## REPLACEMENT OF LIEBERT HVAC UNITS, BOILER AND THE CONTROLS SYSTEM AT THE LITTLE ROCK AIR TRAFFIC CONTROL TOWER BASE BUILDING AND ENVIRONMENTAL BUILDING

LIT ATCT Project Location 2601 David Grundfest Jr. Dr, Little Rock, AR 72202 LAT/LONG: 34.724229, -92.223901

## 1. STATEMENT OF WORK

The Federal Aviation Administration's, Bill and Hillary Clinton National Airport, Little Rock Air Traffic Control Tower (LIT ATCT) has three (3), 15-ton split computer room system HVACs that shall be replaced. The two 5 ton split computer room HVACs for the Power Conditioning System (PCS) in the Environmental Support Unit Building (ESU) shall also be replaced. The boiler for the facility shall be removed and replaced. Additionally, all controls shall be replaced. The system, controls, and computer shall replace all existing controls on the current HVAC equipment, and have the capacity to manage and expand to control all HVAC systems throughout the facility. The initial installation shall replace all field components and sensors associated with the Liebert Units that provide the equipment room cooling in the main building and the two Liebert units in the detached Environmental Support Building. The new system shall include all components and field wiring to make the new system fully operational when complete, including a new computer interface/control work station, with Enterprise Server software installed. Contractor shall create new EBO graphic page, and create new control schematic layout. Contractor shall provide and install all new CAT6 cable and ring topology network as required for a fully operational system. Contractor shall remove and replace the under floor leak detection system. The contractor shall furnish necessary equipment, materials, labor and supervision to perform the following work at the LIT ATCT located at 2601 David Grundfest Jr. Dr, Little Rock, AR 72202. Work within this area requires escort, and might include background checks for all onsite personnel, and must be coordinated with the FAA Contracting Officer's Representative (COR) in advance. Adequate cooling must be maintained within the facility during the construction. Only one unit may be worked on at a time. The Contractor must submit a written plan/sequence of construction detailing the methods, equipment, points of connection, etc. that will be utilized to provide an operational air conditioning system at all times and adhere to the sequence of work proposed for removal and replacement of the HVAC units and controls.

- 1. Establish a redundant, reliable method of temporary cooling to be used to maintain full operation of the LIT TRACO facility during construction. Facility must be capable of maintaining a constant temperature between 65-75F on temporary units before demolition may occur.
- 2. Remove three (3) existing split HVAC units associated condensers serving the main building equipment room.
- 3. The contractor shall capture all refrigerant from the existing units and properly recycle/dispose of it in accordance with applicable regulations. The FAA shall receive a certificate of disposal if applicable. (Certificate Required)
- 4. Furnish and install three (3) new 15-ton split systems and associated condensers. Contractor is to utilize the existing pads and penetrations. If new units have a larger dimension then contractor must enlarge pad as required. (Submittal Required)

- a. Install three (3) new 15-ton split HVAC systems CRU-1, CRU-2, and CRU-3, rated for outside ambient temperatures of 105 degrees, and associated condensers ACC-1, ACC-2, and ACC-3. Provide factory hail guards. Existing conduit, conductors, breakers, and equipment ground may be reused if sized appropriately.
- 5. Remove and replace two (2) 5 ton split HVAC units, cooling only, without dehumidification, and associated condensers serving the Power Conditioning System (PCS) in the ESU Building. Existing conduit, conductors, breakers, and equipment ground may be reused if sized appropriately.
- 6. Existing Line Set Sizes and breakers are as follows:

## <u>CRU 1</u>

Line size- 7/8 inch and 1 ¼ inch Breaker sizes- outside 20A Inside 60A

## <u>CRU 2</u>

Line size- 7/8 inch both Breaker sizes- outside 20A Inside 60A

### <u>CRU 3</u>

Line size- 7/8 inch both Breaker sizes- outside 20A Inside 60A

### <u>CRU 4</u>

Line size- 5/8 inch and 7/8 inch Breaker sizes- outside 30A Inside 20A

### <u>CRU 5</u>

Line size- 5/8 inch and 7/8 inch Breaker sizes- outside 30A Inside 20A

- 7. Condensate pumps are not required, no smoke detection is required within the units, and coils are not required to be E Coated.
- 8. Note that the raised floor is 18"
- 9. The contractor shall capture all refrigerant from the existing units and properly recycle/dispose of it in accordance with applicable regulations. The FAA shall receive a certificate of disposal if applicable. (Certificate Required)
- 10. Remove and replace with five (5) heavy duty NEMA 3R rated fused safety switches with two sets (one set installed and one spare set for each disconnect switch) of appropriately rated fuses for the new HVAC units per FAA STD-1217H. (Submittal Required)
- Contractor shall provide and install Engraved Plastic Laminated Labels, UV Rated for >5 years, black with white letters. (See Figs. 4, 12, 15, 25) Label shall read for example: ACU1 ..., XXX A, 480 VOLTS, 3 PHASE, 3 WIRE. (XXX Replace with Amperage rating of the unit, Verify Voltage Rating to the unit) (Submittal Required)
- 12. Contractor shall ground all new equipment in accordance with FAA STD 19F. Disconnect and reconnect existing grounds from Condensers outside. (See Figs. 3, 15) Disconnect and reconnect ground wires to inside equipment.
- 13. Contractor shall perform a full test and balancing of the new system before commissioning is to occur. Report results in writing. (See Attached 230593 SF Testing Adjusting and Balancing) (See Attached 230800 SF Commissioning of HVAC)
- 14. Engage a factory-authorized service representative to inspect, test, and adjust field assembled components and equipment installation for all new HVAC units. Report results in writing.
- 15. New equipment must operate for a minimum of 48 hours before removing temporary

cooling. Coordinate the removal of temporary cooling with onsite FAA representative prior to removal.

#### Boiler

- 16. Remove and existing boiler (Peerless SC-06-WU) and properly dispose of it in accordance with local codes and EPA standards. (See Figure 22)
- 17. Provide and install a new Peerless minimum 500,000 BTU boiler that is a direct replacement of the existing. (Submittal Required)
- 18. Remove and replace all damaged pipe insulation. (Submittal Required)
- 19. Provide and install new expansion tank and associated piping. (Submittal Required) (See Figures 23, 24, 25)
- 20. Remove and replace existing pressure reducing valve.
- 21. Provide and install new emergency shutoff switch.
- 22. Contractor shall be responsible for obtaining appropriate permits for the project, and shall coordinate all rigging for a complete installation.
- 23. Provide a full system start up and check out.
- 24. Provide training for local personnel on the operations and maintenance of the system.
- 25. After installation, test system for leaks. Repair leaks and retest until no leaks exist.

#### **Under Floor Leak Detection System**

- 26. There is currently a Liebert Under Floor Leak Detection System installed. (See Figs. 6,7, 8, 9). The intent is to replace the detection module and reutilize the existing underfloor sensing wires.
- 27. The leak detection module shall include an integral display with indication of normal and alarm conditions, as well as leak location. Display and measurement modules are contained in a single compact package. The module can monitor Liebert® LT500Y leak detection cable for conductive fluids. The system determines the location of the water on the detection cable and reports the distance from the leak detection module in feet or meters. To ensure proper protection, the system continuously monitors operation, signaling system normal, leak detected and cable fault. The system shall consist of a leak detection module, leak detection cable with cable hold down clips and accessories.
- 28. The leak detection module shall have the following functions:
  - a. Audible and visual alarms
  - b. Adjustable sensitivity set points for leaks and contamination
  - c. Historical log of leaks and faults
  - d. Connection to a building management system
  - e. Automatic detection of broken cables and contaminated cables
  - f. Password protection
  - g. The system shall be provided with retention of configuration after a power failure
  - h. Web based (HTML) interface
- 29. The leak detection module shall be supplied with a quick start guide for ease of installation, configuration and start up. A full user manual shall be located on the manufacturer's web site for review and download. Contractor shall provide 3 copies of printed user manual in a three ring binder at the completion of the project. The user manual shall include installation instructions, a functional description of the equipment, safety precautions, illustrations, step-by-step operating procedures and general maintenance guidelines.

### Controls

- 30. Controls and all associated components shall be replaced. The control wiring shall be disconnected at the unit and reconnected to the new units. More information on Controls in the control section of the SOW. (See Attached 230900 Instrumentation and Control for HVAC)
- 31. Contractor shall remove existing Thermostats, and provide and install new digital thermostats. More information on Controls in the control section of the SOW. (Submittal Required)
- 32. The contractor shall use the manufacturer's startup checklist to document installation for each unit on a separate checklist. (Submittal Paperwork Required)
- 33. The contractor shall certify that the HVAC systems, subsystems, and equipment have been installed, calibrated, and started and are operating as designed.
- 34. The Contractor has the responsibility for hiring the Commissioning Agent (CXA) (Submittal Required)
- 35. The contractor shall provide training for a minimum of 4 personnel on the operation and maintenance of the HVACs, and their controls.
- 36. Provide the following spare parts:
  - (a) Provide one additional set of filters for all new equipment installed.
  - (b) Provide one addition set of fuses for each new disconnect installed.
  - (c) If applicable, provide a set of belts for each belt driven piece of equipment.
- 37. Upon completion of the work, the Contractor shall submit to the COR or Technical Contact three (3) binder copies all paperwork associated with the installation of each unit. This manual shall contain, but not be limited to, instructions for installation, operation and maintenance, startup checklist for each unit, and associated test reports, test and balance reports, replacement parts list, sequence of operation description, sizing and capacity data, shop drawings, manufacturer's warranty information for all equipment furnished by the Contractor, and contractor 24 hour contact information for Contractor warranty period. No extended warranties are specified.
- 38. In a separate binder provide cut sheets for each component used for controls, control wiring diagrams, manuals for controls computer.

