FEATURES

- **Optional feedback input for closed loop control**
- **Jumper selectable analog input**
- **DIP switch selectable input/ output pulse types**
- **Open collector or 24VAC Triac output available**

APPLICATIONS

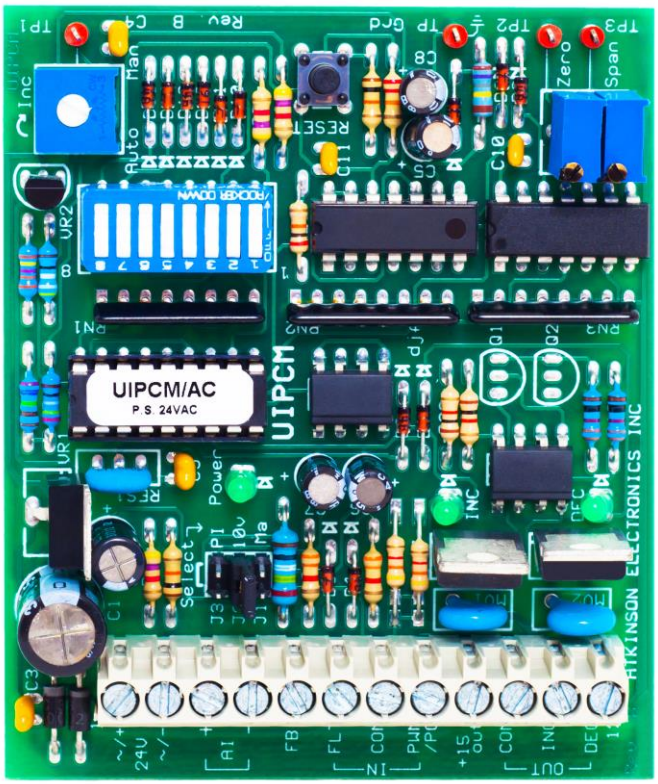
- **0-20mA to Tri-State floating or PWM**
- **0-10VDC to Tri-State floating or PWM**
- **PWM to Tri-State floating or PWM**
- **Tri-State floating to PWM**
- **Phase cut to Tri-State floating or PWM**

DESCRIPTION & OPERATION

The UIPCM accepts all standard analog input signals, including phase cut, as well as digital Pulse Width Modulated (PWM) and Tri-State floating inputs and converts them to a PWM or Tri-State floating output. The UIPCM is useful when interfacing to floating input damper actuators, or PWM input devices. It uses state of the art micro controller technology that give it superior control system performance. The universal input allows for a quick and simple solution for virtually all applications. The UIPCM can be user reconfigured when a field change is required. The outputs may be factory configured for either an AC Triac switched output or an open collector DC output.

Two half-wave, filtered, and regulated supplies provide power to the on-board circuitry. The UIPCM uses an embedded micro controller. The micro controller interprets the input signals and provides a corresponding output signal. The analog input may be configured to accept 0- 5VDC, 0-10VDC or 0-20mA by making a jumper selection. The pulse inputs will accept pulse width modulated, or Tri-State floating signals at time bases of 2.5, 10, 60, and 120 seconds.

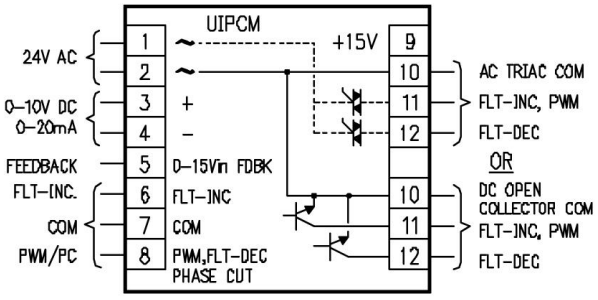
The PWM input may also be configured to accept a 10-90% phase cut input with a jumper and DIP switch selection. DIP switch settings also select pulse input and output types and time bases. An external feedback input is available for closed loop control. The feedback input is configured for 0-10VDC, however, custom feedback configurations are available upon request. Zero and span adjustments are available for adjustments to input signals or for sequencing or rescaling applications. The zero and span adjustment instructions can be found in the FIELD SETUP AND CALIBRATIONS section.



