CIR-44
Premium Solid State

CUSTOMER INTERFACE RELAY INSTRUCTION SHEET

Optimal entrance location for line voltage conductors

POWER CONNECTION (For 120-277VAC)

USB Programming Port

TB1

LINE | NEU | GND | K Y IN #1 | K Y IN #2 | K Y IN #3 | K Y IN #4

BLK | WHT | GRN

INPUT FROM METER #4
INPUT FROM METER #3
INPUT FROM METER #2
INPUT FROM METER #1

UTILITY COMPARTMENT

POWER ●
INPUT LED's
OUTPUT LED's
YEL
GRN

TB2
K1 Y1 K2 Y2 K3 Y3 K4 Y4

***** OUTPUT RATINGS *****
Voltage: 250VAC/VDC
Current: 180mA
Max. Power Dissipation: 1500mW @ 70C

CUSTOMER COMPARTMENT

OUTPUT #1
OUTPUT #2
OUTPUT #4
OUTPUT #3

CUSTOMER'S TERMINALS

ENCLOSURE - The CIR-44 has a NEMA4X weatherproof and dustproof enclosure. The CIR-44 may be mounted in any position, but in general is most convenient and designed to be mounted with the hinge on the left side in the orientation shown above. Four mounting holes are provided.

POWER INPUT - For 120 to 277 VAC power, connect the "hot" lead to the **LINE** terminal. Connect the **NEU** terminal to neutral. Connect the **GND** terminal to the electrical system ground. The CIR-44 must be wired **Phase to Neutral**, not Phase to Phase. If no true neutral is available, connect both the NEU and GND terminals to the electrical system ground. The GND terminal MUST be connected. DO NOT leave the GND terminal unconnected.

