COLLIN COUNTY

Office of the Purchasing Agent
2300 Bloomdale Road
Suite 3160
McKinney, Texas 75071
www.collincountytx.gov

COLLIN COUNTY, TEXAS

ADDENDUM NO. THREE (3) IFB NO. 2022-292

INVITATION FOR BID

FOR

CONSTRUCTION: BUILDING AUTOMATION SYSTEM UPGRADES

DATE: March 8, 2023

NOTICE TO ALL PROSPECTIVE BIDDERS:

PLEASE MAKE THE FOLLOWING CHANGES TO THE INVITATION FOR BID:

CHANGES TO ENGINEER'S SPECIFICATIONS:

DELETE DOCUMENT: 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC

REPLACE WITH: 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC [**AD 3**]

CHANGES TO ENGINEERED DRAWINGS:

DELETE DOCUMENT: M1.1 MINIMUM SECURITY

REPLACE WITH: M1.1 MINIMUM SECURITY [**AD 3**]

DELETE DOCUMENT: M1.2 ANIMAL SHELTER

REPLACE WITH: M1.2 ANIMAL SHELTER [**AD 3**]

DELETE DOCUMENT: M1.3 JUVENILE DETENTION CENTER – CLUSTER IV MEZZANINE

REPLACE WITH: M1.3 JUVENILE DETENTION CENTER – CLUSTER IV MEZZANINE [**AD 3**]

DELETE DOCUMENT: M1.4 CENTRAL PLANT – FIRST FLOOR

REPLACE WITH: M1.4 CENTRAL PLANT – FIRST FLOOR [**AD 3**]

DELETE DOCUMENT: M1.5 CENTRAL PLANT – SECOND FLOOR

REPLACE WITH: M1.5 CENTRAL PLANT – SECOND FLOOR [**AD 3**]

DELETE DOCUMENT: M1.6A FIRST FLOOR ADMIN

REPLACE WITH: M1.6A FIRST FLOOR ADMIN [**AD 3**]

DELETE DOCUMENT: M1.7A SECOND FLOOR PLAN NORTH – ADMIN – ALTERNATE

REPLACE WITH: M1.7A SECOND FLOOR PLAN NORTH – ADMIN – ALTERNATE [**AD 3**]

DELETE DOCUMENT: M1.8A SECOND FLOOR PLAN SOUTH - ADMIN – ALTERNATE

REPLACE WITH: M1.8A SECOND FLOOR PLAN SOUTH - ADMIN – ALTERNATE [**AD 3**]

DELETE DOCUMENT: M1.9A THIRD FLOOR PLAN NORTH - ADMIN – ALTERNATE

REPLACE WITH: M1.9A THIRD FLOOR PLAN NORTH - ADMIN – ALTERNATE [**AD 3**]

DELETE DOCUMENT: M1.10A THIRD FLOOR PLAN SOUTH - ADMIN – ALTERNATE

REPLACE WITH: M1.10A THIRD FLOOR PLAN SOUTH - ADMIN – ALTERNATE [**AD 3**]

DELETE DOCUMENT: M1.11A FOURTH FLOOR PLAN - ADMIN – ALTERNATE

REPLACE WITH: M1.11A FOURTH FLOOR PLAN - ADMIN – ALTERNATE [**AD 3**]

DELETE DOCUMENT: M1.12A ROOF PLAN - ADMIN – ALTERNATE

REPLACE WITH: M1.12A ROOF PLAN - ADMIN – ALTERNATE [**AD 3**]

CHANGES TO DIVISION 00 41 00 BID FORM:

EXTEND BID CLOSING:

FROM: 03/09/2023 AT 2:00 PM (CST)

TO: 03/23/2023 AT 2:00 PM (CST)

ADD ATTRIBUTE NO. 27: ADDENDUM NO. 3 ACKNOWLEDGEMENT

ALL OTHER TERMS AND CONDITIONS OF THE SOLICITATION AND SPECIFICATIONS REMAIN THE SAME.

SINCERELY,
MICHELLE CHARNOSKI, NIGP-CPP, CPPB
PURCHASING AGENT

/HA

Collin County Purchasing

2022-292 Addendum 3

Construction, Building Automation System Upgrades

Issue Date: 12/20/2022
Questions Deadline: 2/2/2023 05:00 PM (CT)
Response Deadline: 3/23/2023 02:00 PM (CT)

Collin County Purchasing

Contact Information

Contact: Hunter Alley Senior Buyer
Address: Purchasing
Admin. Building
Ste. 3160
2300 Bloomdale Rd.
Ste. 3160
McKinney, TX 75071
Phone: (972) 548-4117
Fax: (972) 548-4694
Email: halley@co.collin.tx.us

Event Information

Number:	2022-292 Addendum 3
Title:	Construction, Building Automation System Upgrades
Type:	Invitation for Bid - Construction
Issue Date:	12/20/2022
Question Deadline:	2/2/2023 05:00 PM (CT)
Response Deadline:	3/23/2023 02:00 PM (CT)
Notes:	Resulting contract will be a general contract to furnish and install new controllers to replace the existing Honeywell X50's and install Honeywell XL's and furnish and install Jace 8000 to replace the existing R2 Jaces. This is required to allow for maintenance and the ability to communicate with Collin County's BAS network.

Ship To Information

Address: See Purchase Order
McKinney, TX 75071

Billing Information

Address: Auditor
Admin. Building
Ste. 3100
2300 Bloomdale Rd.
Ste. 3100
McKinney, TX 75071

Bid Activities

Pre-Bid Conference 1/17/2023 2:00:00 PM (CT)

A PRE-BID CONFERENCE will be held by Collin County at 4600 Community Ave. McKinney, TX 75071 on Tuesday, January 17, 2023 at 2:00 P.M. and Thursday, January 19, 2023 at 9:00 A.M in order for bidders to ask questions regarding the proposed work. It is the bidder's responsibility to review the site and documents to gain a full understanding of the requirements of the bid.

Pre-Bid Conference 1/19/2023 9:00:00 AM (CT)

A PRE-BID CONFERENCE will be held by Collin County at 4600 Community Ave. McKinney, TX 75071 on Tuesday, January 17, 2023 at 2:00 P.M. and Thursday, January 19, 2023 at 9:00 A.M in order for bidders to ask questions regarding the proposed work. It is the bidder's responsibility to review the site and documents to gain a full understanding of the requirements of the bid.

