Anatomy of a Fixed System

Rev. 6-24-14

Single Channel

Two Channel

Four Channel

Eight Channel

What is a Fixed System?

- A fixed system also known as stationary system or continuous monitor, is a gas detection system designed to monitor gas on a continuous basis. This system may be required to activate horns, lights, shut down a process, evacuate a building or other work that may be required. RKI's core competencies include:

✓ **Combustible Gas**

✓ **Oxygen Content**

✓ **Toxic Gas**

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Fixed System Applications

- Refineries
- Chemical & Petrochemical Plants
- Water & Wastewater
- Fuel Storage
- Breweries
- Wineries
- Oil and Gas

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Fixed System Uses

- Room air monitoring for employee protection
- Fence line or perimeter monitoring
- Process control
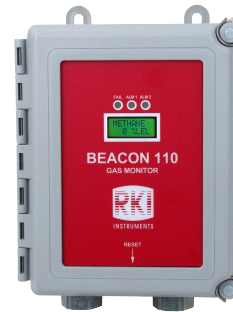- Gas cabinet exhaust monitoring
- Industrial point gas monitoring

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The Building Blocks
Selecting the right components

Gas Detector or Transmitter

- Select the appropriate gas detector or transmitter for the gas you need to detect
- Gas detectors/transmitters can be provided in a variety of configurations to meet your needs:
  - Explosion proof
  - Non explosion proof
  - Diffusion (blind), either direct connect or 4-20 mA communication

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Gas Detector or Transmitter

- Diffusion (non-intrusive), 4-20 mA communication, Modbus
- Sample draw, either direct connect or 4-20mA communication or PoE

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Controller

- Select the appropriate controller for your application
  - RKI Controllers are not always used in fixed system applications, however they perform a vital function
  - If an RKI Controller is not used, transmitters can be wired to a PLC or DCS

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Controller

- RKI Controllers provide the following:
  - Regulated power to each gas transmitters or direct connect sensor (model dependent)
  - A readout of gas concentration for each channel
  - Receives signal from transmitters or direct connect sensors
  - Audible and visual alarms

Controller

  - Relay contacts for performing specific work functions
  - Recorder output for trending (optional on the Beacon 800)
  - Can charge back-up battery systems if needed
  - May be installed in a NEMA 4X housing suitable for industrial use

Controller Selections

- Beacon 110, single sensor
- Beacon 200, one or two sensors
- Beacon 410, one to four sensors
- Beacon 800, one to eight sensors
- RM-5000, from 2 points to 12 points

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Accessories

- Choosing the proper accessory will help complete the system
- Horns
  – For warning or evacuation
- Strobes
  – To alert workers to danger
- Solenoid valves
  – Shut off leaking gas supply

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Accessories

- Auto dialers
  - Notify authorities
- Recorder/Data logger
  - Document readings and trends
- Back up battery
  - Supplies back-up power to system and enunciators

Accessories

- Air Aspirated Sample Draw Adapter
  - Sample from duct or remote location
  - Runs from compressed air only
- J-Tube
  - Self draining moisture trap
- Water Trap
  - Trap liquids

Accessories

- Remote calibration adapters
  - Simplifies calibration for sensors installed on ceilings
- Humidifier tube
  - Adding humidity to dry gas for calibrating MOS type sensors
- Splash guards
  - To protect sensors from wet environments

Calibration Kits

- Required for performance verification and to calibrate sensor/transmitter assemblies
- Select proper kit for each gas
- Do not use other manufacturers regulators, test cups or tubing

Verify age of gas before use by looking at the "Best When Used By" date.

