

632, VEHICULAR SIGNAL HEAD WITH LED LAMP UNITS, BY TYPE, AS PER PLAN (CONT'D)

BALANCE ADJUSTERS SHALL ONLY BE USED WHERE SPECIFIED.

THE DEPARTMENT WILL MEASURE "VEHICULAR SIGNAL HEAD WITH LED LENSES, BY TYPE, AS PER PLAN" BY THE NUMBER OF COMPLETE UNITS FURNISHED AND INSTALLED, AND WILL INCLUDE ALL SUPPORT AND MOUNTING HARDWARE, DISCONNECT HANGERS, CLOSURE CAPS, DIMMERS, AND LAMPS AS SPECIFIED.

632, POWER SERVICE, AS PER PLAN

POWER SERVICE SHALL BE AS PER CMS ITEM 632 AND SCD TC-83.10 WITH THE FOLLOWING EXCEPTIONS:

1. THE METER BASE MOUNTING HEIGHT SHALL BE NO MORE THAN 5 FEET HIGH TO THE CENTER OF THE METER BASE FROM THE GROUND.
2. THE CONTRACTOR SHALL SUPPLY THE NECESSARY METER BASES.
3. ALL POWER SERVICES SHALL BE METERED. THE METER SHALL HAVE A LEVER OPERATED BYPASS.

DISCONNECT SWITCH ENCLOSURES FURNISHED IN ACCORDANCE WITH CMS ITEM 632, POWER SERVICE, AS PER PLAN, SHALL INCLUDE A PADLOCK EQUAL TO MASTER NO. 4BKA OR WILSON BOHANNON 660, WITH LOCK BODY OF BRONZE OR BRASS AND KEYING SHALL BE TO THE STATE MASTER.

THE CONTRACTOR SHALL CONTACT THE METER SECTION OF THE POWER COMPANY FOR INFORMATION REGARDING THE METER BASE INSTALLATION PRIOR TO ORDERING POLES. THE CONTRACTOR WILL BE RESPONSIBLE FOR REQUESTING AND SCHEDULING ANY INSPECTIONS THE POWER COMPANY MAY REQUIRE FOR THE POWER SERVICE HOOK UP. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT THE POWER COMPANY FOR THE ELECTRICAL SERVICE CONNECTION. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR SPLICE POWER CABLE INTO THE POWER COMPANY'S CIRCUITS. THE VOLTAGE SUPPLIED SHALL BE NOMINALLY 120 VOLTS. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS AND THE PAYING OF ALL FEES. THE CONTRACTOR SHALL PAY ALL POWER CHARGES UNTIL THE SIGNAL IS ACCEPTED BY THE MAINTAINING AGENCY.

632, PEDESTRIAN SIGNAL HEAD WITH LED LAMP UNITS, TYPE A2, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF CMS 632 AND 732, THE FOLLOWING REQUIREMENTS SHALL ALSO APPLY:

1. LED, LIGHT EMITTING DIODE, SIGNAL LAMP UNITS SHALL MEET THE REQUIREMENTS OF SUPPLEMENTAL SPECIFICATION 872. ALL LAMP UNITS SHALL BE THE 12 INCH SIZE.
2. THE LED LAMP UNIT SHALL DISPLAY THE SYMBOLS FOR THE UPRaised HAND OR THE WALKING PERSON.
3. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF POLYCARBONATE PLASTIC AND MEET ITE SPECIFICATIONS.
4. PIPE, SPACERS AND FITTINGS CONSTRUCTED OF POLYCARBONATE PLASTIC MAY BE USED IN LIEU OF GALVANIZED STEEL OR ALUMINUM.
5. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING.

THE DEPARTMENT WILL MEASURE "PEDESTRIAN SIGNAL HEAD WITH LED LAMP UNITS, TYPE A2, AS PER PLAN" BY THE NUMBER OF COMPLETE UNITS FURNISHED AND INSTALLED, AND WILL INCLUDE ALL SUPPORT AND MOUNTING HARDWARE, CLOSURE CAPS, AND LAMPS AS SPECIFIED.

