

633 ITEM SPECIAL CONTROLLER, MODEL 170E, WITH MODEL 332 CABINET AND ACCESSORIES

The controller supplied shall be complete with the specified cabinet including all necessary components and cables not specifically mentioned below. All equipment and cabinets shall conform to ODOT Specifications 633, 733 and the following:

MODEL 170E CONTROLLERS:

Specifications for these controllers shall be "Transportation Electrical Equipment Specifications", California Department of Transportation, November 19, 1998, including all addenda. The Controller units shall currently be listed on the Caltrans "Qualified Products List".

In addition:

- The controller unit shall not be supplied with the M170E board.
- For cabinets that are to be included in a hardwire (twisted pair) interconnected signal system, the controller unit shall include a Model 400 modem and communication system interface as specified in the Caltrans Specifications. In addition to the Caltrans Specification, modems shall be designed such that if one modem loses communication with the master, subsequent modems shall still be able to communicate.
- A 412C prom module shall be supplied for memory select #4 configuration without controller software to the ODOT District Office 14 days in advance of when software is needed. The District will provide the local program or master program as required to the Contractor for his use on the 412C prom module. It shall be the Contractor's responsibility to use the returned 412C module with the controller software to program the signal per the plans.
- As per Caltrans requirements, all memory, microprocessor and ACIA devices shall be socket mounted. Sockets shall have machined beryllium copper contacts with gold plating.
- A cable harness, approximately 4 ft. (1.2 m) long, shall be supplied to connect a laptop computer with the controller for the transfer of data. The cable shall have a DB-9 connector on one end, and a connector on the other end to mate with the C2 on the back of the controller.
- All circuit boards shall be vertically mounted.
- The power supply shall be modular and easily removable from the chassis.
- The unit shall contain separate input and output modules.
- If a telephone drop is shown in the plans, all necessary communication modules, modem, lightning protection and cables for auto dial/answer telephone connection shall be provided.

10. If the controller is part of an interconnected signal system, the controller shall include modems, ports and cables for system communication.

2 sets of controller schematics and service manuals shall be supplied with each controller.

Conflict Monitors, Type 2010:

Conflict monitors shall be on the ODOT pre-approved list (S.S. 962). Two sets of operations instructions and monitor schematics shall be supplied with each monitor. Permissive channels shall be programmed with the use of a diode card (Caltrans Standard) which shall be included with the monitor.

Cabinet, Model 332:

Model 332 cabinets shall meet the specifications "Traffic Signal Control Equipment Specifications", California Department of Transportation, January 1989, or latest edition, and shall currently be on the Caltrans "Qualified Products List" (QPL) for 332 cabinets.

Cabinets shall be constructed of aluminum and shall be supplied unpainted. Anodic coating is not required. Cabinets shall be fully equipped with conflict monitor, flashers, AC isolators, DC isolators, and flash transfer relays. The appropriate number of switch packs and Model 222 loop detector sensor units shall be supplied to operate the intersection as shown in the plans. All components shall meet Caltrans Specifications and shall be on the QPL as applicable.

Cabinets shall be fitted with a PDA-2 power distribution assembly. Cabinets shall be equipped with an EDCO SHA12-10 or approved equal surge protector in lieu of the Caltrans specified surge protection. The SHA12-10 unit shall be installed in an enclosure within the cabinet.

The front of the input and output files shall be labeled using a writable tape. In the case of the output file, the tape shall clearly designate the purpose of the corresponding switch pack. An example of switch pack labeling is "Phase 2" or "Phase 2 PED". In the case of the input file, the tape shall clearly designate the purpose of the corresponding detector unit. Every used channel of the 222 detector shall be labeled. An example of detector unit labeling is "Phase 2 C" or "Phase 2 EC" or "Phase 2 EXT" where:
C - Is a call input only during red
EC - Is extend and call during red, yellow and green
EXT - Is an extension only during green

Cabinet wiring shall comply with the following:

- Output files shall be "Hardwired". No printed circuit wiring shall be used in the output file except for the red monitor board.
- Cabinets shall have red monitor cabling installed. A program board shall be installed to enable/disable red monitoring. Cabinets shall be shipped with the red monitor jumpers set in the 'Enable' position.
- Pedestrian yellow loadswitch outputs shall not be connected to the conflict monitor card-edge connector.
- Field wiring for loop detector lead-in cables and pedestrian detectors shall be terminated on a lower loop input panel. EDCO Model SRA-6LCA, SRA-6LCB or SRA-6LC surrestors shall be provided on the lower input panel for protection against incoming electrical surges and lightning. Field wiring terminals on the lower input panel shall be labeled by a permanent screening process to identify the input file (I or J), the input file slot number (1-14) and the channel terminal (D, E, J or K). An example is "I4-K" standing for input file "I"; slot 4; channel terminal "K". All terminals on these detector panels shall be easily accessible without removing equipment from the mounting rack. Tagging of wires shall not be considered acceptable to satisfying terminal labeling.

