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ITEM 633 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 "TRAFFIC SIGNAL CONTROL EQUIPMENT SPECIFICATIONS", CALIFORNIA DEPARTMENT OF TRANSPORTATION, JANUARY 1989. THESE SPECIFICATIONS SHALL INCLUDE ADDENDUM 8, NOVEMBER 1993 OR LATEST REVISION. THE CONTROLLER UNITS SHALL CURRENTLY BE LISTED ON THE CALTRANS "QUALIFIED PRODUCTS LIST".

- IN ADDITION:**
1. THE CONTROLLER UNIT SHALL NOT BE SUPPLIED WITH THE M170E BOARD.
 2. CABINETS SHALL BE EQUIPPED WITH THE REQUIRED FIBER OPTIC MODEM TO PROVIDE SIGNAL COORDINATION.
 3. A 412C PROM MODULE SHALL BE SUPPLIED FOR MEMORY SELECT #4 CONFIGURATION WITHOUT LOCAL CONTROLLER SOFTWARE TO THE ODOT DISTRICT OFFICE 14 DAYS IN ADVANCE OF WHEN SOFTWARE IS NEEDED. THE DISTRICT WILL PROVIDE THE LOCAL PROGRAM TO THE CONTRACTOR FOR HIS USE ON THE 412C PROM MODULE, ACCOMPANYING EACH PROM MODULE SUPPLIED TO THE DISTRICT SHALL BE THE TRAFFIC SIGNAL PLAN SHEET(S) THAT SHOWS THE REQUIRED PHASING AND TIMING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROGRAMMING THE COORDINATION TIMING ONCE ODOT RETURNS THE 412C PROM MODULE LOADED WITH THE LOCAL TIMING AND PHASING.
 4. AS PER CALTRANS REQUIREMENTS, ALL MEMORY, MICROPROCESSOR AND ACIA DEVICES SHALL BE SOCKET MOUNTED. SOCKETS SHALL HAVE MACHINED BERYLLIUM COPPER CONTACTS WITH GOLD PLATING.
 5. THE CONTROLLER SHALL BE SUPPLIED WITH THE APPROPRIATE COMMUNICATION PORT, CABLES AND CONNECTORS FOR COMMUNICATING WITH THE PORTABLE ARTERIAL MONITORING LAPTOP COMPUTER.
 6. ALL CIRCUIT BOARDS SHALL BE VERTICALLY MOUNTED.
 7. THE POWER SUPPLY SHALL BE MODULAR AND EASILY REMOVABLE FROM THE CHASSIS
 8. THE UNIT SHALL CONTAIN SEPARATE INPUT AND OUTPUT MODULES

2 SETS OF CONTROLLER SCHEMATICS AND SERVICE MANUALS SHALL BE SUPPLIED WITH EACH CONTROLLER. ONE SET OF CIAND C2 WRAPAROUND CONNECTORS AND EXTENDER CARDS SHALL BE SUPPLIED AS PART OF THIS PROJECT.

SOFTWARE, EITHER THE CALTRANS "DAT" DIAGNOSTIC AND TESTING OR LICENSED THIRD PARTY SOFTWARE SHALL BE PROVIDED ON A SEPARATE PROGRAM MODULE THAT WILL BE INSERTED INTO THE UNIT FOR TESTING BOTH THE CONTROLLER AND CABINET. FOR THE PROJECT TWO SEPARATE PROGRAM MODULES WITH THE DIAGNOSTIC SOFTWARE AND TWO INSTRUCTION MANUALS SHALL BE PROVIDED.

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 SHAI2-10 OR APPROVED EQUAL SURGE PROTECTOR IN LIEU OF THE CALTRANS SPECIFIED SURGE PROTECTION. THE SHAI2-10 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:

1. OUTPUT FILES SHALL BE "HARDWIRED". NO PRINTED CIRCUIT WIRING SHALL BE USED IN THE OUTPUT FILE EXCEPT FOR THE RED MONITOR BOARD.
2. 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.
3. PEDESTRIAN YELLOW LOADSWITCH OUTPUTS SHALL NOT BE CONNECTED TO THE CONFLICT MONITOR CARD-EDGE CONNECTOR.
4. 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-E" STANDING FOR INPUT FILE "I"; SLOT 4; CHANNEL TERMINAL "E".
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. A WIRING HARNESS WITH A DB-9 CONNECTOR SHALL BE BROUGHT FROM THE C2 ON THE BACK OF THE CONTROLLER TO THE FRONT OF THE CABINET RACK NEAR THE PULL OUT SHELF. THE HARNESS SHALL BE CONNECTED TO THE CONTROLLER TO ALLOW A LAPTOP COMPUTER TO UPLOAD/DOWNLOAD DATA.

