



CITY OF TAMPA

Pam Iorio, Mayor

CONTRACT ADMINISTRATION DEPARTMENT

David L. Vaughn, AIA, Director

ADDENDUM NO. 3

DATE: July 26, 2010

Contract:10- C-00049; ARRA EECBG Energy Management System Installation at Old City Hall, Tampa Police Department Headquarters, Tampa Fire Rescue Headquarters

Bidders on the above referenced project are hereby notified that the following addendum is made to the Contract Documents. BIDS TO BE SUBMITTED SHALL CONFORM TO THIS NOTICE.

Item 1: Specifications, add: Variable Speed Drives Specification pages 1 through 4, for the Tampa Police Department Headquarters

Item 2: Drawing, ME 2.2.1 revise: to add VFD to replace existing starter serving AHU-1C per sketch MESK-1, for the Tampa Police Department Headquarters

Item 3: Drawing, ME 2.0.1 revise: to add VFD Schedule per attached sketch MESK-2, for the Tampa Police Department Headquarters

Attachments: Variable Speed Drives Specification pages 1 through 4, MESK-1, MESK-2

This addendum shall be included in and attached to the inside cover of the Contract Documents by and upon which bids are submitted.

All other provisions of the Contract Documents and Specifications not in conflict with this Addendum shall remain in full force and effect.

Questions are to be e-mailed to ContractAdministration@tampagov.net.

Jim Greiner

Jim Greiner, P.E., Contract Manager

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Variable Speed Drives

PART 1-GENERAL

1.01 DESCRIPTION

- A. This specification is to cover a complete Variable Frequency motor Drive (VFD) consisting of a pulse width modulated (PWM) inverter designed for use on a standard NEMA Design B induction motor.
- B. The drive manufacturer shall supply the drive and all necessary options as herein specified. VFD's that are manufactured by a third party and "brand labeled" shall not be acceptable. All VFDs installed on this project shall be from the same manufacturer.
- C. Manufacturer shall be ABB or approved equal.

1.02 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. Standard 519-1992, IEEE Guide for Harmonic Content and Control.
 - 2. UL508C
 - 3. ICS 7.0, AC Adjustable Speed Drives
 - 4. IEC 16800 Parts 1, 2 and 3
 - 5. NEC 430.120, Adjustable-Speed Drive Systems
 - 6. IBC 2006 Seismic – referencing ASC 7-05 and ICC AC-156
- B. Qualifications:
 - 1. VFDs and options shall be UL listed as a complete assembly. The base VFD shall be UL listed for 100 KAIC without the need for input fuses.
 - 2. CE Mark – The VFD shall meet product standard EN 61800-3 for the First Environment restricted level. (RFI / EMI Filter spec).
 - 3. The entire VFD enclosure, including the bypass shall be seismically certified and labeled in accordance with the IBC 2006 International Building Code:
 - a) VFD manufacturer shall provide Seismic Certification and Installation requirements at time of submittal.
 - b) Seismic importance factor of 1.5 rating is required, and shall be based upon actual shake test data as defined by ICC AC-156.
 - c) Seismic ratings based upon calculations alone are not acceptable. Certification of Seismic rating must be based on testing done in all three axis of motion by a certified lab.

1.03 SUBMITTALS

- A. Submittals shall include the following information:
 - 1. Outline dimensions, conduit entry locations and weight.
 - 2. Customer connection and power wiring diagrams.
 - 3. Complete technical product description including a complete list of options.
 - 4. Compliance to IEEE 519 – harmonic analysis for particular jobsite including total harmonic voltage distortion and total harmonic current distortion (TDD).

- a) The VFD manufacturer shall provide calculations; specific to this installation, showing total harmonic voltage distortion is less than 5%. All VFD's shall include a minimum of 5% impedance reactors, **no exceptions**.