5. For cabinets that are to be included in a hardwire (twisted pair) interconnected signal system, incoming interconnect cable shall be terminated on an appropriate terminal base that is mounted on the side of the cabinet. Protection from incoming electrical surges/lightning on interconnect pairs shall be provided by installation of EDCO PC642 surge arrestors on the terminal base. The protected outputs from the terminal base shall then be routed through to the controller.

6. On the output file, pin number 11 of each switchpack shall be wired to AC-, so that the output indicators on dual indicator switchpacks will display properly. Switchpacks shall have both input and output indicators for each switch.

The following auxiliary items shall be supplied:

1. Cabinets shall have two fluorescent lights (front and rear) with door switches.

2. A rack mounted detector test panel shall be furnished with separate test switches for all possible vehicle and pedestrian phases. The switches shall be three (3) position "on/off/momentary on" switches.

3. Each cabinet shall be provided with a police panel which will include a pushbutton with cord and three switches labeled auto/flash, signals on/off, and auto/manual. The pushbutton cord shall not be wired through an AC isolator, but shall be connected to the controller harness wiring by a molex plug connection. When placed in the manual position, manual control enable shall be applied to the controller and "Recall" shall be applied to all phases. Activation of the pushbutton shall "Advance" the controller except that manual advancement will be prohibited in the minimum green, yellow and red intervals.

4. An aluminum shelf with integral storage compartment shall be provided in the rack below the controller. The storage compartment will have telescoping drawer guides for full extension. The compartment top shall have a non-slip plastic laminate attached.

5. Cabinets shall be supplied with galvanized anchor bolts with nuts and washers. Anchor bolts shall be 3/4" (19 mm) Diam. by 16" (400 mm) minimum length with an "L" bend on the unthreaded end.

Two sets of cabinet wiring diagrams, service manuals, programing and maintenance instructions shall be furnished for each cabinet and equipment item. The cabinet wiring diagrams shall be supplied in a clear plastic pouch fastened to the inside of the controller cabinet.

GENERATOR POWER PANEL:

This item shall allow signal electricians to operate the traffic signal during power outages, without opening the cabinet door or connecting or disconnecting permanent power cables. The enclosure shall be installed on the power panel side of the controller cabinet. Design and layout of the controller cabinet shall determine exact placement of the enclosure but it should be placed near the top of ground mounted cabinets and about 5 feet (1.5 m) from the ground on pole mounted cabinets. The enclosure shall be sealed with a high quality silicon caulk and all holes drilled into the side of the controller cabinet shall be caulked and sealed after the electrical equipment is installed. All electrical connections, soldered or screw type terminals, shall be covered with a clear silicon caulk.

The generator inlet shall be 30 AMP, locking, four wire grounding and meet the NEMA 114-30-P 30A 125/250V specification. The inlet shall be a Hubble catalog #2715.

The line voltage generator switch shall be 30 AMP, 125/250V AC, two (2) pole, three (3) position, (on, off, on). The switch shall be a Hubble catalog #1388. The line voltage indicator light shall be a 125V AC light emitting diode with a red lens. The line voltage circuit breaker shall be single pole single throw and a minimum of 30 AMPS. The amperage shall be increased to accommodate greater loads, if necessary. The gauge of the power cable shall be of proper size per the National Electrical Code (NEC).

