

ADDENDUM NO.: 1

DATE OF ADDENDUM: 11/21/14

**Brownell Hall Mechanical/Electrical Renovations  
Southern Connecticut State University  
BI – RS-307**

Original Bid Due Date / Time:

12/3/14

1:00pm

**TO: Prospective Bid Proposers:**

This Addendum forms part of the "Contract Documents" and modifies or clarifies the original "Contract Documents" for this Project dated 10/2/13. Prospective Bid Proposers shall acknowledge receipt of the total number the Addenda issued for this Project on the space provided on Section 00 41 00 Bid Proposal Form. Failure to do may subject Bid Proposers to disqualification.

The following clarifications are applicable to drawings and specifications for the project referenced above.

**Item 1**

**Closeout Procedures:**

In Section 017419, Paragraph J is deleted.  
In Section 017700, Change Paragraph F to Paragraph E  
In Section 017700, Change Paragraph G to Paragraph F  
In Section 017700, Change 2<sup>nd</sup> Paragraph F to Paragraph G  
In Section 017823, Paragraph C is deleted

**Item 2**

**Warranties and Bonds:**

In Section 017830, Paragraph L add/revise the following:  
Revise Item 1 to 5 years  
Revise Item 2 to Section 223000, Plumbing Pumps, 5 Years  
Revise Item 3 to Chiller  
Add Item 8, Section 232123, HVAC Pumps, 5 years  
Add Item 9, Section 232500, Chemical Feed, 2 years  
Add Item 10, Section 233423, Exhaust Fans, 5 years  
Add Item 11, Section 236513, Cooling Tower, 5 years  
Add Item 12, Section 237313, Air Handling Unit, 5 years  
Add Item 13, Section 238101, Fancoil Units, 5 years  
Add Item 11, Section 262923, Variable Frequency Drives, 3 years

**Item 3**

**Basic Mechanical Materials and Methods:**

In Section 230505, Paragraphs 1.11a and 1.16 shall be revised to include warranties with guarantees, with each for a period of eighteen (18) months (unless otherwise noted) to match Section 017830, paragraph K

**Item 4**

**Meters and Gauges for HVAC Piping:**

In Section 230519, Paragraph 1.04.D add the following:  
2. Extra Gauge Oil for inclined Monometers: One Bottle  
3. Extra Pressure Gauges: one of each type and size

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**Item 5**

**HVAC Equipment Insulation**

In Section 230716, add Paragraph 1.04, Submittals  
Include for all insulation types:

- Requirements of Section 01300
- Product Data
- Installation Procedures

**Item 6**

**Hydronic Piping**

In Section 232113, Paragraph 1.04.G, add the following:  
2. Valve Repacking Kits: One for each size and type of valve

**Item 7**

**HVAC Water Treatment**

In section 232500, Paragraph 1.03.I, add the following:  
1. Sufficient Chemicals for treatment and testing during required maintenance period

**Item 8**

**Forced-Draft Cooling Towers**

In Section 236513, Paragraph 1.04, add the following:

- B. Product Data
- C. Shop Drawings
- D. Manufacturers Instructions & Certificate
- E. Operation and Maintenance Data
- F. Warranty
- G. Maintenance Materials
  - 1. Extra Fan Belts: One Set
  - 2. Extra Spray Nozzles: One for each cell
  - 3. Extra Access Door Gaskets: One for each door
  - 4. Extra Valve Seals: One for each make-up valve

**Item 9**

**Cleaning and Testing Gear**

In Sections 260110, add Paragraph 1.04, Submittals

- 1. Submit per Section 013000
- 2. Submit report as described in 3.01.E

**Item 10**

**Lighting and Control Devices**

In Section 260923, Paragraph 1.04, add the following:  
F. Operation and Maintenance Manual

**Item 11**

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**Fuses**

In Section 262813, Paragraph 1.04.C, add the following:

2. Extra Fuses: One set of three for each type and size
3. Fuse Pullers: One set compatible with each type

**Item 12**

**Interior Lighting**

In Section 265100, Paragraph C 1.04, add the following:

B. for Interior Luminaries, Emergency Lighting, Exit Signs, Power Supply Unit, Lamps and Accessories, submit the following:

1. Product data
2. Shop Drawings
3. Operation and Maintenance Manuals

**Item 13**

**Vibration and Seismic Controls for HVAC Piping and Equipment**

In Section 220548, Paragraph 1.03.C, add the following:

7. Provide Seismic layout drawings, certification letter and calculations including seismic restraint types and locations stamped, sealed and signed by a structural Professional Engineer licensed in the State of Connecticut.

**Item 14**

**Vibration and Seismic Controls for HVAC Piping and Equipment**

In Section 230548, Paragraph 1.03.C, add the following:

7. Provide Seismic layout drawings, certification letter and calculations including seismic restraint types and locations stamped, sealed and signed by a structural Professional Engineer licensed in the State of Connecticut.

**Item 15**

**DWG MD1/Note # MD6**

On Drawing MD1, Note MD6, Contractor to carry the following unit prices per Linear Foot.:

<b>Piping</b>	<b>Material</b>	<b>Labor</b>
8"	\$95.00	\$68.00
6"	\$58.00	\$51.50
4"	\$30.00	\$32.00
3"	\$18.00	\$19.25
2 ½"	\$14.05	\$16.60
2"	\$8.95	\$12.95
1 ½"	\$5.75	\$ 9.30
1 ¼"	\$5.75	\$ 9.30
1"	\$4.64	\$ 8.70
¾"	\$3.17	\$ 7.55

<b>Piping Insulation</b>	<b>Material</b>	<b>Labor</b>
8"	\$4.15	\$7.35
6"	\$2.54	\$ 6.15
4"	\$2.12	\$4.91
3"	\$1.60	\$4.09

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2 1/2"	\$1.50	\$3.88
2"	\$1.32	\$3.68
1 1/2"	\$1.13	\$3.51
1 1/4"	\$1.13	\$3.51
1"	\$1.04	\$3.35
3/4"	\$0.97	\$3.20

**Item 16**

**DWG MD1/Note # MD14**

On Drawing MD1, Note MD14, add the following:

"Remove, reverse, reinstall and seal louver as required, include bird screen"

**Item 17**

**DWG M1/Note # M3**

On Drawing M1, General Note 1, add the following:

"Contractor shall be responsible for any and all demolition of building elements if required/desired for creating access for chiller installation, as well as all required reconstruction to restore building elements to original condition"

**Item 18**

**DWG M1/Note # M19**

On Drawing M1, for RLDS note (M19) and SCBA note (Storage Room 107) include product selection and specification as per attachments. Equipment provided by Mechanical Contractor, wired by Electrical Contractor and all alarm programming in monitor and BAS connections by ATC Contractor.

**Item 19**

**DWG M2/Note # M23**

On Drawing M2, Note M23, add the following:

"Masonry base to be replaced in like kind."

**Item 20**

**DWGS M2, M3/Note # M24**

On Drawings M2 & M3, Contractor to carry the following unit prices:

<u>Opposed Blade Dampers</u>	<u>Material</u>	<u>Labor</u>
12x12	\$29.50	\$60.00

<u>Exhaust Grilles</u>	<u>Material</u>	<u>Labor</u>
12x12	\$26.50	\$60.00

**Item 21**

**DWG M4/Note # M32**

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On Drawing M4, Note M32, add the following:

"Provide all roofing work as required by owner's approved roofing contractor, maintain all warranties."

