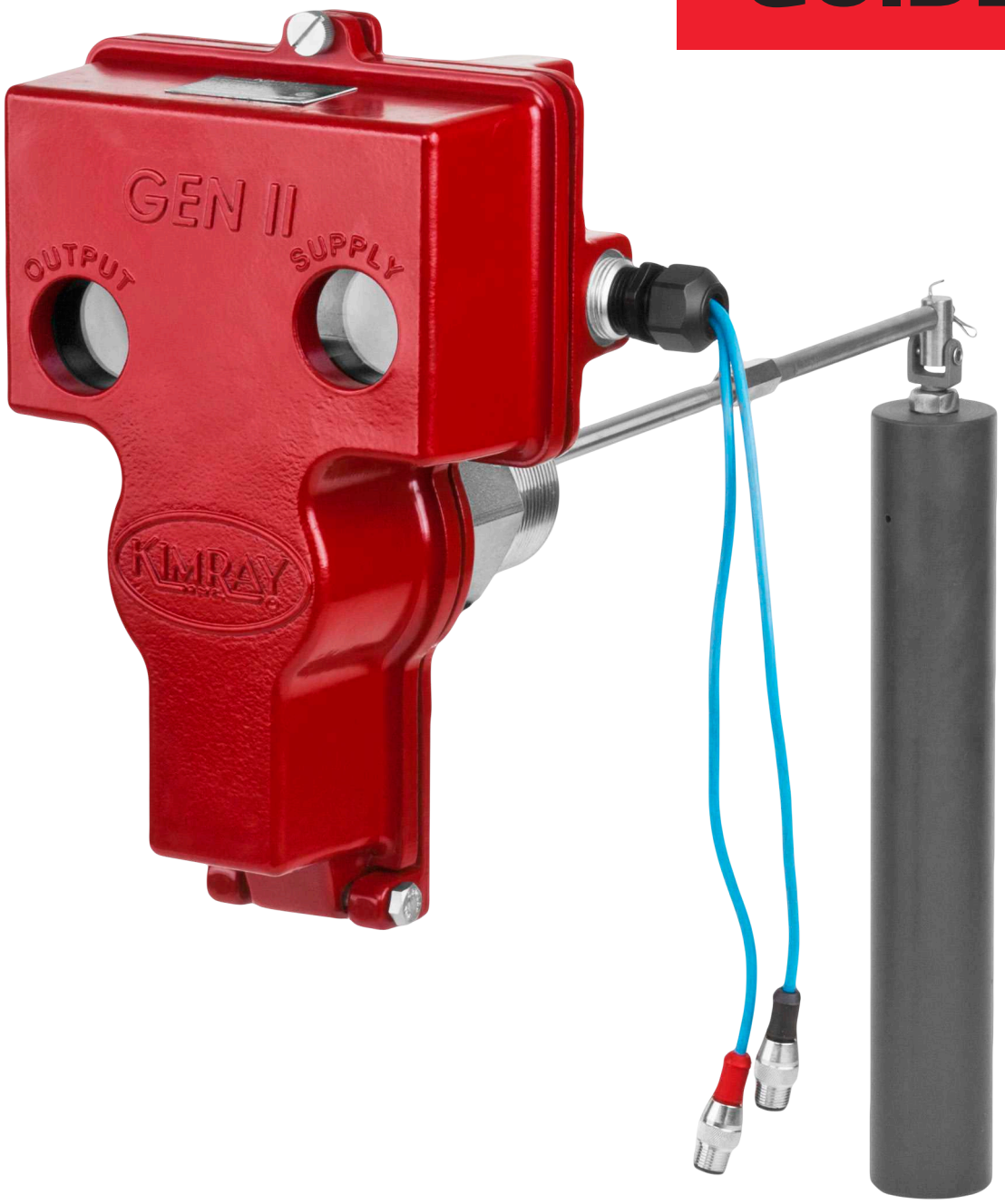
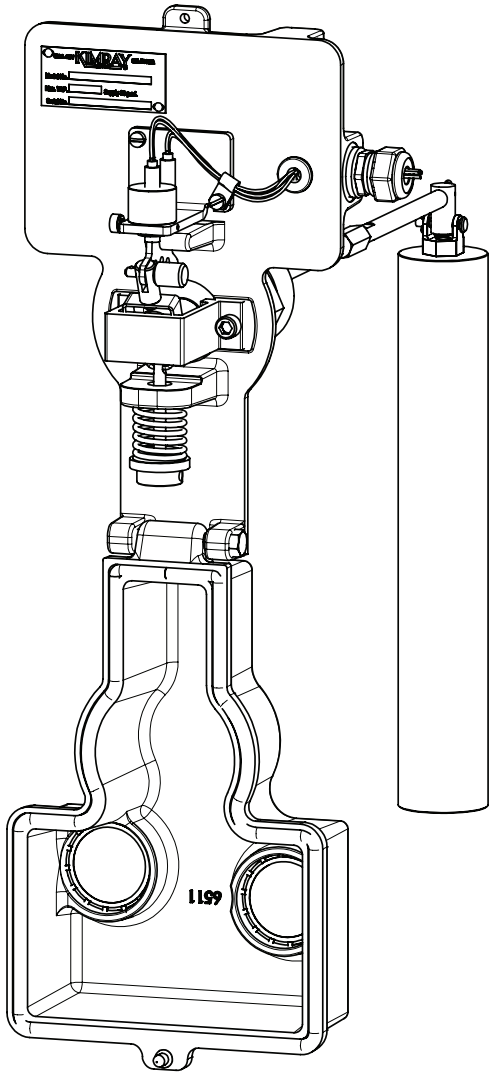
KIMRAY INC.®

INSTALLATION OPERATION & MAINTENANCE GUIDE



ELECTRIC GEN II

Contents



A Before you start

CAUTION:
Prior to installing, the instructions provided herein should be completely reviewed and understood before operating or repairing this equipment. All CAUTION and WARNING notes must be strictly observed to prevent personal injury or equipment damage.

A1 Scope

Do not install, operate, or maintain an Electric GEN II without being fully trained and qualified with the Kimray installation and maintenance manual. To avoid personal injury or property damage, it is important to carefully read, understand, and follow all the contents of this manual, including all safety cautions and warnings. If you have any questions about these instructions, contact your Kimray applications support group before proceeding.

A2 Introduction

This installation manual includes instructions and maintenance information for the Kimray Electric GEN II.

A3 Description

The Kimray Electric GEN II back mount level controller is designed for use in liquid level and liquid/liquid interface control applications. The Electric GEN II uses two proximity sensors to detect displacer position and provides two relay outputs for OPEN and CLOSE signals to an appropriate actuator.

A4 Maintenance

Maintenance should be performed on a regular basis. An initial inspection interval of 12 months is recommended. Depending on the service conditions of the valve, the inspection interval may be decreased.

WARNING:
Always wear protective gloves, clothing, and eyewear when performing any maintenance operations to avoid personal injury. Disconnect any operating lines providing electric power, or a control signal to the pilot.

WARNING:
Use lock-out procedures to be sure that the above measures stay in effect while you work on the equipment.

Related Publications
The following publications are applicable for the actuator.
See catalog section C1 for product pages.

