

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

GENERAL NOTES

ALL CAST METAL PARTS SHALL HAVE A TENSILE STRENGTH OF NOT LESS THAN 17,000 POUNDS PER SQUARE INCH. THE ALLOY USED SHALL BE IS-5A OR CS-72A OF ASTM SPECIFICATION B-26-60T. ONLY METAL COMPONENTS WILL BE PERMITTED ON THE OUTSIDE OF THE PUSHBUTTON. THE PUSHBUTTON SHALL BE WATERPROOF AND DESIGNED FOR RUGGED OPERATION.

PEDESTRIAN PUSHBUTTONS INSTALLED ON STEEL SIGNAL POLES AND ON PEDESTRIAN SIGNAL POLE UNITS SHALL BE SERVICED BY CABLES INSIDE THE POLES. THE CONTRACTOR SHALL DRILL THE PROPER SIZE HOLES IN THE STEEL POLES IN BACK OF THE PUSHBUTTON. INSTALL AN INSULATED BUSHING, CAST PUSHBUTTON SADDLE AND ROUTE THE CABLE THROUGH TO THE PUSHBUTTON IN SUCH A MANNER THAT THE CABLE WILL NOT APPEAR ON THE OUTSIDE OF THE POLES. ALL PUSHBUTTONS SHALL BE INSTALLED WITH THE CENTER OF THE PUSHBUTTON A HEIGHT OF 4'-0" ABOVE THE GROUND. THE PUSHBUTTONS SHALL BE LOCATED ON THE SIDE OF POLES AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.

THE HOUSING AND COVER PLATE SHALL BE PAINTED WITH TWO (2) COATS OF YELLOW ENAMEL.

A 9" X 12" SIGN WITH BLACK LEGEND ON A WHITE BACKGROUND SHALL BE FURNISHED AND INSTALLED AT A POINT ON THE POLE 6" CLEAR DISTANCE ABOVE THE TOP OF THE PUSHBUTTON. THE SIGN SHALL BE FABRICATED FROM .010 ALUMINUM OR ENAMELED STEEL AND SHALL BEAR THE LEGEND "PUSHBUTTON FOR WALK SIGNAL" OR "PUSH BUTTON FOR GREEN LIGHT" AS REQUIRED.

SIGNS AND PUSHBUTTONS SHALL BE ORIENTED TO FACE THE CROSSWALK TO WHICH THEY APPLY UNLESS OTHERWISE NOTED ON THE PLANS.

PAYMENT FOR ITEM 625, PEDESTRIAN PUSHBUTTON WITH SIGN, WILL BE MADE AT THE CONTRACT UNIT PRICE EACH, COMPLETELY ASSEMBLED AND MOUNTED IN PLACE INCLUDING SIGN TESTED, AND ACCEPTED.

625 LOOP DETECTOR PAVEMENT CUTTING

LOOP DETECTOR PAVEMENT CUTTING SHALL CONSIST OF A 1-1/4" OR 2 INCH X 1/4" WIDE SAW CUT IN ACCORDANCE WITH TYPICAL LOOP DETECTOR INSTALLATION DETAIL. THE SAW CUT SHALL BE FILLED WITH A JOINT SEALER AFTER THE WIRE HAS BEEN INSTALLED AS SPECIFIED ON SHEET NO. 30.

PAYMENT FOR ITEM 625, PEDESTRIAN PUSHBUTTON WITH SIGN, WILL BE MADE AT THE CONTRACT UNIT PRICE PER LINEAL FOOT FOR SAW CUTTING AND TREATMENT INCLUDING JOINT SEALER.

625 TRAFFIC RESPONSIVE MASTER CONTROLLER

GENERAL SPECIFICATIONS

ALL COMPONENT PARTS SHALL BE OF HIGH QUALITY, MEETING THE ACCEPTABLE STANDARDS OF GOOD ENGINEERING PRACTICES. THE CONTROLLER SHALL OPERATE SATISFACTORILY BETWEEN A TEMPERATURE RANGE OF -35° F AND 120° F.

POWER

THE CONTROLLER SHALL BE DESIGNED TO OPERATE ON A 120 VOLT, 60 CYCLE NORMAL POWER SUPPLY.

THE CONTROLLER SHALL FUNCTION SATISFACTORILY AT ANY VOLTAGE WITHIN PLUS OR MINUS 10 PER CENT OF THE RATED VOLTAGE.

DESCRIPTION

THE MASTER CONTROLLER SHALL ACT AS A SUPERVISOR OF THE ENTIRE SYSTEM OF LOCAL CONTROLLERS AND SHALL ACT AS THE COORDINATING UNIT FOR THE SYSTEM SUPPLYING A SYNCHRONIZING SIGNAL FOR THE OFFSET CIRCUIT SELECTED BY MASTER CONTROL. THIS SIGNAL OCCURS ONCE PER CYCLE AND ENSURES THAT ALL SECONDARY INTERSECTION CONTROLLERS IN THE SYSTEM REMAIN IN THE PROPER OFFSET RELATIONSHIP WITH THE MASTER.