METER CONNECTIONS - Four 2-Wire (Form A) pulse inputs are provided on the CIR-44. Connect the K and Y wires from each meter. Connect the K & Y leads from Meter #1's dry-contact pulse output to the K & Y terminals on INPUT #1 of the terminal strip in the utility compartment. Connect Meter #2 to K & Y terminals of Input #2, etc. The Y input terminal provides a "pulled up" wetting (sense) voltage of +12VDC to the meters' "Y" terminals. The CIR-44's "K" input terminals provide a common return. The CIR-44's KY inputs are compatible with electromechanical or solid state pulse initiators. When using an open-collector NPN Bi-Polar transistor output or open-drain N-Channel FET transistor to interface a meter with the CIR-44, the transistor's *emitter(-)* pin or the FET's *source(-)* pin must be connected to the K input terminal. The transistor's *collector(+)* or the FET's *drain(+)* pin must be connected to the Y input terminal. Each Y input has a YELLOW LED in the customer compartment to show when the Y input is active.
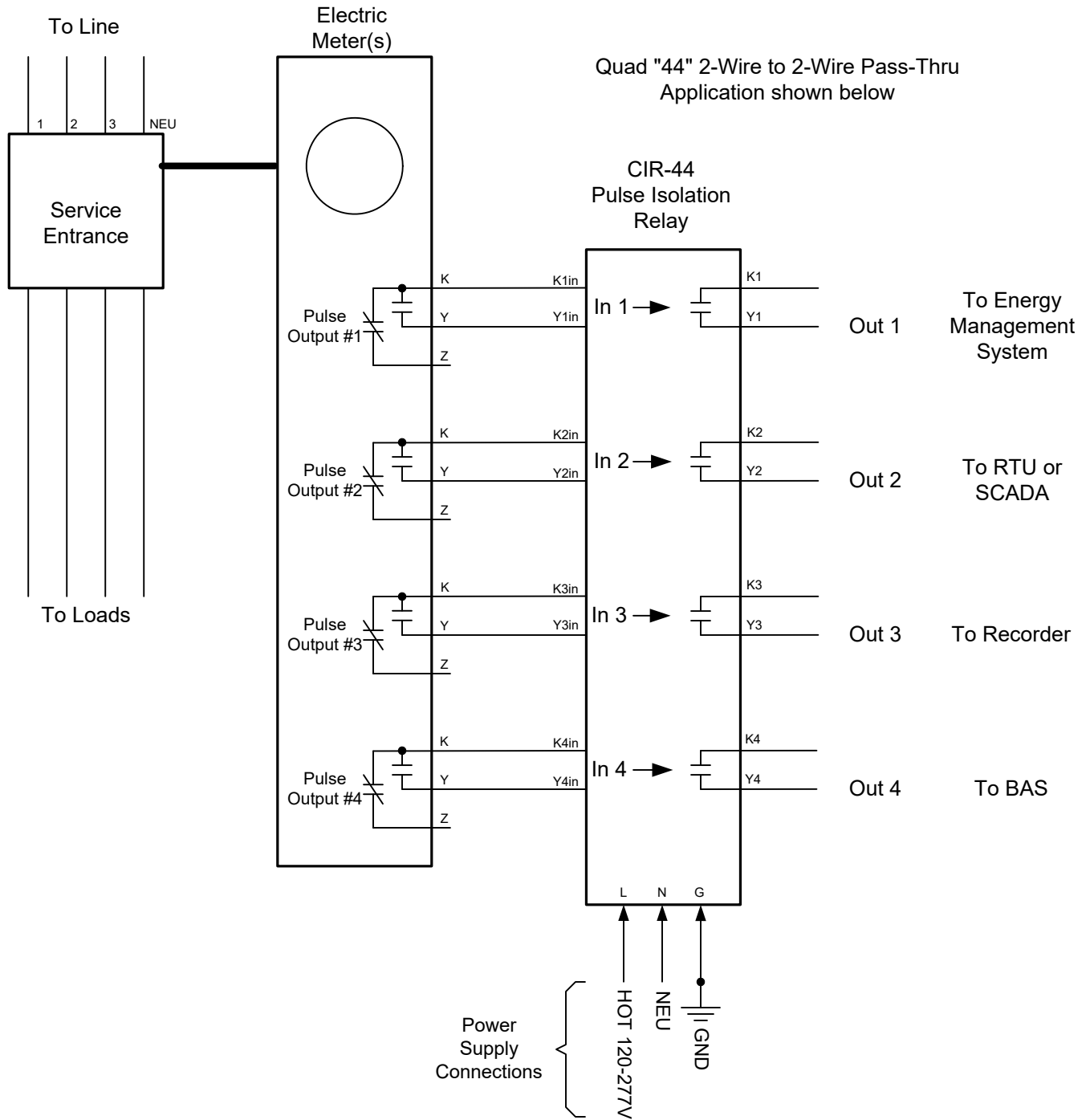
OUTPUTS - Four two-wire isolated outputs are provided on the CIR-44, with output terminals K1 & Y1, K2 & Y2, K3 & Y3, and K4 & Y4 and are located in the bottom of the enclosure in the customer compartment. Outputs are solid-state dry-contact type and must be provided with a wetting voltage from an external source, usually provided by the pulse receiving device. Contacts are rated at 120VAC/VDC MAX and current limited to 180mA. Transient suppression for the contacts of the solid state relays is provided internally. Each relay must be assigned or "mapped" to one of the four input channels, using the SSI Universal Programmer V1.1.0 or later. LEDs on each output show the output's status. A GREEN LEDs indicates each output's K-Y closure.

SOLID STATE INSTRUMENTS
a division of Brayden Automation Corp.
6230 Aviation Circle, Loveland, Colorado 80538
Phone: (970)461-9600
E-mail: support@brayden.com

CIR-44 Wiring Diagram

To Line

Electric Meter(s)

Quad "44" 2-Wire to 2-Wire Pass-Thru
Application shown below

1   2   3   NEU

CIR-44
Pulse Isolation
Relay

Service
Entrance

K   K1in   K1
Pulse   In 1 →   Out 1   To Energy
Output #1   Y   Y1in   Y1   Management
Z   System

To Loads

K   K2in   K2
Pulse   In 2 →   Out 2   To RTU or
Output #2   Y   Y2in   Y2   SCADA
Z

K   K3in   K3
Pulse   In 3 →   Out 3   To Recorder
Output #3   Y   Y3in   Y3
Z

K   K4in   K4
Pulse   In 4 →   Out 4   To BAS
Output #4   Y   Y4in   Y4
Z

L   N   G

Power
Supply
Connections

HOT 120-277V   NEU   GND

CIR-44WiringDiagram.vsd

CIR-44 Repeating Pulse Relay Wiring Diagram	REVISIONS		Brayden Automation Corp./ Solid State Instruments div.
	NO.	DATE	DESCRIPTION

