods will be inserted. Each rod must be pushed into a sewn-in pocket running the length of each panel.



Since the fit is tight over this length, it is recommended that a light spray-on lubricant be used as the rods are pushed into position. The rods will not back out during service because of excessive lubricant, so there is no need to be sparing in its use.

The rods should be arranged as follows. The six shortest rods go in the first six pockets on the front panel, starting from the top. Two of the longest rods go in each side panel. Starting from the top, one rod will go in the first pocket, and one will go in the third pocket. The remaining eight rods also go in the side panels, four in each side. These rods are placed in the second, fourth, fifth, and sixth pockets.

With the help of another person, push each rod into position while holding the cover to prevent it from bunching and the rod from bending. Squeezing the area where the rod is sliding or allowing the rod to flex excessively will make it much more difficult to push the rod into position. Care should be used when inserting the rods since they will become permanently deformed if bent too far. The rods may be tapped with a hammer to move them the final few inches if necessary.

For the best folding action, each end of the debris screen should be tied. At the end of each side panel, make two cuts in the vinyl so a 1/2" wide cable-tie (or tie-wrap or zip-tie) may be wrapped around the cover. Pass the cable-tie through the upper cut and around the back of the cover, as it is stacked on the ground. Now pass the cable-tie through the lower opening and secure the tie. Do not pull the cable-tie to the point where it squeezes the vinyl tightly. The folded vinyl material should be forced into an orderly, stacked configuration, but should be somewhat loose and free to move vertically.

Drill and tap the hinges per Drawing 11431, Section A – A.

Insert the pair of 16" long flat bars into the pockets at the top and bottom of the front panel. The edge of these bars nearest the slots should face away from the rest of the debris screen to avoid bunching as the debris screen is mounted. Center the bar within the pocket and hold the edge nearest to the slots tightly against the folded edge of the pocket.

Mark the center mounting hole location at the center of the cover and within the slot. Remove the flat bar and use a punch tool to create a hole for one of the 1/4" bolts to pass through. A leather, vinyl, or sheet metal hole punch may work well. Replace the flat bar and secure its position by placing one set of 1/4" hardware (bolt, locking washer, flat washer) in the hole.

Position the debris screen inside the barrier frame. With the help of another person, mount the front, upper edge of the cover using the single bolt. The weight of the debris screen must be supported so that the mounting bar is not bent. Determine the position of the other two mounting holes on this edge and mark them. Remove the center mounting bolt and create the other two necessary mounting holes using the same process as for the first hole. Mount the cover using these three bolts and allow it to hang freely.

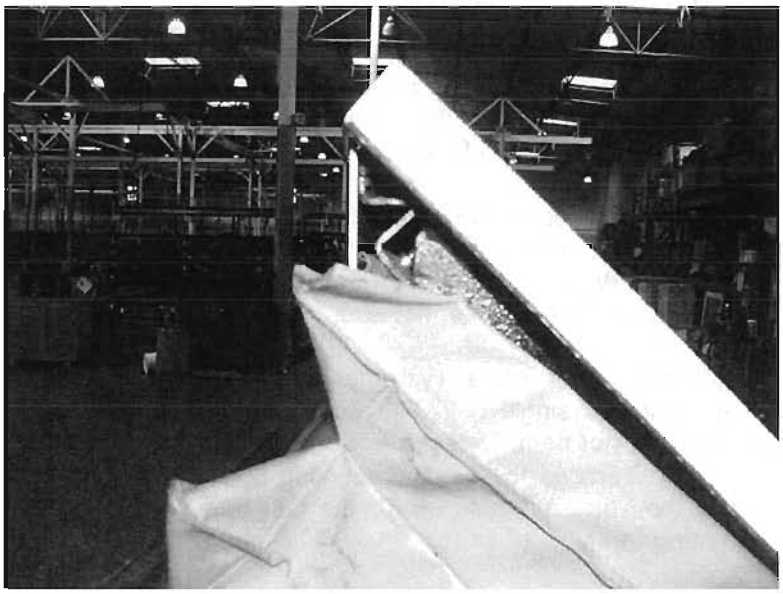
The next mounting point is on the side panel, adjacent to the first three points. The existing tab with 1/4" threaded insert from the original visibility panel will be used. The mounting hole will be located 12" [305mm] from the corner of the debris screen. Locate and punch this hole as done on the front panel. A 15" long flat bar with one slot will be used on each side. The slot is slightly off center with respect to the length of the bar, and the end of the bar nearest the slot goes toward the rear of the barrier.

The final six flat bars help to hold the debris screen in place at the four remaining locations on the lower side of the cover and the two upper locations near the barrier hinge. Because of their small size, these bars can be more difficult to position within the pockets as the previous mounting bars were. For the four lower mounting points, the small bars may be positioned directly between the 1/4" flat washer and the vinyl cover.

If the standard DSC2000 safety bar has been holding the barrier in addition to the safety bar sent with this kit, it should be removed at this time. The new safety bar should remain in use, however. Raise the barrier plate with hydraulic pressure or a hoist before attempting to remove the safety bar. The new safety bar should remain in place throughout this process and for the remainder of the installation.

Locate the positions for the upper rear holes and attach the cover with 1/4" hardware. Locate and punch the three holes for the lower edge of the front panel. Attach this edge of the debris screen. Repeat the process for the final four mounting points at the lower edges of each side of the debris screen.

Mount the included reflector panel at the front edge of the barrier plate using the bracket from the original visibility panel.



Remove the safety bar by raising the barrier plate with hydraulic pressure or a hoist before attempting to remove the safety bar.

Clear the work area and lower the barrier plate with the debris screen installed. Use caution with the initial operation. It is recommended that the speed control for each barrier be set to zero (0) before commanding the barrier to lower.

Give the command to lower the barrier plate and then begin to open the speed control. For the first cycle, keep the speed very low so that any problems in the way the debris screen is folding may be recognized. If it appears that there will be interference or damage, immediately command the barrier plate to reverse or use the speed control valve to stop the motion. Investigate for what may be causing the problem and restart the trial. If the barrier is able to successfully complete its cycle, increase the speed from 1/4 turn to 1/2 turn for each cycle until a moderate speed is achieved. When it is established that there are no problems at these speeds, the barrier may be adjusted to operate at the standard speed of 3 to 5 seconds per half-cycle.

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ELECTRICAL HOOK UP

Number of Barriers: One Phalanx Barrier

Control and Options: Standard 24 VDC Controls

- Barrier Fully Up Limit Switch (Optional)
- Barrier Fully Down Limit Switch (Optional)
- Barrier Front Face Lights (Optional)
- Safety Loop Detector, Model 3546 (Optional)
- Stop/Go Signal Lights, MPL-10 (Optional)
- Stop/Go Signal Gate, Model AG812 (Optional)
- Master Control Panel (Optional)
- Slave Control Panel (Optional)
- Emergency Fast Operation Circuit (Optional)
- Annunciator Circuit (Optional)

Referenced Drawings:

905XX	Hydraulic Power Unit, Single Barrier Set
906x0-1	Control Circuit and Motor Starter, 120-240/24 VDC, Single
90605	Main Board Logic Diagram
907XX-X	Master Control Panel, Single Barrier Set
908XX-X	Slave Control Panel, Single Barrier Set

The following charts have been prepared to assist in the Electrical Interconnect of the Hydraulic Power System, the System Control Circuits, the Remote Control/Status Panels (Master and Slave), as well as various other options offered with Delta Barrier Systems. These charts are designed to supplement the detailed circuit drawings that are furnished with each system.

The voltage carried by each conductor, unless otherwise specified, is 24 VDC. These conductors are indicated by this symbol ">>>>>>>>>". The maximum power at this voltage is 250 watts for hot/neutral wires, 1 watt for device wires. Where the voltage is other than 24 VDC, the conductor is indicated by this symbol ">>>>>> * >>>>>>" and a footnote specifies the voltage and current requirement. Either multi-conductor cable or single conductor wire can be used at the option of the installer. The wire size should be selected based on the pull length, current and voltage requirements and local codes and specifications.

Terminals are designated by a PCB board number followed by two letters followed by the terminal number, i.e. 1 CB 11. The first number is PCB Board number, in this case Barrier # 1, the first letter is the strip location, in this case "control circuit", while the second letter defines the terminal voltage. `A' and some 'C' codes are low voltage 24 VDC. Some 'B' & 'C' codes are the specified local control voltage.

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ELECTRICAL CONNECTION CHART

Reference Drawings: 906x0-1 & 90605.

- Barrier #1 Fully Down Limit Switch (Optional)

Limit Switch		Control Circuit
Common Terminal	>>>>>>>>>>>>>>	1 CA 11
Norm. Opened (Up)	>>>>>>>>>>>>>>	1 CA 12

- Barrier #1 Fully Up Limit Switch (Optional)

Limit Switch		Control Circuit
Common Terminal	>>>>>>>>>>>>>>	1 CA 16
Norm. Opened (Down)	>>>>>>>>>>>>>>	1 CA 17

Load per limit switch is 0.6 watts.

- Barrier #1 Front Face Lights (Optional)

Front Lights		Control Circuit
Lights Hot Terminal	>>>> 12 VDC + >>>>	1 CB 23
Common Neutral Terminal	>>>> 12 VDC - >>>>	1 CB 24

Load per Barrier Front Face Light Set is 5 watts @ 12 VDC (from 12 V voltage regulator).

Reference Drawings: (Drawing No. 906x0-1 & 90605).

- Loop Safety Device, Barrier #1 (Contact is shown for no vehicle 'call')

Loop Detector		Control Circuit
Common Terminal	>>>>>>>>>>>>>>	1 CA 5
Normally Closed Terminal	>>>>>>>>>>>>>>	1 CA 6

Note: Jumper terminal 1 CA 5 to terminal 1 CA 6 if no loop detector safety device is used. Load per loop detector safety device is 0.6 watts.

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ELECTRICAL CONNECTION CHART

Reference Drawings: 906x0-1 & 90605.

- Signal Lights for Barrier # 1

This circuit synchronizes the stop/go lights with the Barrier. As soon as the Barrier starts to rise the red "stop" light comes on and stays on until the Barrier has been lowered and is fully down. The green "go" light comes on at this point.

Signal Lights		Control Circuit
Supply Voltage (Note 3)	>>>> Note 2 >>>>	1 CB 1
Supply Voltage (Note 3)	>>>> Note 2 >>>>	1 CB 2
Common Terminal	>>>> Note 2 >>>>	1 CB 3
Signal Green Light	>>>> Note 1 >>>>	1 CB 4
Signal Red Light	>>>> Note 1 >>>>	1 CB 5

Note 1: These lines must be sized to handle one 40 Watts (maximum) incandescent bulb operating at the AC Control Voltage. If back to back lights are used, twice the current must be handled.

Note 2: If the commons are combined, the total of all currents must be considered.

Note 3: The supply voltage is applied at terminals 1 CB 1 (Hot) and 1 CB 2 (Neutral). This voltage can be whatever the signal lights require. If the lights are to be operated on 24 VDC, customer must insure when using the Delta power supply, the power supply rating is not exceeded.

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ELECTRICAL CONNECTION CHART

- Stop/Go Signal Gate, Model AG812

Reference Drawings: 906x0-1 & 90605

The Stop/Go Signal Gate Model AG812 is designed to have its motion coordinated with its companion Barrier. Upon raising the Barrier, the Signal Gate will lower to provide visual indication to drivers to stop. The Signal Gate will remain in the down position until the Barrier is again lowered to the full down position at which point the Barrier's down limit switch will cause the Signal Gate to raise.

Stop/Go Signal Gate		Control Circuit
Terminal 12	>>>> Note 1 >>>>	1 CB 10
Terminal 14	>>>> Note 1 >>>>	1 CB 11

Note 1: The Model AG812 Signal Gate has the local control voltage brought to terminals L1 and L2. Signal Gate jumpers are on terminals CA 3 and CA 5 (changed from terminals CA 4 and CA 5).

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ELECTRICAL CONNECTION CHART

- Master Control Panel (Optional)

Reference Drawings: 906x0-1, 90605, & 907XX-X).

MASTER REMOTE CONTROL PANEL		CONTROL CIRCUIT
1 MA 3 (+)	>>>> Note 2 >>>>	1 CA 3 + (HOT) Note 1
1 MA 18 (-)	>>>> Note 2 >>>>	1 CA 18 - (NEUTRAL) Note 1
1 MA 4 (Close)	>>>>>>>>>>>>>>	1 CA 4
1 MA 8 (Open)	>>>>>>>>>>>>>>	1 CA 8
1 MA 14 (Emergency)	>>>> Note 2 >>>>	1 CA 14
1 MA 15 (Emergency Reset)	>>>> Note 2 >>>>	1 CA 15
1 MA 19 (Clear)	>>>>>>>>>>>>>>	1 CA 19
1 MA 20 (Not Clear)	>>>>>>>>>>>>>>	1 CA 20

Note 1: Size neutral and hot for 50 watts (maximum). All other lines are 1 watts each.

Note 2: If two master panels are being used: The terminals 1 MA and 2 MA for these lines are jumpered at the factory; 1 MA 3 to 2 MA 3, 1 MA 18 to 2 MA 18, etc. A jumper will be required between the circuit boards in the control circuit.

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ELECTRICAL CONNECTION CHART

➢ Slave Control Panel (Optional)

Reference Drawings: 908XX-X, 907XX-X, 906x0-1 & 90605. (See Note 1)

The Slave Control Panel can be wired into the Master Control Panel or directly into the Control Circuit. Both wiring diagrams are provided below. (See Note 1)

Slave Panel		Master Panel
1 SA 4	>>>>>>>>>>>>>>	1 MA 4
1 SA 8	>>>>>>>>>>>>>>	1 MA 8
1 SA 14	>>>> Note 3 >>>>	1 MA 14
1 SA 15	>>>> Note 3 >>>>	1 MA 15
1 SA 18	>>>> Note 3 >>>>	1 MA 18
1 SA 19	>>>>>>>>>>>>>>	1 MA 19
1 SA 20	>>>>>>>>>>>>>>	1 MA 20
1 SA 27	>>>> Note 3 >>>>	1 MA 27
1 SA 28	>>>> Note 3 >>>>	1 MA 3

OR

Slave Panel		Control Circuit
1 SA 4	>>>>>>>>>>>>>>	1 CA 4
1 SA 8	>>>>>>>>>>>>>>	1 CA 8
1 SA 14	>>>> Note 4 >>>>	1 CA 14
1 SA 15	>>>> Note 4 >>>>	1 CA 15
1 SA 18	>>>> Note 4 >>>>	1 CA 18
1 SA 19	>>>>>>>>>>>>>>	1 CA 19
1 SA 20	>>>>>>>>>>>>>>	1 CA 20
1 SA 27	>>>> Note 2 >>>>	1 MA 27
1 SA 28	>>>>Note 2>>>>	1 MA 3

Note 1: The Slave can be fed from either the Master or from the Control Circuit. If the Slave is fed from the Master, then connect as shown in the first chart. If the Slave is fed from the Control Circuit use the second chart.

Note 2: These connections must be made directly from the Slave Remote to the Master Remote. If the Slave Control Panel is directly connected to the Control Circuit, the routing can be made through a spare terminal on the Control Circuit.

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ELECTRICAL CONNECTION CHART

- Slave Control Panel (Optional) Continued

Note 3: If two Slave panels are being used: The terminals 1 SA and 2 SA for these lines can be commoned. A jumper will be required between the circuit boards in the control circuit.

Note 4: Size neutral and hot for 50 watts (maximum). All other lines are 1 watts each.

Note 5: If two Master panels are being used: The terminals 1 MA and 2 MA for these lines are jumpered at the factory; 1 MA 3 to 2 MA 3, 1 MA 18 to 2 MA 18, etc. A jumper will be required between the circuit boards in the control circuit.

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ELECTRICAL CONNECTION CHART

- Hydraulic Power Unit and Motor

Reference Drawings: 906x0-1 & 90605

Note: These connections have been made at the factory but are shown here as an aid for troubleshooting.

Hydraulic Power Unit Valve Solenoids		Control Circuit Barrier #1
UP	>>>> Note 1 >>>>	1 CB 17
UP COMMON	>>>> Note 1 >>>>	1 CB 18
DOWN	>>>> Note 1 >>>>	1 CB 19
DOWN COMMON	>>>> Note 1 >>>>	1 CB 20
EMERGENCY OPERATE	>>>> Note 2 >>>>	1 CB 21
EO COMMON	>>>> Note 2 >>>>	1 CB 22

		Motor Control Circuit Barrier #1
LEVEL SWITCH	>>>> Note 3 >>>>	CC 8 (CC 18)
LEVEL / PRESSURE SWITCH	>>>> Note 3 >>>>	CC 9 (CC 19)
PRESSURE SWITCH	>>>> Note 3 >>>>	CC 10 (CC 20)

Note 1: These lines must be sized to carry 30 watts at 24 VDC.

Note 2: These lines must be sized to carry 20 watts at 24 VDC.

Note 3: Starter coil power consumption is less than 100 va inrush, and less than 10 va sealed.

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ELECTRICAL CONNECTION CHART

Control Circuit

The Control Circuit is fed from the customer's local AC control voltage supply (either 100-120/1/50-60 or 200-240/1/50-60). Connection is to terminals CC 1(+) and CC 2(-).Supply should be adequate to provide a minimum of 250 Watts of power.

The control circuit contains a power supply, which reduces the local voltage to 24 VDC for use on the remote control panels. The feed out of the control circuit for these remotes is on terminal CA 1(+) and CA 2(-). Standard power capability is 150 watts. Battery back up power supply/charger and batteries are optionally available.

Note: Use caution when installing the field conduits and wiring to the control circuit enclosure. Shield metal chips and wire fragments from falling on to or in to components. Component failure can be caused by careless installation.

Power Unit Motors

The motor has been ordered and supplied to the actual site voltage. Please confirm before hookup. The motor is factory wired to an automatic starter controlled by the hydraulic power unit pressure switch, oil level switch and (optional) three phase power monitor. Thermal overload protection is integrally provided.

The customer should provide branch circuit protection as required by national and local code. Care should be taken in arriving at the correct wire size for the length of cable provided.

Hydraulic Power Unit Wiring

The three phase power is brought into the HPU terminal box to the line side of the door mounted disconnect switch at L1, L2 and L3.

Verify that the motor runs in the correct direction. Units with phase monitors (three phase only) are factory set to run in the correct direction. If motor does not run, or runs in the wrong direction, reverse any two incoming wires at L1, L2 or L3; motor should now run and in the correct direction.

Power for the starter contactor coil is the same as the primary voltage of the control circuit. Coil voltage legend plates are on the starter so that this can be confirmed. Connection points for the coil power are 'CC 1(+)' and 'CC 2(-)'. Starter coil power consumption is less than 100 va inrush, and less than 10 va sealed.

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ELECTRICAL CONNECTION CHART

Barrier and HPU Heaters

The system is furnished with electric heaters for the purpose of melting snow and ice, which may otherwise freeze the Barrier in either the up or down position.

The hydraulic oil reservoir also is equipped with an immersion heater located within the oil level. It is equipped with a thermostat dial and should be set to a value between 60 to 75°F [15 to 25°C].

The electric feed to the heaters is fused in the control circuit. See appropriate wiring diagram for the connections.

Important: Before energizing the heater circuits at the start of each season, the elements must be megger tested. This is typically done with a megger capable of delivering 500 volts to the circuit. A value in excess of 50,000 ohms to ground is acceptable for energizing the heater circuits. Call the factory if a lower reading is found.

Failure of the elements will in no way cause the Barrier to malfunction unless there is an ice or snow build up inside the machine.

'DELTA' STYLE HYDRAULIC POWER UNITS
DSC2000 SERIES PHALANX® BARRIERS
THEORY OF OPERATION

Power Source

Delta Scientific Corporation's barricade systems are powered by a hydraulic oil power unit (HPU). This unit is typically mounted remote from the Barrier(s) and attached to them by hoses or steel pipes. The hydraulic power unit provides the tremendous lifting force necessary to raise the heavy steel weldments of the Barriers. The forces generated are in the range of 20,000 to 25,000 pounds for these large Phalanx® Barricades. An industrial grade electric motor drives the hydraulic gear pump to produce the HPU system pressure.

Power Storage

The HPU stores the pressurized hydraulic oil produced by the gear pump in an accumulator. The accumulator thus provides a high pressure reserve of oil available to move or maintain the position of the Barricade. The pressure of the oil in the accumulator is maintained by the automatic cycling of the pump motor on and off between the low and high settings of a pressure switch. It is important to note that the pump motor thus runs independently of any command from the Barrier control panel; if pressure is low the pump motor will run, if the pressure is within bounds (even with the Barrier moving) the pump motor will be off.

In addition to providing the high pressure oil to move the Barriers, the accumulator also acts as a hydraulic spring to cushion the various parts of the hydraulic system during normal operation and when the Barrier is performing its' designed task of arresting vehicles.

Power Access

To move a Barrier we must direct the pressurized oil in the HPU to the appropriate up or down side of a hydraulic cylinder in the Barrier. This is done by shifting a directional valve mounted on the HPU. The shifting is accomplished by energizing one of two electric solenoids on the valve. The valves used by Delta are known as 'two position, electrically actuated, spring detented'. The spring detent allows the valve to remain in the position it was last shifted to without being constantly energized. This saves energy and allows the Barrier to remain in its commanded position even if power is interrupted to the HPU.

Using two or more of these directional valves allows us to independently control two or more Barriers from one HPU. This feature is useful where Barriers are placed in multiple lanes at the entrance of a facility.

GOOD HYDRAULIC PRACTICE

Safety Precautions

At all times observe good safety practices when working on either the electrical or mechanical system. Particular attention should be paid to the danger of working on the Barrier when the power is on. The Barrier is a powerful hydraulic press that can easily crush anything in its way. Keep hands free of the mechanism when the power is on or the HPU is up to pressure. Turn off the electric power and bleed the hydraulic pressure down to zero before working on any part of the system. Traffic should be controlled around the Barrier(s) during any work so that vehicular accidents do not occur if the Barrier should happen to rise. After work is complete, do not allow traffic over the Barrier until all control and safety functions have been verified to be properly working.

Cleanliness

To maintain system efficiency and reliability great care must be taken to prevent any form of dirt, sand or grit from entering the hydraulic system. Only new, clean filtered hydraulic oil should be used for charging the unit. Unless specifically ordered as filtered, new oil should be pumped through a 25 micron filter when charging. See **Commercial Hydraulic Oil Interchangeability Chart** for our recommended oils. The tests conducted at the factory on the system have been done with the HPU charged with Shell 'Tellus' 46. This grade is for moderate temperatures and is available in most of the worlds leading cities.

Hydraulic oil is subject to degradation and contamination with age, so follow the recommendations in the Maintenance section of this manual.

Location

The hydraulic power unit should be mounted indoors in a clean, dry location away from excessive heat or cold. As an alternate the unit can be mounted outdoors if provided with a suitable cover designed for the area to exclude moisture or dust as appropriate. While HPU's have been mounted below grade in concrete pits, we do not recommend this as drainage becomes extremely important. A drain backup can cause the power unit to go under water with severe damage resulting. Also, the water condensation found in most pits is detrimental to the HPU components.

It is important that the hydraulic power unit be mounted at approximately the same or higher elevation as the Barrier(s). If the HPU is mounted lower than the Barrier(s), the oil in the lines may repeatedly drain back to tank and make the Barrier motion erratic. The power unit can be at elevation greater than the Barrier(s) if it is understood that breaking a line at the Barrier will cause oil to flow in that direction.

System Component Description

The hydraulic power unit (HPU) is assembled on a steel framework which supports the hydraulic oil reservoir and major components. Provision is made to permit bolting or lagging of the frame to a suitable foundation. See the appropriate General Arrangement drawing for hole and interface dimensions. The power unit has been pre-tested for function and leaks at the factory prior to shipment. Preparation for shipment calls for the draining of the test oil, however, approximately one inch [25 mm] will remain in the tank after draining.

Oil Reservoir Tank

The oil reservoir forms the largest component of the hydraulic power unit. It is integral with the backplate of the skid base and forms the structure to which other components are attached. On the top is mounted the filler breather cap by which oil can be added to the tank. The capacity of the reservoir is nominally 20 gallons [75 liters]. This is also approximately the charge of oil that will be required to fill the lines and hydraulic cylinders of the Barriers.

The tank's level is indicated by a sight glass on its' front face. The reservoir should only be filled with the hydraulic system pressure at zero, otherwise overflowing can occur as a result of oil being displaced out of the accumulator. The proper oil level is within 1 inch [25 mm] of the sight glass top at zero system pressure.

The reservoir tank holds the suction strainer on the pump suction line and also provides the mounting for return line filter. A oil level switch is provided to shut the pump/motor off should oil loss threaten pump failure. A reservoir heater can be supplied if the ambient temperature so dictates.

Drains are furnished at tank bottom (both sides) for removing water and/or changing fluids. This should be done at the intervals directed in the **Maintenance** section. A removable cover is provided for clean out and access to the components inside.

Gear Pump/Check Valve

The gear pump is mounted on a motor adapter and attached to the motor drive shaft by a flexible coupling. The set screws in the coupling halves should be checked for tightness on the pump and motor shafts prior to start up. The pump seals, as are all other HPU component seals, are Buna-N. A check valve is located at the pump. Its purpose is to prevent the pressurized oil in the high pressure side of the unit from running back through the pump after the motor shuts off. If it were to fail you would likely see the fan on the pump motor run backwards and the system pressure fall until zero.

Do not start the pump/motor until oil has been put into the reservoir. The pump can only be run dry for a few seconds before damage to the gears and the housing occurs. The suction line to the pump is provided with a shutoff valve to facilitate maintenance. This valve must be fully open at all times except when replacing the pump. A closed pump shutoff valve can destroy the pump in seconds.

Motor

The motor is mounted horizontally and bolted to the HPU framework as will as to the other side of the pump/motor adapter. It is a totally enclosed fan cooled (TEFC) design, three phase. The motor voltage and rating is shown on its nameplate; as a multi winding motor is furnished, the as wired voltage is shown on the Delta motor placard attached to the motor starter enclosure.

Motor/pump direction of rotation is critical. A direction arrow decal is provided. The motor must run in this direction when site power is brought to the HPU skid. If the motor does not run in the proper direction on startup, reverse any two incoming wires to the control circuit disconnect switch.

Phase Monitor (Optional)

An optional phase (voltage) monitor may be supplied to protect the motor from improper phasing, phase loss, or low voltage. The monitor will drop out the motor starter circuit if the three phase power is phased wrong or if the voltage is too low. The unit has been properly phased at the factory. If the motor does not run on initial startup, reverse any two incoming wires to the control circuit. The motor should now run and in the correct direction.

Magnetic Motor Starter/Overload

Site voltage is fed to the line side of the motor starter/thermal overload. See voltage placard attached to the starter enclosure for the **as wired** voltage and motor starter circuit drawing number. The feed to the HPU should be controlled from an appropriately sized circuit breaker/disconnect switch and the wires sized properly to prevent excessive voltage drop from the disconnect to the HPU skid. Motors should not be allowed to run at voltages exceeding +/- 10 percent of their ratings. This could lead to tripping of the thermal overloads or substantial damage to the motor and control circuit components.

The thermal overload is calibrated for the anticipated full load amperage of the motor at run voltage, this setting should be confirmed before start up (the amperage dial of the overload should be set for the full load amps labeled on the motor nameplate). The overload should be in the **MANUAL** position, automatic reset could cause equipment failure if a fault is not corrected in a timely manner.

A voltage/phase monitor may optionally be furnished. In addition to protecting the pump against improper rotation, it will shutdown the motor starter circuit if phase loss/reversal or low voltage is detected.

Accumulator

The accumulator is a large cylindrical pressure vessel that provides the high pressure reserve of oil used to move the Barriers and keep them in position. In addition, the oil stored in the accumulator is available to move the Barrier(s) even if the pump/motor should be inoperable. The amount of oil directed out to the Barrier(s) is not limited by the displacement rate of the hydraulic gear pump but by the oil stored in the accumulator.

An accumulator is divided into two sides by a piston (piston accumulator). On the top side, the accumulator contains dry nitrogen gas pre-pressurized (precharged) at the factory at a level determined by the type of Barriers on your order. The fittings and seals on the nitrogen fill connection should be kept tight to prevent loss of this precharge. A special tool is available from Delta Scientific to check the precharge pressure and facilitate recharging if that should become necessary. Precharge should be checked every six months (see **Maintenance** section of this manual). The pump/motor should not be run if there is no precharge, damage to the accumulator could result. Only dry nitrogen should be used for precharge, air or other gases could cause the accumulator vessel to explode. Precharge should only be done at zero hydraulic pressure or an incorrect precharge pressure will result.

The other side of the accumulator contains the system hydraulic oil. At zero hydraulic oil pressure there is little or no oil in the accumulator, the piston is down hard on the oil outlet. As the pump/motor runs, oil accumulates on the oil side at the pressure indicated by the system pressure gage (oil side). This pressure gage will read the precharge indirectly by jumping to the precharge value on motor startup then slowly running up to the shut off pressure. It is important to note that at shut off, only a portion of the accumulator contains oil, the piston has been pushed back to compress the nitrogen gas which is now also at the shutoff pressure. It is the compressed gas that provides the 'spring' to move oil out of the accumulator and to the cylinders of the Barrier.

When performing accumulator maintenance it is necessary to bring the oil side pressure to zero. Large oil loss can occur if fittings are tampered with while under pressure.

Pressure Switch

The pressure at which the oil side is maintained is determined by a pressure switch mounted on the high pressure (pump or accumulator) side of the system. The switch is factory set for the proper shutoff pressure of 1900 psig [131 bar] and has a 500 psig [34 bar] 'dead-band'. This means that the pressure will fall approximately 500 psi [34 bar] after shutoff (about 1400 psig [97 bar]) before the switch closes to restart the pump motor. These settings should be indicated on the motor starter drawing and noted in the pressure log in the **Maintenance** section. The electric side of the switch is terminated on a terminal strip in the motor starter enclosure.

Pressure Gage

A pressure gage is provided to indicate the hydraulic oil pressure of the system. It does not indicate the accumulator precharge except as noted in the **Accumulator** paragraph of this section. The gage is liquid filled with glycol to eliminate needle bounce and a vent is thus provided to allow the case to breath, preventing case blow out. Upon receipt, remove vent seal plug/label.

This gage must read zero when working on the HPU pressure lines and fittings or large oil loss can occur. A gentle tapping on the gage glass will provide the most accurate readings.

Pressure Relief Valve

A pressure relief valve is provided should the high pressure switch fail to shut off the pump motor. The relief valve is typically set 200 to 250 psig [14 to 17 bar] higher than the high pressure switch. When the pressure relief valve opens, oil is allowed to circulate from the pressure side of the

system to the tank/motor suction. The motor horse power is thus being turned to heat across this valve which could cause component damage if allowed to operate uncorrected. The operators or guards should thus report to the person in charge of Barrier maintenance if they note the HPU constantly running.

An open pressure relief valve will cause a hissing sound and if the motor is not running, a falling pressure gage would be noted. See the **Mechanical Trouble Shooting** section if the relief valve does not reseat on pressure reduction.

The pressure relief valve should in no case be set higher than 1.1 times the pressure rating of the minimum rated component in the Barrier system. Please note that most components are designed with a 4 to 1 safety factor, thus the burst pressure of a 2500 psig [172 bar] rated hose would be 10,000 psig [690 bar].

Low Level Switch

As noted above, an oil reservoir low level switch is provided to shut down the pump/motor if the reservoir level drops to the point where the suction of the pump could become uncovered. The gear pump can only run dry for a few seconds before severe wear occurs on the gears and its' housing. Causes of low level are slow system leaks and catastrophic failure of the pressure lines or hoses.

Oil Filter

A return filter element is furnished to filter the oil as it is being returned to the oil reservoir. The oil filter housing is only rated at 150 psig [10 bar] or less as the oil in the return line has only to overcome the pressure drop through the filter itself. If the filter should become clogged with dirt from the system a bypass check valve inside the filter will open and allow the dirty oil to circulate back to the reservoir. For this reason regular filter maintenance is a must. See the **Maintenance** section for details.

Directional Control Valve

A solenoid actuated directional control valve is provided to direct the high pressure oil to the up or down side of the Barrier cylinder(s). One or more (depending on the number of Barriers to be controlled) are mounted on an aluminum manifold bolted to the back plate on the oil reservoir. When the 'up' side is energized, the valve connects the high pressure (P) side of the manifold to the (B) output port of the manifold. The tank return line (T) is simultaneously connected to the (A) output port. When the 'down' side is energized, the manifold (P) side is connected to the (A) port and the (T) side is connected to the (B) port.

The directional valve is equipped with pin extensions mounted on the solenoid ends so that the valve spool can be manually shifted by inserting a pin with a diameter of approximately 0.125 inch [3 mm]. As described above in the Power Access paragraph, the valve has spring detents so that it remains in the last commanded position until moved by the electric solenoids or the override pins. See the applicable 'Hydraulic Valve Connection' drawing.

The spool of the valve is designed to provide 'closed center ports' so that if the valve malfunctions and does not fully shift, the ports will be closed to one another. Note that these valves require clearance between the spool and the valve body to properly function, thus some leakage from pressure to tank is to be expected. Excessive valve wear will eventually cause the pump/motor to cycle on and off several times per minute even when the Barriers are not moving. Replacement or rebuilding of the affected valve will then be required.

The convention used on all Delta Barrier systems regarding the directional control solenoid valves is as follows:

Directional Control Solenoid Numbering: Valve one (station one) is the bottom most valve on the manifold with the station number increasing to the top of the valve stack.

Color Codes:

Side/Solenoid	Wire Color	Function
Left/'B'	Black	UP
Right/'A'	Red	DOWN
---	White	COMMON
---	Green	GROUND

The valve is held to the manifold with high tensile cap screws. Buna-N O-rings are used to seal the valve port face to the manifold. It is imperative that the mating faces be clean and all 'O' rings in place and lightly lubricated with hydraulic oil before evenly torquing the cap screws.

