

HYDRANT-TYPE VEHICLE FUELING SYSTEM FOR GARAGES AND SERVICE OPERATIONS CENTERS EQUIPMENT DESIGN REQUIREMENTS

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1. GENERAL

1.01 This section furnishes engineering information covering the equipment design require-

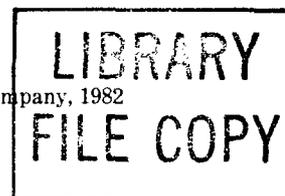
ments of a hydrant-type vehicle fueling system for garages and service operations centers. (Refer to Fig. 1 through 8 at end of section.)

1.02 This section is being reissued to include changes to the hydrant-type vehicle fueling systems for garages and service operations centers. The specific reasons for reissue are listed below:

- (a) Corrects title to distinguish hydrant-type system from island-type system in Section 760-220-162
- (b) Removes installation details of underground vehicle fuel storage tanks since these are now covered in Section 760-220-163
- (c) Removes requirement for excess flow valve
- (d) Adds requirements for solenoid valves at dispensers
- (e) Changes dispenser requirements to add fuel metering at each dispenser
- (f) Adds information that this type of installation does not lend itself to installation of a hydrocarbon vapor recovery system or card/key access automated dispensing of fuel.

Since this reissue is a general revision, no revision arrows have been used to denote significant changes.

1.03 A hydrant-type vehicle fuel dispensing system does not lend itself to installation of stage II hydrocarbon vapor recovery systems (see Section 760-220-163), or to automated fueling using card or key access, which is currently being studied by automotive operations. Therefore, this material is provided for maintaining existing systems only.



2. DESCRIPTIONS**DESCRIPTION OF SYSTEM**

2.01 The system functions in the following manner.

Gasoline is stored in an underground storage tank equipped with a submersible pump. Fuel is pumped through a filter and through the distribution piping to the emergency shear valve and solenoid valve beneath each dispenser, and finally to the dispensers.

DESCRIPTION OF EQUIPMENT

2.02 Dispenser: Each dispenser is equipped with the following:

- (a) A rewind hose reel capable of holding up to 50 feet of 3/4-inch or 1-inch fuel hose.
- (b) An "ON/OFF" control switch which operates the submersible pump. This control switch must be turned to the "OFF" position before the nozzle can be placed into the nozzle holder.
- (c) An automatic nozzle without latch and swivel hose connection. In addition, an optional totalizing meter to record gas flow is available. The automative operations group should decide whether one totalizing meter per work center will suffice, or whether it is necessary to have a meter on each dispenser. The recording of quantity of fuel dispensed to each individual vehicle is required by comptrollers and the Motor Vehicle Information Management System (MOVIMS) for energy conservation, motor vehicle administrative reports, and the Cost Accounting Systems (CAS).

2.03 A red jacket 3/4 hp Model P75S1 submerged turbine pump shall be located in the storage tank.

Note: The anticipated flow rate is 10-12 gallons per minute based on a system which utilizes a dispenser equipped with 40 feet of 3/4-inch fuel hose, 150 feet of distribution piping to the furthest dispenser, flow meter, and filter. Some increase in the flow rate can be obtained by increasing the diameter of the fuel hose from 3/4 inch to 1 inch.

However, if long runs of distribution piping are anticipated, or if flow rates such as 14-16 gallons per

minute are required, two 3/4 hp pumps manifolded together must be used.

2.04 A leak detector shall be provided for each submerged turbine pump used. This tests the entire underground piping for leaks whenever the "ON/OFF" control on the dispenser is turned to the "ON" position. If no leaks are present, the detector allows full flow. If a leak in the piping system is detected, the detector will restrict the flow of gasoline to 1-1/2 gallons per minute, signaling the attendant of a possible leak.

Note: After the dispenser "ON/OFF" switch has been moved to the "ON" position, the attendant must wait 10 seconds before opening the fuel nozzle. If he should open the nozzle before this time, the detector will not have had sufficient time to check for leaks and reset itself to the wide open position; therefore, the flow will continue to be restricted.

2.05 A fuel filter of 10 micron capacity is provided. The filter may be either a Purolator PA G25-D series with replacement element No. 6667930 or an equivalent filter and element.

2.06 Remote emergency power cutoff switches are provided at various locations throughout the parking area. The switch shall be a momentary mushroom-type pushbutton switch with an Normally Open (NO) contact block.

2.07 A tank level indicator sized according to tank size is to be provided. A tank level indicator is available from Simmons Precision, Bellows Falls, Vt, or other suppliers.

2.08 An underground gasoline storage tank must be provided. This tank may be either a fiberglass tank or a steel tank. (Fiberglass is preferred.) Installation of underground fuel storage tanks is covered in Section 760-220-163.

2.09 A 2-inch fiberglass or wrought steel piping shall be used on this system. (Fiberglass piping is preferred.) Installation of underground fuel piping is covered in Section 760-220-163.