Commonly Replaced Parts

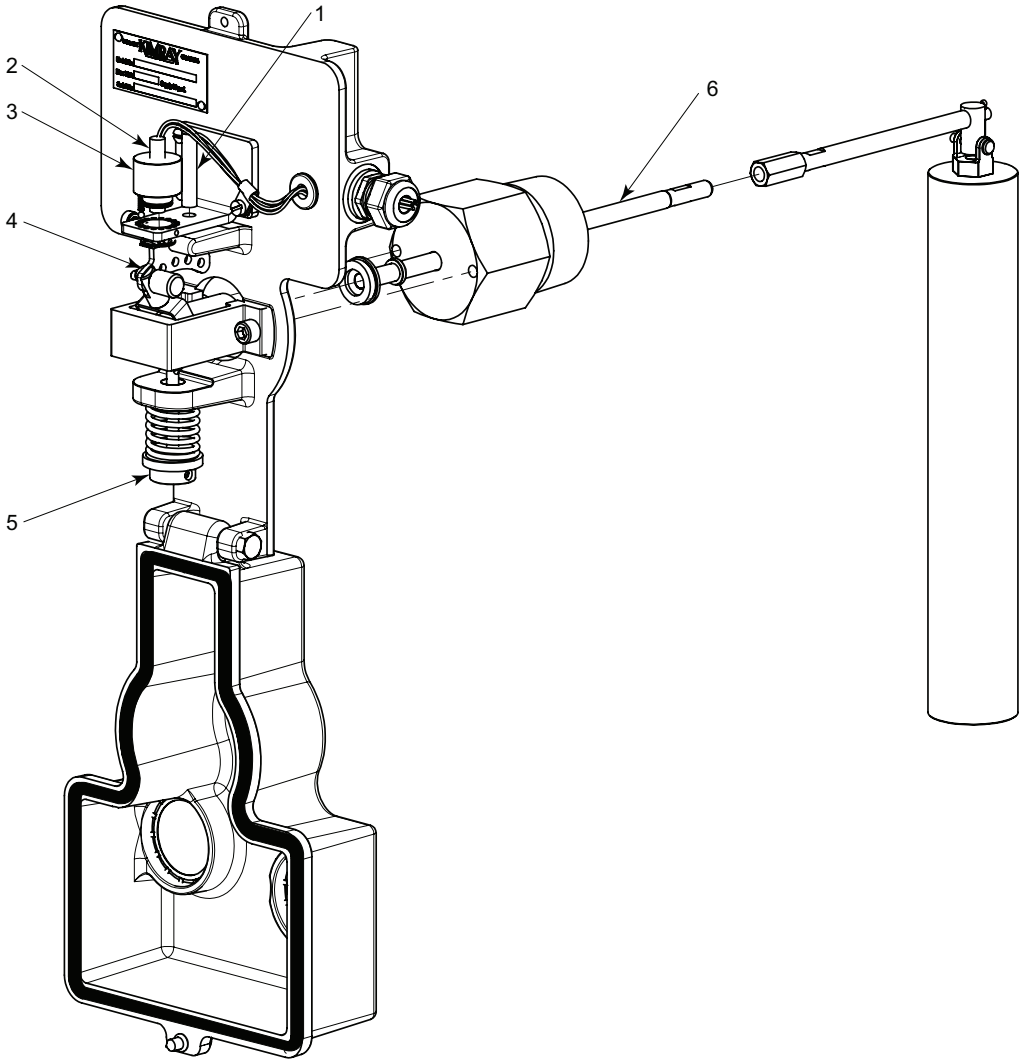
Occasional Replacement Parts
See repair kit

A5 Changes and Updates

A6 SPECIAL TOOLS AND EQUIPMENT

No Special Tools Needed

A7 ORIENTATION



Item	Description	Qty
1	Rear Sensor (Black)	1
2	Front Sensor (Red)	1
3	Span Adjusting Knob	1
4	Tangent Arm	1
5	Spring Adjustment Knob	1
6	Waggle Arm	1

1 Required Accessories

The Electric Gen II requires the additional accessories of an isolation barrier and a set of sensor cables.
The isolation barrier not only serves as the barrier between Class I Div 1 and Class II Div 1 areas, but also provides the necessary signal conditioning for the sensors to operate and translates them into easy to use relay outputs.
The sensor cables are used to connect the isolation barrier (located in Class II Div 1 or less area) to the Electric Gen II (located in Class I Div 1 area). The cables available from Kimray are specifically pinned out to match the sensors and color coded for ease of use.
These required accessories are available from Kimray in the following combinations.
CMNL20 - Barrier with 20ft cables
CMNL50 - Barrier with 50ft cables
CMNL100 - Barrier with 100ft cables
Alternatively, when ordering the Electric Gen II, the cables can be included with the level controller by adding the following suffixes:
L50 - Barrier with 50ft cables
L100 - Barrier with 100ft cables

2 Installation

Before installing the Electric GEN II, inspect it for shipment damage and for foreign material that may have collected during shipment.
Verify all pressure connections are tight before pressurizing the system.
Be sure you fully understand the application, operation and connection of the device before installing.
For threaded (NPT) process connections, use TFE tape or pipe thread sealant on external pipe threads.
Verify that you have the required accessories listed above.

⚠ Tangent Arm position:
The Electric Gen II utilizes common parts from the pneumatic Gen II. Unlike the pneumatic Gen II, the tangent arm is not to be adjusted and should ALWAYS be located in the front-most position.

3 Wiring Instructions

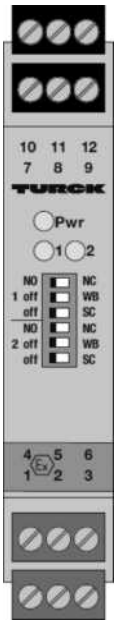
⚠ NOTE:
Use good electrical wiring practices and consult with electrican.

Power Requirements
Ensure a stable DC power source is available for the application. A 1.5w (minimum) power supply is needed to power the required isolation barrier.
Input voltage can be anywhere in the range from 10 to 30 VDC

1. Observe local wiring requirements for hazardous location usage.
2. Ensure power is off before connecting or removing wires
3. An isolation barrier is required for intrinsically safe installation and is needed for the Electric GEN II to function.
4. Sensor cables are required to connect the isolation barrier to the Electric GEN II
5. The barrier has six DIP switches on its face. All of these switches should be moved to the right.

Terminal Descriptions
Class I Div 2 (or less) side:
- Terminal 11: Vin (10-30 VDC)
- Terminal 12: GND (Return path for power)
- Terminals 7 & 10: Relay outputs for top level sensor
- Terminals 8 & 9: Relay outputs for span sensor

Intrinsically Safe side (Class I Div 1)
- Terminal 4: To black (REAR) sensor (blue wire)
- Terminal 1: To black (REAR) sensor (brown wire)
- Terminal 5: To red (FRONT) sensor (blue wire)
- Terminal 2: To red (FRONT) sensor (brown wire)



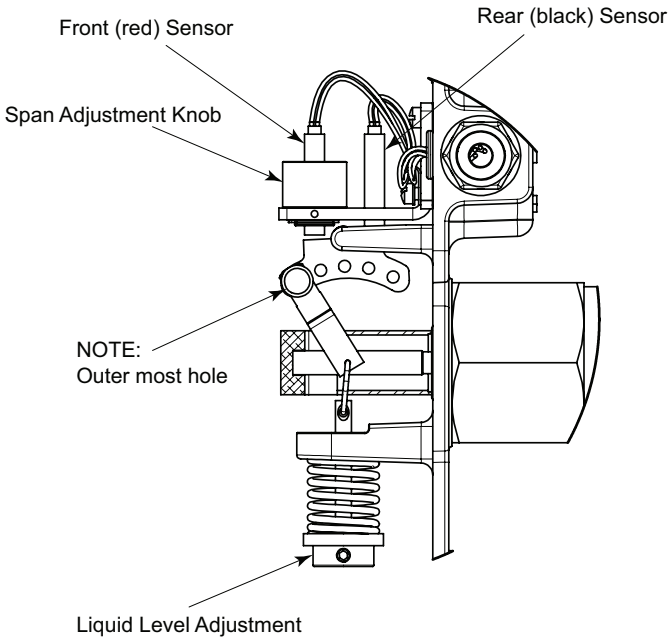
4 Start-up and Test

WARNING:
Follow strict safety precautions when energizing and de-energizing any system. Permits may be required when commissioning or performing maintenance of electrical devices. Live circuits may generate a spark necessary to ignite flammable or combustible gas and vapors.