Valve mounting screw torque:
NFPA DO1/ISO 03 40 to 50 in-lbs [5 to 6 N-M]

Speed Control Valves

Each directional valve station has speed control valves to control the normal up and down speed of the Barriers. They are located in the B line before the B hose. These Barriers require only a single needle valve which will adequately control both the up and down speeds.

Clockwise turning of the adjustment knob is slower (valve closing), faster speed is gained by opening the valve (counter-clockwise). The valve should be locked with the set screw provided after adjustment.

Emergency Fast Operate (EFO) Valve (Optional)

Some systems are equipped with optional emergency fast operate (EFO) bypass valves. These solenoid valves when energized directly connect the high pressure (P) side of the HPU to the up side of the Barrier cylinder(s). This bypasses the normal Barrier speed control valves and allows the Barrier to rise at its' maximum possible speed. The valve is 'cartridge' style and is mounted in an aluminum body plumbed from the (P) side of the system to the (B) output port immediately before the (B) hose.

Should it become necessary to replace an EFO valve cartridge, the following mounting torques apply:

Solenoid Coil Retaining Nut	60 in-lbs [7 N-M]
Cartridge to Body	420 in-lbs [48 N-M]

Auxiliary Emergency Fast Operate Valve (Optional)

Some systems are equipped with an optional additional accumulator separated from the primary accumulator by an auxiliary emergency fast operate valve. This solenoid valve allows oil to be charged into the auxiliary accumulator and held in reserve until the 'emergency fast operate valve' is actuated. The valve then releases high pressure oil to the P side of the system, even if the primary accumulator has been exhausted. The valve is very similar to the normal EFO valve except that it is equipped with a manual override pin so that the auxiliary accumulator can be bleed down prior to performing maintenance.

Should it become necessary to replace an auxiliary EFO valve cartridge, the following mounting torques apply:

Series 14 - Solenoid Coil Retaining Nut	30 in-lbs [15 N-M]
Cartridge to Body	190 in-lbs [22 N-M]
Series 21 - Solenoid Coil Retaining Nut	30 in-lbs [15 N-M]
Cartridge to Body	475 in-lbs [55 N-M]

Hand Pump

In the event power should be lost to the pump/motor, the Barrier(s) can be raised by working a manual hand pump which is mounted adjacent to the pump/motor on the skid base. The hand pump has its' own internal check valve so no fluid is lost through the hand pump back to tank during normal motor driven pump operation. The suction line to the hand pump is located near the reservoir bottom. In use, the hand pump supplies oil to the pressure (P) side of the hydraulic system. The pump can be operated at anytime.

To raise a Barrier with the hand pump when electricity is out:

1) Check sight gage for proper fluid level, add oil as necessary.

2) Make sure accumulator bypass (bleed down) valve is closed.

3) Shift directional valve spool of Barrier from left (Up) side.

4) Start pumping (each stroke should be productive). Pump until Barrier is fully up.

5) Continue pumping for 10 to 20 strokes after the Barrier is up. This will add some oil to the accumulator to provide for some internal leakage before the Barrier would start to drift down from low pressure.

System Bleed Down Valve

Prior to performing any work on the hydraulic power unit or Barricades it is necessary to bleed down the pressure stored in the accumulator(s). **Note**: It is especially necessary to bleed the power unit down to zero hydraulic pressure before topping off the reservoir with fresh oil; large oil spillage can occur if the unit is not at zero pressure when the reservoir is topped off! This is accomplished with the accumulator bypass or bleed down needle valve located between the high pressure side of the system and the reservoir tank. (Typically this valve is mounted behind the hand pump in a line tied to the hand pump suction line.)

To bleed down the system:

1) Turn off electrical power to the pump/motor.

2) If system is equipped with the optional auxiliary emergency fast operate system, release the auxiliary EFO valve override pin by twisting and pulling to the out position.

3) Release set screw. Crack open the bypass needle valve slightly until hissing sound is heard. Continue to open slowly until pressure on gage reads zero.

4) For added safety, leave valve open while performing maintenance.

To resume operation, close the bypass valve snugly and lock with the set screw. Turn on system power

Hydraulic Interconnect Lines

Delta Scientific uses one of two systems to connect the hydraulic power unit to the Barrier(s). Applicable to both systems is a need to run the lines in the most direct route as possible, keeping bends to a minimum. Long runs will slow the Barrier rise time and must be compensated by increasing the flow diameter. In general, all runs over 50 feet [15 M] should first be cleared with the factory, especially if minimum emergency fast rise times are critical to the installation.

The hydraulic power unit should be mounted at approximately the same or higher elevation as the Barrier(s). Other wise, the oil in the lines may repeatedly drain back to tank and make the Barrier motion erratic.

Cleanliness is the other important requirement for the hydraulic interconnect lines. Dirt or metal chips will find their way into the tight clearances of the components, scoring shafts and spools and wearing seals. Lack of cleanliness will shorten the service life of the system.

Flexible Hydraulic Hose

This system conveys the hydraulic oil from the HPU to the Barrier through flexible hose(s) which in turn are run through a larger conduit, generally a 3 inch [75 mm] PVC tube per hose pair. The PVC conduit should be run to the Barriers in as direct a line as possible, all bends being a radius of at least 6 diameters of the conduit. The burial depth of the conduit should be deeper than the maximum permafrost level in areas subject to freeze. This will prevent excessive pressure drops

in the hoses due to high viscosity from the cold. As the hose length changes under pressure, always provide some slack in the hose to allow for shrinkage or expansion.

All joints in the conduit system should be smooth and free from sharp edges and burrs to prevent scoring the hose outer sheathing during pulling and Barrier operation. A hose under pressure is very rigid and tends to bounce when the directional valves are shifted. Sharp edges will quickly cause a hose failure. Where the hose can not be clamped or fixed away from abrasive surfaces, a steel or plastic protective coil or sleeve should be placed over the hose.

Insulate the hose with a heat resistant boot, fire-sleeve or a metal baffle if the hose run passes near an exhaust manifold or other heat source.

Hoses received from the factory have caps on each end and are free from dirt and other contamination. Do not remove caps until hoses are pulled through the conduit and are ready for termination. If caps are not present, reclean the hoses by blowing out with clean compressed air. As an alternate, hose assemblies may be rinsed out with clean mineral spirits, being sure to flow the mineral spirits through from top to bottom without forming any low points which will tend to collect debris.

Before attempting to pull hoses through the conduit first inspect them. Lay the hose out straight and check that the layline of the assembly is not twisted. (Hoses pulled with a twist in them will tend to straighten, causing fitting nuts to loosen.) Check for scoring, cracks, bulging, kinks and dirt in the outer sheath. Check for proper gap between nut and socket or hex and socket; nuts should swivel freely. Be sure hose is capped securely.

If the hose must be stored for a prolonged period prior to installation it should be kept in a dark, dry atmosphere away from electrical equipment. The temperature should not exceed 90°F [32°C]. Storage in straight lengths is preferred. While stored, the hose should be wrapped as necessary with burlap or other suitable material to prevent damage. Hoses should be inspected regularly when in operation, especially where the hose exits the conduit at the power unit and the Barrier. Worn or damaged hose assemblies should be replaced immediately.

Note: Hoses supplied by Delta Scientific are generally supplied in lengths of 50 feet [15 M]. This is adequate for the majority of installations, however, there is generally some left over length. Coil the hose neatly in a circle approximately 20 inches [0.5 M] in diameter at the HPU. Secure the coil with loosely fitting cable ties or similar tying system. Do not allow the hose to rest on the ground or across sharp corners of equipment. If the hose is too short, extension pieces of the correct length can be ordered. As an alternate, hoses can be held back from your shipment and made to exact requirements when the length is determined if desired.

Special field assembly type fittings may be supplied to allow the factory length hoses to be cut and re-terminated to the exact length in the field without the use of special tools.

Steel Pipe Interconnect System

As an alternate to the flexible hose system, steel pipe may be used for the run from the HPU to the Barrier. The same comments above about short, direct runs to the Barrier(s) apply. Typically the pipe run is made up above grade and dropped into a trench for direct burial (below frost level if applicable). If local conditions dictate, the outer portion of the pipe and fittings can be corrosion protected by coating or tape wrapping if desired. Short lengths of hose, typically 3 feet [1 M] long, can be supplied to attach the HPU and Barrier to the pipe system. Or the piping can be plumbed directly to the fittings on HPU or Barrier (for this a union will be required).

The pipe used should be ASTM A-106B seamless (carbon steel) as a minimum. Care should be taken when selecting wall thickness Vs pipe diameter for the system design pressure (Delta can be consulted for proper line sizing, strength calculations and material selection).

Fittings for the pipe run should be forged steel, ASTM A-105 or equal. Malleable iron is not acceptable. All pipe and fittings are to be furnished black, i.e., no galvanizing is permitted; the galvanize can flake off and block or damage hydraulic components.

If desired, stainless steel pipe and fittings can be used, however, do not mix stainless steel pipe with carbon steel fittings or vis-a-vis severe corrosion of the carbon steel components could result. Copper and copper bearing alloys are generally unsuitable for hydraulic oil systems and should be avoided when possible.

Fittings

A variety of fittings are used on a Delta Barrier system; an understanding of how each style seals is important so that leak free operation can be maintained.

Pipe threads are of American National Taper Pipe Thread pattern. As the name implies they seal when the threads pull the tapers together to form a tight joint. These threaded fittings are the only style used by Delta on which Teflon tape or pipe dope may be used. Great care should be taken that pieces of tape or liquid sealant do not end up in the part being sealed as they will eventually find their way into valve seats or other critical parts. Start wrapping the tape one or two threads back from the front of the male fitting and only one or two times around is sufficient. More than twice around is detrimental to a tight joint. Fittings should be brought up snug but not too tight or the female part can be distorted. If orientation of the part is critical, stop on your mark as the part is getting snug instead of trying to force the fitting another complete turn.

SAE (Society of Automotive Engineers) straight threads are used on several fittings where the connection orientation is critical. The male fitting is oriented and a locking nut with washer and O-ring is tightened against the female part. Again, do not over tighten or distortion can occur.
The remaining fittings are SAE 37 degree flare fittings. These have a male nipple to which a compatible female hose or tube/nut can be attached. Most plumbing on the HPU is done with steel hydraulic tubing held to the SAE 37 degree male flare nipple with a ferrule and nut. The tube is not flared but cut square and deburred. The sealing pressure comes from the nut forcing the ferrule down onto the tube. These fittings can be broken and remade if necessary. Again snug is preferred to overtightened.

Most hoses supplied by Delta are terminated with SAE 37 degree female swivel ends. As the nut swivels on the hose, unions are not necessary. These screw directly onto a companion SAE 37 degree male nipple. To avoid confusion as to a fitting size, use the following table should ordering be necessary:

Hose I.D.	Steel Tube OD	Thread
1/8"	1/8"	5/16-24
1/4"	1/4"	7/16-20
3/8"	3/8"	9/16-18
1/2"	1/2"	3/4-16
3/4"	3/4"	1-1/16-12
1"	1"	1-5/16-12

Note: To repeat, do not use Teflon tape or pipe dope on any straight thread fitting. Only taper pipe threads are to be so sealed.

Cylinders

The DSC2000 Phalanx Barriers are moved by double acting hydraulic cylinders. These are specified by the bore diameter and length of stroke, as in 2.5" by 6". When the Barrier is commanded to rise, oil is forced into the top or 'rod' end of the cylinder, collapsing the cylinder rod into the body. The rod end of the cylinder terminates in a clevis and the clevis pin pulls against the Barrier to move it in the up position. When lowering, the cylinder rod extends out of the cylinder body as the oil flows out of the rod end. These heavy Barriers operate single acting. That is, the cap end of the cylinder is allowed to breathe air, gravity alone forcing the oil out of the rod end (single acting). The cap end breather is plumbed back to a dry location (usually a group of fittings on the reservoir tank top) to prevent water from being sucked into the breather fitting.

The cylinders are equipped with fittings at the Delta factory. The fittings may be accessed from the left or right side of the Barrier. The connection fittings are color coded as noted below in the **Interconnection Convention** paragraph.

Interconnect Convention

So that the Barrier rises when the 'Raise' button is pressed it is necessary to coordinate the interconnect lines with the proper HPU and Barrier connections. The following convention has been established by Delta (Note: The 'A' ports are capped off and are *not* used.):

Color Tab	HPU Port	Barrier Cylinder	Function
Red	'B'	Rod (Top) End	UP
Yellow	TANK TOP VENT	Cap (Bottom) End	VENT

Hydraulic Oil

The hydraulic oil selected for the Barrier system is one of the most critical decisions to be made on your installation. The properties of the oil will affect the as new performance of the Barriers as will as the performance in years to come. Delta recommends the use of high grade, inhibited petroleum hydraulic oils for use in its' systems. These oils inhibit or prevent rust, oxidation, foaming and wear. They are readily available just about everywhere in the world.

A viscosity compatible to the expected ambient temperature of the job site should be used. A heavy oil used in snow conditions will tend to slow the Barrier response time down, while light grade oils in desert conditions may not provide lubricity necessary to prevent component wear. Most brands of oils are manufactured in different grades for this purpose.

If required, the new fire-resistant or environmentally friendly fluids can be selected, please consult your fluid dealer for correct selection.

Automatic transmission fluid can be used and is compatible with the seal material used in all the system components; however, it is generally more expensive than the specially formulated general purpose hydraulic oils. **Under no circumstances** should brake fluid be used. It is not compatible with the seals and will swill and degrade them.

Note: The unit as received from the factory has been tested with Shell Oil Company 'Tellus' 46. Although the unit has been drained after test approximately 1 inch [25 mm] of fluid remains in the reservoir bottom. The hydraulic oils in the following table should be compatible with this fluid.

Biodegradable Oils

Environmentally friendly oils are also acceptable for use in these systems. These fluids are generally based on naturally occurring vegetable oils and are biodegradable by naturally occurring organisms when spilled or leaked in relatively small quantities. Larger spills will still need to handled similarly to currently accepted methods for conventional mineral oil spills.

Contamination of these oils by other fluids may change the biodegradability, toxicity, or other performance characteristics. Systems should be cleaned as thoroughly as possible before introducing a biodegradable fluid.

Delta has reviewed the data on biodegradable oils manufactured by both Mobil and Texaco. These are summarized below. Other manufacturers' products are acceptable if equal to the performance of these oils or the standard mineral oils listed in the following pages. Consult your local fluid dealer for his recommendation.

	Mobil Oil Corporation	Texaco Lubricants Company
Light	EAL 224H	Code 1607 Biostar Hydraulic 32
Medium	EAL 224H	Code 1616 Biostar Hydraulic 46

Commercial Hydraulic Oil Interchangeability Chart

*	AMOCO Oil Co. (Std. Oil Co)	Ashland Oil Co. Valvoline Oil Co.	Atlantic Richfield (ARCO)
Light	Rycon Oil #15	AW Oil #15	Duro AW S-150
Medium	Rycon Oil #21	AW Oil #20	Duro AW S-215
Heavy	Rycon Oil #31	AW Oil #30	Duro AW S-315

	Chevron USA Inc.	Continental Oil Co	Exxon USA Inc.
Light	EP Hyd Oil 32	Super Hyd 15	Nuto H 32
Medium	EP Hyd Oil 46	Super Hyd 21	Nuto H 46
Heavy	EP Hyd Oil 68	Super Hyd 31	Nuto H 68

	Getty Refining	Gulf Oil Co.	Mobil Oil Corp.
Light	Veedol Aturbrio AW 150	Harmony 43 AW	DTE 24
Medium	Veedol Aturbrio AW 58	Harmony 48 AW	DTE 25
Heavy	Veedol Aturbrio AW 61	Harmony 54 AW	DTE 26

	Phillips Petroleum	Pennzoil Co.	Shell Oil Company
Light	Magnus A 150	Hyd & GP Oil #1	Tellus 32
Medium	Magnus A 215	Hyd & GP Oil #2	Tellus 46
Heavy	Magnus A 315	Hyd & GP Oil #3	Tellus 68

	Std Oil Co of Ohio	Texaco, Inc.	Union Carbide Corp
Light	Industron 44	Rando Oil HD 32	**
Medium	Industron 48	Rando Oil HD 46	UCON Hyd Fluid WS34
Heavy	Industron 53	Rando Oil HD 68	**

* Light oils are for cooler climates; medium for temperate zones; heavy for tropical or desert areas.

** No recommendation

START UP INSTRUCTIONS
PHALANX MODEL BARRIERS WITH DELTA PUMPS

Safety Precautions

At all times observe good safety practices when working on either the electrical or mechanical system. Particular attention should be paid to the danger of working on the Barrier when the power is on. Barriers are powerful hydraulic presses that can easily crush anything in their way. Keep hands free of the mechanism when the power is on or the HPU is up to pressure. Turn off the electric power and bleed the hydraulic pressure down to zero before working on any part of the system. Traffic should be controlled around the Barrier during any work so that vehicular accidents do not occur if the Barrier should happen to rise. After work is complete, do not allow traffic over the Barrier until all control and safety functions have been verified to be properly working.

YOUR SPECIAL ATTENTION IS CALLED TO THE FOLLOWING:

Special Safety Considerations

Delta Barrier Systems are designed to deter, and as necessary stop unauthorized vehicle traffic by inserting a nearly immovable obstacle in a roadway. During normal servicing, maintenance and testing work, every effort must be made to protect pedestrian and vehicle traffic from entering traffic lanes where work is underway.

During work on either the Barrier(s), the control circuit, control logic, power unit, power feed or the control panel(s); traffic across or near the Barrier(s) should either be stopped or directed into a safe passage.

Prior to starting, restarting or restoring power to a Barrier system all remote input devices such as radio links, card readers, remote control panels, etc. should be checked to insure that they are properly set or are inactive. This is important to insure that a signal directing the Barrier to change status is not unexpectedly received at the time when the power is restored.

Note that any device (supplied by Delta or others) that produces a contact closure to change the Barrier direction must be checked to verify that stray signals or voltages cannot cause that device to produce a false signal.

When a Barrier is powered up, whether at start-up, following a power outage or following the completion of service or maintenance work, these same precautions should be taken.

Consult the other sections of this manual for additional safety and security instructions and warnings.

System Configuration

Depending on the threat analysis and the specific layout of an installation site, Barrier systems can be configured to react differently to a variety of input signals or events. The selection of components and the configuration to meet these requirements are usually incorporated in the system at the time of manufacture. However some changes can be made in the field or by changing the nature of supplied input.

Default Status Quo

In most locations, security considerations are such that a Barrier system can be configured to 'default status quo', that is the Barrier will not change status following a power outage or interruption. If a Barrier system so configured is in the open position when power is applied at initial start-up, following service or in the event of a local power outage, the Barrier will remain in the open position as when the power was removed or interrupted. Or if the Barrier is in the guard position it will return to the guard position upon resumption of power. An exception to this is the special situation as defined below in the 'power off' section.

Default Secure

In certain high security areas Barrier systems may be configured so as to default to the Secure Status when power is applied to a system, whether following the system having been turned off or after unexpected power interruption. Thus a system on stand-by automatically goes to the guard position when the power is applied. That is, should the power be interrupted and then restored, while the Barrier is in the open position, it will return to the guard position.

If a Barrier is in the guard position when the power is interrupted it is normally designed to hold the guard position.

Power Off Operation

A Barrier system with a battery back-up for the control circuit and the power off feature, can be operated a limited number of times during a power off condition. Once the power off reserve is exhausted, the last command the system receives will dictate the Barrier position when power is restored. Hence, if the Barrier is in the open position when the 'power off' reserve is spent, and the system then receives a close signal, the Barrier will remember that last signal and close when power once power is restored.

Additional Precautions

Delta Barrier system controls are configured to meet site specific security conditions and the operating logic is most often defined at the time of procurement.

If the security or safety consideration of the site where the Barrier is installed or to be installed, dictates that the operation be altered from the original specification, contact the Engineering Department of Delta Scientific Corporation for assistance in making the desired revisions.

During routine maintenance and service work, or during thunder storms or other weather related disturbances, power interruptions can occur.

For detailed service, maintenance and safety information refer to the specific sections of this manual provided with each system.

Before operating the system for the first time, make sure that all on the interconnections have been made between the Barrier, control panels and the hydraulic power system. After you are sure that everything is in order, make a visual inspection of the site to check that tools and construction debris are removed and clear of the equipment.

Power

The electrical power that drives the system is typically supplied through a circuit breaker disconnect (customer furnished) that must be turned on before the system will operate. When the main power is turned on the pump motor will, in most cases, start and run until the system cut off pressure is reached. It is important on start up to **verify that the pump motor is turning in the proper direction** indicated by an arrow on the motor fan housing. Turning on the power without this check will destroy the pump in short order.

Control Devices and Their Function

Master Remote Control Panel On/Off Switch

The master control panel has a main power indication light to show that the control circuit power is 'on'. Turning the master control panel main power On/Off key switch to the ON position will in turn illuminate the panel 'on' light.

Barrier Up/Down Controls

There are two basic controls for each of the Barriers, one to **CLOSE** (raise) and one to **OPEN** (lower). The Barriers can be commanded to either **OPEN** or **CLOSE** at any time whether they are moving or stationary. The Barriers will instantly reverse direction if so commanded at any point in their operation.

Barrier Position Indication (optional)

The Barriers have position indication lights on the control panel. A green light indicates that the Barriers are **OPEN** (fully down) on the limit switches, any other position results in a red light indication.

Emergency Operate (optional)

This feature allows the Barriers to be raised at the maximum possible speed when the Emergency Operate button is pressed. Once the button is pressed, the panel is locked up so that all lower commands are overridden. Power is continuously applied to the UP solenoid valves as well as the EO valves until the Reset button is pressed, which will restore the system to normal operation.

Reset should be pressed within 15 minutes of EO use to prevent possible heat damage to the solenoid valves.

Annunciator (optional)

An annunciator feature is provided to alert the guards that the Barriers have been left in the down position for too long. The master remote control panel has an 'Annunciator Off/On' switch. With the switch in the 'Off' position, no alarm will sound. When placed in the 'On' position, the alarm will sound if the Barriers are left down longer than the preset value of the annunciator timer located in the control circuit. The alarm can be silenced by raising the Barriers or by turning the switch back to the 'Off' position. The timer is customer adjustable by accessing the inside of the master control panel.

Secondary, or Slave Panels (optional)

A secondary or slave panel may be incorporated in the system which allows for full operation of the Barriers from a location remote from the master control panel. The slave control panel is armed from the master control panel location. The slave panel has a main power indication light to show that the panel is armed from the master control panel. Turning the slave control panel main power On/Off key switch to the ON position will in turn illuminate the panel 'on' lights and allow full operation of the Barriers from the slave. The annunciator on/off and EO reset control is absent from the slave control panel although the slave panel does include the annunciator output siren.

Other Control Devices

Other control devices may be provided by Delta or by others. The Barrier can be raised or lowered by any normally opened, momentary closure type button or remote control device, such and radio, key pads, card readers, loops, etc.

Start Up Procedure

Safety Precautions

On initial start up, it is important to close off the roadway and clear the Barrier area of nonessential personnel. **Barrier movement may be very erratic at first.** In addition, each time the system is restarted or maintenance is performed the roadway should again be cleared to guard against unexpected Barrier movement.

Start Up Sequence

1. Block all traffic during tests. Stay clear of Barriers.

2. Check that all electrical and hydraulic inter-connections are tight.

3. Fill system with **clean, filtered** oil to within 1" [25 mm] of the top of the sight glass.

4. Confirm that the pressure bleed down valve is turned fully clockwise to close. Do not over tighten.

5. Turn all flow control valves fully clockwise to close, then open each 2 full turns. This will be the starting point for the Barrier up/down speed adjustments.

6. Briefly apply power to the motor to confirm that the motor direction is per the direction arrow on the motor fan housing. Correct if necessary.

7. Apply power to the motor and allow the pump to bring the system up to the shutoff point as shown on the motor starter drawing, 1900 psig [131 bar].

8. Check for any leaking fittings.

9. Operate each Barrier manually by pushing the override pins on the ends of the solenoid valves.

10. Check that when the **left** side solenoid pin is depressed, the Barrier **raises**. When the **right** side pin is depressed the Barrier should **lower**.

11. Cycle the system manually several times to remove air from the system. When the air is removed from the lines (no bleeding should be necessary) the Barrier motion should be smooth.

12. As the Barrier is manually moved, confirm that the pressure switch is turning the pump motor off and on at the correct values as shown on the motor starter drawing; off at 1900 psig [131 bar], on again at 1400 psig [97 bar].

13. Turn power to the pump 'Off'.

14. Bleed the system pressure down to zero by opening the bypass valve. This will help prime the hand pump.

15. **With the system at zero pressure**, top off the reservoir oil tank with **clean, filtered** oil to within 1" [25 mm] of the sight glass top.

16. Test hand pump operation by lifting the Barrier. Approximately 65 to 75 strokes will be required for these Phalanx® Barriers.

17. Turn the motor/pump power back to 'On' to bring the system back to full pressure.

18. Apply power to the control circuit and turn the Master control panel key switch to 'ON'.

19. Run the Barrier Open and Closed several times allowing time for the HPU to recover pressure between each cycle. Check function of the indicator lights on the remote control panel.

20. With the Barrier(s) in the down position and after unit has again come to full pressure, depress the Emergency Operate button. Note that Barrier(s) come to the guard position at the maximum speed. Note that the 'EO Active' light is on. Check that the **OPEN** control buttons are inactive. Press reset button to clear EO condition and lower Barriers.

21. Arm the Slave control panel (if present) from the Master control panel and repeat steps 19) and 20).

22. Arm the annunciator siren from the Master control panel and lower one of the Barriers. Check that the siren sounds at the desired time interval. (The time interval may be adjusted by opening the Master control panel and turning the time knob on the timer.)

23. Adjust the Barrier operating speed to the desired value. Delta suggests that both the up and down speeds be approximately 3 to 5 seconds. The type and adjustments of the valves are in the Drawings section of this manual. Normal operating speeds of 2 seconds or less are possible, but the increased wear and tear on the equipment should negate any considerations to so operate the Barriers. Excess noise also accompanies the faster speeds. After final adjustment is made, lock valves in position.

OPERATIONAL SUMMARY

BARRIERS OPERATED FROM A NORMALLY UP POSITION

1. Barriers are to stay in the up and locked position and are to be lowered for the passage of one vehicle at a time.

2. During the normal hours of operation, the main power key switches shall be in the 'ON' position. The panels shall be turned 'OFF' and the keys removed when no guards are present at the control stations.

3. The control panel controls Barriers in each appropriate location. **CLOSE** and **OPEN** control is provided for each Barrier. Before operating any Barrier:

   A) Check that vehicles and pedestrians are clear.

   B) Check that the controls for the correct Barrier will be pressed.

   C) Press **OPEN** to lower Barrier to permit access.

   D) After vehicle is clear of Barrier, press **CLOSE**.

4. The **EMERGENCY OPERATE** button is to be used for **emergencies** only.

   A) Pressing the **EO** button will raise **all** Barriers in approximately 1 to 2 seconds.

   B) The controls are locked until the **RESET** button is pressed. A red light indication shows that the system is in the EO Mode.

   C) The controls are locked even if all Barriers are UP when the **EO** button is pressed.

   D) The **RESET** button should be pressed within 15 to 30 minutes of the EO Actuation.

5. **Do Not Place Items On The Control Panel.** The buttons are sensitive and the Barriers may move while not intended.

6. **Use The Barriers To Control Vehicles.** If a forced entry attempt occurs, use the **EMERGENCY OPERATE** button. The Barriers are powerful and can block or lift most all vehicles.

HYDRAULIC TROUBLE SHOOTING
DELTA PHALANX® BARRIER SYSTEMS

Safety Precautions

At all times observe good safety practices when working on either the electrical or mechanical system. Particular attention should be paid to the danger of working on the Barrier when the power is on. Barriers are powerful hydraulic presses that can easily crush anything in their way. Keep hands free of the mechanism when the power is on or the HPU is up to pressure. Turn off the electric power and bleed the hydraulic pressure down to zero before working on any part of the system. Traffic should be controlled around the Barrier during any work so that vehicular accidents do not occur if the Barrier should happen to rise. After work is complete, do not allow traffic over the Barrier until all control and safety functions have been verified to be properly working.

Barrier Does Not Move

Isolate the problem to either hydraulic or electrical:

1) Confirm power to the motor starter and control circuit is on. Are circuit breakers reset?

2) Check motor starter overload trip indication. Reset as necessary.

3) Check oil level in reservoir. The oil low level switch will open the starter circuit if the level is too low.

4) If the pump motor runs and the HPU maintains pressure, try operating the Barrier manually (see instructions in the Start Up section).

5) If the Barrier operates manually, run through the **Electrical Trouble Shooting** section.

Hydraulic Problems - HPU Does Not Maintain Pressure

Low pressure is usually caused by leakage, either internal or external, or low accumulator precharge.

External Leakage

External leaks are generally the result of loose or broken fittings or lines. As the path of leakage is away from the unit, the oil level falls and eventually the reservoir low oil level switch shuts down the pump motor. Look for spilled oil to locate the leak source. Correct as necessary. Bring pressure to zero before attempting repair.

Internal Leakage

Internal leakage is harder to locate than the above. Large internal leakage is generally accompanied by a hissing sound as oil flows over a valve seat or past a seal. An industrial stethoscope or a length of tubing is handy for localizing the source of the noise. Small leaks are

harder to find. Internal leakage can cause a component to become warm or hot as energy is dissipated across the leakage point. This temperature rise can also be utilized to locate the leakage source. Working through a list of the probable components may be your only alternative:

1) Bleed down needle valve. Check that valve is tight. Tighten set screw if valve is loosening. If valve will not seal due to a scored seat, replace valve.

2) Relief valve. Check that relief valve is closed at the pressure switch high setting. The valve should start to crack at approximately 2200 psig [152 bar]. Reset should be accomplished before 1900 psig [131 bar] (falling pressure). Adjust as necessary. Tighten lock nut after adjustment. If valve will not reseat, remove and clean or replace as necessary.

   Adjustment of pressure relief valve: Use ½" and 9/16" open end wrenches. Use the 9/16" wrench to slack the lock nut on the valve adjustment spindle while the spindle is being held with the ½" wrench. The pressure relief valves are set at 1000 psig from the factory. Turn the adjustment spindle clockwise to increase pressure to the desired amount (one full turn being approximately 600 psi, or 100 psi for every $1/6^{th}$ turn). When the desired value is reached, tighten lock nut while holding the spindle from moving.

3) Emergency Fast Operate valve. The EFO valve directly connects the pressure ('P') side of the system to the 'B' (Barrier 'UP') manifold. If the EFO valve opens without the main directional solenoid valve shifting to the 'B' solenoid, oil will short circuit through the 'B' port back to tank. The EFO circuit requires that **both** the EFO and 'B' solenoids (left side) energize at the same time. Verify by energizing the EFO circuit. Place a metallic object (such as a screw driver blade) on the solenoid armatures of both the EFO and main directional solenoids; a slight magnetism should be felt. If not, see **Electrical Trouble Shooting** section to correct. If EFO valve leaks without being energized, disassemble and clean or replace as necessary.

4) Main directional control valve. The main directional control valve is of the spool type. This construction requires extremely close tolerances between the body and the spool of the valve for low internal leakage. However, even a new valve will leak oil from the high pressure side to the tank ports. This is most evident at pump shut off where the pressure gage is seen drifting down 50 or 100 psi [3.5 or 7 bar] or more. Older valves may cause the system to drop down to the point of motor turn on every 5 to 15 minutes (without Barrier being moved). At this point, valve replacement should be considered.

5) Check valve. The check valve (integral with the hydraulic pump, both motor driven and the handpump) keeps the oil in the high pressure side of the system from running back through the pumps to tank when the system is pressurized. Dirt or debris under the seat may allow oil to leak back through these routes. Disassemble and clean as necessary. If debris has scored the seat, seat renewal or replacement of the check valve will be necessary. (The motor driven pump check valve may be detected as being unseated by observing the motor fan slowly turning reverse of it's normal run direction. This is because the high pressure oil is reverse driving the gears of the pump.)

6) Hydraulic Pump. The gear pump performance depends upon close tolerances between the gears and the pump housing. Wear from old age or debris from dirty oil will allow oil to bypass around the gears back to the pump suction. Both the displacement and pressure capabilities of the pump will suffer. Eventually the pump will not be able to maintain pressure and will have to be rebuilt or replaced.

7) Hydraulic cylinders. Worn seals or scoring of the hydraulic cylinder walls may allow oil to bypass the cylinder piston. Seal renewal and cylinder honing may be required or the cylinder replaced. The cylinder rod seals are also a potential source of external leakage.

The leakages described above are all generally caused by debris contamination in the oil. Replacement of any of these components is an indication that the oil must be drained and replaced with clean **filtered** oil. A check of the filter and your filter changing procedures is also in order.

Zero or Low Accumulator Precharge

Zero or low accumulator precharge is usually indicated by rapid cycling of the pump motor. This is due to the fact that very little or no oil is available in the accumulator under pressure; the slightest system pressure drop will cause the pressure switch to start the motor. Because very little oil has been displaced, the pressure will then raise very rapidly and cause the switch to stop the motor. This cycle will repeat again and again and will cause rapid deterioration of the hydraulic system.

If this occurs, stop the system and measure the accumulator precharge using the instructions in the **Maintenance** section of this manual. Recharge if necessary to the values indicated in the instructions and/or as written in the pressure log.

Barrier Moves Slowly

Barrier speed is controlled by the flow control valves located between the main directional control valve and the EFO tee connection. Adjust Barrier to the desired speed and tighten the lock nuts. If speed is still undesirably slow:

1) Check temperature. Low temperature raises the viscosity of the hydraulic oil increasing line pressure drop. If temperatures are severely low the power unit should be equipped with a oil reservoir heater. The Barrier's heaters also help (this is **not** their prime function however). Installation of the hydraulic lines in the frost zone will cause Barrier slowing (below the frost line, the ground is a fairly constant 55°F [13°C].