3. EQUIPMENT INSTALLATION

3.01 Installation for underground piping (fiberglass) is as follows:

- (a) The underground piping is joined together using the adhesive suggested by A. O. Smith

Inland Company. The appropriate product bulletins should be followed when installing this piping. Wherever necessary to use the threaded fiberglass adapters, use an UL approved pipe compound on threads before threading into equipment.

(b) The fiberglass piping should be bedded in a minimum of 6 inches of sand backfill and covered by at least 12 inches sand cover. See paragraph 3.03(c) for installation testing. See Table A for list of equipment.

3.02 Caution: The manual shutoff valve located on the discharge side of the pump must be closed prior to running this test so as to prevent the test pressure from reaching the storage tank.

Note: If fiberglass pipe is used, it is recommended that wrought steel pipe be used from the pump to the filter.

3.03 Installation for underground piping (wrought steel) is as follows:

(a) The underground piping shall have back welded joints whenever possible. (Exceptions would include connection to pump, filter, emergency shear valves, sectional distribution valves, swing assemblies, and stub caps. On these threaded fittings, an approved UL listed pipe compound shall be used.)

(b) At least 6 inches of sand backfill under the pipe and 12 inches of cover over the pipe is recommended unless otherwise recommended by piping manufacturer. The backfill under the dispensers should be well tampered so as to add additional support to piping stub where it emerges from the ground.

(c) Before covering the pipe with the backfill, the pipe should be pneumatically tested to 125 percent of the maximum anticipated pressure of the system. This test shall be maintained for a sufficient time to complete visual inspection of all joints and connections but for at least 1 hour. After covering the piping, the piping should be retested to determine if any leaks are present.

3.04 Caution: The manual shutoff valve, located on the discharge side of the pump, must be closed prior to running this test so as

to prevent the test pressure from reaching the storage tank.

3.05 Ordering information of the submerged turbine pump is as follows:

- (a) Specify 3/4 hp motor
- (b) Specify tank diameter
- (c) Specify burial depth
- (d) Specify 50 or 60 cycle operation
- (e) Specify leak detector.

3.06 Installation of the submerged turbine pump is as follows:

- (a) Install pump in a 4-inch tank opening. Use approved nonsetting thread sealant. (If using fiberglass tank, tighten not over 300 foot pounds of torque.)
- (b) Tighten 4-inch riser in tank.
- (c) Line up discharge outlet. Turn in tightening direction only.
- (d) Connect electrical conduit. (See typical electrical conduit layout.)
- (e) Remove the junction box cover, remove compression seal, pull wires from power supply through the seal, and replace. Tighten seal securely.
- (f) Connect wires from power supply to wire in junction box. Make a waterproof splice using electrical tape. Replace the cover using waterproof thread sealant.

3.07 The fuel filter shall be installed in a manhole. The threaded pipe fittings shall be coated with an UL approved pipe compound prior to threading into filter.

3.08 The sectional valves (optional) shall be placed in the system and manholes provided so as to enable one leg of the system to be manually shut off while the remaining branches remain operational. These threaded pipe connections shall be coated with an UL approved pipe compound prior to threading into the valve.

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3.09 The dispenser shall be secured by bolting the dispenser frame to the concrete base below the dispenser.

3.10 The emergency shear valve shall be supported so that it is held rigidly. A pump box, available from Permco, Incorporated, shall be used for this purpose.

3.11 The electrical conduit shall be threaded rigid metal conduit. Seals shall be located as shown on electrical drawing.

3.12 The emergency power cutoff switches should be mounted on the support columns of the truck shed. (In areas where the shed is not used, alternate mountings shall be used.) The switches shall not be more than 40 feet from a dispenser.

3.13 The normally closed solenoid valve should be of 1 inch size, explosion proof, and be prewired to dispenser switch by dispenser manufacturer. Solenoid valve shall be installed between the emergency shear valve and the dispenser reel inlet.

4. MAINTENANCE

4.01 Maintenance for the filter element replacement is as follows:

(a) **Element Life:** Due to the variability of gasoline contaminates and amounts of gasoline dispensed, the element life will vary from location to location. While the elements will filter up to 1/4 pound of contaminates, elements shall be changed when an appreciable decline in fuel delivery at nozzle is noted. In any case, filter elements shall be replaced at least once a year.

(b) **Element replacement** shall be as follows:

- (1) Close manual shutoff valve on discharge side of the pump.
- (2) Open drain cocks and drain filter.
- (3) Loosen retaining nuts and remove old elements.
- (4) Wipe out shells.
- (5) Insert new element and gaskets.
- (6) Reassemble filter.
- (7) Close drain cocks.
- (8) Open manual shutoff valve on discharge side of pump and reset excess flow valve.
- (9) Purge system of air by dispensing fuel.

4.02 The emergency shear valves should be tested once a year under flow conditions. This shall be done by manually tripping the shear arm lever.

4.03 All emergency power cutoff switches shall be tested once a year.

4.04 The dispenser fuel hose shall be inspected once a year for cracks or other signs of wear. While the expected life of the hose is 5 years, this time will vary with use and climatic conditions, and the hose shall be replaced when necessary.

