

# ADDENDUM No. 2 Request for Competitive Sealed Proposals (CSP) 19CSP085- Renovations at Casey Elementary

January 4, 2018

<u>Item 1:</u> CHANGES TO DRAWINGS AND RESPONSES TO QUESTIONS PLANROOM.MILLERIDS.COM UNDER 19CSP085



## S. Kanetzky Engineering, LLC Mechanical, Electrical, Plumbing Consulting Engineers

# CASEY ELEMENTARY SCHOOL RENOVATIONS AT CASEY ELEMENTARY SCHOOL For AUSTIN INDEPENDENT SCHOOL DISTRICT

ADDENDUM NO. 02: January 3, 2019

TO: ALL BIDDERS OF RECORD

This Addendum forms a part of the Contract Documents for the above project and modifies the original Drawings and Specifications, to the extent noted herein. Where provisions of the following supplementary data differ from the original Contract Documents, this Addendum shall govern and take preference.

Careful note of this Addendum shall be taken by all parties of interest so that proper allowance and necessary adjustment is made in all computations, estimates and contracts and so that all trades affected are fully advised in the performance of the work which will be required.

This Addendum must be acknowledged in the appropriate section of the Bid Proposal to be accepted.

#### **ATTACHMENTS**

Project Manual Cover\_Casey ES-Addendum 02.pdf

#### **DRAWINGS**

The following drawings are being re-issued for this Addendum as Revision No. 2 with the changes clouded

**MECHANICAL** 

M9.1 RTU CONTROL DIAGRAMS M9.2 FCU CONTROL DIAGRAMS

#### **CLARIFICATIONS**

#### **MECHANICAL**

- 1. In response to questions 19CSPO85 Renovations at Casey Elementary, drawings M9.1 and M9.2 have been revised to indicate smoke detection.
- 2. Questions 19CSPO85 and their responses are as follows:
  - 1. Please verify that per M9.1 area smoke detection will be utilized and that no duct detectors are required to be provided at the RTU units.

Response: Yes, the rooftop units will be interlocked with the fire alarm system, such that a signal from the fire alarm system to the DDC will shut down the supply air fans within the RTUs on smoke detection.

P. O. Box 90279 • Austin • Texas • 78709 5920 West William Cannon • Suite 200 • Austin • Texas • 78749 2. Please verify that (4) fire alarm relays should be provided at RTUs 1-4 to shut down the units upon an general fire alarm.

Response: Yes, see updates to M9.1.

3. Please verify if any duct detection or fire alarm relays are required at FCUs 4-7.

Response: The fan-coil units serving the library are required to shut-down on smoke detection. The units will be interlocked with the fire alarm system, such that a signal from the fire alarm system to the DDC will shut down the supply air fans within the FCUs on smoke detection. Please refer to updates on M9.2

#### **REQUEST FOR SUBSTITUTIONS**

No substitutions have been accepted by the Owner.

**END of ADDENDUM No. 02** 

Sincerely,

Tom Borkowski, P.E.

Director of Mechanical Engineering S. Kanetzky Engineering, LLC

**TBPE F-2356** 

1. OCCUPIED, UNOCCUPIED, BYPASS/OVERRIDE & DEHUMIDIFICATION:

A. BASE SETPOINT (nviSetpoint) [DEFAULT: 73°F] B. OCCUPIED COOL SETPOINT (nciSetpoints.OCC\_COOL) [DEFAULT: 74°F]

C. OCCUPIED HEAT SETPOINT (nciSetpoints.OCC\_HEAT) [DEFAULT: 70°F] D. UNOCCUPIED COOL SETPOINT (nciSetpoints.UNOCC\_COOL) [DEFAULT: 85°F] E. UNOCCUPIED HEAT SETPOINT (nciSetpoints.UNOCC\_HEAT) [DEFAULT: 60°F]

F. DEHUMIDIFICATION SETPOINT (nviSpaceDehumSP/nciSpaceDehumSP) [DEFAULT: 60%] G. LOCAL SETPOINT RANGE (CALCULATED POINT) [DEFAULT: +/-3F] H. LOCAL SETPOINT ADJUST (CALCULATED POINT):

SETPOINT ADJUST = nvoSetpoint - 72F LIMIT SETPOINT ADJUST VALUE TO RANGE DEFINED BY LOCAL SETPOINT RANGE

WRITE SETPOINT ADJUST VALUE TO nviSetptOffset I. DEAD-BAND (CALCULATED POINT):

DEAD-BAND (DB) = nciSetpoints.OCC\_COOL - nciSetpoints.OCC\_HEAT J. EFFECTIVE COOLING SETPOINT (CALCULATED POINT):

EFF. COOLING SETPOINT (OCCUPIED) =  $nviSetpoint + (DB/2) + Local\_Setpoint\_Adjust$ EFF. COOLING SETPOINT (UNOCCUPIED) = nciSetpoints.UNOCC\_COOL

EXPOSE ON GUI AS ONE POINT THAT UPDATES BASED ON THE UNIT'S ACTUAL OCCUPANCY K. EFFECTIVE HEATING SETPOINT (CALCULATED POINT):

EFF. HEATING SETPOINT (OCCUPIED) =  $nviSetpoint - (DB/2) + Local\_Setpoint\_Adjust$ EFF. HEATING SETPOINT (UNOCCUPIED) = nciSetpoints.UNOCC\_HEAT

EXPOSE ON GUI AS ONE POINT THAT UPDATES BASED ON THE UNIT'S ACTUAL OCCUPANCY L. CALCULATED POINTS DESCRIBED ABOVE SHALL BE PROGRAMMED ON THE BUILDING CONTROLLER (I.E. JACE).

