



SECTION 28 42 00

INDUSTRIAL GAS DETECTION AND ALARM

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fixed gas detection.
 - 1. [TXP-T40](#) Transmitter.
 - 2. [TXP-C20](#) Control Panel.
 - 3. [TXP-C40](#) Control Panel.
 - 4. [TXP-C16X](#) Control Panel.
 - 5. [TXP-C64](#) Control Panel.
- B. Wireless gas detection.
 - 1. [TXP-WTA](#) Transmitter.
 - 2. [TXP-WCR](#) Control Panel.

1.2 RELATED SECTIONS

- A. Division 16 - Electrical.

1.3 REFERENCES

- A. CSA Group (CSA):
 - 1. CSA C22.2 No. 213 – Non-incendive Electrical Equipment for Use in Class I And II, Division 2 And Class III, Divisions 1 And 2 Hazardous (Classified) Locations (Binational Standard with UL 121201).
 - 2. CSA C22.2 No. 1010.1 - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use. Part 1: General Requirements.
- B. EMC Standards:
 - 1. EN61000 - Electromagnetic compatibility.
- C. European Committee for Electrotechnical Standardization (CENELEC):
 - 1. EN55011 - Industrial, scientific, and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement.
- D. Federal Communications Commission (FCC):
 - 1. FCC 15.247 - Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
- E. International Society of Automation (ISA):
 - 1. ISA S82.02 - Safety Standard for Electrical and Electronic Test, Measuring, Controlling and Related Equipment Electrical and Electronic Test and Measuring Equipment.
- F. Underwriters Laboratories (UL):
 - 1. UL 1604 - UL Standard for Safety Electrical Equipment for Use in Class I and II, Division 2, and Class III Hazardous (Classified) Locations.
 - 2. UL 121201 - UL Standard for Safety Non-incendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations.

1.4 SUBMITTALS



- A. Submit under provisions of Section 01300.
- B. Product Data:
 - 1. Manufacturer's data sheets on each product to be used.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Typical installation methods.
- C. Verification Samples: Two representative units of each type, size, pattern, and color.
- D. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.
- B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
- C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
- D. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
 - 1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
 - 2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
 - 3. Retain mock-up during construction as a standard for comparison with completed work.
 - 4. Do not alter or remove mock-up until work is completed or removal is authorized.

1.6 PRE-INSTALLATION CONFERENCE

- A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
- B. Protect from damage due to weather, excessive temperature, and construction operations.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9 WARRANTY

- A. Manufacturer's standard limited warranty unless indicated otherwise.

PART 2 PRODUCTS

2.1 MANUFACTURERS



- A. Acceptable Manufacturer: Macurco Inc., which is located at: 1500 W. 51st Street; Sioux Falls, SD 57105; Toll Free Tel: 877-367-7891; Fax: 605-951-9616; Email: quotes@macurco.com; Web: <http://macurco.com/products/tracxp/>.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 6 00 – Product Requirements.

2.2 FIXED GAS DETECTION

- A. Basis of Design: Model [TXP-T40](#). Fixed Single or Dual Sensor Gas Transmitter
 - 1. Highly configurable fixed gas detector for single or dual sensor applications in Class 1 Division 1 or Class 1 Division 2 environments.
 - 2. Local and remote sensor capabilities.
 - 3. Intelligent sensors transfer sensor information to transmitter including sensor type, measurement range, calibration span values, last calibration date, serial number, sensor life, and manufacture date.
 - 4. Status indicating color display and LEDs provide visual verification of safe or unsafe conditions.
 - 5. Setup and Programming: Intuitive non-intrusive magnetic interface and embedded webpage.
 - 6. Transmitter Housing: Cast Aluminum (LxWxH): 5 x 5.4 x 8 inch (127 x 137 x 203 mm).
 - a. Explosion-Proof: Cl.1 Div.1 Gr ABCD.
 - b. Non-Incendive: Cl.1 Div.2 Gr ABCD.
 - 7. Transmitter Housing: Black Poly Enclosure (LxWxH): 4 x 5 x 7 inch (102 x 127 x 178 mm).
 - a. Non-Incendive: Cl.1 Div.2 Gr ABCD.
 - 8. Sensor Housing: Stainless Steel (LxWxH): 5 x 5.4 x 8 inch (127 x 137 x 203 mm).
 - 9. Power Supply: 10 to 30 VDC at less than 10 watts with relay board; all relays energized.
 - 10. Input: Channel 1 and 2: Electrochemical, Catalytic Bead, Infrared or Photoionization (PID) sensor.
 - 11. Output:
 - a. Dual 3-wire 4 to 20 mA current source; Max loop Resistance 600 ohms at 24 VDC
 - b. Ethernet RJ-45 with built-in web Server, Modbus TCP.
 - c. Three programmable relays plus one dedicated FAULT relay.
 - d. Dual programmable master / slave Modbus RS-485 serial interfaces.
 - 12. Display: QVGA backlit color TFT 320 x 240.
 - a. Displays gas values, units of measurement, trend graphs and alarm levels.
 - 13. Temperature Range: Minus 40 to 140 degrees Fahrenheit (Minus 40 to 60 degrees Celsius).
 - 14. Humidity Range for IR Sensor: 95 percent RH Non-condensing.
 - 15. Humidity Range for Electrochemical Sensor: 85 percent RH Non-condensing.
 - 16. Gas Options:
 - a. Ammonia (NH₃).
 - 1) 86-3112-1900-00 - T40/WTa SENSOR, AMMONIA (NH₃) 0-100 PPM, EC.
 - 2) 86-3112-2000-00 - T40/WTa SENSOR, AMMONIA (NH₃) 0-200 PPM, EC.
 - 3) 86-3144-3300-00 - T40/WTa SENSOR, AMMONIA (NH₃) 0-200 PPM, EC, EXTENDED LIFE.
 - 4) 86-3112-3700-00 - T40/WTa SENSOR, AMMONIA (NH₃) 0-300 PPM, EC.
 - 5) 86-3112-2200-00 - T40/WTa SENSOR, AMMONIA (NH₃) 0-500 PPM, EC.
 - b. Carbon Dioxide (CO₂).
 - 1) 86-2314-2500-00 - T40 SENSOR, CARBON DIOXIDE (CO₂) 0-5,000 PPM, IR.
 - 2) 86-2314-0014-00 - T40 SENSOR, CARBON DIOXIDE (CO₂) 0-5% VOL, IR.
 - 3) 86-2314-0021-00 - T40 SENSOR, CARBON DIOXIDE (CO₂) 0-100% VOL, IR.
 - c. Carbon Monoxide (CO).
 - 1) 86-3115-1800-00 - T40/WTa SENSOR, CARBON MONOXIDE (CO) 0-50 PPM, EC.
 - 2) 86-3115-1900-00 - T40/WTa SENSOR, CARBON MONOXIDE (CO) 0-100 PPM, EC.
 - 3) 86-3115-2000-00 - T40/WTa SENSOR, CARBON MONOXIDE (CO) 0-200 PPM, EC.
 - 4) 86-3115-2000-01 - T40/WTa SENSOR, CARBON MONOXIDE (CO) 0-200 PPM, EC, H₂ COMPENSATED.