The General Contractor (GC) shall be expected to work Monday through Friday during the day time hours of 0700 AM to 0330 PM unless alternatively coordinated in advance with the Contracting Officer Representative (COR). Coordination between the GC and FAA personnel shall be required at all times in order to maintain an operational facility.

Any discrepancies between the contract provisions and the actual site conditions shall be referred to the Contracting Officer (CO) for a written determination in accordance with Contract Clause entitled Order of Precedence.

## 2. SITE ACCESS/CONSTRUCTION LIMITS

- 1. Contractor shall maintain access to the site at all times.
- 2. Construction/demolition shall in no way interfere with FAA Operations. Extreme care shall

be exercised so as not to cause any interference or interruption of service provided by this facility. It is mandatory that the contractor protect FAA personnel and existing communications equipment. Any damages incurred, as a result of construction activity during the performance of this contract will be repaired/replaced immediately by the contractor at no cost to the FAA.

- 3. Any work or activity that may impact the FAA, such as work on critical equipment or circuits, will require coordination with the COR. The COR will coordinate with the local facility personnel to address develop an activity specific "Risk Assessment" for the facility's final approval. This process may take a full day to complete.
- 4. No contractor personnel may terminate or remove any connections to existing power panels. Only FAA personnel shall enter FAA panel boards unless they have been deenergized and coordination has been done in advance with the COR. Contractor shall advise the COR at least one day in advance when it is expected that access to power panels will be necessary to allow for coordination with local FAA specialists to be on site to make the terminations. The contractor personnel shall not operate any breakers in any existing FAA panel boards. NO ELECTRICAL TERMINATIONS SHALL BE MADE ON AN ENERGIZED CIRCUIT.
- 5. The contractor shall confine operations, activities, storage of materials and employee parking within the designated areas, as identified by the COR. If required, Additional space the contractor deems necessary shall be obtained off site, at no additional cost to the Government.
- 6. Vehicles transporting materials shall not be loaded beyond the capacity prescribed by federal, state, or local laws. Obstruction of existing roadways, driveways, to the facility is strictly prohibited.
- 7. Damage to existing paving, lawns, and utilities caused by the contractor's activities shall be repaired immediately. Any damages that are a result of the contractor's activities shall be repaired. All costs of repairs shall be paid by the contractor. After notice to proceed and prior to the commencement of construction, the contractor and COR shall conduct joint inspections of the existing areas affected by the construction. Existing damage or defects shall be noted and will be used as the basis for determination of damages caused by the contractor's operations.
- 8. It is strongly urged that the contractor carefully examine the premises to determine the extent of work and the conditions under which it must be done. The contractor shall coordinate the delivery, set-up, placement of crane, and take down of the crane with the FAA at least one-week prior to site mobilization.
- 9. The Government reserves the right to enter the construction area at any time for work inspection and for the operation of the facility.
- 10. All work hours, shifts, and overtime work shall be coordinated with the COR. Before commencing construction, furnish to the COR a statement of hours per day and days per week to normally be worked and approximate number of persons on the job for a normal work shift.
- 11. At the end of each work day, the contractor shall secure all construction areas. The contractor is responsible for the security of the staging area, and shall provide the required measures at no additional expense to the government.

## 3. PERSONNEL

Contracting Officer - The term "Contracting Officer" (CO) as used herein denotes the person

designated to act on behalf of the Government in the performance of this contract. Where reference is made to "Federal Aviation Administration" (FAA), "Contracting Officer's Representative" (COR), or the like, this shall mean the Contracting Officer or his/her authorized representative.

**Contractor Superintendence** - In accordance with Contract Clause entitled SUPERINTENDENCE BY THE CONTRACTOR, the Contractor shall at all times during performance of this contract and until the work is completed and accepted, directly superintend the work or assign and have on site a competent superintendent with the authority to act for the Contractor.

The Contractor shall submit a Project Organizational Chart with the key personnel identified and their qualifications for the Government's review and approval.

The contractor and his employees shall be subject to all rules and regulations relative to entering and leaving the FAA facility.

**Employees** - The government reserves the right to restrict the employment of any contractor employee, or prospective contractor employee, who is identified as a potential threat to the health, safety, security, general well-being, or operational mission of the installation and its population.

The contractor shall not employ any person who is in employment of the United States Government if the employment of that person would create a conflict of interest.

## 4. COORDINATION

The contractor shall coordinate all work which has any or may have any impact on any operational system through the COR. The contractor shall immediately cease any work which is adversely impacting the operation of the FAA facility and shall be responsible for the immediate repair or restoration of any portion of the operational system that has been damaged or suffered diminished performance as a result of the contractor's activities. No repairs shall be completed without notification of the COR. In some cases, the repairs may be performed by FAA personnel at the contractor's expense, due to the criticality of the repair.

