

ITEM 026140

Item 0261401 - TYPE 170 CONTROLLER - BASE MOUNTED

Item 0261402 - TYPE 170 CONTROLLER - POLE MOUNTED

Item 0261403 - TYPE 170 CONTROLLER - PEDESTAL MOUNTED

DESCRIPTION

Work under this item shall consist of furnishing and installing a Type 170 E Controller in a Model 336S Cabinet at the location and to the dimensions and details shown on the plans or as directed by the engineer and in conformity with these specifications.

REFERENCED ITEMS

None

REQUIRED SUBMITTALS

Material Certificate of Compliance:

Submit 5 copies of material certificate of compliance for the Type 170 Controller (Type) in accordance with the contract general requirements.

Shop Drawings:

Submit 5 copies of shop drawings for the Type 170 Controller (Type) in accordance with the contract general requirements.

MATERIALS

1. APPLICABLE SPECIFICATIONS

The Model 170E controller units shall meet the latest applicable version of Chapter 2 of California Department of Transportation (CalTran's) Specification, except as noted herein.

The Model 336S cabinet, 170E controller, PDA#2 power distribution assembly, 206 power supply module, input file, output file and the pull out drawer shall all be manufactured by the same company in conformity with these specifications.

2. FUNCTIONAL REQUIREMENTS

Controller assemblies shall consist of a Type 170E controller, a cabinet and auxiliary equipment necessary for a complete electrical system as defined in these

specifications. All auxiliary equipment and the Type 170E controller shall be mounted inside the cabinet. All the Input File plugs shall be shipped in original manufacturer's and antistatic packaging after successful testing at the factory.

Each controller assembly furnished as part of this bid shall include the following equipment. All equipment furnished shall be from manufacturers listed on the latest CalTrans Pre-Qualified Products list.

Type 170E Controller

Card 204 Flasher Unit

Card 210 Conflict Monitor

Card 222 two channel loop detector sensor units

Card 242 two channel DC Isolator

Card 252 two channel AC Isolator

Card 200 Switch Packs

Card 404 modem

Model 336 Stretch Cabinet

Input file for 336S cabinet

Output file for 336S cabinet

Pull out drawer for 336S cabinet

Card 430 Flash transfer relays

Card 206 Power Supply Module for PDA#2

a. Type 170E Controller Unit

The Type 170E controller unit shall comply with the latest CalTran's Specification and include the following:

Each Model 170E Traffic Controller shall be furnished with a CPU module with a minimum of two M27C256B EPROMs (32K)

and two DALLAS 1235 Y NOVRAMs (32K) per each CPU module. The CPU module shall be configured to run WAPITI-W4IKS, WAPITI-W70SM and WAPITI-W9FT software version 55. The 170E unit shall be furnished with two Model 404 modems.

The 170E shall be delivered pinned for configuration 2 addressing.

The I/O system shall have separate input and output boards.

The PROM Module opening in the 170E door shall be closed to control the dust entering the unit.

b. Auxiliary Equipment.

The modules and equipment listed in the following paragraphs shall be compatible with the input and output files of the Type 170 controller cabinets specified herein.

Card 204 Flasher Unit

The flasher shall be a solid state device, producing between 50 and 60 flashes per minute with a 50 percent duty cycle. The flasher mechanism shall be mounted on a plug-in base with a plug-in mounting and shall comply with the Model 204 the latest edition of the CalTran's Transportation Electrical Equipment Specifications (TEES), Chapter 3, Section 3.

Card 210 Conflict Monitor with Communications

This conflict monitor shall be "Model 210PC" as manufactured by IDC or "Model 210 ECL" as manufactured by Eberle Design Inc. These Conflict Monitors shall have LEDs to monitor all 3 colors of the signal indications and comm. Ports to access the event logs. The software shall be supplied to access the event logs or any other enhanced features of the unit.

Card 222 Two Channel Loop Detector Sensor Unit

The Loop detectors shall be Model C-1100 as manufactured by RenoA&E or approved equal. The loop detectors shall be fully programmable and menu driven with LCD display and Loop Fail Diagnostics. The LCD shall be back lit for good visibility.