- 5) 86-3115-2300-00 - T40/WTa SENSOR, CARBON MONOXIDE (CO) 0-1,000 PPM, EC.
- d. Chlorine (Cl₂).
 - 1) 86-3116-1400-00 - T40/WTa SENSOR, CHLORINE (Cl₂) 0-10 PPM, EC (HIGHLY REACTIVE).
 - 2) 86-3116-1800-00 - T40/WTa SENSOR, CHLORINE (Cl₂) 0-50 PPM, EC (HIGHLY REACTIVE).
- e. Ethylene Oxide (C₂H₄O).
 - 1) 86-3119-1500-00 - T40/WTa SENSOR, ETHYLENE OXIDE (C₂H₄O) 0-20 PPM, EC (HIGHLY REACTIVE).
- f. Formaldehyde (CH₂O).
 - 1) 86-3121-1400-00 - T40/WTa SENSOR, FORMALDEHYDE (CH₂O) 0-10 PPM, EC (HIGHLY REACTIVE).
- g. Combustibles (IR).
 - 1) 86-2351-0021-00 - T40 SENSOR, METHANE (CH₄) 0-100% VOL, IR.
 - 2) 86-2351-0022-00 - T40 SENSOR, METHANE (CH₄) 0-100% LEL, IR.
 - 3) 86-9551-0022-00 - TXP-IRE SENSOR, METHANE (CH₄) 100% LEL, IR, EXTREME DUTY.
 - 4) 86-2352-0022-00 - T40 SENSOR, PROPANE (C₃H₈) 0-100% LEL, IR.
 - 5) 86-9552-0022-00 - TXP-IRE SENSOR, PROPANE (C₃H₈) 0-100% LEL, IR, EXTREME DUTY.
 - 6) 86-9554-0022-00 - TXP-IRE SENSOR, ETHYLENE (C₂H₄) 0-100% LEL, IR, EXTREME DUTY.
- h. Combustibles (Cat Bead).
 - 1) 86-2251-0022-00 - T40 SENSOR, COMBUSTIBLE GAS, 0-100% LEL, CB (AL OR SS ONLY).