PART 2 – PRODUCTS

2.01 VARIABLE FREQUENCY DRIVES

- A. The VFD package as specified herein shall be enclosed in a UL Listed Type enclosure, (enclosures with only NEMA ratings are not acceptable).
 1. Environmental operating conditions: 0 to 40⁰ C (32 to 104⁰ F) continuous. Altitude 0 to 3300 feet above sea level, less than 95% humidity, non-condensing. All circuit boards shall have conformal coating.
 2. Enclosure shall be UL rated and shall be UL listed as a plenum rated VFD.
- B. All VFDs shall have the following standard features:
 1. All VFDs shall have the same customer interface, including digital display, and keypad, regardless of horsepower rating. The keypad shall be removable, capable of remote mounting and allow for uploading and downloading of parameter settings as an aid for start-up of multiple VFDs.
 2. The keypad shall include Hand-Off-Auto selections and manual speed control. There shall be fault reset and “Help” buttons on the keypad. The Help button shall include “on-line” assistance for programming and troubleshooting.
 3. The VFD shall have internal 5% impedance reactors to reduce the harmonics to the power line and to add protection from AC line transients.
 4. The input current rating of the VFD shall be no more than 3% greater than the output current rating. VFD's with higher input current ratings require the upstream wiring, protection devices, and source transformers to be oversized per NEC 430.120.
 5. The VFD shall provide a programmable loss-of-load (broken belt / broken coupling) Form-C relay output. The drive shall be programmable to signal the loss-of-load condition via a keypad warning, Form-C relay output, and / or over the serial communications bus.
- C. All VFDs to have the following adjustments:
 1. Run permissive circuit - There shall be a run permissive circuit for damper or valve control. Regardless of the source of a run command (keypad command, input contact closure, time-clock control, or serial communications), the VFD shall provide a dry contact closure that will signal the damper to open (VFD motor does not operate). When the damper is fully open, a normally open dry contact (end-switch) shall close. The closed end-switch is wired to a VFD digital input and allows VFD motor operation. A minimum of two separate safety interlock inputs shall be provided. When any safety is opened, the motor shall be commanded to coast to stop and the damper shall be commanded to close.
 2. The VFD control shall include a programmable time delay for VFD start and a keypad indication that this time delay is active. A Form C relay output provides a contact closure to signal the VAV boxes open. This will allow VAV boxes to be driven open before the motor operates.
 3. The VFD shall include a fireman's override input. The mode shall override all other inputs (analog/digital, serial communication, and all keypad commands), except customer defined safety run interlocks, and force the motor to run at a preset speed or in a separate PID mode.
- D. Serial Communications
 1. The VFD shall have an EIA-485 port as standard. The standard protocols shall be Modbus, Johnson Controls N2, Siemens Building Technologies FLN, and BACnet

MS/TP. The use of third party gateways and multiplexers is not acceptable. All protocols shall be “certified” by the governing authority (i.e. BTL Listing for BACnet).

- E. EMI / RFI filters. All VFD’s shall include EMI/RFI filters. The onboard filters shall allow the entire VFD assembly to be CE Marked and the VFD shall meet product standard EN 61800-3 for the First Environment restricted. No Exceptions.
- F. OPTIONAL FEATURES – Optional features to be furnished and mounted by the drive manufacturer. All optional features shall be UL Listed by the drive manufacturer as a complete assembly and carry a UL508 label.
- G. BYPASS CONTROLLER
 1. A complete factory wired and tested bypass system consisting of a door interlocked, padlockable circuit breaker, output contactor, bypass contactor, and fast acting VFD isolation fuses.
 2. The bypass enclosure door and VFD enclosure must be mechanically interlocked such that the disconnecting device must be in the “Off” position before either enclosure may be accessed.
 3. The VFD and bypass package shall have a UL listed short circuit current rating (SCCR) of 100,000 amps and this rating shall be indicated on the UL data label.
 4. The drive and bypass package shall be seismic certified and labeled to the IBC:
 - a. Seismic importance factor of 1.5 rating is required, and shall be based upon actual shake test data as defined by ICC AC-156.
 5. Drive Isolation Fuses - To ensure maximum possible bypass operation, fast acting fuses, exclusive to the VFD, shall be provided to allow the VFD to disconnect from the line prior to clearing upstream branch circuit protection. This maintains bypass operation capability in the event of a VFD failure. Bypass designs, which have no such fuses will not be accepted.
 6. The system (VFD and Bypass) tolerated voltage window shall allow the system to operate from a line of +30%, -35% nominal voltage range. The system shall incorporate circuitry that will allow the drive or bypass contactor to remain “sealed in” over this voltage tolerance at a minimum.
 7. The bypass shall maintain positive contactor control throughout the voltage tolerance window of nominal voltage +30%, -35%. This feature is designed to avoid contactor coil failure during brown out / low line conditions and allow for input single phase operation when in the VFD mode. Designs that will not allow input single phase operation in the VFD mode are not acceptable.
 8. Motor protection from single phase power conditions - the bypass system must be able to detect a single phase input power condition while running in bypass, disengage the motor in a controlled fashion, and give a single phase input power indication. Bypass systems not incorporating single phase protection in bypass mode are not acceptable.
 9. The bypass system shall NOT depend on the VFD for bypass operation. The bypass system shall be designed for stand alone operation and shall be completely functional in both Hand and Automatic modes even if the VFD has been removed from the system for repair / replacement. Serial communications shall remain functional even with the VFD removed.
 10. Serial communications – the bypass shall be capable of being monitored and / or controlled via serial communications. On-board communications protocols shall include ModBus, Johnson Controls N2, Siemens Building Technologies FLN (P1), and BACnet MS/TP.
 11. The bypass control shall include a programmable time delay for bypass start and keypad indication that this time delay is in process. A Form C relay output provides a contact closure to signal the VAV boxes open. This will allow VAV

