

# GENERAL NOTES

FED. RD. DIVISION	STATE	PROJECT	FISCAL YEAR
5	OHIO	T-4030(11)	1973

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WILLOUGHBY CITY SIGNALS, LAKE COUNTY  
LAK 20/84/640

## WIRING PANEL

EACH CONTROLLER CABINET SHALL HAVE MOUNTED THEREIN A WIRING TERMINAL AND COMPONENT PANEL IN SUCH MANNER AS TO MAKE THE WIRING AND SUPPLEMENTAL COMPONENTS NEATLY DONE AND READILY ACCESSIBLE AND VISIBLE.

THE MAIN POWER FOR THE CONTROLLER SHALL BE 115 VOLT,  $\pm 10\%$ , 60 HERTZ.

THE MAIN POWER SUPPLY IN THE CABINET SHALL BE PROTECTED BY A 20 AMP CIRCUIT BREAKER MOUNTED ON THE PANEL.

A REMOTE TERMINAL BLOCK FOR SYSTEM INTERCONNECTION SHALL BE PROVIDED AND FUSED AS NECESSARY.

SOLID STATE LOAD SWITCHING MINIMUM 10AMP CAPACITY PER CIRCUIT SHALL BE MOUNTED ON THE PANEL AND FULL WAVE GREEN CONFLICT MONITORS PROVIDED

## COORDINATING UNITS

DIAL COORDINATING UNITS SHALL BE PROVIDED IN EACH LOCAL CONTROLLER TO INTERCONNECT THE ACTUATED LOCALS TO THE TRAFFIC RESPONSIVE MASTER CONTROLLER.

DIAL COORDINATING UNITS SHALL HAVE THREE (3) DIAL UNITS.

EACH DIAL SHALL BE PLUG CONNECTED AND SHALL BE SO CONSTRUCTED THAT IT MAY BE INSTALLED OR REMOVED WITHOUT THE USE OF TOOLS.

THE TIMING DIAL OF EACH DIAL UNIT SHALL BE DRIVEN BY A SELF-STARTING SEALED, SYNCHRONOUS MOTOR REQUIRING NO LUBRICATION.

THE FRONT OF THE DIAL SHALL HAVE A CALIBRATED SCALE FOR THE SETTING OF EACH FUNCTION SUCH AS YIELD AND FORCE-OFF. THE DIAL SHALL AT ALL TIMES SHOW A VISUAL INDICATION OF THE PERCENTAGE OF THE TIME CYCLE ALLOCATED TO EACH INTERVAL.

THE TIMING DIAL SHALL HAVE AN OFFSET SCALE FOR SETTING THE OFFSET RELATIONSHIP BETWEEN MASTER AND SECONDARY DIAL COORDINATING UNIT.

EACH DIAL SHALL BE EQUIPPED WITH COLOR CODED KEYS WHICH SHALL SNAP IN AND OUT EASILY WITHOUT TOOLS AND SHALL BE SELF LOCKING.

EACH DIAL UNIT SHALL BE EQUIPPED WITH A SEVEN CONTACT DIAL BLOCK WIRED FOR THE FOLLOWING FUNCTIONS: THREE RESET CONTACTS, ONE SPLIT, ONE INTERLOCK (YIELD) AND TWO CONTACTS THAT MAY BE USED AS REQUIRED.

EACH DIAL UNIT SHALL BE DESIGNED FOR PROVISION OF SPLIT TRANSFER.

ANY PRINTED CIRCUIT BOARD CONTROL RELAYS SHALL BE PLUG-IN TYPE AND COMPLETELY INTER-CHANGEABLE WITH ONE ANOTHER.

THE DIAL COORDINATING UNIT SHALL BE PLUG-CONNECTOR TO THE CONTROLLER PANEL. THE PLUG CONNECTION SHALL BE MS TYPE.

THE COORDINATING UNIT SHALL BE EQUIPPED WITH INDICATING LIGHTS FOR CYCLE, OFFSET AND SPLIT FUNCTIONS IN EFFECT AND INCLUDE TEST SWITCHES TO DETERMINE CYCLE AND SPLIT CALLED FOR BY THE MASTER.

AN EXTERNAL FREE OPERATION RELAY ASSEMBLY SHALL BE INCLUDED TO ALLOW FREE OPERATION OF THE TIMER WHEN SYSTEM INTERCONNECT IS OFF OR WHEN THE COORDINATING UNIT IS REMOVED FROM THE CIRCUIT.

## CABINETS

LOCAL CONTROLLERS SHALL BE HOUSED IN MOUNTED, WEATHERPROOF CABINETS, CLEAN CUT IN DESIGN AND APPEARANCE.

THE SIZE OF THE CABINET SHALL BE SUCH TO PROVIDE AMPLE SPACE FOR HOUSING THE TIMER, PANEL, COORDINATING UNIT, DETECTOR AMPLIFIERS, CONFLICT MONITORS AND OTHER ASSOCIATED ELECTRICAL DEVICES WHICH ARE FURNISHED WITH THE CONTROLLER.

METAL SHELVES SHALL BE FURNISHED FOR THE TIMER AND ACCESSORIES AS REQUIRED.