OCCUPIED MODE

A. THE FAN SHALL BE STARTED AND STOPPED UNDER CONTROL OF SOFTWARE BY A TIME SCHEDULE. WHEN THE UNIT IS STARTED, THE FAN SHALL START AND RUN CONTINUOUSLY.

B. THE TIME SCHEDULE SHALL INITIALLY BE OCCUPIED DURING 6AM-6PM M-F.

2. TEMPERATURE CONTROL:

A. THE OCCUPIED AND UNOCCUPIED TEMPERATURE SETPOINTS SHALL BE ESTABLISHED IN THE CONFIGURATION SETPOINT VARIABLE (cSP) AND SHALL BE AS FOLLOWS:

OCCUPIED COOL: 73°F OCCUPIED HEAT: 70°F

UNOCCUPIED COOL: 85°F UNOCCUPIED HEAT: 60°F

B. THE DIFFERENCE BETWEEN THE HEAT AND COOL SETPOINT SHALL BE REFERRED TO AS DEAD-BAND (ZERO-ENERGY BAND).

DEAD-BAND (ZERO-ENERGY BAND) = COOL SETPOINT - HEAT SETPOINT

C. DEFAULT LOCAL SETPOINT ADJUST RANGE SHALL BE  $-3/+3^{\circ}F$  (cSAR) D. THE JACE CONTROLLER SHALL PROVIDE A DEMAND FOR FIRST STAGE COOL WHEN THE SENSED TEMPERATURE IS GREATER THAN ONE-HALF THE PROPORTIONAL BAND (cPB) ADDED TO THE COOL CONFIGURATION SETPOINT:

1ST-STAGE COOL ON = COOL SETPOINT + (1/2 PROPORTIONAL BAND)E. THE JACE CONTROLLER SHALL PROVIDE A DEMAND FOR SECOND STAGE COOL WHEN THE SENSED TEMPERATURE IS GREATER THAN THE COOL CONFIGURATION SETPOINT PLUS ONE—HALF THE

PROPORTIONAL BAND (cPB) ADDED TO THE SECOND STAGE TEMPERATURE DELTA (cD2S):

 $2ND-STAGE\ COOL\ ON\ =\ COOL\ SETPOINT\ +\ (1/2\ PROP.\ BAND\ +\ 2ND\ STAGE\ DELTA)$ F. THE JACE CONTROLLER SHALL REMOVE THE DEMAND FOR FIRST & SECOND STAGE COOL WHEN THE SENSED TEMPERATURE IS LESS THAN ONE-HALF THE PROPORTIONAL BAND SUBTRACTED FROM THE COOL CONFIGURATION SETPOINT:

1ST-STAGE COOL OFF = COOL SETPOINT - (1/2 PROPORTIONAL BAND)

 $2ND-STAGE\ COOL\ OFF\ =\ COOL\ SETPOINT\ -\ (1/2\ PROPORTIONAL\ BAND)$ H. THE JACE CONTROLLER SHALL PROVIDE A DEMAND FOR HEAT WHEN THE SENSED TEMPERATURE IS LESS THAN ONE-HALF THE PROPORTIONAL BAND (cPB) SUBTRACTED FROM THE HEAT CONFIGURATION SETPOINT: HEAT ON = HEAT SETPOINT -(1/2 PROPORTIONAL BAND)

I. THE HEAT OUTPUT SHALL INITIATE TO MAINTAIN HEAT SETPOINT.

J. THE JACE CONTROLLER SHALL REMOVE THE DEMAND FOR HEAT WHEN THE SENSED TEMPERATURE IS GREATER THAN ONE-HALF THE PROPORTIONAL BAND ADDED TO THE HEAT CONFIGURATION SETPOINTS

HEAT OFF = HEAT SETPOINT + (1/2 PROP. BAND)K. DEFAULT PROPORTIONAL BAND VALUE SHALL BE 2°F (cPB).

L. DEFAULT 2ND STAGE DELTA VALUE SHALL BE 2°F (cD2S).

3. VENTILATION CONTROL:

A. UPON UNIT OCCUPANCY (OCCUPIED AND BYPASS/OVERRIDE MODE), OUTSIDE AIR DAMPER SHALL MODULATE OPEN TO PROVIDE THE SCHEDULED OUTSIDE AIR CFM PER THE UNIT SCHEDULE (%-OPEN POSITION SHALL BE PROVIDED BY TAB CONTRACTOR).

