

SINGLE CHANNEL WALL MOUNT CONTROLLER

Gas Detection For Life

Beacon™ 110 Model



Gas detection should not be complicated. The Beacon 110 is gas detection simplified.

The Beacon 110 is a powerful, low cost fixed system controller for one point of gas detection. It is microprocessor controlled, simple to install and operate, and priced to be the industry's best value single gas detection controller. It is capable of accepting RKI sensors directly for LEL level combustibles, oxygen, CO2, and toxic gas sensors. The Beacon 110 can also accept any 4-20 mA transmitter (2 or 3 wire, 24 VDC). Sensors can be mounted directly at the Beacon 110 housing, or can be wired remote from the controller.

The 10 amp rated relay contacts allow direct control of external alarms and horns. The digital display has backlighting and simultaneous readout of the gas type and concentration.

The Beacon 110 is also housed in a NEMA 4X rated case for a weather tight seal. This case design complies with lock out / tag out standards and can be fully secured. An external reset switch allows the alarm to be silenced from outside of the controller housing. The Beacon 110 ships complete with a wall mounting kit for easy installation.

RKI offers the industry's widest selection of standard and toxic gas detection sensors, all of which can be utilized with the Beacon 110, providing gas monitoring protection for almost any application.

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Beacon™ 110 Model

Physical

Dimensions	Height: 8.5" 216 mm Width: 7.0" 178 mm Depth: 4.3" 109 mm		
Enclosure	Wall mounting grey fiberglass with hinged cover		
Conduit Connection	3/4" NPT conduit hubs, 2 provided. 1 for sensor wiring and 1 for power & relay wiring		
Wiring Termination	Screw type terminal block, 14 gauge max.		
Power	Universal 115 VAC & 220 VAC, or 24 VDC nominal, battery backup option available		
Controls	3 internal push buttons for setup, programming, and calibration. 1 external push button for alarm reset.		

Environmental

Operating Temperature	-4°F to 122°F (-20°C to 50°C)
Storage Temperature	-4°F to 158°F (-20°C to 70°C)
Enclosure Rating	NEMA-4X enclosure, chemical, and weather resistant. Suitable for indoor and outdoor installations.

Inputs

Direct Wired Sensors	LEL, Oxygen, Carbon Dioxide, and toxic gas sensors. Remote amp not required for less than 500 feet
4-20 mA Sensors	Accepts any 4-20 mA transmitter (24 VDC, 2 or 3 wire). A wide variety of RKI/Riken sensors are available with 4-20 mA signals. Wiring distances up to 8,000 feet
Sampling Methods	Diffusion and sample draw heads available

Outputs

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Relays	Three relays - 10 amp rating (at 115 VAC), SPDT isolated contacts. 2 relays for gas alarms and 1 trouble relay. Relays fully programmable for: increasing or decreasing alarm, latching or self reset, normally energized or normally de-energized, time delay for alarm on and alarm off.		
4-20 mA	Signal output, 4-20 mA (maximum load impedance 500 ohms), per channel		
24 VDC	24 VDC (400 mA max) output provided to operate sample drawing adapters or other accessories		
Display	2 x 8 Alphanumeric display with backlighting		
Audible	Built-in audible alarm, 94 dB, mounted on enclosure Coded output: pulsing = gas alarm, steady = fail		
Visual	3 LED's on the front cover for alarm status indication, and malfunction. Optional top-mount strobe		
Approvals	CSA Certified to CSA C22.2 No. 1010 and UL 61010-1		
Warranty	One year materials and workmanship		

Authorized Distributor:

Specifications subject to change without notice.



ISO 9001

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STAND ALONE TRANSMITTER

Gas Detection For Life

M2A Series

Features
 Operates with or without a controller Direct digital readout with OLED display Available gases include LEL and CO2 Infrared sensor for combustibles and CO2 4-20 mA & digital Modbus outputs standard 2 fully programmable alarm relays & fail relay Non-intrusive calibration via magnetic wand Explosion proof construction Patented water repellent sensor cover User friendly setup, push buttons & LCD menus Long-life sensors (2 - 5 years typical for catalytic, 5 -10 years typical for IR) Inclustry Applications Petrochemical plants Refineries Water & wastewater treatment plants Pulp & paper mills Manufacturing facilities Automotive Semiconductor plants Chemical plants

The RKI M2A[™] is a state-of-the-art transmitter that can operate as an independent, stand-alone monitor or as part of an integrated system. The M2A connects with an analog or digital signal to virtually any controller, PLC, or DCS. Setup procedures are simplified with user friendly push buttons and LCD menus. It utilizes a magnetic wand technique for performing non-intrusive calibration. The M2A provides an automatic zero drift correction feature, which results in more stable readings and reduces the need for adjustments due to sensor aging.