SPECIFICATIONS

SIZE:	4.5”L x 3”W x 1.25”H
MOUNTING:	3” RDI Snap Track (supplied)
POWER:	24VAC, ± 10%, 50/60Hz, 2VA
INPUTS:	0-90% phase cut 0-20mA, 0-5VDC, 0-10VDC PWM or 3 point floating @ 2.5, 10, 60 and 120 seconds
FEEDBACK SIGNALS:	STD. 0-10VDC, OPT. 0-5V
OUTPUTS:	PWM or Tri-State floating @ 2.5, 10, 60 and 120 seconds
OUTPUT RATINGS:	24VAC Triac @ 4 Amps Open collector @ .5 Amps
ADJUSTMENTS:	Zero – 256 step absolute Span – 64 step 1/3x to 3x
AMBIENT TEMP:	0 to 85°C

WIRING CONFIGURATION



ORDERING INFORMATION

UIPCM/SEL/XX/XX

- Feedback Voltage Option Code
- Output Option Code (AC or DC)
- Onboard Universal Selectable Input

ONBOARD UNIVERSAL SELECTABLE INPUT

PC	10-90% STAEFA phase cut
Ma	0-20mA input (JP1)
5V	0-5VDC input (JP3)
10V	0-10VDC input (JP2)
PWM	Pulse Width Modulation input
FLT	3 point floating (Tri-State) input

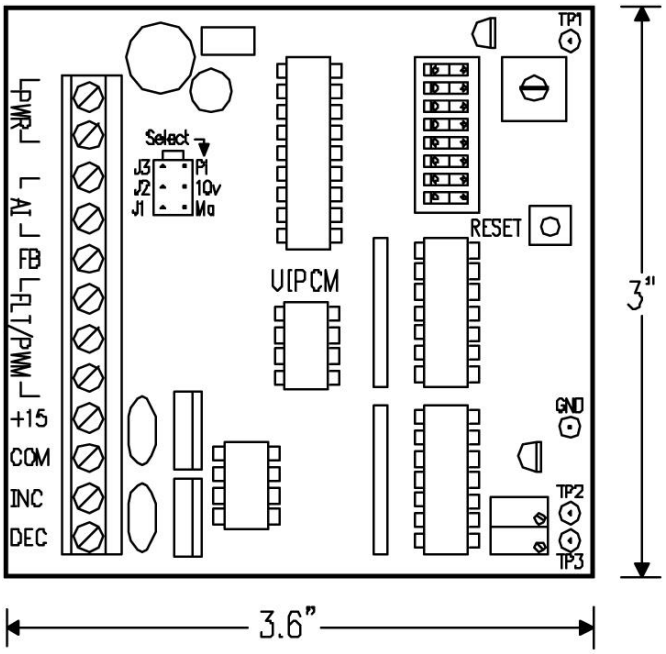
OUTPUT CODE OPTIONS

AC	24VAC digital Triac output
DC	15VDC digital open collector output

FEEDBACK VOLTAGE CODE OPTIONS

5V	0-5VDC feedback input signal
10V	0-10VDC feedback input signal (STD)
15V	0-15VDC feedback input signal
5V	0-5VDC feedback input signal
10V	0-10VDC feedback input signal (STD)
15V	0-15VDC feedback input signal