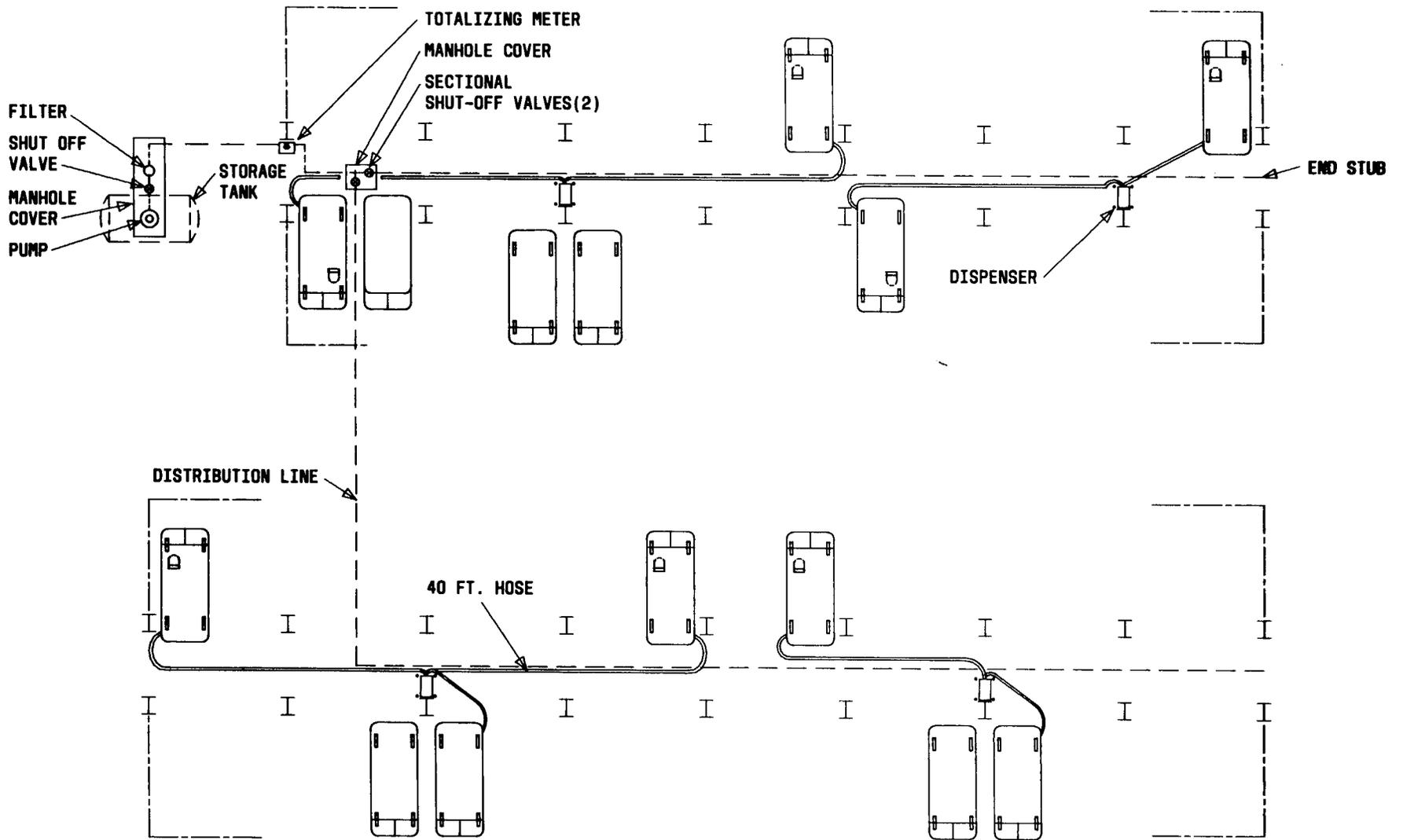


Fig. 1—Typical Piping Layout

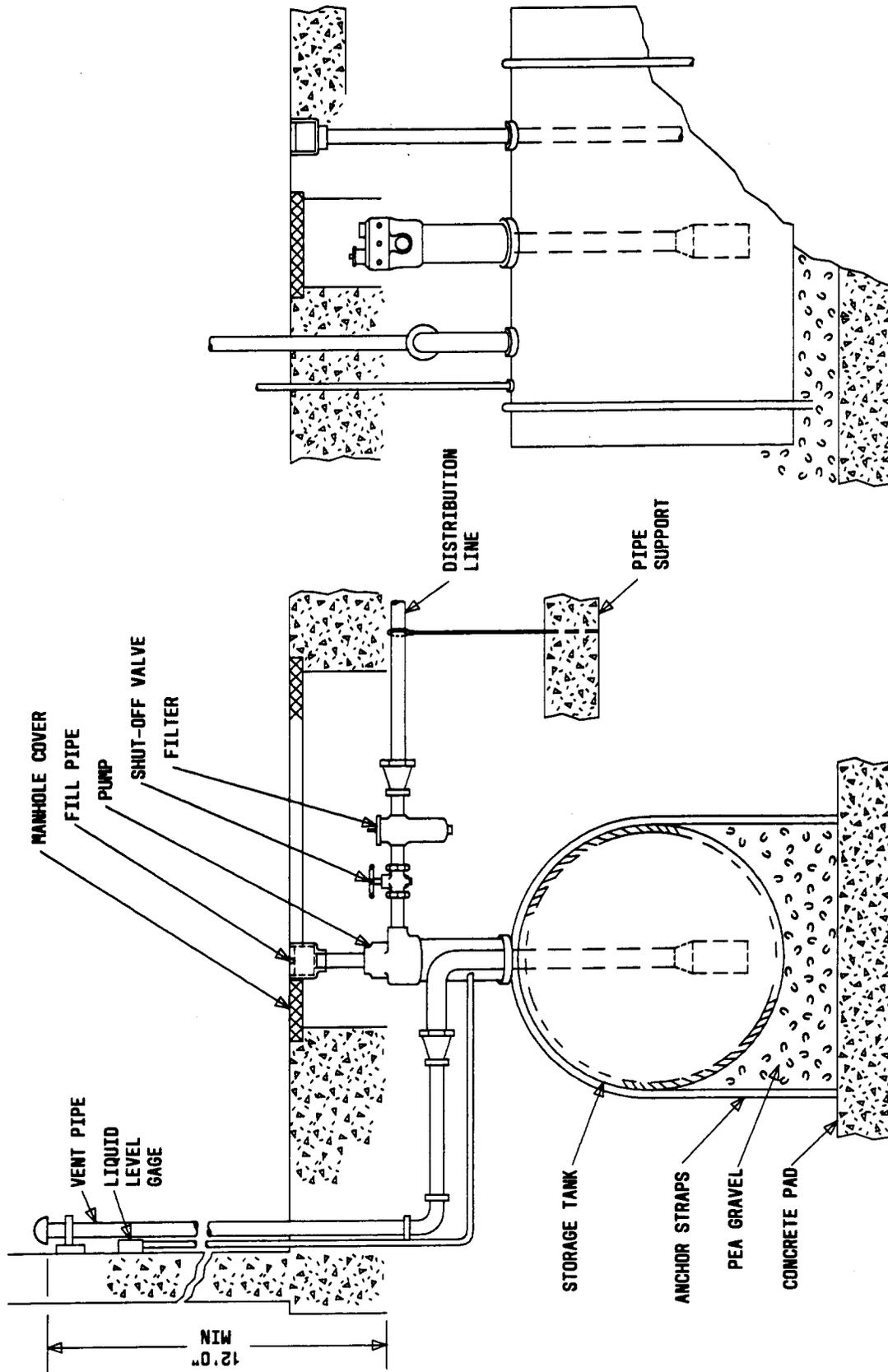