Bid Attachments

LEGAL NOTICE.docx Download

Legal Notice

Collin County BAS Upgrade Specifications.pdf View Online

Division 00 & Division 23

Collin County BAS Upgrade Drawings.pdf View Online

BAS Drawings

01_2022-292 Addendum No. 1.doc View Online

Addendum No. 1

02_AD 1_00 21 13 Instruction to Bidders.doc View Online

00 21 13 Instructions to Bidders [AD 1]

05_00 41 00 Bid Form.pdf Addendum No. 3: 00 41 00 BID FORM View Online

00 41 00 Bid Form [AD 1]

10_Response (MD) to ADD #1.pdf View Online

Mechanical Engineer's Memorandum 01.25.23 [AD 1]

20_M1.1 - MINIMUM SECURITY.pdf View Online

M1.1 - MINIMUM SECURITY [AD 1]

30_M1.4 - CENTRAL PLANT - FIRST FLOOR.pdf View Online

M1.4 - CENTRAL PLANT - FIRST FLOOR [AD 1]

30_M1.5 - CENTRAL PLANT - SECOND FLOOR.pdf View Online

M1.5 - CENTRAL PLANT - SECOND FLOOR [AD 1]

40_M1.6A - ADMIN.pdf View Online

M1.6A - ADMIN [AD 1]

50_M1.7A - ADMIN.pdf View Online

M1.7A - ADMIN [AD 1]

60_M1.8A - ADMIN.pdf View Online

M1.8A - ADMIN [AD 1]

70_M1.9A - ADMIN.pdf View Online

M1.9A - ADMIN [AD 1]

80_M1.10A - ADMIN.pdf View Online

M1.10A - ADMIN [AD 1]

90_M1.11A - ADMIN.pdf View Online

M1.11A - ADMIN [AD 1]

100_M1.12A - ADMIN.pdf View Online

M1.12A - ADMIN [AD 1]

110_2022-292 Pre-Bid Attendance Records.pdf View Online

Pre-Bid Attendance Records 01/17 & 01/19

01_2022-292_Addendum_No._2.doc View Online

Addendum No. 2

Bid Form_AD2.pdf View Online

00 41 00 BID FORM [AD 2]

01_2022-292 Addendum No. 3.doc View Online

Addendum No. 3

23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.pdf View Online

23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC [AD 3]

211410 - M1.1 - MINIMUM SECURITY.pdf View Online

M1.1 MINIMUM SECURITY [AD 3]

211410 - M1.2 - ANIMAL SHELTER.pdf View Online

M1.2 ANIMAL SHELTER [AD 3]

211410 - M1.3 - JUVENILE DETENTION CENTER - CLUSTER IV.pdf View Online

M1.3 JUVENILE DETENTION CENTER – CLUSTER IV MEZZANINE [AD 3]

211410 - M1.4 - CENTRAL PLANT - FIRST FLOOR.pdf View Online

M1.4 CENTRAL PLANT – FIRST FLOOR [AD 3]

211410 - M1.5 - CENTRAL PLANT - SECOND FLOOR.pdf View Online

M1.5 CENTRAL PLANT – SECOND FLOOR [AD 3]

211410 - M1.6A - ADMIN.pdf View Online

M1.6A FIRST FLOOR ADMIN [AD 3]

211410 - M1.7A - ADMIN.pdf View Online

M1.7A SECOND FLOOR PLAN NORTH – ADMIN – ALTERNATE [AD 3]

211410 - M1.8A - ADMIN.pdf View Online

M1.8A SECOND FLOOR PLAN SOUTH - ADMIN – ALTERNATE [AD 3]

211410 - M1.9A - ADMIN.pdf View Online

M1.9A THIRD FLOOR PLAN NORTH - ADMIN – ALTERNATE [AD 3]

211410 - M1.10A- ADMIN.pdf View Online

M1.10A THIRD FLOOR PLAN SOUTH - ADMIN – ALTERNATE [AD 3]

211410 - M1.11A - ADMIN.pdf View Online

M1.11A FOURTH FLOOR PLAN - ADMIN – ALTERNATE [AD 3]

211410 - M1.12A - ADMIN.pdf View Online

M1.12A ROOF PLAN - ADMIN – ALTERNATE [AD 3]

Requested Attachments

W-9

(Attachment required)

Conflict of Interest Questionnaire

Bid Attributes

1	**eBid Notice** Collin County exclusively uses IonWave Technologies, Inc. (Collin County eBid) for the notification and dissemination of all solicitations. The receipt of solicitations through any other means may result in your receipt of incomplete specifications and/or addendums which could ultimately render your bid/proposal non-compliant. Collin County accepts no responsibility for the receipt and/or notification of solicitations through any other means. Please initial. _____ _____ _____ *(Required: Maximum 1000 characters allowed)*
2	**Contact Information** List the contact name, email address and phone number of the main person(s) Collin County should contact in reference to this solicitation. Contact(s) shall be duly authorized by the company, corporation, firm, partnership or individual to respond to any questions, clarification, and or offers in response to this solicitation. _____ _____ _____ _____ _____ _____ *(Required: Maximum 4000 characters allowed)*

3 **Calendar Days Bid**

Please state the consecutive calendar days bid from notice to proceed through completion of project.

(Required: Numbers only)

4 **Delivery**

Delivery will be F.O.B. inside delivery at Collin County designated locations and all transportation charges are to be paid by the supplier to destination. Please state delivery in calendar days from date of order.

(Required: Maximum 1000 characters allowed)

5 **Exceptions (for IFB - Construction)**

If you take any exceptions to the specifications, you must submit the exception/s as a Question via the public eBid portal before the Question Cutoff Date for County consideration. The County will review and publish a response via eBid. If you would like to offer any substitutions, please review the Instruction to Bidders Document 002113, Section 1.7 and submit by separate attachment. Please initial.

(Required: Maximum 1000 characters allowed)

6 **Insurance Acknowledgement – Construction/Public Works**

I understand that the insurance requirements of this solicitation are required and are included in the submitted pricing. The Contractor shall furnish certificates of insurance for both the Contractor and any subcontractor to the Purchasing department if awarded all or a portion of the resulting contract. Please initial.

(Required: Maximum 1000 characters allowed)

7 **Bonding Requirement Acknowledgement**

I understand that the bonding requirements of this solicitation are required and are included in the submitted pricing. A bond certificate (payment, performance, and/or maintenance) as stated in the specification document shall be submitted to the Purchasing department if I am awarded all or a portion of the resulting contract. Please initial.

(Required: Maximum 1000 characters allowed)

8 **Bid Bond Acknowledgement**

I understand that accompanying this bid, is a certified check, cashier's check or Bid Bond in the amount of five percent (5%) of the total amount bid. Bidders submitting a bid via Collin County eBid shall upload a Bid Bond at https://collincountytx.ionwave.net. Regardless of delivery method, all Bid Bonds shall be received prior to the bid opening time to be considered.
I understand that the original Bid Bond shall be received in the Collin County Purchasing Department no later than close of business on the third working day after the bid opening. **Late receipt of original Bid Bond shall be cause for rejection of bid.** Please initial.

(Required: Maximum 4000 characters allowed)

9 **Subcontractors**

State the business name of all subcontractors and the type of work they will be performing under this contract. If you are fully qualified to self-perform the entire contract, please respond with "Not Applicable-Self Perform".

(Required: Maximum 4000 characters allowed)

10 **Reference No. 1**

List a company or governmental agency, other than Collin County, where these same/like products/services, as stated herein, have been provided. Texas references are preferred. Include the following: Company/Entity, Contact, Address, City/State/Zip, Phone, and E-Mail. It is the responsibility of the Bidder/Proposer to ensure submitted references will be responsive to the County's requests. The County reserves the right to contact references other than those listed, and to consider any information acquired from all references during the evaluation process.

(Required: Maximum 4000 characters allowed)

11 **Reference No. 2**

List a company or governmental agency, other than Collin County, where these same/like products/services, as stated herein, have been provided. Texas references are preferred. Include the following: Company/Entity, Contact, Address, City/State/Zip, Phone, and E-Mail. It is the responsibility of the Bidder/Proposer to ensure submitted references will be responsive to the County's requests. The County reserves the right to contact references other than those listed, and to consider any information acquired from all references during the evaluation process.