A HINGED DOOR SHALL BE PROVIDED PERMITTING COMPLETE ACCESS TO THE INTERIOR OF THE CABINET. WHEN CLOSED, THE DOOR SHALL FIT TIGHT AGAINST THE GASKET. A STRONG LOCK, KEYS TO THE CITY OF WILLOUGHBY SHALL BE PROVIDED.

CABINETS SHALL BE MOUNTED AS SHOWN ON THE PLANS WITH A BASE MOUNTED CABINET BEING MOUNTED ON A CONCRETE BASE AS DETAILED.

## ENVIRONMENTAL PROTECTION

THE FOLLOWING PROTECTIONS SHALL BE BUILT INTO THE TIMER:

ELECTRICAL - THE TIMER SHALL OPERATE AT 115 VOLTS AC,  $\pm 10\%$ . ALL TIMER INPUTS SHALL BE CAPACITOR FILTERED AND INCLUDE POWER LINE SURGE PROTECTION. A POWER INTERRUPTION OF LESS THAN 0.5 SECONDS SHALL NOT AFFECT THE CONTINUED CYCLIC OPERATION OF THE TIMER. POWER FAILURES LONGER THAN 0.5 SECONDS SHALL CAUSE THE TIMER TO RE-INITIALIZE WHEN POWER IS RESUMED. THE TIMER POWER SUPPLY SHALL BE DESIGNED TO PREVENT OVER VOLTAGE FROM DAMAGING ANY INTERNAL TIMER COMPONENTS.

TEMPERATURE - THE TIMER SHALL OPERATE SATISFACTORILY OVER THE RANGE OF  $-30^{\circ}$  F TO  $+165^{\circ}$  F.

HUMIDITY - THE TIMER SHALL OPERATE SATISFACTORILY UP TO 95% RELATIVE HUMIDITY AND SHALL BE CAPABLE OF PASSING MIL - E - 005272C.

VIBRATIONS - THE EQUIPMENT SHALL BE CAPABLE OF WITHSTANDING A .5G ACCELERATION AT ANY RESONANT FREQUENCY FROM 5 TO 30 HERTZ IN ANY OF THE THREE MUTUALLY PERPENDICULAR PLANES.

DUST RESISTANCE - THE TIMER SHALL BE FULLY ENCLOSED TO DETER THE ENTRANCE OF DUST AND DIRT.

PAYMENT FOR ITEM 625 SEMI-VEHICLE ACTUATED, THREE PHASE FULL VEHICLE ACTUATED AND FOUR PHASE FULL VEHICLE ACTUATED CONTROLLERS WILL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH, COMPLETELY INSTALLED, WIRED, TESTED AND ACCEPTED.

## 625 LOOP DETECTOR AMPLIFIER

THE AMPLIFIER SHALL CONFORM TO THE FOLLOWING:

THE DETECTOR SHALL OPERATE SATISFACTORILY AT ANY TEMPERATURE BETWEEN  $-30^{\circ}$  F AND  $\pm 165^{\circ}$  F.

THE OPERATING VOLTAGE SHALL BE 115 VOLT, 60 CYCLE.

THE INTERNAL CIRCUITRY MAY BE INCORPORATED INTO PRINTED CIRCUIT BOARD ASSEMBLIES.

THE DETECTOR DESIGN SHALL INCLUDE A FIXED FREQUENCY CRYSTAL WHICH WILL GENERATE A SINE WAVE FORM OF SIGNAL.

NO EXTERNAL EQUIPMENT SHALL BE NECESSARY FOR INSTALLATION, TUNING OR SENSITIVITY ADJUSTMENT.

VARIOUS TYPES OF OUTPOSTS SHALL BE AVAILABLE INCLUDING PULSE AND PRESENCE. THESE OUTPOSTS SHALL BE AVAILABLE BY SWITCHING FROM ONE TO THE OTHER WITHOUT CHANGING ANY INTERNAL PARTS.

ALL TRANSISTORS, CRYSTALS, AND RELAYS SHALL BE OF THE PLUG-IN TYPE TO FACILITATE REPLACEMENT.

THE AMPLIFIER AND POWER SUPPLY SHALL BE CAPABLE OF DRIVING SEVERAL LOOPS FROM THE ONE SOURCE. THE AMPLIFIER SHALL BE CAPABLE OF DETECTING VEHICLES IN A TOTAL AREA OF UP TO 400 SQUARE FEET AND SHALL PROPERLY FUNCTION WITH LEAD-IN LENGTHS TALLING UP TO 750 FEET.

PAYMENT FOR ITEM 625 LOOP DETECTOR AMPLIFIER WILL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH DETECTOR AMPLIFIER, COMPLETELY WIRED AND INSTALLED IN CONTROLLER CABINET.

## 625 SIGNAL CABLE

TRAFFIC SIGNAL CABLE SHALL BE WEATHERPROOF AND SHALL CONSIST OF THE NUMBER OF CONDUCTORS AS SPECIFIED ON THE PLANS. ALL CONDUCTORS SHALL BE AWG #14. CABLES SHALL BE INSULATED, JACKETED, RATED 600 VOLTS FOR USE IN UNDERGROUND CONDUIT OR AS AERIAL CABLE SUPPORTED BY A MESSENGER. IT SHALL BE COLOR CODED AND IN EVERY RESPECT FOLLOW THE INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION SPECIFICATIONS NUMBER 19-1-67.