   Low temperature hydraulic oils can be selected for use during the cold months. See the selection chart in the **Hydraulic Theory** section of this manual. As an alternative, heaters and line tracing can be done at time of installation.

2) Accumulator pressure. Low accumulator precharge pressure causes less oil to be stored at high pressure. This reduces the maximum Barrier speed to that allowed by the amount of oil that can be displaced by the pump. The precharge pressure is indicated on a tag on the accumulator. Delta P/N 2469-31 Accumulator Charging Kit or similar device can be used to check precharge. **Note**: On units with auxiliary EFO, the auxiliary accumulator

EFO valve override must be in the 'out' position to relieve its' pressure before reading precharge.

3) Low system pressure. Low system pressure can be the result of an out of adjustment pressure switch or internal leakage as outlined above. If motor turns off below 1900 psig [131 bar] plus/minus 50 psi [3.5 bar], replace switch. Otherwise, determine cause of internal leakage.

Barrier Does Not Fully Raise or Lower

Failure of the Barrier to obtain full raised or lowered position usually indicates a mechanical difficulty at the Barrier. Check:

1) Debris buildup. Debris or other obstructions inside the Barrier foundation frame or along the rear hinge support may restrict Barrier movement. Remove top plates to inspect. Remove offending material.

2) Low pressure. If the HPU electrical power fails and the pump cannot return the unit to system pressure, the Barrier will slow and eventually stop when pressure is exhausted. Barrier may become stuck between position. Manually shift directional valve and hand pump the Barrier to the desired full up or full down position. Check low oil level is not the cause of pump shut off.

Pump Problems

The heart of the hydraulic power unit is the pump. As it rotates at several thousand RPM, it is subject to more wear and tear than the other components. Pump problems to check are:

Pump Fails to Rotate

1) Check that the switches to the motor are properly set (see **Electrical Trouble Shooting** section). Correct as necessary.

2) Check that the coupling between the motor and the pump rotates. Check condition of the resilient 'spider' between the coupling jaws. Replace coupling key(s), spider or entire coupling if necessary.

3) Check that the pump input shaft rotates by hand. If not, replacement or disassembly of pump will be required.

Pump Delivery Abnormally Low

1) Check that oil level in reservoir adequately covers the suction strainer.

2) Check for clogged suction strainer and suction line air leaks.

3) Check motor is running at rated speed; low voltage or single phasing of three phase motors are probable causes.

4) Check that relief valve setting is not too low (leakage through relief valve back to tank).

5) Check that oil temperature is not too high (above 160°F [71°C]). This can cause the viscosity to be lower than the recommended range of the pump. Also check that proper oil has been selected.

Excessive Pump Noise

Hammer, gurgle or rattle noises are usually the result of a starved pump suction or air leakage in the suction lines. Causes and corrective action are:

1) Check that oil level in reservoir adequately covers the suction strainer.

2) Check for clogged suction strainer.

3) Check for suction line air leaks.

4) Check that oil temperature is not too high (above 160°F [71°C]). This can cause the viscosity to be lower than the recommended range of the pump. Severely excessive oil temperature may cause the pump to cavitate. Also check that proper oil has been selected.

5) Check that the oil temperature is not too low. Excessive viscosity can cause pump suction starvation.

6) Check reservoir filler/breather. A clogged breather can prevent the tank from venting, causing vacuum inside reservoir. This will again starve the suction.

ELECTRICAL TROUBLE SHOOTING
PHALANX® STYLE BARRIERS OPERATING INDEPENDENTLY - BATTERY BACKUP

Safety Precautions

At all times observe good safety practices when working on either the electrical or mechanical system. Particular attention should be paid to the danger of working on the Barriers when the power is on. The Barriers are powerful hydraulic presses that can crush anything in their way. Keep hands free of the mechanism when the power is on or the HPU is up to pressure. Turn off the electric power and bleed the hydraulic pressure down to zero before working on any part of the system. Traffic should be controlled around the Barriers during any work so that vehicular accidents do not occur if the Barriers should happen to rise. After work is complete, do not allow traffic over the Barriers until all control and safety functions have been verified to be properly working.

Observe *all* safety precautions for the type Phalanx® Barrier being trouble shot *whenever* working under the Barrier. These precautions are found in the Maintenance section of this manual.

If the power unit will not run:

1) Check the main power distribution feed to the power unit and the control circuit. Correct as necessary.

2) Check any disconnect before the hydraulic power unit motor starter. Turn on as necessary.

3) With the disconnect/main switch turned 'on', manually operate the armature of the motor starter. If the motor starts, check the solenoid coil of the starter for continuity. Next check that voltage is being applied to the coil. If no voltage is being applied, check the various switches in the starter circuit by directly applying power to the starter coil (CC2 and coil terminal A1).

   If direct application of power to the coil causes the starter to pull in and the system is not up to pressure, then try the starter circuit switches in this order:

   A) Check hydraulic power unit for leaks or broken lines. Low oil level will cause reservoir level switch to open starter coil. Switch should be closed if oil is visible at least 1" from the bottom of the site gage glass.

   B) Check pressure switch. High and low pressure settings are indicated on the starter circuit drawing. The pressure switch is factory set, if values are plus/minus more than 50 psig from the indicated values, consider replacing the switch.

   C) Check voltage value to the starter. Values 15 percent low will cause the power monitor (if present) to interrupt power to the starter coil.

D) Check that the starter overload relay has not tripped. If so, determine the cause, ie, high ambient, pump cavitation, failed pressure switch, etc. Be sure that overload relay is left with the reset in the 'manual' position. The 'automatic' reset feature can lead to failure of other parts in the hydraulic unit.

If power unit runs and is up to pressure but the Barriers can't be opened or closed:

4) Check control circuit voltage at terminals CC1 and CC2. Ordered voltage should be present (120-220/1/50-60). Correct as necessary.

5) The voltage selector switch on the 1PS power supply should be set for the voltage supplied in Step 4).

6) Check fuse 1FU before 1PS power supply for continuity. Replace if necessary.

7) Check fuse 2FU out of the 1PS power supply for continuity. Replace if necessary.

8) Check voltage at terminals CA1 (+) and CA2 (-). This should now be 24 VDC nominal (+2 / -0 volts). Correct if necessary by adjusting the power supply output potentiometer (adjacent incoming power conductors, labeled "V ADJ").

9) Check that the batteries are connected to the circuit and that they are not deep discharged. (**Note**: If power is to be left off the equipment for any length of time, disconnect the batteries or they may be discharged to the point of damage.)

10) With the remote control panel key switch **ON**, check that the panel power indicator light is 'on'. If not, check the voltage across xMA3 and xMA18. It should be equal to the voltage found in step 8). If not, check the interconnect lines to xCA3 and xCA18. If voltage present, check the key switch for continuity. Replace if necessary.

11) Pressing the appropriate **OPEN/CLOSE** command button should cause the control relay in the control circuit to energize and in turn switch on power to the desired control valve solenoid. Voltage to xCA4 allows x1CR to pull in, in turn energizing the Barrier **up** (close) solenoid valve. Voltage to xCA8 allows the down relay x2CR to energize the Barrier **down** (open) solenoid.

A) Determine if command buttons and relays are functioning.

1. Press Barrier **CLOSE** button. x1CR should pull in. The safety loop detector between terminal xCA5 and xCA6, if used, should be closed; jumper these terminals for this test. If x1CR fails to operate, jumper from xCA1 to xCA6. If relay still fails to energize, replace relay or PCB assembly.

2. Repeat for Barrier **OPEN**. x2CR should pull in. If not, jumper xCA1 to xCA8. (The PCB has been factory assembled with a jumper between xCA9 and xCA10). Replace relay or PCB assembly as necessary.

B) If the **CLOSE/OPEN** relays (x1CR and x2CR) function and valve still does not shift, check:

1. With appropriate relay energized, check that line voltage is applied between terminal xCB17 and xCB18 ('close' neutral) for 'Up' and xCB19 and xCB20 ('open' neutral) for 'Down' for the appropriate Barrier.

2. If voltage is present, check affected valve coil for continuity by directly applying line voltage (xCA1 and xCA2) to the valve coil. If coil fails this, replace the valve coil or entire valve as appropriate.

Emergency Operate Circuit

12) When the emergency operate (EO) signal is given to the control circuit (by pressing the EO button), 24 VDC is applied to the EO relays x4CR which self hold as the up relays x1CR pull in and energize the directional control valves and the EO valves. The relays and valves remain energized until the reset button is actuated which releases x4CR and restores the system to normal operation. **Note**: Reset should be pressed within 15 minutes of EO actuation to prevent possible heat damage to the solenoid valve coils.

13) If the EO system is not operating, first check that the x4CR's are pulling in. If not, place a jumper across xCA13 and xCA15. If the system now works, check the EO actuate switch (button) which is normally open and the reset button which is normally closed. Correct as necessary. If the relays x4CR pull in when the EO actuate switch (button) is pressed but the valves do not shift, check that the voltage between xCB21(+) and xCB22(-) is at 24 VDC. If voltage is present, check the valve coils for continuity. Replace relay(s) or valve coil(s) as necessary.

Barrier Position Indications

14) The Barriers are equipped with limit switches which pilot relays to provide Barrier position indication. These indications are commonly used to run the Barrier **OPEN/CLOSE** (down/up) lights on the remote control panels and run traffic safety indications such as the stop/go signal lights.

If the indicator lights are not coordinated with the correct Barrier position, check:

A) Limit Switch. The Barrier limit switch is a dry contact switch powered from the control circuit. xCA11 is common; xCA12 is the connection to the limit switch relay and auxiliary relay, x3CR and x3BCR, for the two Barriers. The limit switches should be 'opened' with the Barriers in the up position. The limit switches close when the Barriers are lowered to the full down position. Verify that the contacts behave accordingly, replace if necessary.

B) If the switch is OK, jumper xCA11 to xCA12. Relays x3CR and x3BCR should pull in. Replace relay or entire PCB assembly as necessary.

C) If relays appear OK, check bulbs by applying 24VAC xCA1/xCA2 (xMA3/xMA18 or xSA28/xSA18) directly to the suspected bulb.

Delta Model AG812 Stop/Go Signal Gate (optional)

15) The Barrier control circuit provides an independent output from the down limit switch that is used to Vend (raise) a Delta Model AG812 Series Stop/Go Signal Gate when the Barrier is fully lowered. The Signal Gate then simultaneously resets (lowers) as the Barrier is again raised off the down limit switch. Restating the above:

START - Barrier 'UP' -	AG812 Gate Arm 'DOWN'
'Lower' Command	Barrier Starts Down
Barrier Full Down	Arm Starts Up
Barrier Still Down	Arm Full Up
'Raise' Command	Barrier Starts Up/Arm Starts Down
FINISH - Barrier 'UP' -	AG812 Gate Arm 'DOWN'

A) The AG812 Access Gate is installed per the instructions on Document A2021. Wire the 220 VAC power supply to L1 and L2 on the AG812 Terminal Strip.

B) When the Barrier down button is pushed, the Barrier falls making the down limit switch auxiliary relay, 3BCR. The limit switch relay energizes and the Barrier/Signal Gate synchronization contact, 3BCR.1 closes, causing the Signal Gate to raise.

C) Determine if the limit switch and limit switch relays are functioning (paragraph 13). If OK, check:

D) When contact 3BCR.1 closes, Signal Gate should raise. If not, consult Signal Gate instructions, Document A2021 to trouble shoot the Signal Gate.

MAINTENANCE
DELTA MODEL DSC2000 PHALANX® BARRIER SYSTEMS

IMPORTANT
READ THE SUMMARY ON THE SAFETY ASPECT REGARDING MAINTENANCE ON OR ABOUT THE BARRIER – PAGE 7 AND 8 OF THIS DOCUMENT

Safety Precautions

At all times observe good safety practices when working on either the electrical or mechanical system. Particular attention should be paid to the danger of working on the Barrier when the power is on. Barriers are powerful hydraulic presses that can easily crush anything in their way. Keep hands free of the mechanism when the power is on or the HPU is up to pressure. Turn off the electric power and bleed the hydraulic pressure down to zero before working on any part of the system. Traffic should be controlled around the Barrier during any work so that vehicular accidents do not occur if the Barrier should happen to rise. After work is complete, do not allow traffic over the Barrier until all control and safety functions have been verified to be properly working.

A Barrier ramp brace is provided for each Barrier in the system. The Barrier ramp brace should be in place and firmly bolted in position when working under the Barrier ramp. The Barrier ramp brace is stowed in the Barrier frame when not in use. This makes it readily available for use at all times.

Particular attention should be paid to the rigging and lifting equipment used when installing, moving, removing, relocating or servicing any of the heavy elements of the Barrier system. The rigging and lifting gear should be properly sized and attached when lifting heavy components in all instances.

Each Barrier ramp has two attachment points (threaded 3/4"-10 for heavy eye bolts) that are located on the front and rear edges of the ramp and in line with the center of gravity of the ramp. The rear axle lugs can be also be used to attach the lifting gear to the ramp rear edge. The attachment means between the Barrier ramp and the lifting gear must be sized or designed to take into consideration both the vertical lift as well as side loading conditions.

Barrier Disassembly, Service and Assembly

The Barrier assembly is designed to facilitate easy repair and maintenance. Depending on the environmental conditions, we recommend at least a one-month interval of inspection to conform that no debris, sand or dirt is accumulated inside the Barrier that would interfere with its operation. This can be easily checked by installing the ramp brace (read the summary on the safety aspect regarding maintenance on or about the barrier – page 7 and 8 of this document) and removing the hydraulic cylinder shroud. Conduct a visual inspection of the hydraulic cylinder, optional limit switches and heaters and the underside of the Barrier ramp. Particular attention should be given to the hydraulic cylinder to confirm that the seals are tight and not leaking. Cylinder clevis pins, cotter pins and bushings should be inspected and lubricated as needed. The main Barricade bearings should be inspected at the same time by removing the bearing plate covers at the rear of the Barricade. Grease the bearing blocks if equipped with grease fittings.

Should disassembly be necessary:

1) Remove the bearing block inspection plates.

2) Raise the Barrier ramp to its guard position using the hydraulic pumping unit or an auxiliary means such as a crane, forklift or other properly sized lifting means. The 3/4"-10 threaded attachment point near the front lip of the barrier plate is provided for this purpose. See the Safety Precautions above dealing with rigging and hoisting.

3) Install the Barrier ramp brace. Bolt firmly in position.

4) Remove the front Barrier visibility panel.

5) Remove the chain assemblies.

6) Remove hydraulic cylinder clevis pins at the Barrier ramp.

7) Secure the Barrier ramp in the up position using a crane, forklift or other properly sized lifting means.

8) Remove the Barrier ramp brace and slowly lower the Barrier ramp to it's flush down position.

9) Remove the bearing block bolts at the rear hinge area.

10) Each Barrier ramp has two attachment points (threaded 3/4"-10 for heavy eye bolts) that are located on the front and rear edges of the ramp and in line with the center of gravity of the ramp. The rear axle lugs can be also be used to attach the lifting gear to the ramp rear edge. Using a suitable rope, chain or sling, slowly lift the Barrier ramp plate. Once the front lip is above the foundation frame, the ramp plate can be leveled and guided away from the foundation. Insure that the ramp plate it doesn't swing or rock while it is moving. Damage to critical components can occur if it is allowed to strike the foundation or its elements, hydraulic cylinders or limit switches.

Full access to the hydraulic lines and the cylinders is now possible. These can be inspected, repaired or replaced as required. Before reassembly, any rust or other corrosion should be removed and the area coated with sealer or rust inhibiting paint. The foundation can be vacuumed of debris and the drain can be cleared as required.

Inspect and lubricate all bronze style bearings and pins. Graphite/fiberglass bearings should be inspected for any damage and replaced as necessary, lubrication of these style bearings is optional. Anti-seize compound has been used on the bearing block bolts at factory assembly, reapply if you remove the bolts. The proper torque value is 45 foot-lbs [60 N-M]. Check for sand and construction debris about the bearings and shafts and clean if necessary. Reassemble in reverse order.

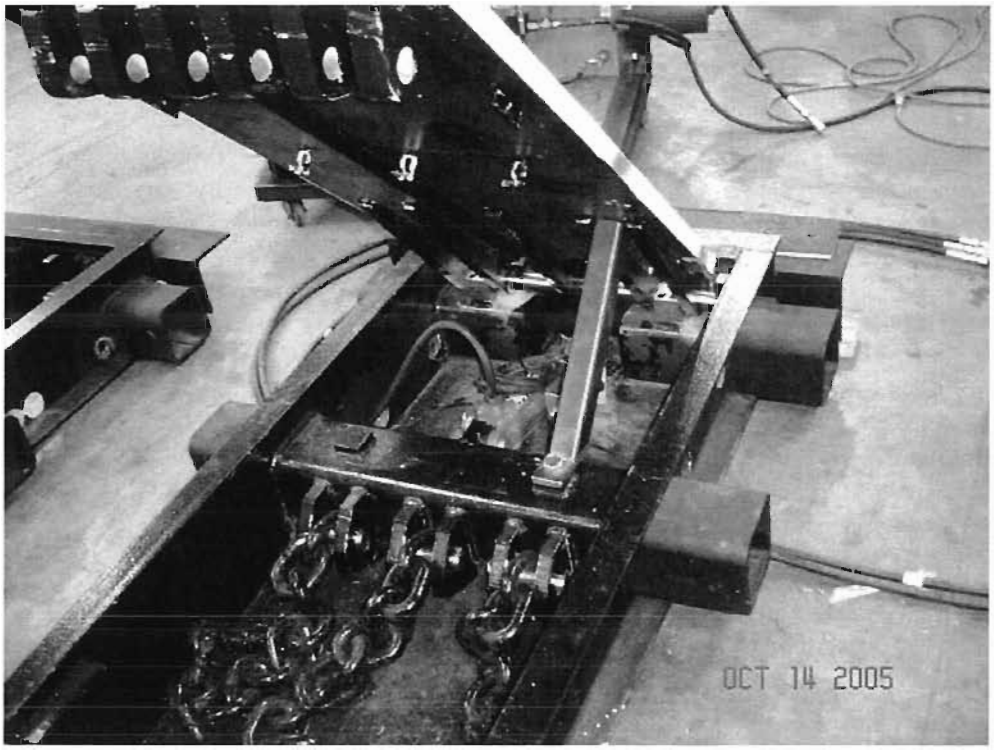


Photo 1 - Safety brace in place and the chain pin removed. The chains are laying on the floor of the Barrier frame assembly.

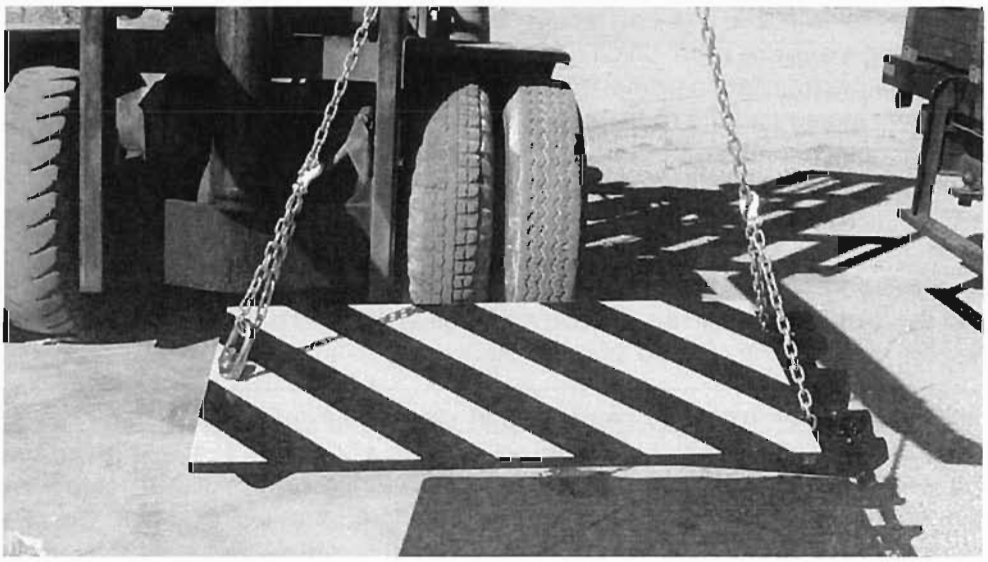


Photo 2 - Safely lifting the DSC2000 ramp plate.

Hydraulic System Cleanliness

The cleanliness of the hydraulic fluid directly affects the reliability of the hydraulic system and the longevity of the components. When contaminates are present, component wear and fatigue are accelerated, performance is degraded, valves, hydraulic motors and cylinders can malfunction and the hydraulic fluid may break down.

To maintain system efficiency and reliability great care must be taken to prevent any form of dirt, sand or grit from entering the hydraulic system. Only new, clean filtered hydraulic oil should be used for charging the unit. Unless specifically ordered as filtered, new oil should be pumped through a 25-micron filter when charging. See Commercial Hydraulic Oil Interchangeability Chart in the **Mechanical Theory** section of this manual for our recommended oils. The tests conducted at the factory on the system have been done with the HPU charged with Shell 'Tellus' 46. This grade is for moderate temperatures and is available in most of the worlds leading cities. Hydraulic oil is subject to degradation and contamination with age or if subject to high temperatures (above 180°F [82°C]. The contamination can be from the following sources:

1) Particulate (dust, dirt, sand, rust, fibers, paint chips, etc.)

2) Wear metals, silicon and excessive oil additives.

3) Water.

4) Sealants (Teflon tape and pastes).

5) Sludge, oxidation and other corrosion products.

6) Acids and other chemicals.

7) Biological and microbes (for high water based fluids or other biodegradable fluids).

The hydraulic fluid should be sampled and tested periodically to ensure contamination and fluid properties are within acceptable levels. We suggest that the first test be done after one year's operation. The frequency of testing will depend upon the results of that test. Most major cities will have hydraulic fluid testing commercially available.

Filters

A filter element is furnished to filter the oil as it is being returned to the oil reservoir. The oil filter housing is only rated at 150 psig [10 bar] or less as the oil in the return line has only to overcome the pressure drop through the filter itself. If the filter should become clogged with particulates from the system, a bypass check valve inside the filter will open and allow the dirty oil to circulate back to the reservoir. For this reason, frequent inspection of the filter is required.

A visual determination of the filter's degree of contamination should be made during filter change outs. Adjust the interval between changes if a high degree of particulates are found.

Pump Motor

Electric motors are basically dependable machines and require little maintenance. Too much attention may be worse than none. The following should be helpful in reducing maintenance.

Wherever possible, prevent:

1) Dampness and dripping water.

2) Dirt, especially dust, which may block ventilation.

3) Inaccessible position, in case maintenance is necessary.

4) Excessive heat. Surrounding air (ambient) temperatures must not exceed 104°F [40°C). Overloading a motor or operating it in an area where the temperature exceeds 104°F [40°C], may cause it to overheat. Frequent or prolonged starting periods or blocked ventilation are other causes of overheating.

The motor has front and rear ball bearings. The bearings have been given initial lubrication at the factory. Motors without regreasing capability are factory lubricated for normal bearing life. Motors having regreasing capability should be relubricated by the procedure noted below if they have been in storage for over one year and at the following service intervals:

1) Every five years based on 5000 hours per year operation.

2) Every two years based on continuous operation.

3) Every six months for continuously high ambient temperature and or dirty or moist locations.

Greasing procedure:

1) Keep grease clean. Lubricate motors at standstill. Do not mix petroleum grease and silicone grease in motor bearings.

2) Use Shell Oil Company "Dolium R", Chevron "SRI No. 2" or Texaco Inc. "Premium RB".

3) Overgreasing bearings can cause premature bearing failure. If motor is equipped with an Alemite type fitting, clean tip of fitting and apply grease gun. Use only one to two full strokes.

Pump Replacement

The following recommendations are given should replacement of the pump be required:

1) Damage to this component is generally caused by debris contamination in the oil. Replacement of the pump is an indication that the oil must be drained and replaced with clean filtered oil. A check of the filter and your filter changing procedures is also in order.

2) When changing out the pump, avoid contamination. Do not remove the plastic port plugs until just prior to installing the fittings and hoses. The pump mounting flange must make full contact with the pump/motor adapter. Do not use the pump mounting bolts to force the pump pilot into the pilot hole or to align the pump. To avoid damaging the pump seals and bearings, do not hammer on the pump or shaft to install or remove the pump/motor couplings.

System Maintenance

The following maintenance procedures and schedules should be adhered to in order to assure safe, long and trouble free service from your Delta Barrier System:

REMEMBER: SAFETY FIRST !!!

SUMMARY OF SAFETY ASPECTS REGARDING MAINTENANCE ON OR ABOUT THE BARRIERS

General

At all times observe good safety practices when working on either the electrical or mechanical system. **Particular attention should be paid to the danger of working on the Barrier when the power is on**. Barriers are powerful hydraulic presses that can easily crush anything in their way. Keep hands free of the mechanism when the power is on or the HPU is up to pressure. Turn off the electric power and bleed the hydraulic pressure down to zero before working on any part of the system. Traffic should be controlled around the Barrier during any work so that vehicular accidents do not occur if the Barrier should happen to rise. After work is complete, do not allow traffic over the Barrier until all control and safety functions have been verified to be properly working.

Maintenance work in the area about Barrier

Secure area from unauthorized personnel and traffic

1) Select Barrier UP or DOWN position as desired from the control panel.

2) Turn control panel key switch to OFF position and remove key.

3) Turn system power OFF at the disconnect on the hydraulic power unit (HPU). Padlock the disconnect with your personnel lock.

4) Proceed with maintenance. DO NOT PERFORM ANY WORK UNDER THE BARRIER OR INSIDE THE BARRIER ACCESS AREAS!

   Should work be required under the Barrier or inside the access areas, follow the procedures in the next section.

5) When all work is finished, remove padlock and turn HPU disconnect ON. Return panel key to the control panel.

Maintenance Work Under the Barrier or in the Barrier Access Areas

Secure area from unauthorized personnel and traffic

A ramp brace is provided with each barrier in the system and should be in place and bolted into position prior to working under a raised ramp plate.

With hydraulic pressure available.

1) Select Barrier UP from the control panel.

Note: Lifting eyes secured in the tapped holes provided in the top plates can be used for chaining the Barrier in the UP position if hydraulic pressure is not available to raise the plate.

2) Insert the ramp brace and bolt into position.

3) Lower the plate onto the ramp brace.

4) Turn the control panel key switch to OFF position and remove key.

5) Turn system power OFF at the disconnect on the hydraulic power unit. Padlock the disconnect with your personnel lock.

6) Bleed down the system:

   A) If system is equipped with the optional auxiliary emergency fast operate system, release the auxiliary EFO valve override pin by twisting and pulling to the out position.

   B) Release set screw (or lock nut) on the system bleed down valve. Turn (anti-clockwise) the handle on the valve slightly until hissing sound is heard. Continue to open slowly until pressure on gage reads zero.

   C) For added safety, leave valve open while performing maintenance.

7) Check that the Barrier is firmly held against movement.

8) Proceed with maintenance. Minimize any exposure to working under the Barrier by using whenever possible tools with handle extensions.

9) When all work is finished, remove padlock and turn HPU disconnect ON. Close any valves opened in the bleed down procedure. Return panel key to the control panel.

10) Raise the moving plate and remove the ramp brace(s).

11) Remove any safety road closure means used to secure the area for undertaking the above work.

MAINTENANCE SCHEDULE
FIRST WEEKS OPERATION

Check operation of the Barrier at least once daily. Have the guards or operators report if Barrier fails to operate, or operates with a jerky motion. It is recommended that someone be on call who can explain the operation of the Barrier system to each new guard or operator.

Daily Check

1) Log pressure settings on sheet supplied in this section.

2) Check for leaks around all fittings. Tighten where necessary.

3) Check that hydraulic hoses (if used) are not rubbing on any hard or sharp surfaces. Especially check where hose enters conduit or where it may contact the ground.

4) Check oil level in the site glass after the pump/motor has run to full pressure and shutoff. If level appears to be falling, investigate the HPU and Barrier fittings and the hydraulic lines.

5) See appropriate Trouble Shooting section of the manual if any faults are observed.

6) Check all control functions for complete operation of all features.

7) Replace the oil filter at the end of the first week of operation.

8) At the start and end of the first week's operation, check the tightness of each of the sixteen hardened steel cap screws holding the four bearing blocks. Anti-seize compound has been used on the bolts, reapply if you remove the bolts. The proper torque value is 45 foot-lbs [60 N-M]. Check for sand and debris about the bearings and shafts and clean if necessary. Inspect and lubricate all bronze style bearings and pins. Graphite/fiberglass bearings should be inspected for any damage and replaced as necessary, lubrication of these style bearings is optional.

9) Check all top plate bolts for tightness. Note any tendencies for the top plate bolts to loosen.

10) Check that the frame of the Barrier is free of water. Should water be present or seems to be accumulating, determine if the drain is blocked. Correct as necessary.

MAINTENANCE SCHEDULE
MONTHLY

Check and service the following at monthly service intervals:

Note: Block traffic during maintenance to prevent accidents.

1) Shut system off and drop system pressure to zero.

2) Replace the oil filter at first monthly maintenance. For systems that are cycled less than 100 cycles per day, replace every third month there after. If system is cycled above this rate, or the location is in a high dust environment, replace filter monthly.

3) Check the accumulator pressure while the system is at zero pressure using Delta Charging Kit 2469-31 or equal. If tool is not available, observe the value that the pressure gage jumps to when power is again turned on. (See Hydraulic Section for details.) Log value and pressure setting on Log sheet provided.

4) Confirm that the Barrier operates smoothly during the raise and lower cycle. Adjust speeds as desired.

5) Without placing any body parts under the Barrier ramp, check for debris build up in the bottom of the foundation frame. Check for indications of oil leaks around the cylinders and Barrier header fittings. Check that the frame of the Barrier is free of water. Should water be present or seems to be accumulating, determine if the drain is blocked. Correct as necessary.

6) Observe Safety Precautions for working under the Barrier. Remove the bearing block inspection plates and check the tightness of each of the eight hardened steel cap screws holding the two bearing blocks. Anti-seize compound has been used on the bolts, reapply if you remove the bolts. The proper torque value is 45 foot-lbs [60 N-M]. Check for sand and debris about the bearings and shafts and clean if necessary. Inspect and lubricate all bronze style bearings and pins. Graphite/fiberglass bearings should be inspected for any damage and replaced as necessary, lubrication of these style bearings is optional. Reinstall top plates; check all top plate bolts for tightness. Note any tendencies for the top plate bolts to loosen.

7) Check the operation of the Barrier heaters if so equipped. They should get warm in approximately one minute after energization.

8) Check all control functions for complete operation of all features.

9) With the hydraulic system pressure bleed to zero, add clean, filtered oil to the top of the site glass.

10) Clean dust and debris from around HPU tank and hydraulic lines. Wipe up any spilled oil.

11) Turn power on and bring system back to operation.

MAINTENANCE SCHEDULE

YEARLY

Check and service the following at yearly service intervals in addition to the monthly check:

Note: Block traffic during maintenance to prevent accidents.

1) Drain the oil from the reservoir and flush with mineral spirits or clean oil. After wiping down the tank sides and bottom to assure that no contamination remains, replace with clean filtered oil.

2) Remove hydraulic cylinder shroud and check that the hydraulic cylinders are not leaking internally (see Hydraulic Trouble Shooting section for details). Replace cylinder seals or cylinder as necessary.

3) Check cylinder clevis and cotter pins for wear, replace as necessary.

4) Examine the foundation frame for debris buildup; check drain lines and sump wells for drainage. Clean debris.

5) Tighten or replace any loose top plate bolts. Drill and tap to next size or use inserts if threads are stripped.

6) Check condition of the Barrier paint surface. Prepare, prime and touch up areas where the paint has be chipped or worn away. Apply new reflective tape as necessary.

7) Check hydraulic interconnect lines for kinks, contact wear or bulging. Replace or protect hoses as required.

8) Thoroughly clean the HPU, removing dust and spilled oil. Remove any rust build up on components. Touch up paint where necessary.

9) Check the accumulator pressure while the system is at zero pressure using Delta Charging Kit 2469-31 or equal. If tool is not available, observe the value that the pressure gage jumps to when power is again turned on. (See Hydraulic Section for details.) Log value and pressure setting on Log sheet provided.

10) Test motor starter overloads by pressing the test button. Replace if necessary or press reset. Auto/Manual switch should be in the **Manual** position.

11) Check the pressure relief valve by depressing the starter armature and allowing unit to run to the relief pressure value of 2200 psig [152 bar]. Adjust as necessary.

MODEL 257

3-Phase Monitor

- **Detects phase loss, low voltage, phase reversal**
- **50 Hz, 60 Hz and 400 Hz models**
- **Automatic or manual reset**
- **Five year unconditional warranty**

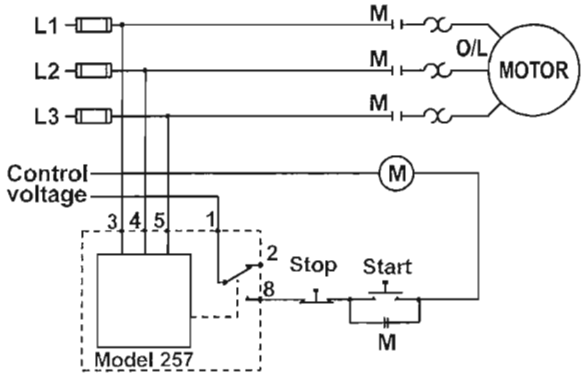
DESCRIPTION

The **Model 257** continuously monitors 3-phase power lines for abnormal conditions. When properly adjusted, the Model 257 monitor will detect phase loss on a loaded motor even when regenerated voltage is present.

This device consists of a solid-state voltage and phase-angle sensing circuit, driving an electro-mechanical relay. When correct voltage and phase rotation are applied, the internal relay will energize. A fault condition will de-energize the relay. When the fault is corrected, the monitor will automatically reset *(a manual reset version is also available)*.