Factory calibrated to Methane (CH₄) and can be used for the following combustible gases: Acetaldehyde (C₂H₄O); Propyl acetate (C₅H₁₀O₂); Acetic acid (C₂H₄O₂); Acetic anhydride (C₄H₆O₃); Acetone (C₃H₆O); Acetylene (C₂H₂); Allyl alcohol (C₃H₆O); Ammonia (NH₃); Aniline (C₆H₇N); Benzene (C₆H₆); Butadiene (C₄H₆); Butane, n- (C₄H₁₀); Butane, i- (C₄H₁₀); Butanol, n- (C₄H₁₀O); Butanol, i- (C₄H₁₀O); Butanone (C₄H₈O); Butene-1 (C₄H₈); Butene-2, cis (C₄H₈); Butene-2, trans (C₄H₈); Butyl acetate (C₆H₁₂O₂); Butyric acid (C₄H₈O₂); Carbon monoxide (CO); Carbonyl sulfide (COS); Chlorobenzene (C₆H₅Cl); Chloropropane, 1- (C₃H₇Cl); Cyanogen (C₂N₂); Cyclohexane (C₆H₁₂); Cyclohexanone (C₆H₁₀O); Cyclopropane (C₃H₆); Decane, n- (C₁₀H₂₂); Dichloroethane, 1,2- (C₂H₄Cl₂); Dichloromethane (CH₂Cl₂); Dicyclopentadiene (C₁₀H₁₂); Dimethylamine (C₂H₇N); Dimethylbutane (C₆H₁₄); Dimethylformamide (C₃H₇NO); Dimethylpentane, 2,3- (C₇H₁₆); Dimethyl sulfide (C₂H₆S); Dimethyl sulfoxide (C₂H₆OS); Dioxane, 1,4- (C₄H₈O₂); Diesel fuel (C₁₀H₂₀ - C₁₅H₂₈); Ethane (C₂H₆); Ethanol (C₂H₆O); Ethene (C₂H₄); Ethyl acetate (C₄H₈O₂); Ethylamine (C₂H₇N); Ethyl benzene (C₈H₁₀); Ethyl bromide (C₂H₅Br); Ethyl chloride (C₂H₅Cl); Ethyl ether (C₄H₁₀O); Ethyl formate (C₃H₆O₂); Ethyl mercaptan (C₂H₆S); Ethyl methyl ether (C₃H₈O); Ethyl pentane (C₇H₁₆); Ethylene (C₂H₄); Ethylene oxide (C₂H₄O); Formaldehyde (CH₂O); Gasoline (C₇H₁₆ - C₁₁H₂₄); Glacial acetic acid (C₂H₄O₂); Heptane, n- (C₇H₁₆); Hexadiene, 1,4- (C₆H₁₀O); Hexane, n- (C₆H₁₄); Hydrazine (N₂H₄); Hydrogen (H₂); Hydrogen cyanide (HCN); Isobutane (C₄H₁₀); Isobutylene (C₄H₈); Isobutyraldehyde (C₄H₈O); Isopropane (C₃H₈); Isopropanol (C₃H₈O); Kerosene (C₁₂H₂₆ - C₁₅H₃₂); Leaded gasoline (C₈H₂₀Pb); Liquefied petroleum gas (C₃H₈, C₄H₁₀); Methane (CH₄); Methanol (CH₄O); Methyl acetate (C₃H₆O₂); Methylamine (CH₅N); Methyl bromide (CH₃Br); Methyl chloride (CH₃Cl); Methylcyclohexane (C₇H₁₄); Methyl



ether (C₂H₆O); Methyl ethyl ketone (C₄H₈O); Methyl formate (C₂H₄O₂); Methyl hexane (C₇H₁₆); Methyl isobutyl ketone (C₆H₁₂O); Methyl mercaptan (CH₄S); Methylpentane (C₆H₁₄); Methyl propionate (C₄H₈O₂); Methyl n-propyl ketone (C₅H₁₀O); Methyl vinyl ether (C₃H₆O); Naphthalene (C₁₀H₈); Nitromethane (CH₃NO₂); Nonane, n- (C₉H₂₀); Octane, n- (C₈H₁₈); Pentane, n- (C₅H₁₂); Pentane, i- (C₅H₁₂); Pentane, Neo- (C₅H₁₂); Pentene, 1- (C₅H₁₀); Phosphine (PH₃); Propane (C₃H₈); Propanol, n- (C₃H₈O); Propene (C₃H₆); Propylamine (C₃H₉N); Propylene (C₃H₆); Propylene oxide (C₃H₆O); Propyl ether, iso- (C₆H₁₄O); Propyne (C₃H₄); Styrene (C₈H₈); Tetrahydrofuran (C₄H₈O); Toluene (C₇H₈); Triethylamine (C₆H₁₅N); Trimethylamine (C₃H₉N); Trimethylbutane (C₇H₁₆); Turpentine (C₁₀H₁₆); Unleaded gasoline (C₈H₁₈ (Mix)); Vinyl chloride (C₂H₃Cl); Xylene, m- (C₈H₁₀); Xylene, o- (C₈H₁₀); Xylene, p- (C₈H₁₀).