WIRES SHALL BE SOLID.

PAYMENT FOR ITEM 625 SIGNAL CABLE #14 AWG WILL BE MADE AT THE CONTRACT UNIT PRICE PER LINEAL FOOT BY TYPE, IN PLACE, COMPLETED AND ACCEPTED, INCLUDING WIRING, TERMINALS, CONNECTIONS, TESTING, AND ALL INCIDENTALS NECESSARY.

## 625 LOOP DETECTOR WIRE AND LEAD-IN CABLE

LOOP DETECTOR WIRE SHALL CONSIST OF SINGLE CONDUCTOR, INSULATED, NO. 14 AWG RHW OR THW TYPE 600 V. STRANDED COPPER. EACH WIRE LOOP SHALL CONSIST OF THE NUMBER OF TURNS AS REQUIRED BY THE MANUFACTURER OF THE LOOP DETECTOR. THE LOOP WIRE SHALL RUN CONTINUOUSLY TO THE ADJACENT PULL BOX WHERE IT SHALL BE SPLICED TO THE LOOP DETECTOR LEAD-IN CABLE. LOOP WIRE SHALL BE INSTALLED IN ACCORDANCE WITH THE TYPICAL LOOP DETECTOR DETAIL.

PAYMENT FOR ITEM 625 LOOP DETECTOR WIRE WILL BE MADE AT THE CONTRACT UNIT PRICE PER LINEAL FOOT IN PLACE FOR NO. 14 DETECTOR WIRE AND SHALL INCLUDE DETECTOR WIRE, INSTALLATION, JACKET, CONDUIT FROM ROADWAY EDGE TO PULLBOX, SPLICE AND ALL INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION. THE ESTIMATED QUANTITIES OF LOOP DETECTOR WIRE SHOWN ON THE PLANS IS BASED ON AN ANTICIPATED REQUIRED NUMBER OF TURNS. PAYMENT WILL BE BASED ON THE ACTUAL LINEAL FEET INSTALLED AS THIS IS CONTROLLED BY THE DETECTOR MANUFACTURER'S REQUIREMENTS FOR LOOPS.

PAYMENT FOR ITEM 625 LOOP DETECTOR LEAD-IN CABLE WILL BE MADE AT THE CONTRACT UNIT PRICE PER LINEAL FOOT IN PLACE FOR #14 AWG TWO CONDUCTOR WIRE, POLYETHYLENE INSULATED, TWISTED PAIR, SHIELDED AND JACKETED CABLE, INCLUDING SOLDERED WATERPROOF POURED SPLICE.

## 625 INTERCONNECT CABLE #6 AWG TRIPLEX

INTERCONNECT CABLE TO BE INSTALLED AND CONNECTED AS SHOWN ON THE PLANS. THE CABLE SHALL BE FABRICATED OF THREE NO. 6 AWG STRANDED ALUMINUM CONDUCTORS, TWO OF WHICH ARE INSULATED AND THE THIRD BARE, TWISTED TOGETHER IN SUCH A MANNER AS TO CREATE A CABLE OF THE TYPE KNOWN AS SELF SUPPORTING TRIPLEX SERVICE CABLE. THE CABLE SHALL BE RATED AT 600 VOLTS FOR USE IN AERIAL INSTALLATIONS. THE INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION SPECIFICATIONS FOR SUCH CABLE SHALL BE MET IN EVERY RESPECT. PAYMENT FOR ITEM 625 INTERCONNECT CABLE, WILL BE MADE AT THE CONTRACT UNIT PRICE PER LINEAL FOOT FOR INTERCONNECT CABLE, TRIPLEX, 3/C #6 AWG INSULATION SHALL BE NEOPRENE OR CROSSLINKED POLYETHYLENE INCLUDING ALL SUSPENSION FIXTURES AND FITTINGS, AND TERMINALS, IN PLACE READY FOR USE.

## 625 PEDESTRIAN PUSHBUTTON WITH SIGN

PUSHBUTTON SHALL BE OF TWO PIECE CONSTRUCTION, CONSISTING OF A HOUSING AND A REMOVABLE COVER PLATE ASSEMBLY. THE COVER PLATE ASSEMBLY SHALL ATTACH TO THE HOUSING WITH STAINLESS STEEL MACHINE SCREWS. THE COVER PLATE ASSEMBLY SHALL CONSIST OF ONE SET OF NORMALLY OPEN CONTACTS AND ALL THE NECESSARY MECHANICAL AND ELECTRICAL COMPONENTS REQ'D FOR THE OPERATION OF THE PEDESTRIAN PUSHBUTTON. THE HOUSING SHALL HAVE A SINGLE ONE-HALF INCH (1/2) CONDUIT THREADED OPENING (TOP AND BOTTOM). THE COVER PLATE AND HOUSING WILL CONSIST OF A CAST ALUMINUM ALLOY MATERIAL.