**Item 22**

**DWG M5/Note # Detail 7**

On Drawing M5, Detail 7, add the following:

"Heat Exchanger Drains shall be piped to nearest floor drain."

**Item 23**

**DWG E1/Note # E19**

On all Electrical Drawings referencing Supplemental Bids, Coordinate the following:

- Supplemental Bid A is referenced as #1 on Bid Release Form
- Supplemental Bid B is referenced as #2 on Bid Release Form

**Item 24**

**DWG E5 /Note# Detail 1**

On Drawing E5, Detail 1, add the following:

"Provide all roofing work as required by owner's approved roofing contractor, maintain all warranties."

**Item 25**

**DWG E6/Note # Detail 3 Note 1**

On Drawing E6, Detail 3, Contractor to carry the following unit prices Per Linear foot:

<b>Electrical Conduit</b>	<b>Material</b>	<b>Labor</b>
1 1/4"	\$4.35	\$6.10
1"	\$3.53	\$5.35
3/4"	\$2.46	\$4.74

**Item 26**

**Miscellaneous**

Project Contract Administrator shall be the following:

The Morganti Group, 100 Mill Plain Road, Danbury, CT 06811. (Fax): (203) 830-4478

**Item 27**

**Miscellaneous**

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Pre-bid meeting attendance log attached for reference

**Item 28**

**Temporary Facilities and Controls**

In section 051213, Paragraph C, the following is deleted:

“The General Contractor shall supply the Owner’s Representative and the Owner office or trailer(s) with a water cooler for hot and cold water”.

**Item 29**

**Temporary Facilities and Controls**

In section 051213, Paragraph C.1, the following is revised:

State User Agency Provided Field Offices: The State User Agency will furnish, without charge, one (1) room for the Owner’s Representative and the Owner office use within Brownell Hall. The General Contractor shall provide and install a 5-lb ABC fire extinguisher, an approved first aid kit and a water cooler for hot and cold water. The General Contractor shall be responsible for furniture and shall keep this area clean and return it to its original condition after use. The General Contractor shall provide the following furniture and Equipment, which will remain his property. The furniture may be used but shall be in good condition as judged by the Owner and Construction Administrator.

**Item 30**

**Temporary Facilities and Controls**

In section 051213, Paragraph C.1.15, the following is added:

One (1) Copy Machine/Laser printer with automatic stapling, copying and printing capability for letter sized paper (8 ½ inches x 11 inches), legal size (11 inches x 14 inches) and ledger size (11 inches x 17 inches), ability to enlarge and reduce, with collation up to ten (10) sets, duplex copying (both sides).

**Item 31**

**DWG MD1/Note # MD8, include the following:**

“Remove concrete housekeeping pad complete”.

**Item 32**

**DWG M1/Note # M12, revise as follows:**

“Provide new concrete housekeeping pad for all new mechanical equipment, sizes as required. Field verify prior to installation. See attached for specifications and detail.”

**Item 33**

**RFI Responses, contractor to incorporate the following:**

- Provide Switchgear test and Arc Flash Study Section 260110
- Horizontal branch takeoffs for all FCU risers to remain, provide new piping connections as per 6/M5 (typical)
- Each FCU stack has it’s own branch takeoff, disregard sizes per Drawing M2, provide new piping connections with sizes as per 6/M5 (typical)
- (3) sets of risers shown in room Pickup 1150 are for: 1. FC-A only in Room 1150, 2. Living Room 200, 3<sup>rd</sup> Floor FC-C, 4<sup>th</sup> Floor FC-D, 3. FC-B each in Bedroom 300, 3<sup>rd</sup> & 4<sup>th</sup> Floors

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- As per installation drawings dated 10/28/92, gas service provided only for domestic hot water boiler – cut, cap and remove per plans. Contractor to verify prior to construction
- Duct insulation specification as per Section 230113, minimum 1-1/2" thick
- Mechanical joining system such as 'Pro-Press' NOT allowed
- Existing FCU pipe risers are within integral stackable fancoil chase enclosures

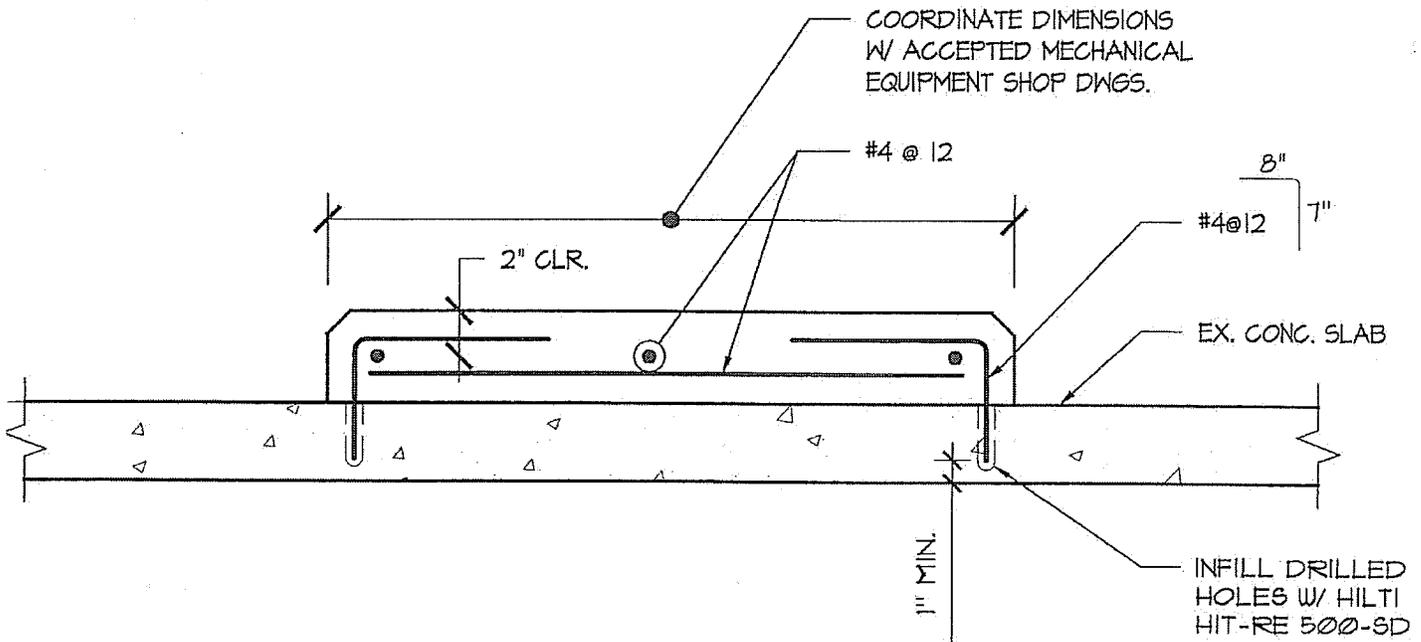
All questions must be in writing (not phone or e-mail) and must be forwarded to the consulting Architect/Engineer (Aztech Engineers, Inc. Fax # 860-549-2572) with copies sent to the CT DCS Project Manager (Thomas Surprenant Fax # 860-713-7270) and Construction Manager (Morganti Fax # 203-830-4477)