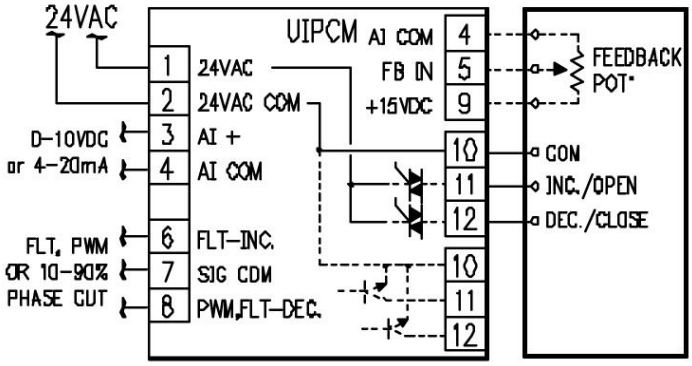
PHYSICAL CONFIGURATION



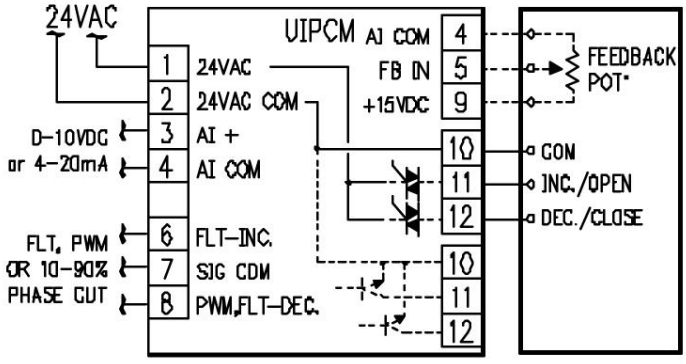
ORDERING CODES EXAMPLES

UIPCM //AC	Universal input to 24VAC Tri-State floating or PWM output.
UIPCM //DC	Universal input to 15VDC Tri-State floating or PWM output.

TYPICAL APPLICATIONS



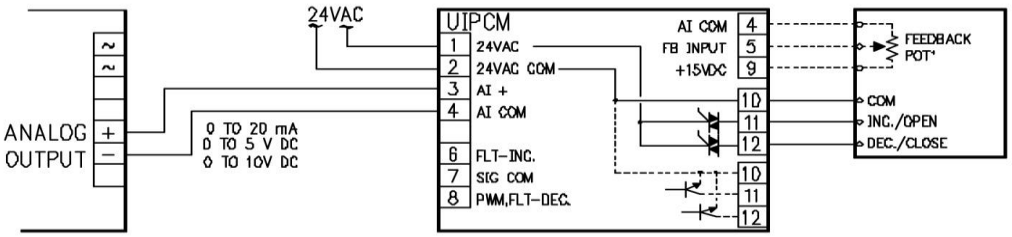
The UIPCM-AC uses two logic Triacs to switch the 24VAC outputs. The UIPCM can be configured with an optional feedback input for open or closed loop control.



The UIPCM-DC uses two open collector NPN transistors to switch the common in and out, in either PWM or Tri-State floating applications.

APPLICATION 1

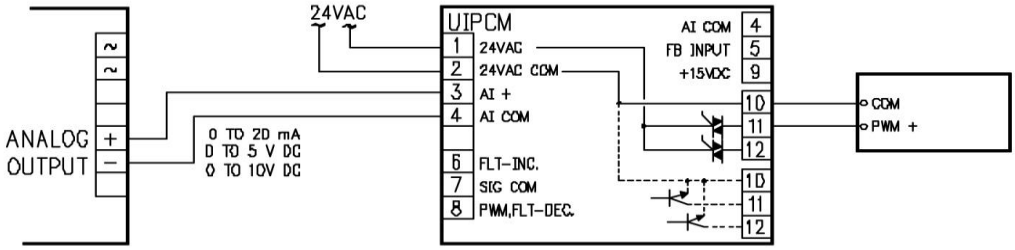
ANALOG INPUT TO THREE POINT FLOATING OUTPUT



The UIPCM-AC is used to convert an analog input signal to a Tri-State floating (FLT) output. Select the jumper for the desired input, 0-5VDC (J3), 0-10VDC (J2), or 0-20mA (J1) input signal. The UIPCM-AC outputs uses a Triac rated @ 4 Amps, to switch the 24VAC. The output is updated every 30 seconds. The output time base selected will determine the length of each adjustment pulse within that 30 second window. A 100% call for adjustment will give a 25% of the output time base selected. For example if the controller is giving a 5VDC output and the feedback indicates the position at 1VDC, then a proportional output pulse will be given based on the difference up to a maximum 25% of the output time base selected. If you are not using a feedback signal, then a calculated percentage of full scale signal will be given up to a maximum of 25% of full scale. See the FIELD SETUP AND CALIBRATION section for more information.