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 MOMENTARY CONTACT PUSHBUTTONS OR ON/OFF SWITCHES. SWITCHES OR BUTTONS CAPABLE OF PROVIDING A PERMANENT "ON" POSITION SHALL NOT BE SUPPLIED. A CONSTANT CALL SHALL BE SIMULATED BY CONTINUOUSLY HOLDING THE BUTTON OR SWITCH IN THE ON POSITION.
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") 19mm DIAM. BY (16") 406mm MINIMUM LENGTH WITH AN "L" BEND ON THE UNTHREADED END.

TWO SETS OF CABINET WIRING DIAGRAMS, SERVICE MANUALS, PROGRAMMING 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 FROM THE GROUND ON POLE MOUNTED CABINETS. DETAIL DRAWING SHOWING THE ENCLOSURE, FRONT VIEW OF THE GENERATOR POWER PANEL AND THE ELECTRICAL HOOK-UP ARE INCLUDED IN THE SPECIFICATION. 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 I14-30-P 30A I25/250V SPECIFICATION. THE INLET SHALL BE A HUBBLE CATALOG #2715.

THE LINE VOLTAGE GENERATOR SWITCH SHALL BE 30 AMP, I25/250V AC, TWO (2) POLE, THREE (3) POSITION, (ON, OFF, ON HUBBLE #1388).

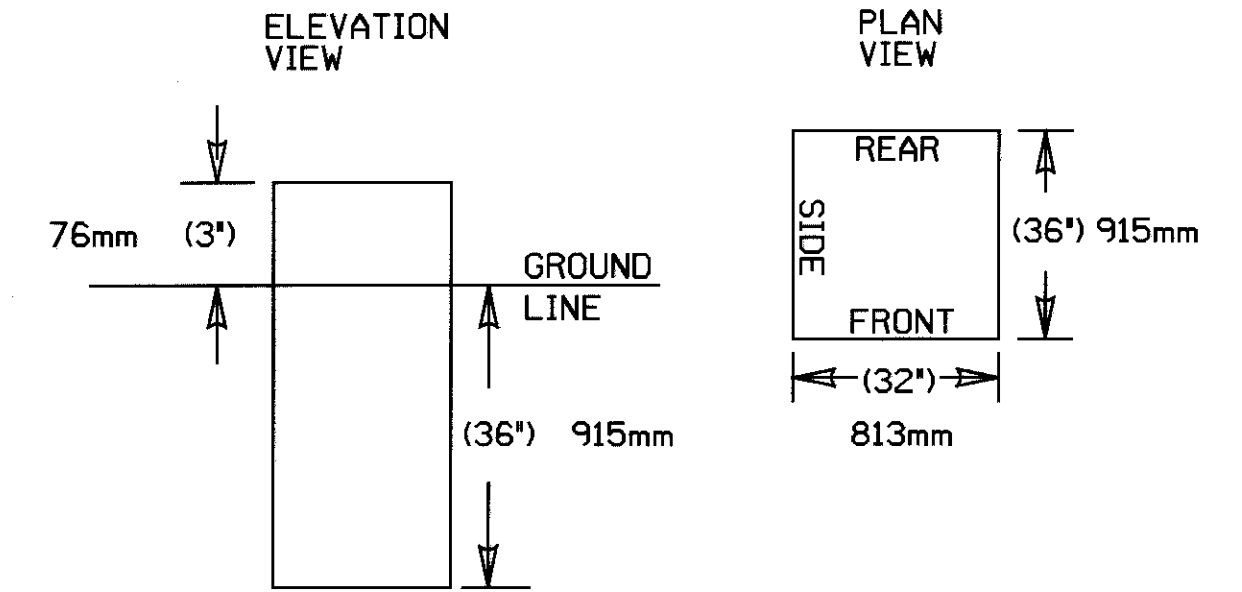
THE LINE VOLTAGE INDICATOR LIGHT SHALL BE I25V AC LIGHT EMITTING DIODE WITH A RED LENS.