**End of Addendum 1**



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**Mellanee Walton, Associate Fiscal Administrative Officer**  
**Department of Administrative Services**  
**On Behalf of the Division of Construction Services**



## TYPICAL EQUIPMENT PAD DETAIL

### CAST-IN-PLACE CONCRETE NOTES

1. PROVIDE CONCRETE WITH THE FOLLOWING PROPERTIES IN THE LOCATIONS INDICATED:

LOCATION	STRENGTH (F'c)	AGGREGATE
HOUSEKEEPING PAD	3000 PSI	NORMAL WEIGHT

2. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60.
3. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 WITH A MINIMUM YIELD STRENGTH OF 75 KSI. LAP WIRE MESH A MINIMUM OF 8-INCHES AND WIRE TOGETHER.
4. ALL DETAILING, FABRICATION, AND INSTALLATION OF REINFORCING STEEL SHALL COMPLY WITH THE LATEST ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315.
5. MINIMUM CONCRETE COVER FOR REINFORCEMENT SHALL BE PER SECTION 7.7.1 OF ACI 318, UNLESS OTHERWISE INDICATED OR SHOWN.
6. ALL REINFORCEMENT SHALL BE SECURELY TIED IN PLACE TO PREVENT DISPLACEMENT BY CONSTRUCTION TRAFFIC OR CONCRETE. TIE WIRE SHALL BE 16 GAUGE CONFORMING TO ASTM A82.

SECTION 23 64 16

REFRIGERANT MANAGEMENT SPECIFICATION

PART 1 GENERAL

1.01 REFERENCES

- A. ASHRAE 15-1992 - Safety Code for Mechanical Refrigeration.
- B. ANSI/ASHRAE 34-1992 - Number Designation and Safety Classification of Refrigerants.
- C. ASHRAE Guideline 3-1990 - Reducing Emissions of Fully Halogenated Chlorofluorocarbon (CFC) Refrigerants in Refrigeration and Air-conditioning Equipment and Applications.
- D. ANSI/ASME SEC 8 - Boiler and Pressure Vessel Code.

1.02 SCOPE

- A. The purpose of this Mechanical Equipment Room (MER) Refrigerant Management System is to provide the mechanical equipment room and its occupants with safe and hygienic environmental conditions per ASHRAE 15-1992 - Safety Code for Mechanical Refrigeration. Additionally it shall help to eliminate or minimize the release of refrigerants to the atmosphere and maintain equipment operating efficiencies to minimize the environmental impact of equipment operation per ASHRAE Guideline 3-1990 - Reducing Emissions of Fully Halogenated Chlorofluorocarbon (CFC) Refrigerants in Refrigeration and Air-conditioning Equipment and Applications.

1.03 SUBMITTALS

- A. The BAS contractor shall submit a copy of the ASHRAE Guideline 3 report for engineer approval at the time of system submittals.

PART 2 PRODUCTS

2.01 REFRIGERANT MANAGEMENT PRODUCTS

- A. Refrigerant Monitor
- B. Multi-Point Scanner
- C. Oxygen Depletion Sensor
- D. Chiller Pressurization Control System
- E. Chiller Resealing Relief System
- F. Self Contained Breathing Apparatus

PART 3 EXECUTION

PART 4 SEQUENCE OF OPERATIONS

4.01 Purge Monitoring

- A. The MER Refrigerant Management System shall monitor the operation of each chiller purge unit and log the following information:
  - 1. Purge Alarm/Failure contacts to provide operator notification of any malfunction of unit operation.
  - 2. Purge pump out compressor 24 hour run time.
  - 3. Initiate an alarm when 24 hour purge pump out compressor runtime exceeds 5 minutes on any chiller. Time limit at which alarm occurs shall be operator editable individually for each chiller
  - 4. Run time/Maintenance to provide the operator notification of required maintenance including:
    - a. Semi-annual air-cooled condenser cleaning
    - b. Annual purge tank service, filter dryer core replacement and controls calibration.

4.02 Refrigerant Concentration Monitoring

- A. The MER Refrigerant Management System shall monitor the operation of each Refrigerant Concentration Monitor for control and logging as follows

1. Initiate emergency ventilation sequence in section 4.07 of this specification.
2. Instantaneous MER refrigerant concentration in Parts Per Million (ppm).
3. Initiate an alarm when MER refrigerant concentration exceeds the rated AEL 500 ppm for the refrigerant being monitored. The alarm limit shall be operator editable.
4. Initiate a warning when MER refrigerant concentration exceeds 20 ppm of the rated AEL for the refrigerant being monitored as a warning that a refrigerant leak exists. The warning limit shall be operator editable.
5. Initiate an alarm when MER refrigerant concentration exceeds the rated EEL 1000 ppm of the refrigerant being monitored as an alarm that a refrigerant spill has occurred or that a leak exists. The warning limit shall be operator editable.
6. The BAS system shall maintain reports for operator viewing to assist in refrigerant asset management. As a minimum the BAS shall log the data listed below. All monthly data shall be logged in the BAS systems for 12 months.
  - a. Equipment Room Refrigerant Concentration: current, daily maximum and average, monthly maximum and average.
  - b. Chiller Starts & Run Time: daily and monthly totals
  - c. Chiller Purge Exhaust Compressor Starts and Run Time: daily and monthly totals (Note: Applicable for Low Pressure Refrigerant Chillers Only)
  - d. Chiller Average Run Load Amperage: current, daily average and monthly average.
  - e. Chiller Setpoint: current, daily average and monthly average.
  - f. Leaving Chilled Water Temperature: current, daily average and monthly average.
  - g. Difference Between Entering and Leaving

Chilled Water Temperatures: current, daily average and monthly average.

- h. Evaporator Refrigerant Temperature: current, daily average and monthly average.
- i. Chilled Water to Refrigerant Temperature Approach: current, daily average and monthly average.
- j. Leaving Condenser Water Temperature: current, daily average and monthly average.
- k. Difference Between Entering and Leaving Condenser Water Temperatures: current, daily average and monthly average.
- l. Condenser Refrigerant Temperature: current, daily average and monthly average.
- m. Condenser Water to Refrigerant Temperature Approach: current, daily average and monthly average.

#### 4.03 Catastrophic Loss Of Refrigerant

- A. The BAS system shall monitor each chiller's [condenser [and evaporator] refrigerant pressure] [condenser and evaporator; entering and leaving water temperatures] and provide an alarm of impending loss of refrigerant charge because of excessive pressure.