The Contractor will be responsible for obtaining and payment of all building fees, inspection fees, utility connection charges and any other fees or charges which may be incurred in the performance of this contract. The contractor shall comply with all local city, county, and state construction codes.

All materials or workmanship or both which have been rejected by the COR by reasons of failure to conform with the requirements of the Contract Documents shall be removed and replaced with new, acceptable materials by the contractor at the contractor's own expense. Contractor shall also pay for testing of new materials which have been installed in place of rejected materials.

## 5. CONSTRUCTION SCHEDULE

The work plan and schedule prepared by the contractor shall consist of a logical narrative plan. Include construction activities, submittal and approval of materials, samples and shop drawings (if applicable), the procurement of critical materials and equipment, fabrication of special materials and equipment along with their installation and testing.

Within fifteen (15) calendar days of contract award, the contractor shall submit the schedule and work plan. <u>A Notice to Proceed will not be issued until the schedule is approved.</u>

- 1. The work plan must describe the methods, procedures, and strategies to complete each task. The FAA shall review and comment. (Submittal Required)
  - a. The work plan must include but is not limited to the following:
    - 1. Work schedule including forecasted times and any facility impact.
    - 2. Contractor onsite personnel.
    - 3. Procedures and methods of completing tasks.
    - 4. Equipment and material storage requirements.
    - 5. Power requirements.
    - 6. Trades involved.

## 6. SAFETY REQUIREMENTS

Contractor Responsibility

- 1. General Safety Provisions The Contractor shall bear full responsibility to provide safe working conditions for its employees and Contractors. The Contractor shall not permit any employee or Subcontractor to work in surroundings or under working conditions that are unsanitary, hazardous, or dangerous to the health and safety of the employee.
- 2. Accident Prevention The Contractor shall bear the responsibility of maintaining an accident prevention program such that frequent and regular inspections of the job site, materials and equipment are made by a competent person designated by the employer.
- 3. Use of Equipment The Contractor shall not permit the use of any machinery, tool, material, or equipment that is not in compliance with OSHA regulations. The employer shall permit only those employees qualified by training and/or experience to operate equipment and machinery.
- 4. The FAA shall not be held responsible for safety inspections to ensure Contractor conformance with the OSHA safety regulations. The FAA, however, reserves the right to notify the Contractor of any deficiencies regarding worker safety.

The FAA will evaluate the Contractor on its safety performance, including that of its Subcontractors. The number and severity of safety and security violations will be considered in this evaluation. Contractor safety violations are cause for termination for default, may result in notification of the Contractor's bonding company, and will affect the Contractor's opportunity to propose on future work. Failure to correct such deficiencies may impact the Contractor's ability to work on future FAA contracts.

### **OSHA Regulations**

The Contractor shall comply with the latest Occupational Safety and Health Administration regulations (CFR 29 Part 1926) regarding safety in the work area.

The Contractor shall be responsible for obtaining copies of non-FAA referenced documents without additional cost to the FAA. If Contractor requests a copy of FAA directives, they may be obtained by contacting the Contracting Officer.

The Contractor is not relieved from adhering to other OSHA requirements not listed herein. The Contractor shall consult the latest referenced OSHA documents for safety regulations.

#### **OSHA Documents:**

CFR 29 Part 1926 Safety and Health Regulations for Construction

CFR 29 Part 1910 General Industry Standards Applicable to Construction Industry

## 7. CLEAN-UP

The contractor shall correct or repair any damage done during any part of this contract. Scrap and debris resulting from the project shall be removed from the site after each day's work on site. All debris and generated waste shall require disposal in a manner that is not in conflict with local sanitary regulations.

## 8. SUPPLIES AND EQUIPMENT

The Contractor shall furnish all supplies and equipment as specified to accomplish the contract specifications.

All equipment installed shall at a minimum bear the salient characteristics of the existing equipment being replaced. New equipment shall be a direct replacement and all refrigerant equipment shall utilize R410 Refrigerant.

<u>SHIPPING AND RECEIVING MATERIAL</u>. FAA shall not be responsible for shipping or receiving any material relating to this contract nor shall the contractor ship or otherwise receive any materials at the expense of the FAA.

<u>PROTECTION OF MATERIAL</u>. Contractor shall protect and maintain in like new condition all materials and supplies to be incorporated into this project and shall be responsible for their safe storage.

<u>STORAGE OF MATERIALS</u>. No storage area/space will be provided for contractor furnished equipment or supplies. Onsite storage must be coordinated with the COR so that the roadway is not blocked.