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).

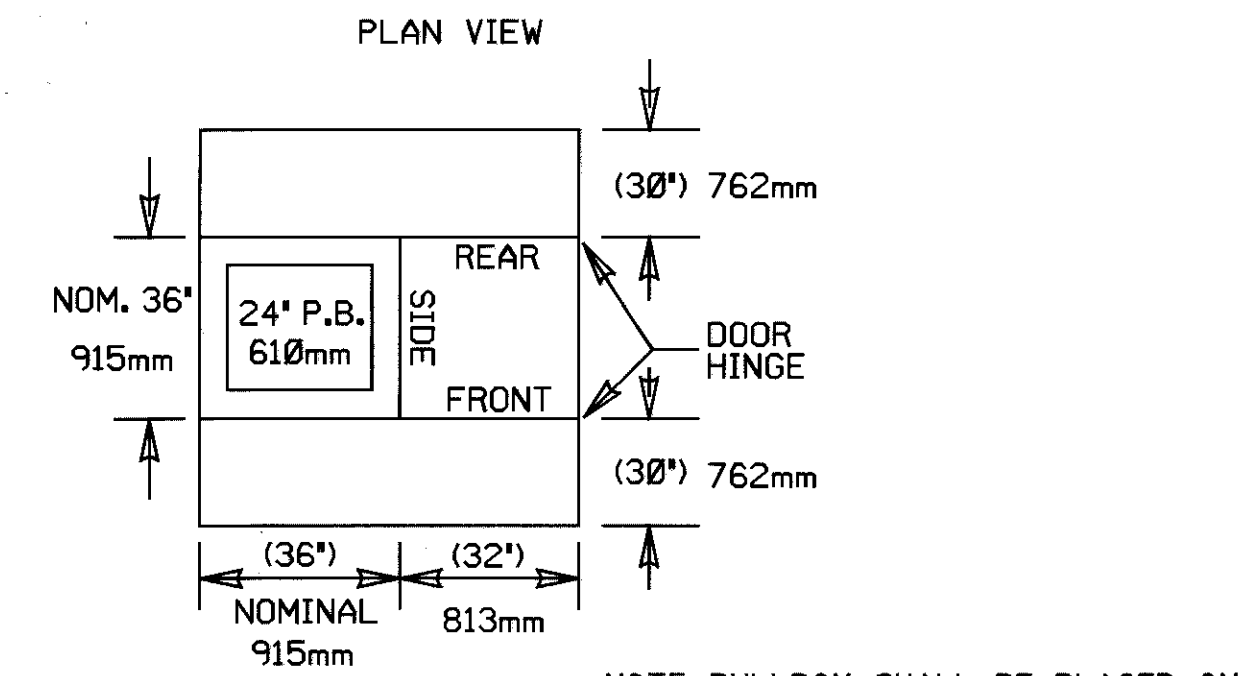
CABINET RISER:
 AN ALUMINUM RISER SHALL BE PROVIDED WITH EACH BASE MOUNTED 332 CABINET WHICH WILL RAISE THE CABINET APPROXIMATELY (8") 203mm ABOVE THE CONCRETE FOUNDATION. THE BOTTOM OF THE RISER SHALL BOLT TO THE STANDARD CABINET FOUNDATION ANCHOR BOLTS AND THE TOP OF THE RISER SHALL BOLT TO THE BOTTOM 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 ITEM 633, CONTROLLER, MODEL 170E, WITH MODEL 332 CABINET AND ACCESSORIES.

332 CABINET FOUNDATION



332 CONTROLLER WORK PAD



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

INPUT FILE TERMINAL ASSIGNMENT

TERM.	PIN	FUNCTION
1	SP	SPARE
2	F	CHANNEL 1 OUTPUT
3	W	CHANNEL 2 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.

REVISED BY:	DATE:
ODOT MAINTAINED MODEL 170E CONTROLLER WITH MODEL 332 CABINET AND ACCESSORIES	
DATE 08/12/98	

CALCULATED XXX
 CHECKED XXX
 SIGNAL DETAILS
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