APPLICATION 2

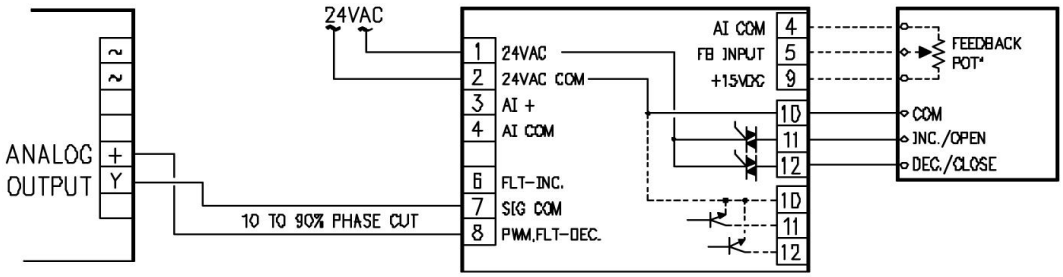
ANALOG INPUT TO PULSE WIDTH MODULATED OUTPUT



The UIPCM-AC is used to convert an analog input signal to a pulse width modulated (PWM) output. Select the jumper for the desired input, 0-5VDC (J3), 0-10VDC (J2), or 0-20mA (J1) input signal. The UIPCM-AC outputs uses a Triac rated @ 4 Amps, to switch the 24VAC. The output is a continuous pulse stream, however, it is also non-latching. For any given input signal, the output will pulse for a proportional percentage of the chosen output time base. In the case of reverse PWM selection, the output will pulse for the compliment of the input signal percentage of the output time base selected. See the FIELD SETUP AND CALIBRATION section for more information.

APPLICATION 3

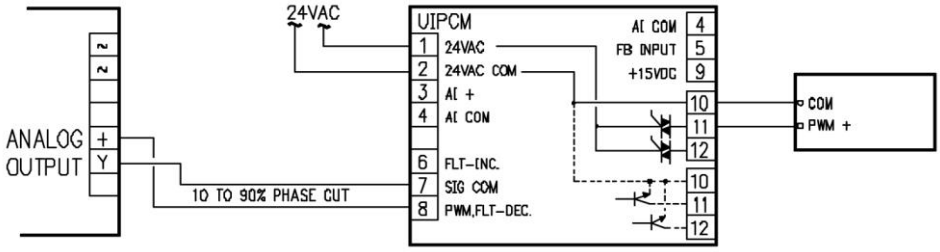
PHASE CUT INPUT TO THREE POINT FLOATING OUTPUT



The UIPCM-AC is used to converts a 10-90% phase cut signal to a Tri-State floating (FLT) output signal. A phase cut input configuration is selected by switching dip switches 3 & 4 to the off or 0 position, and making J1 or J2 (provides input load for unused Ai input). The UIPCM-AC outputs uses a Triac rated @ 4 Amps to switch the 24VAC. The output pulse is updated every 30 seconds. The output time base selected will determine the length of each adjustment pulse within that 30 second window. A 100% call for adjustment will give a 25% of the time base selected. For example if the controller is giving a 5VDC output and the feedback indicates the position at 1VDC, then a proportional output pulse will be given based on the difference up to a maximum 25% of the output time base selected. If you are not using a feedback signal, then a calculated percentage of full scale signal will be given up to a maximum of 25% of full scale. FIELD SETUP AND CALIBRATION section for more information.