#### 4.04 Chiller Performance Monitoring

- A. The BAS system shall monitor the parameters of the chiller operation as shown below and in the points list to allow operation within ASHRAE Guideline 3. The chiller performance report shall automatically print on an hourly basis.
- B. The BAS system shall maintain reports for operator viewing to assist in chiller performance monitoring. As a minimum the BAS shall log the data listed below. All monthly data shall be logged in the BAS systems for 12 months.
  - 1. Unit operating mode
  - 2. Unit diagnostic status
  - 3. Chiller Starts & Run Time: daily and monthly totals

4. Chiller Purge Compressor Starts and Run Time: daily and monthly totals (Note: Applicable only for low pressure refrigerant chillers.)
5. Chiller Setpoint: Current, daily average and monthly average.
6. Leaving Chilled Water Temperature: Current, Daily average and Monthly average.
7. Chilled Water Delta T: Current, daily average and monthly average.
8. Evaporator Refrigerant Temperature: current, daily average and monthly average.
9. Chilled Water to Refrigerant Temperature Approach: current, daily average and monthly average.
10. Leaving Condenser Water Temperature: current, daily average and monthly average.
11. Condenser Water Delta T: Current, daily average and monthly average.
12. Condenser Refrigerant Temperature: current, daily average and monthly average.
13. Condenser Water to Refrigerant Temperature Approach: current, daily average and monthly average.
14. Chiller Current Limit Setpoint: current, daily average and monthly average.
15. Chiller Run Load Amperage: current, daily average and monthly average.
16. Chiller Individual Phase RLA: current, daily average and monthly average
17. Chiller Oil Sump Temperature: current, daily average and monthly average
18. Chiller Differential Oil Pressure: current,

daily average and monthly average

19. Motor Winding Temperatures - all three phases:  
current, daily average and monthly average

#### 4.05 Mechanical Equipment Room Ventilation

- A. NORMAL MODE During normal operation the BAS shall control the mechanical equipment room (MER) AHU to maintain the MER temperature at 85 F for operator comfort whenever the equipment room is occupied. Temperature setpoint shall be operator adjustable.
- B. EMERGENCY VENTILATION MODE - When an excessive concentration of refrigerant is sensed in the MER the BAS shall turn the AHU in the high speed purge mode. The purge mode shall:
  1. Provide a ventilation exhaust rate not less than that specified ASHRAE 15-1992 - Safety Code for Mechanical Refrigeration.
  2. Provide sufficient make-up air to replace air being exhausted. Make-up shall be 100% outside air, conditioned as required to avoid damage to the equipment in the equipment room.
  3. Level-1 Alarm (Warning Strobe and alarm to DDC). Refrigerant PPM =20 PPM
  4. Level-2 Alarm (Exhaust EF-9 Starts). Refrigerant PPM =500 PPM
  5. Level-3 Alarm (Evacuate ). Refrigerant PPM = 1000
- C. SELF CONTAINED BREATHING APPARATUS
  1. Ayon Safety #EN137, or approved equal.

END OF SECTION

SECTION 23 64 16

REFRIGERANT MANAGEMENT SPECIFICATION

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PART 3 EXECUTION

PART 4 SEQUENCE OF OPERATIONS

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  - 2. Purge pump out compressor 24 hour run time.
  - 3. Initiate an alarm when 24 hour purge pump out compressor runtime exceeds 5 minutes on any chiller. Time limit at which alarm occurs shall be operator editable individually for each chiller
  - 4. Run time/Maintenance to provide the operator notification of required maintenance including:
    - a. Semi-annual air-cooled condenser cleaning
    - b. Annual purge tank service, filter dryer core replacement and controls calibration.

4.02 Refrigerant Concentration Monitoring

- A. The MER Refrigerant Management System shall monitor the operation of each Refrigerant Concentration Monitor for control and logging as follows

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2. Instantaneous MER refrigerant concentration in Parts Per Million (ppm).
3. Initiate an alarm when MER refrigerant concentration exceeds the rated AEL 500 ppm for the refrigerant being monitored. The alarm limit shall be operator editable.
4. Initiate a warning when MER refrigerant concentration exceeds 20 ppm of the rated AEL for the refrigerant being monitored as a warning that a refrigerant leak exists. The warning limit shall be operator editable.
5. Initiate an alarm when MER refrigerant concentration exceeds the rated EEL 1000 ppm of the refrigerant being monitored as an alarm that a refrigerant spill has occurred or that a leak exists. The warning limit shall be operator editable.
6. The BAS system shall maintain reports for operator viewing to assist in refrigerant asset management. As a minimum the BAS shall log the data listed below. All monthly data shall be logged in the BAS systems for 12 months.
  - a. Equipment Room Refrigerant Concentration: current, daily maximum and average, monthly maximum and average.
  - b. Chiller Starts & Run Time: daily and monthly totals
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  - d. Chiller Average Run Load Amperage: current, daily average and monthly average.
  - e. Chiller Setpoint: current, daily average and monthly average.
  - f. Leaving Chilled Water Temperature: current, daily average and monthly average.
  - g. Difference Between Entering and Leaving

Chilled Water Temperatures: current, daily average and monthly average.

- h. Evaporator Refrigerant Temperature: current, daily average and monthly average.
- i. Chilled Water to Refrigerant Temperature Approach: current, daily average and monthly average.
- j. Leaving Condenser Water Temperature: current, daily average and monthly average.
- k. Difference Between Entering and Leaving Condenser Water Temperatures: current, daily average and monthly average.
- l. Condenser Refrigerant Temperature: current, daily average and monthly average.
- m. Condenser Water to Refrigerant Temperature Approach: current, daily average and monthly average.

#### 4.03 Catastrophic Loss Of Refrigerant

- A. The BAS system shall monitor each chiller's [condenser [and evaporator] refrigerant pressure] [condenser and evaporator; entering and leaving water temperatures] and provide an alarm of impending loss of refrigerant charge because of excessive pressure.

#### 4.04 Chiller Performance Monitoring

- A. The BAS system shall monitor the parameters of the chiller operation as shown below and in the points list to allow operation within ASHRAE Guideline 3. The chiller performance report shall automatically print on an hourly basis.
- B. The BAS system shall maintain reports for operator viewing to assist in chiller performance monitoring. As a minimum the BAS shall log the data listed below. All monthly data shall be logged in the BAS systems for 12 months.
  - 1. Unit operating mode
  - 2. Unit diagnostic status
  - 3. Chiller Starts & Run Time: daily and monthly totals

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15. Chiller Run Load Amperage: current, daily average and monthly average.
16. Chiller Individual Phase RLA: current, daily average and monthly average
17. Chiller Oil Sump Temperature: current, daily average and monthly average
18. Chiller Differential Oil Pressure: current,