Fig. 2 — Typical Equipment Layout — Storage Tank Piping

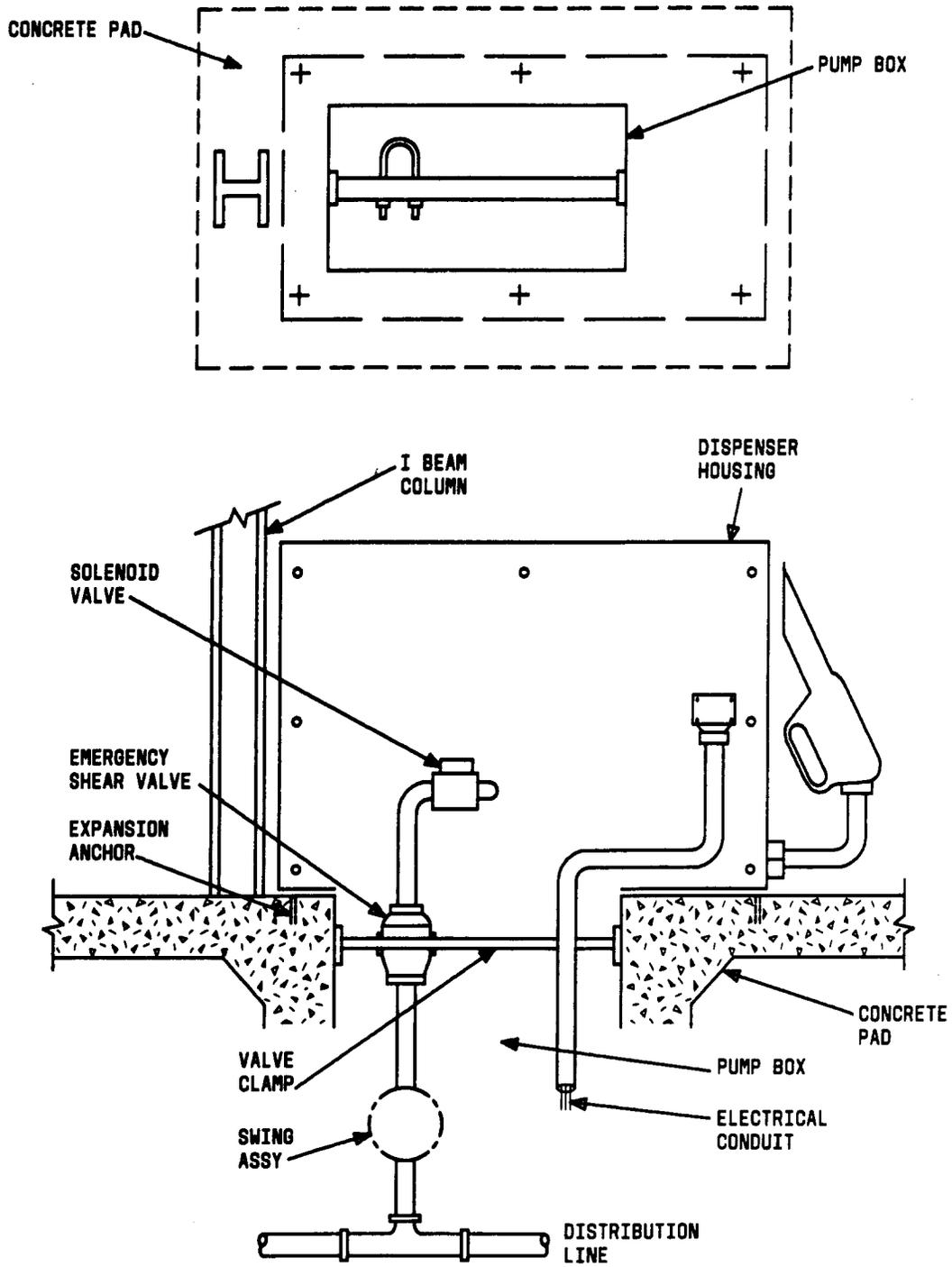


Fig. 3—Typical Equipment Layout Dispenser