APPLICATION 4

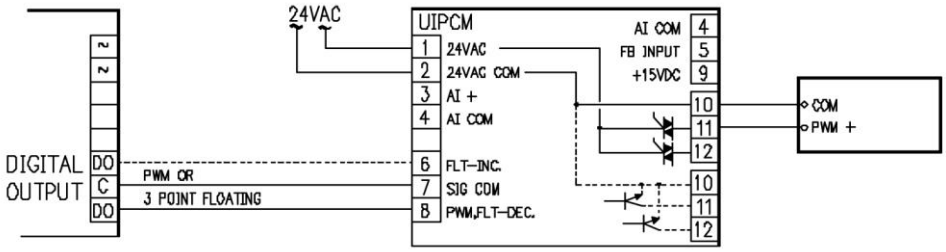
PHASE CUT INPUT TO PULSE WIDTH MODULATED OUTPUT



The UIPCM-AC is used to converts a 10-90% phase cut signal to a Pulse Width Modulated (PWM) output signal. A phase cut input configuration is selected by switching dip switches 3 & 4 to the off or 0 position, and making J1 or J2 (provides input load for unused Ai input). The UIPCM-AC outputs uses a Triac rated @ 4 Amps to switch the 24VAC. The output pulse is updated every 30 seconds. The output pulse is updated every 30 seconds. The output is a continuous pulse stream, however, it is also non-latching. For a given input signal, the output will pulse for a proportional percentage of the chosen output time base. In the case of reverse PWM selection, the output will pulse for the compliment of the input signal percentage of the output time base selected.

APPLICATION 5

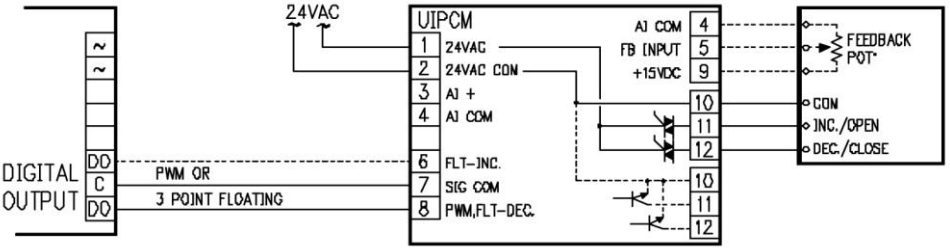
PULSE WIDTH MODULATED OR THREE POINT FLOATING INPUT TO PWM OUTPUT



The UIPCM-AC is used to convert a Pulse Width Modulated (PWM) or Tri-State floating (FLT) signal to a PWM output signal. A PWM or FLT input configuration is selected by switching dip switches 3 & 4, and making J1 or J2, (provides input load for unused Ai input), and J3 for pulsed inputs. The UIPCM-AC outputs uses a Triac rated @ 4 Amps to switch the 24VAC. The output pulse is updated every 30 seconds. For a given input signal, the output will pulse for a proportional percentage of the chosen output time base. In the case of reverse PWM selection, the output will pulse for the compliment of the input signal percentage of the output time base selected. See the FIELD SETUP AND CALIBRATION section for more information.

APPLICATION 6

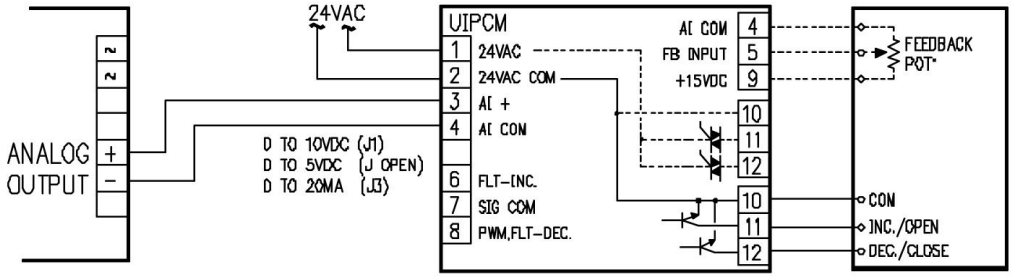
PWM OR THREE POINT FLOATING INPUT TO THREE POINT FLOATING OUTPUT



The UIPCM-AC is used to convert a pulse width modulated (PWM) or Tri-State floating (FLT) signal to a Tri-State floating (FLT) output signal. A PWM or FLT input configuration is selected by switching dip switches 3 & 4, and making J1 or J2, (provides input load for unused Ai input), and J3 for pulsed inputs. The UIPCM-AC outputs uses a Triac rated @ 4 Amps to switch the 24VAC. The output pulse is updated every 30 seconds. The output time base selected will determine the length of each adjustment pulse within that 30 second window. A 100% call for adjustment will give a 25% of the time base selected. For example if the controller is giving a 5VDC output and the feedback indicates the position at 1VDC, then a proportional output pulse will be given based on the difference up to a maximum 25% of the output time base selected. If you are not using a feedback signal, then a calculated percentage of full scale signal will be given up to a maximum of 25% of full scale. See the FIELD SETUP AND CALIBRATION section for more information.