The housing of the M2A does not need to be opened for zeroing or calibration, making it unnecessary to declassify the area for routine maintenance. It is designed so that a complete field calibration can be performed by one person. Sensor construction is rated Class I, Div. 1 groups B, C, D for flammables and CO2. For CO2, a general purpose (not explosion proof) construction is also available.

The transmitter provides a 4-20 mA output in addition to a Modbus digital output. It also has two levels of alarms with relays, plus a fail alarm with relay. A digital display of the gas concentration, as well as alarm and status lights, can be viewed through the front window.

The M2A represents the latest leading edge technology in sensor / transmitters today.

The "A" version of the M2 style instrument includes several improvements over the past design. This includes an OLED display for cold temperature operation (to -40 C or F), side access conduit opening for better leak protection, improved RFI/EMI resistance, and superior protection against power surges or spikes.

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M2A Series

	LEL General Purpose	LEL H2 Specific	CH4 Methane	HC Hydrocarbons	CO2 Carbon Dioxide
Part#	65-2640RK 65-2640RK-05	65-2641RK 65-2641RK-05	65-2619RK-CH4 65-2628RK-CH4	65-2619RK-HC	65-2660RK-02 65-2660RK-03 65-2660RK-05 65-2660RK-10
Sensors	Cata	lytic		Infrared	·
Measuring Ranges	0 - 100	% LEL	0 - 100% LEL 0 - 100% Vol.	0 - 100% LEL	-02 0 - 5000 ppm -03 0 - 5% Vol. -05 0 - 50% Vol. -10 0 - 100% Vol.
Resolution	1% l	_EL	1% LEL /	/ 1% Vol.	20 ppm / 0.1% Vol.
Lower Detectable Limit (LDL)			2% of full scale		
Response Time (T-90)	35 Seconds or less		30 Seconds or less		ess
Life Expectancy	2 to 3 years with normal service	3 to 5 years with normal service	5 yea	rs plus with norma	al service
Accuracy (which ever is greater)	\pm 5% of reading or \pm 2 % LEL		± 5% of	reading or $\pm 2 \%$	of full scale
Weather Resistant	Patented w		ater repellent sen	sor coating	
Alarm Settings	Two fully programmable alarm set points, increasing / decreasing, latching / self-resetting, on delays, off delays, normally energized or de-energized				
Alarm Indication	Visual LEDs. Alarm 1, Amber; Alarm 2, Red; Fail, Red				
Relays	5 amp form 'C' contacts for alarm 1, alarm 2, and fail				
Dimensions	Height: 8.5" (215 mm), Width: 5.2" (132 mm), Depth: 4.5" (114 mm)			4 mm)	
Display	Alphanumeric OLED display. 8 characters per line; 2 lines for gas concentration readout, plus user-friendly calibration and setup		n and setup		
Enclosure	Explosion proof for Class I, Div 1, Groups B, C, D.				
Enclosure Rating	NEMA 4X, explosion proof, watertight, c		cast aluminum with	n o-ring seal and e	poxy powder coating
Controls	Magnet used for calibration functions. Calibrates without opening the housing. Internal push-button controls also available for calibration and setup				
Operating Temperature	-40°F to 167°F, -40°C to 75°C		-4°F	⁼ to 122°F, -20°C	to 50°C
Relative Humidity	5 - 95% RH non-condensing				
Location	Indoor or outdoor. Explosion proof for Class I, Div. 1, Groups B, C, D.				
Operating Voltage	: 19 VDC - 30 V		/DC, 12 VDC vers	ions available	
Analog	4-20 mA signal, into 500 ohms		s impedance max,	corresponding to	0 - full scale
Digital	Modbus RTU output standard, fully configurable, 2-wire RS-485, 1200 to 19.2k baud		0 to 19.2k baud		
Approvals	65-2640RK-05 UL	65-2641RK UL		(all IR)	
	65-2640HK-05 C CSA US	65-2641HK-05 C CSA US		C OF OS	
Controllers	Compatible with all RKI Beacon controllers, as well as most DCS / PLC systems: Beacon 110, Beacon 200, Beacon 410 and Beacon 800				
Warranty		One year	material and work	kmanship	

* Specifications subject to change without notice.