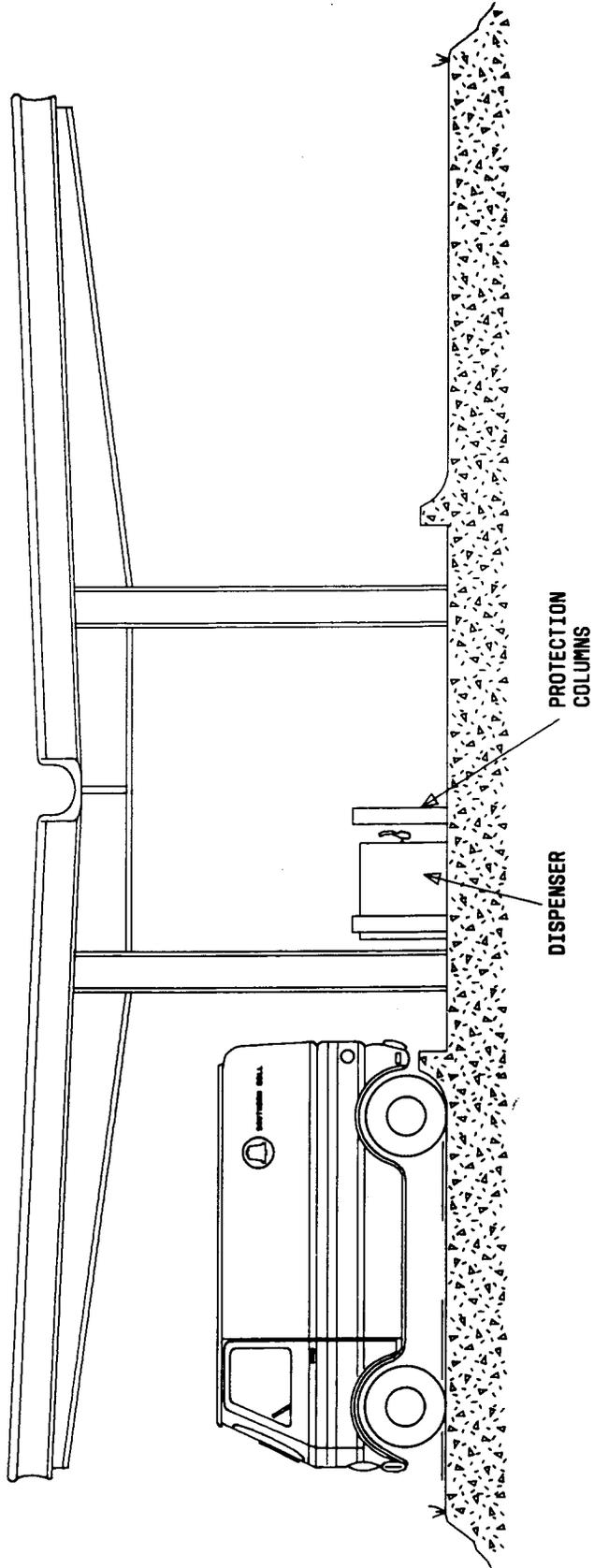


Fig. 4 — Truck Port-End View

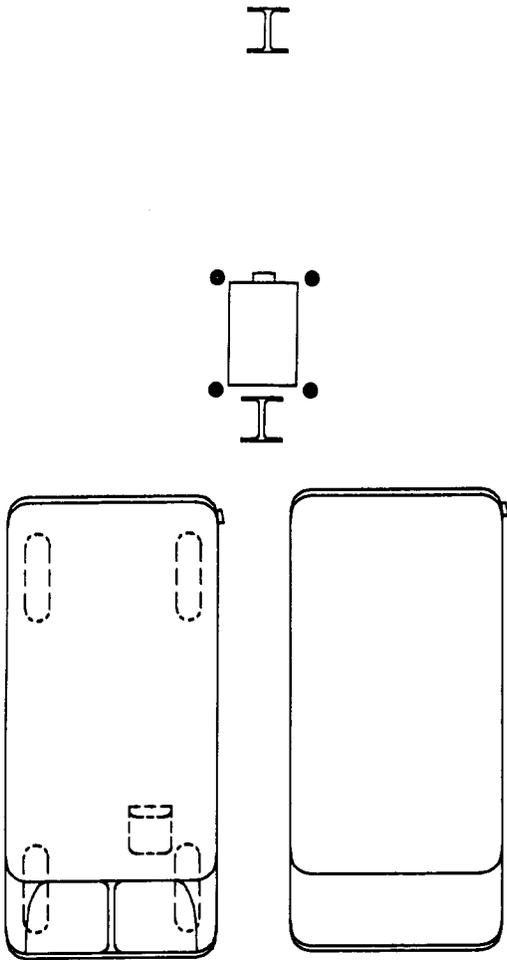