- 2) 86-2261-0022-00 - T40 SENSOR, ACETYLENE (C₂H₂) 0-100% LEL, CB (AL OR SS ONLY).
- i. Hydrogen (H₂).
 - 1) 86-3124-2300-00 - T40/MTA SENSOR, HYDROGEN (H₂) 0-1,000 PPM, EC.
 - 2) 86-3124-2600-00 - T40/MTA SENSOR, HYDROGEN (H₂) 0-10,000 PPM, EC.
 - 3) 86-2253-0022-00 - T40 SENSOR, HYDROGEN (H₂), 0-100% LEL, CB.
- j. Hydrogen Chloride (HCl).
 - 1) 86-3126-1900-00 - T40/MTA SENSOR, HYDROGEN CHLORIDE (HCL) 0-100 PPM, EC (HIGHLY REACTIVE).
- k. Hydrogen Cyanide (HCN).
 - 1) 86-3127-1800-00 - T40/MTA SENSOR, HYDROGEN CYANIDE (HCN) 0-50 PPM, EC (HIGHLY REACTIVE).
- l. Hydrogen Fluoride (HF).
 - 1) 86-3128-3700-00 - T40/MTA SENSOR, HYDROGEN FLUORIDE (HF) 0-40 PPM, EC.
- m. Hydrogen Peroxide (H₂O₂).
 - 1) 86-3192-1400-00 - T40/MTA SENSOR, HYDROGEN PEROXIDE (H₂O₂) 0-10 PPM, EC.
- n. Hydrogen Sulfide (H₂S).
 - 1) 86-3130-1600-00 - T40/MTA SENSOR, HYDROGEN SULFIDE (H₂S) 0-25 PPM, EC.
 - 2) 86-3130-1800-00 - T40/MTA SENSOR, HYDROGEN SULFIDE (H₂S) 0-50 PPM, EC.
 - 3) 86-3130-1900-00 - T40/MTA SENSOR, HYDROGEN SULFIDE (H₂S) 0-100 PPM, EC.
 - 4) 86-3130-2000-00 - T40/MTA SENSOR, HYDROGEN SULFIDE (H₂S) 0-200 PPM, EC.
 - 5) 86-3130-2200-00 - T40/MTA SENSOR, HYDROGEN SULFIDE (H₂S) 0-500 PPM, EC.
 - 6) 86-3130-2300-00 - T40/MTA SENSOR, HYDROGEN SULFIDE (H₂S) 0-1,000 PPM, EC.
- o. Methyl Mercaptan (CH₃SH).
 - 1) 86-3132-1400-00 - T40/MTA SENSOR, METHYL MERCAPTAN (CH₃SH) 0-10 PPM, EC.
- p. Nitric Oxide (NO).
 - 1) 86-3133-1900-00 - TXP/MTA SENSOR, NITRIC OXIDE (NO) 0-100PPM, EC.
- q. Nitrogen Dioxide (NO₂).
 - 1) 86-3134-1400-00 - T40/MTA SENSOR, NITROGEN DIOXIDE (NO₂) 0-10 PPM, EC.
 - 2) 86-3134-1500-00 - T40/MTA SENSOR, NITROGEN DIOXIDE (NO₂) 0-20 PPM, EC.
- r. Oxygen (O₂).
 - 1) 86-3111-0017-00 - T40/MTA SENSOR, OXYGEN (O₂) 0-25% VOL, EC.
- s. Ozone (O₃).
 - 1) 86-3136-1100-00 - T40/MTA SENSOR, OZONE (O₃) 0-1 PPM, EC (POLY ONLY).
 - 2) 86-3136-1500-00 - T40/MTA SENSOR, OZONE (O₃) 0-20 PPM, EC (POLY ONLY).
- t. Sulfur Dioxide (SO₂).
 - 1) 86-3140-1500-00 - T40/MTA SENSOR, SULFUR DIOXIDE (SO₂) 0-20 PPM, EC.
- u. Volatile Organic Compounds (VOC).
 - 1) 86-6643-6000-00 - T40 SENSOR, GENERAL VOC LOW RANGE, 0-200 PPM, PID, 10.6