B. OUTSIDE AIR DAMPER SHALL REMAIN CLOSED DURING NIGHT SETUP/SETBACK MODES.

C. DISTECH CONTROLLER SHALL PROVIDE MEANS TO OVERRIDE OUTSIDE AIR DAMPER FROM THE HMI.

4. ECONOMIZER CONTROL

A. ECONOMIZER MODE IS PROVIDED BY THE UNIT ECONOMIZER MODULE USING COMPARATIVE ENTHALPY.

ECONOMIZER IS ENABLED WHEN OA ENTHALPY < (RA ENTHALPY -3 BTU/LB)

ECONOMIZER IS DISABLED WHEN OA ENTHALPY > RA ENTHALPY

B. WHEN ECONOMIZING MODE IS ENABLED. THE UNIT IS OPERATING IN THE COOLING MODE AND OA ENTHALPY IS BELOW THE RA ENTHALPY AS DESCRIBED ABOVE. THE ECONOMIZER DAMPER IS MODULATED BETWEEN ITS MINIMUM POSITION AND 100% TO MAINTAIN THE ZONE TEMPERATURE.

C. IF THE ECONOMIZER IS NOT ABLE TO SATISFY THE COOLING SETPOINT, MECHANICAL COOLING WILL BE ENERGIZED. MECHANICAL COOLING WILL NOT START UNTIL THE ECONOMIZER HAS BEEN FULLY OPEN FOR FIVE MINUTES.

5. <u>DEMAND CONTROL VENTILATION:</u>

A. DURING OCCUPIED HRS. THE OUTSIDE AIR DAMPERS SHALL MODULATE OPEN/CLOSE TO MAINTAIN A CO2 LEVEL OF 400 PPM (ADJ) ABOVE CO2 LEVEL. THE MIN/MAX RANGE SHALL BE 200-600 PPM (ADJ). ABOVE THE OUTSIDE CO2 LEVEL.

6. KITCHEN ROOFTOP UNIT OUTDOOR AIR CONTROL

A. THE DDC SHALL RECEIVE A DI STATUS SIGNAL FROM THE KITCHEN HOOD EXHAUST FAN.

A B. DURING OCCUPIED HOURS, AND WHEN KITCHEN HOOD IS OFF, THE ROOFTOP UNIT AIR FLOW SHALL BE CONTROLLED AS DENOTED IN 5 ABOVE, DEMAND CONTROL VENTILATION.

C. WHEN KITCHEN HOOD EXHAUST FAN IS ON, THEN THE MINIMUM OUTDOOR AIR FOR THIS ROOFTOP UNIT SHALL BE AS SCHEDULED. THE OUTDOOR AIR FLOW SHALL BE MEASURED BY A FLOW STATION.

UNOCCUPIED MODE

NIGHT SETUP/SETBACK MODE:

AO-OUTSIDE AIR

DAMPER COMMAND

O/A

A. WHEN THE UNIT IS IN THE UNOCCUPIED MODE AND THE SPACE TEMPERATURE EXCEEDS THE NIGHT UNOCCUPIED COOL/HEAT SETPOINTS, THE UNIT WILL ENABLE IN THE RESPECTIVE COOLING/HEATING MODE UNTIL THE SPACE TEMPERATURE IS SATISFIED.

2. BYPASS MODE: A. WHEN UNIT IN THE UNOCCUPIED MODE, AN OVERRIDE BUTTON SHALL COMMAND UNIT TO THE OCCUPIED MODE FOR A PERIOD OF ONE HOUR (ADJUSTABLE).

B. THE UNIT SHALL RETURN TO ITS PREVIOUS MODE ONCE THE BYPASS TIME HAS ELAPSED.

5. DEHUMIDIFICATION CONTROL (OCCUPIED AND BYPASS/OVERRIDE MODES ONLY):

ST-35ER SMART-STAT IO COUNT

Relay Out Uni In/Out

A. IF SPACE TEMPERATURE IS WITHIN ZERO-ENERGY DEAD-BAND AND SPACE HUMIDITY RISES ABOVE 60%, ENABLE 1ST-STAGE COOL AND HOT-GAS REHEAT. CONTINUE UNTIL SPACE HUMIDITY DECREASES BELOW 55%.

B. IF SPACE HUMIDITY IS ABOVE SETPOINT WHILE ON 1ST OR 2ND STAGE COOL AND SPACE TEMPERATURE FALLS WITHIN ZERO-ENERGY DEAD-BAND, 1ST STAGE COOL SHALL CONTINUE TO OPERATE AND HOT-GAS REHEAT

DDC POINT LIST

→ OUTSIDE AIR FLOW

GAS HEAT CMD

ZONE HUMIDITY

ZONE TEMPERATURE

ENERGY RECOVERY

ZONE SETPOINT ADJUST

SUPPLY FAN START/STOP

OUTSIDE AIR DAMPER CMD

DISCHARGE AIR TEMPERATURE

HOT GAS REHEAT CMD

COMPRESSOR STAGE-1 START/STOP

COMPRESSOR STAGE-2 START/STOP

DO-COMPRESSOR STAGE-1 START/STOP

DO-COMPRESSOR STAGE-2 START/STOP

DUAL STAGE PACKAGED ROOFTOP UNIT WITH

HOT-GAS REHEAT AND SINGLE STAGE GAS HEAT

POINT DESCRIPTION

DUAL STAGE PACKAGED ROOFTOP UNIT WITH OUTSIDE AIR, HOT-GAS REHEAT, AND GAS HEAT

AO = Analog Output, AI = Analog Input, DO = Digital Output, DI = Digital Input

DX

Contact Smart Controls for equipment guestions (800) 893-4846.