The Model 257 does not require a neutral connection and can be used with Wye or Delta systems. Voltage ranges are sufficiently wide to allow for proper adjustment to existing conditions. Both "TRIP" and "NORM" condition indicators are provided to aid in adjustment and system trouble-shooting.

TYPICAL APPLICATION

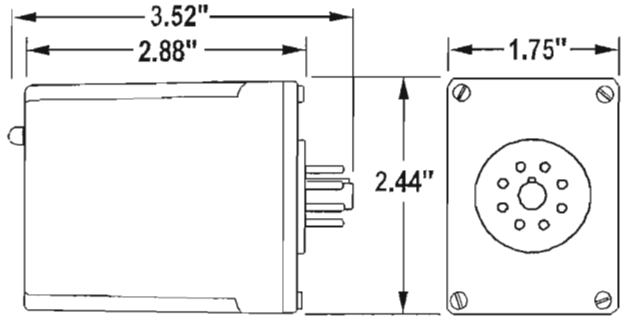


SPECIFICATIONS

AUTO Reset MANUAL Reset	B257B B257BM	257B 257BM	A257B A257BM	EX257B EX257BM	B257B-400 B257BM-400	257B-400 257BM-400
Nominal AC voltage (phase to phase)	120 vac	208/240 vac	480 vac	380 vac	120 vac	208/240 vac
Case Color	Gray	Red	Yellow	Yellow	Gray	Red
Adjustment range	85-120vac	160-240vac	380-480vac	300-400vac	85-120vac	160-240vac
Frequency	60 Hz	60 Hz	60 Hz	50 Hz	400 Hz	400 Hz
Power consumption	0.75W	1.5W	4.5W	3.75W	0.75W	1.5W
Transient protection	2500 VAC for 10msec					
Repeat accuracy	± 0.1% of set point (fixed conditions)					
Response time	50 msec (set or reset)					
Dead band	Approximately 2%					
Output contacts	SPDT 10 amps at 240 VAC resistive					
Expected relay life	Mechanical: 10 million operations Electrical: 100,000 operations at rated load					
Operating temp	-40° to +131° F					
Humidity tolerance	0 - 97% w/o condensation					
Enclosure material	Dust cover: ABS plastic					
Mounting	8-pin socket (**sold separately)					
Weight	5 ounces					
Agency approvals	UL Recognized* and CSA Certified ***condition of acceptability:** the 380V and 480V versions must be used with a UL Recognized 600 VAC socket					

** Order 8-pin socket number **51X120**

DIMENSIONS



(dimensions have tolerance of ± 0.06)

Telephone: Main - (918) 438-1220
Sales - (800) 862-2875
Fax: (918) 437-7584

E-mail: sales@time-mark.com
Internet: http://www.time-mark.com

TIME MARK CORPORATION

11440 East Pine Street
Tulsa, Oklahoma 74116

Doc No. 87A189 12/00

TIME MARK is a division of AEMT, Inc.

MODEL 257 3-Phase Monitor

**READ ALL INSTRUCTIONS BEFORE INSTALLING, OPERATING OR SERVICING THIS DEVICE.
KEEP THIS DATA SHEET FOR FUTURE REFERENCE.**

GENERAL SAFETY

POTENTIALLY HAZARDOUS VOLTAGES ARE PRESENT AT THE TERMINALS OF THE MODEL 257. ALL ELECTRICAL POWER SHOULD BE REMOVED WHEN CONNECTING OR DISCONNECTING WIRING. THIS DEVICE SHOULD BE INSTALLED AND SERVICED BY QUALIFIED PERSONNEL.

Installation Instructions

WARNING

IN APPLICATIONS WHERE VOLTAGES IN EXCESS OF 300 VAC ARE TO BE MONITORED, BE CERTAIN TO USE THE TIME MARK MODEL 51X120 8-PIN SOCKET, OR AN EQUIVALENT UL APPROVED 600 VAC RATED SOCKET.

INSTALLATION

Mount the 8-pin socket in a suitable enclosure. A NEMA-1 rated enclosure, designed for socket-mounted relays is available from Time Mark Corporation.

Connect 3-phase power to terminals 3, 4, and 5 on the socket. Phase rotation should be verified using a Time Mark Model 108A or 108B Phase Sequence Detector.

Connect the load control wiring to the appropriate terminals on the socket:

For motor control applications; use terminals 1 and 8.
For phase loss alarm applications; use terminals 1 and 2.

Insert the Model 257 into the socket and apply power. If the contact does not transfer (green light ON), check that all phases are present, and of the correct voltage. If power is correct, rotate the level adjustment counter-clockwise.

If the contact still does not transfer, remove power and reverse two of the three phase wires at the socket *(phase rotation is reversed)*. Re-apply power. The contact should transfer to provide a signal path between pins 1 and 8.

NOTE: *When installing the Model 257 monitor in areas of high humidity or contamination, it is recommended that the base area and all exposed metal parts of the socket be coated liberally with a good quality silicon grease, such as Dow Corning DC-4 or DC-4X. Insert the unit into the socket and wipe off excess grease around the base. This will prevent the entrance of moisture and other contaminates into the base and socket areas.*

ADJUSTMENT SETTINGS

The following procedure will allow the Model 257 to be adjusted to achieve a trip point just below the nominal phase-to-phase voltage, where the unit is applied.

Rotate the adjustment control fully clockwise, or until the red (TRIP) indicator illuminates.

Slowly rotate the adjustment control in a counter-clockwise direction, just until the green (NORM) indicator illuminates.

At this point, the Model 257 is the most sensitive to irregular power line conditions. If nuisance tripping occurs, turn the control slightly farther counter-clockwise.

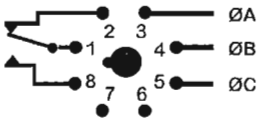
A more accurate setting will require the use of a 3-phase variac to lower the voltage to an exact measurable setting. Time Mark also offers a factory set version of all models and voltage ranges, for only a small additional charge.

TROUBLESHOOTING

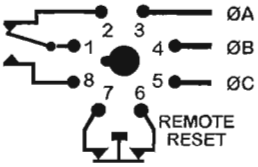
Should the Model 257 Monitor fail to operate properly, check that all three voltages are present, and are of the correct voltage level and phase rotation (a Model 108A or 108B Phase Sequence Detector should be used to verify phase rotation). Check all fuses and verify that all wiring connections are correct. If problems persist, contact your local Time Mark Distribuor, or the factory for assistance *(Monday-Friday, 8 a. m. to 5 p.m. CST)*.

MANUAL RESET VERSIONS

IF YOU DO NOT WISH TO USE THE EXTERNAL RESET SWITCH ON THE MANUAL RESET VERSION, YOU MUST JUMPER PINS 6 AND 7. Refer to the Manual Reset 8-pin diagram.



Automatic Reset



Manual Reset

WARRANTY

The **Model 257 3-Phase Monitor** is warranted to be free from defects in materials and workmanship, and is covered by our exclusive **5-year Unconditional Warranty**. If this device fails to operate, for any reason, we will repair or replace it free, for five years from the date of purchase. Contact the Time Mark Sales department, Monday through Friday; 8 a.m. to 5 p.m., CST, for further details.

Telephone: Main - (918) 438-1220
Sales - (800) 862-2875
Fax: (918) 437-7584

E-mail: sales@time-mark.com
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TIME MARK CORPORATION

11440 East Pine Street
Tulsa, Oklahoma 74116

Doc No. 87A189 12/00

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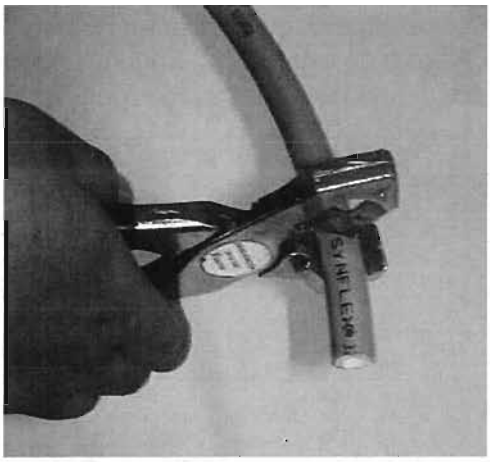
HOW TO ASSEMBLE REUSABLE HOSE FITTINGS

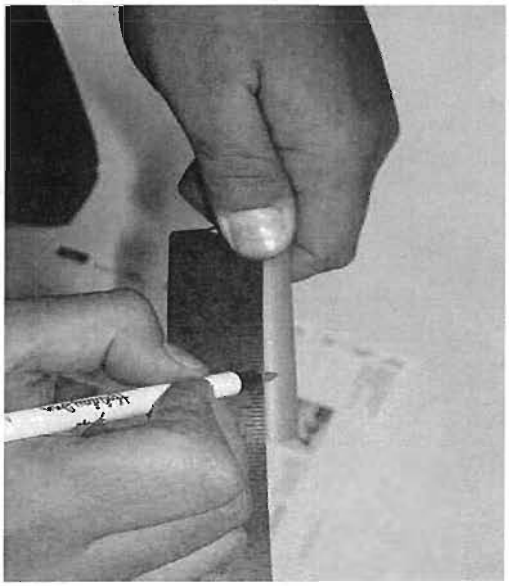
1) Cut the hose squarely with hand-held hose cutter or with a sharp razor knife.



2) Use the table to establish the length of hose that is inserted into the fitting socket:

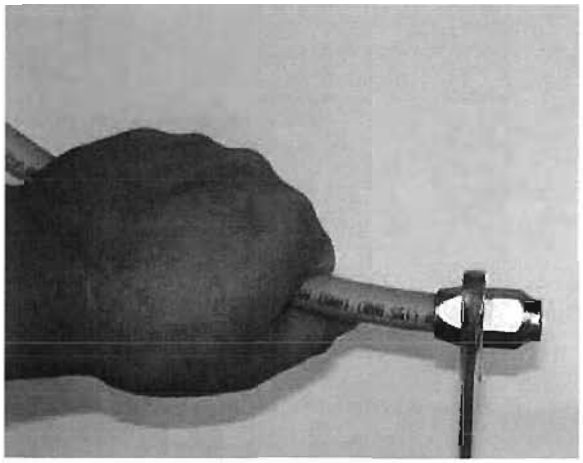
Hose I.D.	Insertion Depth		
	Inch, Fractional	Inch, Decimal	Millimeters
¼"	7/8"	0.88"	22 mm
3/8"	1-1/4"	1.25"	32 mm
½"	1-1/2"	1.5"	38 mm

3) Use a rule for measurement and mark the hose with a colored pencil or similar.

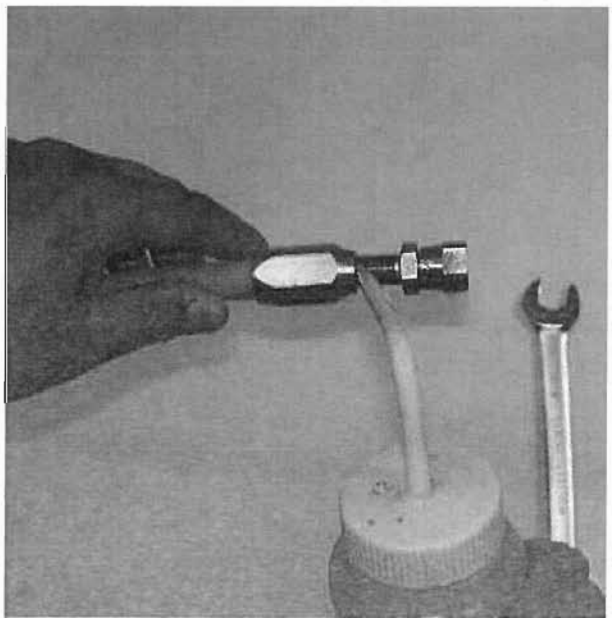


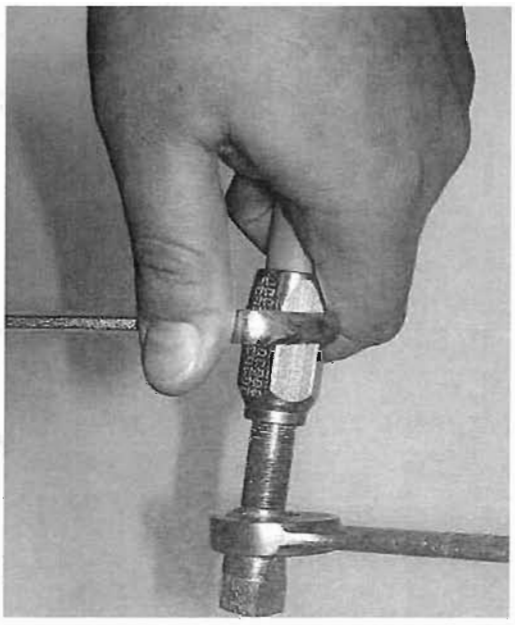
4) Lightly lubricate the outer surface of the hose to make it easier to push the fitting over the hose. Use SAE 20 motor oil or the hydraulic oil the system is to be filled with.

5) While tightly holding the hose, push the fitting socket over the lubricated hose and screw the socket on counterclockwise until the socket end is even with the depth mark. The end of the hose should be 0.1 to 0.06 inch [2.3 to 1.6 mm] from the inner shoulder of the fitting socket. It should not be bottomed against the shoulder. Do not over-tighten.



6) Push the fitting insert into the socket. Lubricate the threads on the insert. Holding the socket in a vise or with a box wrench, screw the fitting insert clockwise into the socket with a second wrench until the bottom of the insert hex contacts the socket shoulder. Do not over-tighten.





ACCUMULATOR PRECHARGE PROCEDURE

Use an inert gas such as Nitrogen for precharging accumulators. If oil pumped is not available, dry water pumped Nitrogen gas may be used. **Note: Do Not Use Air or Oxygen, the Accumulator Could Explode!**

Before precharging, make certain that the accumulator gas valve is screwed in tight. Check that the hydraulic pressure is a zero on the oil pressure gage. Precharging the accumulator while under pressure will result in an incorrect precharge pressure.

Check the pre-charge value on the accumulator's label or on the HPU's Flysheet. The following values are a guide only and may be modified in some instances to provide certain barrier performance.

DSC800, TT203 & TT210 Bollards	500 PSIG
DSC720 Bollards	700 PSIG
TT205 & TT207 Phalanx	700 PSIG
DSC501, TT207S & TT207S/FM Phalanx	850 to 1100 PSIG
DSC1100	700 to 1000 PSIG
DSC1200	900 to 1000 PSIG
DSC1400	1000 PSIG
DSC2000	700 PSIG
DSC7000(H)	900 PSIG
TT224, TW107, TW108, TW2015 and TW4030 Phalanx	700 PSIG
TT270 Hydraulic Gate Operator	800 PSIG
TT212H, TT212E(H) & BB10M Beam Barriers	600 to 700 PSIG
TT212EC(H) & (M), IP500(H) & (M)	600 to 1300 PSIG

CAUTIONS:

1. Do not loop or twist the hose, as it will stiffen when gas pressure is released from the nitrogen gas bottle.

2. Never loosen swivel nut attached to the accumulator gas valve without first backing the Gas Chuck stem out all the way.

3. Do not reduce accumulator pre-charge pressure by depressing accumulator gas valve core (the high-pressure gas may rupture the rubber valve seat). Instead, slowly turn gas valve out until gas begins to escape through the bleed hole drilled through the threads of the valve. This hole is a safety feature, warning of stored pressure whenever the gas valve is being removed. Install a new gas valve 'o'-ring each time the gas valve is removed.

Note: During this procedure, refer to the diagrams on page 4.

Determining the Current Pressure in the Accumulator:

1. Remove the gas valve guard. Ensure that the valve is closed on the Nitrogen gas bottle and attach the accumulator charge kit's hose to the nitrogen bottle.

2. Attach the gauge assembly to the hose. Back out the Gas Chuck stem all the way by turning the T-handle (counter-clockwise) before attaching to accumulator.

3. Using a 3/4-inch wrench, hold the top hex on the accumulator's gas valve, and remove the yellow cap with 3/8-inch wrench.

4. Holding top hex on the accumulator's gas valve with a 3/4-inch wrench, attach the gas chuck on the gauge assembly to the gas valve on the accumulator. Secure the gauge assembly gas chuck to the accumulator gas valve with an 11/16-inch wrench. (Position of the tee handle on gas chuck should be fully turned counter-clockwise.)

5. Turn the T-handle on the gas chuck until the stem is all the way up (counter-clockwise).

6. Ensure that the bleeder valve on the gauge assembly is closed.

7. Turn the T-handle on the gas chuck until the stem is all the way down (clockwise) which will depress the accumulator gas valve core.

8. Be certain that the bleeder valve is closed.

9. Using a 3/4 inch wrench, hold bottom hex on accumulator gas valve, and **slowly** turn top hex on the gas valve counter-clockwise with second 3/4 inch wrench until the valve is open. The gauge will show pre-charge pressure.

10. Check the pressure on the gauge. If the gauge pressure matches the recommended pre-charge pressure for your barrier proceed to step 13.

Adjusting the Pre-charge Pressure in the Accumulator:

11. If the pre-charge pressure needs to be-increased, slightly crack open the valve on the Nitrogen gas bottle to slowly fill the accumulator. Close the valve when the gage indicates the desired precharge pressure.

DANGER! NEVER EXCEED THE **MAXIMUM** ALLOWABLE WORKING PRESSURE OF THE PRESSURE VESSEL.

12. If the gauge pressure exceeds the desired pre-charge pressure is exceeded, ensure that the valve on the Nitrogen gas bottle is closed and then open bleeder valve slightly to reduce pressure.

Note: Allow accumulator to rest 10-15 minutes after gas pre-charging. This will allow the gas temperature to adjust and equalize. Recheck gas pressure and adjust as necessary.

Removing the Pre-charge Kit:

13. Using a 3/4 inch wrench, hold bottom hex on accumulator gas valve, and **slowly** turn top hex on the gas valve clockwise with second 3/4 inch wrench until the valve is closed.

14. Before loosening the gas valve swivel nut, turn the T-handle on the gas chuck until the stem out all the way (counter-clockwise)

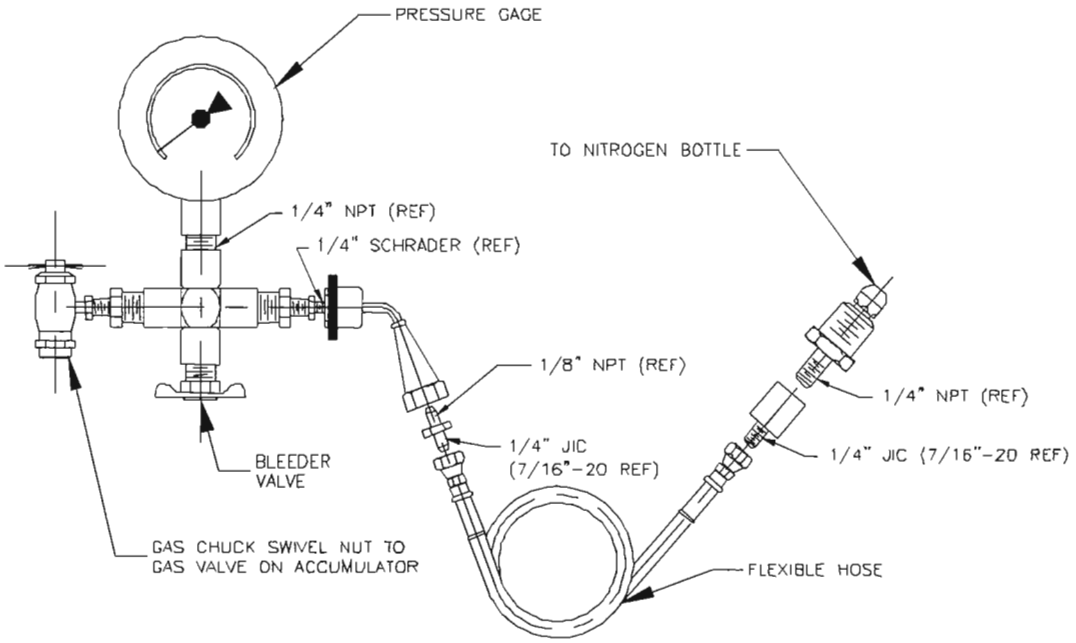
15. Ensure that the valve on the Nitrogen bottle is closed and then **Slowly** open bleed valve on gauge assembly. Relieve pressure in the hose assembly until gauge reads zero.

16. Holding top hex on the accumulator's gas valve with a 3/4-inch wrench, remove the gas chuck on the gauge assembly to the gas valve on the accumulator with an 11/16-inch wrench.

17. Install yellow gas valve cap on accumulator.

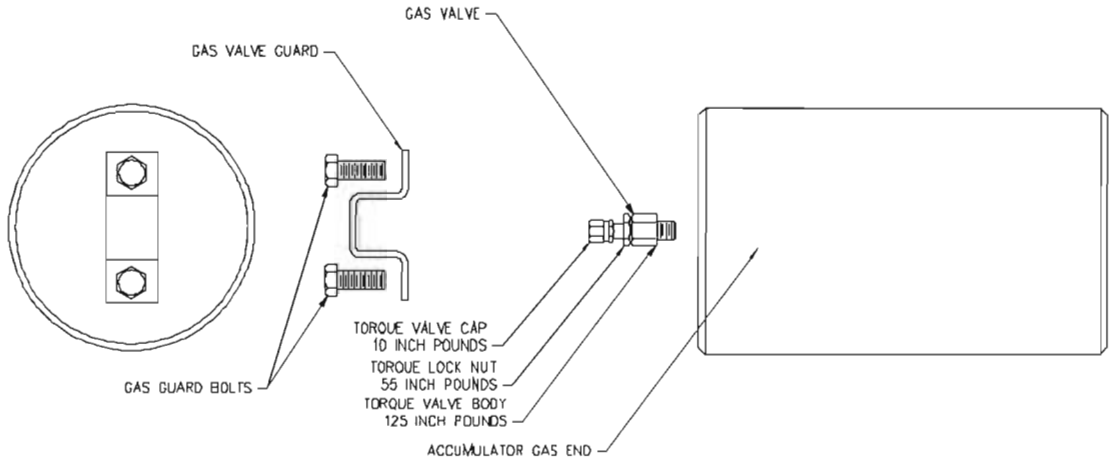
18. Install spacer (optional) and the gas valve guard on accumulator with the supplied 3/8-inch hex bolts.

DANGER! NEVER OPERATE ACCUMULATOR WITHOUT GAS VALVE GUARD INSTALLED.



Delta Stk. No. 2469-31 Accumulator Charge Kit

Figure 1



GAS VALVES WITH LOCKING NUTS

HYDRAULIC POWER UNIT PRESSURE LOG

Pump Serial Number: _____

Use this log to provide a record of the key pressure values on the hydraulic system to facilitate trouble shooting and preventive maintenance:

As Shipped:_____-_____-_____

Reading Date	Low Pressure Reset	High Pressure Shutoff	Accumulator Precharge

Definitions:

High Pressure Shutoff - The gage reading where the pressure switch shuts the pump motor off. Compare against the as shipped value. Values +/- 50 psig are generally OK.

Low Pressure Reset - The gage reading where the pressure switch turns the pump motor back on after pressure drops from being at the higher value. Compare against the as shipped value. Values +/- 50 psig are generally OK.

Accumulator Precharge - The nitrogen precharge pressure in the accumulator. Compare against the as shipped value. Values +/- 100 psig are generally OK. See the **Mechanical Theory** Section of this manual for a discussion of the accumulator. Can be directly checked at zero hydraulic system pressure with Delta Tool, Stock Number 2469-31 "Accumulator Charge Kit". See Document A2025 for the complete instructions of using this tool.

SPARE PARTS ORDERING INFORMATION

Insurance or breakdown spares can be obtained locally or from Delta Scientific Corporation as desired. If parts are found locally, they should be of the same manufacture and pattern as the original part. On hydraulic systems, we do not recommend the replacement of the main directional valve by any other manufacturer than Vickers/Double A or Rexroth.

When ordering parts from the factory, please specify the Model of the Barriers and the serial number. If these are not known, the original order number and date of purchase of the system should be given.

(Serial numbers are located on the equipment nameplates on the HPU and in the Barrier access area. The Model number of the system is also shown on the nameplate. Electrical control panels and circuits reference the appropriate drawing number; please provide this number when ordering control components.)

Use the numbers on the attached spare parts list as well as the actual component's manufacturers' number. Give as complete a description of the part and its function as possible. If uncertain as to the parts name or function, a sketch should be mailed or FAXED with the order.

Most parts are maintained in stock and can be processed for shipment within one week of order.
If parts are for breakdown replacement, please note on order so that we may expedite shipment.
If parts are not in stock, we will confirm your order with an expected delivery date.

Prices shown are net each, FOB Palmdale, California. Prices are subject to change without notice.

Contact:

Delta Scientific Corporation
40355 Delta Lane
Palmdale, California 93551
Phone (661)575-1100
Fax (661)575-1109
E-MAIL info@deltascientific.com

DELTA SCIENTIFIC CORPORATION
40355 DELTA LANE
PALMDALE, CALIFORNIA, 91355, USA

PHONE 661-575-1100
FAX 661-575-1109
EMAIL info@deltascientific.com

SPARE PARTS LIST – JOBS 7585 THROUGH 7486D
DELTA MODELS DSC2000 PHALANX BARRIERS

ELECTRICAL PARTS

EFFECTIVE September 3, 2010

STK NO.	DESCRIPTION	UNIT COST
2459-10	FUSE, 250 V, 2.5 AMP, 5/PKG,	8.53
2459-13	FUSE, 250 V, 15 AMP, 5/PKG,	8.53
2461-27	POWER SUPPLY, 320 WATTS,	440.78
2461-40	BATTERY, 12 VOLT, 7 AMP-HOUR	55.00
2463-01	KEY SWITCH,	61.16
2463-01K	KEY, KEY SWITCH,	6.60
2463-02A	SELECTOR SWITCH,	6.78
2463-03A	EFO, HOODED TOGGLE TYPE,	44.26
2463-06	PUSHBUTTON, N.O. BLACK,	13.86
2463-07	PUSHBUTTON, N.C. RED,	15.40
2463-16	PILOT LIGHT, LED, RED,	17.20
2463-17	PILOT LIGHT, LED, GREEN,	17.20
2463-63	ANNUNCIATOR SIREN,	44.54
2464-165	MOTOR, 5 HP @ 380/3/50,	834.53
2465-08	PRESSURE SWITCH,	230.08
2465-11	LEVEL SWITCH,	157.08
2465-27	LIMIT SWITCH ASSY, MAGNETIC,	43.73
2465-66	POWER MONITOR, 380/3/50,	217.80
2465-107	DIN HARNESS - BRN/BLU/GRN	38.50
2467-01	DIRECT. VALVE, DO3, 24 VDC,	400.69
2467-31	EFO VALVE, 24 VDC,	168.04
2467-100	DIN HARNESS, BLK, WHT, GRN,	15.95
2467-101	DIN HARNESS, RED, WHT, GRN,	15.95
2531-67	STARTER OVERLOAD, 5.4-27 A,	123.20
2531-108	MOTOR STARTER, 240 V COIL,	153.51
2531-113	DISCONNECT SWITCH, 30 AMP,	211.20
2534-68	TIMER RELAY TRIM POT,	2.20
2534-69	TIMER RELAY, 24 VDC,	84.08
7195-FU1	FUSE, 2 AMPS, FAST ACTING	1.00
7195-V1	VOLTAGE REGULATOR, 12 V,	0.89
90605-00	BARRIER CONTROL CARD,	583.00
IN5404	DIODE	2.20
1/4W1.2K	RESISTOR	2.20

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.
PRICES ARE NET 30 DAYS TO APPROVED ACCOUNTS, FOB PALMDALE, CALIFORNIA.
SEE ORDERING INSTRUCTIONS TO ASSURE THAT PROPER PARTS ARE ORDERED.

DELTA SCIENTIFIC CORPORATION
40355 DELTA LANE
PALMDALE, CALIFORNIA, 91355, USA

PHONE 661-575-1100
FAX 661-575-1109
EMAIL info@deltascientific.com

SPARE PARTS LIST – JOBS 7585 THROUGH 7486D
DELTA MODELS DSC2000 PHALANX BARRIERS

MECHANICAL PARTS

EFFECTIVE September 3, 2010

STK NO.	DESCRIPTION	UNIT COST
2464-32	MOTOR/PUMP ADAPTER,	167.20
2464-52	MOTOR HALF COUPLING,	29.74
2464-53	PUMP HALF COUPLING,	29.74
2464-61	COUPLING SPIDER,	14.34
2465-05	PRESSURE RELIEF VALVE,	103.00
2465-21	PRESSURE GAGE, 0-3000 PSIG,	50.95
2465-22	LEVEL GAGE, 10",	68.77
2465-23	GAGE SNUBBER,	31.50
2465-91	TOOL KIT IN TOOL BOX,	269.64
2466-11B	1/4" NEEDLE VALVE,	65.47
2466-12B	3/8" NEEDLE VALVE,	80.08
2466-33B	1/2" BALL VALVE, BRONZE,	35.02
2467-72	MANIFOLD, DO3-2 STATION	339.17
2467-94	VALVE MOUNTING BOLT SET,	2.20
2469-31	ACCUM CHARGE KIT,	239.03
2469-51	ACCUM CHARGE BOTTLE,	258.50
2469-94	ACCUMULATOR, 5.0 GALLON,	1,419.00
2469-96	ACCUM REBUILD KIT, 6 INCH,	451.00
2470-02	FILTER HOUSING & ELEMENT,	236.76
2470-12	FILTER ELEMENT, TANK TOP,	96.62
2470-41	SUCTION STRAINER,	30.49
2470-43	FILLER BREATHER,	49.52
2471-21	HAND PUMP, COMPLETE,	417.93
2471-27	PUMP, 0.258 CU IN/REV,	377.56
2471-27S	PUMP SEAL KIT, SHAFT & CRES.	41.18
2471-31	HAND PUMP, SEAL KIT,	59.40
2512-4-FT	HOSE ASSY, 1/4" X xx FT LG,	$ 5.41/FT + 20.24
2512-6-FT	HOSE ASSY, 3/8" X xx FT LG,	$ 5.68/FT + 25.08
2512-8-FT	HOSE ASSY, 1/2" X xx FT LG,	$ 6.12/FT + 27.19
2512-45T	HOSE FIELD FITTING, JIC 04	55.60
2512-46T	HOSE FIELD FITTING, JIC 06	61.36
2512-47T	HOSE FIELD FITTING, JIC 08	81.16
7002-1	GASKET, OIL TANK COVER,	8.16

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EMAIL info@deltascientific.com

SPARE PARTS LIST – JOBS 7585 THROUGH 7486D
DELTA MODELS DSC2000 PHALANX BARRIERS

DSC2000 PARTS EFFECTIVE September 3, 2010

STK NO.	DESCRIPTION	UNIT COST
10667-17	RING HANGER, 3/4",	2.31
10670-00	TOP PLATE ASSEMBLY,	3,749.90
10679-01	CHAIN PIN, SHORT,	34.56
10679-02	CHAIN PIN, LONG,	95.70
10679-03	HINGE PIN,	130.63
10679-04	HINGE PIN, FLANGED,	35.00
10704-00	CHAIN (13 LINKS),	511.50
10705-00	HINGE COVER PLATE,	93.06
10716-00	FRAME ASSEMBLY,	4,316.40
10727-00	FRONT SKIRT,	130.02
10743-01	CHAIN, CHAIN PULL,	1.98
10871-00	CYLINDER COVER,	65.34
11058-00	SAFETY BAR,	50.82
2468-115	LINCH PIN, 3/16" SELF LOCKING,	2.75
2534-45	REFLECTOR,	18.81
2739-010	BEARING BLOCK,	69.38
2739-02G	GARMAX GM2428-32,	24.42
2739-05G	GARMAX GM1620-16,	13.90
BSH142012SS	SCREW, BUTTON HEAD HEX, 1/4-20 X .50 LONG, SST,	0.28
COT532214	COTTER PIN 5/32" X 2.25",	0.28
FSH38241SS	MACHINE SCREW, FLAT HEAD HEX, 3/8"-24 X 1" LG, SST,	1.76
HHC1420112	BOLT, HEX HEAD, 1/4"-20 X 1.5 LONG,	0.22
HHC34102	BOLT, HEX HEAD, 3/4-10 X 2 LONG,	2.20
NUT1420NY	NUT 1/4"-20 NYLOCK,	0.22
PPH103212SS	MACHINE SCREW, BUTTON HEAD HEX, 10-32 X .50 LG, SST,	0.22
SHC12202	MACHINE SCREW, SOCKET HEAD, 1/2"-20 X 2",	3.30
WAS1220CUST	WASHER, 2" OD x 1.56 ID X 0.13 THK,	1.32
WAS14SAESS	WASHER, 1/4" SST,	0.11
WAS14SLSS	LOCK WASHER, 1/4" SST,	0.11

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.
PRICES ARE NET 30 DAYS TO APPROVED ACCOUNTS, FOB PALMDALE, CALIFORNIA.
SEE ORDERING INSTRUCTIONS TO ASSURE THAT PROPER PARTS ARE ORDERED.