- EV.
- 2) 86-6631-2600-00 - T40 SENSOR, GENERAL VOC HIGH RANGE, 0-4,000 PPM, PID, 10.6 EV.
- 3) 86-6691-6200-00 - T40 SENSOR, BENZENE (C6H6) 0-10 PPM, PID, 10.0 EV.
- 4) 86-6643-6100-00 - T40 SENSOR, GENERAL VOC HIGH RANGE, 0-2,000 PPM, PID, 10.0 EV.
- 17. Accessories:
 - a. Remote Sensor Assemblies.
 - 1) Part Number: 88-1109-0000-10 - Remote Sensor Assembly, Aluminum, Stainless Steel Sensor Head C1D1; Non-reactive Sensor.
 - 2) Part Number: 88-1109-0000-20 - Remote Sensor Assembly, Aluminum, Stainless Steel Sensor Head C1D2; Reactive Sensor.
 - 3) Part Number: 88-1309-0000-30 - Remote Sensor Assembly, Poly C1D2 Non-Incendive.
 - 4) Part Number: 88-1209-0000-10 - Remote Sensor Assembly, Stainless Steel C1D1; Non-reactive Sensor.
 - b. Part Number: 88-C50G-0000-00 - Splash Guard With Calibration Port. Compatible with Stainless Steel Sensor Housing.
 - c. Part Number: 88-C50P-0000-00 - Sensor Head Calibration Adapter. Compatible with Stainless Steel Sensor Housing.
 - d. Part Number: 88-C20S-0000-00 - Sensor Head Flow Cell Adapter. Compatible with Stainless Steel Sensor Housing.
 - e. Part Number: 88-C50P-0000-00 - Sensor Head Flow Cell, Cover Only. Compatible with Poly Sensor Housing.
 - f. Part Number: 88-C200-0000-0D - Duct Mount Kit (Aluminum or Stainless Steel).
 - g. Part Number: 88-C200-0000-0D - Duct Mount Kit (Poly).
 - h. Part Number: 88-C000-0000-02 - Large Magnetic Wand, AL/SS Transmitters.
 - i. Part Number: 88-C000-0000-01 - Small Magnetic Wand, Poly Transmitters.
- B. Alarm Control Panels:
 - 1. Basis of Design: Model TXP-C20. Two (2) Channel Alarm Control Panels. Designed to display readings and control alarm event switching for two sensor points.
 - a. Optional Inputs:
 - 1) Dual Analog 4-20 mA Input.
 - 2) Digital Modbus RS-485 RTU.
 - b. Optional Outputs:
 - 1) Dual Analog 4-20mA Output.
 - 2) Alarm Relay Board (6, 5A Form C Relays).
 - 2. Basis of Design: Model [TXP-C40](#). Four (4) Channel Alarm Control Panels. Designed to display readings and control alarm event switching for four sensor points.
 - a. Inputs: TXP-C40:
 - 1) Quad Analog 4-20 mA Output.
 - 2) Digital Modbus RTU Master/Slave RS-485 RTU.
 - b. Optional Outputs:
 - 1) Quad Analog 4-20mA Output.
 - 2) Alarm Relay Board (6, 5A Form C Relays).
 - 3) Serial to dual Ethernet Modbus TCP bridge, for C1D2 locations.
 - 3. Standards Compliance:
 - a. CSA C22.2 No. 1010.1.
 - b. ISAS82.02: UL1604 / C22.2 No 213I; NEMA 4X Enclosures: Div. 2, Groups A, B, C and D.
 - c. EN55011 and EN 61000.
 - 4. Poly Enclosure Size (LxWxH): 14.1 x 12.14 x 7.75 inch (358 x 308 x 197 mm). NEMA 4X.
 - 5. Primary Power Supply: 120 to 240 VAC Input. 24 VDC Output. 50 Watt.
 - 6. Relays:
 - a. Two programmable 5A 30 VDC or 250 VAC resistive Form C Relays for warning, high alarm, horn, and fault conditions.



- b. Optional: Six programmable 5A 30 VDC or 250 VAC resistive Form C Relays.
 - 7. Display:
 - a. LCD Screen: 128 x 64 pixel backlit indicates engineering units, 30 minute trends or bar-graphs.
 - b. LEDs: Quantity of Six, provide alarm and fault status, cal mode and keypad activity.
 - 8. Temperature Range: Minus 13 to 140 degrees F (Minus 25 to 60 degrees C).
 - 9. Humidity Range: 0 to 90 percent R. H. non-condensing.
 - 10. Altitude: Recommended up to 6562 ft (2000 m).
 - 11. Parts and Accessories for TXP-C20:
 - a. Part Number: 88-4000-0300-00 - TXP-C20 4-20MA ANALOG INPUT BOARD (2 CHANNELS).
 - b. Part Number: 88-5000-0080-00 - TXP-C20 ADDRESSABLE INPUT BOARD (MODBUS RS-485 RTU).
 - c. Part Number: 88-4000-0020-00 - TXP-C20 ALARM RELAY BOARD (6, 5A FORM C RELAYS).
 - d. Part Number: 88-4000-0070-00 - TXP-C20 4-20MA ANALOG OUTPUT BOARD (2 CHANNELS).
 - 12. Parts and Accessories for TXP-C40:
 - a. Part Number: 90-8000-5000-00 - TXP-C40 4-20MA ANALOG INPUT BOARD (4 CHANNELS).
 - b. Part Number: 88-5000-0080-00 - TXP-C40 ADDRESSABLE INPUT BOARD (MODBUS RS-485 RTU).
 - c. Part Number: 88-4000-0020-00 - TXP-C40 ALARM RELAY BOARD (6, 5A FORM C RELAYS).
 - d. Part Number: 88-5000-0070-00 – TXP-C40 4-20MA ANALOG OUTPUT BOARD (4 CHANNELS).
 - e. Part Number: 88-5000-0070-20 - TXP-C40 RS-485 SERIAL TO DUAL ETHERNET MODBUS TCP BRIDGE FOR C1, D2.
- C. Multi-Channel Controllers:
1. Basis of Design: Model [TXP-C16X](#). Sixteen (16) Channel Alarm Controller. Provides signal conditioning, simultaneous real-time display, and alarm events for 16 input channels. Display settings offer readings in numerical engineering units, bar graphs and trends. Data is logged and retrieved via an SD card.
 2. Basis of Design: Model [TXP-C64](#). Sixty-Four (64) Channel Alarm Controller. Provides signal conditioning, simultaneous real-time display, and alarm events for 64 input channels. Display settings offer readings in numerical engineering units, bar graphs and trends. Data is logged and retrieved via an SD card.
 3. Standards Compliance:
 - a. CSA C22.2 No. 1010.1 and ISA S82.02.
 - b. UL 1604 / C22.2 No. 213; NEMA 4X: Class 1 Div. 2 Groups A, B, C, D.
 - c. EN55011 and EN61000.
 4. Housing Dimensions, Fiberglass (LxWxH): 16 x 13.16 x 8.5 (406 x 334 x 216 mm).
 - a. Shipping Weight: 32 lbs (14.51 kg).
 5. Primary Power Supply
 - a. TXP-C16X: 120 to 240 VAC Input. 24 VDC Output. 150 Watt.
 - b. TXP-C64: 120 to 240 VAC Input. 24 VDC Output. 600 Watt.
 6. Modbus Inputs: Dual Modbus Master and Slave RS-485 ports.
 7. Ethernet Port: Modbus TCP interface port with web server.
 8. Analog 4-20mA Inputs
 - a. TXP-C16X: 8 or 16.
 - b. TXP-C64: 16, 32, 48 or 64.
 9. Analog 4-20mA Outputs,
 - a. TXP-C16X: 8 or 16.
 - b. TXP-C64: 16, 32, 48 or 64.
 10. Relays (standard): Five, 5A 30 VDC or 250 VAC resistive Form C.
 - a. Two standard SPDT relays for horn and fault.
 - b. Three programmable SPDT alarm relays.
 11. Optional Programmable Alarm Relay Board (5A Form C Relays):
 - a. TXP-C16X: 8 or 16.