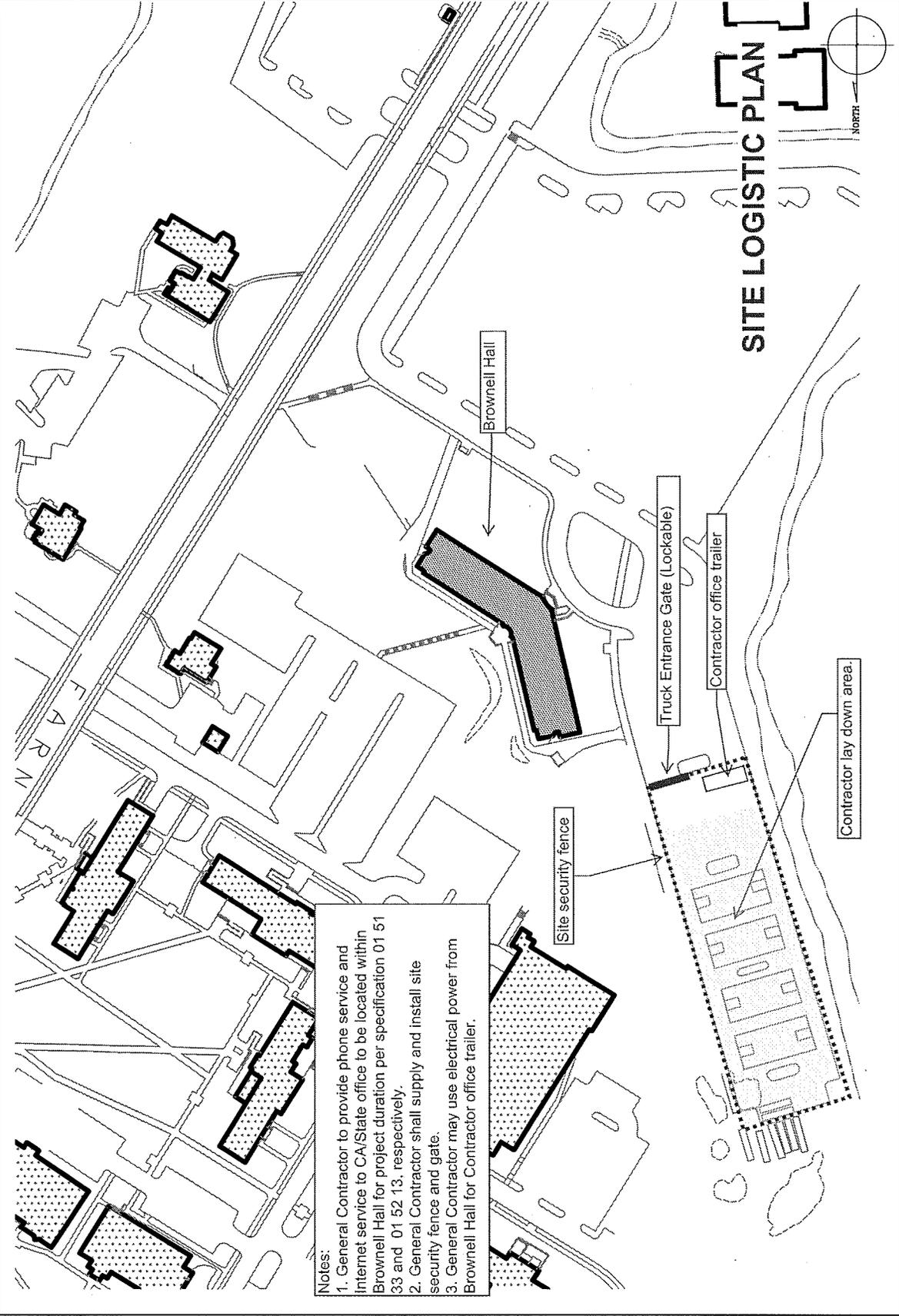
daily average and monthly average

19. Motor Winding Temperatures - all three phases:  
current, daily average and monthly average

#### 4.05 Mechanical Equipment Room Ventilation

- A. NORMAL MODE During normal operation the BAS shall control the mechanical equipment room (MER) AHU to maintain the MER temperature at 85 F for operator comfort whenever the equipment room is occupied. Temperature setpoint shall be operator adjustable.
- B. EMERGENCY VENTILATION MODE - When an excessive concentration of refrigerant is sensed in the MER the BAS shall turn the AHU in the high speed purge mode. The purge mode shall:
  1. Provide a ventilation exhaust rate not less than that specified ASHRAE 15-1992 - Safety Code for Mechanical Refrigeration.
  2. Provide sufficient make-up air to replace air being exhausted. Make-up shall be 100% outside air, conditioned as required to avoid damage to the equipment in the equipment room.
  3. Level-1 Alarm (Warning Strobe and alarm to DDC). Refrigerant PPM =20 PPM
  4. Level-2 Alarm (Exhaust EF-9 Starts). Refrigerant PPM =500 PPM
  5. Level-3 Alarm (Evacuate ). Refrigerant PPM = 1000
- C. SELF CONTAINED BREATHING APPARATUS
  1. Ayon Safety #EN137, or approved equal.

END OF SECTION



**SITE LOGISTIC PLAN**

- Notes:
1. General Contractor to provide phone service and internet service to CA/State office to be located within Brownell Hall for project duration per specification 01 51 33 and 01 52 13, respectively.
  2. General Contractor shall supply and install site security fence and gate.
  3. General Contractor may use electrical power from Brownell Hall for Contractor office trailer.

CTDCS Project No.: BI-RS-307  
 Date: November 13, 2014  
 Meeting Start Time: 10:00am  
 Meeting Location: 615 Fitch Street Hamden CT  
 Meeting Purpose:  Pre-Bid Meeting  
 Post Bid Review Meeting  
 Other:

Name: Tom Surprenant	Title: Project Manager
Company/Department: DCS	E-mail: Thomas.surprenant@ct.gov
Street: 165 Capitol Ave.	Phone: 860-713-5932
City/State/Zip Hartford, CT 06106	FAX: 860-713-7270

Name: ALLEN AITKEN	Title: PROJECT MANAGER
Company/Department: MORGANTI	E-mail: AAITKEN@MORGANTI.COM
Street: 100 HILL PLAIN ROAD	Phone: 203 830 3304
City/State/Zip DANBURY CT 06811	FAX: 203 830-4477

Name: Peter Royer	Title: Pres
Company/Department: Conn Boiler Repairing Inc	E-mail: Peter.Royer@ct-boiler.com
Street: 614 C. Knicker Ave	Phone: (860) 953-1911
City/State/Zip West Hartford, CT 06110	FAX: (860) 953-0246

Name: STEVEN GREENING	Title: PROJECT MANAGER
Company/Department: WEST STATE MECHANICAL	E-mail: WSM_SOVENE@YAHOO.COM
Street: PO BOX 1045 3000 S. MAIN ST.	Phone: 860-482-5917
City/State/Zip TORRINGTON, CT, 06790	FAX: 860-482-4686

Name: DONALD BELLOVILLE	Title: ESTIMATOR
Company/Department: E.C.C.	E-mail: DONALD@ECCINCORPORATED.COM
Street: 2570 MAIN ST	Phone: 860-549-2827
City/State/Zip HARTFORD CT	FAX: 860-549-2948

Name: LOUIS HOENER	Title: Pres.
Company/Department: HOENER ELEC.	E-mail: J.VENCHO@HOENERELECTRICAL.COM
Street: 596 JOHN ST.	Phone: 203 335-4204
City/State/Zip BPT, CT. 06600	FAX: 203-368-2425

CTDCS Project No.: BI-RS-307  
 Date: November 13, 2014  
 Meeting Start Time: 10:00am  
 Meeting Location: 615 Fitch Street Hamden CT

Name: Bill Mackey	Title: GM
Company/Department: Conn State Electrical Electric	E-mail: MACKEYB@CONSTATELECTRICAL.COM
Street: 100 Whipple St Unit F	Phone: 203-464-2111
City/State/Zip: New Haven CT 06512	FAX: 203-464-9430

Name: DAN PINO	Title: V.P.
Company/Department: OLYMPUS CONSTRUCTION	E-mail: DAN@OLYMPUSCONSTRUCTION.COM
Street: 77 CHERRY ST	Phone: 203-878-1544
City/State/Zip: MILFORD, CT	FAX: 203-878-6430

Name: Ken Stewart	Title: President
Company/Department: Stewart Mechanical Services Inc	E-mail: kstewart@stewartmsi.com
Street: 1495 Thomaston Ave	Phone: 203-575-0440
City/State/Zip: Waterbury CT 06704	FAX: 203-575-0424