1. Apply power to the Electric GEN II barrier.
2. Pull down on the Spring adjustment knob to lift the displacer. LED “1” should light on the barrier to indicate an OPEN signal is being sensed and RELAY 1 outputs are now active.
3. Push up on the spring adjustment knob to lower the displacer. LED “2” should light on the barrier to indicate a CLOSE signal is being sensed and RELAY 2 outputs are now active.

5. Adjustments

From the factory, the Electric Gen II is calibrated so that the rear sensor is triggered when water is detected at midpoint of the displacer. The front sensor triggers when the displacer lowers about 2 inches. This factory adjustment should satisfy most applications to detect level between gas, air and water.
To compensate for varying specific gravities and for detecting liquid interface, it may be necessary to adjust the sensor trip points.
The spring adjustment knob is used to change the upper trip point of the displacer. Loosening the spring adjustment knob will raise the upper trip point of the displacer. Tightening the spring adjustment knob will lower the upper trip point of the displacer. One turn of the spring adjustment knob will change the upper trip point by approximately one inch.
The upper adjustment knob is used to change the lower trip point of the displacer. Lowering the front sensor will raise the lower trip point of the displacer. Raising the front sensor will lower the lower trip point of the displacer. One quarter turn (4-clicks) of the upper adjustment knob will change the lower trip point by approximately one inch.

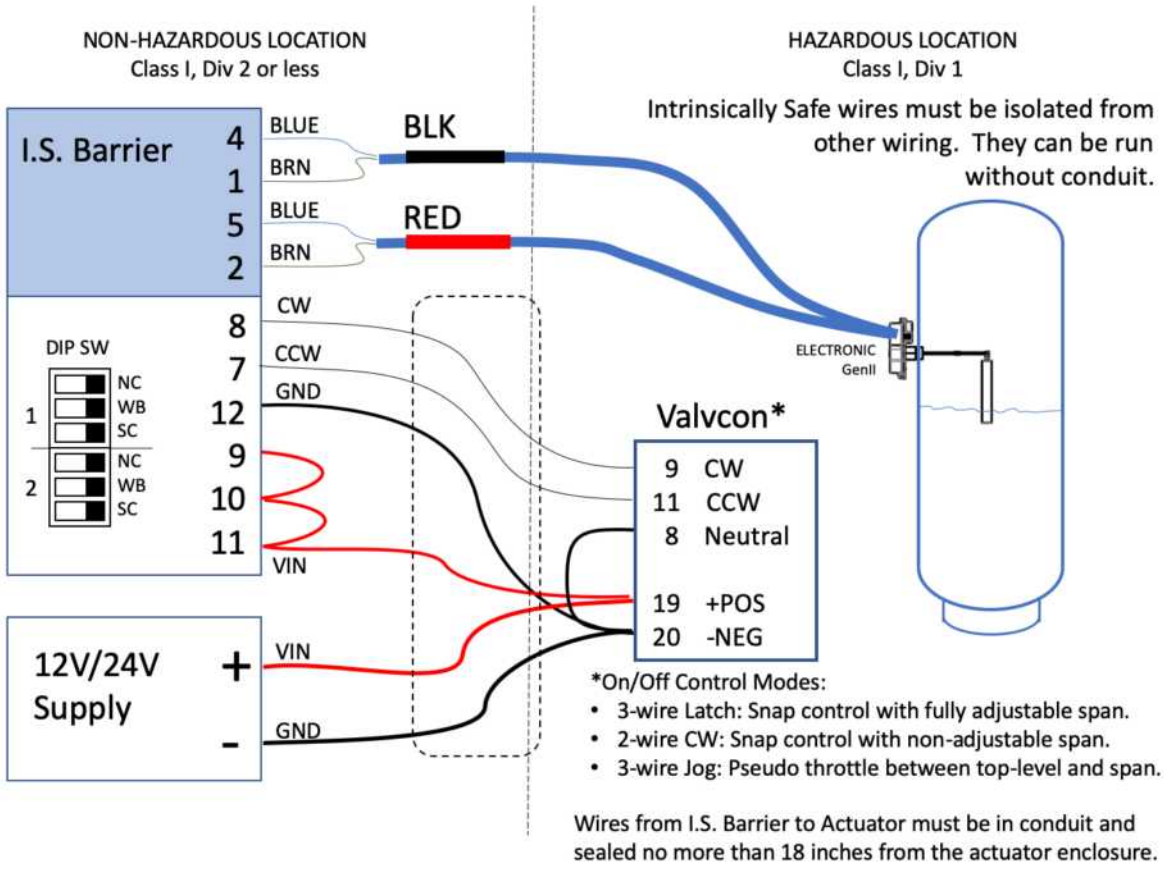


6 Wiring Diagrams

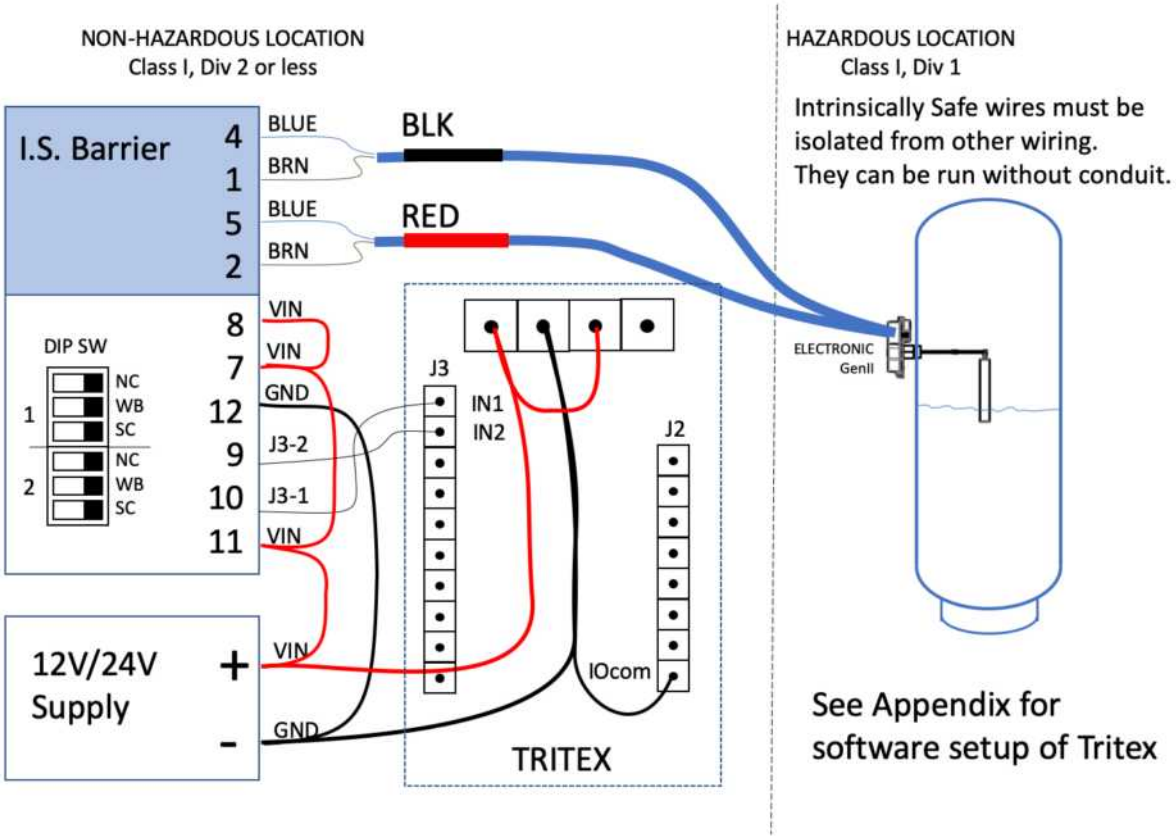
Liquid Dump snap control with fully adjustable span.
Place the ON/OFF Control selector to the 3-Wire Latch position. When the liquid level rises, the rear (Black) sensor will detect the rising level and the barrier will send a CCW (OPEN) signal to the Valvcon. When the liquid level falls, the front (Red) sensor will detect the falling level and the barrier will send a CW (CLOSE) signal to the Valvcon.