DATE ORIGINAL 05/10/24   SCALE N/A

LATEST REVISION   JOB NO.   CHECKED   DRAWN WHB

MAXIMUM POWER DISSIPATION OF OUTPUTS - Output devices are rated at a maximum of 1500 mW. Care should be taken to insure that the wetting voltage used across the output device times the current (or burden) of the input of the downstream device, does not exceed the maximum power output dissipation of 1500mW. Normally this is not a problem since most downstream instrumentation devices are high impedance and present a very low burden, usually less than 10mA. For example, if 120VAC is used, the maximum allowable current across the output is 12.5 mA. If 12VDC is used, the maximum current allowable across the output is approximately 125mA, well under the 180mA current rating of the device. Therefore, the maximum dissipation when using 12V is 1500mW since the current is limited to .125 Amp. Calculate the maximum current using the following formula: 1500milliWatts / Voltage = Max. Current (burden) in milliamps. Adjust the voltage or current used across the output to insure that the maximum power dissipation, voltage and current maximums are not exceeded.

FUSES - Each output has its own automatically resetting Fuse rated at 150mA. F1, F2, F3 and F4 correspond to outputs 1, 2, 3, and 4, respectively. Maximum fuse ratings are designated on the silkscreen under or adjacent to each fuse position.

FORM A PULSE WIDTHS - In the event that the user requires a fixed pulse width on the output, a pulse width from .00001 second to 10000 seconds can be programmed. The fixed output length is disabled by entering 0.0000 as the pulse width. This puts the output in the toggle mode or "Mirror" mode where the output timing equals the input timing.

OPERATING MODES - The CIR-44 has three operating modes as follows:
        1.) Form A In/Form A Out - Pass thru; Output closure time equals Input closure time.
        2.) Form A In/Form A Out - Pass thru with Fixed Width Output timing.
        3.) Form A In/ Form A Out - Conversion Mode with designated Input and Output values.

These modes are assignable by the entries into the programming table.

TOTALIZING - The CIR-44 is able to totalize any of the four inputs, with either a positive (delivered) ore negative (received) value. In this way, the CIR-44 allows you to "Net Out" energy between Delivered and Received energy quantities. Negative Limits are also settable to insure that negative accrued values do not go further negative than the designated limit. Pulse values are also settable for input and output values so that actual pulse values from different meters may be accurately totalized. See the SoCo Programmer Manual for detailed information on totalizing.

SOLID STATE INSTRUMENTS
a division of Brayden Automation Corp.
6230 Aviation Circle, Loveland, Colorado 80538
Phone: (970)461-9600   Fax: (970)461-9605
E-mail:support@solidstateinstruments.com

WORKING WITH THE CIR-44 RELAY

OPERATING MODES: The CIR-44 Programmable Customer Interface Relay has 3 operating modes. One is "**Pass-Thru**", the second is **"Fixed-Width"** output mode and the third is **"Value Conversion"** mode. Any of these modes may be used with or without the totalizer function.

Mode 1 - Form A In/Form A Out: In this Pass-Thru mode, both the input and the output are set to Form A (2-wire) mode and the fixed Output Pulse Width is disabled. The Form A output(s) follow the Form A input. Output pulse widths equal the input pulse widths.