Provide Smart-Stat programmable controller Model# ST-35ER Manufactured by Smart Controls.

TAG

SF-C

OA-C

0AD-0

DX1-C

DX2-C

DEH-C

GH-O

 $\mathsf{DA}\mathsf{-}\mathsf{T}$ 

ZN-H

\_

HGRH

ONE TEMPERATURE (BAC-NET)

ZONE SETPOINT (BAC-NET)

ZONE OVERRIDE (BAC-NET)

DISTECH 14 POINT

**PROGRAMMABLE** 

CONTROLLER

ECL-203 SERIES

TYPE

DO

Αl

ΑO

DO

DO

DO

ΑO

Αl

Αl

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DO-HOT GAS REHEAT CMD

AIR FLOW STATION

10K Type-II thermistor

SUPPLY

FAN

RH

Built-in.

Built-in.

Spring-return BELIMO actuator

If unit provided with two stages of cooling

SENVA 3% Room Recessed. Mount above zone sensor (stack).

GAS

DO-SUPPLY FAN START/STOP

ZONE CO2 (BAC-NET)

(ADJACENT TO TEMP SENSOR)

ZONE HUMIDITY (BAC-NET)

AREA SMOKE DETECTOR

BY DIV. 28

INTERLOCK TO STOP SF ---FOR ALL ROOFTOP UNITS

(ADJACENT TO TEMP SENSOR)

TERMINATE DEHUMIDIFICATION CONTROL (DISABLE HOT-GAS REHEAT) UPON A DEMAND FOR COOL OR HEAT.

1

AI-OUTSIDE AIR FLOW

 $\triangle$ 

⚠ 1. UNITS PROVIDING CUMULATIVE SUPPY AIR TO ANY GIVEN SPACE SHALL BE INTERLOCKED WITH THE BUILDING FIRE ALARM SYSTEM TO SHUT-OFF SUPPLY AIR FANS ON SMOKE DETECTION.

GRAPHIC USER INTERFACE THE FOLLOWING POINTS SHALL BE EXPOSED ON THE ASSOCIATED GRAPHICS

EFFECTIVE OCCUPANCY (oOc) -SHOW AS OCCUPIED/UNOCCUPIED

FAN COMMAND (oFanCommand) —SHOW AS START/STOP COOLING CALL (oC) -SHOW AS ON/OFF (50%=STAGE-1 ON; 100%=STAGE-2 ON)

HEATING CALL (oH) -SHOW AS 0-100%

OUTSIDE AIR DAMPER COMMAND -SHOW AS ON/OFF

DISCHARGE AIR TEMPERATURE (oT2) OCCUPIED COOL (cSP)

OCCUPIED HEAT (cSP)

UNOCCUPIED COOL (cSP)

UNOCCUPIED HEAT (cSP) SPACE TEMPERATURE (oT)

SPACE HUMIDITY

LOCAL SETPOINT ADJUST (iUSO)

EFFECTIVE SETPOINT (oESP)

MIN. OUTSIDE AIR DAMPER POSITION SETPOINT OK-TO-ECONOMIZE STATUS -SHOW AS YES/NO

OUTSIDE AIR DAMPER OVERRIDE

CONTRACTOR SHALL PROVIDE PROGRAM IN TRIDIUM—JACE BUILDING CONTROLLER TO ISSUE CALL FOR OK-TO-ECONOMIZE TO SMART-STAT WHEN GLOBAL OUTDOOR AIR ENTHALPY IS EQUAL OR BELOW 28 BTU/LB (ADJUSTABLE) USING NEW GLOBAL OUTSIDE AIR TEMPERATURE AND HUMIDITY SENSORS, PROGRAM SHALL BE PROVIDED WITH A 2 BTU/LB DEAD-BAND TO PREVENT MODE SHORT-CYCLING.

CONTRACTOR TO PROVIDE NEW OUTSIDE AIR TEMPERATURE AND HUMIDITY SENSORS, ASSOCIATED WIRING AND CONDUIT. CONNECT SENSORS INTO ONE OF THE NEW DISTECH CONTROLLERS. COORDINATE LOCATION OF NEW SENSORS WITH OWNER'S REPRESENTATIVE.

COMMENT

DO-AUX. HEAT COMMAND

AI-DISCHARGE AIR TEMP

S/A

G/SK/TB 12/18/18

JG/SK/TB 12/29/18

REVISION DESCRIPTION

ADDENDUM NO.