Liquid Dump in a pseudo-throttle mode.
Place the ON/OFF Control selector to the 3-Wire Jog position. When the liquid level rises to the rear (Black) sensor, an open (CCW) jog signal will be sent to the Valvcon to bump the valve open. When the liquid level falls to the front (Red) sensor, a close (CW) jog signal will be sent to the Valvcon to bump the valve closed.

Liquid Dump snap control with minimum span
Place the ON/OFF Control selector to the 2-Wire CCW position. When the liquid level rises to the rear (Black) sensor, an open (CCW) signal will be sent to the Valvcon to open the valve. When the liquid level falls below the rear (Black) sensor, the CCW signal will be removed and the Valvcon will close.



CMME to TriTex II Actuator Wiring Diagram
For Instructions see Appendix A



7 Installation of Intrinsically Safe Systems

KIMRAY INC.®

Installation of Intrinsically Safe Systems

Drawing KE-IS1, Canadian Standards Association Certified Systems

C SA US

Kimray, Inc.
52 NW 42nd St
Oklahoma City, OK 73118
1-405-525-6601

HAZARDOUS (CLASSIFIED) LOCATION
Class I, Div 1, Groups A,B,C,D; Class II, Div 1, Group G; Class III, Div 1

NON-HAZARDOUS LOCATION

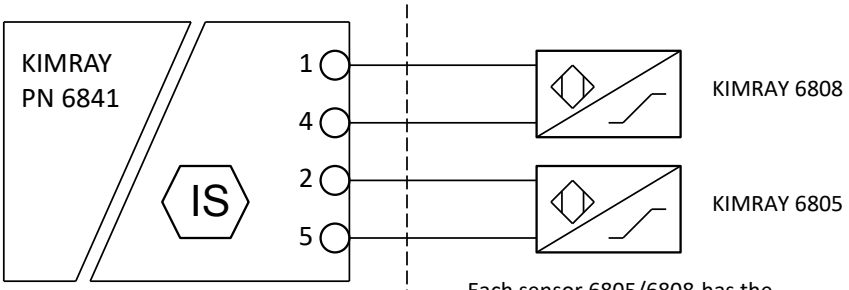
Any CSA Certified associated apparatus with Entity Concept parameters as follows:

$V_{OC} \leq 15V$
$I_{SC} \leq 60mA$
$C_a \geq C_{cable} + 220nF$
$L_a \geq L_{cable} + 280\mu H$

KIMRAY Electronic GenII Backmount with the following sensors:

KIMRAY P/N 6805
KIMRAY P/N 6808

$V_{max} = 15V$, $I_{max} = 60mA$,
$C_i = 220nF$, $L_i = 280\mu H$



Entity Parameters

V_{oc} (V)	I_{sc} (mA)	C_a (uF) AB/CE/DFG	L_a (mH) AB/CE/DFG
9.6	10.7	3.76/11.3/30.1	282/981/1H

Each sensor 6805/6808 has the following entities:

$V_{max} = 15V$
$I_{max} = 60mA$
$C_i = 220nF$
$L_i = 280\mu H$

Notes:

1. Control equipment connected to the associated apparatus must not use or generate more than 250Vrms or VOC.
2. Installation in the U.S. should be in accordance with ANSI/ISA RP12.6 “Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations and the Ntional Electrical Code (ANSI/NFPA 70) Sections 504 and 505.
3. Installations in Canada should be in accordance with the Canadian Electrical Code, CSA C22.1, Part 1, Appendix F.
4. Associated apparatus manufacturer’s installation drawing must be followed when installing this equipment.
5. For U.S. installations, Kimray sensor part numbers 6808 and 6805 are approved for Class I, Zone 0 applications.
6. No revision to drawing without CSA-International approval.
7. Warning: Substitution of components may impair intrinsic safety.
8. If the electrical parameters of the cable are unknown, the following values may be used: Capacitance – 60pF/foot; Inductance – 0.2uH/foot.

KE-IS1, Rev Date: 1/11/2012
Sheet 1 of 1

8 TROUBLESHOOTING

Most troubleshooting can be done from the barrier by observing the LEDs and manipulating the Electric Gen II spring adjustment knob

With normal operation:

1. All switches should be moved to the right.
2. The PWR LED must be lit.
3. With the spring adjustment knob pulled all the way down, LED 1 should be lit YELLOW and LED 2 will be OFF.
4. With the spring adjustment knob pushed all the way up, LED 1 should be OFF and LED2 will be lit YELLOW.

There may be a location where both LEDs are lit yellow. This may or may not be a problem, it simply indicates there is some overlap in the sensor trigger locations. Opening up the span will remove this scenario.

Problem	Possible Cause(s)	Possible Solution
The PWR LED is off	There may be a problem with the power supply.	Use a voltmeter to check power from terminal 11 to terminal 12. Correct the input voltage.
LED2 is RED	The rear sensor cable may be shorted	Turn the SC switch off. If the red light goes off, then there is a short in the wiring. Correct the wiring
	The rear sensor cable may be reversed.	Verify that the brown wire of the sensor cable is connected to terminal 1 and the blue wire is connected to terminal 4. Correct the wiring
	The rear sensor cable may be open.	Turn the WB switch off – if red light turns off, then the sensor cable is open. Correct the wiring
LED1 is RED	The front sensor cable may be shorted.	Turn the SC switch off. If the red light goes off, then there is a short in the wiring. Correct the wiring
	The front sensor cable may be reversed	Verify that the brown wire of the sensor cable is connected to terminal 2 and the blue wire is connected to terminal 5. Correct the wiring
	The front sensor cable may be open.	Turn the WB switch off – if red light turns off, then the sensor cable is open. Correct the wiring
LED2 is always YELLOW	The front sensor has been lowered too far.	Turn the upper adjustment knob to the left to raise the sensor.
Operation appears to be reversed.	The sensors may not be hooked up correctly.	Verify that the rear sensor is tied to terminals 1 & 4 of the barrier and that the front sensor sensor is connected to terminals 2 & 5 of the barrier.
	The sensors may not be configured correctly	Confirm the dip switches are all to the RIGHT (NC, WB, SC are selected).

9 FREQUENTLY ASKED QUESTIONS

Why is the barrier required?
The sensors on the Kimray Electric Gen II are NAMUR sensors and have different circuitry than standard 2-wire proximity sensors. The barrier is used to provide the very specific voltage and currents needed to operate the NAMUR sensor and the circuitry to interpret proximity. The barrier also converts the detected proximity into a use-able form - standard relay outputs. Additionally, the barrier provides intrinsically safe protection by guaranteeing that the power delivered to the device is below the ignition threshold should a fault occur.

Why are the Kimray Cables required?
Cables are required to connect the barrier (located in a non-hazardous area) to the Kimray Electric Gen II (located in a hazardous area). The customer is free to design their own cable as long as they meet the entity parameters listed on drawing KE-IS1 (located in the installation manual). It must also have an M-12 connector on one end to the correct pinout for the sensors. The Kimray wires are designed to meet all the required parameters as well as providing convenient color coding to match the sensors to their location.

How much power does the CMME use?
The Turck barrier is specified with a DC input voltage of 10-30V and power less than 1.5W. The Kimray Electric GenII gets its power from the barrier.