Name: JOHN MAULUCCI	Title: PM / ESTIMATOR
Company/Department: HHS MECHANICAL CONTRACTORS, INC.	E-mail: John@hhs-mech.com
Street: 80 COLONIAL RD	Phone: 860 643-3939
City/State/Zip: MANCHESTER, CT 06042	FAX: 860 643-3977

Name: Nick Pullano	Title: PM
Company/Department: Rando Construction	E-mail: NPULLANO@RANDOCONSTRUCTION.COM
Street: 814 Washington Ave	Phone: 203-461-9590
City/State/Zip: 06473 Milford CT	FAX: 203-461-0010

Name: LEO VERENEW	Title:
Company/Department: RIVCO CONST.	E-mail: RIVCOCONST@GMAIL.COM
Street: 10 Donna	Phone: 810-250-2445 - Glen
City/State/Zip: Burlington CT 06010	FAX: 810-1673-3181

CTDCS Project No.: BI-RS-307  
 Date: November 13, 2014  
 Meeting Start Time: 10:00am  
 Meeting Location: 615 Fitch Street Hamden CT

Name: John Scinto	Title: Airtocal coordinator
Company/Department: Southport Contracting Inc	E-mail: southportcontracting@airtocal.com
Street: 1730 Commerce Dr	Phone: 203-334-2323
City/State/Zip: Bridgeport CT 06605	FAX: 203-334-2321

Name: PATRICK CALLAHAN	Title: MECHANICAL ENGINEER
Company/Department: Airtocal ENGINEERS, INC.	E-mail: pcallahan@airtecheng.com
Street: 901 WETHERSFIELD AVENUE	Phone: 860-542-9987
City/State/Zip: HARTFORD, CT 06114	FAX: 860-549-2972

Name: Phyllis G. Sholey	Title: Assoc Vice Pres.
Company/Department: SCSC	E-mail: sholey@scs.com
Street: 615 Fitch St.	Phone: 203-392-6050
City/State/Zip: Hamden, CT	FAX: 203-392-6058

Name:	Title:
Company/Department:	E-mail:
Street:	Phone:
City/State/Zip:	FAX:

Name:	Title:
Company/Department:	E-mail:
Street:	Phone:
City/State/Zip:	FAX:

Name:	Title:
Company/Department:	E-mail:
Street:	Phone:
City/State/Zip:	FAX:



**TRANE®**

# TruSense SD™ Refrigerant Monitor

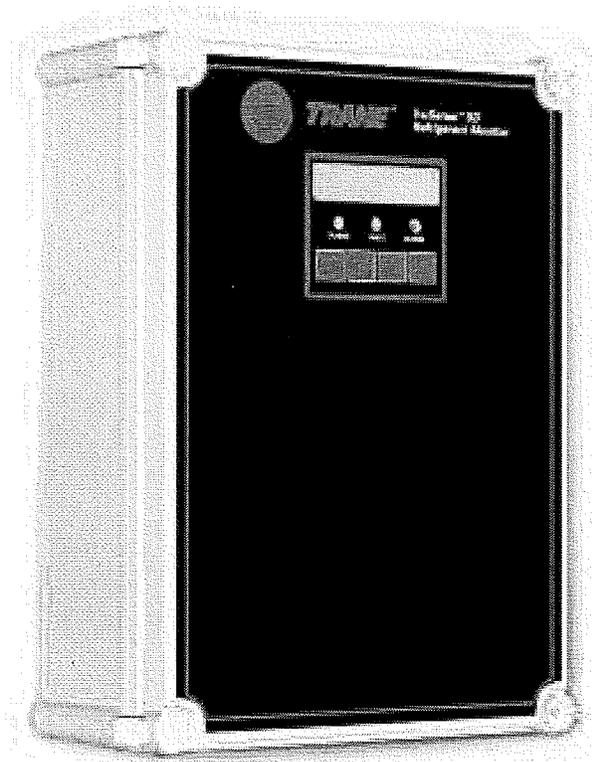
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## Introduction

Trane TruSense SD refrigerant sensors and monitors provide reliable refrigerant detection as low as 20 ppm for interfacing with building automation systems. The Trane TruSense SD refrigerant sensors and monitors are intended for indoor use in mechanical equipment rooms or in areas where bulk refrigerants are stored.

The Trane TruSense SD refrigerant sensor module provides reliable refrigerant detection for equipment room protection and for early warning of refrigerant leaks. It uses infrared photoacoustic sensing, a technology proven to provide stable operation and minimize false alarms. Trane TruSense SD refrigerant sensor modules conform to the requirements and recommendations of ASHRAE Standard 15, 1994.

**The TruSense SD refrigerant monitor** has a standard 4-20 mA analog output for interfacing with Tracer Summit™ and other building automation systems. It is packaged in a self-contained enclosure and requires no external connections other than for power and for BAS analog input. Finally, every TruSense SD sensor has Trane's unequalled worldwide parts, technical, and service support.





## Unequaled Flexibility

### Self-Contained or Split Configurations

A TruSense SD refrigerant monitor can be configured for either self-contained or split operation. And whether the system was originally split or self-contained, additional split sensing points can be added at any time. This allows a system to grow whenever new ports or new refrigerants are required.

A self-contained TruSense SD is available only with a pumped refrigerant-sensing port. For split TruSense SD systems, the remote sensors can be ordered either as pumped or diffusion type. Up to eight ports can be connected to any TruSense SD system.

### Diffusion Sensing Capability

The TruSense SD is the first refrigerant monitor to have diffusion-based, infrared, photo-acoustic refrigerant sensing ports. Having no moving parts or serviceable filters, these patented diffusion sensors are preferred over pumped sensors whenever high reliability and low maintenance are prized.

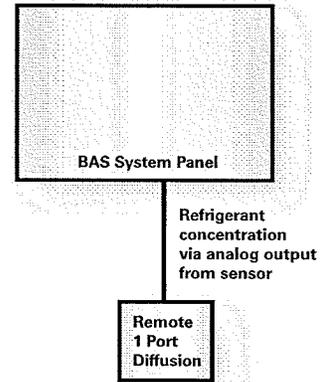
### Multiple Refrigerant Sensing

TruSense SD control module allows the selection of a different refrigerant for each remote sensing module. This allows equipment having different refrigerants to be served by the same TruSense SD system. Also, it is easy to add new refrigerants to any existing TruSense SD refrigerant monitor.

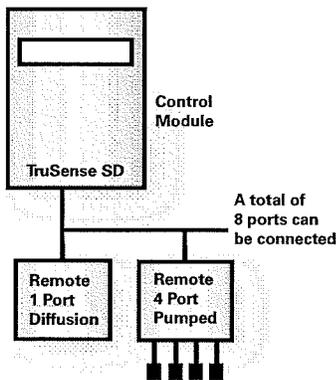
### Building Automation Interface

As standard, each TruSense SD includes two built-in analog outputs that indicate the sensed port and refrigerant concentration. In addition, the remote diffusion refrigerant sensor has a built-in analog output that allows it to be a stand-alone refrigerant-concentration sensor for a building automation system.

