

 **TELEDYNE  
ANALYTICAL INSTRUMENTS**



**Flammable gas and  
vapor detection system**

**Rugged, flexible, easy to maintain**

model  
**1220**

# Flammable Gas & Vapor Detection System

## Model 1220

Teledyne's Model 1220 microprocessor-controlled gas detection system is specifically designed to monitor industrial locations such as refineries and chemical plants, and warn of the presence of potentially explosive gases and vapors. In addition to warning of impending danger, the 1220 can activate ventilation or sprinkler systems, or shut down process equipment until the danger is eliminated. Developed in collaboration with plant personnel who utilize gas detection equipment, the Model 1220 is a blend of flexibility and simplicity with state-of-the-art electronics.

### Advantages

- Dependable microprocessor based electronics
- 1MAN calibration
- No field mounted electronics required
- Rugged, field proven detectors

### Building Block Concept

Virtually every application has unique requirements, beginning with the number of locations to be monitored by one system. Therefore, flexibility is a key ingredient in the 1220 design. A 1220 system is comprised of a central control station and remote detectors. A system can be as small or as large as needed because the control station incorporates a building block concept of control modules, each of which houses up to eight channel modules connected to one or two detectors mounted in the hazardous location.

A free standing system (figure 1) can accommodate up to seven control modules (figure 2), 56 channel modules and 112 field mounted detectors. The detectors can be located well over a mile from the main system. Only AC or optional DC power is needed for the system to be fully operational.

### Control Module Features

- Accepts up to eight channel modules and 16 sensor inputs
- Provides common alarm relay outputs from all eight channels
- Common audible alarm and bypass switch with indicator light
- Main power on/off control and indicator light

Information from all eight channels is fed into a central receiver. The audible alarm and common alarm relays automatically actuate when any alarm condition exists on any channel (failure, caution, or high). Control module relays can be made to operate either normally energized or normally de-energized. A common alarm bypass switch is provided to silence the internal audible alarm and external alarm devices are not affected by the bypass switch.

### Channel Module Features

- A 30 second time delay on start up to prevent false alarms
- Three customer-selectable calibration modes
- Pass code protection
- Customer selectable alarm set points and relay functions
- Custom backlit LCD display
- 0-10 VDC output
- Error codes to prevent incorrect calibration
- Sensor sensitivity gauge
- Separate power supplies for each channel
- Self diagnostics with fail codes and test points

The channel module (figure 3) is a stand-alone unit with its own microprocessor, power supplies, alarm relays, self diagnostics and controls. Easy to use and service, each channel module provides self diagnostics that automatically



Control Module System Enclosure  
(figure 1)

check power supplies, sensors, signal output and connections to insure key components are functioning properly. Failure codes are provided to quickly locate troubles spots and assist in keeping the system on line at all times. The module can be easily re-configured to operate in the dual detector configuration by simply installing the S2 activation PC board. When installed the microprocessor automatically reconfigures itself to accommodate the second detector.

Modifications to the channel module settings are protected by an optional pass code which prevents access to the SELECT key menus. Once the SELECT key is activated the menus are displayed. Successive key strokes advance the selection and menus are prioritized based on anticipated usage.

### Options

- T Two sensors per channel
- M 4-20 mADC output
- R RS-485 output (MODBUS Protocol )
- V 12-24 VDC operation

The 1220 module is also designed as a drop-in replacement for Teledyne's existing Model 122 channel modules providing a cost effective approach when replacement is indicated.

## 1MAN Calibration

The Model 1220's 1MAN calibration feature eliminates the inherent reliability problems associated with field mounted electronics. A novel software program allows the operator to apply zero and span gas to the remote detector while the calibration data is being stored in the channel module. The values are displayed on the channel module's LCD where they can be adjusted when the operator returns to the channel module location. Error codes are provided to alert the operator when calibration was unsuccessful or a fault has



Control Module (figure 2)

been detected. The LCD also includes a sensitivity gauge which provides vital information on the detector's health. As gas detectors age their sensitivity slowly degrades in a predictable manner. Dramatic sensitivity shifts can be an indication of poisoning or chemical attack and potential loss of detection capability.

## Communication Port

The optional RS-485 communication port (MODBUS protocol) provides the operator with 23 customer selectable inputs including mode of operation, min/max gas value detection, fail codes, configuration settings, and before and after calibration values. The customer selectable channel module ID (Hexadecimal) feature also provides the ability to specifically identify the detector's location within the plant.