INSTRUMENTS



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Detector Head Input Type	Description
∎H2S	•An H2S detector is connected to the M2A Transmitter with 2 wires using the TOX + and - terminals from the detector/transmitter terminal strips.
•CO	•A CO detector is connected to the M2A Transmitter with 2 wires using the TOX + and - terminals from the detector/transmitter terminal strips.
•OXYGEN	 An oxygen detector is connected to the M2A Transmitter with 2 wires using the OXY + and - terminals from the detector/transmitter terminal strips.
•LEL	 An LEL detector head is wired to the M2A Transmitter with 4 wires using the LEL BLK, GRN, WHT, and RED terminals.



MENTS	Ti	rouble S	shooting
	Symptom	Probable Cause	Corrective Action
	 No OLED Display on M2A transmitter 	 Bad display assembly Bad terminal relay board 	 Replace M2A Display Replace terminal relay board
	No Modbus on M2A	 Modbus needs to be enabled Modbus settings incorrect Modbus function inoperative 	Enable Modbus in setup mode Correct Modbus settings Replace terminal relay board
	 Unable to access calibration mode using magnetic wand 	 Incorrect magnet being used M2A lid not screwed down tightly Bad Hall Effect switch 	Use RKI magnet Tighten lid Replace OLED assembly
	 No 4 to 20 mA signal output on M2A 	 Bad terminal relay board 	Replace terminal relay board
	 Alarm function on M2A 	 Incorrect alarm settings Excessive alarm delay 	 Check and correct alarm set points Adjust alarm delay to a reasonable setting
	 M2A will not power up 	 Incorrect voltage to terminal relay board No voltage applied 	 Verify that proper voltage is applied to instrument. Turn on RKI controller or verify wiring from power source
	 Instrument displays incorrect gas type on M2A 	 Internal gas settings incorrect 	 Reset gas settings to match sensor installed.
	 Readings unstable or random alarms on M2A 	 May have bad sensor EMI or RFI interference Improper grounding Running from power source that has a negative ground 	Replace sensor Verify that instrument is properly shielded and grounded. Verify proper grounding Use power source with floating ground





Quick Reference Guide Beacon 110 Series Programming

TOOLS REQUIRED:

None.

CALIBRATION MODE (Direct Connect Combustible gas version example)

- Press and HOLD the UP/YES button.
 - Calib? YES/NO Will be displayed.
 - $\circ~$ Press YES to enter Calibration mode or NO to EXIT
 - FreshAir Adjust?
 - Press YES to perform a fresh air adjust.
 - FRESH AIR WAIT... will be displayed as fresh air reading is adjusted.
 - FreshAir 0% LEL / ENTER will be displayed prompting user to press ENTER button. Press the ENTER button.
 - FreshAir PASS will be displayed if Beacon 110 is able to set fresh air reading.
 - FreshAir SAVED will appear briefly.
 - SPAN W/Cal Gas? Press the YES button to continue with calibrating with gas or NO button to EXIT.
 - APPLY SPAN GAS will be displayed if YES button is pressed
 - 0% LEL will be displayed alternating with APPLY SPAN GAS. Attach calibration cup to sensor, turn on calibration gas and let gas flow to sensor for 1-2 minutes or until reading stabilizes.
 - Use UP or DOWN buttons to increase or decrease span to match value on cylinder.
 - Press the ENTER button to set calibration.
 - Remove Cal Gas will be displayed alternating with gas reading. Remove the calibration gas and turn off regulator.

CONFIGURATION MODE

- Press and HOLD the UP and ENTER button
 - $\circ~$ Enter Config? Press the YES button to enter or NO button to EXIT
 - METHANE 100% LEL will be displayed then,
 - Alarm-1 10% LEL will be displayed.
 - Press the UP or DOWN button to raise or lower alarm point
 - Press the ENTER button to set
 - Alarm -1 Increase will be displayed
 - Press the UP or DOWN button to change from Increase to Decrease