APPENDIX A

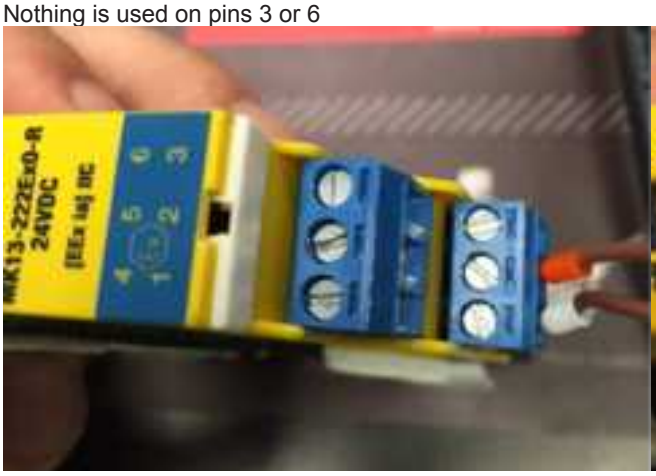
CMME to TriTex II Actuator Wiring Instructions

**special notes

When looking straight down at the barrier, remember that the pin numbers start at the bottom and read left to right – bottom to top. Pin numbers 1-2-3, 4-5-6 are for the blue terminals. Pin numbers 7-8-9, 10-11-12 are for the black terminals on the opposite side. All dip switches in the center of the I.S. Barrier will remain pushed over to the right.

Wires going into the I.S. Barrier from CMME (blue cables provided with CMME unit)

Top Level Sensor (brown) goes to pin 1 (black ringed cable)
Top Level Sensor (blue) goes to pin 4 (black ringed cable)
Span Level Senor (brown) goes to pin 2 (red ringed cable)
Span Level Sensor (blue) goes to pin 5 (red ringed cable)
Nothing is used on pins 3 or 6



Wiring the I.S barrier

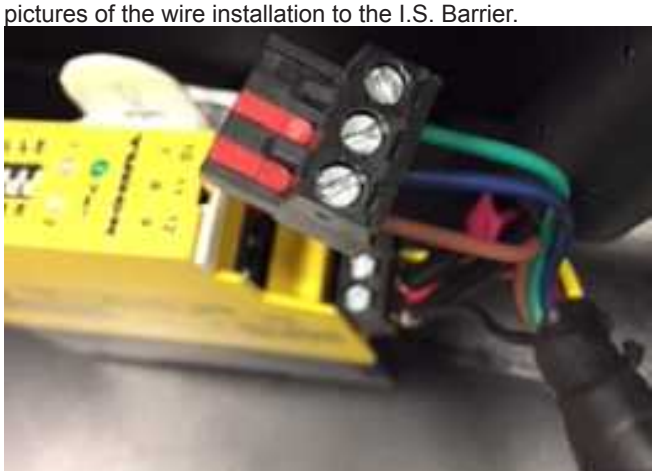
Take your wire and strip back enough room to expose the conductor wires underneath. Then take each individual wire and strip off enough sheathing to expose the bare wire underneath.

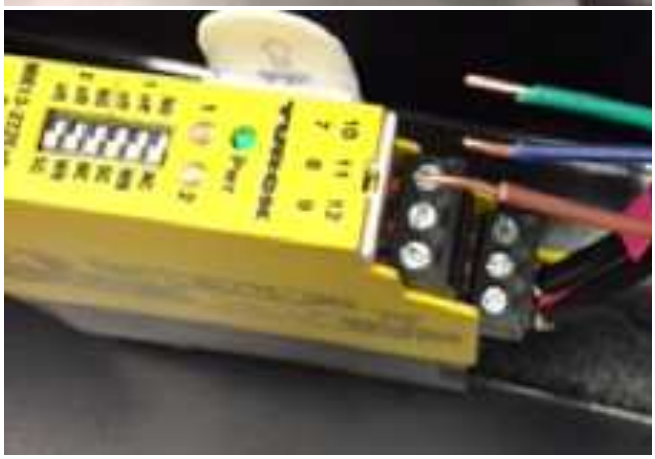
Assign your wires to a certain pin number on the black terminals on the I.S. Barrier – write it down to help you remember. In my example I used 18/7 wire so I had 7 different colored wires to choose from which allowed me to use 6 of the wires and have one extra for making jumpers if needed. This part is pretty easy – again it can be any color you choose just label it.

Pin # 7 – I assigned it green
Pin # 8 – I assigned it blue
Pin # 9 – I assigned it brown
Pin # 10 – I assigned it yellow
Pin # 11 – I assigned it red. This is the main power pin for the I.S. Barrier
Pin # 12 – I assigned it black. This is the main ground pin for the I.S. Barrier

Because I used an external power supply, I had to combine its wires with the new wires I assigned to Pin 11 and 12 to make sure I was providing power to the I.S. Barrier. I ran the positive wire off of the external power supply to Pin # 11 and the negative wire to Pin # 12.

Special Note: You can remove the terminal from the I. S. Barrier to make this process easier. Here are some additional pictures of the wire installation to the I.S. Barrier.





Wiring from Barrier to TriTex II

Here is a diagram of how you connect from the barrier to the TriTex board.

Remember how you assigned your colored wires earlier? Didn't think so – pull out your notes so you can connect the wires to the appropriate place on the TriTex board.
Remember in my example:
Pin # 7 – I assigned it green
Pin # 8 – I assigned it blue
Pin # 9 – I assigned it brown
Pin # 10 – I assigned it yellow
Pin # 11 – I assigned it red. This is the main power pin for the I.S. Barrier
Pin # 12 – I assigned it black. This is the main ground pin for the I.S. Barrier

Now that you can see what wire you assigned to each pin you can follow the diagram above.
You will combine the wires from pin #'s 7, 8, and 11 (my green, blue, and red wires) and place them under the main power (BUS +) terminal at the top of the TriTex board. You will need to create a small jumper wire that connects the main power (BUS +) terminal to the logic power (Logic +) terminal. Then take your wire coming from pin # 12 on the I.S. Barrier (the black wire in my example) and connect it to the main ground terminal (Common). You will also create an additional jumper that goes from this main ground terminal to the I/O common on the very bottom of the right-hand side- J2 terminal bank. Use wire from Pin # 9 (my brown wire) and place it in terminal labeled In2 on the J3 Terminal bank on the top left-hand side of the unit. Take wire from Pin # 10 (my yellow wire) and place it in terminal labeled In1 – just above the In2 terminal on the J3 Terminal bank.