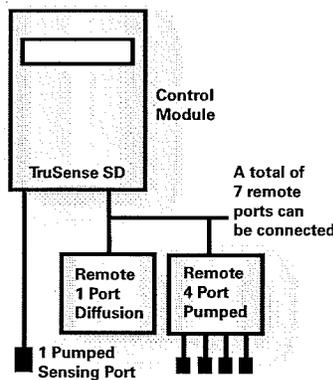
### TruSense SD BAS refrigerant remote diffusion 1-port sensor without control module



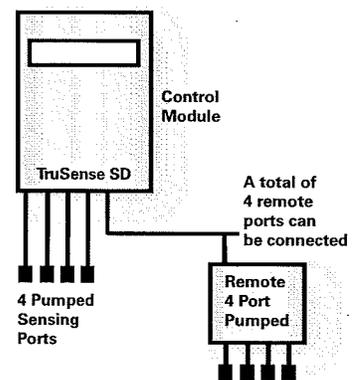
### TruSense SD, 0-port control module control with remote sensor(s)



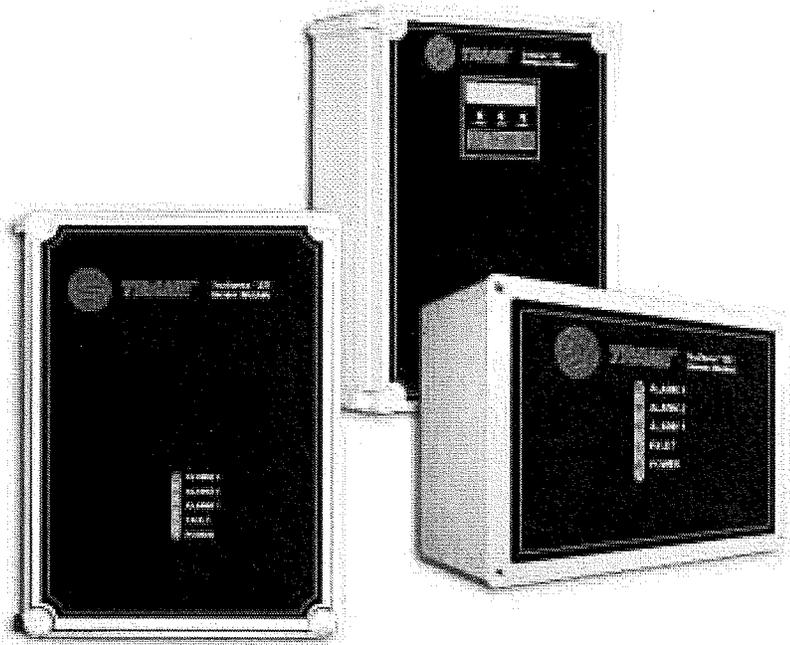
### TruSense SD, 1-port control module with or without remote sensor(s)



### TruSense SD, 4-port control module with or without remote sensor(s)



## Unique Features



### Infrared Photoacoustic Sensing

The TruSense SD sensor uses advanced infrared photo-acoustic sensing for accurate and false-alarm-resistant operation. This eliminates the "Auto Zero" functions required by other infrared refrigerant monitors. It is also the most trouble-free, reliable, and accurate infrared technology available.

### Diffusion Operation

The TruSense SD refrigerant sensor uses gas diffusion to sample its surrounding equipment-room air. This eliminates the need for moving parts, including pumps, flow sensors, flow solenoids, and flow transducers used in other infrared sensors. Eliminating these parts greatly increases monitor reliability. The sensor is mounted in a compact enclosure, suitable for mounting at the desired sensing locations.

### Moisture Resistant Design

Moisture is the enemy of electronics, which is why every TruSense SD comes with a moisture-resistant, sealed, and gasketed enclosure. Was this easy? No—most other monitors are only designed to Nema 1. In fact, some even have ventilation louvers! That's pretty

worrisome, because dripping pipes or other leaks can ruin a refrigerant monitor. This is exactly why the TruSense SD refrigerant monitor is designed to the NEMA 4x standard for moisture resistance.

### True Specifications

Today, there is no standard rule for specifying refrigerant monitor performance. To avoid mistakes, Trane publishes complete and understandable performance specifications. This assures designers that TruSense SD sensor modules will have the sensitivity required by the life safety specifications of their state and local building codes.

### 100% Performance Verification

It's hard to tell if a refrigerant monitor is working. Every TruSense SD sensor module is factory tested with NIST (National Institute of Standards and Testing) refrigerant calibration gas prior to shipment. Trane believes proving that a refrigerant monitor can sense refrigerant at its acceptable exposure limit (AEL) gives the ultimate peace of mind.

### Performance

- Infrared photo-acoustic
- Minimum sensed-gas Concentration: 20 ppm
- Precision: 0-100 ppm +/- 5 ppm  
100-1000 ppm +/- 5% of reading
- Response time: 90% of concentration, < 90 seconds
- 24 VDC (sensor module only)
- 24 VAC (sensor module only)

### Electrical

- 110 Vac, 60 Hz, 1 Phase
- 240 Vac, 60 Hz, 1 Phase

### Remote and Sensor Module Enclosures

- Polystyrene enclosure
- Permanent wall mounting
- NEMA 4X gasketed enclosure
- Status LEDs indicating power, fault, and alarm level
- UL 3111 (pending), fire, and shock detection
- Strobe option

### Sample System

- Selectable as diffusion gas transfer or pumped sample system

### Calibration

- Standard units can be calibrated for HCFC-123, CFC-11, HFC-134a, HCFC 22, or CFC-12, plus special calibrations for most other refrigerants

### Analog Outputs

- Control module: Refrigerant concentration - 4-20 mA output, Refrigerant port number 0 - 10 v
- Remote module: Refrigerant concentration - 4 - 20 mA

### Binary Outputs

- Control module: Alarm level 1, 2, 3, and system fault relays
- Remote module: Audible alarm relay

### Serial Communications

- RS-485 serial communications between Control and Remote modules



**TRANE®**

**Trane**  
**An American Standard Company**  
**[www.trane.com](http://www.trane.com)**

*For more information contact  
your local district office or  
e-mail us at [comfort@trane.com](mailto:comfort@trane.com)*

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Literature Order Number	SAFT-SLB001-EN
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Date	May 2002
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Supersedes	New
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Stocking Location	La Crosse
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*Trane has a policy of continuous product and product data improvement and reserves the right to change design and specifications without notice.*

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### EN137 Industrial self contained breathing apparatus SCBA with 6L Steel cylinder for military using - Ayonsafety

FOB Price: US \$0 - 450 / Set | [Get Latest Price](#)

Min. Order Quantity: 1 Set/Sets

Supply Ability: 500 Set/Sets per Week

Port: shanghai port

Payment Terms: L/C,D/A,D/P,T/T,Western Union,Cash

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Leave Messages

Start Order Add to Inquiry Cart

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#### Quick Details

Place of Origin:	Shanghai China (Mainla...	Brand Name:	AS	Model Number:	AS
Use:	Industrial and chemical fi...	Cylinder:	3L,6L for option	Material:	Steel cylinder
Pressure:	200 bar or 2900 psig	Cylinder weight:	6L: 6.5KG	Total net weight:	about 12 KG

#### Packaging & Delivery

Packaging Detail: each set in one plastic case

Delivery Detail: 1-2 working days after payment

#### Specifications

designed for the use in fire fight application, chemical industry , metallurgy, mines, petrol industry , rescue operation etc.

## Industrial self-contained breathing apparatus SCBA



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Ayonsafety positive pressure air breathing apparatus is designed for the use in fire fight application, chemical industry , metallurgy, mines, petrol industry , rescue operation, maintenance works and polluted area wherever there is or may be oxygen content than 17% , or fog caused by fire accident.