ADDENDUM NO. 2

NO DWN CHK DATE

AH/GB/JR

Tom Borkowski

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**AUSTIN I.S.D** 

DEPARTMENT OF

CONSTRUCTION MANAGEMEN'

1/3/19

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Engineering, LLC. 5920 W. William Cannon Bldg. 7, Suite 200 Austin, Texas 78749 (512) 329-5774. www.skaneng.com TBPE Firm No. F-2356 SKE PROJECT # 19-0015-CASEY

Filename: AS NOTED Drawn By: AH/GB/JR Checked By: JG/SK/TB Date: 11/28/2018

**DWG Number:** 

RTU CONTROL DIAGRAMS

NOT TO SCALE

R/A

1. UNITS ARE SINGLE ZONE, CONSTANT VOLUME SPLIT DX HEAT PUMPS EQUIPPED WITH ELECTRO-MECHANICAL CONTROLS, ONE OR TWO ON/OFF STAGES OF DX COOLING, OUTSIDE AIR DAMPER AND ONE OR TWO STAGES OF ELECTRIC HEATING.

2. ALL CONTROL DEVICES, SENSORS, AND ACTUATORS DESCRIBED HEREIN SHALL BE FURNISHED AND INSTALLED BY THE CONTROLS CONTRACTOR, UNLESS OTHERWISE NOTED. REFER TO SCHEMATIC AND DDC POINT LIST.

3. UPON PROJECT COMPLETION CONTRACTOR SHALL PROVIDE OWNER WITH IMPLEMENTED PROFILE DOCUMENTATION INCLUDING PROFILE QUICK REFERENCE, APB, NXE, XIF FILES, ETC.

SMART-STAT POINTS

1. THE FOLLOWING MINIMUM POINTS FROM THE SMART-STAT SHALL BE AVAILABLE FOR MONITORING AND/OR ADJUSTMENT ON THE HMI:

A. iOc: SETS THE OCCUPANCY MODE OF THE THERMOSTAT (occupied; unoccupied)

B. iUSO: INDICATES THE VALUE OF THE LOCAL SETPOINT ADJUST.

C. iESD: SETS THE THERMOSTAT FOR EMERGENCY SHUTDOWN (0=normal; 1=shutdown).

D. ot: INDICATES THE VALUE OF THE LOCAL SPACE TEMPERATURE SENSOR.

oOc: INDICATES THE STATUS OF THE OCCUPANCY STATE. oESP: INDICATES THE CURRENT EFFECTIVE SETPOINT VALUE FOR TEMPERATURE CONTROL.

oESP = (Heat/Cool Setpoint) + iUSO

G. oBT: INDICATES THE CURRENT VALUE OF THE TIME IN SECONDS REMAINING ON THE BYPASS TIMER.

H. oFanCommand: INDICATES THE STATE OF THE FAN COMMAND (0=off; 1=on). oFanStatus: INDICATES THE STATE OF THE FAN STATUS (0=off; 1=on).

oFN: INDICATES THE CURRENT STATE OF THE FAN ALARM (0=normal; 1=alarm)

K. oC: INDICATES THE CURRENT DEMAND FOR COOL (0=no demand; 100%=demand). oh: INDICATES THE CURRENT DEMAND FOR HEAT (0-100%).

N. oT2: INDICATES THE VALUE OF THE TEMPERATURE MEASURED FROM UIO4.

cSP: DEFINES THE OCCUPIED COOL, HEAT AND UNOCCUPIED COOL AND HEAT SETPOINTS.

P.  ${\sf cPB}$ : DEFINES THE PROPORTIONAL BAND AROUND THE DISPLAYED SETPOINT Q. cD2S: DEFINES THE 2ND STAGE TEMPERATURE DELTA FOR 2ND STAGE COOL/HEAT

R. cO: DEFINES THE OFFSET ADDED TO THE MEASURED TEMPERATURE FOR CALIBRATION.

S. cSAR: DEFINES THE SETPOINT ADJUST RANGE THAT A USER IS ALLOWED TO ADJUST THE OCCUPIED SETPOINT VALUES ABOVE OR BELOW THE VALUE ESTABLISHED BY THE CONFIGURATION SETPOINT (cSP).

cBT: DEFINES THE DURATION OF THE BYPASS TIME IN SECONDS.

U. cF: DEFINES THE FAN MODE OPERATION (0=auto; 1=continuous).

V. cCO: DEFINES IF THE REVERSING VALVE IS ENERGIZED WITH A DEMAND FOR COOL (0) OR HEAT (1).

W. cDs: DEFINES THE DISPLAY OF TEMPERATURE IN FAHRENHEIT (0) OR CELSIUS (1)

X. cAH: DEFINES THE APPLICATION AS AN AIR (0) OR WATER (1) SOURCED HEAT PUMP.

Y. cCST: DEFINES THE TIME IN SECONDS FOR THE FAN ALARM.

Z. cCS: DISABLES (0) OR ENABLES (1) THE FUNCTIONAL OPERATION OF UIO3 AS AN INPUT FOR FAN ALARM. THE

AA. cT2: DEFINES IF THE THERMOSTAT MEASURES, CONTROLS AND DISPLAYS THE ON-BOARD TEMPERATURE SENSOR (0) OR THE REMOTE TEMPERATURE SENSOR (1). DEFAULT SHALL BE ON-BOARD SENSOR (0).

AB. cXX: DEFINES IF UNIT IS PROVIDED WITH ECONOMIZER (0=NO ECONOMIZER; 1=ECONOMIZER). AC. cXX: DEFINES THE MINIMUM OUTSIDE AIR DAMPER POSITION FOR VENTILATION (0-100% OPEN).