Figure 1: Form A Input/FormA Output Operation
Normal Mode
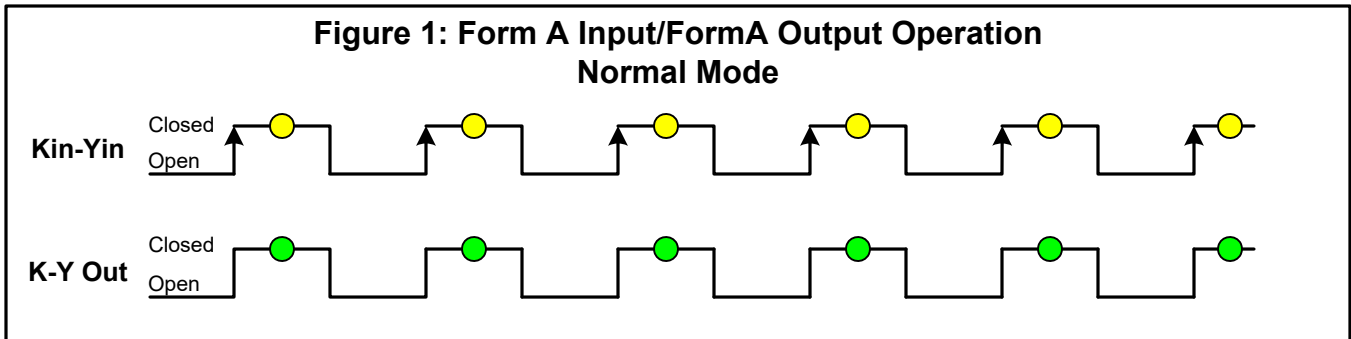
Mode 2 - Form A In/Form A Out with fixed Output Pulse Width: In this Fixed Width mode,the Form A output(s) follow the Form A input, but close for the selected pulse width duration.

Figure 3: Form A Input/FormA Output Operation
Fixed Width Output Pulse
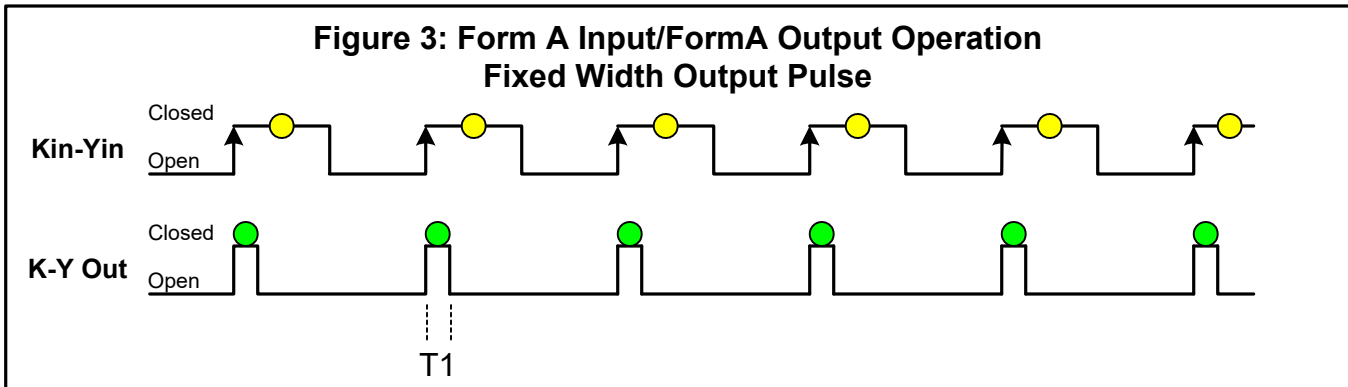
In this mode, the output pulse width is set to 50mS, up to 10,000mS, so output pulses are a fixed width(🟢) as defined by the Pulse Width entry box. The input pulses will speed up and slow down so the time between pulses is variable, but the on-time (T1) of a pulse is fixed. If input pulses are faster than output pulses, an overflow can occur in this mode. That means that output pulses cannot keep up with input pulses because of the timing constraints of the fixed pulse width. Pick a pulse width shorter than your fastest input pulse or disable the fixed pulse width, then click on <Program>.

Contact the factory for technical support at (888)272-9336.

WORKING WITH THE CIR-44 RELAY(con't)

<u>Mode 3 - Form A In/Form A Out, Pulse Value Conversion Mode</u>: In this mode, the Input and Output pulse values are entered into the program. Upon each closure of the Form A input, the value of the pulse is added to the Accrued Energy Value (AER) register. When the value in the AER is equal to or greater than the programmed output pulse value, a pulse is outputted. This conversion function allows the input and output pulse values to be different.

