



\* CONTROLS PROVIDED AND WIRED BY CONTROLS CONTRACTOR.

**NOTES:**

1. THE CONTROLS CONTRACTOR SHALL BE IN THE CONTROLS BUSINESS SUCH AS BARCOL CONTROLS OR OTHER SIMILAR CONTRACTOR PRIOR TO PREPARING SHOP DRAWINGS FOR CONTROLS. SUBMIT SHOP DRAWINGS FOR APPROVAL WITH DETAILED SEQUENCE OF OPERATION FOR ALL SYSTEMS. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL DETAILS.

**SCOPE OF WORK:**

1. SCOPE OF WORK INCLUDES THE DESIGN, SUPPLY, INSTALLATION, COMMISSIONING AND TRAINING FOR A NEW ELECTRIC CONTROLS SYSTEM FOR THE FOLLOWING:

- GAS DETECTION SYSTEM INTERLOCKED TO NEW ENGINE AND EXISTING VENTILATION SYSTEMS (EF-1, SF-1 AND ASSOCIATED MOTORIZED DAMPERS).

**SEQUENCE OF OPERATION:**

**EXISTING CONTROLS SYSTEMS:**

1. ON A CALL FOR VENTILATION OR DEHUMIDIFICATION, THE EXISTING EXHAUST FAN EF-1 WILL TURN ON AND ASSOCIATED MOTORIZED DAMPER MD-1 WILL MODULATE TO MAINTAIN TEMPERATURE AND HUMIDITY SET-POINT.

2. TO PURGE THE PUMP ROOM AND OPERATING ROOM WITH FRESH AIR (SUMMER OPERATION ONLY) THE FAN SWITCH FOR SUPPLY FAN SF-1 CAN BE MANUALLY TURNED ON BY THE OPERATOR.

**NEW CONTROLS SYSTEMS:**

1. WHEN THE ENGINE STARTS, THE EXISTING COMBUSTION AIR INTAKE MOTORIZED DAMPER MD-2 WILL OPEN. COMBUSTION AIR FROM THE ENGINE IS POWER VENTED OUTSIDE BY THE ENGINE VENT FAN PROVIDED BY THE ENGINE SUPPLIER.

2. WHEN A GAS DETECTOR SENSES ELEVATED LEVELS (ALARM LEVEL A), THE GAS MONITORING SYSTEM WILL SEND AN ALARM TO THE CITY'S SCADA PANEL.

3. WHEN A GAS DETECTOR CONTINUES TO SENSE RISING LEVELS (ALARM LEVEL B), THE GAS MONITORING SYSTEM WILL:

- SHUT OFF AND LOCK OUT THE ENGINE,
- START THE EXISTING EXHAUST FAN EF-1 AND OPEN THE EXISTING ASSOCIATED MOTORIZED DAMPER MD-1, IF NOT ALREADY RUNNING
- START THE EXISTING SUPPLY FAN SF-1, IF NOT ALREADY RUNNING
- ACTIVATE THE AUDIBLE/VISIBLE HIGH ALARM MOUNTED OUTSIDE THE ENTRANCE DOOR TO THE PUMPHOUSE, AND
- ALARM TO THE CITY'S SCADA PANEL

4. WHEN THE GAS DETECTOR SENSES GAS LEVELS HAVE DISSIPATED TO SAFE CONDITIONS BELOW HIGH LEVEL ALARM (ALARM LEVEL A), THE GAS MONITORING SYSTEM WILL:

- RELEASE ENGINE LOCKOUT, AND
- ALLOW EXISTING VENTILATION SYSTEMS EF-1, SF-1 AND ASSOCIATED MOTORIZED DAMPERS TO RETURN TO NORMAL OPERATION

**LEGEND:**

- MD-1 FRESH AIR INTAKE MOTORIZED DAMPER
- MD-2 COMBUSTION AIR INTAKE MOTORIZED DAMPER
- AUDIBLE/VISIBLE ALARM
- VISIBLE ALARM
- GMS GAS MONITORING SYSTEM
- CO REMOTE CARBON MONOXIDE GAS DETECTOR
- CH4 REMOTE METHANE GAS DETECTOR
- ECP ENGINE CONTROL PANEL
- SCADA CITY REMOTE MONITORING SYSTEM
- T THERMOSTAT
- H HUMIDISTAT

**PRODUCTS:**

- QTY. 1 - HONEYWELL ANALYTICS MODEL VA301EM-RFSA EXPANSION MODULE/CONTROLLER
- QTY. 1 - HONEYWELL ANALYTICS MODEL S301D2COMB(CH4) EXPLOSION PROOF SENSOR
- QTY. 1 - HONEYWELL ANALYTICS MODEL S301D2CO EXPLOSION PROOF SENSOR