DELTA SCIENTIFIC CORPORATION
40355 DELTA LANE
PALMDALE, CALIFORNIA, 91355, USA

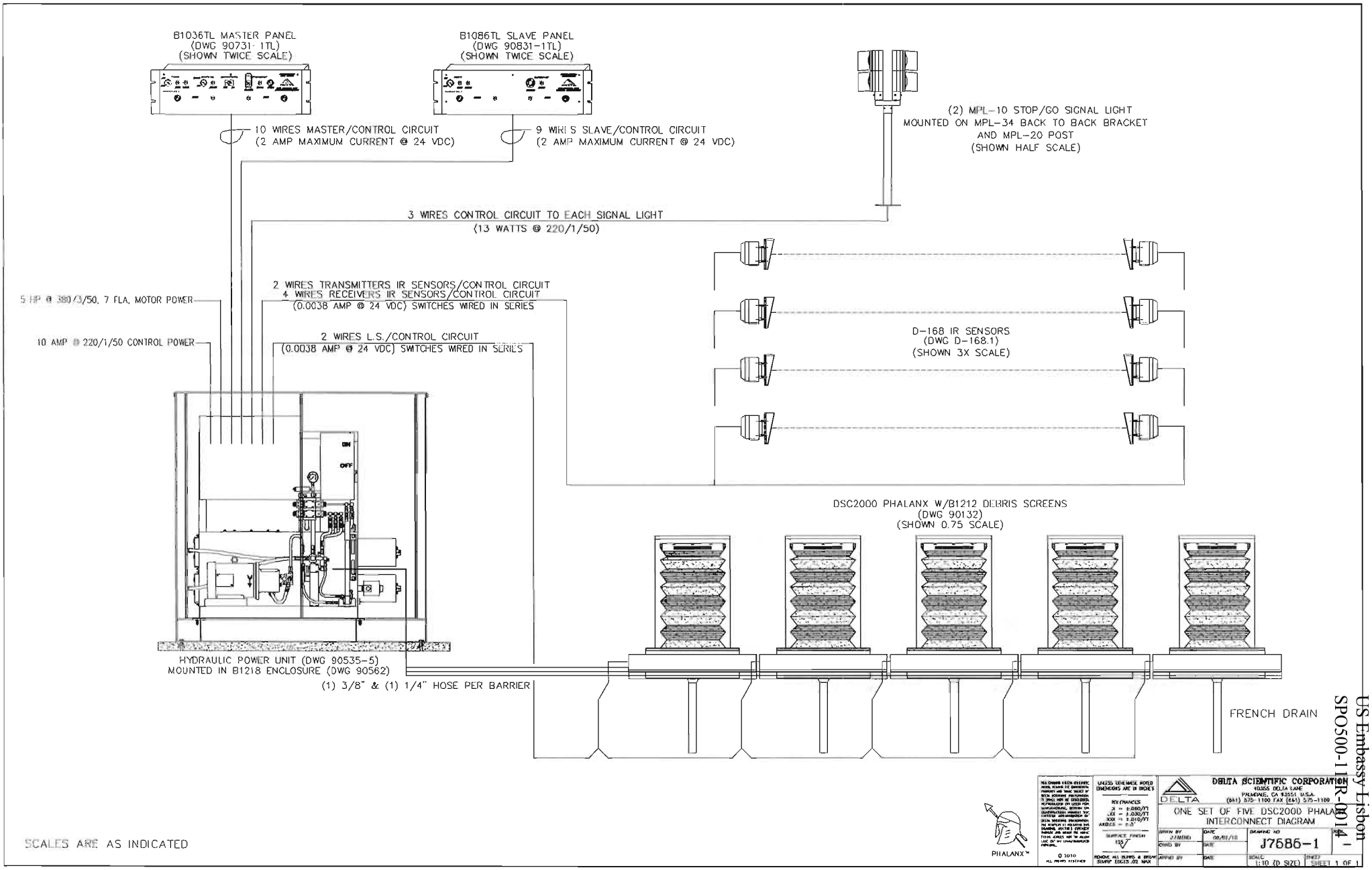
PHONE 661-575-1100
FAX 661-575-1109
EMAIL info@deltascientific.com

SPARE PARTS LIST – JOBS 7585 THROUGH 7486D
DELTA MODELS DSC2000 PHALANX BARRIERS

DSC2000 HYDRAULIC CYLINDER PARTS — EFFECTIVE September 3, 2010

STK NO.	DESCRIPTION	UNIT COST
10046-07	THREADED ROD 1/4"-20 X 12" LONG,	3.30
10046-13	TUBE, 3/8" O.D. X 0.035 WALL X 9" LONG,	3.30
11047-00	UPPER CLEVIS BRACKET,	7.70
11048-00	ADJUSTABLE BRACKET, DOWN LIMIT SWITCH,	5.50
11049-00	FIXED UPPER BRACKET AND ROD GUIDE,	6.60
11050-00	MAGNET BRACKET,	2.20
11051-00	FIXED LOWER BRACKET, UP LIMIT SWITCH (B2006 ONLY),	4.40
2465-203	LIMIT SWITCH MAGNET,	15.95
2465-27	MAGNETIC LIMIT SWITCH,	43.73
2468-08	HYDRAULIC CYLINDER, 2-1/2" DIA. X 6" STROKE,	363.00
2468-13	DELTA 2.5" UNIVERSAL KIT,	37.76
2468-21	CYLINDER PIN, 1" DIA, TIE ROD,, CROSS OR EQ	7.00
2501-4-6	CYLINDER CAP END FITTING,	6.60
2501-6-6	CYLINDER ROD END FITTING,	6.60
NUT1420NY	1/4 - 20 NYLOCK HEXNUT,	0.22
NUT3816	3/8" NUT,	0.11
WAS14SL	1/4" STEEL LOCK WASHER,	0.06
WAS38SAE	3/8" FLAT STEEL WASHER,	0.06
WAS38SL	3/8" STEEL LOCK WASHER,	0.06
MANUAL	OWNERS MANUAL, SERIAL NUMBER 7585	65.00

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.
PRICES ARE NET 30 DAYS TO APPROVED ACCOUNTS, FOB PALMDALE, CALIFORNIA.
SEE ORDERING INSTRUCTIONS TO ASSURE THAT PROPER PARTS ARE ORDERED.



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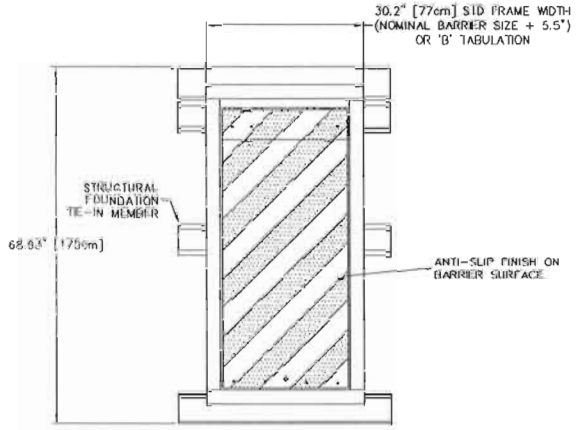
DRAWING 90132 FLY-SHEET

DELTA JOB NUMBER:	7585
CUSTOMER:	ANIXTER INC P.O. 597-598651-431 AMERICAN EMBASSY – LISBON, PORTUGAL
DATE:	September 3, 2010

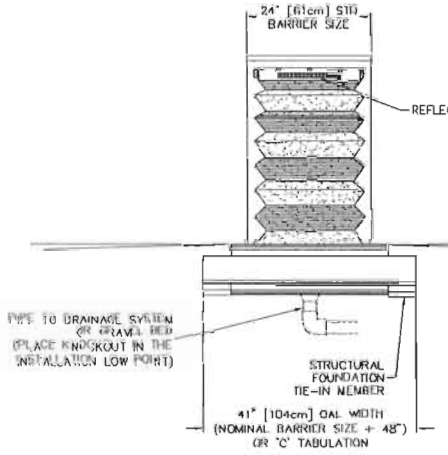
THIS FLY-SHEET COVERS JOB SPECIFIC TABULATIONS TO DELTA DRAWING 90132.

	S/N 7585-1, 7585-2, 7585-3, 7585-4 AND 7585-5, (FIVE DSC2000 PHALANX BARRIERS)
'A' OPTION HEATER:	NO BARRIER HEATERS
'B' OPTION LIMIT SWITCH, DOWN:	YES, (1 EA) FULLY DOWN POSITION, B2005
'C' OPTION LIMIT SWITCH, UP:	NO FULLY UP LIMIT SWITCH
REFLECTOR OR FLASHING LIGHT:	STANDARD RED REFLECTOR
DOWN LIMIT SWITCH STOCK NUMBER:	STOCK NUMBER 2465-27 (MAGNETIC STYLE)
UP LIMIT SWITCH STOCK NUMBER:	NO FULLY UP LIMIT SWITCH
CYLINDER STOCK NUMBER:	2468-08 (2.5" X 6")
BARRIER SURFACE PREPARATION:	HOT DIP GALVANIZE
PHALANX COLOR SCHEME:	BLACK W/4" YELLOW STRIPES TOP PLATES

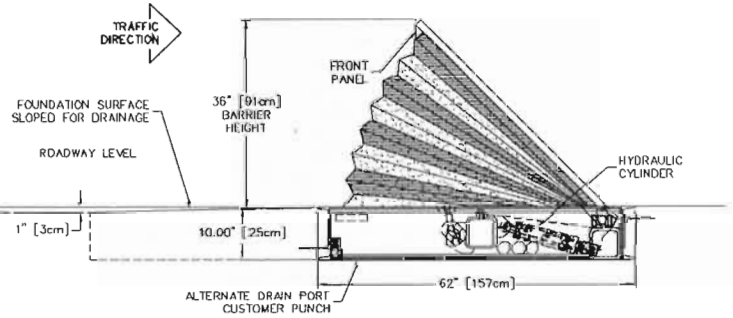
THESE ARE DSC2000'S WITH B1212 DEBRIS SCREENS.



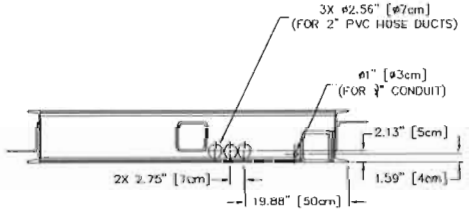
PLAN VIEW – DOWN POSITION



FRONT ELEVATION – UP POSITION



SIDE ELEVATION – UP POSITION



HOSE DUCT AND CONDUIT CONNECTIONS BOTH SIDES

ITEM	REQ'D	DESCRIPTION/MATERIAL	WT EA	TOT WT	REF NO
1	1	FRAME ASSEMBLY	602.0	602.0	10716-00
2	1	TOP PLATE ASSEMBLY	523.0	523.0	10670-00
3	3	CHAIN (13 LINKS)	34.0	102.0	10704-00
4	1	HYDRAULIC CYLINDER, 2.5" X 6"	20.0	20.0	2468-08
5	3	TUBE, PVC, 2.5" O.D.	3.4	10.3	10667-05
6	2	BEARING BLOCK	5.0	10.0	2739-010
7	8	SCREW, SOCKET HEAD, 1/2-20 X 2"	0.0	0.2	SSH12202
8	8	WASHER, LOCK, 1/2"	0.0	0.1	STOCK
9	8	WASHER, FLAT, 1-3/8" I.D. X 2.5" O.D. X 3/16" THK	0.1	0.4	STOCK
10	3	CHAIN PIN	2.0	6.0	10679-01
11	1	UPPER CHAIN PIN	7.0	7.0	10679-02
12	1	HINGE PIN	12.0	12.0	10679-03
13	1	FRONT SKIRT	21.0	21.0	10727-00
14	5	BOLT, 1/4-20 X 50 LONG, SST	0.0	0.1	STOCK
15	5	WASHER, 1/4" SST	0.0	0.1	STOCK
16	5	LOCK WASHER, 1/4" SST	0.0	0.1	STOCK
17	3	RING HANGER, 3/4"	0.0	0.1	3032T12
18	3	CABLE, CHAIN PULL	0.1	0.3	10743-00
19	6	BOLT, 1/4-20 X 1.25 LONG	0.0	0.1	STOCK
20	6	NUT, 1/4-20	0.0	0.1	STOCK
21	8	LINCH PIN	0.1	0.8	STOCK
		TOTAL WEIGHT		1,315	

NOTES:

1. OPTIONAL FEATURES (PARTIAL)

		PART NO.
(A)	HEATER, 300 WATTS @ 120 VOLTS	B1283
(A)	HEATER, 300 WATTS @ 240 VOLTS	B1284
(B)	LIMIT SWITCH, FULLY DOWN	B2005
(C)	LIMIT SWITCH, FULLY UP	B2006
(D)	HOT-DIP GALVANIZING PRIOR TO PAINTING	

2. COLOR OPTIONS:

   SCHEME 90130-20: WHITE W/4" WIDE YELLOW STRIPES
   SCHEME 90130-25: BLACK W/4" WIDE YELLOW STRIPES
   SCHEME 90130-30: WHITE W/4" WIDE RED STRIPES

   FOUNDATION – ASBESTOS FREE ASPHALT EMULSION UNDERCOAT.

3. ALL STEEL MEMBERS PER AISC STANDARDS WELDING DESIGN CRITERIA AWS D1.1, LATEST REVISION.
4. ALL VISIBLE TOP STEEL COMPONENTS SANDBLASTED TO NEAR WHITE METAL AFTER FABRICATION AND PRIOR TO COATING.
5. REFER TO DRAWING 91130 FOR FOUNDATION SPECIFICATION

PHALANX™

DELTA SCIENTIFIC CORPORATION
40035 DELTA LANE
PALMDALE, CA 93551 U.S.A.
(661) 575-1100 FAX (661) 575-1169

DSC2000 PHALANX BARRIER
WITH B1212 DEBRIS SCREEN

DRWN BY: S.WEITZNER	DATE: 10/15/07	DRAWING NO: 90132
CHKD BY:	DATE:	
APPVD BY:	DATE:	SCALE: 1:12 (D SIZE) SHEET: 1 OF 1

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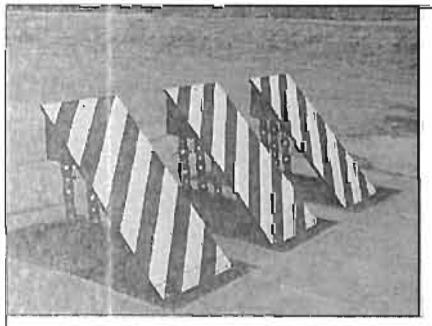
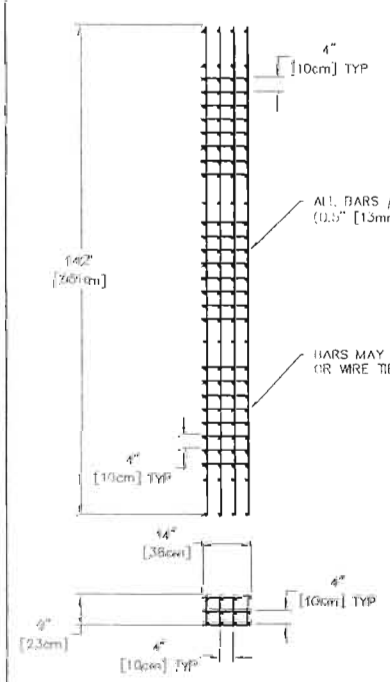
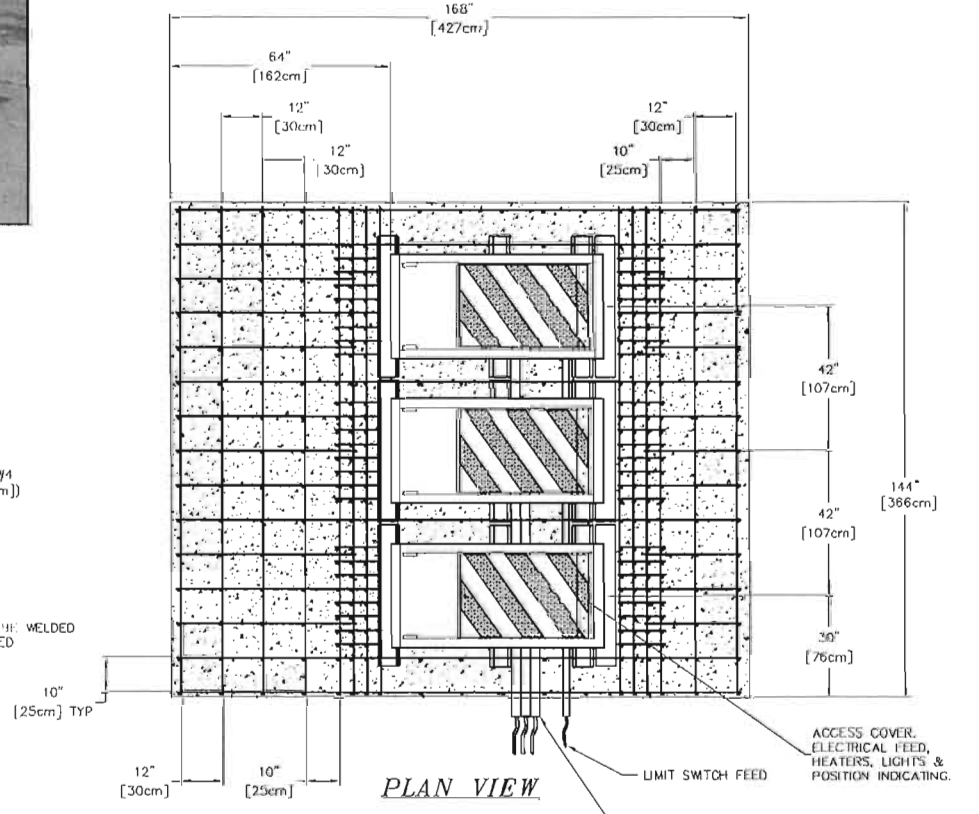
SPO500-11R-0014

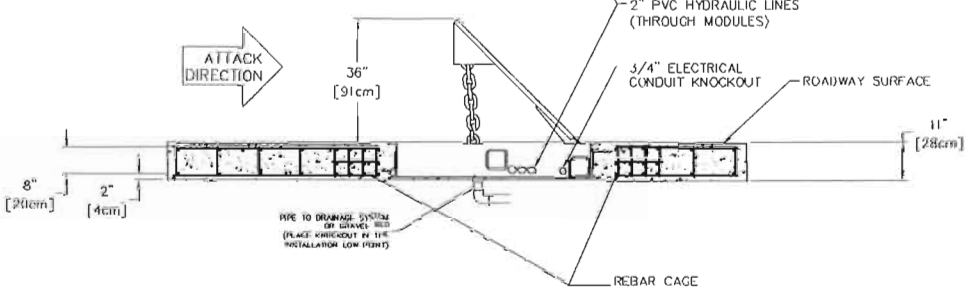




MAIN REBAR BEAM
TWO REQUIRED



PLAN VIEW



SIDE ELEVATION

CONCRETE NOTES & RECOMMENDED SPECIFICATIONS

1. CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS AT THE JOB SITE.
2. FOUNDATION CONCRETE MAY BE PLACED DIRECTLY INTO NEAT EXCAVATIONS, PROVIDED THE SIDES OF THE EXCAVATION ARE STABLE. WHERE CAVING OCCURS, PROVIDE SHORING. TYPE AND METHOD OF SHORING SHALL BE AT CONTRACTORS OPTION.
3. THE EXCAVATION SHALL BE KEPT DRY AT ALL TIMES. GROUND WATER, IF ENCOUNTERED, SHALL BE PUMPED FROM THE EXCAVATION.
4. CONCRETE SHALL BE LABORATORY DESIGNED, MACHINE MIXED, PRODUCING 3,000 PSI (20,68 MPA) AT 28 DAYS.
5. CEMENT SHALL BE TESTED PORTLAND CEMENT CONFORMING TO ASTM C150, TYPE II ONLY.
6. AGGREGATES SHALL CONFORM TO ASTM C33 & B GRADE PER STANDARD SPECIFICATIONS. MAXIMUM SIZE OF AGGREGATE SHALL BE 1-1/2 INCHES (38mm).
7. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A615, GRADE 60 (60,000 PSI OR 413.7MPA).
8. HOOKS AND BENDS SHALL CONFORM TO ACI STANDARD 318, LATEST REVISION. INSIDE DIAMETER OF HOOKS AND BENDS SHALL BE AT LEAST SIX (6) BAR DIAMETERS.
9. PROVIDE SPACER BARS, CHAIRS, SPREADERS, BLOCKS, ETC. AS REQUIRED TO POSITIVELY HOLD THE STEEL IN PLACE BEFORE CONCRETE IS POURED.
10. CONCRETE SHALL BE CONVEYED FROM THE MIXER TO FINAL DEPOSIT BY METHODS THAT WILL PREVENT SEPARATION OR LOSS OF MATERIALS.
11. CONCRETE SHALL BE THOROUGHLY CONSOLIDATED BY SUITABLE MEANS DURING PLACEMENT AND SHALL BE THOROUGHLY WORKED AROUND REINFORCEMENT AND EMBEDDED FIXTURES AND CORNERS OF FORMS.
12. CONCRETE SHALL BE MAINTAINED ABOVE 50°F (10°C) AND IN A MOIST CONDITION FOR AT LEAST SEVEN (7) DAYS AFTER PLACEMENT. ADEQUATE EQUIPMENT SHALL BE PROVIDED FOR HEATING CONCRETE MATERIALS AND PROTECTING CONCRETE DURING FREEZING OR NEAR FREEZING WEATHER.
13. WHERE EXTERIOR WALL FACE REQUIRES SHORING AND/OR FORMING, THE FORMS SHALL BE SUBSTANTIAL AND SUFFICIENTLY TIGHT TO PREVENT LEAKAGE. FORMS SHALL NOT BE REMOVED UNTIL THE CONCRETE IS SEVEN (7) DAYS OLD.
14. BACKFILLING SHALL BE DONE BY DEPOSITING AND TAMPING INTO PLACE CLEAN SAND OR POURING LEAN CONCRETE, TO 95% COMPACTION. WATER JETTING SHALL NOT BE ALLOWED.
15. CONDUITS AND PIPES OF ALUMINUM SHALL NOT BE ALLOWED.
16. CONSTRUCTION JOINTS NOT INDICATED ON THE DRAWINGS SHALL NOT BE ALLOWED. WHERE A CONSTRUCTION JOINT IS TO BE MADE, THE SURFACE OF THE CONCRETE SHALL BE THOROUGHLY CLEANED AND ALL LAITANCE AND STANDING WATER REMOVED.
17. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL ADJACENT AREAS AGAINST DAMAGE AND SHALL REPAIR OR PATCH ALL DAMAGED AREAS TO MATCH EXISTING IMPROVEMENTS.
18. CONTRACTOR SHALL KEEP THE CONSTRUCTION AREA CLEAN AT ALL TIMES AND AT COMPLETION OF WORK, REMOVE ALL SURPLUS MATERIALS, EQUIPMENT AND DEBRIS AND LEAVE THE PREMISES IN A CLEAN CONDITION ACCEPTABLE TO THE OWNER OR OWNER'S REPRESENTATIVE.

- **AS TESTED IN ACCORDANCE WITH THE UNITED STATES DEPARTMENT OF STATE, CERTIFICATION STANDARD SD-STD-02.01, REV. A**
  RATING: K12

PHALANX™

REV.	DESCRIPTION	DRAWN BY	DATE	APPVD BY	DATE
A	ECO #2006-131	JNF	10/11/06		

DELTA SCIENTIFIC CORPORATION
40359 DELTA LANE
PALMDALE, CA 93551 USA
(661) 575-1100 FAX (661) 575-1169

MODEL DSC2000 PHALANX BARRIER
FOUNDATION SPECIFICATION *

DRWN BY	DATE	DRAWING NO.	REV
J. FRIEND	09/09/05	91130	A
CHKD BY	DATE		
APPVD BY	DATE	SCALE: 1:10 (D SIZE)	SHEET 1 OF 1

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES

TOLERANCES
X = ± .060/1.5
.XX = ± .030/.75
.XXX = ± .010/.11
ANGLES = ± .5°

SURFACE FINISH
125

REMOVE ALL BURRS & BREAK SHARP EDGES .02 MAX

US Embassy Lisbon
SPO50014-R-0014

DRAWING 90535-5 FLY-SHEET

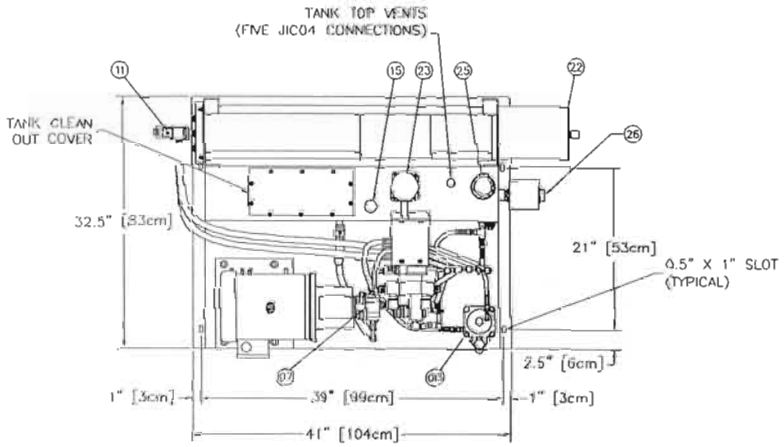
DELTA JOB NUMBER: 7585

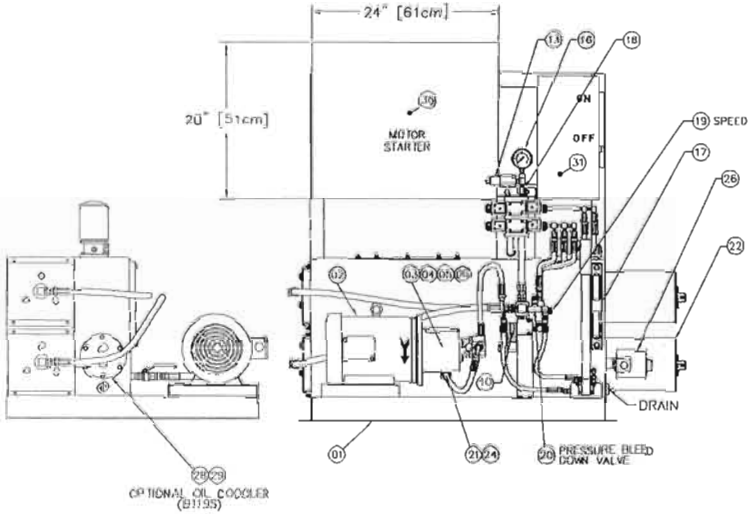
CUSTOMER: ANIXTER INC
P.O. 597-598651-431
AMERICAN EMBASSY – LISBON, PORTUGAL

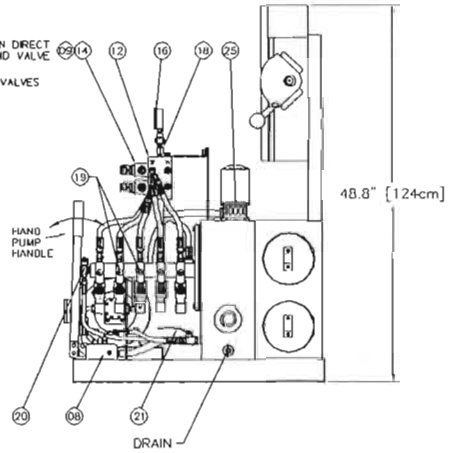
DATE: September 3, 2010

THIS FLY-SHEET COVERS JOB SPECIFIC TABULATIONS TO DELTA DRAWING 90535-5.

	S/N 7585-HPU (ONE HYDRAULIC POWER UNIT)
'H' HORSEPOWER @ 'V' MOTOR VOLTAGE:	5 HP @ 380/3/50
'M' MOTOR STOCK NUMBER:	2464-165
B1020 AUXILIARY EFO OPTION:	NO AUXILIARY EFO
ACCUMULATOR QUANTITY:	(TWO) FIVE GALLON, TEN GALLONS TOTAL
ACCUMULATOR PRECHARGE PRESSURE:	700 PSIG DRY NITROGEN
B1190/B1191 OIL HEATER OPTION:	NO OIL HEATER
B1195/B1196 OIL COOLER OPTION:	NO OIL COOLER
B1260 DISCONNECT OPTION:	YES, B1260, STOCK NUMBER 2531-113
B1325 HANDPUMP OPTION:	YES, B1325, STOCK NUMBER 2471-21
MOTOR STARTER DRAWING NUMBER:	90610-2/C
WEIGHT, POUNDS [KILOGRAMS]:	792 POUNDS [359 KG]
HPU ENCLOSURE:	YES, STOCK NUMBER B1218 [WHITE]
WEIGHT IN ENCLOSURE, POUNDS [KG]:	1,857 POUNDS [842 KG]
HPU ENCLOSURE DRAWING:	DWG 90562/-

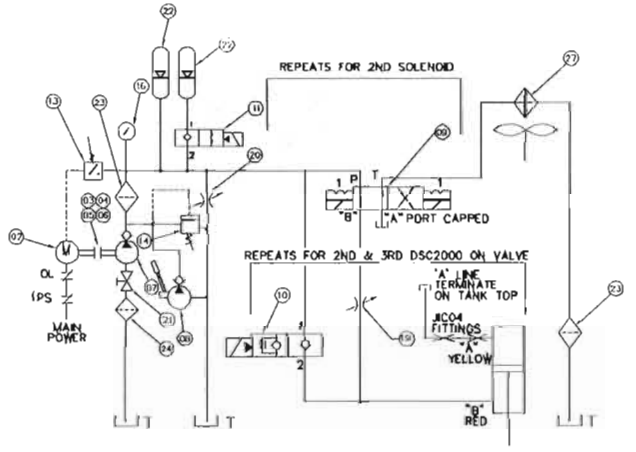






	ITEM	REQ'D	MATERIAL DESCRIPTION	STK NO
	01	1	HPU, TANK AND FRAME	B050-00
	02	1	MOTOR, 'H' HP @ 'V' (SPECIFIED VOLTAGE)	2464-'M'
	03	1	PUMP/MOTOR ADAPTER, 8.5" AK TO SAE 4 BOLT,	2464-32
	04	1	PUMP HALF COUPLING, 1/2"	2464-53
	05	1	MOTOR HALF COUPLING, 1 1/8"	2464-52
	06	1	COUPLING SPIDER,	2464-61
	07	1	HYD PUMP, 0.258 CUBIC INCH/REV	2471-17
OPTIONAL	08	0 or 1	HANDPUMP, B1325 OPTION	2471-21
	09	2	VALVE,SOLENOID, D03, 24 VDC, SPRING DETENTED	2467-01
	10	5	VALVE, EFO, 24 VDC	2467-31
OPTIONAL	11	0 or 1	VALVE, AUXILIARY EFO, 24 VDC, B1020 OPTION	2467-33
	12	1	MANIFOLD, ISO 03, DUAL STATION	2467-72
	13	1	PRESSURE SWITCH, OFF @ 1900 PSIG/REST 1400 PSIG,	2465-01
	14	1	PRESSURE RELIEF VALVE, SET 2200 PSIG,	2465-05
	15	1	LEVEL SWITCH,	2465-11
	16	1	PRESSURE GUAGE, 0-3000 PSIG,	2465-21
	17	1	LEVEL GAUGE, 10",	2465-22
	18	1	GAUGE SNUBBER, 1/4" NPT SIZE,	2465-23
	19	5	VALVE, NEEDLE, 3/8" NPT,	2466-12
	20	1	VALVE, NEEDLE, 1/4" NPT,	2466-11
	21	1	VALVE, BALL, 1/2" NPT, BRONZE	2466-33B
	22	2	ACCUMULATOR, PISTON TYPE, 5 GALLON,	2469-94
	23	1	FILTER ELEMENT/HOUSING,	2470-02
	24	1	SUCTION STRAINER,	2470-41
	25	1	FILLER BREATHER,	2470-43
OPTIONAL	26	0 or 1	TANK HEATER, B1190 or B1191 OPTION	2465-xx
OPTIONAL	27	0 or 1	OIL RESERVOIR COOLER (AIR), B1196 OPTION	2465-xx
OPTIONAL	28	0 or 1	OIL COOLER, WATER COOLED, B1195 OPTION	2465-52
OPTIONAL	29	0 or 1	OIL COOLER WATER THERMOSTAT, B1195 OPTION	2465-53
	30	1	MOTOR STARTER, CONTROL CIRCUIT	906xx
OPTIONAL	31	0 or 1	DISCONNECT SWITCH, B1260 OPTION	2531-110

TOTAL WEIGHT = 792 POUNDS [359 KG]



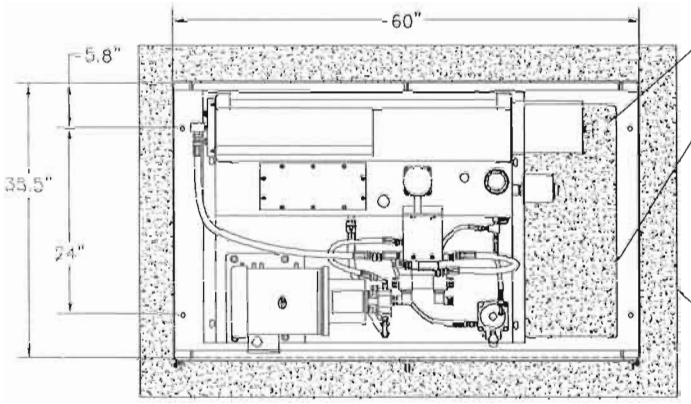
TYPICAL HYDRAULIC FLOW SCHEMATIC

BARRIERS OPERATE SINGLE ACTING WITH ROD END VENTS

DELTA SCIENTIFIC CORPORATION
DELTA HYDRAULIC POWER UNIT
GENERAL ARRANGEMENT
DRAWN BY J. FRIEND
DATE 11/20/96
DRAWING NO 90535-5
SCALE 1/8 (D SIZE)
SHEET SHEET 1 OF 1

US Embassy Lisbon
SPO500-14-R-0014

ITEM	REQ'D	DESCRIPTION	STK. NO.	WEIGHT
01	1	B1218 HPU ENCLOSURE ASSEMBLY	7435-00	1065 POUNDS
02	1	HYDRAULIC POWER UNIT	905xx	xxxx POUNDS
			TOTAL WT:	xxxx POUNDS



PLAN VIEW (ROOF REMOVED)

OVERHEAD INFRINGEMENT IN STUB-UP AREA

STUB-UP AREA - 6.5 [165] x 31.0 [787]
KEEP THIS AREA AVAILIBLE FOR
CONDUIT ENTERING/LEAVING HPU

3.0 INCH IPS SCH. 40 PVC
(OR EQUIVALENT) - ONE REQUIRED PER BARRIER OR BOLLARD
* ALTERNATE HYDRAULIC:
RIGID STEEL PIPE MAY BE
SUBSTITUTED FOR HOSE/PVC
CONDUIT SYSTEM

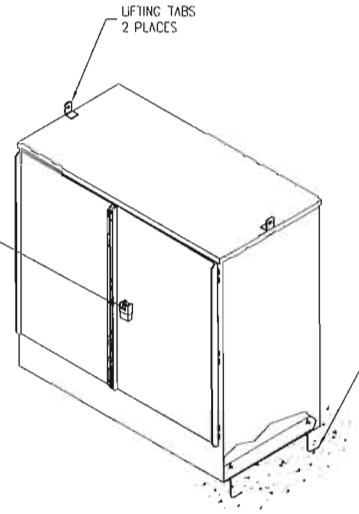
ELECTRICAL CONDUIT:
(1 EA) - PER BARRIER OR BOLLARD LIMIT SWITCH
(1) - MAIN POWER FEED
(1 EA) - PER BARRIER OR BOLLARD HEATER (OPTIONAL)
(1 LOT) - CONTROL CONDUIT AS REQUIRED

ALL SUPPLIED BY INSTALLING CONTRACTOR

CONCRETE FOUNDATION
(CUSTOMER FURNISHED)

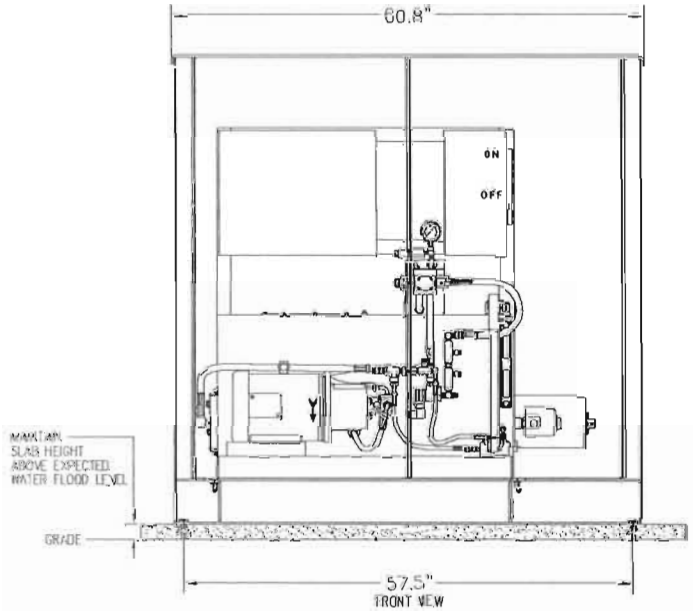
LIFTING TABS
2 PLACES

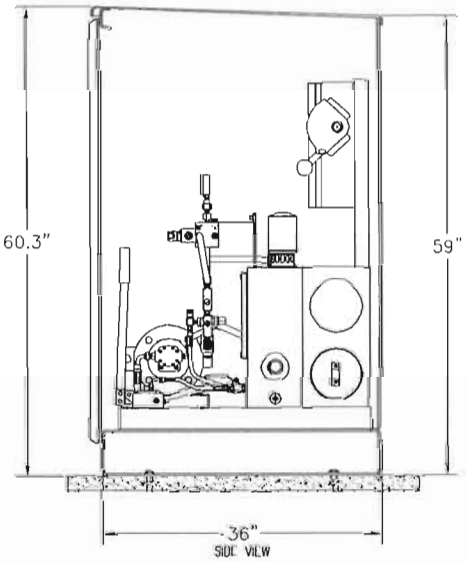
HASP TO ACCOMMODATE
MEDECO PAD LOCK
#54-510R00-KA,
#5/16" SHACKLE,
1-1/8" CLEARANCE



ENCLOSURE ATTACHMENT NOTES:

5/16" LEG ANCHOR BOLT
4 REQUIRED
* ALTERNATE LAG SCREW/LAG SCREW SHIELD
/MASONRY ANCHOR/
ALL INSTALLER SUPPLIED





NOTES:

1) COVER IS 0.25 INCH THICK MILD STEEL.
2) FURNISHED STANDARD SHOP PRIMER (GRAY)
FINISH COAT - INDUSTRIAL ENAMEL (WHITE)
3) PADLOCK FURNISHED BY OTHERS
4) AREA UNDER HPU SKID REPRESENTS
OIL DRIP PAN, 35" X 45" X 6" DEEP.
5) MAXIMUM HPU HEIGHT IS 53 INCHES.