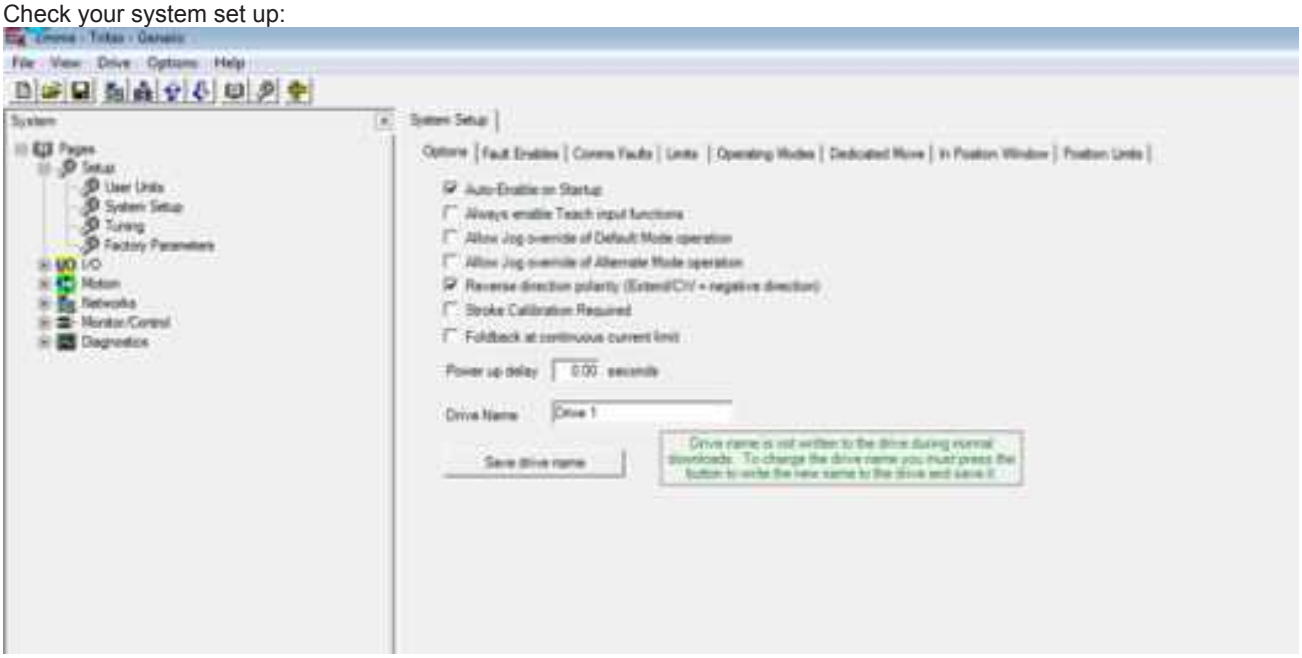
When you are done it should look something like this:

Now you should be able to power up the unit – and see the barrier light up like so:

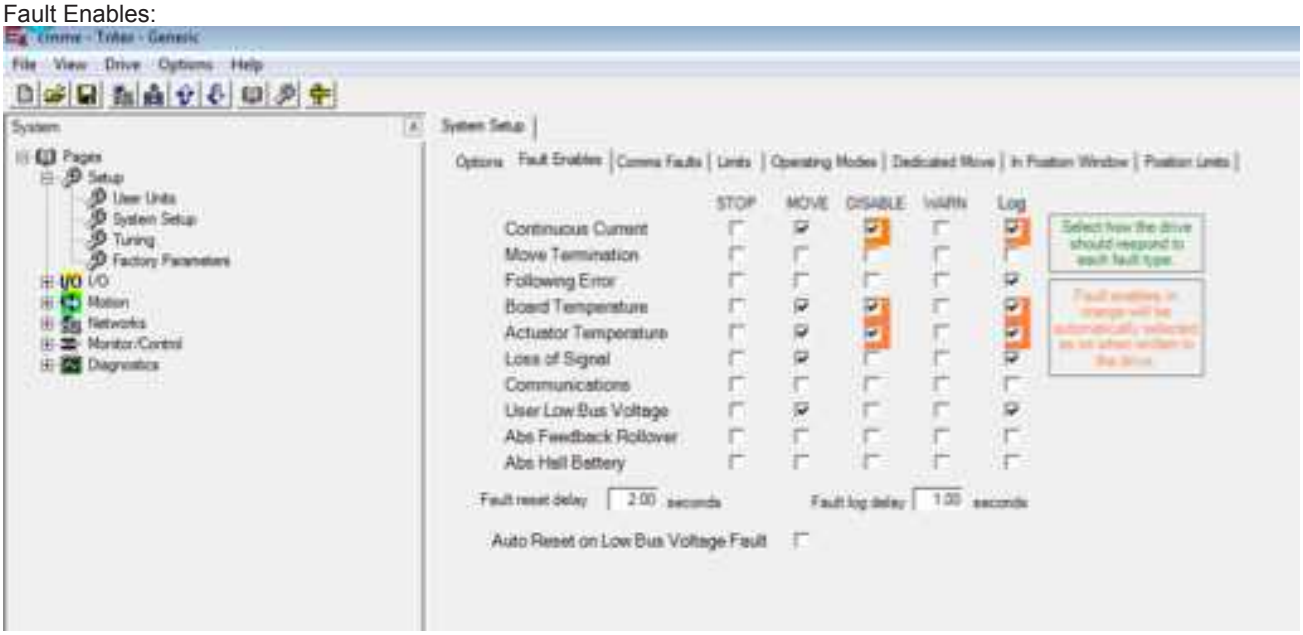
NOTE – The TriTex unit should hum (due to the servo motor running) and the Green light on the TriTex board should be glowing (lets you know you've got power to the board).

Now that you have the unit wired up and checked to see if the lights are on (everything is receiving power) – time to make sure you have the TriTex programed to work with the CMME. I am assuming that you have already connected to your unit to a computer opened the exlar software, connected to the network, read the TriTex unit, jogged the unit into place for attachment to the valve bottom works, placed all user units in inches,selected linear actuator, and defined home.

Check your system set up:

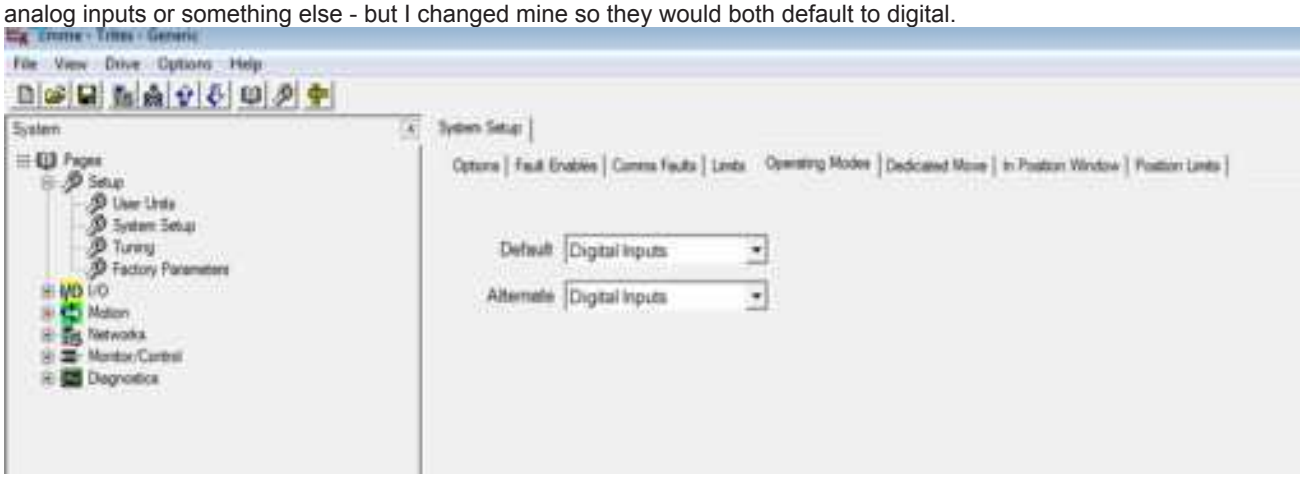


Fault Enables:

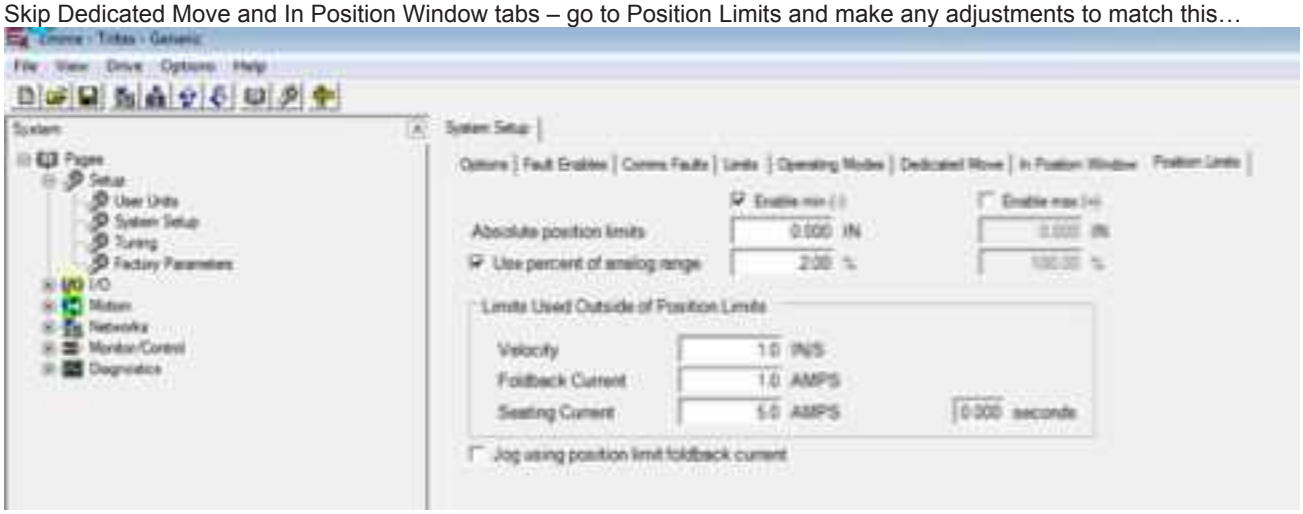


Skip Comms Faults tab – check Limits:

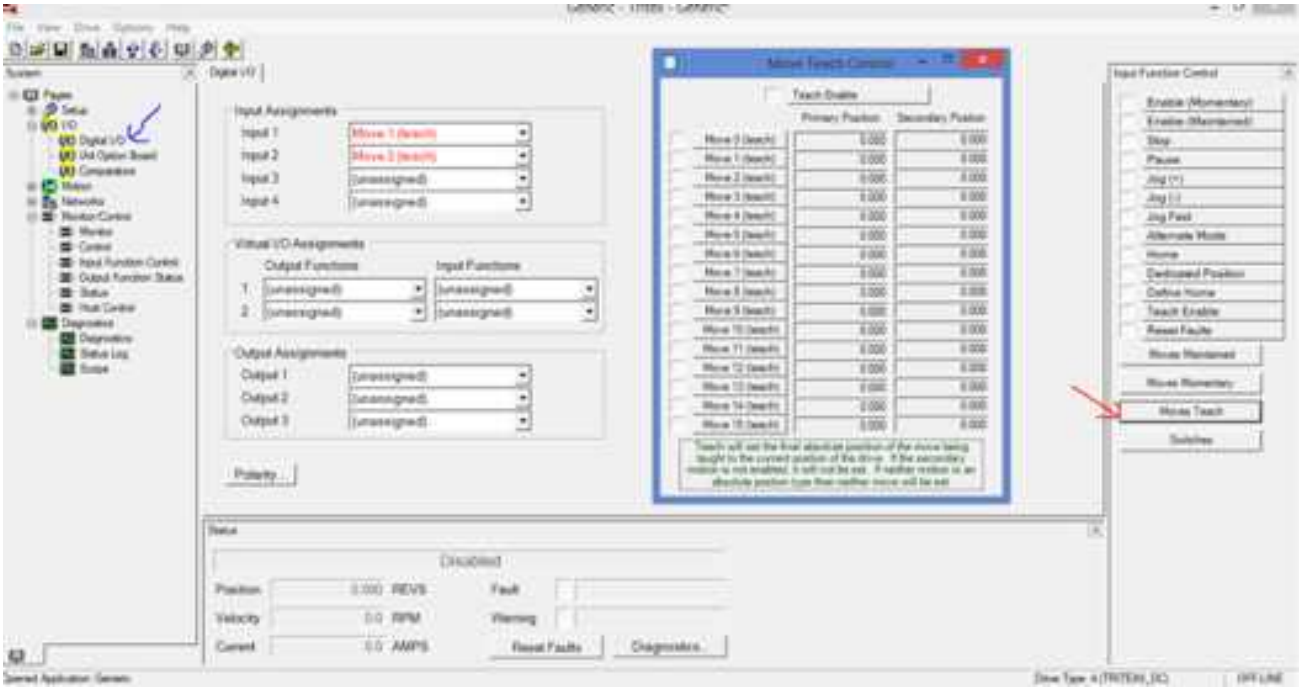
Make sure you adjust your default operating mode to Digital Inputs .The alternate does not have to be digital – it can be analog inputs or something else - but I changed mine so they would both default to digital.



Skip Dedicated Move and In Position Window tabs – go to Position Limits and make any adjustments to match this…



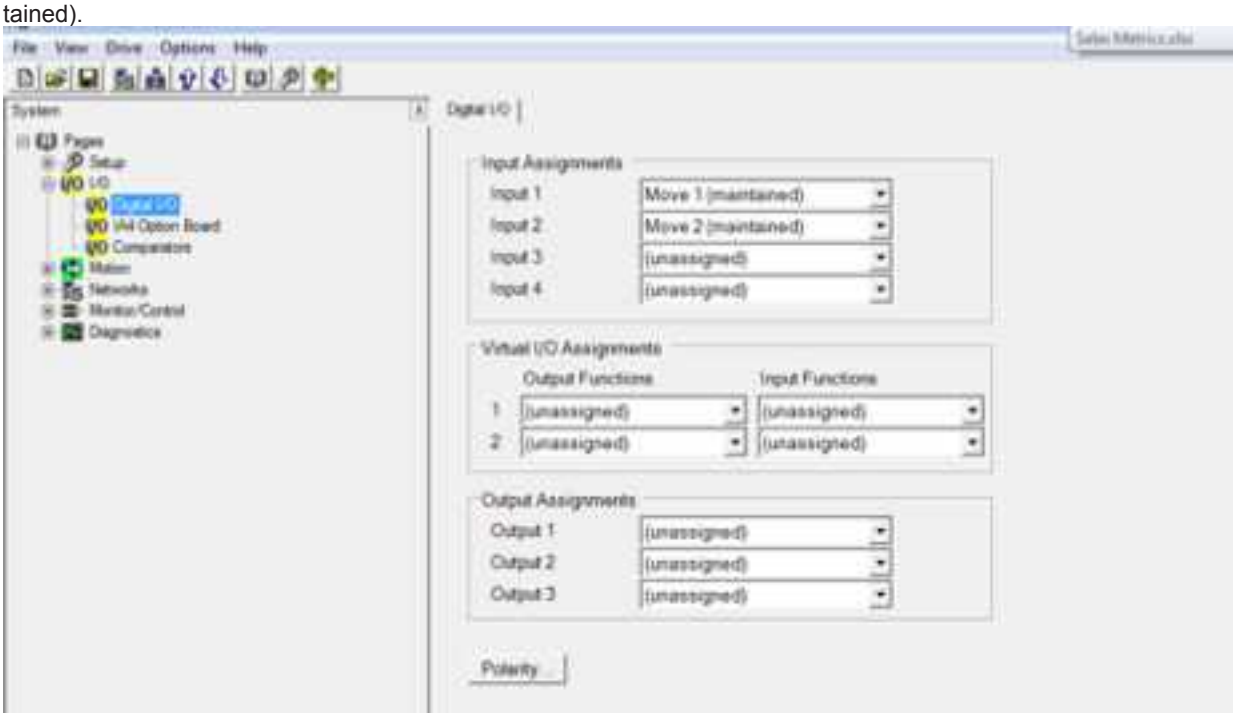
Once done with System Setup, go to I/O tree on left side of page… enter the digital I/O page and assign the input as Move 1 and Move 2 teach. You will then have to teach the unit these two moves.



