

Model 5020 Combustible Gas Detection Module



- **Single slot plug-in module which can be inserted into or removed from rack with power on**
- **Monitors combustible gas sensors via 4-20 mA sink or source input**
- **Digital 7-segment LED readout in percent of Lower Explosive Limit**
- **Dual alarm trip points. Flashing red LED indication and Form C contact outputs**
- **Field wiring continually monitored for faults**
- **Incoming signal digitally filtered to reject transients and line noise**
- **Alarm outputs independently set "latching" or non-latching**
- **Solid state outputs for external alarm lamps or LED's**
- **24 VDC output for powering sensors**
- **Isolate switch deactivates module outputs for calibration or test**
- **Module self-check routine performed every 8 minutes**
- **Can accept any sensor with 4-20 mA output, regardless of manufacturer**
- **One person calibration when used with suitable "smart" sensor**

The SST Model 5020 Combustible Gas Detection Modules are used to monitor the concentration of combustible gases which may accumulate in a protected area. The module can be used with any sensor that provides a standard 4-20 mA output signal. The sensor input on the module is completely isolated, so that it can be fed from a transmitter that is referenced to + DC, - DC, ground, or floating. Because this is a current loop, other devices, such as a PLC input or a data acquisition system, may be connected into the same loop without affecting the Model 5020 indications. A 24 VDC output, derived from the redundant NOVA-5000 System power supplies, is provided for powering the field sensor.

During normal operation, the green Power LED will be the only visible indication on the module. All other indications, including the digital readout of gas concentration, are suppressed. This avoids confusion when there are several modules installed adjacent to each other, and makes the module that is displaying an alarm more visible. Whenever the concentration of combustible gas in the protected area exceeds 3% of the Lower Explosive Limit (3% LEL), this percentage is displayed on a 2-digit numeric display. Associated with the %LEL display are two independent alarm trip circuits. The trip point for either circuit is set to any desired value, using switches on the module printed circuit board. Alarm trip A1, the "Low Gas Alarm," would normally be set somewhere between

10% and 30% LEL, and can be either latching or non-latching. Likewise, alarm trip A2, "High Gas Alarm," would typically be set between 40% and 50% LEL, latching or non-latching. When the level of gas exceeds the low level trip point, the red A1 LED will begin flashing, and the module low alarm relay is energized. There is also a separate Alarm Lamp output on the module which will be flashing, and can be used to drive an external lamp or LED. At the same time, a short pulse signal is sent on the main system alarm bus to initiate an external alarm signal. Similarly, gas in excess of the high gas trip point will cause the red A2 LED to flash. The lights continue to flash until the module receives an **Acknowledge** signal (from an external pushbutton or a Model 5120 System Module); this causes the flashing lights to change to a steady "on" condition. If the alarm circuits are set to be "**latching**," alarm indications and outputs remain until the Reset switch is depressed.

An **Isolate** switch is provided on the module to permit temporary deactivation of the alarm outputs during calibration. This switch is recessed so that a tool is required for its operation. When isolated, the yellow isolate LED will be lit. If the calibrating gas is now applied to the gas sensor, the digital readout, alarm LED's and lamp outputs will function normally. However, the alarm relay outputs will not be activated.

During normal operation, the sensor wiring connected to the Module input terminals is continuously "**supervised**" for faults. The supervised circuit will cause the yellow fault



LED to flash (until acknowledged) if any field wire is open, shorted, or drawing excessive current. Faults in the sensing wires are identified by diagnostic messages displayed on the module readout. In addition, the total current being drawn by the sensor is checked; if a sensor failure causes excessive current draw, it will be shutdown, and the yellow SDOWN (shutdown) LED will light. Any power failure will be indicated by illumination of the yellow power fault LED.

The module has an automatic self-check routine which is run every eight minutes. During self-check, the module analog measurement and trip circuits are tested for performance. The green CHK LED will flash during the test, and the trip level settings can be read on the digital readout. If any failure is detected during this test, the yellow CHK LED will flash, and the system fault bus will be energized.