Fig. 5—Truck Port-Plan View

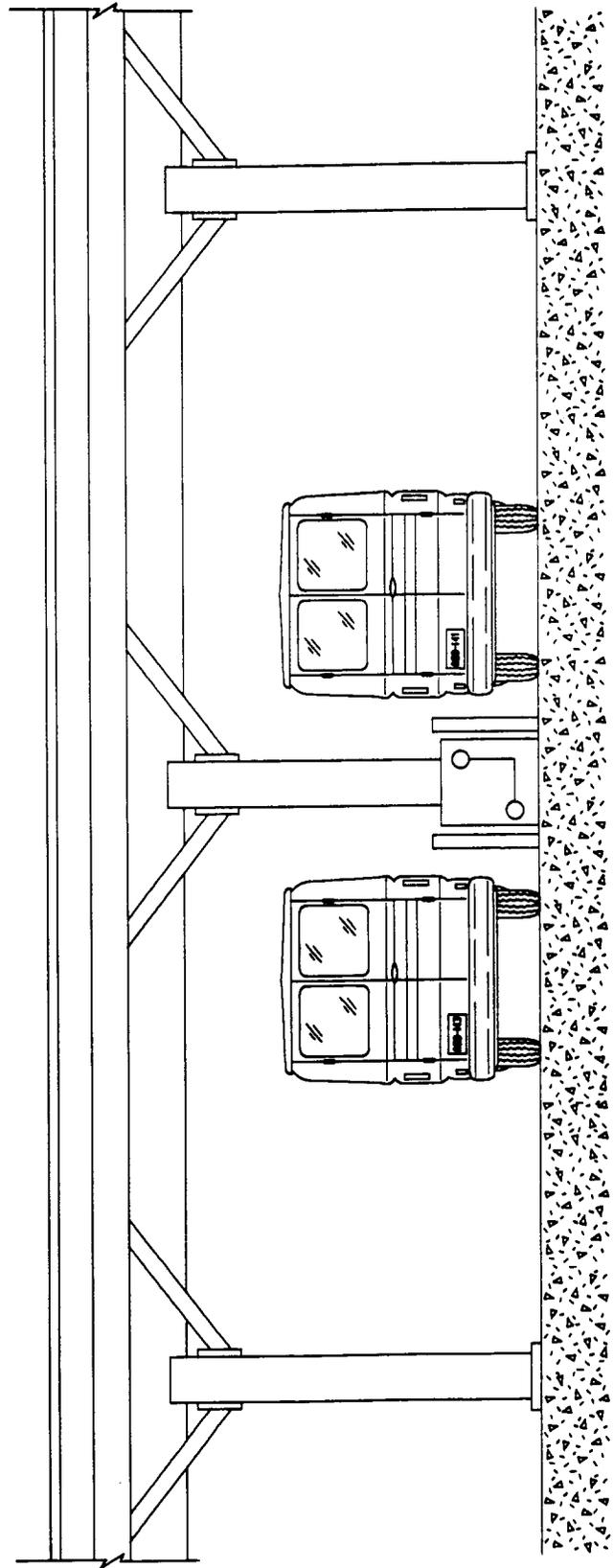
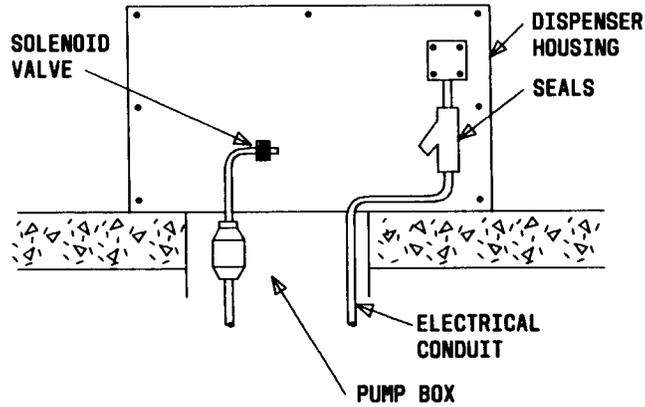