Many gases have short shelf life such as: NO2 - 6 months and Chlorine - 9 months
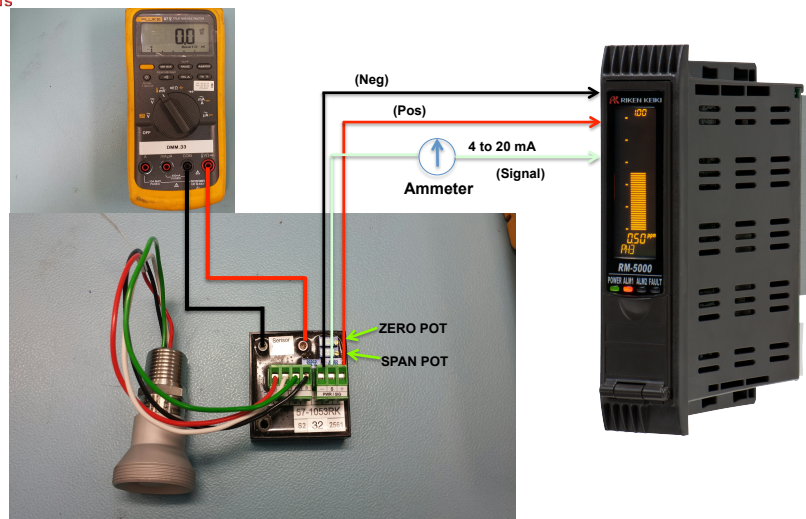
Internal Power Supply

- Do not use the internal power supply to power external devices such as horns, strobes or valves
- Many external devices produce electrical noise that can adversely affect the operation of your monitor
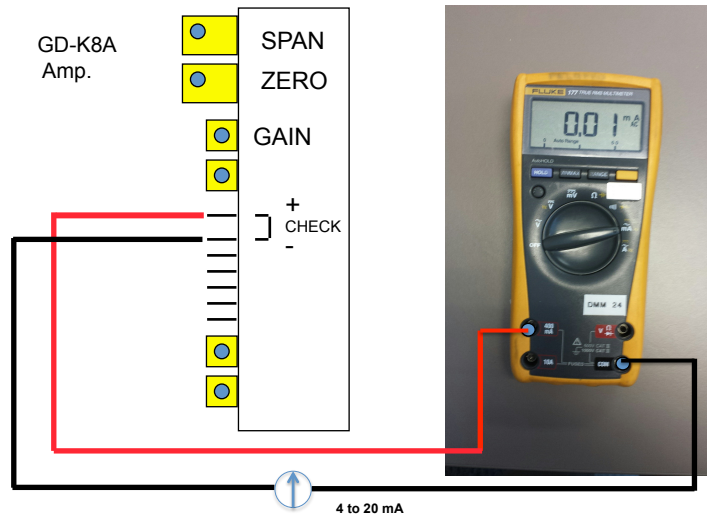
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4-20 mA Communication

(Neg)
(Pos)
4 to 20 mA
Ammeter
(Signal)

ZERO POT
SPAN POT

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4-20 mA Communication

GD-K8A Amp.

SPAN

ZERO

GAIN

+ CHECK

-

4 to 20 mA

Useful Formulas

- Standard S-Type Transmitter
  - Oxygen: 20.9/full scale x 400 + 100
    - Oxygen calibration setting in mV
  - Combustible & Toxic: (Cal gas/full scale) x 400 + 100
    - Combustible/toxic span setting in mV
- Current Source Amplifier
  - Toxics: (Cal gas/full scale) x 16 + 4
    - Toxic span setting in mA

10.0 Applications Worksheet

10.1   Description And Explanation of Importance:

The Applications Worksheet is a guide which compiles all of the information normally necessary to consider to select and design a gas monitoring system. The Worksheet questions will help define the application parameters so that the pertinent considerations can be included. Please take care to fill out the Applications Worksheet completely and accurately. Feel free to contact RKI if you need assistance or have any questions regarding the worksheet or how to consider the information on it. When contacting RKI for assistance, please first fill out the worksheet as much as you can and Fax it to RKI at (510) 441-5650 prior to calling so that the RKI Systems Applications Engineers can best serve you.

10.2   How to Fill Out an Applications Worksheet:

Please make a copy of the Applications Worksheets in this manual, and return the originals to the binder for later use. The worksheet consists of 4 parts:

10.2.1 Customer information, description of the general application, and what gases and ranges you need to detect. Please fill this information in carefully since it is critical in helping to select the proper system.

10.2.2 Conditions at the sensor location. Please describe the environmental conditions at the sensing location. The worksheet asks questions and has blanks to fill in the appropriate information. The information on this sheet will assist both you and RKI to select the most appropriate sensor solution for your application.