Card 242 Two-Channel DC Isolators

Channel isolators shall be utilized to provide independent isolation between electrical contacts external to the controller. This module shall comply with the provisions of Chapter 5, Section 4 of the latest edition of the CalTran's TEES, and all requirements listed below:

Note: All printed circuit boards shall be **Double Sided** boards. Edge connectors shall be **Double Sided** for each pin.

The Card 242 Units shall be as manufactured by either General Devices, Inc. (GDI) or IDC.

Card 252 Two-Channel AC Isolators

The two-channel and AC isolator shall contain two isolation channels which provide isolation between external 120 VAC input circuits and the controller unit input circuits and shall comply with the latest edition of CalTran's TEES, Chapter 5, Section 5.

The Card 252 Two-Channel AC Isolators shall be as manufactured by GDI or IDC.

Card 200 Switch Packs

Signal light circuits shall be controlled by 3-circuit solid state load switch. Each circuit shall be independent of the other two and within its own metal package. This package shall be attached to the interior wall of the load switch to allow for heat dissipation during operation. The Card 200 switch pack shall comply with the latest edition of CalTran's TEES, Chapter 3, Section 2.

The Card 200 Switch packs shall be manufactured by TSC or IDC.

Card 404 Modem

The Card 404 Modem shall be as manufactured by GDI, Model 404.

Card 430 Flash Transfer Relays

The flash transfer relay unit shall be a Model 430 as specified in the latest edition of CalTran's TEES.

c. Model 336 Stretch Cabinet

The Type 170 controller cabinet shall comply with Chapter 6 of the CalTran's TEES, and with all applicable standards for a Model 336 Stretch controller cabinet.

Cabinets furnished under this bid shall be fabricated from 0.125 inch minimum thickness UNFINISHED sheet aluminum. 336 stretch cabinets shall be furnished with a 22"X38"x12" M - Base Adapter as shown on the plans. The adapter shall be fabricated from 0.188 inch minimum thickness unfinished sheet aluminum.

Cabinet locks shall be CORBIN "2" type locks. The cabinet doors shall have a THREE POINT locking system with steel handles.

The police panel shall include a DPDT toggle switch labeled "MANUAL/AUTOMATIC" and a manual push-button switch on a four (4) foot cord. There shall be sheet metal housing behind the police door to hold the manual push button cord. The toggle switch shall have contacts rated for 15 amperes at 120 volts AC. When placed in the "MANUAL" position, the 170 controller unit shall be inhibited from timing. Depressing the manual push-button while the switch is in the "MANUAL" position shall cause the controller to advance to the next interval. YELLOW AND RED CLEARANCE intervals shall not be affected by the manual advance input.

The cabinet shall be furnished with POWER DISTRIBUTION ASSEMBLY #2. Two Model 204 Flasher Units and one Model 206 Power Supply Module shall be furnished with Power Distribution Assembly #2.

Cabinets shall be furnished with a radio filter and surge protection device, EDCO Model SHA 1210, mounted inside the Power Distribution Assembly #2.

The cabinet shall be furnished with a 170E Controller Unit (see section 2.3), one Input File (14 slots) and one Output File. The output file shall provide centralized connections for the safety monitor, 12 switch packs, four flash transfer relays and 8 flash programming plugs.

Cabinets shall be wired to accept and implement all of the features of the conflict monitor specified.

Cabinets shall be furnished with a florescent light fixture mounted inside the cabinet above the rear door. The light shall be connected to door switch which shall automatically turn the light on when the door is open and turn the light off when the door is closed.

The Model 336 stretch cabinet shall be designed to be base mounted, pole mounted and pedestal mounted. The cabinet shall be designed to withstand the following loading conditions:

80 MPH sustained winds

A 100 pound point load applied horizontally at the top edge of the cabinet.

A maximum deflection of 3" measured at the top edge of the cabinet, under the loads described in conditions 1 or 2 above.

A Communications Cable Termination Panel shall be furnished in each cabinet. This panel shall be fabricated from 0.125 inch minimum thickness sheet aluminum and shall consist of:

One R66-M Type quick-connect block with four columns by 50 rows of pins and a clear plastic cover.