AD. iXX: INDICATES IF UNIT IS "OK-TO-ECONOMIZE" (0=FALSE; 1=TRUE)

2. ALL POINTS SHALL BE PROVIDED WITH DESCRIPTIONS ON THE HMI TO INDICATE THEIR PURPOSE.

### OCCUPIED MODE

1. FAN CONTROL:

A. THE FAN SHALL BE STARTED AND STOPPED UNDER CONTROL OF SOFTWARE BY A TIME SCHEDULE. WHEN THE UNIT IS STARTED, THE FAN SHALL START AND RUN CONTINUOUSLY (cF).

SMART-STAT SHALL ILLUMINATE LEFT-DECIMAL POINT ANYTIME UNIT IS IN THE OCCUPIED OR BYPASS MODE. C. IF UNIT REPLACING AN OLD UNIT, ADD UNIT TO EXISTING ASSOCIATED TIME SCHEDULE. OTHERWISE, PROVIDE NEW TIME SCHEDULE [INITIAL SCHEDULE: 6AM-6PM M-F]. GROUP ALL UNITS SERVING SAME AREA/WING INTO A

2. TEMPERATURE CONTROL:

SINGLE TIME SCHEDULE.

A. THE OCCUPIED AND UNOCCUPIED TEMPERATURE SETPOINTS SHALL BE ESTABLISHED IN THE CONFIGURATION SETPOINT VARIABLE (cSP) AND SHALL BE AS FOLLOWS:

OCCUPIED COOL: 73°F

OCCUPIED HEAT: 70°F

iii. UNOCCUPIED COOL: 85°F iv. UNOCCUPIED HEAT: 60°F

B. THE DIFFERENCE BETWEEN THE HEAT AND COOL SETPOINT SHALL BE REFERRED TO AS DEAD-BAND (ZERO-ENERGY BAND).

DEAD-BAND (ZERO-ENERGY BAND) = COOL SETPOINT - HEAT SETPOINT

C. DEFAULT LOCAL SETPOINT ADJUST RANGE SHALL BE  $-3/+3^{\circ}F$  (cSAR).

D. THE SMART-STAT SHALL PROVIDE A DEMAND FOR FIRST STAGE COOL WHEN THE SENSED TEMPERATURE IS GREATER THAN ONE—HALF THE PROPORTIONAL BAND (cPB) ADDED TO THE COOL CONFIGURATION SETPOINT:  $1ST-STAGE\ COOL\ ON\ =\ COOL\ SETPOINT\ +\ (1/2\ PROPORTIONAL\ BAND)$ 

E. THE SMART-STAT SHALL PROVIDE A DEMAND FOR SECOND STAGE COOL WHEN THE SENSED TEMPERATURE IS GREATER THAN THE COOL CONFIGURATION SETPOINT PLUS ONE-HALF THE PROPORTIONAL BAND (cPB) ADDED TO THE SECOND STAGE TEMPERATURE DELTA (cD2S):

 $2ND-STAGE\ COOL\ ON\ =\ COOL\ SETPOINT\ +\ (1/2\ PROP.\ BAND\ +\ 2ND\ STAGE\ DELTA)$ THE SMART-STAT SHALL REMOVE THE DEMAND FOR FIRST & SECOND STAGE COOL WHEN THE SENSED TEMPERATURE IS LESS THAN ONE-HALF THE PROPORTIONAL BAND SUBTRACTED FROM THE COOL CONFIGURATION SETPOINT:

 $1ST-STAGE\ COOL\ OFF\ =\ COOL\ SETPOINT\ -\ (1/2\ PROPORTIONAL\ BAND)$  $2ND-STAGE\ COOL\ OFF\ =\ COOL\ SETPOINT\ -\ (1/2\ PROPORTIONAL\ BAND)$ 

H. THE SMART-STAT SHALL PROVIDE A DEMAND FOR HEAT WHEN THE SENSED TEMPERATURE IS LESS THAN ONE-HALF THE PROPORTIONAL BAND (cPB) SUBTRACTED FROM THE HEAT CONFIGURATION SETPOINT:

HEAT ON = HEAT SETPOINT -(1/2 PROPORTIONAL BAND)

THE ELECTRIC HEAT OUTPUT SHALL INITIATE TO MAINTAIN HEAT SETPOINT. J. THE SMART-STAT SHALL REMOVE THE DEMAND FOR HEAT WHEN THE SENSED TEMPERATURE IS GREATER THAN ONE-HALF THE PROPORTIONAL BAND ADDED TO THE HEAT CONFIGURATION SETPOINT:

HEAT OFF = HEAT SETPOINT + (1/2 PROP. BAND)K. DEFAULT PROPORTIONAL BAND VALUE SHALL BE 2°F (cPB).