- boxes to be driven open before the motor operates at full speed in the bypass mode. The time delay shall be field programmable from 0 – 120 seconds.
12. The user shall be able to select the text to be displayed on the keypad when an external safety opens. Example text display indications include “FireStat”, “FreezStat”, “Over pressure” and “Low suction”. The user shall also be able to determine which of the up to four (4) customer safety contacts is open over the serial communications connection.
 13. Smoke Control Override Mode (Override 1) – The bypass shall include a dedicated digital input that will transfer motor from VFD mode to bypass mode upon receipt of a dry contact closure from the Fire / Smoke Control System. In this mode, the system will ignore low priority safeties and acknowledge high priority safeties as required by UL 864/UUKL. All keypad control, serial communications control, and normal customer start / stop control inputs will be disregarded. This Smoke Control Mode shall be designed to meet the intent of UL864/UUKL.
 14. Fireman’s Override Mode (Override 2) – the bypass shall include a second, programmable override input which will allow the user to configure the unit to acknowledge selectable digital inputs. This programmability allows the user to program the bypass unit to react in whatever manner the local Authority Having Jurisdiction (AHJ) requires. The Override 2 action may be programmed for “Run-to-Destruction”. The user may also force the unit into Override 2 via the serial communications link.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Installation shall be the responsibility of the contractor.
- B. Power wiring shall be completed by the contractor, to NEC code 430.122 wiring requirements based on the VFD input current.
- C. The contractor shall complete all wiring in accordance with the recommendations of the VFD manufacturer as outlined in the VFD installation manual.

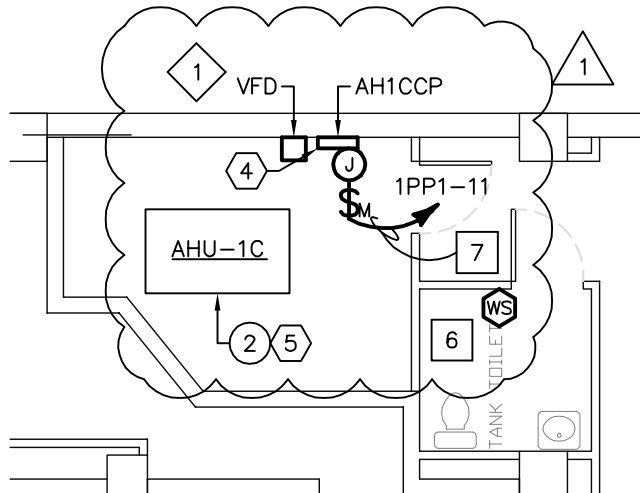
3.02 START-UP

- A. Certified factory start-up shall be provided for each drive by a factory authorized service center.

3.03 WARRANTY

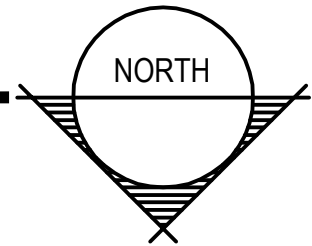
- A. The VFD Product Warranty shall be 24 months from the date of certified start-up, not to exceed 30 months from the date of shipment. The warranty shall include all parts, labor, travel time and expenses. A toll free 24/365 technical support line shall be available.

End of Section



MECHANICAL/ELECTRICAL PLAN - FIRST FLOOR

SCALE 1/8"=1'-0"



◆ ELECTRICAL PLAN NOTES

- EXISTING STARTER SERVING AHU-1C TO BE REPLACED WITH VFD. VFD IS PROVIDED BY CONTROL CONTRACTOR, ELECTRICAL CONTRACTOR TO INSTALL. DISCONNECT AND REMOVE EXISTING STARTER. WIRE VFD TO EXISTING CIRCUIT LEFT FROM REMOVAL OF STARTER. EXTEND (3)-#10 THWN CU. AND (1)-#10 CU. GROUNDING CONDUCTOR IN 1/2" CONDUIT AND MAKE FINAL TERMINATIONS AS REQUIRED.