(Required: Maximum 4000 characters allowed)

12 **Reference No. 3**

List a company or governmental agency, other than Collin County, where these same/like products/services, as stated herein, have been provided. Texas references are preferred. Include the following: Company/Entity, Contact, Address, City/State/Zip, Phone, and E-Mail. It is the responsibility of the Bidder/Proposer to ensure submitted references will be responsive to the County's requests. The County reserves the right to contact references other than those listed, and to consider any information acquired from all references during the evaluation process.

(Required: Maximum 4000 characters allowed)

13 **Cooperative Contracts**

As permitted under Title 8, Chapter 271, Subchapter F, Section 271.101 and 271.102 V.T.C.A. and Title 7, Chapter 791, Subchapter C, Section 791.025, V.T.C.A., other local governmental entities may wish to also participate under the same terms and conditions contained in this contract. Each entity wishing to participate must enter into an inter-local agreement with Collin County and have prior authorization from vendor. If such participation is authorized, all purchase orders will be issued directly from and shipped directly to the local governmental entity requiring supplies/services. Collin County shall not be held responsible for any orders placed, deliveries made or payment for supplies/services ordered by these entities. Each entity reserves the right to determine their participation in this contract. Would bidder be willing to allow other local governmental entities to participate in this contract, if awarded, under the same terms and conditions?

☐ Yes ☐ No

(Required: Check only one)

14 **Preferential Treatment**

The County of Collin, as a governmental agency of the State of Texas, may not award a contract to a nonresident bidder unless the nonresident's bid is lower than the lowest bid submitted by a responsible Texas resident bidder by the same amount that a Texas resident bidder would be required to underbid a nonresident bidder to obtain a comparable contract in the state in which the nonresident's principal place of business is located (Government Code, Title 10, V.T.C.A., Chapter 2252, Subchapter A).

1. Is your principal place of business in the State of Texas?
2. If your principal place of business is not in Texas, in which State is your principal place of business?
3. If your principal place of business is not in Texas, does your state favor resident bidders (bidders in your state) by some dollar increment or percentage?
4. If your state favors resident bidders, state by what dollar amount or percentage.

(Required: Maximum 4000 characters allowed)

15 **Debarment Certification**

I certify that neither my company nor an owner or principal of my company has been debarred, suspended or otherwise made ineligible for participation in Federal Assistance programs under Executive Order 12549, “Debarment and Suspension,” as described in the Federal Register and Rules and Regulations. Please initial.

(Required: Maximum 1000 characters allowed)

16 **Immigration and Reform Act**

I declare and affirm that my company is in compliance with the Immigration and Reform Act of 1986 and all employees are legally eligible to work in the United States of America. I further understand and acknowledge that any non-compliance with the Immigration and Reform Act of 1986 at any time during the term of this contract will render the contract voidable by Collin County. Please initial.

(Required: Maximum 1000 characters allowed)

17 **Disclosure of Certain Relationships**

Chapter 176 of the Texas Local Government Code requires that any vendor considering doing business with a local government entity disclose the vendor’s affiliation or business relationship that might cause a conflict of interest with a local government entity. Subchapter 6 of the code requires a vendor to file a conflict of interest questionnaire (CIQ) if a conflict exists. By law this questionnaire must be filed with the records administrator of Collin County no later than the 7th business day after the date the vendor becomes aware of an event that requires the statement to be filed. A vendor commits an offense if the vendor knowingly violates the code. An offense under this section is a misdemeanor. By submitting a response to this request, the vendor represents that it is in compliance with the requirements of Chapter 176 of the Texas Local Government Code. Please send completed forms to the Collin County County Clerk's Office located at 2300 Bloomdale Rd., Suite 2104, McKinney, TX 75071. Please initial.

(Required: Maximum 1000 characters allowed)

18 **Anti-Collusion Statement**

Bidder certifies that its Bid/Proposal is made without prior understanding, agreement, or connection with any corporation, firm, or person submitting a Bid/Proposal for the same materials, services, supplies, or equipment and is in all respects fair and without collusion or fraud. No premiums, rebates or gratuities permitted; either with, prior to, or after any delivery of material or provision of services. Any such violation may result in Agreement cancellation, return of materials or discontinuation of services and the possible removal from bidders list. Please initial.

_____

_____

_____

(Required: Maximum 1000 characters allowed)

19 **Disclosure of Interested Parties**

Section 2252.908 of the Texas Government Code requires a business entity entering into certain contracts with a governmental entity to file with the governmental entity a disclosure of interested parties at the time the business entity submits the signed contract to the governmental entity. Section 2252.908 requires the disclosure form (Form 1295) to be signed by the authorized agent of the contracting business entity, acknowledging that the disclosure is made under oath and under penalty of perjury. Section 2252.908 applies only to a contract that requires an action or vote by the governing body of the governmental entity before the contract may be signed or has a value of at least $1 million. Section 2252.908 provides definitions of certain terms occurring in the section. Section 2252.908 applies only to a contract entered into on or after January 1, 2016. Please initial.

_____

_____

_____

(Required: Maximum 1000 characters allowed)

20 **Notification Survey**

In order to better serve our offerors, the Collin County Purchasing Department is conducting the following survey. We appreciate your time and effort expended to submit your bid. Should you have any questions or require more information please call (972) 548-4165. How did you receive notice of this request?

☐ Plano Star Courier ☐ Plan Room ☐ Collin County eBid Notification ☐ Collin County Website

☐ Other

(Required: Check only one)

21 **Construction Acknowledgement**

Bidder, declares that the only person or parties interested in this bid are those principals named herein, that his/her bid is made without collusion with any other person, firm or corporation, that he/she has carefully examined the Contract Documents including the Advertisement for Bids, Instruction to Bidders, Construction Agreement, Specifications and the Drawings, therein referred to and has carefully examined the locations, conditions and classes of materials for the proposed work, and agrees that he/she will provide all the necessary labor, machinery, tools, equipment, apparatus and other items incidental to construction and will do all the work and furnish all the materials called for in the Contract Documents in the manner prescribed therein. Bidder hereby declares that he/she has visited the site of the Work and has carefully examined the Contract Documents pertaining to the Work covered by the above Bid, and he/she further agrees to commence work within ten (10) consecutive calendar days after date of written Notice to Proceed and to substantially complete the work on which he/she has bid within the number of days specified subject to such extensions of time allowed by Specifications. Bidder certifies that the bid prices contained in this bid have been carefully checked and are submitted as correct and final. The prices have been shown in words and figures for each item listed in this bid and it is understood that in the event of a discrepancy, the words shall govern. Please initial.

_____

_____

_____

(Required: Maximum 1000 characters allowed)

22	**Critical Infrastructure Affirmation** Pursuant to section 2274.0102 of the Texas Government Code, Respondent certifies that neither it nor its parent company, nor any affiliate of Respondent or its parent company, is: (1) majority owned or controlled by citizens or governmental entities of China, Iran, North Korea, Russia, or any other country designated by the Governor under Government Code Section 2274.0103, or (2) headquartered in any of those countries. Please initial. *(Required: Maximum 1000 characters allowed)*
23	**Energy Company Boycotts** Pursuant to Section 2274.002 of the Texas Government Code, should the contract have a value of $100,000 or more and the company employs 10 or more full-time employees, Respondent represents and warrants that: (1) it does not, and will not for the duration of the contract, boycott energy companies, and (2) will not boycott energy companies during the term of the contract. If circumstances relevant to this provision change during the course of the contract, Respondent shall promptly notify Agency. Please initial. *(Required: Maximum 1000 characters allowed)*
24	**Firearm Entities and Trade Associations Discrimination** Pursuant to section 2274.002 of the Texas Government Code, should the contract have a value of $100,000 or more and the company employs 10 or more full-time employees, Respondent verifies that: (1) it does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association and (2) will not discriminate during the term of the contract against a firearm entity or firearm trade association. If circumstances relevant to this provision change during the course of the contract, Respondent shall promptly notify Agency. Please initial. *(Required: Maximum 1000 characters allowed)*
25	**Addendum No. 1** Please initial to verify your receipt of the addendum. *(Required: Maximum 1000 characters allowed)*
26	**Addendum No. 2** Please initial to verify your receipt of the addendum. *(Required: Maximum 1000 characters allowed)*

27 **Addendum No. 3**

Please initial to verify your receipt of the addendum.