Fig. 6—Truck Port-Elevation View



NOTES:

1. SEALS SHALL BE PROVIDED AS OUTLINED IN N.E.C. ARTICLE 501-5. ALSO SEE N.F.P.A. CODE ARTICLE 514.2 FOR DESCRIPTION OF HAZARDOUS MEAS.
2. GROUNDING ELECTRODE SHALL BE SIZED AND INSTALLED ACCORDING TO N.E.C. ARTICLE 250.
3. GROUNDING CONDUCTOR SHALL BE CONNECTED TO EQUIPMENT AND GROUNDING ELECTRODE IN SUCH A WAY AS TO INSURE A GOOD ELECTRICAL CONNECTION. FOLLOW N.E.C. ARTICLE 250.

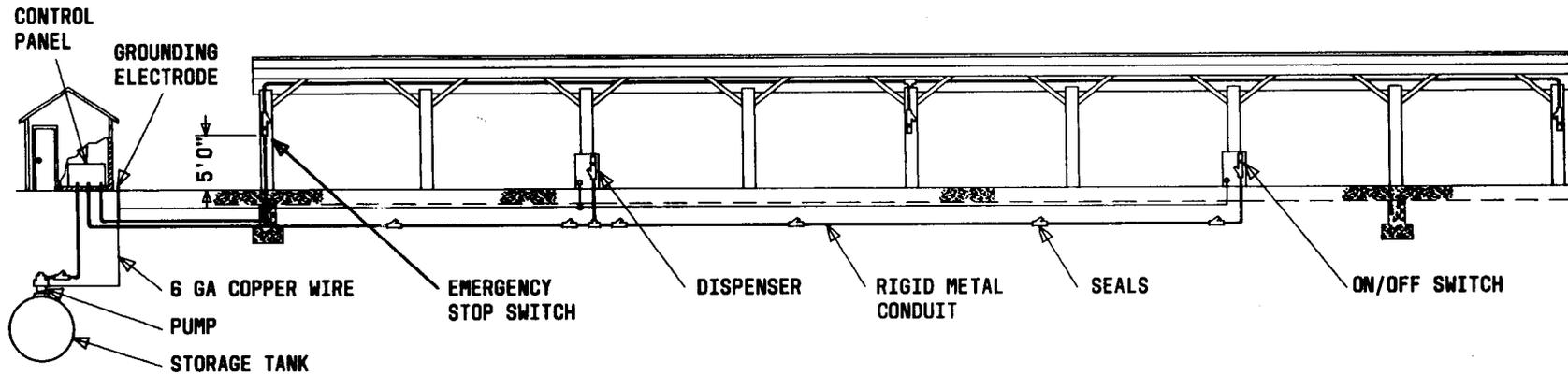


Fig. 7—Typical Electrical Conduit Layout

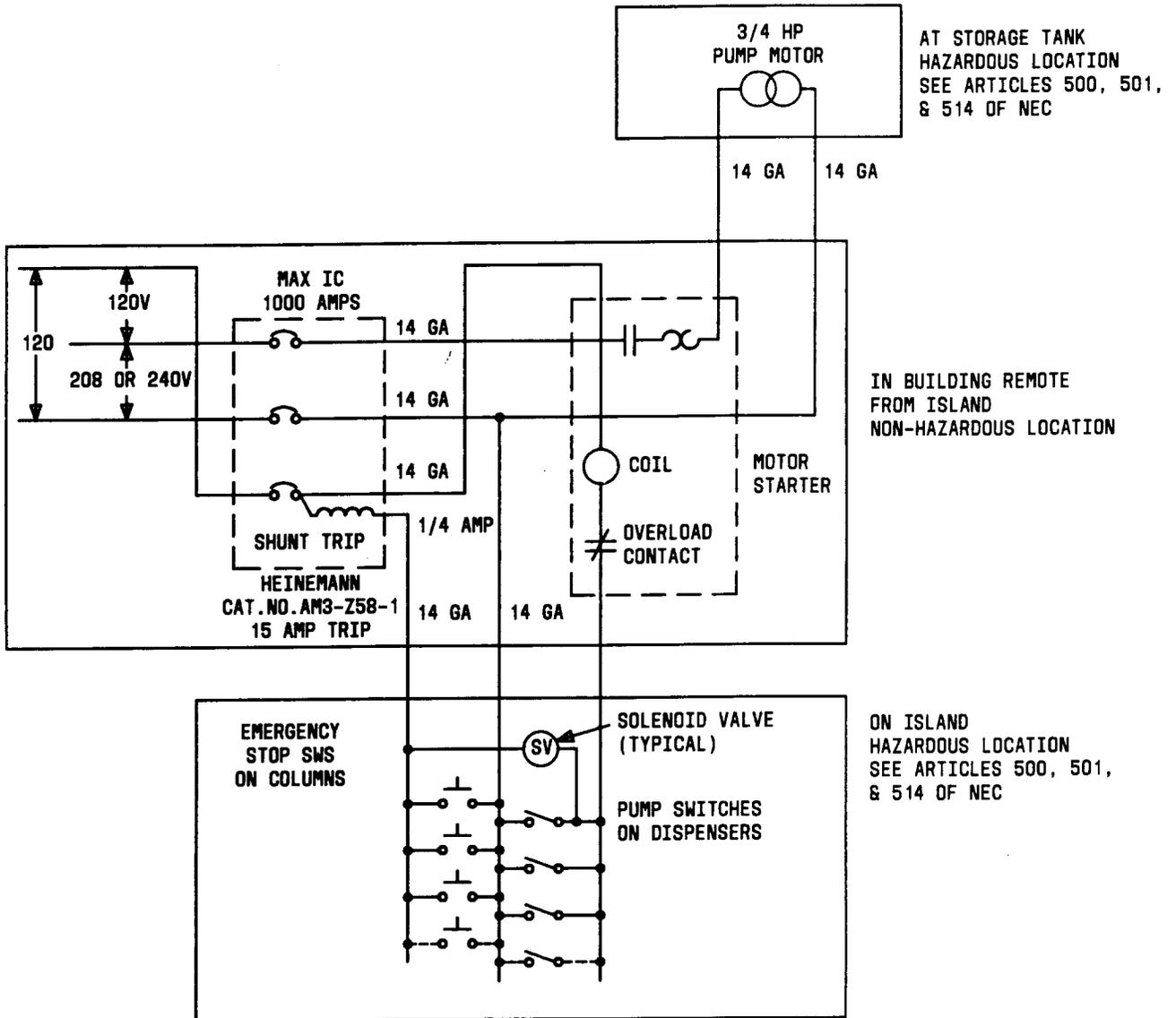


Fig. 8—Typical Electrical Schematic

TABLE A
EQUIPMENT LIST

ITEM	SUPPLIER	NOTES
Fuel Dispenser	Equipment Sales 4471 Amwiler Rd. Doraville, Ga. 303340 Model ESCO 25-40 or Model ESCO 25-40M with meter)	(Specify length of fuel hose and diameter, and whether totalizing meter is required. Also specify 1 inch explosion proof solenoid valve prewired to dispenser switch.)
Remote Totalizing Meter (Optional)	Equipment Sales (as above) Model 682 with Register Extension Shaft	
Impact Shear Valve	Equipment Sales (as above) Model 541T	(May be ordered with dispenser or separately)
Pump Box	Permco Corp Memphis, Tenn. Model SC-B	