1 07-23-2010

ADDENDUM NO. 1

DRAWING TITLE: PARTIAL MECH/ELEC PLAN	DATE: 07-23-2010	JOB NO. 210010	REF. SHEET ME2.2.1	DRAWING NO. MESK-1
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PROJECT NAME:
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DRAWING TITLE: VFD SCHEDULE DATE: 07-23-2010 JOB NO.: 210010 REF. SHEET: ME2.0.1 DRAWING NO.: MESK-2

VFD SCHEDULE									
VFD	SERVING	HP	ABB MODEL	VOLTAGE	ENCLOSURE	MOUNTING LOCATION	DISCONNECT/CIRCUIT OR NONE	BYPASS	MINIMUM AMP RATING
1	OAU	20	ACH550-VCR-031A-4+F267	460/3	UL TYPE 1	INDOORS	CIRCUIT BREAKER	YES	31
2	GEF	5	ACH550-VCR-08A8-4+F267	460/3	UL TYPE 1	INDOORS	CIRCUIT BREAKER	YES	8.8
3	AHU-1C	10	ACH550-VCR-015A-4+F267	460/3	UL TYPE 1	INDOORS	CIRCUIT BREAKER	YES	15.4

NOTES:

- DRIVE AMPS SHALL BE RATED PER NATIONAL ELECTRICAL CODE TABLE 430.250.
- PROVIDE 5% INTERNAL LINE REACTOR (VFD'S THAT USE OPTIONAL EXTERNAL REACTORS ARE NOT ACCEPTED).
- PROVIDE INTERNAL EMI/RFI FILTER. DRIVE INPUT CURRENT SHALL NOT EXCEED DRIVE OUTPUT CURRENT.
- VFD SHALL BE BTL LISTED (COMMUNICATION "GATEWAYS" ARE NOT ACCEPTABLE). VFD SHALL HAVE MODBUS, BACNET, JOHNSON N2, SIEMENS FLN, AND LONWORKS SERIAL COMMUNICATIONS TO INTERFACE TO BMS SYSTEM NOW OR IN THE FUTURE.
- THE VFD SHALL BE RATED FOR 100KAIC WITHOUT THE NEED FOR INPUT FUSING.
- ALL ENCLOSURES SHALL BE UL TYPE APPROVED. (SELF CERTIFIED NEMA ENCLOSURES NOT ACCEPTABLE).
- UL TYPE 1 ENCLOSURES SHALL BE PLENUM RATED. DRIVES ARE MOUNTED INDOORS, UL TYPE 1 ENCLOSURE.
- VFD AND BYPASS COMPLETE ASSEMBLY SHALL BE SEISMICALLY TESTED AND CERTIFIED TO IBC2006 IP FACTOR OF 1.5.
- INCLUDE ON SIRE FACTORY-AUTHORIZED START-UP VALIDATING ABB WARRANTY (PARTS AND ON-SITE LABOR INCLUDING TRAVEL), 24 MONTHS AFTER START-UP NOT TO EXCEED 30 MONTHS FROM DATE OF SHIPMENT.

ADDITIONAL BYPASS NOTES:

- THE BYPASS SHALL HAVE THE ABILITY TO COMMUNICATE WITH THE BUILDING AUTOMATION SYSTEM EVEN IF THE VFD IS REMOVED.
- THE BYPASS SHALL HAVE A PLAIN ENGLISH DISPLAY OF BYPASS FUNCTIONS / OPERATION. PROVIDE SERVICE SWITCH.
- DISTINCT ANNUNCIATION OF UP TO (4) SAFETY INTERLOCKS IN PLAIN ENGLISH ON THE BYPASS KEYPAD.
- THE VFD/BYPASS SYSTEM SHALL BE CAPABLE OF AUTO TRANSFER TO BYPASS ON SELECTABLE VFD FAULTS.
- THE VFD/BYPASS SYSTEM SHALL HAVE POSITIVE CONTACTOR CONTROL OVER A +30/-35% VOLTAGE RANGE. (115 VOLT CPT CONTACTOR CONTROL NOT ALLOWED)
- THE BYPASS SYSTEM SHALL HAVE SINGLE PHASE PROTECTION.
- THE VFD/BYPASS SYSTEM SHALL BE UL LISTED TO 100KAIC SHORT CIRCUIT RATING AS A PACKAGE.

07-23-2010
APPENDUM NO. 1