DELTA SCIENTIFIC CORPORATION
40355 DELTA LANE
PALMDALE, CA 93551 U.S.A.
(661) 315-1500 FAX (661) 575-1150

B1218, FORCE RESISTANT HEAVY DUTY HPU
ENCLOSURE, 1/4" PLATE CONSTRUCTION

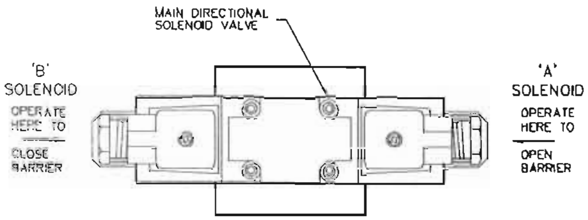
DRAWING NO. 90562

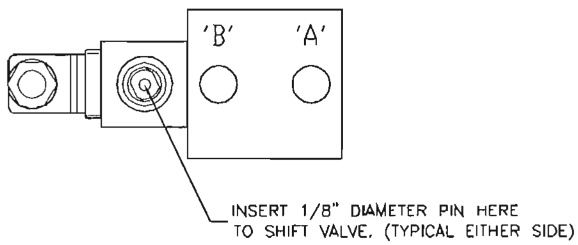
SIZE D (D SIZE) SHEET 1 OF 3

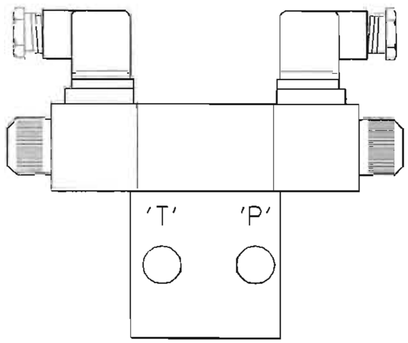
UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES
TOLERANCES
.X = ±.060/.1T
.XX = ±.030/.1T
.XXX = ±.010/.1T
ANGLES = ±.5°
SURFACE FINISH
125
REMOVE ALL BURRS & BREAK SHARP EDGES .02 MAX

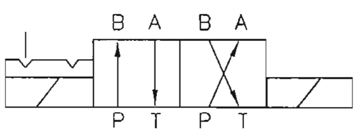
US Embassy Lisbon
SPO500-11R-0014

MAIN DIRECTION CONTROL VALVE
(ON MANIFOLD)



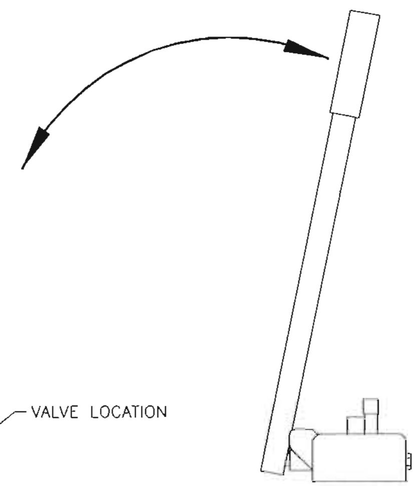


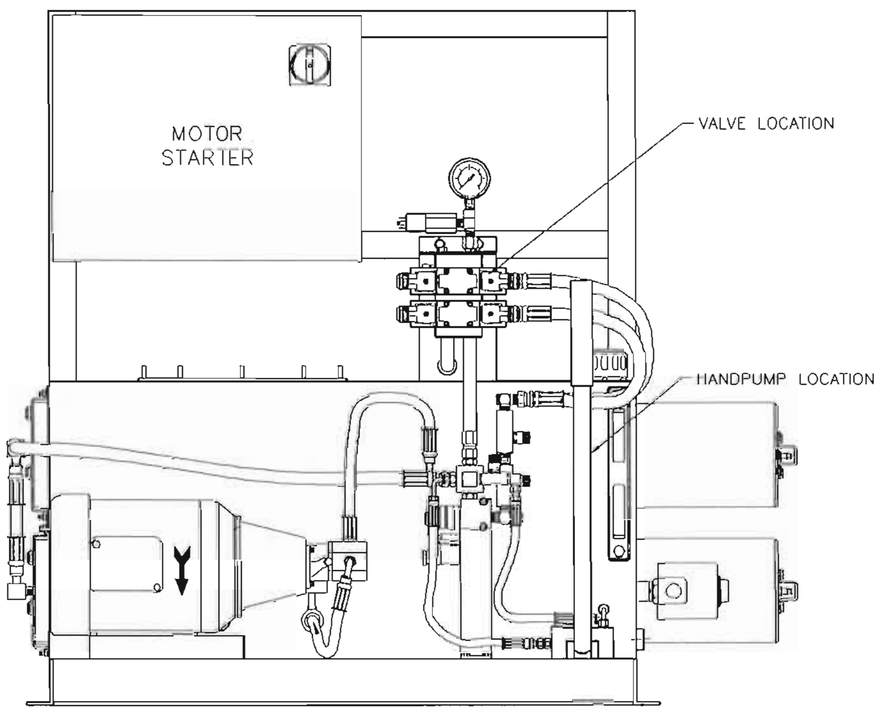




VALVE SYMBOL

HANDPUMP
(ON POWER UNIT BASE)





FRONT ELEVATION

MANUAL OPERATION INSTRUCTIONS:

1) SHIFT VALVE FROM LEFT TO CLOSE OR FROM RIGHT TO OPEN THE BARRIER.

2) OPERATE THE HANDPUMP UNTIL BARRIER IS IN THE DESIRED POSITION.

REV.	DESCRIPTION	DRWN BY	DATE
A	ECO #2003-42	JHF	01/21/03

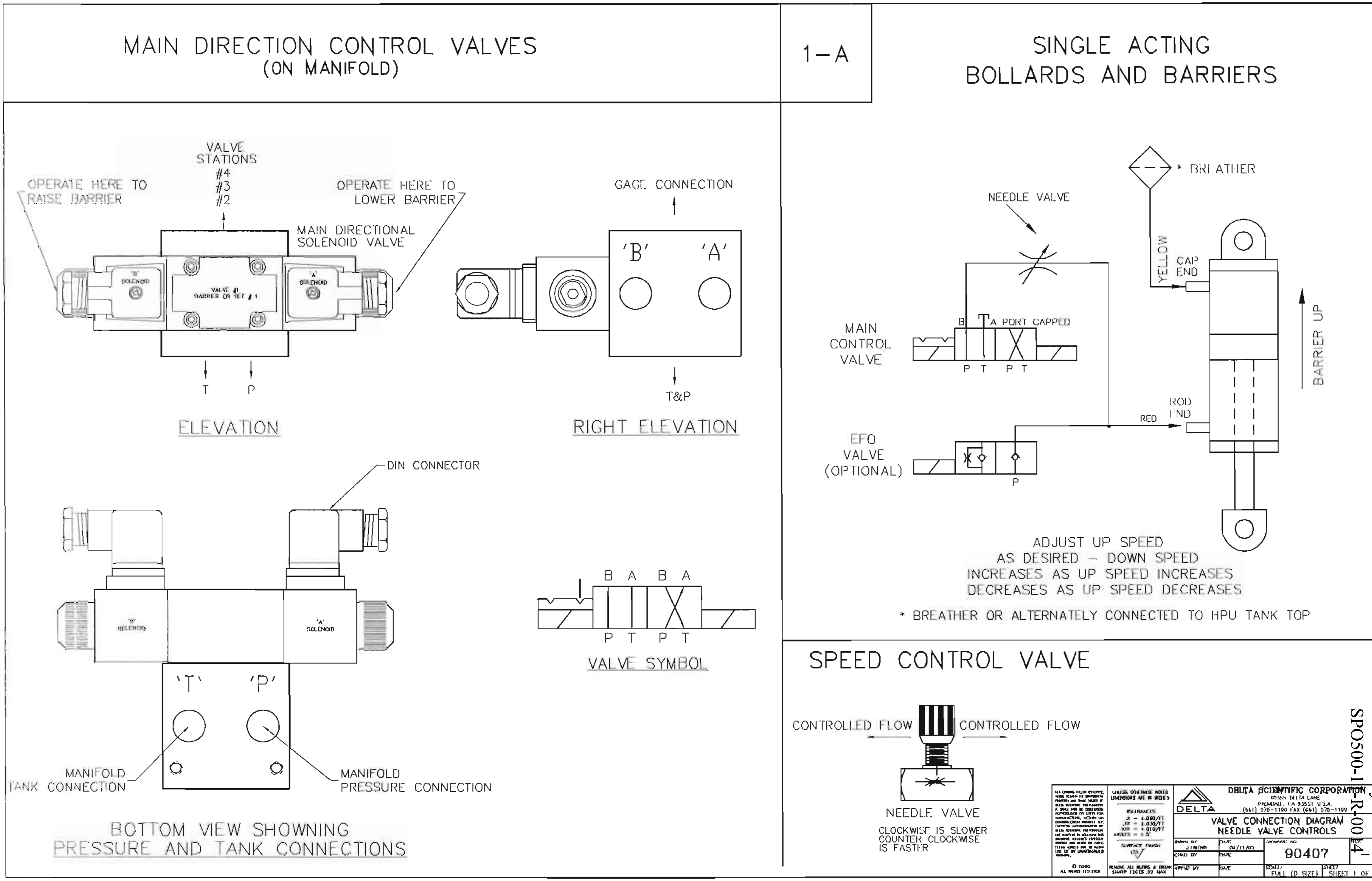
DELTA SCIENTIFIC CORPORATION

MANUAL OPERATION INSTRUCTIONS DELTA - SOLENOID VALVE AND HANDPUMP

DRAWING NO. 90520 REV. A

SCALE N.T.S. SHEET 1 OF 1

US Embassy Lisbon
SPO500-1?-R-0014



DRAWING 90610-2 FLY-SHEET

DELTA JOB NUMBER: 7585

CUSTOMER: ANIXTER INC
P.O. 597-598651-431
AMERICAN EMBASSY – LISBON, PORTUGAL

DATE: September 3, 2010

THIS FLY-SHEET COVERS JOB SPECIFIC TABULATIONS TO DELTA DRAWING 90610-2.

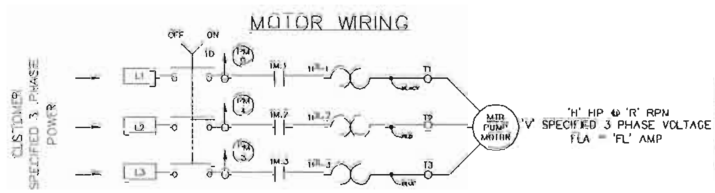
	S/N 7585-CC (ONE CONTROL CIRCUIT)
'H' HORSEPOWER @ 'R' MOTOR RPM:	5 HP @ 2875 RPM
'V' MOTOR VOLTAGE:	380/3/50
'FL' MOTOR FULL LOAD AMPS:	7 AMPS
'CV' CONTROL CIRCUIT VOLTAGE:	220/1/50
'PSW' POWER SUPPLY WATTS / STK. NO:	320 WATTS, STOCK NUMBER 2461-27
'1FU'/'PA' FUSE AND STOCK NUMBER:	4 AMPS, STOCK NUMBER 2459-19
'2FU'/'SA' FUSE AND STOCK NUMBER:	12 AMPS, STOCK NUMBER 2459-141
'3FU'/'RHA' FUSE AND STOCK NUMBER:	NO OIL HEATER
'RW' OIL HEATER WATTS:	NO OIL HEATER
'4FU-9FU'/'BHA' FUSE AND STOCK NUMBER:	NO BARRIER HEATER
'HW' BARRIER HEATER WATTS:	NO BARRIER HEATER
WIRE COLOR CODE:	EUROPE
B1255 POWER MONITOR OPTION:	YES, STOCK NUMBER 2465-66
B1260 DISCONNECT OPTION:	YES, STOCK NUMBER 2531-113 (600 VOLT)
STARTER STOCK NUMBER:	2531-108 (A-B 100-C16KL10)
OVERLOAD STOCK NUMBER:	2531-67 (A-B 193ED1EB)

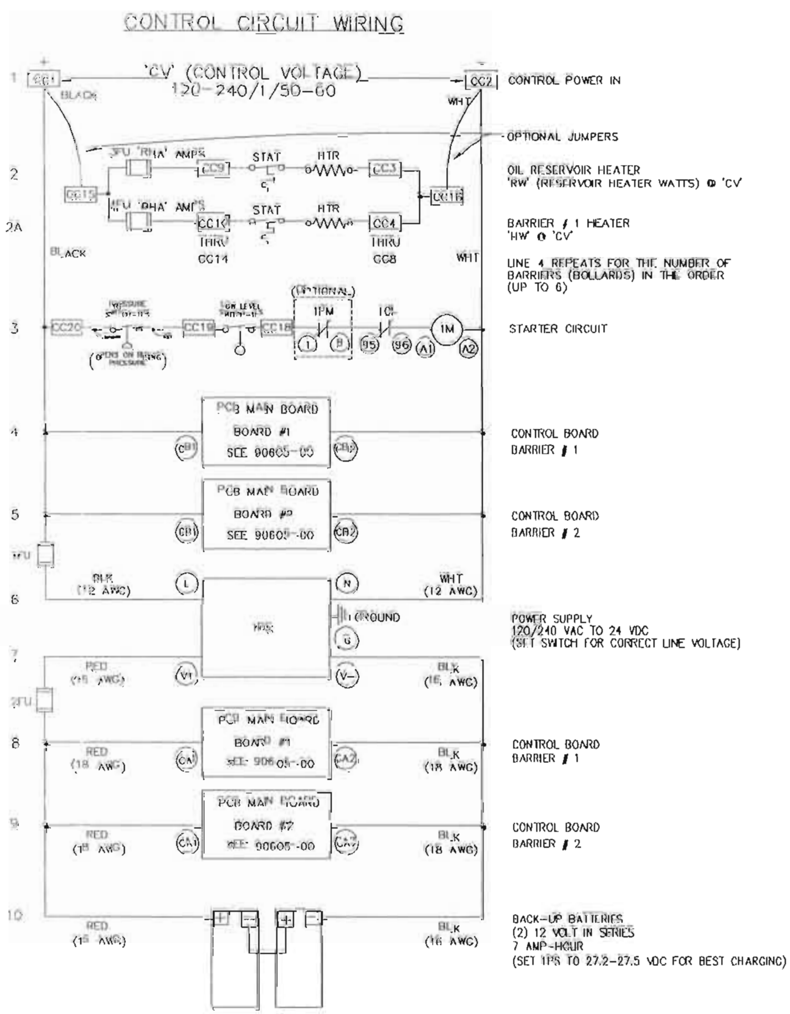
US Embassy Lisbon
SPO500-11-R-0014

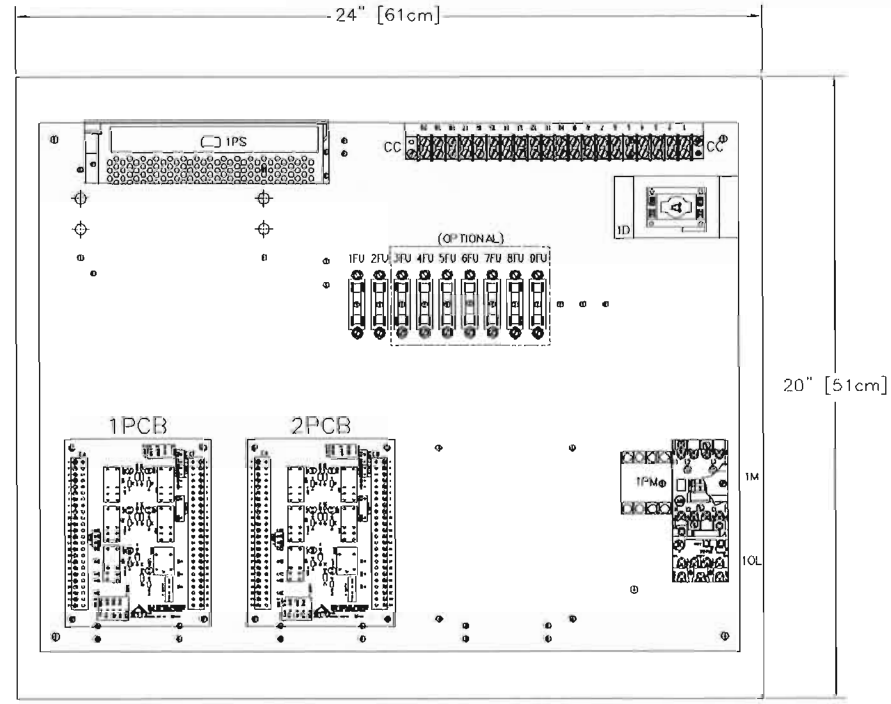
ITEM	REQ'D.	DESCRIPTION	STK. NO.
1PCB-2PCB	2	DELTA PRINTED CIRCUIT BOARD ASSEMBLY, P/N 7314-00	90605-00
1M	1	MOTOR STARTER.	2531-xx
1OL	1	STARTER OVERLOAD.	2531-xx
OPTIONAL 1D	0 or 1	DISCONNECT, B1260 OPTION	2531-95
OPTIONAL 1PM	0 or 1	POWER MONITOR, B1255 OPTION	2465-0x
1PS	1	POWER SUPPLY, 120/240 V, 50/60 HZ/24 VDC, 150 WATTS	2461-25
1FU	1	FUSE, 250 VOLTS, 'PA' AMP, DUAL ELEMENT,	2459-xx
2FU	1	FUSE, 250 VOLTS, 'SA' AMP, DUAL ELEMENT,	2459-xx
OPTIONAL 3FU	0 or 1	FUSE, 250 VOLTS, 'RHA' AMP, DUAL ELEMENT,	2459-xx
OPTIONAL 4FU-9FU	0 - 6	FUSE, 250 VOLTS, 'BHA' AMP, DUAL ELEMENT,	2459-xx
1BAT-2BAT	2	BATTERY, 12 VOLT, 7 AMP-HOUR, YUASA NP7-12 OR EQ	2461-40
01	1	TERMINALS, 15 AMP, 10 POINT	2460-11
02	1	ENCLOSURE, NEMA 1, 20" x 24" x 6",	2462-75
03	1	CHASSIS PAN, 17" x 22.5"	2462-76

LOCATION	L1	L2	L3	NEUTRAL	GROUND
USA - 200-250 VAC	BLACK	RED	BLUE	WHITE	GREEN *
USA - 400-500 VAC	BROWN	ORANGE	YELLOW	WHITE	GREEN *
CANADA	RED	BLACK	BLUE	WHITE	GREEN *
EUROPE	BROWN	BLACK	GREY	BLUE	GRN/YEL

* GROUND CONDUCTOR MAY BE BARE COPPER WIRE





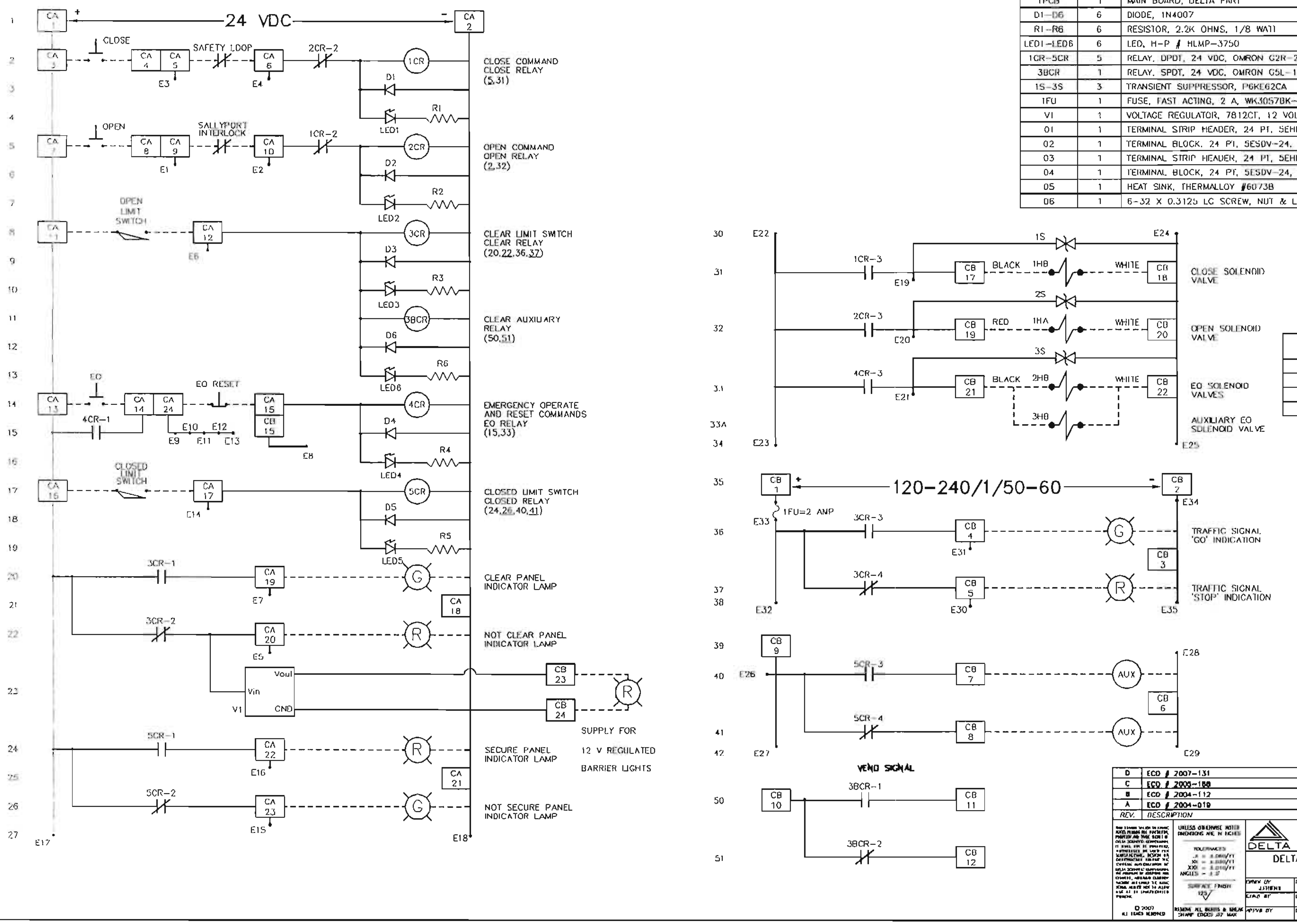


APPROXIMATE PARTS LOCATION ON CHASSIS PAN
ENCLOSURE CLASSIFICATION NEMA 1

REV.	DESCRIPTION	DRAWN BY	DATE
C	ECO #2007-148	JHF	12/07/07
B	ECO #2003-80	JHF	03/02/03
A	ADDED JUMPERS TO HEATER TERMINALS	JHF	09/14/01

DELTA SCIENTIFIC CORPORATION
CONTROL CIRCUIT/MOTOR STARTER
DOUBLE BARRIER SYSTEM
DRAWING NO. 90610-2 C
SCALE 1:2 (D SIZE) SHEET 1 OF 1

ITEM	QUAN.	DESCRIPTION	STOCK NO.
1PCB	1	MAIN BOARD, DELTA PART	7195-00
D1-D6	6	DIODE, 1N4007	3546-01
R1-R6	6	RESISTOR, 2.2K OHMS, 1/8 WATT	3546-R1
LED1-LED6	6	LED, H-P # HLMP-3750	3546-LED
1CR-5CR	5	RELAY, DPDT, 24 VDC, OMRON G2R-24-24VDC	2457-91
3BCR	1	RELAY, SPDT, 24 VDC, OMRON G5L-114P-PS-24VDC	2457-92
1S-3S	3	TRANSIENT SUPPRESSOR, P6KE62CA	7195-S1
1FU	1	FUSE, FAST ACTING, 2 A, WK3057BK-ND (MFG 37312000410)	7195-FU1
V1	1	VOLTAGE REGULATOR, 7812CT, 12 VOLT	7195-V1
01	1	TERMINAL STRIP HEADER, 24 PT, 5EHDRC-24, 1-24	2460-92
02	1	TERMINAL BLOCK, 24 PT, 5ESDV-24, 1-24	2460-93
03	1	TERMINAL STRIP HEADER, 24 PT, 5EHDRC-24, 24-1	2460-94
04	1	TERMINAL BLOCK, 24 PT, 5ESDV-24, 24-1	2460-95
05	1	HEAT SINK, THERMALLOY #6073B	7195-05
06	1	6-32 X 0.3125 LG SCREW, NUT & LOCK WASHER	------



JUMPER CHART		
E1	TO	E2
E4	TO	E9
E17	TO	E22
E18	TO	E24

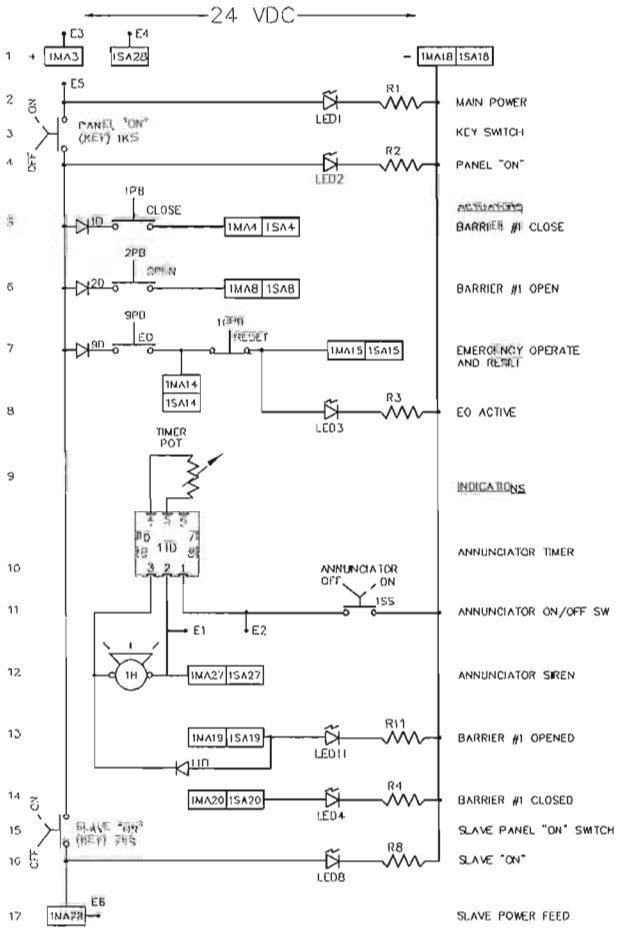
* WITH DIODE

REV.	DESCRIPTION	DRAWN BY	DATE	APPVD BY	DATE
D	ECO # 2007-131	JNF	10/24/07		
C	ECO # 2005-188	JNF	12/14/05		
B	ECO # 2004-112	JNF	08/11/04		
A	ECO # 2004-019	JNF	04/29/04		

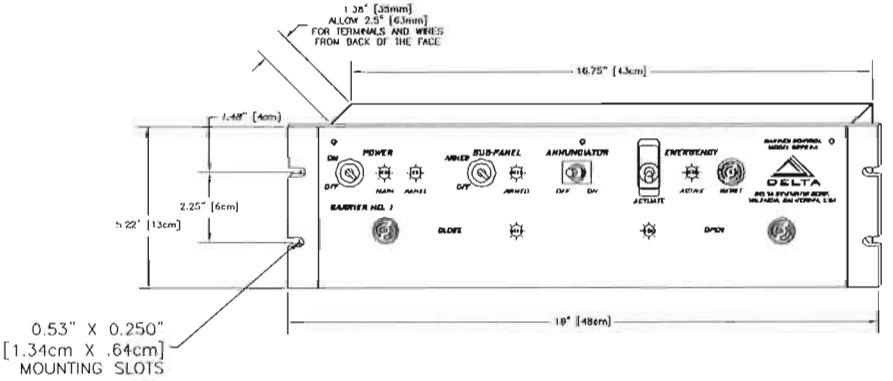
DELTA SCIENTIFIC CORPORATION
40355 DELTA LANE
PALMDALE, CA 93551 U.S.A.
(661) 575-1100 FAX (661) 575-1109

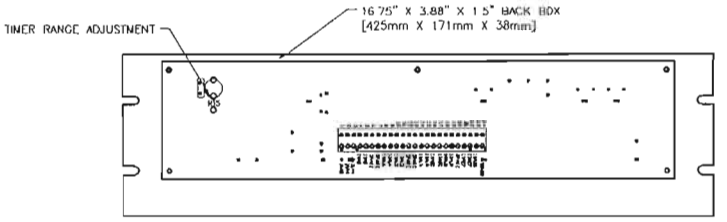
DELTA BARRIER CONTROL CIRCUIT
PRINTED CIRCUIT BOARD

DRAWING NO. 90605 — D
SCALE: NTS
SHEET 1 OF 1



ITEM	REQ'D	DESCRIPTION	STK. NO.
1KS-2KS	2	KEY SWITCH,	2463-01
1SS	1	SELECTOR SWITCH,	2463-02A
1PB-2PB	2	PUSH BUTTON, N.O.,	2463-06
3PB	1	HOODED TOGGLE,	2463-03A
1OPB	1	PUSH BUTTON, N.C.,	2463-07
LED1-LED8	5	PILOT LIGHT, RED, LED, 24 VDC,	2463-16
LED11	1	PILOT LIGHT, GREEN, LED, 24 VDC,	2463-17
1H	1	ANNUNCIATOR SIREN,	2463-63
1TD	1	RELAY, ON-DELAY, 24 VDC,	2534-69
POT	1	TRIM POT, 1K OHM,	2534-68
1D-11D	4	DIODE, IN5404	IN5404
R1-R11	6	RESISTOR, 1.2K OHM, 0.25 WATT,	———
01	1	BOARD, PCB,	90731-TL
02	1	PANEL FACE, 5.22" X 19" X 0.125"	1883-XX
03	1	ENCLOSURE, 3.88" X 16.75" X 1.5"	2462-58
04	2	TERMINAL STRIP, 28 POINT, FEMALE	2460-02
05	2	TERMINAL STRIP, 28 POINT, MALE	2460-03