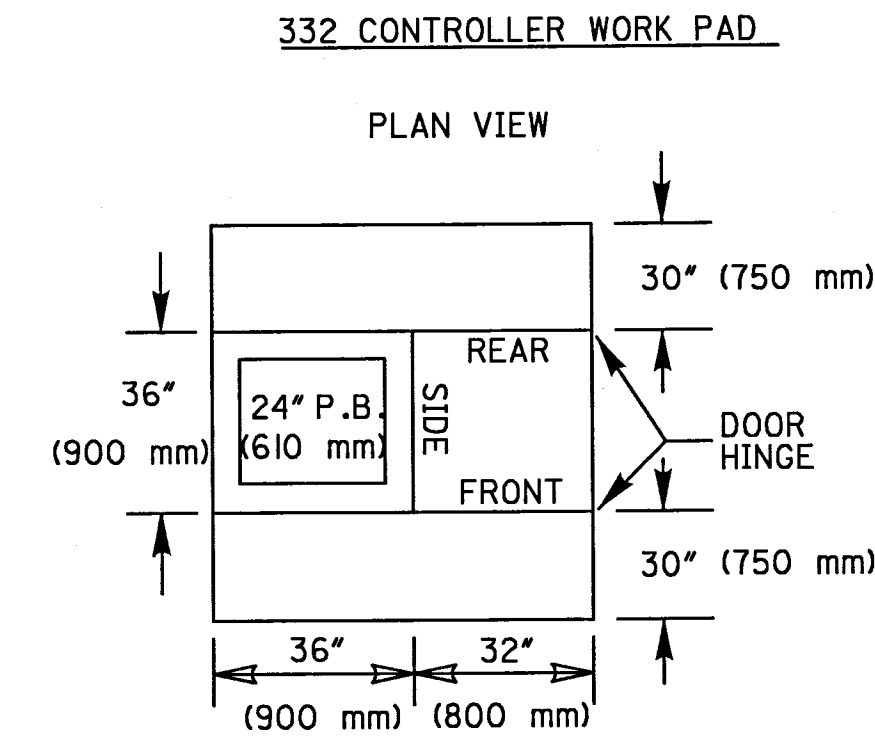
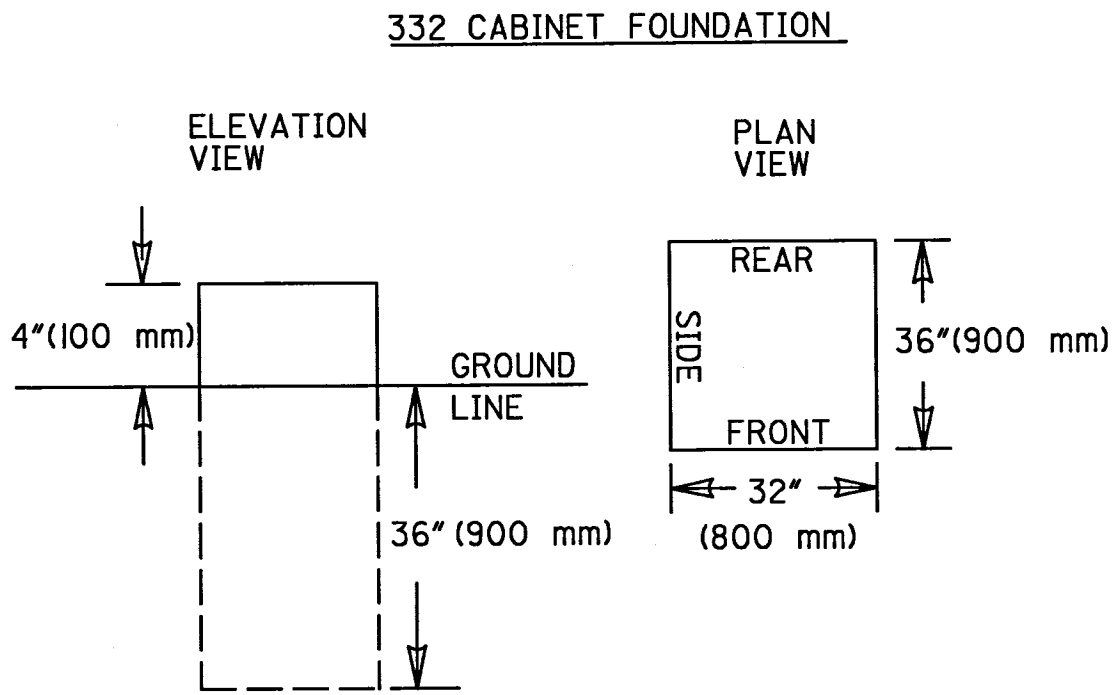
DESIGNER NOTE: CABINET RISER IS OPTIONAL.

Cabinet Riser:

An aluminum riser shall be provided with each base mounted cabinet which will raise the cabinet approximately 8" (200 mm) above the concrete foundation. The bottom of the riser shall bolt to the standard cabinet foundation anchor bolts and the top of the riser shall bolt to the bottom of the cabinet. All necessary bolts, washers and nuts shall be supplied.

Payment:

Cost for all of the above including labor, material, tools and equipment to provide and install a completely operational cabinet and controller shall be included in the bid item price for 633 Item Special, Controller, Model 170E, with Model 332 Cabinet and Accessories.