- b. TXP-C64X: 16, 32, 48 or 64.
- 12. Display: Color QVGA 320 x 240 pixel graphic LCD with backlight displays bar graphs, trends, and engineering units.
 - a. Five discrete LEDs indicate alarm status for five alarm relays.
- 13. Temperature Range: Minus 13 to 140 degrees F (Minus 25 to 60 degrees C).
- 14. Magnetic Key-Pad: For non-intrusive operation.
- 15. Security Functions: Lock out unauthorized users.
- 16. Expandable for changing needs.
- 17. Parts and Accessories for TXP-C16X:
 - a. Part Number: 88-8000-0100-00 - ANALOG 4-20MA INPUT BOARD; 8 CHANNELS.
 - b. Part Number: 88-8000-0020-00 - ANALOG 4-20MA OUTPUT BOARD; 8 CHANNELS.
 - c. Part Number: 88-8000-0030-00 - PROGRAMMABLE ALARM RELAY BOARD; 8, 5A FORM C RELAYS.
 - d. Part Number: 88-8000-0040-00 - DISCRETE ALARM RELAY BOARD; 8, 5A FORM C RELAYS.
 - e. Part Number: 88-8000-0050-00 - 900 MHZ RADIO KIT FOR USE WITH TXP-WTA.
- 18. Parts and Accessories for TXP-C64:
 - a. Part Number: 88-7000-0300-00 - ANALOG 4-20MA INPUT BOARD; 16 CHANNELS.
 - b. Part Number: 88-7000-0070-00 - ANALOG 4-20MA OUTPUT BOARD; 16 CHANNELS.
 - c. Part Number: 88-7000-0030-00 - PROGRAMMABLE ALARM RELAY BOARD; 16, 5A FORM C RELAYS.
 - d. Part Number: 88-7000-0020-00 - DISCRETE ALARM RELAY BOARD; 16, 5A FORM C RELAYS.
 - e. Part Number: 88-7000-0010-00 - AUXILIARY STANDARD ALARM RELAY BOARD; TWO STANDARD RELAYS FOR HORN AND FAULT, THREE PROGRAMMABLE RELAYS.
 - f. Part Number: 88-8000-0050-00 - 900 MHZ RADIO KIT FOR USE WITH TXP-WTA.
 - g. Part Number: 88-700R-0000-00 - NEMA 4X EXPANSION KIT; ADDS UP TO 5 OPTION POSITIONS.
 - h. Part Number: 88-730U-0000-00 - NEMA 4X EXPANSION ENCLOSURE; ADDS UP TO 10 OPTION POSITIONS.

2.3 WIRELESS GAS DETECTION

- A. Basis of Design: Model [TXP-WTA](#). 900 MHz Wireless Transmitter. Available using a robust 900 MHz radio frequency to meet demanding communication requirements. Smart Sensors: Single or dual configurations allow different gas combinations or redundant readings for critical operations. Allows changing sensor types. Supports integral and remote sensors. Intuitive non-intrusive magnetic interface.
 - 1. Standards Compliance: FCC 15.247 and Industry Canada (IC), CSA Certified for Class 1, Division 2 Hazardous locations.
 - 2. Aluminum Housing (LxWxH): 5 x 5.4 x 8 inches (127 x 137 x 203 mm).
 - a. Shipping Weight: 6.5 lbs. (2.94 kg).
 - 3. Poly Housing (LxWxH): 4 x 5 x 7 inches (102 x 127 x 178 mm).
 - a. Shipping Weight: 3 lbs. (1.36 kg).
 - 4. Power Supply: Disposable, internal 3.6 V, D-cell lithium battery.
 - 5. Input: Single or dual sensor inputs of any electrochemical and/or infrared sensor configuration.
 - 6. Standard Output: Frequency-hopping spread spectrum (FHSS) Wireless modem with data encryption 900MHz power adjustable from 10 mW to 1.0 watt / 0-30 dBm.
 - 7. Display: 64 x 128 Pixel LCD w/ 30-minute trend Bar graph and engineering units.
 - 8. Temperature Range: Minus 40 to 131 degrees F (Minus 40 to 55 degrees C).
 - 9. Humidity: 0 to 95 percent RH non-condensing.
 - 10. Five LED Indications: Three alarms, and two communication status.
 - 11. Password provides menu security.
 - 12. Performance:
 - a. 900 MHz indoor/urban range: Up to 3000 ft (912.4 m).
 - b. 900 MHz frequency range: 902 to 928 MHz with 50 hops with 2dBi dipole antenna.