### CONTACT/LOCATION INFORMATION

A. Location of Work:

#### LIT ATCT 2601 David Grundfest Jr. Dr, Little Rock, AR 72202 LAT/LONG: 34.724229, -92.223901

B. FAA Point of Contact:

Ron Nelson

### 901-482-7667

C. <u>Pre-Bid Site Visit:</u> All interested contractors are invited to view the site conditions prior to bidding. A site visit can be coordinated with the FAA Point of Contact. All expenses for the recommended site visit shall be the responsibility of the contractor. The U.S. Government shall not reimburse any expenses incurred for the purpose of soliciting bids for this contract.

## 9. ACCEPTANCE OF WORK

The FAA COR will conduct a Construction Acceptance Inspection at the completion of the project to ensure that all items of the contract have been fulfilled and that the site has been cleaned of debris.

# **PHOTOS**



Figure 1: Satellite View of Facility



Figure 2: Two of the Inside Units pictured



Figure 3: Outside Condensers for Main Building



Figure 3: View of Condensers outside main building.



Figure 4: Typical Disconnect for Condensers. 3 To be Replaced.



Figure 5: View of Refrigerant Lines. May be reused f sized properly and flushed accordingly.







Figure 6: Underfloor Refrigerant piping. Typical each unit.



Figure 7: Leak Detection Monitoring System Panel. To be Replaced. Panel is Liebert LSD 1000 (to be replaced)



Figure 8: Location beneath floor of end of line device for leak detection sensor wire.



Figure 9: Same as Figure 9



Figure 10: Two units to be replaced in ESU Building



Figure 11: Condensate drain between units in ESU Bldg.



Figure 12: Disconnect switches for ESU Bldg Units to be reused.





Figure 14: Typical, 1 of 2 Condensers for ESU Bldg. Liebert Model Number CSF 083LX

Ground Wires - Remove/Reinstall

Figure 13: Condenser units for ESU Bldg Lieberts. Replace.



Figure 15: Replace both Disconnects and Provide and install new Black Plastic Laminate Nameplates



Figure 16: Existing Controls Interface Box for ESU Building Liebert Units. Replace



Figure 17: Interior of Controls box in ESU Building. Replace.





Figure 18: Inside Power Supply Box In Main Building



Figure 19: Controls in Main Building





Figure 20: Screenshot of current monitoring control panel. To be replaced.

Figure 21: Current User Manual

PEERLESS	CEPTIFIED DX
CAST IRON BOILERS	EAFCO, INC.
OIL BOILER BOILER,NO. SC-040-1297	BOILER No. SC-06 MAWP, STEAM 15 P.S.I. MAWP, WATER 30 P.S.I. MAXIMUM WATER TEMP. 250°F
IBR BURNER CAPACITY GROSS DUTPUT B.T.U./HR. HOSOCO WATER HOSOCO STEAM	MIN. RELIEF VALVE CAPACITY 405 LBS./HR. 9165-1
NET 1267 SQ.FT. STEAM IBR 304000 B.T.U./HR. STEAM RATINGS 000 B.T.U./HR. WATER DIV. OF PEERLESS HEATER CO. BOYEPTOWIN, PA. 19512	

Figure 22: Nameplate Info on Existing Boiler









Figure 24: Nameplate Info on Expansion Tank

Figure 23: Expansion Tank for Boiler (XT1 To be Replaced)



Figure 25: Expansion Tank



Figure 26: Burner Control Cabinet









Figure 29: Tower Shaft 8th Floor Controls







Figure 30: ESU Building Controls



# **DRAWINGS (For Reference)**

LIT-ATCT-M02-D	LIT-ATCT-M03-01	LIT-ATCT-M04
LIT-ATCT-M04-B	LIT-ATCT-M05-D	LIT-ATCT-M06
LIT-ATCT-M06-B	LIT-ATCT-M07-B	LIT-ATCT-M08
LIT-ATCT-M08-B	LIT-ATCT-M09	LIT-ATCT-M10
LIT-ATCT-M14	LIT-ATCT-M11	LIT-ATCT-M15
LIT-ATCT-M19	LIT-ATCT-M16-B	LIT-ATCT-M12-01
LIT-ATCT-M002-BL	LIT-ATCT-M001-BL	LIT-ATCT-Q001-BL
LIT-ATCT-Q011	LIT-ATCT-A09-01	LIT-ATCT-A05-01-A
LIT-ATCT-A12-01	LIT-ATCT-E21-01	LIT-ATCT-E12-01

Attachments Original Contractor Controls Drawings FAA STD 1217 230593 SF Test and Balance 230800 Commissioning 230900 Controls