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- Press the ENTER button to set
- Alarm-1 N. DE-EN (Alarm-1 relay normally de-energized)
 - Press the UP or DOWN button to change from N. DE-EN to normally energized relay contacts (Fail Safe)
 - Press the ENTER button to set.
- Alarm-1 LATCH will be displayed
 - Press the UP or DOWN button to change from LATCH to SELF-RST (self resetting alarms)
 - Press the ENTER button to set.
- A1 Strobe (below functions can be selected by using the Down button)
 - Can Reset
 - None
 - Non Reset
- Alarm-1 OnDy 1 secs (alarm on delay set to one second)
 - Press the UP or DOWN button to change from 0 seconds to a maximum of 60 minutes.
 - Press the ENTER button to set.
- Alarm-2 50% LEL will be displayed.
 - Press the UP or DOWN to raise or lower the Alarm-2 set point.
 - Press the ENTER button to set.
- Alarm -2 INCREASE will be displayed
 - Press the UP or DOWN button to change from INCREASE to DECREASE
 - Press the ENTER button to set
- Alarm-2 N. DE-EN (Alarm-2 relay normally de-energized)
 - Press the UP or DOWN button to change from N. DE-EN to normally energized relay contacts (Fail Safe)
 - Press the ENTER button to set.
- Alarm-2 LATCH will be displayed
 - Press the UP or DOWN button to change from LATCH to SELF-RST (self resetting alarms)
 - Press the ENTER button to set.
- A1 Strobe (below functions can be selected by using the Down button)
 - Can Reset
 - None
 - Non Reset
- Alarm-2 OnDy 1 secs (alarm on delay set to one second)
 - Press the UP or DOWN button to change from 0 seconds to a maximum of 60 minutes.
 - Press the ENTER button to set.
- Zero Supp 2% LEL (zero suppression)
 - Press the UP or DOWN button to increase or decrease zero suppression.
 - Press the ENTER button to set.
- FILTER 5 SEC
 - Press the UP or DOWN button to adjust from 0 to 60 seconds.
 - Press the ENTER button to set.

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- CAL TIME 15 MIN will be displayed
 - Use the UP or DOWN button to change from 5 MIN to 30 MIN.
 - Press the ENTER button to set.
- SAVE IT? YES/NO
- Press YES to save and EXIT
- CONFIG SAVED will be displayed.

INPUT SELECTION

- Press the UP/YES and DOWN/NO buttons to enter gas type selection mode.
 - Select Input? Will be displayed. Press the YES button to enter. Inputs below can be selected by using the Down button.
 - Input? LEL DIR (LEL direct connect) will be displayed)
 - Input? 4-20mA (remote amp will be displayed)
 - SAVE IT? YES/NO
 - Press the YES button to save and exit.

4-20 mA ADJUSTMENT

- Press and HOLD the UP, DOWN and ENTER buttons to enter.
 - Tune 4-20mA? Will be displayed.
 - Press the YES button
 - 4 mA OUT Up Dn-ENT will be displayed
 - Press the UP or DOWN button to raise or lower the 4 mA.
 - Note: If necessary, an ammeter can be installed in the Signal (feed back) line to measure the current.
 - For certain installations it may be necessary to set the 4 mA slightly above 4 if connected directly to PLC.
 - Press the ENTER button to set.
 - o 20 mA OUT Up Dn-ENT will be displayed
 - Use the UP or DOWN button to set the reading to 20 mA
 - Press the ENTER button to set.
 - 4-20 CAL DONE will be displayed.



Quick Reference Guide M2 Series Programming

TOOLS REQUIRED:

None.

CALIBRATION MODE (Combustible gas version example)

- Press and HOLD the UP/YES button
 - Calib? Will be displayed
 - Press YES to enter Calibration mode or NO to EXIT
 - FreshAir Adjust?
 - Press YES to perform a fresh air adjust
 - FRESH AIR WAIT... will be displayed as fresh air reading is adjusted
 - FreshAir 0% LEL / ENTER will be displayed prompting user to press ENTER button
 - o FreshAir PASS will be displayed if M2 is able to set fresh air reading
 - FreshAir SAVED will appear briefly.
 - SPAN W/Cal Gas? Press the YES button to continue with calibrating with gas or NO button to EXIT.
 - APPLY SPAN GAS will be displayed if YES button is pressed
 - 0% LEL will be displayed. Attach calibration cup to sensor, turn on calibration gas and let gas flow to sensor for 1-2 minutes or until reading stabilizes.
 - Use UP or DOWN buttons to increase or decrease span to match value on cylinder.
 - Press the ENTER button to set calibration

CONFIGURATION MODE

- Press and HOLD the UP and ENTER button
 - Enter Config? Press the YES button to enter or NO button to EXIT
 - METHANE 100% LEL will be displayed then,
 - Alarm-1 10% LEL will be displayed.
 - Press the UP or DOWN button to raise or lower alarm point
 - Press the ENTER button to set
 - o Alarm -1 Increase will be displayed
 - Press the UP or DOWN button to change from Increase to Decrease
 - Press the ENTER button to set
 - Alarm-1 N. DE-EN (Alarm-1 relay normally de-energized)