633, UNINTERRUPTIBLE POWER SUPPLY, (UPS), 1000 WATT

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING A BATTERY BACKUP UPS SYSTEM TO PROVIDE UNINTERRUPTIBLE, RELIABLE, EMERGENCY POWER TO A TRAFFIC SIGNAL INTERSECTION IN THE EVENT OF A POWER FAILURE OR INTERRUPTION. THE TRANSFER FROM UTILITY POWER TO BATTERY POWER SHALL NOT INTERFERE WITH THE NORMAL OPERATIONS OF THE TRAFFIC CONTROLLER, CONFLICT MONITOR OR ANY OTHER PERIPHERAL DEVICES WITHIN THE TRAFFIC CONTROL SYSTEM. THE SYSTEM SHALL BE SELF-CONTAINED INCLUDING ALL UPS HARDWARE, THE REQUIRED NUMBER OF BATTERIES AND ITS OWN SEPARATE VENTILATED ENCLOSURE.

THE UPS UNIT PROVIDED SHALL BE MYERS POWER PRODUCTS, INC. MODEL PBM-2000 ITS; ECONOLITE CONTROL PRODUCTS, INC. MODEL UPS 1800 OR APPROVED EQUAL FOR BATTERY BACKUP SYSTEMS, EXTERNAL OPTION ONLY, AND HAVE THE FOLLOWING FEATURES AND CAPABILITIES:

I. OPERATION

THE BBS SHALL PROVIDE A MINIMUM TWO AND ONE HALF (2.5) HOURS OF FULL RUN-TIME OPERATION FOR AN "LED-ONLY" INTERSECTION WITH 1000 WATTS OF ACTIVE OUTPUT POWER.

BBS SHALL BE COMPATIBLE WITH ALL OF THE FOLLOWING TRAFFIC SIGNAL/EQUIPMENT; NEMA TS-1 AND TS-2 CONTROLLERS AND CABINETS, MODEL 332 & 336 CABINETS, TYPE 170 & 2070 CONTROLLERS AND ELECTRICAL SERVICE PEDESTALS.

THE MAXIMUM TRANSFER TIME ALLOWED, FROM DISRUPTION OF NORMAL UTILITY LINE VOLTAGE TO STABILIZED INVERTER LINE VOLTAGE FROM BATTERIES, SHALL BE 65 MILLISECONDS OR LESS. THE SAME MAXIMUM ALLOWABLE TRANSFER TIME SHALL ALSO APPLY WHEN SWITCHING FROM INVERTER LINE VOLTAGE TO UTILITY LINE VOLTAGE.

INCLUDE A MEANS TO SWITCH THE INTERSECTION FROM FULL-OPERATION TO FLASHING OPERATION AFTER 2-HOURS OF RUNTIME. THIS IS TO CONSERVE BATTERY OPERATION DURING AN EXTENDED UTILITY POWER OUTAGE.

INCLUDE STANDARD FORM C RELAY CONTACTS TO TRIGGER AN ALARM WITHIN THE CONTROLLER ASSEMBLY, INFORMING A TECHNICIAN THE SYSTEM IS OPERATING ON BATTERY BACK UP.

OPERATING TEMPERATURE FOR BOTH THE INVERTER/CHARGER, POWER TRANSFER RELAY AND MANUAL BYPASS SWITCH SHALL BE -37 Degrees C TO +74 Degrees C.

BOTH THE POWER TRANSFER RELAY AND MANUAL BYPASS SWITCH SHALL BE RATED AT 240VAC/30 AMPS, MINIMUM.

BBS SHALL BYPASS THE UTILITY LINE POWER WHENEVER THE UTILITY LINE VOLTAGE IS OUTSIDE THE FOLLOWING VOLTAGE RANGE: 100VAC TO 130 VAC, + 2 VAC.

WHEN UTILIZING BATTERY POWER, THE BBS OUTPUT VOLTAGE SHALL BE BETWEEN 110 VAC AND 125 VAC, PURE SINE WAVE OUTPUT, 60HZ PLUS OR MINUS 3HZ.

WHEN THE UTILITY LINE POWER HAS BEEN RESTORED BETWEEN 100 VAC AND 130 VAC FOR MORE THAN 30 SECONDS, THE BBS SHALL DROPOUT OF BATTERY BACKUP MODE AND RETURN TO UTILITY LINE MODE.