(Required: Maximum 1000 characters allowed)

Bid Lines

1 ***Package deleted as part of an Addendum***

2 **Package Header**

Minimum Security Bid Grand Total

Quantity: 1 UOM: job Total: $

Item Notes: Total Material Cost (Line 2.1) and Total Labor Cost (Line 2.2) must add up to the Bid Grand Total.

Supplier Notes:

☐ No bid
☐ Alternate specification *(Attach separate sheet)*
☐ Additional notes *(Attach separate sheet)*

Package Items

2.1 Total Materials Cost Incorporated in Project
(Response required)

Quantity: 1 UOM: lump sum Price: $ Total: $

Supplier Notes:

☐ No bid
☐ Additional notes *(Attach separate sheet)*

2.2 Total Labor Cost Incorporated in Project
(Response required)

Quantity: 1 UOM: lump sum Price: $ Total: $

Supplier Notes:

☐ No bid
☐ Additional notes *(Attach separate sheet)*

3 **Package Header**

Animal Shelter Bid Grand Total

Quantity: 1 UOM: job Total: $

Item Notes: Total Material Cost (Line 3.1) and Total Labor Cost (Line 3.2) must add up to the Bid Grand Total.

Supplier Notes:

☐ No bid
☐ Alternate specification *(Attach separate sheet)*
☐ Additional notes *(Attach separate sheet)*

Package Items

3.1 Total Materials Cost Incorporated in Project
(Response required)

Quantity: 1 UOM: lump sum Price: $ Total: $

Supplier Notes:

☐ No bid
☐ Additional notes *(Attach separate sheet)*

3.2 Total Labor Cost Incorporated in Project
(Response required)

Quantity: 1 UOM: lump sum Price: $ Total: $

Supplier Notes:

☐ No bid
☐ Additional notes *(Attach separate sheet)*

4 Package Header

Juvenile Detention Center - Cluster IV Mezzanine Bid Grand Total

Quantity: 1 UOM: job Total: $

Item Notes: Total Material Cost (Line 4.1) and Total Labor Cost (Line 4.2) must add up to the Bid Grand Total.

Supplier Notes:

☐ No bid
☐ Alternate specification *(Attach separate sheet)*
☐ Additional notes *(Attach separate sheet)*

Package Items

4.1 Total Materials Cost Incorporated in Project
(Response required)

Quantity: 1 UOM: lump sum Price: $ Total: $

Supplier Notes:

☐ No bid
☐ Additional notes *(Attach separate sheet)*

4.2 Total Labor Cost Incorporated in Project
(Response required)

Quantity: 1 UOM: lump sum Price: $ Total: $

Supplier Notes:

☐ No bid
☐ Additional notes *(Attach separate sheet)*

5 Package Header

Central Plant Bid Grand Total

Quantity: 1 UOM: job Total: $

Item Notes: Total Material Cost (Line 5.1) and Total Labor Cost (Line 5.2) must add up to the Bid Grand Total.

Supplier Notes: _____

☐ No bid
☐ Alternate specification *(Attach separate sheet)*
☐ Additional notes *(Attach separate sheet)*

Package Items

5.1 Total Materials Cost Incorporated in Project
(Response required)

Quantity: 1 UOM: lump sum Price: $ Total: $

Supplier Notes: _____

☐ No bid
☐ Additional notes *(Attach separate sheet)*

5.2 Total Labor Cost Incorporated in Project
(Response required)

Quantity: 1 UOM: lump sum Price: $ Total: $

Supplier Notes: _____

☐ No bid
☐ Additional notes *(Attach separate sheet)*

6 Package Header

Alternate: Administration Building [includes sheets M1.6A, M1.7A, M1.8A, M1.9A, M1.10A, M1.11A, M1.12A]

Quantity: 1 UOM: job Total: $

Item Notes: Total Material Cost (Line 6.1) and Total Labor Cost (Line 6.2) must add up to the Bid Grand Total.

Supplier Notes: _____

☐ No bid
☐ Alternate specification *(Attach separate sheet)*
☐ Additional notes *(Attach separate sheet)*

Package Items

6.1 Total Materials Cost Incorporated in Project
(Response required)

Quantity: 1 UOM: lump sum Price: $ Total: $

Supplier Notes: _____

☐ No bid
☐ Additional notes *(Attach separate sheet)*

6.2 Total Labor Cost Incorporated in Project
(Response required)

Quantity: 1 UOM: lump sum Price: $ Total: $

Supplier Notes: _____

☐ No bid
☐ Additional notes *(Attach separate sheet)*

Supplier Information

Company Name: _____

Contact Name: _____

Address: _____

_____

_____

_____

Phone: _____

Fax: _____

Email: _____

Supplier Notes

_____

_____

_____

_____

_____

_____

_____

_____

The undersigned hereby certifies the foregoing bid submitted by the company listed below hereinafter called “bidder” is the duly authorized agent of said company and the person signing said bid has been duly authorized to execute same. Bidder affirms that they are duly authorized to execute this contract; this company; corporation, firm, partnership or individual has not prepared this bid in collusion with any other bidder or other person or persons engaged in the same line of business; and that the contents of this bid as to prices, terms and conditions of said bid have not been communicated by the undersigned nor by any employee or agent to any other person engaged in this type of business prior to the official opening of this bid.

_____ _____

Print Name *Signature*

SECTION 23 09 00 – INSTRUMENTATION AND CONTROL FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to the Work in this Section.

1.2 SUMMARY

A. This Section includes control equipment for HVAC systems, components and other systems shown to be controlled by the Building Automation System (BAS), including, but not limited to, all computer software and hardware, controllers, sensors, transmission equipment, local panels, installation, engineering, supervision, commissioning, acceptance testing, training and warranty service necessary for a complete and working system.

B. The Contractor shall furnish and install the controls including all necessary hardware and all operating and applications software necessary to perform the control sequences of operation as specified in Division 23 Section “Sequence of Operations for HVAC Controls”. The controls contractor shall coordinate all work with the stand-alone controls provided with the equipment being controlled.

C. The intent is that all facility operations new or existing would be stand-alone.

D. All components of the system – local controllers, unitary controllers, etc. shall communicate using the BACnet protocol, as defined by the most current edition of ASHRAE Standard 135 and as specified herein or equal. Proprietary communications shall not be acceptable.