- c. 900 MHz outdoor RF LOS range: Up to 2 to 3 miles (3.22 to 4.83 km) with high-gain antenna.
- 13. Magnetic Mount Kit Options:
 - a. 83-7000-0001-00 - ALUMINUM ENCLOSURE (2 LARGE)
 - b. 83-7000-0003-00 - POLYCARBONATE ENCLOSURE (4 SMALL)
- 14. Gas Options:
 - a. Ammonia (NH₃).
 - 1) 86-3112-1900-00 - T40/WTa SENSOR, AMMONIA (NH₃) 0-100 PPM, EC.
 - 2) 86-3112-2000-00 - T40/WTa SENSOR, AMMONIA (NH₃) 0-200 PPM, EC.
 - 3) 86-3144-3300-00 - T40/WTa SENSOR, AMMONIA (NH₃) 0-200 PPM, EC, EXTENDED LIFE.
 - 4) 86-3112-3700-00 - T40/WTa SENSOR, AMMONIA (NH₃) 0-300 PPM, EC.
 - 5) 86-3112-2200-00 - T40/WTa SENSOR, AMMONIA (NH₃) 0-500 PPM, EC.
 - b. Carbon Dioxide (CO₂).
 - 1) 86-4414-0014-00 - WTa SENSOR, CARBON DIOXIDE (CO₂) 0-5% VOL, IR, LOW POWER.
 - c. Carbon Monoxide (CO).
 - 1) 86-3115-1800-00 - T40/WTa SENSOR, CARBON MONOXIDE (CO) 0-50 PPM, EC.
 - 2) 86-3115-1900-00 - T40/WTa SENSOR, CARBON MONOXIDE (CO) 0-100 PPM, EC
 - 3) 86-3115-2000-00 - T40/WTa SENSOR, CARBON MONOXIDE (CO) 0-200 PPM, EC.
 - 4) 86-3115-2000-01 - T40/WTa SENSOR, CARBON MONOXIDE (CO) 0-200 PPM, EC, H₂ COMPENSATED.
 - 5) 86-3115-2300-00 - T40/WTa SENSOR, CARBON MONOXIDE (CO) 0-1,000 PPM, EC.
 - d. Chlorine (Cl₂).
 - 1) 86-3116-1400-00 - T40/WTa SENSOR, CHLORINE (Cl₂) 0-10 PPM, EC (HIGHLY REACTIVE).
 - 2) 86-3116-1800-00 - T40/WTa SENSOR, CHLORINE (Cl₂) 0-50 PPM, EC (HIGHLY REACTIVE).
 - e. Ethylene Oxide (C₂H₄O).
 - 1) 86-3119-1500-00 - T40/WTa SENSOR, ETHYLENE OXIDE (C₂H₄O) 0-20 PPM, EC (HIGHLY REACTIVE).
 - f. Formaldehyde (CH₂O).
 - 1) 86-3121-1400-00 - T40/WTa SENSOR, FORMALDEHYDE (CH₂O) 0-10 PPM, EC (HIGHLY REACTIVE).
 - g. Combustibles (IR).
 - 1) 86-4451-0022-00 - WTa SENSOR, COMBUSTIBLE GAS, 0-100% LEL CH₄, IR (LOW POWER).
 - a) Factory calibrated to Methane (CH₄).
 - h. Hydrogen (H₂).
 - 1) 86-3124-2300-00 - T40/WTa SENSOR, HYDROGEN (H₂) 0-1,000 PPM, EC.
 - 2) 86-3124-2600-00 - T40/WTa SENSOR, HYDROGEN (H₂) 0-10,000 PPM, EC.
 - i. Hydrogen Chloride (HCl).
 - 1) 86-3126-1900-00 - T40/WTa SENSOR, HYDROGEN CHLORIDE (HCl) 0-100 PPM, EC (HIGHLY REACTIVE).
 - j. Hydrogen Cyanide (HCN).
 - 1) 86-3127-1800-00 - T40/WTa SENSOR, HYDROGEN CYANIDE (HCN) 0-50 PPM, EC (HIGHLY REACTIVE).
 - k. Hydrogen Fluoride (HF).
 - 1) 86-3128-3700-00 - T40/WTa SENSOR, HYDROGEN FLUORIDE (HF) 0-40 PPM, EC.
 - l. Hydrogen Peroxide (H₂O₂).
 - 1) 86-3192-1400-00 - T40/WTa SENSOR, HYDROGEN PEROXIDE (H₂O₂) 0-10 PPM, EC.
 - m. Hydrogen Sulfide (H₂S).
 - 1) 86-3130-1600-00 - T40/WTa SENSOR, HYDROGEN SULFIDE (H₂S) 0-25 PPM, EC.
 - 2) 86-3130-1800-00 - T40/WTa SENSOR, HYDROGEN SULFIDE (H₂S) 0-50 PPM, EC.
 - 3) 86-3130-1900-00 - T40/WTa SENSOR, HYDROGEN SULFIDE (H₂S) 0-100 PPM, EC.