Submersible Turbine Pump	Red Jacket P.O. Box 3888 Davenport, Iowa Model P7551, 34 hp	(See Section 2.03)
Leak Detector	Red Jacket (see above) Model 116-11	(May be ordered wth pump or separately)
Filter	Purolator, Inc Rahway, N.J. Model PAG25-D with Element No.6667930 or Faber Associates Colfax Avenue Clifton, N.J. Commercial Filter Model MMCX1-10-1 with Element No. E17X10-2TZV	

TABLE A (Contd)

EQUIPMENT LIST

ITEM	SUPPLIER	NOTES
Pipe (Fiberglass)	(Only A.O. Smith Inland, Inc 2700 West 65th Street Little Rock, Arkansas 72209	
Emergency Power Cutoff Switches	(Local Distributor) Square "D" Model KR-5R-H13 with KN-305 Name Plate or Equivalent	
Sealing Conduits	(Local Distributor) Crouse-Hinds Type EZS or Equivalent	
Sealing Compound	(Local Distributor) Chico A Sealing Compound or Equivalent	
Emergency Power Cutoff Switch Box and Switch Plate	(Local Distributor) Crouse-Hinds Type FS & FD Conduits with Cast Feralog Cover Plate or Equivalent	
Tank Level Indicator	Simmons Precision, Inc Bellows Falls, Vt, or Equivalent	
Circuit Breaker	(Only) Heinemann, Inc, Trenton, N.J. Cat No. AM3-Z-58-1	
Motor Starter	Allen Bradley Milwaukee, Wisconsin Cat No. 709AAT with Heater Element N.26	