Here is what you will do:

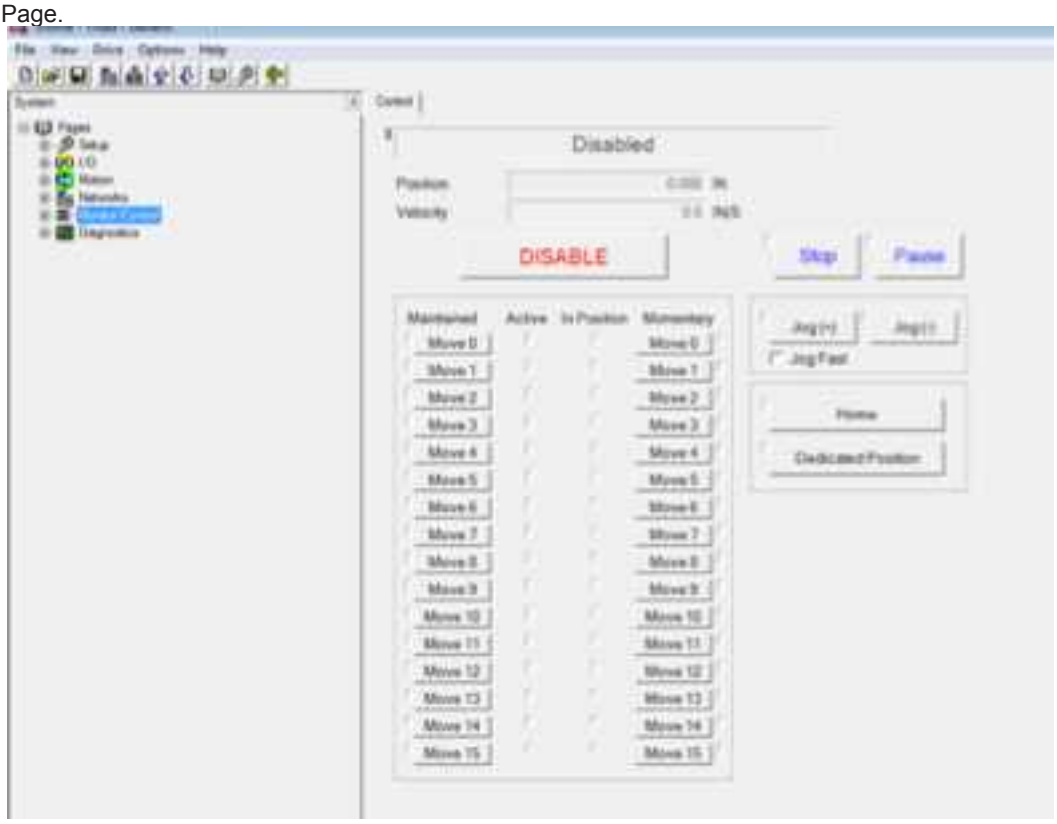
1. Click the Digital I/O option on the I/O tree (blue arrow above)
2. Make your input assignments move 1 and 2 teach
3. Click moves teach in the input function control box (red arrow)
4. Click the teach enable and then jog to the position and click teach move 1. Do the same for teaching move 2.

When you are done “teaching” the TriTex – you can reassign input 1 as Move 1 (maintained) and input 2 as Move 2 (maintained).



Use the level controller to actuate the TriTex – it should work perfectly. If you need to make adjustments go back into the software to make your changes.

FYI. If you get stuck and cannot figure out something, you can go to the Monitor/Control tree and then go into the Control Page.



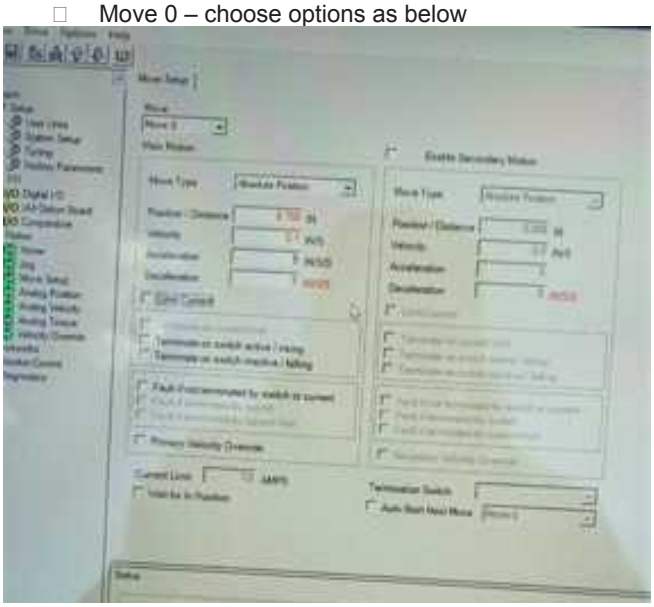
This page allows you to check on any assigned moves – it will show you if the move is active or not/in position or not/ you can jog the unit up or down/ force it go home, etc. This is a good quick tool to pull up when troubleshooting your TriTex actuator.

Use this checklist alongside the Kimray QSG for on/off service
KIMRAY QSG

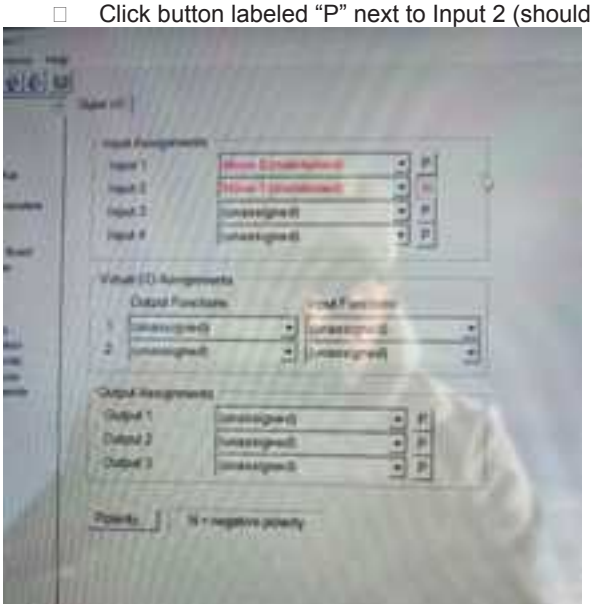
- For single 24 VDC input – connect wire to Input 1 on J3 Terminal block
- Power will use the “1, 2 & 3” inputs on J1 Terminal Block (Bus +, Common and Logic+)
- Step 5 – leave as default for digital input.

DIGITAL SETUP STEPS (AFTER COMPLETING QSG) – MOVES SETUP

- Open “Motion” on setup tree
- Move 0 – choose options as below



- Move 1 – setup same above – except “Position/Distance” should be 0.00
- Open “I/O” on setup tree
- Click on “Digital I/O”
- Open “Input 1” dropdown and scroll to choose “Move 0 (maintained)”
- Open “Input 2” dropdown and scroll to choose “Move 1 (maintained)”
- Click button labeled “Polarity”
- Click button labeled “P” next to Input 2 (should change from a “P” to an “N”



NOTE: Opening “Moves Maintained” in right side options will allow you to monitor signal. The boxes next to “Move 0” and “Move 1” will light up according to which move is in control.

Kimray is an ISO 9001- certified manufacturer.
Kimray quality assurance process maintains strict controls
of materials and the certification of parts used in the Kimray Electric Burner Valve.

Please visit our website for up to date product data www.kimray.com

WHO WE ARE

Kimray is a manufacturer of oil and gas control equipment based in Oklahoma City, Oklahoma, USA.

Trusted for generations, Kimray has been creating simple, effective solutions for temperature, level, flow, and pressure control since 1948. Common applications include separation, heating, compression, dehydration, and artificial lift.

Buying from Kimray is about much more than the product. We are partners with hearts to serve. The relationships between our representatives and our customers extend from before the sale through the life of the product. Our focus is not on short-term profits but long-term growth for our customers.

Visit Kimray.com to learn more about our company and the products we create.

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