D.E. OPEN NIC STATEMENTS - All Niagara 4 software licenses shall have the following NiCS: "accept.station.in=*"; "accept.station.out=*"and "accept.wb.in=*"and "accept.wb.out=*". In any case, the end user shall maintain the right to instruct the contractor to modify any software license, regardless of supplier, as desired by the end user. The contractor shall not install any “brand-specific” software, applications, or utilities on Niagara Framework-based devices. All hardware and field-level devices installed shall not be limited in their ability to communicate with a specific brand of Niagara Framework JACE. They shall also be constructed in a modular fashion to permit the next generation and support components to be installed, in replacement of or in parallel with existing components. All controllers must be able to be programmed within the Niagara Workbench. At the completion of the project, the owner shall be given all existing platform and station login credentials to include; super user (admin) user names; passwords and passphrases.

E.F. The BAS contractor shall review and study all drawings and the entire specification to become familiar with the equipment and system operation and to verify the quantities and types of controllers and devices to be provided.

F.G. All interlock, control and power wiring and installation of control devices associated with the equipment described in this specification, and sequence of operations, shall be provided under this Contract.

G.H. The integration of the controls into the Owners software will be handled by the County’s integrator.

H.I. Provide services and manpower necessary for commissioning of system in coordination with the Owner’s Representative and Owner’s Integrator.

I.J. All work performed under this section of the specifications will comply with all codes, laws and governing bodies. If the drawings and/or specifications are in conflict with governing codes, the Contractor shall submit a proposal with appropriate modifications to the project to meet code restrictions. If this specification and associated drawings exceed governing code requirements, the specification will govern. The Controls Contractor shall obtain and pay for all necessary construction permits and licenses associated with this scope of work.

1.3 QUALITY ASSURANCE

A. Building Automation System (BAS) shall be manufactured, tested and installed in accordance with the following standards:
   1. National Electrical Manufacturers Association (NEMA).
   2. Underwriters Laboratories (UL).
   3. BACnet Testing Laboratories (BTL).
   4. National Fire Protection Association (NFPA).

B. EBMS System Supplier:
   1. A firm having 5 years of successful installation, configuration and integration experience with projects utilizing equipment similar in type and scope to that required for this Project.
   2. Certified for configuration of building management systems of Section 23 09 00 - Instrumentation and Control for HVAC Direct Digital Control System for HVAC by the manufacturer's representative.
   3. Provide specified products of types and sized required from manufacturers whose products have been in satisfactory use in similar service for a minimum of 8 years.
   4. Be the system supplier for Section 23 09 00 - Instrumentation and Control for HVAC Direct Digital Control System for HVAC.

C. Installer Qualifications: Automatic control system manufacturer's authorized representative who is trained and approved for installation of system components required for this Project.

D. Upon completion of the installation, the Contractor shall thoroughly inspect, check, adjust, calibrate, and make ready for use all devices/sensors comprising the control system and certify that they are installed in accordance with "Record" Drawings.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

F. Data Communications Protocol: Certify that each proposed Controls system component complies with ASHRAE Standard 135 for each protocol.

G. Controls system component testing: Comply with ASHRAE 135.1 and all addenda for all controllers.

H. All controllers used to control or monitor equipment and/or field devices shall be tested, compliant with and carry the mark of the BACnet Testing Laboratories (BTL):
   1. Building Controllers.
   2. Advanced Application Controllers.
   3. Application Specific Controllers.

I. Quality Management Program
   1. Designate a competent and experienced employee to provide BAS Project Management. The designated Project Manager shall be full time on this project and be empowered to make financial, technical, scheduling and related decisions on behalf of the BMS Contractor. At minimum, the Project Manager shall:
      a. Serve as the point of contact for the Construction Team.
      b. Manage the scheduling of the work to ensure that adequate materials, labor and other resources are available when needed.
      c. Lead and be involved in the coordination efforts with other trades.
      d. Be responsible for the work and actions of the BAS workforce on site.

J. As evidence and assurance of the Contractor's ability to support the project's Commissioning efforts, the Contractor must have successfully completed three commissioned projects totaling at least the value of this contract, as a minimum.

1.4 SUBMITTALS

A. Provide submittals as required in Section 23 00 10, “Submittal Process”.

B. Product Data: For all products listed in Part 2 below provide detailed manufacturer product data, technical literature indicating dimensions, finishes, material, weights, performance characteristics, electrical characteristics, capacities, loads, required clearances, method of field assembly, components, and location and size of each field connection. Include

manufacturer's technical literature for each control device. Indicate finishes for materials, and installation and startup instructions for each type of product indicated.

1. Control System Software: Include technical data for operating system software, operator interface, color graphics, and other third-party applications including all software licensing agreements.
2. Controlled Systems: Instrumentation list with element name, type of device, manufacturer, model number, and product data. Include written description of sequence of operation including schematic control diagram.

C. Shop Drawings:
   1. Bill of materials of equipment indicating quantity, manufacturer, and model number.
   2. Wiring Diagrams: Power, signal, and control wiring.
   3. Conductor numbering or color code schedules.
   4. Details of control panel faces, including controls, instruments, and labeling.
   5. Schedule of identification labels for controllers and devices.
   6. Controlled Systems:
      a. Schematic diagrams of each controlled system with control points labeled and control elements graphically shown, with wiring.
      b. Scaled drawings showing mounting, routing, and wiring of elements including bases and special construction.
      c. Written description of sequence of operation including schematic diagram.
      d. Points list.
   7. Submit hard and soft copies in file format compatible with AutoCAD 2012.

D. Data Communications Protocol Certificates: Certify that each proposed control system component complies with ASHRAE Standard 135 for each protocol.

E. Software and Firmware Operational Documentation: Include the following:
   1. Software operating and upgrade manuals.
   2. Program Software Backup required to reinstall and configure system in the event of a catastrophic failure: On CD, complete with data files.
   3. Device address list.
   4. Printout of software application and graphic screens.
   5. Software license required by and installed for operator workstations and control systems.

F. Software Upgrade Kit: For Owner to use in modifying software to suit future systems revisions or monitoring and control revisions.

G. Field quality-control test report forms.

H. Contract Closeout Documentation:
   1. Operation and Maintenance Data: Include emergency, operation, and maintenance manuals.
      a. Maintenance instructions and lists of spare parts for each type of control device.
      b. Interconnection wiring diagrams with identified and numbered system components and devices.
      c. Keyboard illustrations and step-by-step procedures indexed for each operator function.
      d. Inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
      e. Calibration records and list of set points.
   2. Training provided by BAS installer.

1.5 WARRANTY

A. Controls Contractor shall guarantee all system components and installations to be free from defects for one (1) year from the date of acceptance as determined by the Owner. Any defects found during this period shall be repaired and/or replaced at no cost to the Owner. The Controls Contractor shall provide maximum of 24-hour response time for trouble calls or maintenance.

B. Controls Contractor shall provide all corrective software modifications or updates available from the software manufacturer during warranty service periods. All user documentation shall be updated on user and manufacturer backup software disks.

1.6 SPECIAL TOOLS AND SPARE PARTS

A. Contractor will provide a recommended spare parts list with the following information.
   1. Contact Information: Closest parts stocking location to the Owner.
   2. Identify Critical Spare Parts: Parts being associated with long lead times and/or those critical to system operation.
   3. Maintenance Spares: Identified as being parts required to regularly perform scheduled maintenance on furnished equipment. Spares include, but not limited to, consumable spares required to be exchanged during scheduled maintenance periods.

B. Spare Parts: Provided for each type and size of unit installed.
   1. Provide minimum spare parts recommended by manufacturers.
   2. Provide 1 set of each type of power and control fuse installed within equipment.
   3. Properly marked and packaged for long term storage.
   4. Printed circuit boards: Provided in separate anti-static containers.