## PHOTOS OF EXISTING CONTROLS DRAWINGS (For Reference)













1008 NC (PTI) NO (PTI) 7 REVISION HISTORY AH1C1 AH1 CLG AH1E AH1 ENABLE 00200008 0. 004 2N100K 1B AHIRA 2N AHI RA TMP 00200000 500 0 500 1 AHIDT AHI DA TMP 0-NC (PT2) NO (PT2) 1A - 016 - -0\* CRU1FE CRU1 ENABLE 00200017 NC (PTI) NO (PTI) COM (PTI) NC (PT2) NO (PT2) COM (PT2) 000 012 00200016 2B0000 7 7 7 7 CRU1RT CRU1 RA TEMP 00200013 AH1MAT AH1 MA TMP 00200012 0°00 00 2A - [ 202504 T CRU2FE CRU2 ENABLE 00200024 0\* 506 7 8 NC (PTI) COM (PTI) NC (PT2) COM (PT2) NO (PT2) CRU3FE CRU3 ENABLE 50 0 020 3B CRU2RT 2NIO 0000 CRU3RT CRU3 RA TEM 00200021 0 -0. 3A 032 20250M - 1 -CRUIDT 2NIOOK CRUI DA TEMP 00200028 0 500 0 0 HWP1E 20250 HWP1 ENABLE 00200032 SIG (PT NC (PTI) NO (PTI) HWP2E HWP2 ENABLE 00200033 4B CRU2DT CRU2 DA TEMP NC (PT2) NO (PT2)-COM (PT2) -0 4A - 040 20250M T 036 2N100K NC (РТІ) СОМ (РТІ) NC (РТ2) NO (РТ2) 506 7 8 EF5E EF5 ENABLE 00200041 BLR1 ENABLE 00200040 CRU3DT 2HIO CRU3 DA TEMP 00200036 5B HWST COM HWS TMP 00200037 -0° 5A - 048 20250M NC (PTI) COM (PTI) NC (PT2) NO (PT2) COM (PT2) 00 586 7 8 044 2N100K EF7E EF7 ENABLE 00200049 EF6E EF6 ENABLE 00200048 HWRT 2NIC COM HWR TMP 00200044 HWP1ST HWP1 HWS TMP 00200045 6B -0. 6A - 056 20250M ---SG (P12) COM (P11) COM (P11) COM (P12) C NC (РТІ) 04 СОМ (РТІ) 00 (РТІ) 07 0000 506 7 8 EF7HL 202 EF7 HI/LOW 00200056 052 2N100K HWP2ST 2N10 HWP2 HWS TM 00200052 00200057 7B 0-0-00200053 NC (PT2) NO (PT2)-7A 060 0000 1 2 3 5 0000 5678 AH1F1P 2142 AH1 FLT2 PRS 00200060 AH1F2P AH1 FLT2 PR5 00200061 **8**B 26V () SG (PTI 8A 0000 068 0000 AH1F1 AFS1 PRES 00200068 AH1F2 AFS2 PRES 00200069 9B 9A A (PTI) B (PTI) A (PT2) B (PT2) B (PT2) NG (PT2) -0" 076 0\* AHIDSM AHI DA SMOK AHIRPA AD 0000 2 6 7 8 AH1FS AH1 PROOF AH1SDP 242 AH1 STATIC P 00200076 AH1RSM AH1 RA SMOKE 00200082 AH1HWF AH1 HW FLOW 00200077 B (PT3)-10B 0N 10A 00 B (PT4)ě. B (PT2) OBE 0. 084 A (PTI)-B (PTI)-A (PT2)-B (PT2)-0000 . CRU3S CRU2S CRU3 PROOF CRU2 PROOF 00200090 00200085 CRU1S CRU1 PROOF CRU1RH 2143 CRU1 RA HUM 00200084 CRU2RH CRU2 RA HUM 00200085 -0n 0 N -SIC (PTI) 11B -0 -0 11A -0--<u>Õ</u>-B (PT4)-000 400 A (PTI) B (PTI) A (PT2) A (PT2) A (PT2) 092 A (PT3)-0000 . CRU1FP CRU1 FLT PRS 00200093 CRU3RH 2142 CRU3 RA HUM 00200092 CRUIRA REGRIG ALM CRU3SM CRU3 SMOKE 0020009 CRU2SM<sup>102</sup> CRU2 SMOKE 00200096 IZRA B (PT3)-5 0 0 SIG (PTI) 12A 12B A (PT2) B (PT2) -<u>Õ</u>-B (PT4)-0-000 4 000 100 104 CRU3RA REFRIG ALM 00200104 0 N 000 A (PT3)-CRU2FP 2142 CRU2 FLT PRS 00200100 00 0 CRU3FP CRU3 FLT PRS 00200101 A (PT1)-EF5S EF5 PROOF HWP2S HWP2 ENABLE B (PT3)-26V (PTI) SIC (PTI) A (PT4) B (PT1) 13A 000 A (PT4) A (PT2) B (PT4) B (PT2) B -00 13B -<u>Ō</u>--0--**O** 0 0000 108 A (PT3) A (PT1) O 4 B (PT3) B (PT1) O 7 A (PT4) A (PT2) O 7 B (PT4) B (PT2) O 7 112 4D20 0000 LANDIS & GYR HWRF HWR FLOW 00200108 00 FP1S FIRE PWP 1 00200114 HWP1F HWP1 FLOW 00200109 25V (PTI) SIG (PTI)-EF7S EF7 PR00F 00200113 EF65 4D2 EF6 PR00F 00200112 -0-14A 00 14B -00 04 116 0000 2 ° 0 00 HWP2F HWP2 FLOW 00200116 000 000 SIG (PTI) 00200117 15A -0-25V (PT2) 15B Powers of Little Rock, Free (soi) Arkansas AR 72204 ) 844-5420 ) 844-7308 16A 16E - 1 - -0+ 24V (PT2) - (PT2) - (PT2) - (PT1) 132 2010SM AH1IV AH1 INLET VN 00200133 AH1DPR 211 AH1 DAMPER 00200132 - (PTI)-LR, ARPORT IRAFFIC CONT LR, ARPORT IRAFFIC CONT UTTLE ROCK AR ROR BASE BULDING (SEE EQUIPMENT LIST SHEET + (PT2)-5) + (PT) 17A 17B 01 140 O AH1HV 214 AH1 HTG VLV 00200140 26V (PT1) SIG (PT1)-On 00-IRAFFIC CONIROL AR B GROOM BY MULTICARY 100 / 05 / 07 00200141 0 m 18A 26V (PT2) SIG (PT2) -0-18B 00 POWER MODULE 19A 19B 545 703 CONTROLLER MODULE MBC 02 Protocol 2 / 1.25 MB 90 20A 318-URA-1978-97 20E 545 715 NUMBER



