10.2.3 Conditions at the controller. Please decide where you would like the controller to be installed. In many cases the controller is not located in the same area as the sensor, so it is important to evaluate the conditions where the controller will be located to select an appropriate controller.

10.2.4 Sketch a drawing of the area to be monitored on the graph paper section of the Worksheet. Include dimensions of the area to be monitored (estimate if necessary), and include the location of the equipment, tank, piping, etc. , that is the possible source of the gas leak. This sketch will help to select the best location for the gas sensors, and the number of gas sensors.

When the worksheet is completed to the best of your ability, Fax it to RKI Instruments Fixed Systems Applications Engineering at (510) 441-5650 (or your local distributor) for assistance selecting and pricing the best system for your use.

10.0 Applications Worksheet

Company:_____   Date:_____

CONDITIONS AT CONTROLLER (Please use a separate sheet for each type of controller, application or location)

Location:	Location#:

Number of detectors in system:

Describe controller site:

Location Requirements		Hazard Rating		
Indoor ☐	Outdoor ☐	Hazardous ☐	Non Hazardous ☐	Restricted Access ☐
Inaccessible ☐	Duct or Vessel ☐	XP Rating:	Class:	Division:	Group:

Environment		3rd Party approval Req'd	Yes ☐ No ☐

| | | Approval Needed: | FM ☐ | UL ☐ | CSA ☐ | Other: |

Temperature:	Minimum: Maximum: Cycle:	Approval Needed: FM ☐ UL ☐ CSA ☐ Other:
	Humidity: % RH:	**Available Utilities**
	Condensing ☐ Non Condensing ☐	Electrical:	Volts AC:	Volts DC:	Hertz:
Dust/Mists:	Yes ☐ No ☐ If yes, which?	Compressed Air:	PSIG:	Volume:	Filtered: Yes ☐ No ☐
Corrosives:	Yes ☐ No ☐ If yes, state types.	Signal Required:	4-20 mA	RS-232:	RS-485: Other:
Vibration:	Yes ☐ No ☐	Interferences:	Radio:	EMI:	Poisons:
Splash/Washdown:	Yes ☐ No ☐ If yes, which?	

Replacing existing equipment?   Yes ☐   No ☐   If yes, explain why

Back-up power supply ☐   Repeater display ☐   Relays ☐   Alarm delay needed ☐   Alarms ☐   Audible ☐   Visual ☐

CONDITIONS AT DETECTOR (Please use a separate sheet for each type of controller, application or location)

Location:	Location#:

Target gas:

Describe detector / transmitter site:

Operate other equipment? If yes, state type.

Any special relays?

Location Requirements		Hazard Rating		
Indoor ☐	Outdoor ☐	Hazardous ☐	Non Hazardous ☐	Restricted Access ☐
Inaccessible ☐	Duct or Vessel ☐	XP Rating:	Class:	Division:	Group:

Environment		3rd Party approval Req'd	Yes ☐ No ☐

Temperature:	Minimum: Maximum: Cycle:	Approval Needed: FM ☐ UL ☐ CSA ☐ Other:
	Humidity: % RH:	**Available Utilities**
	Condensing ☐ Non Condensing ☐	Electrical:	Volts AC:	Volts DC:	Hertz:
Dust/Mists:	Yes ☐ No ☐ If yes, which?	Compressed Air:	PSIG:	Volume:	Filtered: Yes ☐ No ☐
Corrosives:	Yes ☐ No ☐ If yes, state types.	Signal Required:	4-20 mA	RS-232:	RS-485: Other:
Vibration:	Yes ☐ No ☐	Interferences:	Radio:	EMI:	Poisons:
Splash/Washdown:	Yes ☐ No ☐ If yes, which?	

Replacing existing equipment?   Yes ☐   No ☐   If yes, explain why

10.0 Applications Worksheet

Optional / Accessories:		
	Yes	
Back-up power supply:		
Repeater display:		
Alarms delay needed:		
Splash guard:		
Filter:		
Hydrophobic:		
Particulate:		
Sample-draw adapter:		
Comp. air/electric pump		
Sample conditioning:		
Heated/cooled? If yes, which?		
Alarms:		
Audible		
Visual		
Display:		
Spare parts:		
Start-up service:		
Service contract:		

10.0 Applications Worksheet

Sketch:
(Please include rough dimensions, note significant features and equipment, suggested sampling sites, etc.)