C. Special Tools: Specific tools, not normally found in an electrician's toolbox, required to remove, and install spare parts must be furnished.

D. Provide PC-based computer configuration software, or mobile device App tool, and a minimum of one communication interface cable for each type of cable required to connect the computer/device to devices specified for configuration and programming.

E. Provide Cloud-based SAAS configuration software and Cloud based Engineering platform required to connect and design devices specified for configuration and programming.

F. Electronic configuration files, in a media format acceptable by the Owner (e.g. CD, USB stick, etc.), updated to an as-installed and commissioned state.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design – Honeywell or Distech Controls

B. Installers shall be factory authorized for installation of Honeywell or Distech Controls

2.2 MANAGEMENT LEVEL CONTROLLERS

A. Basis of Design: Honeywell or Distech, JACE 8000 Controller: Compact, embedded Niagara Framework based controller and server platform. Connects multiple diverse devices and sub-systems. Requires additional core software and service maintenance licenses.
   1. Model JACE-8000-US: Unlicensed controller, 2 RS-485 ports, 2 10/100 MB Ethernet ports, USB backup and restore, Wi-Fi connectivity (US).
   2. Model JACE-8000-WW: Unlicensed controller, 2 RS-485 ports, 2 10/100 MB Ethernet ports, USB backup and restore, Wi-Fi connectivity (configurable Wi-Fi country code for worldwide use).
   3. Internet connectivity and web-serving capability.
   4. Integrated control, supervision, data logging, alarming, scheduling, and network management.
   5. Stream data and rich graphical displays to web browsers via ethernet or wireless LAN, or over the internet.
   6. Licensing Model: Standard drivers with optional IO and field bus expansion modules for flexibility and expandability.
   7. Optimized for the Niagara 4 platform. In large and multi-building applications, use Niagara 4 Supervisors with JACE 8000 controllers to aggregate information,

including alarms and data: historical and real-time, creating a single, unified application.

8. Standards Compliance and Certifications:
   a. UL 916.
   b. CE EN 61326-1.
   c. RCM.
   d. FCC Part 15 Subpart B, Class B.
   e. FCC Part 15 Subpart C.
   f. C-UL listed to Canadian Standards Association (CSA) C22.2 No. 205-M1983.
   g. "Signal Equipment:"
      1) 1999/5/EC R&TTE Directive.
      2) CCC.
      3) SRRC.
      4) RSS.
      5) RoHS.
9. Environmental:
   a. Operating temperature: Minus 4 to 140 degrees F (Minus 20 to 60 degrees C).
   b. Storage temperature: Minus 40 to 185 degrees F (Minus 40 to 85 degrees C).
   c. Humidity: 5 to 95 percent, non-condensing.
   d. Shipping and vibration: ASTM D4169, Assurance Level II.
   e. MTTF: 10 plus years.
10. Technical Specifications:
   a. TI AM3352: 1000 MHz Arm Cortex-A8 1GB DDR3 SDRAM.
   b. Removable micro-SD card with 4GB flash total storage/2GB user storage.
   c. Wi-Fi (Client or WAP).
      1) IEEE802.11a/b/g/n.
      2) IEEE802.11n HT20 at 2.4GHz.
      3) IEEE802.11n HT20/HT40 at 5GHz.
11. Configurable radio (Off, WAP, or Client) WPAPSK/WPA2PSK supported.
   a. USB Type A Connector: Back-up and restore support.
   b. Two isolated RS-485 with selectable bias and termination.
   c. Two 10/100MB Ethernet ports.
   d. Secure boot.
   e. Supply Requirements: 24 VAC rated at 24 VA minimum, or 24 VDC rated at 1A.
   f. Power: 24 W minimum.
   g. Runs NiagaraA: 3.8u1 and later.
   h. Runs Niagara 4: 4.1 and later.
   i. Niagara Analytics 1.1 requires NiagaraAX 3.8u1 or later update builds.
   j. Niagara Analytics 2.0 requires Niagara 4.2 and later.
   k. Real-time clock.
   l. No battery.

2.3 PROGRAMMABLE FIELD EQUIPMENT CONTROLLER (FEC)

A. Description: BACnet programmable VAV/Unitary controller

B. Basis of Design: Honeywell Spyder or Distech ECB-VAV.

C. The FEC controllers are BACnet MS/TP network devices designed to control HVAC equipment. Each FEC controller is programmable and configurable through software.

D. The FEC BACnet controllers shall have the BACnet Programmable Feature to be licensed in the WEBpro workbench tool and the WEBS AX JACE Controller for programming and downloading

E. The FEC shall include an integral real-time clock and support time-based tasks which enables these field controllers to monitor and control:
   1. Schedules
   2. Calendars
   3. Alarms
   4. Trends

F. The FEC can operate as a stand-alone controller in applications that do not require a networked supervisory device or for network applications where it is preferred to have the scheduling, alarming, and/or trending performed locally in the field controllers.

2.4 ELECTRONIC SENSORS

A. Description: Vibration and corrosion resistant; for wall, immersion, or duct mounting as required.

B. Thermistor, Temperature Sensors and Transmitters:
   1. Sensor Types: Provide one of the following:
      a. 100 ohm (+/-0.12%) platinum resistance temperature detectors having a coefficient of resistivity of 0.00385 ohms/ohm/°C. Provide RTD temperature transducers with of 4-20 mA output signal variations of less than 0.2% of full scale output for supply voltage variations +/-10% and integral and accessible zero and span adjustment.
      b. 10,000 ohm thermistor having an accuracy of .5°F at calibration point of 75°F may be used for room temperature only.
   2. Accuracy: Plus or minus 0.5°F (0.3°C) at calibration point.
   3. Wire: Twisted, shielded-pair cable.
   4. Insertion Elements: Single point in center of duct or coil face area, use where not affected by temperature stratification or where airflow cross sectional area is smaller than 9 sq. ft.
   5. Averaging Elements: Twice the diagonal length of coil or duct. Use where prone to temperature stratification or where airflow cross sectional area is larger than 10 sq. ft.
   6. Insertion Elements for Liquids: Brass or stainless-steel socket with minimum insertion length of 2-1/2 inches or 75% of pipe inside diameter, whichever is less.
   7. Room Thermostats: Off-white enclosure capable of being mounted on a standard single gang electrical back box. Provide each with:
      a. Local display of current space temperature.
      b. Local setpoint adjustment (+/- 5 deg F) and temporary override button, both of which can be overridden by BAS at OWS.
      c. RJ45 connection for connection to PDU.
   8. Outside-Air Sensors: Watertight inlet fitting, shielded from direct sunlight.

C. RTDs and Transmitters:
   1. Accuracy: Plus or minus 0.2 percent at calibration point.
   2. Wire: Twisted, shielded-pair cable.
   3. Insertion Elements in Ducts: Single point; use where not affected by temperature stratification or where ducts are smaller than 9 sq. ft.
   4. Averaging Elements in Ducts: Use where prone to temperature stratification or where ducts are larger than 9 sq. ft; length as required.
   5. Insertion Elements for Liquids: Brass socket with minimum insertion length of 2-1/2 inches.
   6. Room Sensor Cover Construction: Off-white enclosure capable of being mounted on a standard single gang electrical back box.