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- Press the UP or DOWN button to change from N. DE-EN to normally energized relay contacts (Fail Safe)
- Press the ENTER button to set.
- Alarm-1 LATCH will be displayed
 - Press the UP or DOWN button to change from LATCH to SELF-RST (self resetting alarms)
 - Press the ENTER button to set.
- Alarm-1 OnDy 1 secs (alarm on delay set to one second)
 - Press the UP or DOWN button to change from 0 seconds to a maximum of 60 minutes.
 - Press the ENTER button to set.
- Alarm-2 50% LEL will be displayed.
 - Press the UP or DOWN to raise or lower the Alarm-2 set point.
 - Press the ENTER button to set.
- Alarm -2 INCREASE will be displayed
 - Press the UP or DOWN button to change from INCREASE to DECREASE
 - Press the ENTER button to set
- Alarm-2 N. DE-EN (Alarm-2 relay normally de-energized)
 - Press the UP or DOWN button to change from N. DE-EN to normally energized relay contacts (Fail Safe)
 - Press the ENTER button to set.
- o Alarm-2 LATCH will be displayed
 - Press the UP or DOWN button to change from LATCH to SELF-RST (self resetting alarms)
 - Press the ENTER button to set.
- Alarm-2 OnDy 1 secs (alarm on delay set to one second)
 - Press the UP or DOWN button to change from 0 seconds to a maximum of 60 minutes.
 - Press the ENTER button to set.
- Zero Supp 2% LEL (zero suppression)
 - Press the UP or DOWN button to increase or decrease zero suppression.
 - Press the ENTER button to set.
- FILTER 5 SEC
 - Press the UP or DOWN button to adjust from 0 to 60 seconds.
 - Press the ENTER button to set.
- CAL TIME 15 MIN will be displayed
 - Use the UP or DOWN button to change from 5 MIN to 30 MIN.
 - Press the ENTER button to set.
- SAVE IT? YES/NO
- Press YES to save and EXIT
- CONFIG SAVED will be displayed.



MODBUS SETUP

- Press and Hold the DOWN/NO and ENTER buttons to enter MODBUS setup mode.
 - Set Up Modbus? Will be displayed. Press the YES button to enter.
 - Modbus DISABLED will be displayed.
 - Press the UP or DOWN button to ENABLE
 - Press the ENTER button to set.
 - Slave ID will now be displayed.
 - Press the UP or DOWN button to set the ID
 - Press the ENTER button to set.
 - BaudRate 9600 will now be displayed.
 - Press the UP or DOWN button to set the BAUD RATE from 1200 to 19200 baud.
 - Press the ENTER button to set.
 - Parity EVEN will be displayed.
 - Press the UP or DOWN button to set to NONE, ODD or EVEN parity.
 - Press the ENTER button to set.
 - Resp Dly 0 mS will be displayed
 - Press the UP or DOWN buttons to set from 0 to 20 mS.
 - Press the ENTER button to set.
 - SAVE IT? YES/NO will now be displayed.
 - Press the YES button to SAVE. Modbus Saved will be displayed.

GAS TYPE SELECTION

- Press the UP/YES and DOWN/NO buttons to enter gas type selection mode.
 - Select GasType? Will be displayed.
 - Press the YES button
 - GAS TYPE? METHANE will be displayed
 - Press the NO button to select gas type for HC, METHANE, HYDROGEN or HEXANE. Once selected, press the YES button
 - SAVE IT? YES/NO
 - Press the YES button to save and exit.



4-20 mA ADJUSTMENT

- Press and HOLD the UP, DOWN and ENTER buttons to enter.
 - Tune 4-20mA? Will be displayed.
 - Press the YES button
 - 4 mA OUT Up Dn-ENT will be displayed
 - Press the UP or DOWN button to raise or lower the 4 mA.
 - Note: If necessary, an ammeter can be installed in the Signal (feed back) line to measure the current.
 - For certain installations it may be necessary to set the 4 mA slightly above 4 if connected directly to PLC.
 - Press the ENTER button to set.
 - 20 mA OUT Up Dn-ENT will be displayed
 - Use the UP or DOWN button to set the reading to 20 mA
 - Press the ENTER button to set.
 - 4-20 CAL DONE will be displayed.



Training Notes

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Training Notes

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