**VA301EM-RFSA EXPANSION MODULE/CONTROLLER:**

- THE EXPANSION MODULE MUST BE CAPABLE OF COMMUNICATING WITH UP TO FOUR SENSORS AND CAN BE CONNECTED AT A MAXIMUM DISTANCE OF 500 FEET. ONE POWER SUPPLY (BRINGING EITHER 17-27 VAC OR 24-38 VDC) WILL BE SUFFICIENT TO POWER THE EXPANSION MODULE AND SENSORS.
- THE EXPANSION MODULE WILL MANAGE FOUR INTERNAL DPDT RELAYS AT FULLY PROGRAMMABLE ALARM LEVELS. THE RELAY RATING WILL BE NO LOWER THAN 5 A, 30 VDC OR 250 VAC (RESISTIVE LOAD).
- THE EXPANSION MODULE MUST PROVIDE ALL THE FUNCTIONALITIES NECESSARY TO COMPLY WITH MECHANICAL CODES. THIS INCLUDES A KEY FOR MANUAL FAN OPERATION, A SILENCE KEY TO ACKNOWLEDGE.
- THE EXPANSION MODULE WILL INDICATE THE EXACT CONCENTRATION OF GAS AND THE GAS DETECTED. THE LCD DISPLAY WILL INDICATE MULTIPLE ALARM LEVELS FOR EACH SENSING POINT. THE LED WILL ALSO PROVIDE VISUAL FEEDBACK IN THE FOLLOWING MANNER:

- NORMAL OPERATION: GREEN LED
- ALARM LEVEL A: RED LED
- ALARM LEVEL B: RED LED
- ALARM LEVEL C: RED LED
- FAILURE: YELLOW LED

- THE STANDARD THREE HIGH/LOW ALARM LEVELS WILL BE COMPLEMENTED WITH A FAULT RELAY.
- THE EXPANSION MODULE MUST PROVIDE AN INDIVIDUAL 4-20mA OUTPUT PER SENSOR (UP TO FOUR) FOR DCS/ PLC COMPATIBILITY.
- THE EXPANSION MODULE WILL HAVE AN AUDIBLE ALARM INCORPORATED (RATED AT NO LESS THAN 65 DBa AT 3ft), WHICH WILL BE ACTIVATED AT FULLY PROGRAMMABLE LEVELS.
- THE UNIT WILL BE CERTIFIED TO UL AND CSA STANDARDS. THE CONTROLLER MUST BE MANUFACTURED WITHIN AN ISO 9001 PRODUCTION ENVIRONMENT.
- THE EXPANSION MODULE MUST BE A VULCAIN MODEL VA301EM-RFSA MANUFACTURED BY HONEYWELL ANALYTICS.

**S301D2 COMBUSTIBLE GAS & CO SENSOR:**

- THE SENSOR WILL BE POWERED BY THE VA-301EM EXPANSION MODULE. THE GAS SENSORS WILL HAVE RESOLUTION LEVELS OF 1% WITH A STANDARD RANGE OF 0-100% L.E.I. FOR COMBUSTIBLES AND 3% FOR ELECTROCHEMICAL CO. TEMPERATURE AND RELATIVE HUMIDITY VARIATIONS WILL HAVE NO EFFECT ON THE UNIT'S ACCURACY.
- THE SENSOR WILL BE CAPABLE OF OPERATING WITHIN RELATIVE HUMIDITY RANGES OF 0-95% AND TEMPERATURE RANGES OF -40°F TO 122°F (-40°C TO 50°C).
- THE SENSOR (S) WILL BE RATED FOR CLASS 1 DIV. I GROUPS B,C,D.
- THE UNIT WILL BE MANUFACTURED TO UL AND CSA STANDARDS.
- THE SENSOR ALARM LEVELS AND UNIT ARE TO BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING PARAMETERS:

TOXIC GASES	FIRST ALARM RECOMMENDED SET POINT	SECOND ALARM RECOMMENDED SET POINT	SENSOR LOCATION	RADIUS OF COVERAGE
METHANE (CH4)	10%	20%	1ft BELOW CEILING	20ft
CARBON MONOXIDE (CO)	12ppm	25ppm	5ft ABOVE FLOOR	20ft

1 VENTILATION CONTROLS SCHEMATIC  
SCALE: N.T.S.

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 PLOT: 1:1 A-1

FIELD BOOK #:				ENGINEER'S SEAL					
DESIGNED BY	RLG			CHECKED BY	<i>RLG</i>				
DRAWN BY	RLR	APPROVED BY	<i>RLG</i>	PROJECT TITLE <b>WESTWOOD WASTEWATER PUMPING STATION STANDBY ENGINE AND FORCEMAIN WALL INSERT REPLACEMENT CONTROLS SCHEMATIC</b>		SHEET OF CITY DRAWING NUMBER			
HOR. SCALE: AS NOTED		RELEASED FOR CONSTRUCTION:							
NO. REVISIONS		DATE	BY	DATE	12/10/26	DATE		M03	