L. DEFAULT 2ND STAGE DELTA VALUE SHALL BE 2°F (cD2S).

# 3. **VENTILATION CONTROL:**

A. UPON UNIT OCCUPANCY (OCCUPIED AND BYPASS/OVERRIDE MODE), OUTSIDE AIR DAMPER SHALL MODULATE OPEN TO PROVIDE THE SCHEDULED OUTSIDE AIR CFM PER THE UNIT SCHEDULE (%-OPEN POSITION SHALL BE PROVIDED BY TAB CONTRACTOR).

B. OUTSIDE AIR DAMPER SHALL REMAIN CLOSED DURING NIGHT SETUP/SETBACK MODES.

C. SMART-STAT SHALL PROVIDE MEANS TO OVERRIDE OUTSIDE AIR DAMPER FROM THE HMI.

**UNOCCUPIED MODE** NIGHT\_SETUP/SETBACK\_MODE

WHEN THE UNIT IS IN THE UNOCCUPIED MODE AND THE SPACE TEMPERATURE EXCEEDS THE UNOCCUPIED COOL/HEAT SETPOINTS, THE UNIT SHALL ENABLE IN THE RESPECTIVE COOLING/HEATING MODE UNTIL THE SPACE TEMPERATURE DECREASES/INCREASES BY 5°F AT WHICH POINT UNIT SHALL RETURN TO ITS PREVIOUS MODE OF OPERATION.

OUTSIDE AIR DAMPER SHALL REMAIN CLOSED DURING THIS MODE.

A. WHEN THE UNIT IN THE UNOCCUPIED MODE, PRESSING THE MODE PUSH-BUTTON ON THE SMART-STAT SHALL COMMAND UNIT TO THE OCCUPIED MODE FOR A PERIOD OF ONE HOUR (cBT)

THE UNIT SHALL RETURN TO ITS PREVIOUS MODE ONCE THE BYPASS TIME HAS ELAPSED (oBT).

1. UNITS PROVIDING CUMULATIVE SUPPY AIR TO ANY GIVEN SPACE SHALL BE INTERLOCKED WITH THE BUILDING FIRE

ALARM SYSTEM TO SHUT-OFF SUPPLY AIR FANS ON SMOKE DETECTION.

**GRAPHIC USER INTERFACE** 

THE FOLLOWING POINTS SHALL BE EXPOSED ON THE ASSOCIATED GRAPHIC:

EFFECTIVE OCCUPANCY (oOc) -SHOW AS OCCUPIED/UNOCCUPIED

FAN COMMAND (oFanCommand) —SHOW AS START/STOP

COOLING CALL (oC) -SHOW AS ON/OFF (50%=STAGE-1 ON; 100%=STAGE-2 ON)

HEATING CALL (oH) -SHOW AS 0-100%

OUTSIDE AIR DAMPER COMMAND -SHOW AS ON/OFF

DISCHARGE AIR TEMPERATURE (oT2)

OCCUPIED COOL (cSP) OCCUPIED HEAT (cSP)

UNOCCUPIED COOL (cSP)

UNOCCUPIED HEAT (cSP)

SPACE TEMPERATURE (oT)

SPACE HUMIDITY

LOCAL SETPOINT ADJUST (iUSO)

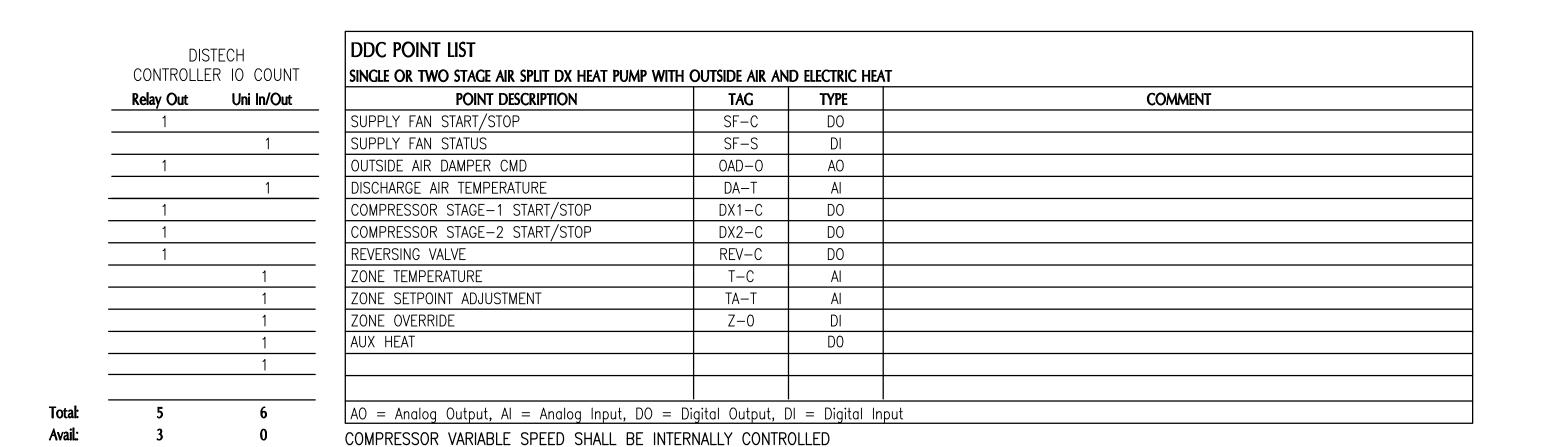
EFFECTIVE SETPOINT (oESP) SPACE HUMIDITY SETPOINT