Fixed Systems Accessories

Horns and Strobes

51-0055RK
Rotating alarm light

51-0090RK
Rotating alarm light

51-0096RK
Strobe light with horn

52-0004RK
24 VDC Horn

Non Hazardous Locations

Part#	Description	Suggested Retail
51-0092RK	Flashing alarm light with horn, amber, 115 VAC, 40 watt lamp, Edwards 51A-N5-40W	450.00
51-0091RK	Flashing alarm light with horn, blue, 115 VAC, 40 watt lamp, Edwards 51B-N5-40W	450.00
51-0059RK	Flashing alarm light, amber, 24 VDC, 20W, Edwards 48FINA-G1-20WH	195.00
51-0061RK	Flashing alarm light, blue, 24 VDC, 20W, Edwards 48FINB-G1-20WH	240.00
51-0060RK	Flashing alarm light, green, 115 VAC, 25W, Edwards 48FING-N5-25WH	240.00
51-0057RK	Flashing alarm light, red, 115 VAC,25W, Edwards 48FINR-N5-25WH	240.00
52-0003RK	Horn, 115 VAC, vibratory, NEMA 4X, Edward's 876-N5	220.00
52-0004RK	Horn, 24 VDC, vibrating, Federal 450-24 VDC	220.00
51-0090RK-24	Light with horn, flashing red, 24 VDC, 40 watt lamp, Edwards 51R-G1	450.00
51-0090RK	Light with horn, flashing red,115 VAC, 40 watt lamp	450.00
51-0090RK	Light with horn, flashing red,115 VAC, 40 watt lamp	450.00
51-0054RK	Rotating alarm light, amber, 115 VAC	295.00
51-0056RK	Rotating alarm light, blue, 115 VAC	295.00
51-0053RK	Rotating alarm light, green, 115 VAC	295.00
51-0055RK	Rotating alarm light, red, 115 VAC	295.00
51-0058RK	Rotating alarm light, red, 24 VDC, with 1/2" NPT mounting	195.00
51-0080RK	Stack light with audible alarm, red, base mount, Cutler-Hammer E26XWWF2Q-V4	475.00
51-0097RK	Strobe light with horn, red housing, no markings, 96 - 132 VAC, NEMA 4X	220.00
51-0096RK	Strobe light with horn, red housing, no markings, 8 - 33 VDC, NEMA 4X	130.00
51-0067RK	Strobe light, amber, 2 4 VDC, NEMA 4X	173.00
51-0068RK	Strobe light, blue, 24 VDC, NEMA 4X	120.00
51-0066RK	Strobe light, red, 24 VDC, NEMA 4X	120.00

Hazardous Locations (Class I, Div 2)

52-0005RK
Horn, Class I, Div 2

51-0035RK
Stobe Light, amber, Class I, Div 2

51-0030RK
Stobe Light, red, Class I, Div 2

Part#	Description	Suggested Retail
52-0005RK	Horn, Federal Signal 350-WBX, for hazardous locations, Class I Div 2	655.00
51-0035RK	Strobe light, amber, 115 VAC, Edwards 105FINHA-N5, for hazardous locations, Class I Div 2	365.00
51-0030RK	Strobe light, red, 115 VAC, Edwards 105FINHR-N5, for hazardous locations, Class I Div 2	365.00