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	CUP IRBAIT 1994-67 POINESS OF HARANSAS ALL		REVISION HISTORY	UL TEMP. RATING	UL VULIAGE RATING	NEC CLASS		SHIFTING	TWISTS DED FOOT	CADACITANCE	CABLE CONFIGURATION		1	IN CONDUIT AS PER LOCAL C	4. TWSTED PAIR, NON-JACKETE	THE CLASS 2 WIRE IS UL RA- OR THE CLASS 2 WIRE IS NEI (167F) OR BETTER. NEC TYP	CLASS 2 POINT WRING MAY S ONLY WHERE LOCAL CODES P WRING MAY BE RUN TOGETHE	<ol> <li>WIRE LENGINS AFFECT FOINT ADJUST INTERCEPTS ACCORDING</li> <li>CONDUIT SHARING RULES:</li> </ol>	TABLE 1 & 2 NOTES: 1. MAXIMUM WRE RUN DISTANCE TRUNK, WITHOUT USE OF TRU (SEE TABLE 4) IF TRUNK ISO	PMD         TRUNK         2         18         AV           19,200         BAUD         20         A1           24         A1         24         A1	9600 BAUD 2 18 AW 20 AV 24 AV	4800 BAUD 2 18 AW 24 AV	ANALOG OUTPUT 2 #20 1 4-20 mA OF	ANALOG OUTPUT Z #ZU	ANALOG INPUT 2 #20 H 4-20 mA CM OF	ANALOG INPUT 2 #20 II 0-10 V CM OF	THERMISTOR 2 #20 II	1K NI OR RTD 2 CM OR	DIGITAL INPUT	DIGITAL INPUT 2 EM OR	DIGITAL OUTPUT 1 & 2 CODES	AC LINE POWER POWER THHN	CIRCUIT TYPE CLASS WIRE TYP	MBC MIRING THE AT	
	21-00 21-00			NOT SPECIFIED	NOT SPECIFIED	CM, CMP (75'C OR BETTER)	NOT REQUIRED	6 MINIMUM	n.a.	20 AWG (SOLID OR STRANDED) 2	TWSTED PAIR T	LOW-VOLTAGE POINT APPLICATIONS	MBC WIRE SPECI	CM OR CMP CABLE WHEN CONTAIN	MARKED 300V / 75°C (167F) OF	TED 300V / 75°C (167F) OR BETT C TYPE CM OR CMP RATED 75°C	SHARE CONDUIT WITH CLASS 1 WIF ERMIT. BOTH CLASS 1 AND CLAS IR IN THE MBC ENCLOSURE PROVI	NGLY.	S FOR PMD TRUNKS ARE PER LOO NK ISOLATOR EXTENDERS. ATOR EXTENDERS ARE USED.	NG TSP 2kft (0.61km) CLASS NG TSP 4kft (1.22km) ONLY	VG TSP 4ktt (1.22km) OLASS VG TSP 4ktt (1.22km) ONLY VG TSP 4ktt (1.22km)	VG TSP 4ktt (1.22km) ONLY	CMP (JULE (I DELIN) CODES	CMP (JERT (JERT ) CODES	CMP CMP CODES	CMP / CODES CODES	CMP / CODES / CODES	4 750ft (230 m) CHECK I	- + 750ft (230 m) CHECK I	CMP / COVES COVES		A COLORING SEE TABLE 3 CHECK	AS REQUIRED CHECK	ABLE 1 CONTINUE ST	IN CALICE REQUIREMENTS