Two 10-circuit Buchannan connectors.

Two "Edco" PC642C-30X four-wire modules with a printed circuit board connector.

Two four-wire, three (3) foot harnesses with sleeve and connectors for C2 and C20 ports shall be installed to the Buchannan connectors on the Communication Panel. The C2 and C20 connectors shall have locking latches.

The load side of the surge protection shall be connected to the harness and the line side shall be connected to the communication field wires. The ground terminal shall be connected to the chassis ground.

See the details for a schematic of the Communication Panel. This panel shall be installed at the rear, bottom left hand corner of the cage. The C2 and C20 Harnesses shall be secured to the Communication Panel with plastic Tie-Wraps. The Communication Panel shall be equipped with eight Tie-Wrap Hooks as shown in the schematic.

The Model 336 Cabinets shall be the 336 Stretch Model not to exceed a maximum height of 48" or a minimum height of 46".

The cabinet shall have vents on both front and back doors and fiberglass pleated filters shall be provided for both doors with metal water deflection panels mounted inside the vents.

The output file of the cabinet shall be hard wired. The equipment on the cage shall be arranged to leave maximum clearance at the bottom.

A pull out drawer, hinged at the top and having sliding tracks, shall be provided in the cabinet. The drawer shall be one inch in height, 13 inches deep, 16 inches wide and capable of holding 40 pounds in weight when drawer is extended. This drawer shall be located between the 170 Unit and the Power Distribution Assembly Unit.

The Input and Output files shall be furnished with ten switch packs, four flash transfer relays, eight Model 222 units, three Model 242 units, one conflict monitor, two flashers, eight red - two yellow - two white Flash programming plugs, red monitoring cable and ten 2K/10W bleeding resistors for unused outputs.

The conflict monitor shall be wired with a connector to monitor All Red- yellow outputs.

All pins in C1 connector shall be wired and C5 connector shall be installed for future use with an auxiliary output file.

CONSTRUCTION METHODS

The Controller and Cabinet shall be installed at the locations shown on the plans in the following manner:

The pole mounted controller cabinet shall be attached to the side of the pole with the use of mounting brackets supplied by the controller manufacturer. A hole shall be drilled in the pole, using a hole saw, to accept a 2 1/2 inch coupling which is to be welded to the pole. A 90 degree pull box shall be attached to the coupling with a standard pipe nipple. The bottom of the cabinet shall have an opening for cable entrance and four holes to fasten the flange of the 90 degree pull box.

The base mounted cabinet shall be installed on a level foundation. A one (1) inch thick bead of silicone type caulking shall be placed between the "M" base adapter and the foundation before bolting the adapter to the foundation. A one (1) inch thick bead of silicone type caulking shall be placed between the 336 S cabinet and the "M" base adapter before the 336S cabinet is attached to the adapter base. To further prevent rainwater from entering inside the cabinet all the outer edges of the 336 S cabinet and the "M" base adapter shall be sealed with the silicone type caulking.

All unused conduits in the foundation shall be stuffed with a rag and duct seal to prevent rats and gas entering the cabinet.

The cabinet doors shall be parallel or facing to the curb as specified in the plans. If the plans do not indicate this information, the contractor shall confirm with the engineer regarding the direction of the cabinet door opening. All controllers shall be effectively grounded using a 5/8 inch by 10 foot copper rod with #8 AWG solid, bare, tinned copper wire attached to the controller cabinet and to the ground rod by a square head bolt clamp.

METHOD OF MEASUREMENT

This work will be measured for payment by the number of each type controller completed, operating, and accepted in place.

BASIS OF PAYMENT

This work will be paid for the contract unit price each for "Type 170 Controller in 336S Cabinet (Type)", which price shall include controller, cabinet, M-base adapter, all auxiliary equipment, necessary fittings for mounting, pole mounting brackets and hardware kit, testing and all materials, equipment, tools, shipping, and labor incidental thereto.

<u>PAY ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
0261401	Type 170 Controller - Base Mounted	EA
0261402	Type 170 Controller - Pole Mounted	EA

0261403

Type 170 Controller - Pedestal Mounted

EA