**Composed of the following parts:**

1: Full Face Mask



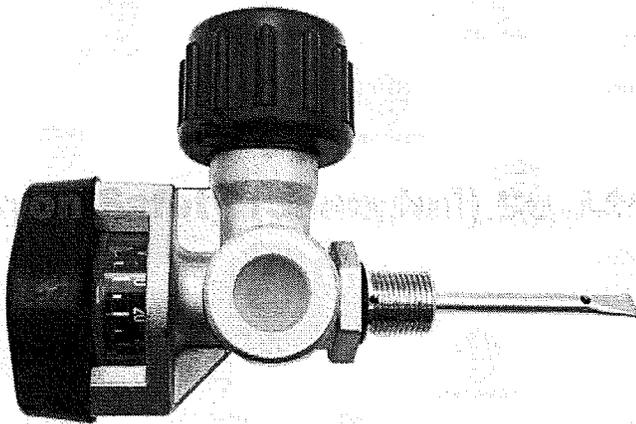
sales@ayonsafety.com  
www.ayonsafety.com

2: Demand Valve



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www.ayonsafety.com

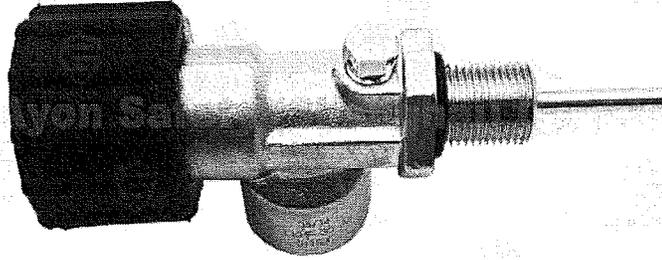
3: Pressure Reducer and Cylinder Valve



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AYON SAFETY



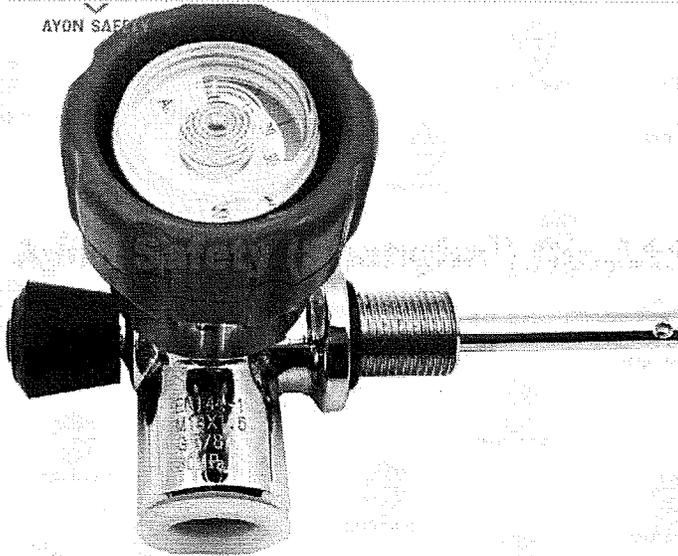
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Product Details

Company Profile

Report Suspicious Activity

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Communicate with Supplier:



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Contact Supplier

Leave Messages

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1 request,multiple quotations  
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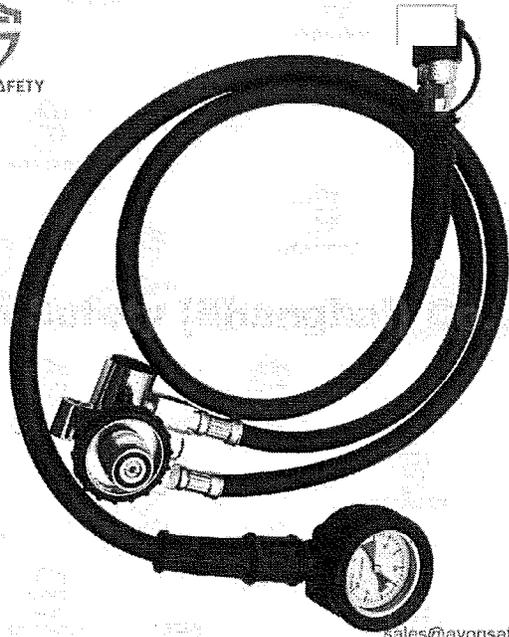
You May Like:



4: Pressure Gauge and Warning Device



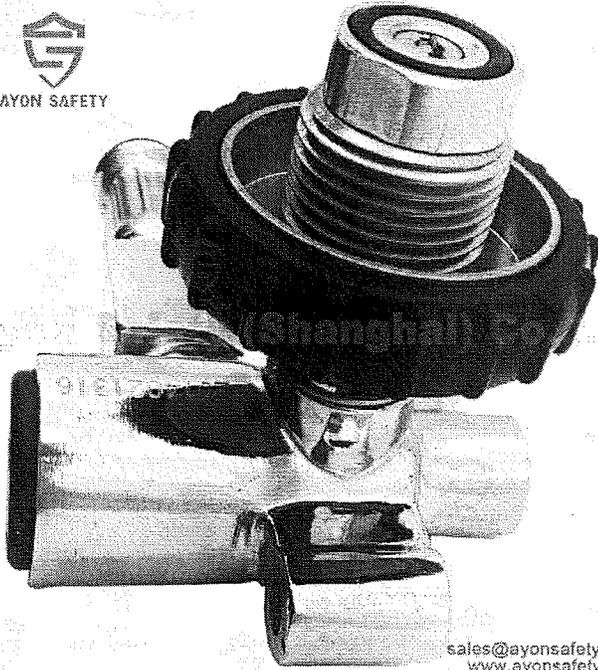
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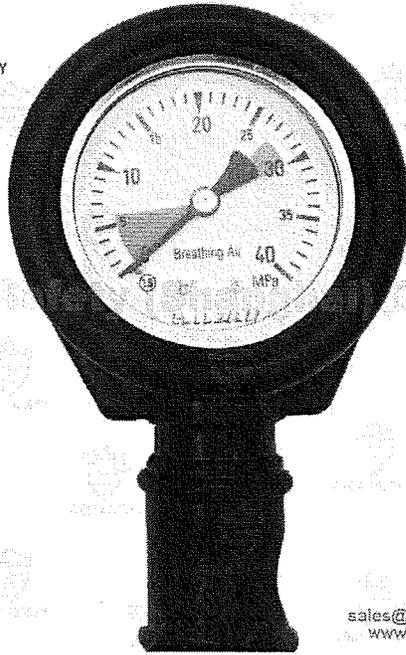
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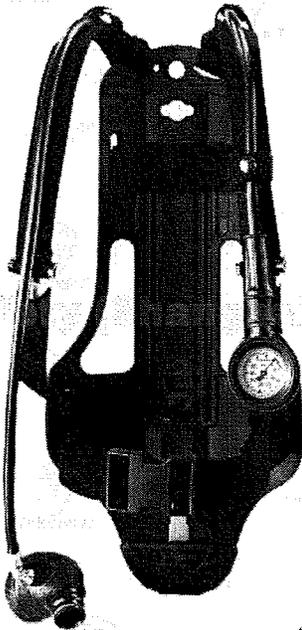


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5: Back Plate Assembly with Harness



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