D. Pressure Transmitters/Transducers:
   1. Static-Pressure Transmitter: Non-directional sensor with suitable range for expected input, and temperature compensated. Accuracy of 2 percent of full scale with repeatability of 0.5 percent. Linear output of 4 to 20 mA.
      a. Building Static-Pressure Range: 0- to 0.25-inch wg.
      b. Duct Static-Pressure Range: 0- to 5-inch wg.
   2. Water Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig . operating pressure; linear output 4 to 20 mA.
   3. Water Differential-Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig operating pressure and tested to 300-psig; linear output 4 to 20 mA.
   4. Differential-Pressure Switch (Air or Water): Snap acting, with pilot-duty rating and with suitable scale range and differential.
   5. Pressure Transmitters: Direct acting for gas, liquid, or steam service; range suitable for system; linear output 4 to 20 mA.

2.5 STATUS SENSORS
A. Low Limit Temperature Switch: Minimum 20 ft. element for freeze protection. Serpentine across the face of the coil and of sufficient length or number for three passes across the width of the coil it is protecting. Connect in series with other safety devices to de-energize fans serviced when a drop in temperature below setpoint is detected.
B. Voltage Transmitter (100- to 600-V ac): Comply with ISA 50.00.01, single-loop, self-powered transmitter, adjustable, with suitable range and 1 percent full-scale accuracy.
C. Power Monitor: 3-phase type with disconnect/shorting switch assembly, listed voltage and current transformers, with pulse kilowatt hour output and 4- to 20-mA kW output, with maximum 2 percent error at 1.0 power factor and 2.5 percent error at 0.5 power factor.
D. Current Switches: Self-powered, solid-state with adjustable trip current, selected to match current and system output requirements.
E. Electronic Valve/Damper Position Indicator: Visual scale indicating percent of travel and 2- to 10-V dc, feedback signal.
F. Water-Flow Switches: Bellows-actuated mercury or snap-acting type with pilot-duty rating, stainless-steel or bronze paddle, with appropriate range and differential adjustment, in NEMA 250, Type 1 enclosure.

2.6 ACTUATORS
A. Electric Motors: Size to operate with sufficient reserve power to provide smooth modulating action or two-position action.
   1. Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment".
   2. Permanent Split-Capacitor or Shaded-Pole Type: Gear trains completely oil immersed and sealed. Equip spring-return motors with integral spiral-spring mechanism in housings designed for easy removal for service or adjustment of limit switches, auxiliary switches, or feedback potentiometer.
   3. Nonspring-Return Motors for Valves Larger Than NPS 2-1/2: Size for running torque of 150 in. x lbf and breakaway torque of 300 in. x lbf.
   4. Spring-Return Motors for Valves Larger Than NPS 2-1/2: Size for running and breakaway torque of 150 in. x lbf .
   5. Nonspring-Return Motors for Dampers Larger Than 25 Sq. Ft.: Size for running torque of 150 in. x lbf and breakaway torque of 300 in. x lbf.
   6. Spring-Return Motors for Dampers Larger Than 25 Sq. Ft.: Size for running and breakaway torque of 150 in. x lbf.
B. Electronic Actuators shall be of 0 10 VDC type. Direct-coupled type designed for minimum 60,000 full-stroke cycles at rated torque. The minimum actuator impedance shall be 800 ohms even when more than one actuator is connected in parallel. Spring return shall be required for two-position (NO/NC) control sequence or for steam valve control. Non-spring

return actuators shall be used for all modulating sequence of control. They shall conform to all requirements of sequence descriptions specified or scheduled. Main mechanical equipment actuators shall have a manual position dial to allow manual positioning of valve in absence of control power.

1. Valves: Size for torque required for valve close off at maximum pump differential pressure.
2. Dampers: Size for running torque calculated as follows:
    a. Opposed-Blade Damper with Edge Seals: 5 inch-lb/sq. ft. of damper.
    b. Opposed-Blade Damper without Edge Seals: 3 inch-lb/sq. ft. of damper.
    c. Parallel-Blade Damper with Edge Seals: 7 inch-lb/sq. ft. of damper.
    d. Parallel-Blade Damper without Edge Seals: 4 inch-lb/sq. ft of damper.
    e. Dampers with 2- to 3-Inch wg of Pressure Drop or Face Velocities of 1000 to 2500 fpm: Increase running torque by 1.5.
    f. Dampers with 3- to 4-Inch wg of Pressure Drop or Face Velocities of 2500 to 3000 fpm: Increase running torque by 2.0.
    g. Nonspring-Return Motors for Dampers Larger Than 25 Sq. Ft.: Size for running torque of 150 in. x lbf and breakaway torque of 300 in. x lbf.
    h. Spring-Return Motors for Dampers Larger Than 25 Sq. Ft.: Size for running and breakaway torque of 150 in. x lbf.
3. Coupling: V-bolt and V-shaped, toothed cradle.
4. Overload Protection: Electronic overload or digital rotation-sensing circuitry.
5. Fail-Safe Operation: Mechanical, spring-return mechanism. Provide external, manual gear release on nonspring-return actuators.
6. Power Requirements (Two-Position Spring Return): 24-Vac.
7. Power Requirements (Modulating): Maximum 10 VA at 24-V ac or 8 W at 24-V dc.
8. Proportional Signal: 2- to 10-V dc or 4 to 20 mA, and 2- to 10-V dc position feedback signal with damper position indicator indicating percent of travel.
9. Temperature Rating: Minus 0 degrees to plus 122 deg F.
10. Actuator Housing: Molded or die-cast zinc or aluminum.
11. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Division 23 Section "Common Motor Requirements for HVAC."
12. Size to operate with sufficient reserve power to provide smooth modulating action or two-position action.
    a. Permanent Split-Capacitor or Shaded-Pole Type: Gear trains completely oil immersed and sealed. Equip spring-return motors with integral spiral-spring mechanism in housings designed for easy removal for service or adjustment of limit switches, auxiliary switches, or feedback potentiometer.

C. Actuators for VAV Terminal Box Controllers shall be 24V floating point, 0-10Vdc, modulating and their position shall be readable in percentage open at the OWS.

D. Actuators for smoke dampers shall be 24V floating point, 0-10Vdc, modulating and their position shall be readable as open or closed via end switch at the OWS.

E. Actuators shall be Honeywell or Distech.

2.7 CONTROL CABLE

A. Control cable shall be shielded.

B. Control wire penetrating a plenum shall be plenum rated with a 25/50 smoke rating

C. Control wiring ran through a vertical shaft more than 2 floors shall be installed in a continuous raceway and a pull box at each floor.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Factory-Mounted Components: Where control devices specified in this Section are indicated to be factory mounted on equipment in other Sections, arrange for shipping of control devices to equipment manufacturer. Upon delivery the equipment manufacturer shall inspect shipment for visual damages. The Controls Contractor shall replace any damaged control equipment at no cost to the Owner.

B. Provide factory shipping containers for each piece of equipment. Provide factory applied plastic end caps on each length of pipe and tube. Maintain cartons and end caps through shipping, storage and handling as required to prevent equipment and pipe-end damage, and to eliminate dirt and moisture from equipment and inside of pipe and tube. Where possible store equipment and materials inside and protected from weather. When necessary, to store outside, elevate well above grade and enclose with durable water-proof wrapping.

3.2 EXAMINATION

A. Verify that power supply is available to all controllers, and electric actuators.

3.3 COORDINATION

A. Coordinate location of temperature sensors, humidistats, and other exposed control sensors with plans and room finish details before installation.