			/5°C (167F)	JUD VAC	TO TECHTIED	NOT REQUIRED	NOT BECKIER	5 MINIMUM	1.d.	20 AWG (STRANDED)	WISTED PAIP (IN IACVETED)		FICATIONS		R BETTER.	TER, BETWEEN CABINETS • CM/CMP WIRE IS N	RING PMD TRUNK MUST	EACH 19.2k BAUD FOR 9600 BAUD P	GICAL ALWAYS REFER TO WIRING MUST HAVE VOLTAGE CIRCUIT I	2 SIZE WIRE FOR LOA	GENERAL NOTES:	SERIES TIE'S	2 SPEED	LOCAL MAXIMUM NUMBER	LOCAL SIZE 4 MOTOR	LOCAL 4A @ 240VAC	LOCAL 2 MBC DO CONTA	LOCAL 1. DISTANCES SHO	LOCAL 1500 VA	LOCAL 1150 VA	LOCAL 550 VA	LOCAL 200 VA	LOCAL INRUSH	HARING 3 NOMINAL STA	MAXIML
	Phone: (501) 664-5420 Fox: (501) 664 7306		NOT SPECIFIED	NOT SPECIFIED	CM, CMP (75'C OR BETTER)	100% FOIL W/ DRAIN WIRE	6 MINIMUM	12:3 pl/10 UN LESS	17 E - 6/4 OB LECC	IWISTED SHIELDED PAIR	PHD AND LAN TRUNKS					OST BE AN UNIN LERRUPTED RU NO SPLICES ALLOWED. OT USABLE FOR CLASS 1 CIRCL	BE "DAISY CHAINED" BETWEEN	MD TRUNKS OVER 4000ft TOTAL	LOCAL CODES FOR CONDUIT SH INSULATION RATED FOR HIGHES	PPROVED OR LISTED FOR THE	A BUILDING CODES	10 7 6	1200 4800 9600 H	OF TIE'S IN SERIES ON PMU	STARTER 20W 0 > 30 TOT	(RESISTIVE) DC OPERATION:	THE WIRE FOR A TIPICAL SIMIN	OWN ASSURE LESS THAN 10% VO	4 (21m) (30m) (6	3 100ft 150ft (7) (30m) (46m) 70	2 (61m) (91m) (15	1 (152m) (274m) (42	17E #18 #16 #	INTER ME STE	M DO WIRE RUN LENGHIS
CCO	Powers of Arkansas 1601 Westpark Dr Suite 7 Little Rock, AR 72204	1 (22)		PMD TRUNK O	3. TERMINATE SH	2. CABINETS MUS	MBC CONTROL	1. PMD TRUNK C	NOTES:	22)		1	IN FACTORY.	2. RECEPTACLE IS	1. NO MORE THAN	TS.	MBC	LENGTH.	T LINE FREQUENCY	NFC. CSA. MBC POWER SO	(22)	1) MBC	2%	$\frac{11101111}{C} = \frac{1}{2} \frac{2}{2} \frac{3}{4}$	TOUNK $A = 1" & 1-1/4"$	KNINCKOUT TYPES		TAGE	m) CLEAR FOR POWE	M) OR POLY IN THIS	oft no not run WR	)ft,	oft		1
MAC NOTALLAT	L.R. AIRPORT TRAFFIC L.R. AIRPORT TRAFFIC UTTLE ROCK	DC FIND IERMINATI		MLY. AT LEAVING END OF	G 19.2 KHAUD.	ST BE DAISEY-CHAINED	LER MODULE.	ONNECTOR PLUCS INTO			MBC POWER WIDING			SINGLE 3-WIRE CIRCUIT.	SEVEN (7) MBC'S ARE				204-264 VAC 50 / 60 Hz 200 VA (MAX.)	URCE REQUIREMENTS		CONDUIT PENETRAI		,	(IT	"A" -A		n h	ULES.			C-B	"B"	"A"	
80/60	CONTROL AR BY WITAL RELEASE 451 201	ON IN			CONNECTOR	S -	)			DUPLEX RECEPT	COVER WITH			HOT	COND			AC EARTH GROUND TO GROUNDING	THESE CONNECTIONS	MBC ENCLOSUR		SNOL		"C" MMI EXT. CAB	- Free								LOSURE		
C.C. 126	318-LRA-1978-97		TT- WHI	EL PER		+ SCREWS I	WIRE SEC			ACLE	JUNCTION BOX			ŧ	A A		0	I I I I I I I I I I I I I I I I I I I						ILE			"B"				- DUPLEX RECEPTACLE	- POWER BOX	- WIRE COVER	- C (NOT STORY)	">" (NOT SHOWN)