PANEL BACK – WIRING CONNECTIONS

MASTER PANELS:
JUMPER E3 TO E5, E4 TO E6

SLAVE PANELS:
JUMPER E4 TO E5

LEGEND

1TD (2) (7) — DEVICE WITH DEVICE'S PIN CALLOUTS

2MA28 — TERMINAL LOCATION

DELTA SCIENTIFIC CORPORATION
10365 DELTA LANE
PALMDALE, CA 93551 U.S.A.
(661) 575-1100 FAX (661) 575-1100

B10351L MASTER PANEL W/INDICATING LIGHTS EFO, ANNUNCIATOR AND OVERRIDE, ONE BARRIER

DRAWN BY: J.LISTMO — DATE: 08/18/03
CHKD BY — DATE
APPVD BY — DATE
DRAWING NO: 90731-1TL –
SCALE: 1:2 (D SIZE)
SHEET: SHEET 1 OF 1

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES
TOLERANCES: X = ±.030/.Y1 .XX = ±.010/.Y1 ANGLES = ±2°
SURFACE FINISH 125
REMOVE ALL BURRS & BREAK SHARP EDGES .02 MAX

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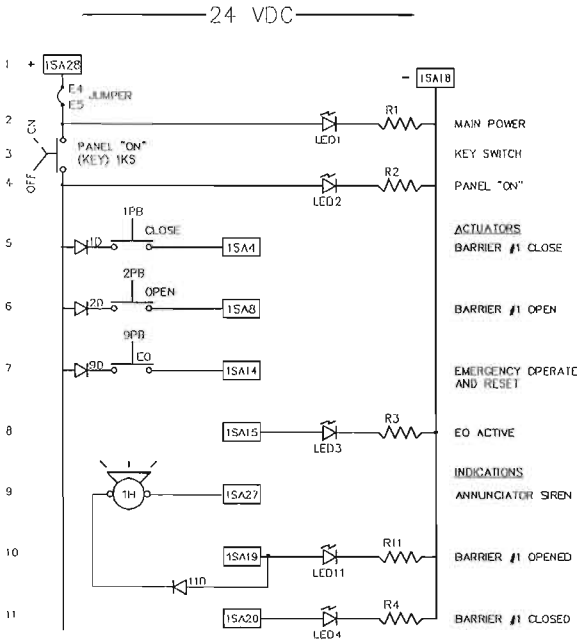
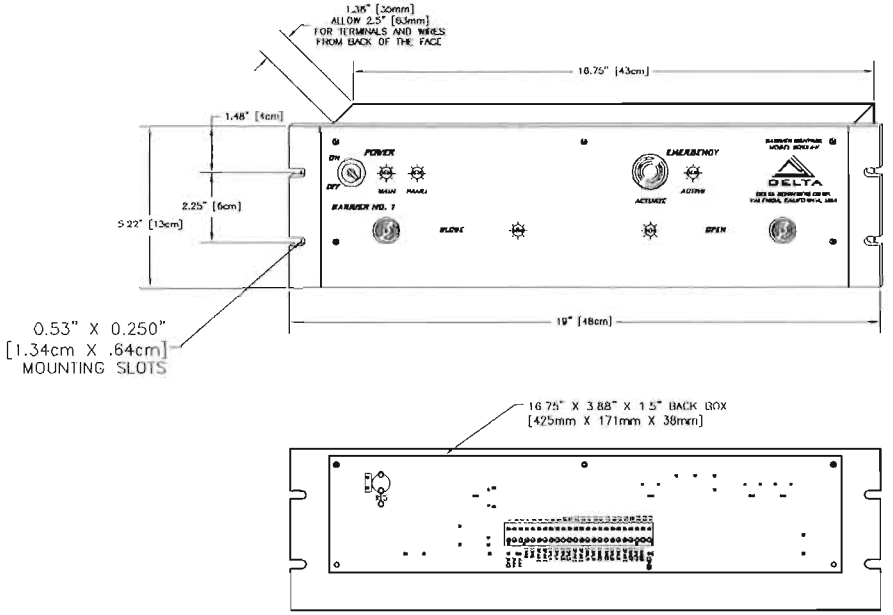
US Embassy Lisbon
SPO500-11R-0004 –

ITEM	REQ'D	DESCRIPTION	STK. NO.
1KS	1	KEY SWITCH,	2463-01
1PB-2PB	2	PUSH BUTTON, N.O.,	2463-06
9PB	1	LARGE PUSH BUTTON,	2463-04A
LED1-LED4	4	PILOT LIGHT, RED, LED, 24 VDC,	2463-16
LED11	1	PILOT LIGHT, GREEN, LED, 24 VDC,	2463-17
1H	1	ANNUNCIATOR SIREN,	2463-63
1D-11D	4	DIODE, IN5404	IN5404
R1-R11	5	RESISTOR, 1.2K OHM, 0.25 WATT,	----
01	1	BOARD, PCB,	90731-TL
02	1	PANEL FACE, 5.22" X 19" X 0.125"	1893-XX
03	1	ENCLOSURE, 3.88" X 16.75" X 1.5"	2462-58
04	1	TERMINAL STRIP, 28 POINT, FEMALE	2460-02
05	1	TERMINAL STRIP, 28 POINT, MALE	2460-03





PANEL BACK - WIRING CONNECTIONS

MASTER PANELS:
JUMPER E3 TO E5, E4 TO E6

SLAVE PANELS:
JUMPER E4 TO E5

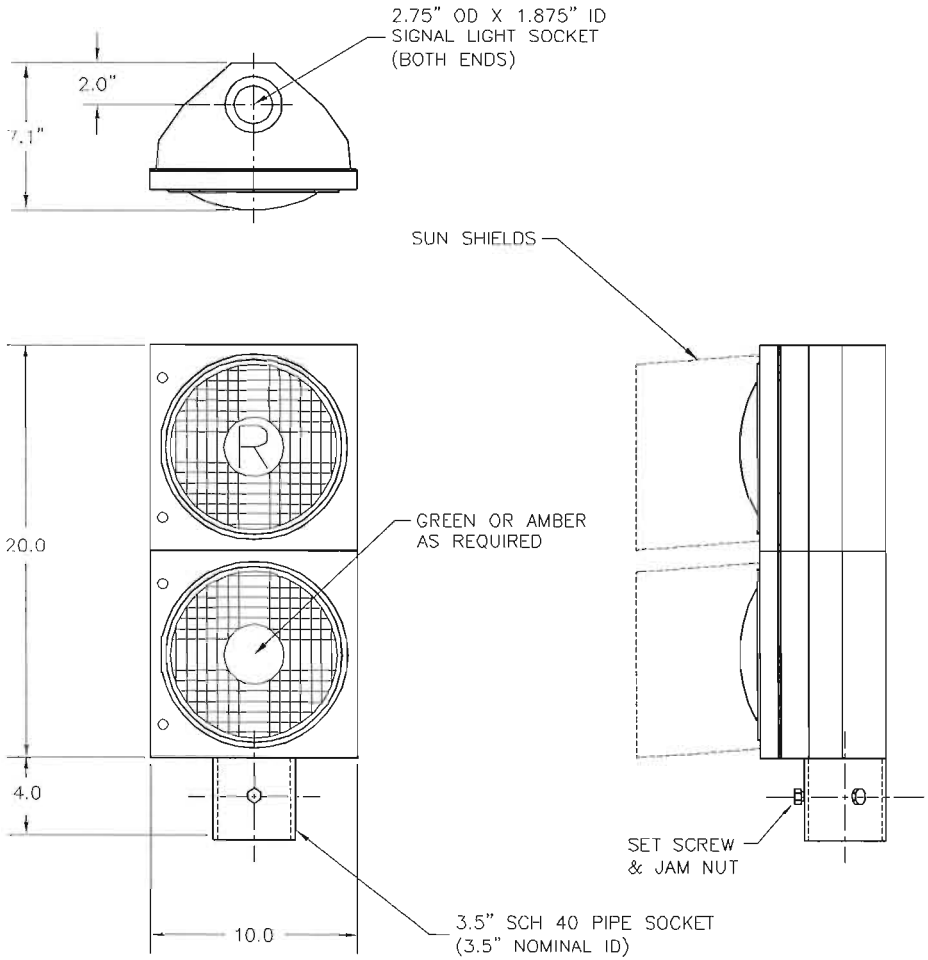
LEGEND

1TD
2 7
DEVICE WITH DEVICE'S PIN CALLOUTS

2MA2B
TERMINAL LOCATION

DELTA SCIENTIFIC CORPORATION
B1086TL SLAVE PANEL W/INDICATING LIGHTS EFO AND ANNUNCIATOR, ONE BARRIER
DRAWN BY: J.METRO
DATE: 08/18/03
DRAWING NO: 90831-1TL
REV: 4
CHKD BY:
DATE:
APPD BY:
DATE:
SCALE: 1:2 (D SIZE)
SHEET: SHEET 1 OF 1

US Embassy Lisbon
SPO500-1R-0014



MODEL MPL-10LEDXX LIGHT

FLASHER DIAGRAMS

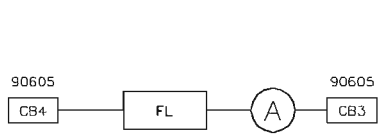


DIAGRAM 'A'

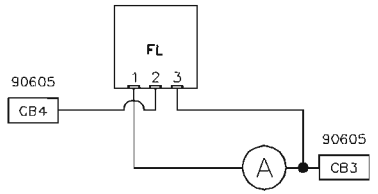
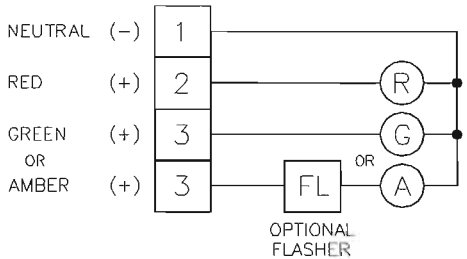


DIAGRAM 'B'

TERMINAL DIAGRAM



MODEL NO.	LED LAMP COLORS	VOLTAGE	HERTZ	DIAGRAM	FL STK.NO.
MPL-10LED230RFA	RED/FLASHING AMBER	200-250	50/60	B	2534-113
MPL-10LED120RFA	RED/FLASHING AMBER	100-125	50/60	A	2534-56
MPL-10LED230RA	RED/AMBER	200-250	50/60	-	-
MPL-10LED120RA	RED/AMBER	100-125	50/60	-	-
MPL-10LED230	RED/GREEN	200-250	50/60	-	-
MPL-10LED120	RED/GREEN	100-125	50/60	-	-

DELTA SCIENTIFIC CORPORATION
1055 DELTA LANE
PALMDALE, CA 93551 U.S.A.
(661) 575-1100 FAX (661) 575-1109

MODEL MPL-10LEDXX STOP/GO LIGHT
GENERAL ARRANGEMENT

DRAWN BY: J.FREEMAN | DATE: 08/18/07 | DRAWING NO: MPL-10LEDXX | REV: A
CHKD BY: | DATE:
APPROVED BY: | DATE: | SCALE: 1:3 (D SIZE) | SHEET: SHEET 1 OF 1

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES
TOLERANCES: X = ±.010/.1"; .XX = ±.030/.1"; .XXX = ±.010/.1"; ANGLES = ±.5°
SURFACE FINISH: 125
REMOVE ALL BURRS & BREAK SHARP EDGES .02 MAX

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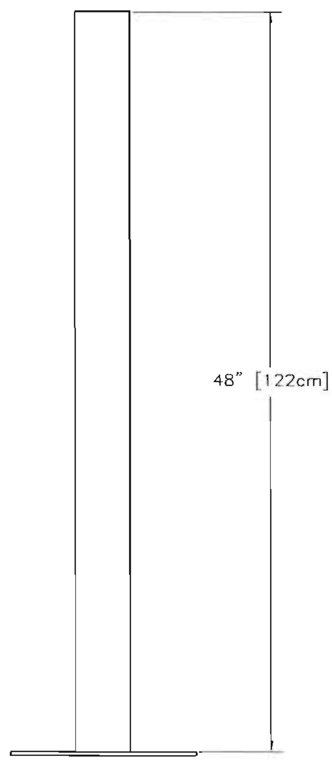
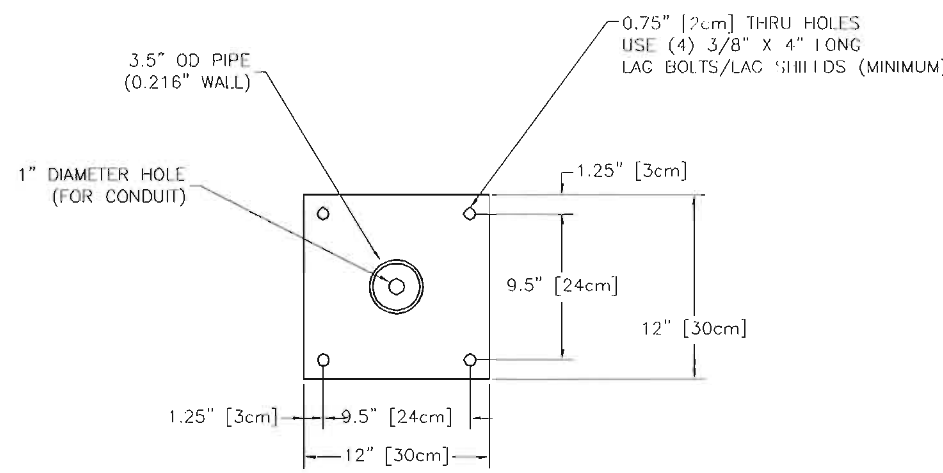
US Embassy Lisbon
SPO500-11R-0014

ALL POSTS FURNISHED WITH STANDARD WHITE PAINTED FINISH (MPL-20W)
RED (MPL-20R) AND YELLOW (MPL-20Y) AVAILABLE AS AN OPTION



MODEL MPL-20

48" FLANGED POST



BASE FLANGE (TYPICAL)

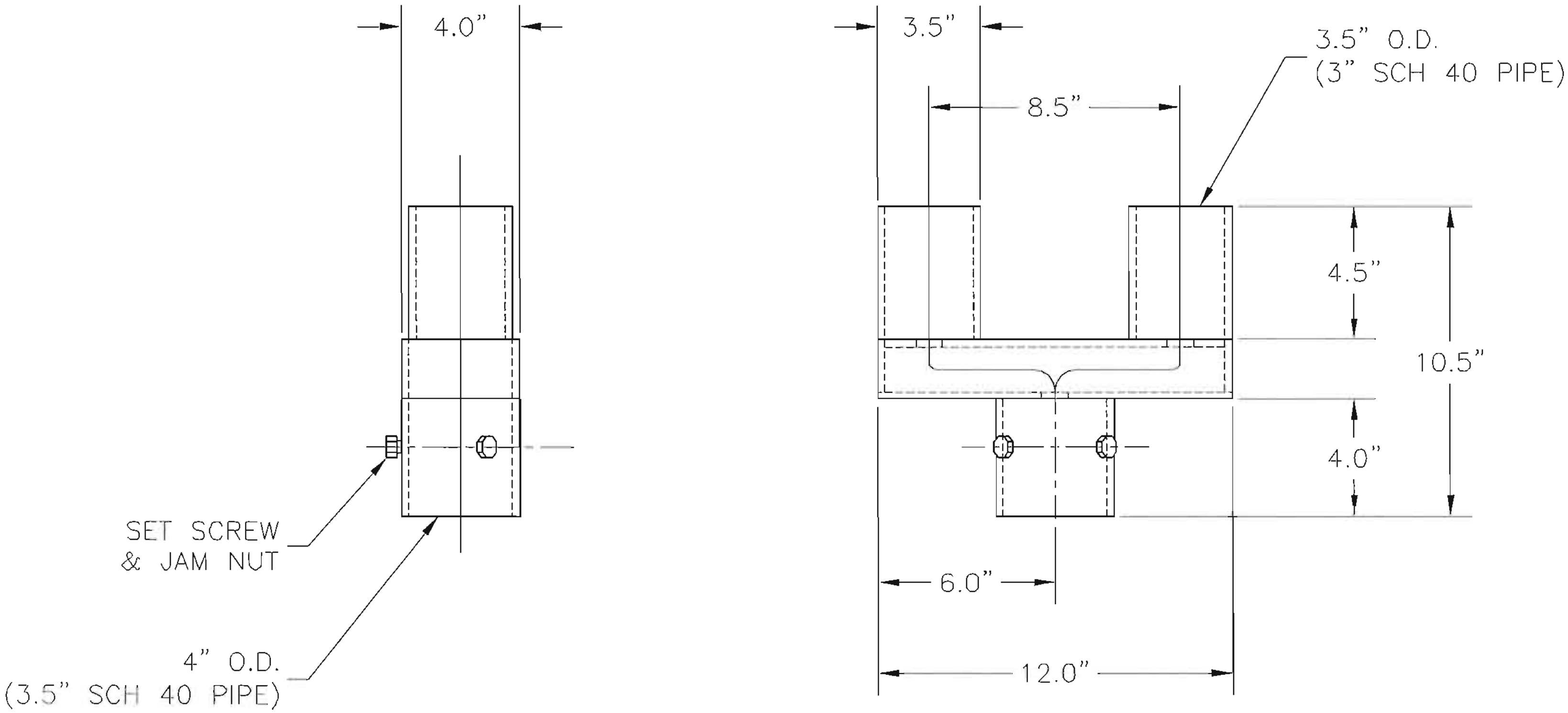
A	ECO #2004-110	JHF	06/10/04	
REV	DESCRIPTION	DRWN BY	DATE	APPVD BY / DATE

DELTA SCIENTIFIC CORPORATION

FLANGED MOUNTING POST
48 INCH [122 CM] HIGH

DRAWING NO. MPL-20 — REV. A

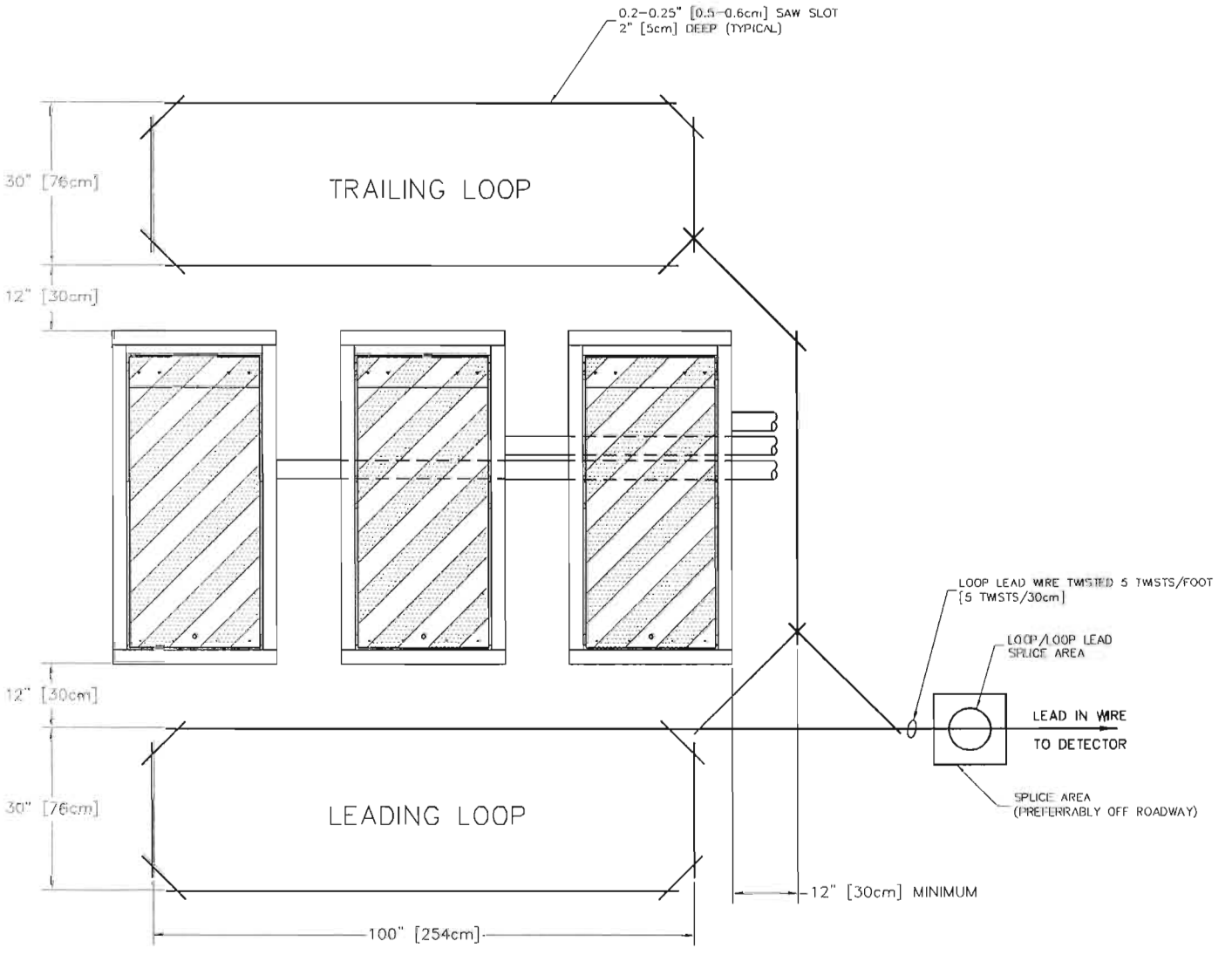
SCALE: 1:4 (D SIZE) — SHEET 1 OF 1

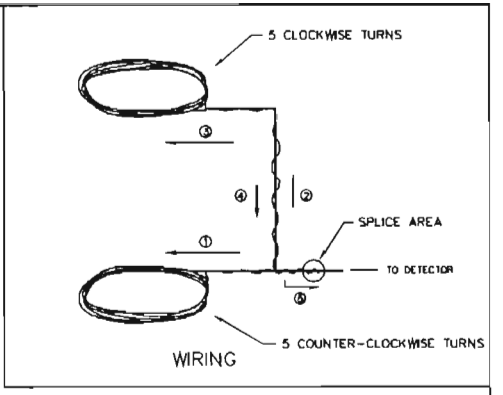


MODEL MPL-34 BACK TO BACK BRACKET

(1729-00)

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES	DELTA SCIENTIFIC CORPORATION 24901 WEST AVE. STANFORD VALENCIA, CA 91355 U.S.A. (805) 257-1800 FAX (805) 257-0617	
TOLERANCES .X = ±.060/FT .XX = ±.030/FT .XXX = ±.010/FT ANGLES = ±.5°	MODEL MPL-34 BACK TO BACK BRACKET GENERAL ARRANGEMENT	
SURFACE FINISH 125	DRAWN BY J FRIEND DATE 01/20/99	DRAWING NO. MPL-34 REV. –
REMOVE ALL BURRS & BREAK SHARP EDGES .02 MAX	CHKD BY DATE APPVD BY DATE	SCALE 1:2 (D SIZE) SHEET SHEET 1 OF 1





WIRING

NOTES:

1) FOR LOOP INSTALLATION, REFER TO DSC LA2075.

2) PREFERRED LOOP MATERIAL IS 7 STRAND, #16 AWG COPPER W/0.045" CROSS LINKED POLYETHYLENE INSULATION.

ALTERNATE MATERIAL, #14 OR #16 AWG STRANDED COPPER, TYPE THHN OR BETTER INSULATION.

3) PREFERRED LOOP LEAD-IN CONDUCTOR IS 2 CONDUCTOR #16 AWG COPPER, 19-29 STRAND, TWISTED 5 TURNS PER FOOT, INNER INSULATION 20 MIL HI-DENSITY POLYETHYLENE, 1 MIL ALUMINUM SHIELD W/0.5 MIL POLYESTER FILM, #20 AWG TINNED COPPER DRAIN WIRE, OUTER JACKET 35 MIL HI-DENSITY POLYETHYLENE.

ALTERNATE LEAD-IN MATERIAL, #14 OR #16 AWG STRANDED COPPER PAIR, THHN OR BETTER INSULATION, TWISTED 5 TURNS PER FOOT MINIMUM.

4) LEAD-IN CONDUCTOR CAN BE RUN IN SAW CUT OR CONDUIT.

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES
XX = ±.030/.76
XXX = ±.010/.25
ANGLES = ±.5°
SURFACE FINISH 125
REMOVE ALL BURRS & SHARP EDGES .02" MAX

DELTA SCIENTIFIC CORPORATION
45550 DELTA LANE
PALMDALE, CA 93551 USA
(661) 575-1100 FAX (661) 575-1109

DSC2000 SAFETY LOOPS
SUGGESTED INSTALLATION

DRAWN BY: JNF	DATE: 10/24/08	DRAWING NO: 90425	REV:
CHKD BY:	DATE:		
APPVD BY:	DATE:	SCALE: N.T.S.	SHEET: 1 OF 1

US Embassy Lisbon
SPO500-14-R-0014

DELTA DIGITAL VEHICLE DETECTORS

DOCUMENT A2075

OPERATING INSTRUCTIONS – SERIES 3546

THIS DELTA DIGITAL VEHICLE DETECTOR, WHICH INCORPORATES AN ADVANCED MICRO CONTROLLER, COMBINES A POWERFUL DIGITAL COMPUTER AND THE LATEST AND MOST ADVANCED INDUCTIVE VEHICLE LOOP TECHNOLOGY TO GIVE THE TRAFFIC, PARKING OR SECURITY PROFESSIONAL THE FINEST IN RELIABILITY, FLEXIBILITY AND ACCURACY WHEN MEASURING, COUNTING OR DETECTING VEHICLES.

WARNING!!! THERE ARE MANY DIFFERENT WIRING CONFIGURATIONS. FAILURE TO MATCH THE CONNECTIONS OF MALFUNCTION OF THE DETECTOR SERIES AND THE HARNESS CAN RESULT IN MALFUNCTION OF THE DETECTOR AND SYSTEM.

Installation: Plug the detector into a harness or panel wired in accordance with the chart of connections listed on the detector label or in accordance with the chart of connections for the specific detector.

Apply power to the detector. The detector will tune and be operation immediately thereafter.

Field Selective Features: A detector can be configured to meet and satisfy a wide range of operating and interface situations. The following programming options are for all Delta detectors.

Multiple Loop Installations: (frequency settings) The detectors for adjacent loops should be set at different frequencies in installations where several loops of the same approximate size and number of turns are operated in close proximity. This will eliminate or greatly reduce the possibility of cross talk between the detectors. A high, low or medium frequency range is selected by the three-position toggle switch.

Sensitivity: The sensitivity is factory set at level 5 and in most installations will not have to be changed. Sensitivity can be increased or decreased by means of a 10 position rotary switch located on the PCB of the detector. Level '9' is the highest sensitivity and level '0' the lowest (factory setting level '5').

Automatic Profile Tracking: (Standard on Delta detectors) With profile tracking, the detector automatically tracks the profile of high bed vehicles and adjusts its sensitivity so that it will hold the vehicle as long as it is over the loop, thus reducing the possibility that the detector will drop the "call" (no field adjustment needed).

Re Self-Tune Hold Time: (Ref. Dwg. 'A')
PROGRAMMING JUMPER #4 INSTALLED, HOLD TIME BEFORE RE-TUNE IS 2 HOURS.
PROGRAMMING JUMPER #4 REMOVED, HOLD TIME BEFORE RE-TUNE IS INFINITY.
(Time after self-tuning that the detector will wait after a steady call before re-tuning to the new condition.)

Fail Safe/ Fail Secure Options (Ref Dwg 'B')
PROGRAMMING JUMPER #3 INSTALLED, DETECTOR OUTPUTS ARE FAIL-SAFE.
PROGRAMMING JUMPER #3 REMOVED OR SEVERED, DETECTOR OUTPUTS ARE FAIL SECURE.

Loop Self Diagnostics (See Note No. 1) (Ref Dwg 'B')
WITH JUMPER IN POSITION AS SHOWN, SELF-DIAGNOSTICS ENABLED.
WITH JUMPER REMOVED OR SEVERED, SELF-DIAGNOSTICS DEACTIVATED.

Dual Relay Detectors: In addition to the above field programming features, dual relay detectors can be programmed as follows:

Pulse Relay-Pulse on Exit or Pulse on Entrance: (Ref Dwg 'B')
PROGRAMMING JUMPER #2 INSTALLED, PULSE OUTPUT ON ENTRY TO LOOP.
PROGRAMMING JUMPER #2 REMOVED, PULSE OUTPUT ON EXIT FROM LOOP.

Single Relay Detectors: In addition to the above field programming features, single relay detectors can be programmed as follows:

Pulse or Presence Output Options: (Ref Dwg 'A')
PROGRAMMING JUMPER #1 AND PROGRAMMING JUMPER #3 INSTALLED, RELAY OPERATES IN PRESENCE MODE.
PROGRAMMING JUMPER #1 REMOVED, RELAY OPERATES IN PULSE MODE.

Pulse on Entrance or Pulse on Exit: (Ref Dwg 'A')
WHEN OPERATED IN THE PULSE MODE WITH PROGRAMMING JUMPER #2 AND PROGRAMMING JUMPER #3 INSTALLED, PULSE OUTPUT ON ENTRANCE TO LOOP.
PROGRAMMING JUMPER #2 REMOVED, PULSE OUTPUT ON EXIT FROM LOOP.

Note No. 1: When this feature is enabled and the detector is powered up, the LED lights momentarily while the detector self-tunes. After tuning, the LED will light when the detector signals a "call".

If the LED commences a repeated series of flashes, this indicates that the loop is probably shorted (series of flashes followed by a pause) or the loop is open (steady series of flashes). If the problem is intermittent and self heals, the detector will resume normal operations. However, the fault signal will continue until the detector is reset by either the front panel reset button or by turning off the power momentarily. When the self-diagnostics is deactivated the detector is powered up; the LED lights momentarily while the detector self tunes. After tuning, the LED will light when the detector signals a "call".

Note No. 2: The detector can be reset by pressing the red button on the detector case or by momentarily tuning the power off and then back on.

DELTA DIGITAL VEHICLE DETECTORS

DOCUMENT A2075

OPERATING INSTRUCTIONS – SERIES 3546

Loop Layouts and Configuration:

DELTA detectors will tune and operate successfully with loops in a wide range of shapes and sizes such as squares, rectangles, circular, quadruple and diamond shape, etc.

The following chart is a guide to the number of turns to use when installing standard square, rectangular or diamond shape loops.

Compute the area of the proposed loop in square feet (square meters) and then using the chart, lookup the appropriate number of turns.

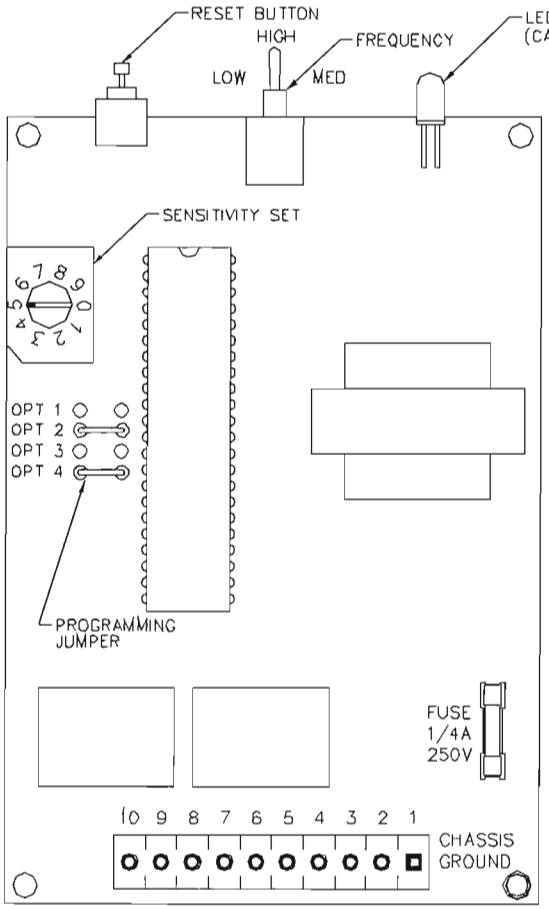
Area Square Ft	Square Meters	Turns
5-14	(,46-1,3)	6
15-20	(1,-1,9)	5
20-64	(1,9-6.0)	4
65-250	(6,0-23.2)	3
Over 250	(23,2)	2

When the lead-in distance from loop to detector exceeds 490 feet (125m) it is recommended that an additional turn be added to the loop.

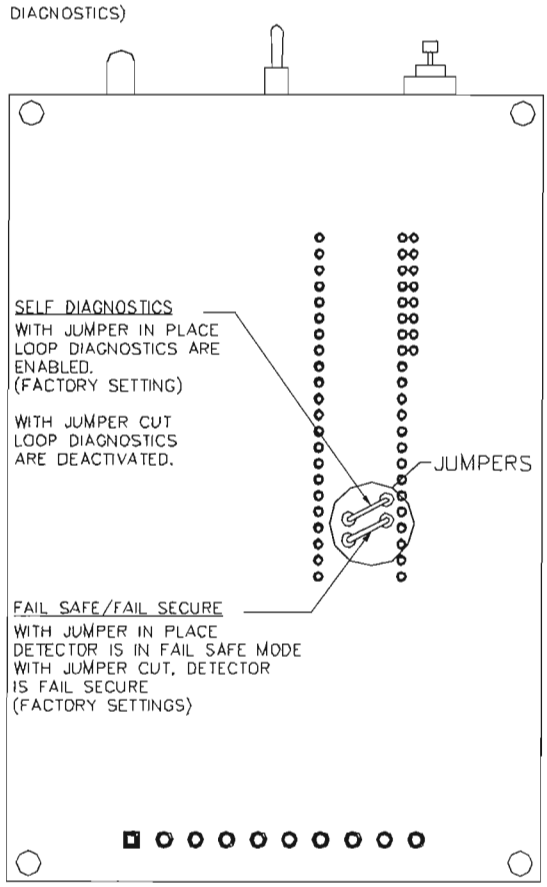
When winding the loop, care should be exercised that the wire insulation is protected from scuffing or cuts while being inserted into the saw slot. Where possible avoid sharp comers by saw cutting small diagonals at each corner of the loop. A standard stranded cooper wire with good all condition insulation should be used (#12 to #16 AWG).