NOTE: PULLBOX SHALL BE PLACED ON OPPOSITE SIDE OF DOOR HINGE

INPUT FILE ASSIGNMENT FOR 332 CABINET

| | SLOT 1 | SLOT 2 | SLOT 3 | SLOT 4 | SLOT 5 | SLOT 6 | SLOT 7 | SLOT 8 | SLOT 9 | SLOT 10 | SLOT 11 | SLOT 12 | SLOT 13 | SLOT 14 |
|-------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|-----------------|----------|----------|-----------|
| Channel #1 | 1 EC | 2 EC | 2 EC | 2 C | 3 EC | 4 EC | 4 EC | 4 C | 1 EC | SPARE | MAN. CTRL. ADV. | 2 PPB | 6 PPB | FLSH |
| Field Term. | I 1-D,E | I 2-D,E | I 3-D,E | I 4-D,E | I 5-D,E | I 6-D,E | I 7-D,E | I 8-D,E | I 9-D,E | I 10-D,E | I 11-D,E | I 12-D,E | I 13-D,E | I 14-D,E |
| Channel #2 | (1 EC) | 2 EC | 2 EXT | (2 C) | (3 EC) | 4 EC | 4 EXT | (4 C) | 3 EC | SPARE | ADV. ENAB. | 4 PPB | 8 PPB | STOP TIME |
| Field Term. | I 1-J,K | I 2-J,K | I 3-J,K | I 4-J,K | I 5-J,K | I 6-J,K | I 7-J,K | I 8-J,K | I 9-J,K | I 10-J,K | I 11-J,K | I 12-J,K | I 13-J,K | I 14-J,K |

FRONT VIEW OF TOP INPUT FILE I

| | SLOT 1 | SLOT 2 | SLOT 3 | SLOT 4 | SLOT 5 | SLOT 6 | SLOT 7 | SLOT 8 | SLOT 9 | SLOT 10 | SLOT 11 | SLOT 12 | SLOT 13 | SLOT 14 |
|-------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|----------|----------|
| Channel #1 | 5 EC | 6 EC | 6 EC | 6 C | 7 EC | 8 EC | 8 EC | 8 C | 5 EC | SPARE | SPARE | EV-A | EV-B | RR-1 |
| Field Term. | J 1-D,E | J 2-D,E | J 3-D,E | J 4-D,E | J 5-D,E | J 6-D,E | J 7-D,E | J 8-D,E | J 9-D,E | J 10-D,E | J 11-D,E | J 12-D,E | J 13-D,E | J 14-D,E |
| Channel #2 | (5 EC) | 6 EC | 6 EXT | (6 C) | (7 EC) | 8 EC | 8 EXT | (8 C) | 7 EC | SPARE | SPARE | EV-C | EV-D | RR-2 |
| Field Term. | J 1-J,K | J 2-J,K | J 3-J,K | J 4-J,K | J 5-J,K | J 6-J,K | J 7-J,K | J 8-J,K | J 9-J,K | J 10-J,K | J 11-J,K | J 12-J,K | J 13-J,K | J 14-J,K |

FRONT VIEW OF BOTTOM INPUT FILE J

SEPARATE BID ITEMS:

625 PULLBOX, 713.08, 24" (610 mm)
633 CONTROLLER WORK PAD
633 CONC. FOR CAB. FOUNDATION

INPUT FILE TERMINAL ASSIGNMENT

| TERM. | PIN | FUNCTION |
|-------|-----|------------------|
| 2 | SP | SPARE |
| 3 | W | CHANNEL 1 OUTPUT |
| 4 | D | CHANNEL 1 INPUT |
| 5 | E | CHANNEL 1 INPUT |
| 6 | J | CHANNEL 2 INPUT |
| 7 | K | CHANNEL 2 INPUT |
| 8 | L | EQUIPMENT GROUND |

() - JUMPERED TO UPPER CHANNEL
C - INPUT ONLY DURING RED
EC - EXTEND AND CALL (RED, YELLOW, GREEN)
EXT - INPUT ONLY DURING GREEN

Termination of field wiring shall conform to the above chart. The Contractor shall duplicate the input assignment chart and include it in the cabinet documentation. The chart shall clearly indicate which input file slots and channel terminals are used in the cabinet. A red pen shall be used to circle slot numbers and channel terminals that are used.

12-07-00

ODOT MAINTAINED MODEL 170E CONTROLLER WITH MODEL 332 CABINET AND ACCESSORIES

OFFICE OF TRAFFIC ENGINEERING

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