IN THE EVENT OF INVERTER/CHARGER FAILURE, BATTERY FAILURE OR COMPLETE BATTERY DISCHARGE, THE POWER TRANSFER RELAY SHALL REVERT TO THE NC (AND ENERGIZED) STATE, WHERE UTILITY LINE POWER IS CONNECTED TO THE CABINET.

RECHARGE TIME FOR THE BATTERY, FROM "PROTECTIVE LOW-CUTOFF" TO 80% OR MORE OF FULL BATTERY CHARGE CAPACITY, SHALL NOT EXCEED 10 HOURS.

ALL NECESSARY WIRING AND HARDWARE FOR MOUNTING (SHELF ANGLES, RACK, ETC) SHALL BE INCLUDED.

II. MAINTENANCE, DISPLAYS, CONTROLS AND DIAGNOSTICS

THE BBS SHALL INCLUDE A DISPLAY AND/OR METER TO INDICATE CURRENT BATTERY CHARGE STATUS AND CONDITIONS.

THE BBS SHALL HAVE LIGHTNING SURGE PROTECTION COMPLIANT WITH IEEE/ANSI C.62.41.

THE BBS SHALL INCLUDE A RE-SETTABLE FRONT-PANEL EVENT COUNTER DISPLAY TO INDICATE THE NUMBER OF TIMES THE BBS WAS ACTIVATED AND A FRONT-PANEL HOUR METER TO DISPLAY THE TOTAL NUMBER OF HOURS THE UNIT HAS OPERATED ON BATTERY POWER. BOTH METERS SHOULD BE RE-SETTABLE.

MANUFACTURER SHALL INCLUDE TWO (2) SETS OF EQUIPMENT LISTS, OPERATION AND MAINTENANCE MANUALS, AND BOARD-LEVEL SCHEMATIC AND WIRING DIAGRAMS OF THE BBS, AND THE BATTERY DATA SHEETS. MANUAL SHALL CONFORM TO TEES 1999, CHAPTER 1 SECTION 1.2.4.2.

III. BATTERY SYSTEM

MINIMUM FOUR (4) BATTERIES SHALL BE SUPPLIED WITH THE UPS SYSTEM. EACH BATTERY SHALL BE 12VDC AND BE RATED AT 105 AHRS, OR APPROVED EQUAL TO ACHIEVE THE (2.5) HOUR RUN TIME REQUIREMENT. BATTERIES SHALL BE EASILY REPLACED AND COMMERCIALY AVAILABLE OFF THE SHELF.

BATTERIES SHALL BE DEEP CYCLE, SEALED PRISMATIC LEAD-CALCIUM BASED AGM/VRLA (ABSORBED GLASS MAT/ VALVE REGULATED LEAD ACID).

BATTERIES SHALL BE CERTIFIED BY THE MANUFACTURER TO OPERATE OVER A TEMPERATURE RANGE OF - 25 Degrees C TO +74 Degrees C.

ALL BATTERIES SHALL BE PLACED ON BATTERY HEATER MATS IN THE ENCLOSURE. THE BATTERY HEATER MATS ARE DESIGNED TO EXTEND THE LIFE OF THE BATTERIES.

AN INTEGRAL SYSTEM SHALL PREVENT THE BATTERY FROM DESTRUCTIVE DISCHARGE AND OVERCHARGE. BATTERIES SHALL NOT BE RECHARGED WHEN BATTERY TEMPERATURE EXCEEDS 50 Degrees C PLUS OR MINUS 3 Degrees C.

IV. ENCLOSURE

THE ENCLOSURE SHALL BE MOUNTABLE TO A STANDARD MODEL 332, NEMA TS-1 OR TS-2 TRAFFIC SIGNAL CABINET AND BE CONSTRUCTED OF NATURAL UNPAINTED ALUMINUM. THE CABINET SIZE SHALL BE ADEQUATE TO HOUSE "ALL" THE UPS EQUIPMENT INCLUDING THE CONTROLLER UNIT,

MANUAL BYPASS SWITCH AND THE (4) BATTERIES. THE ENCLOSURE SHALL BE KEYED TO THE STATE MASTER #2 LOCK AND INCLUDE 2 KEYS.