In addition to the features noted above, all LED's will be illuminated when the LAMP TEST bus input is activated. Each module mounts in one plug-in space in the NOVA-5000 Rack Assembly.

ARCHITECT'S AND ENGINEER'S SPECIFICATIONS

Combustible gas detection capability shall be provided by plug-in module(s) with associated combustible gas detectors, suitable for detecting (*name of gas*) in concentrations up to 100% LEL. The module shall utilize a standard 4-20 mA circuit between the module and the sensor devices, and be capable of supplying operating current for these devices. The field installed wiring between the module and field device shall be continuously supervised, and a fault reported upon detection of any open or short circuit. A fault must also be reported if the sensor draws excessive current, and the sensor circuit must then be shutdown to prevent further damage. Alarm and Fault conditions shall be indicated by LED's on the front of the module. The LED's shall flash when activated until an "acknowledge" signal is applied to the module, at which time any flashing LED's shall change to a steady "on" indication. The module shall provide a front panel mounted ISOLATE switch which enables calibration and testing of the alarm circuits in the module without activating the system outputs from the module. It shall be permissible to insert or remove the module from its mounting rack without removing power from the rack, and the manufacturer's literature shall so state. Safety Systems Technology Model 5020 Combustible Gas Detection Modules, or approved equivalent, shall be supplied.

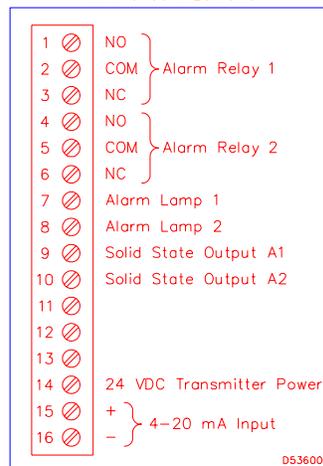
MODULE TECHNICAL SPECIFICATIONS

Sensor Input:	4-20 mA current input, 0.2 volts maximum voltage drop, 120 volts AC/DC isolation
Power Supply to Sensor:	24 VDC @ 500 mA Momentarily interrupted if necessary to reset field sensor.
Alarm Relay Contacts:	1.0 Amp @ 28 VDC Resistive Low alarm A1, high alarm A2, screw terminals on backplane
Solid State Alarm Outputs:	Open Collector current sink, 300 mA max. Follows state of alarm relays on module.
Alarm Lamp Outputs:	Open Collector current sink, 300 mA max. Follows state of alarm LED's on module, flashes on detection of A1 and A2 alarms, steady when acknowledged.
Power Status Output:	Open Collector current sink, 300 mA max Momentarily interrupted when module is reset. Used to reset self-powered field devices with alarm latches.
Digital Readout:	- 9% to + 99% LEL Readout blanked below 3% LEL except during calibration.
Front Panel Indicators:	Power On, Power Fault, Alarm A1, Alarm A2, Self-check running, self-check fault, Channel Isolated, Channel Fault, Shutdown
Front Panel Switches:	Isolate, Reset Isolate switch requires tool to operate.
Internal Adjustments:	Alarm trip level set (2), alarm latch/non-latch (2), zero, span Trip levels set digitally on DIP switches. Extender card required to adjust zero and span on rack mounted modules.
Power Required:	24 VDC nominal, 80 mA standby, 140 mA alarm Total for module only. Does not include power drawn by sensor.
Size:	0.99 inches wide x 5.06 inches high x 7.4 inches deep Requires 1 mounting space in SST Standard Mounting Rack.
Weight:	7 ounces

ORDERING INFORMATION

PART NUMBER	DESCRIPTION
35020-100	Model 5020 Combustible Gas Detection Module for use with 0-100% LEL sensors having 4-20 mA output
35360	Module Calibration and Test Extender Card

MODEL 5020
WIRING CONNECTIONS



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