THE MASTER CONTROLLER SHALL BE SO DESIGNED AS TO ENCOMPASS THE FOLLOWING EQUIPMENT:

TRAFFIC ADJUSTMENT SECTION
THREE DIAL MASTER COORDINATING UNIT
THREE DIAL OFFSET INTERRUPTER
WEEKLY PROGRAMMER AND TIME SWITCH
MASTER CONTROL PANEL LIGHTS AND SWITCHES
TO FUNCTION ENCODER & 10 FUNCTION DECODER AND REQUIRED INTERCONNECT & COMMUNICATIONS FACILITIES
TRAFFIC ADJUSTMENT SECTION

DESIGN

THE CONTROLLER SHALL BE DESIGNED TO EFFICIENTLY DIRECT THE OPERATIONS OF A NUMBER OF INTERCONNECTED INTERSECTION CONTROLLERS. THE CONTROLLER SHALL PROCESS TRAFFIC FLOW INFORMATION SUPPLIED TO ITS INPUTS BY VEHICLE PRESENCE DETECTORS. THE PROCESSING SHALL RESULT IN THE GENERATION OF TWO CONTROL PARAMETERS; CONGESTION INDEX AND DIRECTION INDEX. CONGESTION INDEX, A DIRECT MEASURE OF TRAFFIC DEMAND ON AN ARTERY, SHALL HAVE THE RANGE OF 0 TO 100 PER CENT, 0 PER CENT REPRESENTING NO DEMAND, 100 PER CENT REPRESENTING BUMPER TO BUMPER TRAFFIC. DIRECTION INDEX, A MEASURE OF THE DIRECTIONAL BALANCE OF THE MEASURE TRAFFIC, SHALL HAVE THE RANGE 0 TO 100 PER CENT, 0 PER CENT REPRESENTING A TOTALLY OUTBOUND FLOW, AND 100 PER CENT A TOTALLY INBOUND FLOW. THE COMPUTED PARAMETERS SHALL BE CLASSIFIED INTO DISCRETE CATEGORIES AND SHALL BE USED TO SELECT SYSTEM CYCLE LENGTH AND OFFSET. THE OUTPUT CIRCUITS ASSOCIATED WITH THE SELECTED CATEGORIES SHALL BE USED TO CONTROL THE OPERATION OF ASSOCIATED COORDINATING UNITS.

OPERATION

THE TRAFFIC ADJUSTMENT SECTION SHALL CONSIST OF TWO IDENTICAL MODULES HOUSED IN A CHASSIS WITH AN INTEGRAL POWER SUPPLY AND SHALL OPERATE IN THE FOLLOWING MANNER:

INPUT

EACH MODULE SHALL BE CAPABLE OF ACCEPTING PRESENCE INFORMATION FROM ONE THROUGH FOUR PRESENCE DETECTORS. IT SHALL BE POSSIBLE TO USE A TOTAL OF EIGHT DETECTORS FOR SAMPLING; FOUR FOR INBOUND TRAFFIC, FOUR FOR OUTBOUND TRAFFIC. A SEPARATE INPUT CHANNEL SHALL BE PROVIDED FOR EACH DETECTOR.

EACH MODULE SHALL BE PROVIDED WITH A FRONT PANEL CONTROL TO ADJUST FOR THE ACTUAL NUMBER OF DETECTORS USED.

AN INDICATOR LIGHT SHALL BE ASSOCIATED WITH EACH DETECTOR INPUT CHANNEL. THE LIGHT SHALL BE ILLUMINATED FOR THE ENTIRE PERIOD OF VEHICLE DETECTION.

COMPUTATION

EQUAL COMPUTATIONAL WEIGHT SHALL BE GIVEN TO INFORMATION FROM EACH DETECTOR.

VALUES OF CONGESTION INDEX SHALL BE SEPARATELY COMPUTED FOR EACH DIRECTION OF TRAFFIC. THE VALUES COMPUTED SHALL BE DISPLAYED ON FRONT PANEL MOUNTED METERS AND SHALL BE USED IN CYCLE CATEGORY SELECTION. THE METERS SHALL HAVE TWO RANGES 0 TO 50 PER CENT AND 0 TO 100 PER CENT. A METER RANGE SELECTOR SWITCH SHALL BE PROVIDED FOR EACH METER.

THE COMPUTATIONS SHALL BE AVERAGED OVER AN ADJUSTABLE TIME PERIOD HAVING THE RANGE OF 1 TO 10 MINUTES IN 1 MINUTE STEPS.

DIRECTION INDEX, BALANCE OF TRAFFIC, SHALL BE COMPUTED AND SHALL BE USED AS THE BASIS FOR OFFSET SELECTION.