Fixed Systems Accessories

Fixed Systems Replacement Parts and Accessories

Part#	Description	Suggested Retail
18-0400RK-01	Junction box, with spacers (Aluminum)	100.00
18-0400RK-02	Junction box, with spacers (Aluminum) and terminal strip	100.00
21-0519RK	Rain proof housing for GD-K8A	480.00
30-0951RK	Flow through adapter, LEL, chamber and fittings only	400.00
30-0951RK-01	Flow through adapter, LEL, chamber and fittings only	180.00
30-0951RK-02	Flow through adapter, LEL, chamber with flow meter, and fittings only	325.00
30-0951RK-H2S	Sample drawing adapter, air aspirated, for use with NPT style sensor, for Hydrogen Sulfide (H2S) (sensor sold separately)	460.00
30-0951RK-HS-01	Flow through adapter, H2S, chamber and fittings only	230.00
30-0951RK-HS-02	Flow through adapter, H2S, chamber, flow meter, and fittings only	430.00
30-0951RK-IR	Sample drawing adapter, air aspirated for IR (sensor sold separately)	400.00
30-0951RK-IR-01	Flow through adapter, IR sensors, chamber and fittings only	180.00
30-0951RK-IR-02	Flow through adapter, IR sensors, chamber with flow meter and fittings	325.00
30-0951RK-O2/CO	Sample drawing adapter, air aspirated for Oxygen or Carbon Monoxide (sensor sold separately)	400.00
30-0951RK-OC-01	Flow through adapter, O2/CO, chamber and fittings only	180.00
30-0951RK-OC-02	Flow through adapter, O2/CO, chamber, flow meter, and fittings only	325.00
33-0165RK	Filter, Millipore, PTFE, Disc type, hydrophobic, EAGLE, Fixed Systems	27.00
33-0401RK	Water Trap assembly with J - tube	600.00
33-2001RK-01	Humidifier tube assembly for cal kits, with 3/16" tubing on ends	90.00
33-2002RK-01	Humidifier, 24" for cal kits, with 3/16" tubing on ends, for EAGLE	245.00
33-6095RK	Charcoal filter for fixed systems, CF-188	38.00
33-7116RK-01	Silicone removal filter for 1/2" NPT LEL sensor	60.00
33-7121RK	Filter, H2S scrubber disk for ESM-01DH-SO2 sensor	5.00
47-1015RK-01	Power cord, SJT, 115 VAC, 8 feet, with bushings, added to fixed systems	30.00
49-8103RK	Standby battery assembly, 24 VDC, 1.2 AMP hours, for Beacon 110 and Beacon 200	250.00
49-8104RK	Standby battery assembly, 24 VDC, 12 AMP hours, for Beacon 110, Beacon 200, Beacon 410, & Beacon 800	450.00
57-1053RK	Transmitter, S2, LEL, 4-20 mA, standard version, 4 wire (low current) detector	240.00
57-1064RK-01	Transmitter, S2, Oxygen, 0-25%, 4-20 mA, with gasket	225.00
57-1064RK-03	Transmitter, S2, toxics, 4-20 mA, with gasket	225.00
81-1103RK	Calibration cup, for IR 3/4" NPT sensor	15.00
81-1103RK-01	Calibration cup / splash guard, for IR 3/4" NPT sensor, with diffuser holes	40.00
81-1109RK	Cal cup for 82 single gas series, GX-82/86/91B (Not for GX-82A or GX-86A)	50.00
81-1112RK-01	Cal cup with diffuser holes, for 1/2 NPT sensor	45.00
81-1113RK	Cal cup, PS-2, with Screws	12.00
81-1114RK	Cal cup, diffusion, super toxic, GD-K8A, (rim feed)	20.00
81-1116RK	Cal cup/splash guard assembly, for CT7 sensor housing	60.00
81-1117RK	Cal cup, standard, fixed systems, for conduit mounting, LEL/O2/H2S/CO, (NPT type)	40.00
81-1117RK-05	Cal cup,standard, fixed systems, for conduit mounting, LEL/O2/H2S/CO, (NPT type), with CSA	55.00
81-1120RK	Cal cup, for GD-A8 and GD-A8V,w/fitting	100.00
81-1138RK	Cal cup, for ESM-01 diffusion sensors, fixed systems (not for Cl2 or NH3)	45.00
81-1138RK-CL2	Cal cup, for ESM-01 diffusion chlorine sensors, fixed systems	45.00
81-1138RK-NH3	Cal cup, for ESM-01 diffusion ammonia sensors, fixed systems	45.00
81-1190RK	Splash guard for ESM-01 detectors	15.00
82-0101RK	Magnetic wand, for M2 Transmitter, south pole	15.00
82-5100RK	Datalogger, 4-channel, 4-20 mA with software & USB cable	1,800.00
82-5102RK	Datalogger, 1 channel, 4-20 mA input, USB interface, with software & leads, Lascar EL-USB-4	250.00

Accessories

Training Notes

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