## Detectors

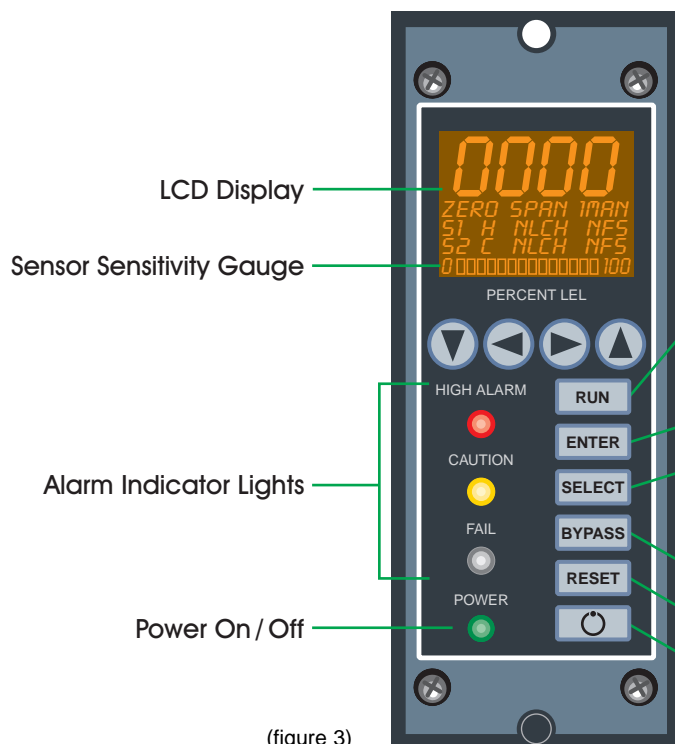
Refined over the years, Teledyne's rugged detector design has demonstrated exceptional performance under the harshest environments. Based on the low temperature catalytic oxidation principle, the detector utilizes stainless steel support bars in the construction of the platinum sensing beads which provide exceptional stability and long life under shock and vibration conditions.

The beads are heated by passing a constant current through the heating coils. Upon exposure to combustible gases an oxidation reaction occurs at the catalytic active bead which raises its temperature. This temperature rise causes the resistance of the coil to increase slightly as well. Measurement of the change in the coil resistance produces an accurate measurement of the concentration of the combustible gas. The inert bead compensates for changes in coil resistance which might occur from other phenomena other than the combustible gas.

A wide variety of sensor configurations are available to meet specific application requirements including stainless steel sensor housings, lead or silicone resistance, and optimization for specific gases such as ammonia.



Field Mounted Detectors



(figure 3)

## Channel Module

- Arms System
- Toggle LCD on/off
- Display Sensor 1 Gas Value
- Display Sensor 2 Gas Value
- Enters Information in the Computer
- Sensor(s) Calibration
- Alarm Setpoint & Relay Function
- Channel ID
- Pass Code on/off
- Silence / Audible Alarm
- Resets Latching Alarm Relays
- Turns Power on/off
- Activates 30 Second Time Delay

Applications

- Aerosol filling
Automotive manufacturing
Battery charging
Chemical plants
Loading docks
Metal coating
Sewage plants
Paint & varnish manufacturing
Petroleum refineries
Pipelines
Power plants
Landfills
Semiconductor manufacturing
Solvent manufacturing
Utility companies

- Accuracy: +/- 2% of full scale at constant temperature
Alarm indicator lights: LED
Signal output: 0-10VDC
Optional 4-20mA negative ground
Operating temperature: 32 to 122°F (0-50°C)
Alarm relays: Form C SPDT rated at 2 amps @ 240 VAC non-inductive
Alarm relay operation: Fail Safe/Non-Fail Safe, Latching/Non-Latching
Digital port: RS485 MODBUS protocol \*
Power requirements: 100-240VAC, 50/60Hz
Optional 12-24VDC
Power consumption: 20 watts / channel nominal

Specifications

Electronic Controls

- Number of channels: Up to 8 per control module
Field connections: Barrier-type terminal strips with screw connections
Dimensions: 7" H x 12.3" D x 19" W (control module)
Housing: Aluminum (standard 19" rack mount)
Display: Transflective backlit 4 digit, 7 segment LCD
Range: 0-100% LEL
Repeatability: 2% of full scale

Detector

- Sensor housing: Anodized aluminum standard
Options: Stainless steel housing; elements suitable for use with lead/silicon/halogen compounds; explosion proof junction box rated Class 1, Div 1, Group C&D
Response time: 90% in less than 15 seconds
Operating temperature: -40 to 54°C
Accuracy: +/- 2% of full scale at constant temperature
Life expectancy: 3-5 years
Maximum loop resistance for sensor connections / cabling: 35 ohms (single sensor applications)
20 ohms per sensor (dual-sensor applications)

\* Contact factory for availability

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Warranty

Instrument is warranted for 1 year against defects in material or workmanship

NOTE: Specifications and features will vary with application. The above are established and validated during design, but are not to be construed as test criteria for every product. All specifications and features are subject to change without notice.

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