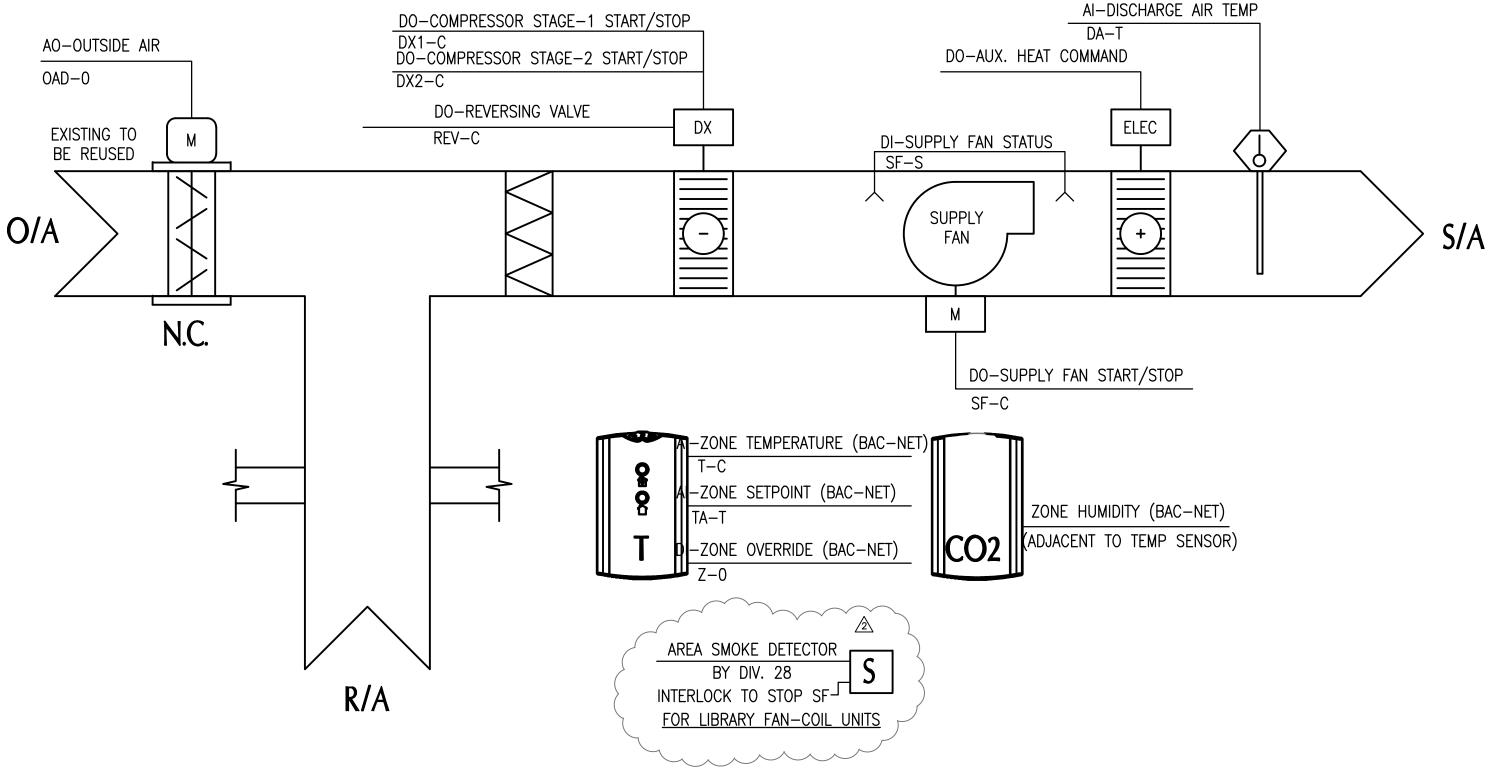
MIN. OUTSIDE AIR DAMPER POSITION SETPOINT

OK-TO-ECONOMIZE STATUS -SHOW AS YES/NO

OUTSIDE AIR DAMPER OVERRIDE

CONTRACTOR SHALL PROVIDE PROGRAM IN TRIDIUM-JACE BUILDING CONTROLLER TO ISSUE CALL FOR OK-TO-ECONOMIZE TO SMART-STAT WHEN GLOBAL OUTDOOR AIR ENTHALPY IS EQUAL OR BELOW 28 BTU/LB (ADJUSTABLE) USING EXISTING GLOBAL OUTSIDE AIR TEMPERATURE AND HUMIDITY SENSORS. PROGRAM SHALL BE PROVIDED WITH A 2 BTU/LB DEAD-BAND TO PREVENT MODE SHORT-CYCLING.





SINGLE AND DUAL STAGE HEAT PUMP WITH OUTSIDE AIR & AUX. ELECTRIC HEAT

NOT TO SCALE

REVISION DESCRIPTION DATE CHK 12/29/18 ADDENDUM NO. 2

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DEPARTMENT OF CONSTRUCTION MANAGEMEN'

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