THE ENCLOSURE SHALL INCLUDE A VENT, FAN AND THERMOSTAT AS PER TEES CHAPTER 7, SECTION 2-HOUSINGS.

V. WARRANTY

MANUFACTURER SHALL PROVIDE A TWO (2) YEAR FACTORY-REPAIR WARRANTY FOR PARTS AND LABOR ON THE BBS FROM DATE OF ACCEPTANCE BY THE STATE. BATTERIES SHALL BE WARRANTED/FOR FULL REPLACEMENT FOR TWO (2) YEARS FROM DATE OF PURCHASE.

VI. PAYMENT

PAYMENT FOR 633 "UNINTERRUPTIBLE POWER SUPPLY, (UPS), 1000 WATT" SHALL BE MADE AT THE CONTRACT PRICE BID PER EACH. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, TESTING, CERTIFICATIONS AND OTHER INCIDENTALS NECESSARY TO FURNISH THE UPS COMPLETE IN PLACE, INCLUDING ALL CONNECTIONS MADE, WIRING COMPLETE, TESTED AND ACCEPTED.

633, CONTROLLER, MISC.; PREEMPTION RECEIVING UNIT

RECEIVING UNITS SHALL CONSIST OF A LIGHTWEIGHT, WEATHER-PROOF AND DIRECTIONAL ASSEMBLY. EACH RECEIVING UNIT SHALL BE 360 DEGREE ADJUSTABLE. THE RECEIVING UNIT SHALL BE CAPABLE OF SENDING THE PROPER ELECTRICAL SIGNAL TO THE TRAFFIC SIGNAL CONTROLLER VIA THE PREEMPTION DETECTOR CABLE. RECEIVING UNITS SHALL BE SUPPLIED WITH MAST ARM MOUNTING HARDWARE AS SHOWN IN THE PLANS.

PAYMENT FOR ITEM 633 "CONTROLLER, MISC.; PREEMPTION RECEIVING UNIT" SHALL BE AT THE CONTRACT UNIT FOR EACH RECEIVING UNIT IN PLACE, COMPLETELY INSTALLED AT THE LOCATION SHOWN IN THE PLANS, WIRED, TESTED AND ACCEPTED.

633, CONTROLLER, MISC.; PREEMPT PHASE SELECTOR

THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING PREEMPT PHASE SELECTORS INCLUDING WIRING INTERFACE PANELS IN THE LOCAL CONTROLLER CABINET AND ALL OTHER ACCESSORIES THAT ARE NECESSARY TO MAKE THE PREEMPT PHASE SELECTORS COMPLETELY FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS. THIS ITEM SHALL INCLUDE THE EXTRA CABINET SPACE LOCATED IN THE LOCAL CONTROLLER CABINETS WHERE INDICATED IN THE PLANS.

THE PHASE SELECTORS SHALL CONSIST OF A MODULE OR MODULES THAT WILL PROVIDE THE NECESSARY INPUTS TO THE CONTROLLER. PHASE SELECTORS SHALL BE SUPPLIED WITH SUFFICIENT QUANTITIES OF CHANNELS TO PROVIDE PREEMPTION FOR ALL APPROACHES TO THE INTERSECTION SEPARATELY. POWER SHALL BE OBTAINED FROM THE PHASE SELECTOR OR PHASE SELECTOR POWER SUPPLY AND NOT FROM THE LOCAL CONTROLLER TIMER.

THE PHASE SELECTORS SHALL HAVE FRONT PANEL INDICATORS FOR ACTIVE PREEMPT CHANNEL STATUS. IT SHALL HAVE TEST SWITCHES TO ACTIVATE ALL PREEMPT CHANNELS.

PAYMENT FOR ITEM 633 "CONTROLLER, MISC.; PREEMPT PHASE SELECTOR" SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH PHASE SELECTOR IN PLACE, COMPLETELY INSTALLED IN THE LOCAL CONTROLLER SHOWN IN THE PLANS, WIRED, TESTED AND ACCEPTED.