The lead-in from the loop to the detector should be twisted (4 twist per foot medium) and shielded if available. The shield should be properly grounded and weather protected at the junction box.

Good low resistance electrical connections at all junction points of the loop are important. Where possible connections or splices should be soldered or bonded together by means of positive flow crimp type connectors (no wire nuts). Physical protection of the connection points against corrosion or contamination also contributes to long term operation.



POPULATED SIDE
"A"



BACK SIDE
"B"

DELTA
SCIENTIFIC CORPORATION

LOOP APPLICATION NOTES
VEHICLE DETECTOR LOOP INSTALLATION GUIDE

INTRODUCTION:

This loop application note is intended to illustrate the steps involved in installing a "saw cut type" vehicle detector loop. The loop sizes and configurations vary according to the detector requirement being accommodated. Long-length or multiple loops may be required in conjunction with traffic signals where the important factor is to know if there is at least one vehicle in a large zone of detection such as a left-turn lane. The smaller loop size (such as 18 inch by 54 inch) is used where it is important to have a separate detection output for each vehicle in a slow-moving stream of heavy traffic, such as a parking gate.

General Notes:

- We recommend using a 12 to 16 gauge THHN or better stranded wire.
- Backer rod is not commonly used anymore, but may be used if available.
- Wire loop and twisted lead-in wire should be one (1) piece. It is best to **not** splice the loop and lead wires.
- Solder all wire connections at the connector (harness) of the loop detector. Do **not** use wire nuts to make connection.
- Asphalt patching compound can be substituted for epoxy, and is typically supplied in caulking gun tubes.

INSTALLATION INSTRUCTIONS:

1) Mark the loop outline on the pavement surface using either a string or rigid frame and aerosol spray paint as shown in Figures 1 & 2. Note that corners are to be either diagonally cut (Method "A") or core drilled (Method "B") to prevent damage to wire insulation during placement of wire in the slot. (See Photo 1 and Illustration 1).

2) Place a mark on the concrete saw blade to insure the saw cut depth is 2 inches [50 mm] deep (see Figure 4). The saw blade should be ¼ inch [6 mm] wide.

3) Saw loop outline in pavement as shown in Photo 2.

Photo 1

Mark the loop outline on the pavement surface using a snap line chalk or other marking techniques.

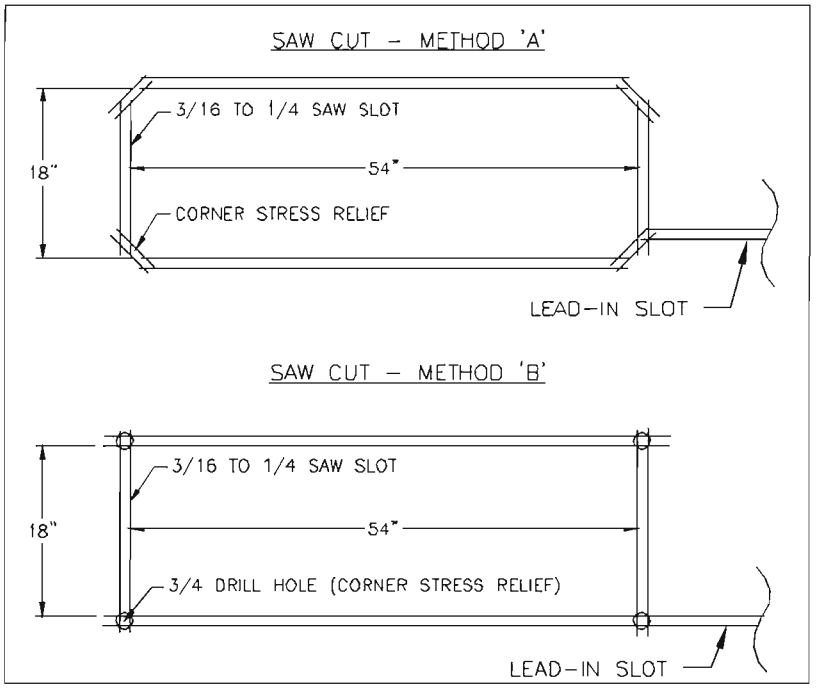


ILLUSTRATION 1

Photo 2

Sawing the Loop with concrete saw

4) Clean debris from slot with water or compressed air and allow surface to completely dry (See Photo 3).

Photo 3

Loop is sawn, debris removed from the saw slot and ready to dry

5) After the loop size has been determined, refer to Illustration 2 to determine the number of turns of loop wire to be placed in the loop slot. It is important that the proper number of turns is used. Wire should be minimum 16 gauge in size and should be stranded type.

NOTE: NO WIRE SPLICES ARE PERMITTED IN THE SAW SLOT!!!

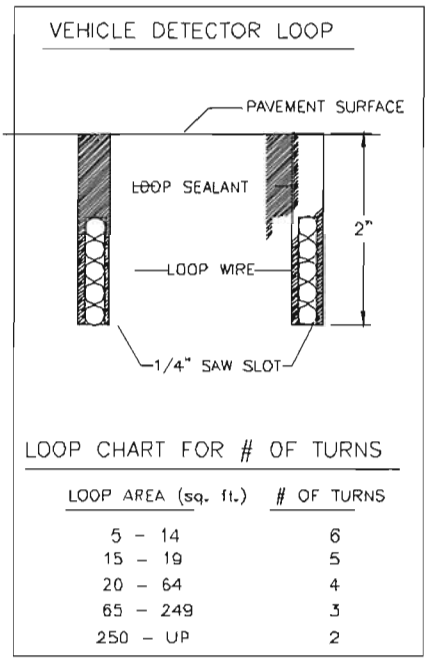


ILLUSTRATION 2

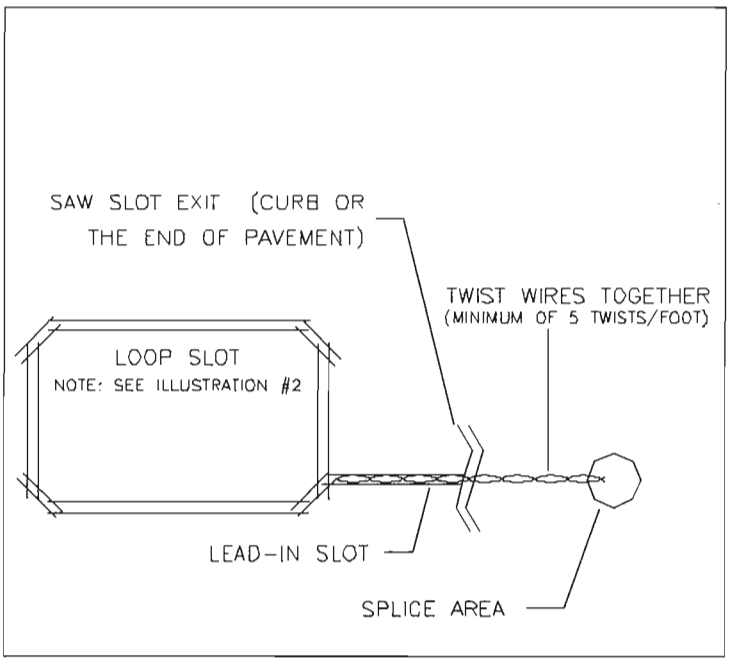
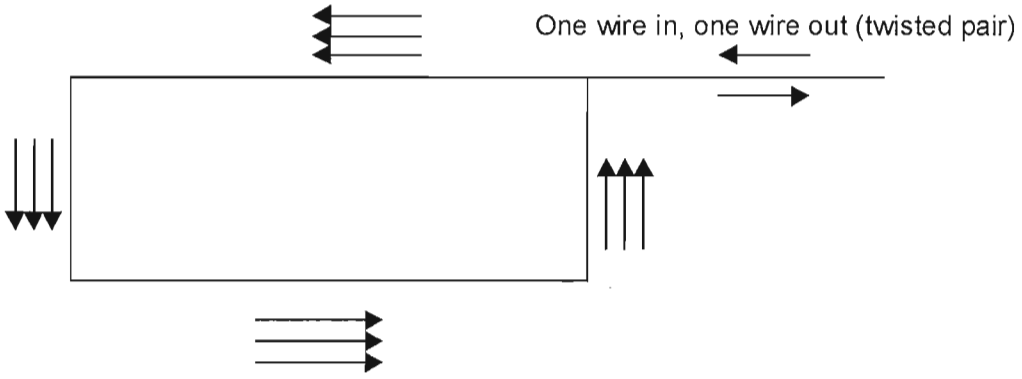


ILLUSTRATION 3

6) Calculate the total footage of wire needed to accommodate both the proper number of turns around the loop **PLUS SUFFICIENT FOOTAGE TO PROVIDE BOTH LEADS INTO THE LOOP FROM THE LOOP DETECTOR HARNESS.** Leaving enough wire at the proposed location of the Detector Harness, carefully start to install the wire in the loop slot (see Photo 4) and then make the proper number of turns around the loop. When the loop is complete begin twisting the loop leads together a minimum of 5 turns per foot (a drill motor is handy for doing this). Continue twisting these wires together all the way to the connection point with the Detector harness. All caution must be used when installing wire not to cut or nick the wire insulation while placing it in the ground.



Multiple turns of wire (use chart for number of turns)

Typical turn pattern

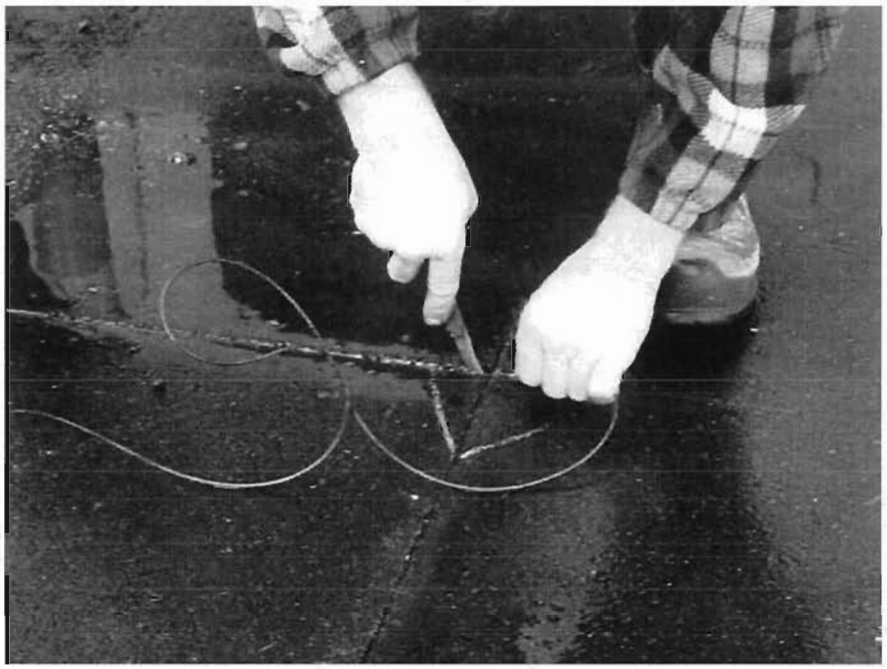


Photo 4

Installing loop wire in saw slot with blunt nosed tool

7) Once loop wire is laid then it should be sealed. Select a sealer proper for your application: concrete crack sealer for concrete, or asphalt crack sealer for asphalt. The more liquid the sealer the easier it flows and contains the wire. What you want to achieve is for the wire to not be able to move or rattle in the slot, and be watertight. Follow all directions of the sealer you are using (see Photo 5).

Photo 5

Sealing loop wire into the saw slot with silicone chalk

8) Clean and finish loop sealant for neat and clean appearance (see Photo 6).

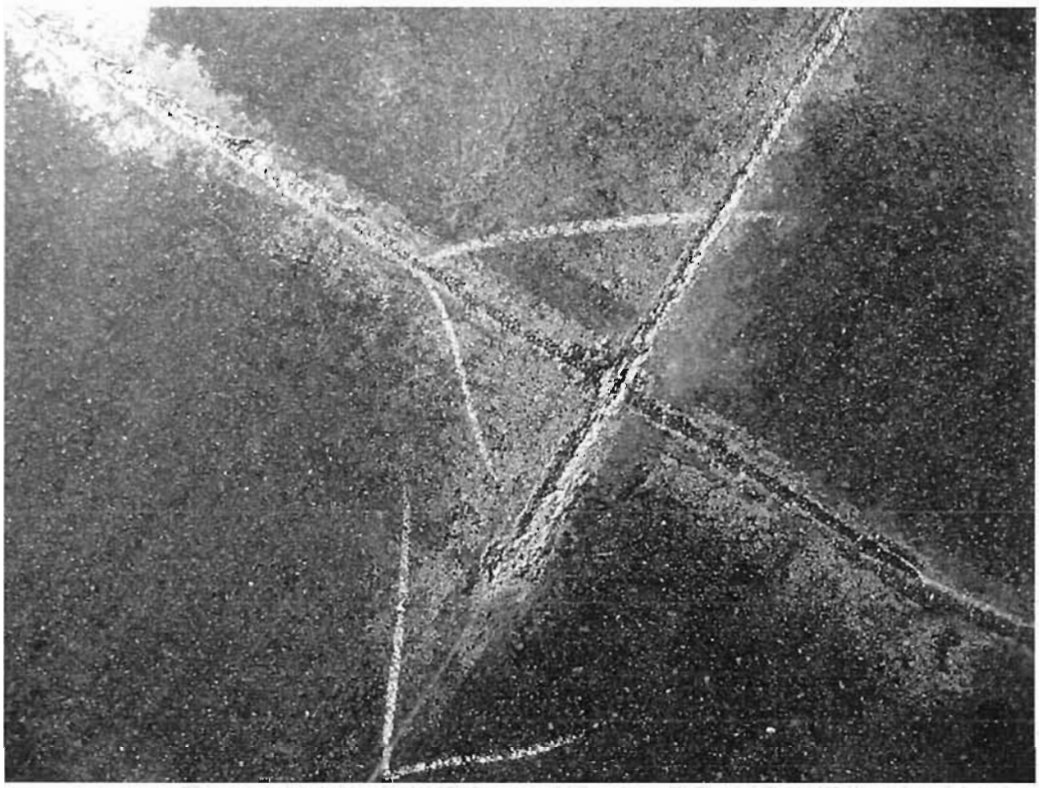
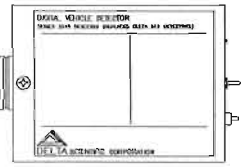


Photo 6

Loop is chalked and finished out neat and clean

9) Finish loop installation by soldering the loop wire connections to harness. Use a good grade heat shrink to waterproof your solder joint. (Most loop failures are caused by crimped loop to harness joints.)

3546-DCNP DETECTOR

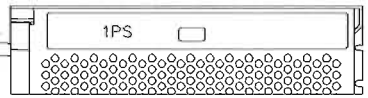


NOTE: DETECTOR INTERNAL
FUSE TERMINAL 1: 1/2 AMP

POWER SUPPLY
120/240 VAC TO 24 VDC
(SET SWITCH FOR CORRECT VOLTAGE)

OC02-11 DETECTOR HARNESS

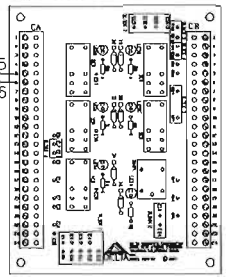
1.5 AMPS
MDL 1-1/2



POWER SUPPLY

TERMINAL 1 - BLACK
TERMINAL 2 - WHITE
TERMINAL 3 - ORANGE
TERMINAL 4 - GREEN
TERMINAL 5 - YELLOW — PRESENCE RELAY - COMMON
TERMINAL 6 - BLUE
TERMINAL 7 - GREY
TERMINAL 8 - BROWN — TWISTED PAIR - TO LOOP (SEE DSC LA2075 FOR DETAILS)
TERMINAL 9 - RED
TERMINAL 10 - VIOLET — PRESENCE RELAY - N.C.
TERMINAL 11 - WHITE/GREEN

90605
MAIN BOARD



(BOLLARDS & BARRIERS)

GATE ALTERNATE

PRESENSE RELAY - N.C.
PRESENSE RELAY - COMMON
CA22
CA9

80600 & 80650
'CA' TERMINALS
(GATES ONLY)

REV.	DESCRIPTION	DRWN BY	DATE	APPVD BY	DATE
B	ADDED 1PS POWER SUPPLY	JFW	11/11/02		

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES

TOLERANCES
.X = ±.060/FT
.XX = ±.030/FT
.XXX = ±.010/FT
ANGLES = ±.5°

SURFACE FINISH
125√

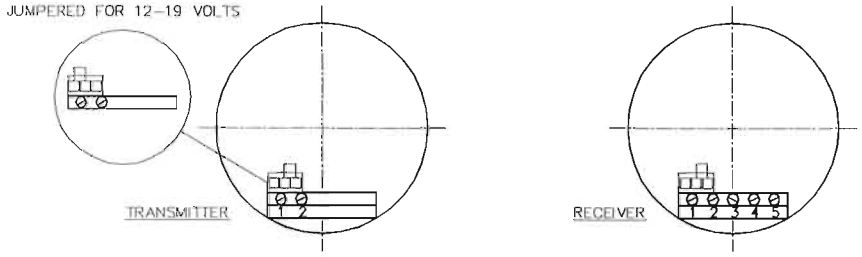
REMOVE ALL BURRS & BREAK SHARP EDGES .02 MAX

DELTA SCIENTIFIC CORPORATION
40355 DELTA LANE
PALMDALE, CA 93551 U.S.A.
(661) 575-1100 FAX (661) 575-1109

DIGITAL VEHICLE DETECTOR - 24 VDC
SAFETY HOOKUP

DRWN BY	DATE	DRAWING NO.	REV.
J. WRIGHT	11/11/02	3546-DCNP	B
CHKD BY	DATE		
APPVD BY	DATE	SCALE: N.T.S.	SHEET 1 OF 1

US Embassy Lisbon
SPO500-11-R-0014



CONNECTIONS

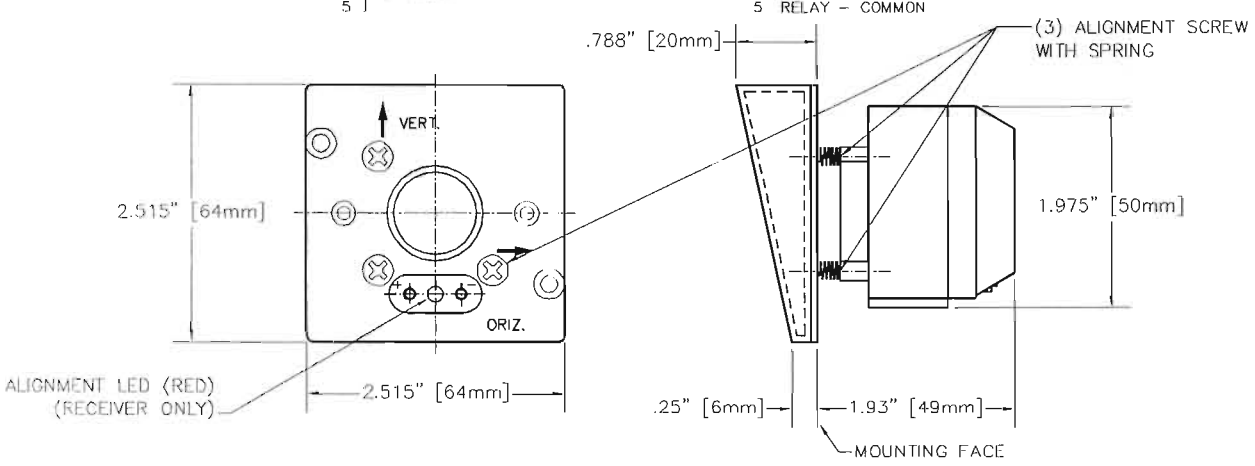
PIN NO.	
1+	12-24 VAC/DC
2-	(SHOWN JUMPERED FOR 20-24 VOLTS)
3	NOT USED
4	
5	

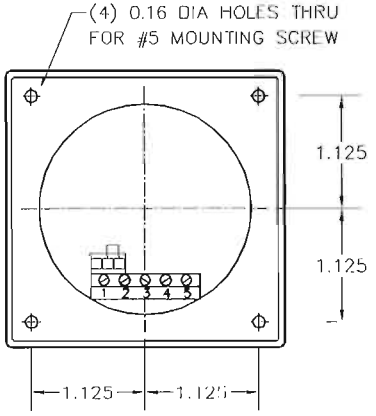
PIN NO.	
1+	12-24 VAC/DC
2-	
3	RELAY - N/O
4	RELAY - N/C
5	RELAY - COMMON

A SYSTEM CONSISTING OF A PULSED ENERGY TRANSMITTER AND A MATCHING RECEIVER TO DETECT THE PRESENCE OF A BODY IN ITS PATH. SYSTEM IGNORES OR IS INSENSITIVE TO TRANSIENT INTERFERENCE SIGNALS AND/OR OTHER CONTINUOUS SOURCES OF I.R.

RANGE -- 100 FEET MAX. (THIS DIMENSION HAS BEEN DERATED FOR RAIN AND FOG).
INPUT VOLTAGE - 12 OR 24 VAC/VDC
OUTPUT RELAY SPDT - RATING 1 AMPS @ 30 VAC/VDC
FLUSH MOUNTING WEATHER PROOF.

NOTE: INDICATING LED AND ALIGNMENT SCREWS ARE OBSCURED BY FRONT LENS UNDER NORMAL CONDITIONS. LENS CAN BE REMOVED FOR SET UP AND ADJUSTMENT BY OBSERVING THE MAGNITUDE OF INTERNAL SIGNAL.





TRANSMITTER & RECEIVER OUTLINE

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES

TOLERANCES
.X = ±.060/FT
.XX = ±.030/FT
.XXX = ±.010/FT
ANGLES = ±.5°

SURFACE FINISH
125

REMOVE ALL BURRS & BREAK SHARP EDGES .02 MAX

DELTA SCIENTIFIC CORPORATION
40355 DELTA LANE
PALMDALE, CA 93551
(661) 575-1100 FAX (661) 575-1109

MODEL D-168 Mark I
INFRARED BEAM SENSOR SYSTEM

DRWN BY	DATE	DRAWING NO	REV.
JNF	03/13/06	D-168.1	
CHKD BY	DATE		
APPVD BY	DATE	SCALE: 1.25:1 (B SIZE)	SHEET: SHEET 1 OF 1

US Embassy Lisbon SPO500-11-R-0014

Infrared Photocell Synchronized
Instruction Manual

Introduction

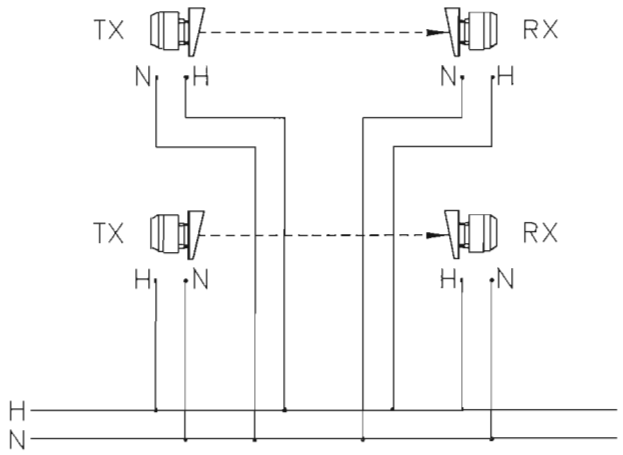
The photoelectric cells D-168 Mark 1 is a safety device suitable for automatic access. Each pair consists of a modulated infrared ray transmitter (TX) and a receiver (RX) with a dual relay output contact. Both cells have an optical system (lens) to concentrate the ray, an electronic circuit as immunity to sunlight and synchronizing system for installing two pairs of photocells. The container is in a glass reinforced plastic material offering high resistance mechanical damage and weathering.

The D-168 Mark 1 is wall embeddable and operates at 12 to 24 VAC/VDC. Two outer cases are provided to enhance the mechanical installation.

Installation

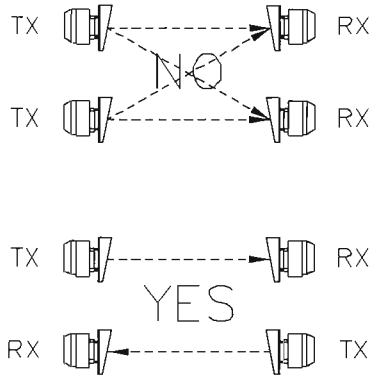
The receiver and transmitter must be located one in front of the other and fixed so as to be as accurately aligned as possible. In the case of errors or in extreme cases, the inside bodies of the photocells can be slanted vertically or horizontally +/- 15°.

If two parallel pairs of photocells are used, the rays of one pair can interfere with the other pair causing a malfunction. In case of alternating current it is advised to set both transmitters so they are synchronized. Synchronizing requires the pairs of photocells to function on different phases. Therefore it is important to pay attention to the wiring supply. The phases must be the same in the first pair, but inverted in the second pair (Figure 1). Cut jumper to synchronize (Figure 4).



(Figure 1)

Avoid placing both receivers on one side and both transmitters on the other; alternate receivers with transmitters (Figure 2).



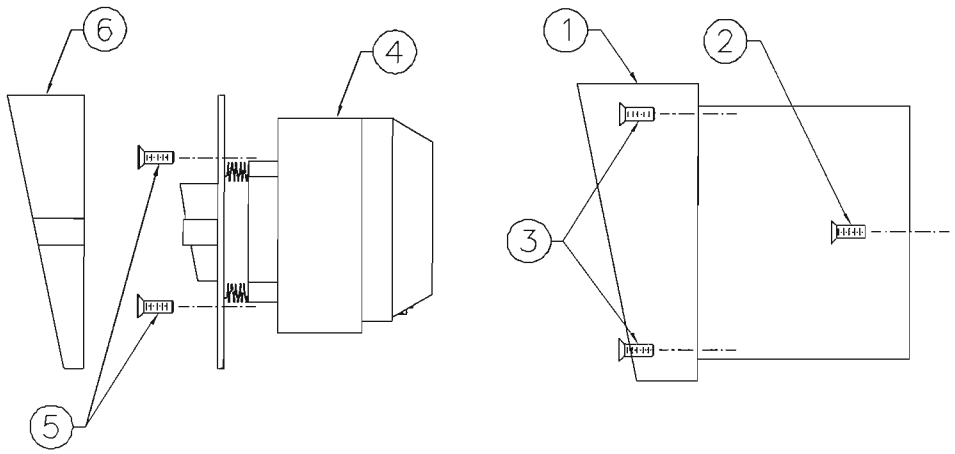
(Figure 2)

The sensors should be installed by qualified personnel in accordance with all applicable codes and standards established by the laws in force in the country of installation. Failure to comply with the instructions could prejudice correct functioning of the equipment, creating a hazard source for people, consequently THE MANUFACTURER declines all responsibility for any malfunction and/or damage as a result of such failure.

A) Reference Figure 3, insert the covers (1) and line up the TX and RX as much as possible. They can be fastened as follows:

- using two screws in the holes on the bottom (2)
- using foamed adhesive material or concrete,
- using four screws (3) for attachment to studs or sheet metal.

B) Make the electrical connections according to the drawings. To facilitate installation and centering, it is recommended to keep the cables between the outside cover and the photocell as short as possible.



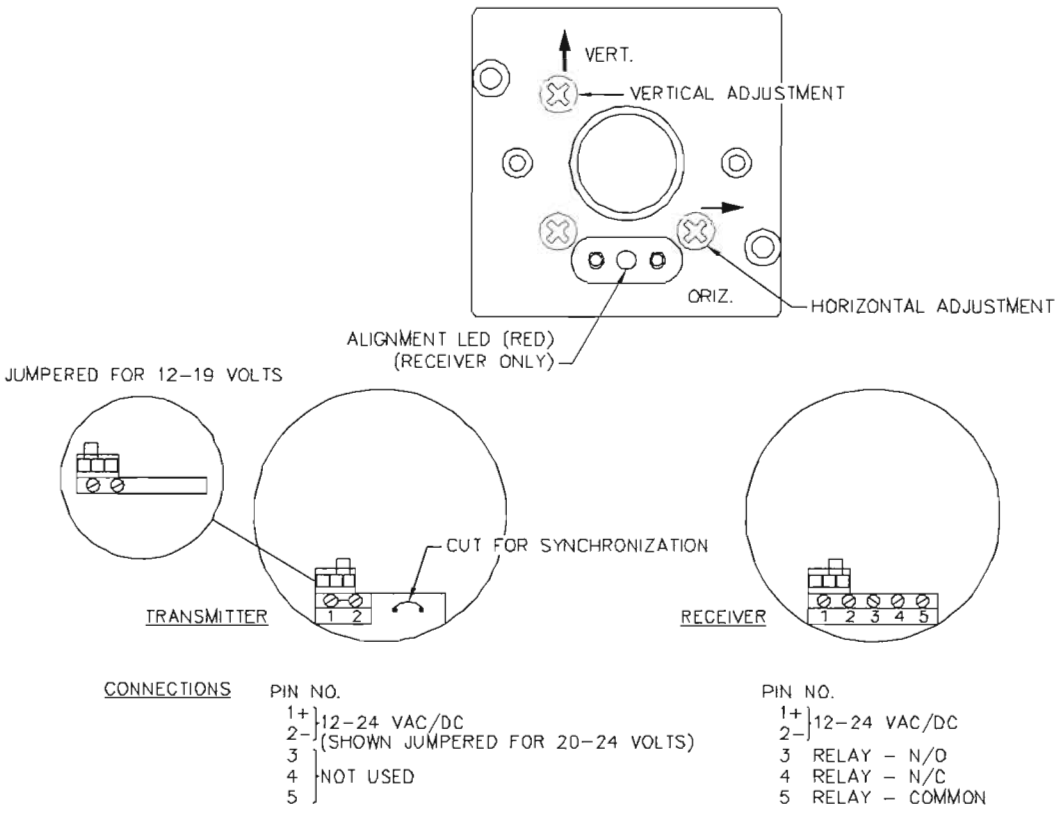
(Figure 3)

C) Fasten the photocell (4) using the supplied screws (5).

D) Test the photocell and center it. After adjustment, install the lens covers (6).

Power Supply and Switch Outputs

The photocells are powered with 24 VAC or VDC. For voltages lower than 19 V plug in the jumper provided (Figure 4).



(Figure 4)

Centering and Testing

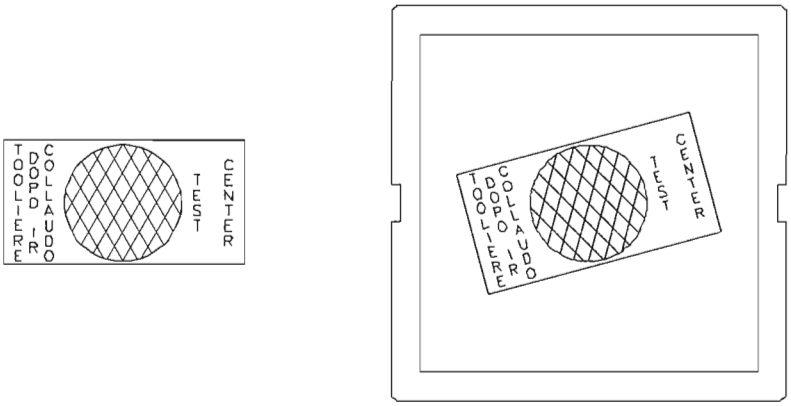
Check that the voltage is the same as required for the photocells and that the power is on. At this point, if the alignment of the pair is reasonably centered, the receiver should switch the output. If this does not happen proceed with centering.

To facilitate alignment, the inside bodies of both the transmitter and receiver are mounted on springs and with the aid of the two adjustment screws they can be swiveled horizontally and/or vertically (Figure 4). The receiver is equipped with a red LED that switches off when the photocell is centered. The photocells should be centered as close as possible, even if they initially appear aligned.

Check functioning by passing in front of the infrared ray several times (the red LED on the receiver should turn on and the relay should switch). Repeat this also after the covers of the receiver and transmitter have been installed.

The centering filter (Figure 5) is used for an additional test and to be sure that even in the worst conditions, i.e. fog or rain, everything works properly.

The test is quick and simple: place the film on one of the fronts and check that the photocell is working properly. If it does not it means the photocells are at the limit of its working range or the alignment is not accurate. ***Note:*** Remember to remove the plastic film when you have finished testing.



(Figure 5)

Technical Data

Type	Modulated Infrared
Range	200 feet [60 meters] (Note 1)
Power Supply	12 V - 24 V VDC or VAC +/- 20%
Power Consumption TX + RX	24 V 105mA (60mA + 45mA)
	12 V 155mA (85mA + 70mA)
Operating Temperature	-4°F to 140°F [-20°C to 60°C]
Contact Rating	1 Amp at 30 VDC

(Note 1) Due to rain, fog, dust or misalignment, the range may be reduced by 50 to 70 percent.

EC Declaration of Conformity

The producer, Telecoma S.r.l, declares that the product FT501 (Delta Model D-168 Mark 1) used as photocells for gate openers comply with essential requirements of the **Directives 89/336 (EMC)** and **73/23 (LVD)** and their amendments, when used for their intended purpose. The above mentioned product is meant as an integral part of one of the installation configurations as shown in our catalogs.

Place and Date: **Conegliano, 04/06/2001**

General Manager