3.4 INSTALLATION

A. Install software in control units. Implement all features of programs to specified requirements and as appropriate to achieve sequence of operations.

B. Connect and configure equipment and software to achieve sequence of operations specified.

C. Mount all wall thermostats, and other exposed control sensors on dedicated electrical backboxes.

D. Install averaging elements in ducts and plenums in crossing or zigzag pattern.

E. Install damper motors on outside of duct in warm areas, not in locations exposed to outdoor temperatures.

3.5 ELECTRICAL WIRING AND CONNECTION INSTALLATION

A. Install systems and materials in accordance with manufacturer's instructions, rough-in drawings and equipment details.

B. The term "control wiring" is defined to include providing of wire, conduit, and miscellaneous material as required for mounting and connecting electric or electronic control devices.

C. Install all control wiring in conduit for electric/electronic control systems. Conceal wiring, except in mechanical rooms and areas where other conduit and piping are exposed. UL plenum rated cable shall be allowed above accessible lift out ceilings, in air plenums and in other areas as approved by Architect and local and NEC codes.

D. Stub conduit to above lift out ceilings. Plastic bushing shall be installed where the wiring exits the conduit to prevent damage.

E. Properly support and run in a neat workmanlike manner all wiring and conduit. Run parallel to or at a right angle to building structure.

F. Number-code or color-code conductors, excluding those used for individual zone controls, appropriately for future identification and servicing of control system.

G. This section shall provide all line voltage power wiring required because of substitution of equipment specified in this section.

H. Install line voltage wiring in rigid conduit.

I. Install signal and communication cable according to following:

1. Bundle and harness multi-conductor instrument cable in place of single cables where several cables follow a common path.

2. Fasten flexible conductors, bridging cabinets and doors, along hinge side; protect against abrasion. Tie and support conductors.
3. Number-code or color-code conductors for future identification and service of control system, except local individual room control cables.
4. Install wire and cable with sufficient slack and flexible connections to allow for vibration of piping and equipment.

J. Connect manual-reset limit controls independent of manual-control switch positions. Automatic duct heater resets may be connected in interlock circuit of power controllers.

K. Connect hand-off-auto selector switches to override automatic interlock controls when switch is in hand position.

L. Unless indicated otherwise, mount room sensors (i.e. thermostats and sensors for room control) immediately inside of door adjacent to light switch.
1. Where a light switch is not located immediately inside of door, mount sensor within room where it is best suited to sense true space conditions for proper operation and controllability of equipment serving the room.
2. Unless indicated otherwise mount sensor at 48 IN above finished floor or as indicated on the Drawings.

M. Identification:
1. Provide laminated plastic nameplates for control panels. Other equipment devices furnished, including sensors, switches, valves, gages, actuators and all other item furnished under this section shall be identified with plastic embossed labels adhered to the device. Each nameplate shall identify the function, such as "mixed air low limit" or "cold deck temperature sensor" Laminated plastic shall be one-eighth inch thick whiter with black center core. Nameplates shall be a minimum of 1 inch by 3 inch with minimum one quarter inch high engraved block lettering. Nameplates for devices smaller than 1 inch by 3 inch shall be attached by a nonferrous metal chain. Submit a schedule of proposed wording of each nameplate with hardware submittal.
2. Instrumentation and Control Diagrams: Provide framed drawings including the sequence of controls and verbal description in laminated plastic showing complete diagrams for all equipment furnished and interfaces to all existing equipment, at each respective equipment location. Condensed operating instructions explaining preventive maintenance procedures methods of checking the system for normal safe operation and procedures for safely starting and stopping the system manually shall be prepared in typed form, framed as specified for the diagrams and posted beside the diagrams. Proposed diagrams, instructions and other sheets shall be submitted prior to posting.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including connections. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:
1. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove and replace malfunctioning units and retest.
2. Test and adjust controls and safeties.
3. Test each point through its full operating range to verify that safety and operating control set points are as required.
4. Test each control loop to verify stable mode of operation and compliance with sequence of operation. Adjust PID actions.
5. Test each system for compliance with sequence of operation.
6. Test software and hardware interlocks.

C. Controls Verification:
   1. Verify that instruments are installed before calibration, testing, and loop checks.
   2. Check instruments for proper location and accessibility.
   3. Check instrument installation for direction of flow, elevation, orientation, insertion depth, and other applicable considerations.
   4. Check flow instruments. Inspect tag number and line and bore size, and verify that inlet side is identified and that meters are installed correctly.
   5. Check pressure instruments, piping slope, installation of valve manifold, and self-contained pressure regulators.
   6. Check temperature instruments and material and length of sensing elements.
   7. Check control valves. Verify that they are operating in the correct direction.
   8. Check dampers. Verify that proper blade alignment, either parallel or opposed, has been provided.
   9. Check control system as follows:
      a. Verify that controller power supply is from emergency power supply, if applicable.
      b. Verify that wires at control panels are tagged with their service designation and approved tagging system.
      c. Verify that spare I/O capacity has been provided.
      d. Verify that controllers are protected from power supply surges.

D. Replace damaged or malfunctioning controls and equipment and repeat testing procedures.

3.7 ADJUSTING

A. Calibrating and Adjusting:
   1. Calibrate instruments.
   2. Make three-point calibration test for both linearity and accuracy for each analog instrument.
   3. Calibrate equipment and procedures using manufacturer's written recommendations and instruction manuals. Use test equipment with accuracy at least double that of instrument being calibrated.
   4. Control System Inputs and Outputs:
      a. Check digital inputs using jumper wire.
      b. Check digital outputs using ohmmeter to test for contact making or breaking.
      c. Check resistance temperature inputs at 0, 50, and 100 percent of span using a precision-resistant source.
   5. Flow:
      a. Set differential pressure flow transmitters for 0 and 100 percent values with 3-point calibration accomplished at 50, 90, and 100 percent of span.
      b. Manually operate flow switches to verify that they make or break contact.
   6. Pressure:
      a. Calibrate pressure transmitters at 0, 50, and 100 percent of span.
      b. Calibrate pressure switches to make or break contacts, with adjustable differential set at minimum.
   7. Temperature:
      a. Calibrate resistance temperature transmitters at 0, 50, and 100 percent of span using a precision-resistance source.
      b. Calibrate temperature switches to make or break contacts.
   8. Stroke and adjust control valves and dampers without positioners, following the manufacturer's recommended procedure, so that valve or damper is 100 percent open and closed.
   9. Stroke and adjust control valves and dampers with positioners, following manufacturer's recommended procedure, so that valve and damper is 0, 50, and 100 percent closed.
   10. Provide diagnostic and test instruments for calibration and adjustment of system.

11. Provide written description of procedures and equipment for calibrating each type of instrument. Submit procedures review and approval before initiating startup procedures.

B. Adjust initial temperature and humidity set points.

3.8 DEMONSTRATION & TRAINING

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain HVAC instrumentation and controls. Refer to Division 01 Section "Demonstration and Training."

B. Upon system acceptance provide a minimum of five (5), six (6) hour general classroom training sessions for three (3) of the Owner's personnel in the operation, programming, troubleshooting and maintenance of the control system. Training sessions shall be videotaped by the BAS contractor and tapes/digital files turned over to the Owner at completion of training along with a log book to document follow training issues.

1. Training to occur at manufacturer's local training facility.
2. Travel, room and board at Owner's expense.
3. Class size to be limited to five (5) operators at a time.

END OF SECTION