FRONT PANEL CONTROLS SHALL BE PROVIDED TO FACILITATE TRAFFIC ADJUSTMENT TESTS. THE CONTROLS SHALL CAUSE THE ADJUSTMENT SECTION TO GENERATE CONGESTION INDEX VALUES OF 50 AND 100 PER CENT FOR EACH DIRECTION.

CLASSIFICATION

TWO GROUPS OF THREE EACH SEPARATELY ADJUSTABLE LEVEL CONTROLS SHALL BE PROVIDED. EACH LEVEL CONTROL SHALL HAVE THE RANGE 0 TO 100 PER CENT. ONE GROUP SHALL BE USED TO SET THE LEVEL CROSSOVER POINTS FOR CYCLE CATEGORY SELECTION, THE SECOND GROUP SHALL BE USED TO SET THE LEVEL CROSSOVER POINTS FOR OFFSET SELECTION. FOUR CYCLE AND FIVE OFFSET CATEGORIES SHALL BE PROVIDED.

A DIFFERENTIAL CONTROL SHALL BE ASSOCIATED WITH EACH GROUP OF LEVEL CONTROLS. THE TWO SEPARATELY ADJUSTABLE DIFFERENTIAL CONTROLS SHALL HAVE THE RANGE OF 0 TO 10 PER CENT AND SHALL BE USED TO ESTABLISH THE CATEGORY CROSSOVER POINTS IN THE DECREASING DIRECTION.

INDICATOR LIGHTS SHALL BE PROVIDED TO SHOW THE CYCLE AND OFFSET CATEGORIES SELECTED.

WITH A PREFERENTIAL OFFSET CALLED FOR THE CONGESTION INDEX COMPUTATION USED FOR CYCLE CATEGORY SELECTION SHALL BE THE VALUE COMPUTED FROM THE DETECTORS ASSOCIATED WITH THE PREFERRED DIRECTION, EXAMPLE:

INBOUND OFFSET, INBOUND DETECTORS SHALL BE USED TO SELECT CYCLE CATEGORY. WITH AN AVERAGE OFFSET THE CYCLE CATEGORY SELECTION SHALL BE A FUNCTION OF THE COMPUTED AVERAGE CONGESTION INDEX USING ALL DETECTORS.

OUTPUT

A NORMALLY OPEN RELAY CONTACT SHALL BE PROVIDED FOR EACH CATEGORY TO DIRECT THE OPERATION OF ASSOCIATED COORDINATING UNITS.

TWO ANALOG OUTPUTS SHALL BE PROVIDED TO PERMIT RECORDING, ON A 1 MA MOVEMENT RECORDER, INBOUND CONGESTION INDEX AND OUTBOUND CONGESTION INDEX.

ACCURACY

ALL ADJUSTABLE CONTROLS SHALL BE CAPABLE OF BEING SET WITHIN PLUS OR MINUS TWO PER CENT OF FULL SCALE THROUGH THE USE OF FRONT PANEL MARKINGS.

VALUES ONCE SET ON THE ADJUSTABLE CONTROLS SHALL BE STABLE WITHIN PLUS OR MINUS TWO PER CENT OVER THE TEMPERATURE RANGE MINUS 30 TO PLUS 165 DEGREES FAHRENHEIT WITH A 60 HZ SOURCE WITHIN THE RANGE 95 TO 130 VOLTS.

MASTER COORDINATING UNIT

THE COORDINATING UNIT SHALL BE EQUIPPED WITH MASTER SUPERVISORY DIAL UNIT CONTACTS FOR AUTOMATICALLY ESTABLISHING THE OFFSET RELATIONSHIP OF THE SECONDARY DIAL COORDINATING UNITS WITHIN THE SYSTEM.

ALL DIAL COORDINATING UNITS SHALL HAVE PROVISION TO UTILIZE THREE DIALS.

EACH DIAL COORDINATION UNIT SHALL BE DESIGNED FOR PROVISION OF SPLIT TRANSFER WHICH MAY USE AN OPTIONAL PRINTED CIRCUIT BOARD TO PROVIDE SPLIT TRANSFER CAPABILITY IN ASSOCIATION WITH 7 CONTACT DIAL UNIT (S).

ANY PRINTED CIRCUIT BOARD CONTROL RELAYS SHALL BE PLUG-IN TYPE AND COMPLETELY INTERCHANGEABLE WITH ONE ANOTHER TO SIMPLIFY MAINTENANCE REQUIREMENTS.

THE DIAL COORDINATING UNIT SHALL BE PLUG-CONNECTED TO THE CONTROLLER PANEL SO THAT IT MAY BE REPLACED WITH A SIMILAR UNIT WITHOUT THE NECESSITY OF DISCONNECTING OR RECONNECTING INDIVIDUAL WIRES. THE PLUG CONNECTION SHALL BE MS TYPE.

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

OPERATION

SEQUENCE

THE COORDINATING UNIT SHALL PROVIDE AND ALLOW FOR CONSECUTIVE DIVISIONS OF A TIME CYCLE HEREAFTER TERMED INTERVALS.