Figure 4: Form A Input/FormA Output Operation
Pulse Value Conversion Mode
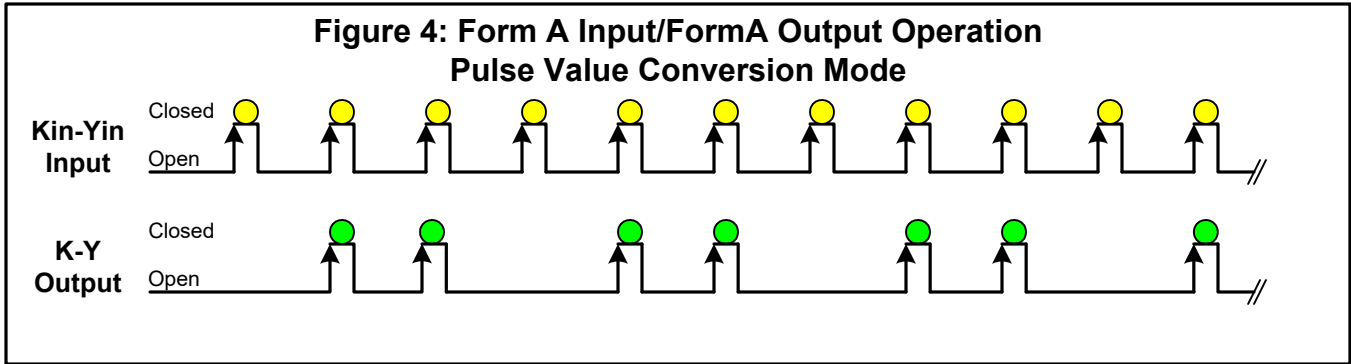
For Example, let's assume that your input pulses are worth 2.88 watt-hours per pulse. Further let's assume that your ouput pulse value is set to 4.00 watt-hours per pulse. The first pulse enters 2.88 in the accrued Energy register (AER).   No output pulse is generated. The second pulse received increments the AER by another 2.88 wh giving 5.76 wh. 5.76 is greater than 4 so a pulse is generated. A remainder of 1.76 wh remains in the AER. The third input pulse of 2.88 adds to the AER giving a balance of 4.64 wh. Another output pulse is generated, leving .64 wh in the register. The fourth input pulse adds 2.88 to the AER giving a new balance of 3.52 wh. This is not enough to generate a pulse, so 3.52 is held in the AER until the 5th pulse is received, at which time another pulse is generated. This process continues, making sure that the output pulses are worth 4.00 Wh's each. So as you can see this creates an assymmetrical pulse pattern but changes the value from 2.88wh/ pulse to 4.00 wh/pulse.

<u>Mapping each Output to an Input</u>: The four outputs of the CIR-44 must be assigned, or "mapped", to one of the inputs. Any output may be mapped to any one of the four inputs. The default configuration is 1 to 1, 2 to 2, 3 to 3 and 4 to 4. This is called the 4x4 configuration and is the default configuration. In this configuration, each output is tied to the input of the same number.

Any configuration or combination of outputs to inputs is possible depending on the application. All four outputs may be assigned to one input giving four isolated contacts. The unused inputs may be disabled.

Another popular configuration is the "24" where two outputs each follow one input. For example outputs #1 and #2 follow input #1 and outputs #3 and #4 follow Input #2. Therefore, Inputs #3 and #4 are not used. This configuration is often used for delivered and received kWh pulses, or for kwh and kVARh pulses.

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SOCO Programer

The SoCo Programer is a windows-based programming utility for the CIR-44 Series. Download the SoCo Programmer from the CIR-44 page on the SSI website at www.solidstateinstruments.com/sitepages/downloads.php. The Programmer page is shown below. Please see the SOCO Programming manual for instructions on how to program the CIR-44.

SOCO Pulse Board Programmer 2 [Version 01-21-2021]				**x**

Totalizer Channels

Input Pulse Weight	Output 1	Output 2	Output 3	Output 4	
1	1.0000	Add	None	None	None
2	1.0000	None	Add	None	None
3	1.0000	None	None	Add	None
4	1.0000	None	None	None	Add

	Output 1	Output 2	Output 3	Output 4
Output Pulse Weight	1.0000	1.0000	1.0000	1.0000
Negative Pulse Limit	0.0000	0.0000	0.0000	0.0000

Program
Read

Clear
Defaults
Help
Cancel

Input Debounce (Milli-Seconds) 100
Output Delay (Milli-Seconds) 100

Comm Port COM8
Password

Log off

Message

Reset Factory Defaults- You can reset the CIR-44 to the factory defaults by clicking on the Defaults button.