- 4) 86-3130-2000-00 - T40/MTA SENSOR, HYDROGEN SULFIDE (H₂S) 0-200 PPM, EC.
 - 5) 86-3130-2200-00 - T40/MTA SENSOR, HYDROGEN SULFIDE (H₂S) 0-500 PPM, EC.
 - 6) 86-3130-2300-00 - T40/MTA SENSOR, HYDROGEN SULFIDE (H₂S) 0-1,000 PPM, EC.
 - n. Methyl Mercaptan (CH₃SH).
 - 1) 86-3132-1400-00 - T40/MTA SENSOR, METHYL MERCAPTAN (CH₃SH) 0-10 PPM, EC.
 - o. Nitric Oxide (NO).
 - 1) 86-3133-1900-00 - TXP/MTA SENSOR, NITRIC OXIDE (NO) 0-100PPM, EC.
 - p. Nitrogen Dioxide (NO₂).
 - 1) 86-3134-1400-00 - T40/MTA SENSOR, NITROGEN DIOXIDE (NO₂) 0-10 PPM, EC.
 - 2) 86-3134-1500-00 - T40/MTA SENSOR, NITROGEN DIOXIDE (NO₂) 0-20 PPM, EC.
 - q. Oxygen (O₂).
 - 1) 86-3111-0017-00 - T40/MTA SENSOR, OXYGEN (O₂) 0-25% VOL, EC.
 - r. Ozone (O₃).
 - 1) 86-3136-1100-00 - T40/MTA SENSOR, OZONE (O₃) 0-1 PPM, EC (POLY ONLY).
 - 2) 86-3136-1500-00 - T40/MTA SENSOR, OZONE (O₃) 0-20 PPM, EC (POLY ONLY).
 - s. Sulfur Dioxide (SO₂).
 - 1) 86-3140-1500-00 - T40/MTA SENSOR, SULFUR DIOXIDE (SO₂) 0-20 PPM, EC.
- B. Basis of Design: Model [TXP-WCR](#). 900 MHz 32 Channel Wireless Controller/Receiver.
1. TXP-WCR/PY: NEMA 4X non-metallic polyester wall mount.
 - a. DIV 2 Groups A, B, C, D.
 - b. Category II and pollution degree 3.
 - c. NEMA 4X; IP66.
 2. TXP-WCR/SS: NEMA 4X Stainless Steel Wall Mount.
 - a. DIV 2 Groups A, B, C, D.
 - b. Category II and pollution degree 3.
 - c. NEMA 4X; IP66.
 3. Poly Housing (LxWxH): 7.3 x 12.1 x 14.1 inch (185 x 307 x 358 mm). NEMA 4X, C1, D2.
 - a. Shipping Weight: 18.2 lbs (8.25 kg).
 4. Stainless Steel Housing (LxWxH): 6.0 x 9.75 x 13.75 inch (152 x 248 x 349 mm). NEMA 4X, C1, D2.
 - a. Shipping Weight: 17.0 lbs (7.71 kg).
 5. Power Supply:
 - a. AC Power 100-240 VAC 50/60 Hz at .80 amp Max.
 - b. 40 watts Max Steady-State 10-30 VDC.
 - c. 3 watts max; TXP-WCR with all relays energized.
 6. Input: 900 MHz Wireless Communication from TXP-WTA.
 7. Output: 900 MHz Power Adjustable From 10 mW to 1 watt.
 8. Display: 128 x 64 Pixel Graphic LCD.
 9. Temperature Range: 35 to 140 degrees F (Minus 25 to 60 degrees C).
 10. Humidity: 0 to 90 percent RH Non-Condensing.
 11. Non-volatile memory.
 12. Up to 26 frequency-hopping spread spectrum hopping patterns.
 13. Programmable Relays: Eight, 5A 30 VDC or 250 VAC resistive Form C.
 14. Real time clock and calendar.
 15. Non-intrusive magnetic interface.
 16. Time and date stamped event logging.
 17. I / O Communications Accessories:
 - a. 83-800U-0000-00 - TXP-WCR WIFI RADIO MODULE KIT W/ REMOTE HMI FUNCTIONALITY
 - b. 83-8000-D000-00 - TXP-WCR DATALOGGER, WIRED MODBUS, WIFI INTERFACE PCB
 - c. 83-8000-A000-00 - TXP-WCR DATALOGGER, WIRED MODBUS INTERFACE PCB

PART 3 EXECUTION

3.1 EXAMINATION



- A. Do not begin installation until substrates have been properly constructed and prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.
- B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

3.5 CLEANING AND PROTECTION

- A. Clean products in accordance with the manufacturer's recommendations.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