APPLICATION 7

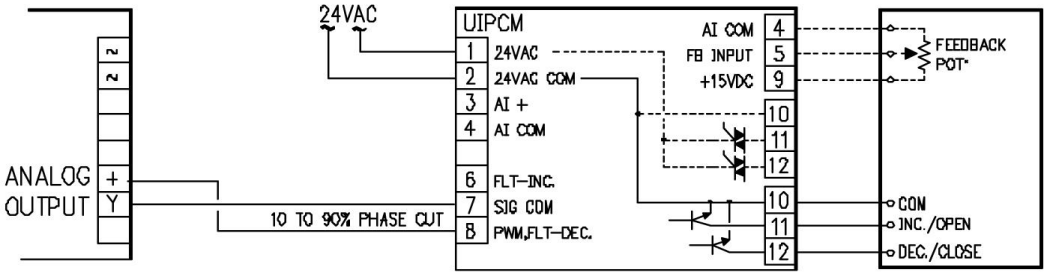
ANALOG INPUT TO OPEN COLLECTOR OUTPUT



The UIPCM-DC is used to convert an analog input signal to a Pulse Width Modulation (PWM), or Tri-State floating (FLT) output. By making one of the three input selection jumpers, the input may be set for a 0-5VDC (J3), 0-10VDC (J2), or 0-20mA (J1) input signal. The UIPCM-DC outputs uses two open collector transistors rated @ .5 Amps, to switch the DC voltage to ground. The output is updated every 30 seconds. The output time base selected will determine the length of each adjustment pulse within that 30 second window. A 100% call for adjustment will give a 25% of the output time base selected. See the FIELD SETUP AND CALIBRATION section for more information.

APPLICATION 8

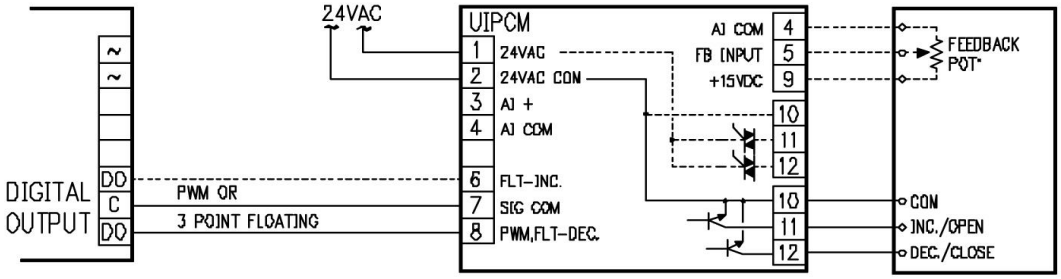
PHASE CUT INPUT TO OPEN COLLECTOR OUTPUT



The UIPCM-DC is used to converts a 10-90% phase cut signal to a Pulse Width Modulated (PWM), or Tri-State floating output signal. A phase cut input configuration is selected by switching dip switches 3 & 4 to the off or 0 position, and making J1 or J2 (provides input load for unused Ai input). The UIPCM-DC outputs uses two open collector transistors rated @ .5 Amps, to switch the DC voltage to ground. The output pulse is updated every 30 seconds. The output pulse is updated every 30 seconds. The output is a continuous pulse stream, however, it is also non-latching. For a given input signal, the output will pulse for a proportional percentage of the chosen output time base. In the case of reverse PWM selection, the output will pulse for the compliment of the input signal percentage of the output time base selected. See the FIELD SETUP AND CALIBRATION section for more information.

APPLICATION 9

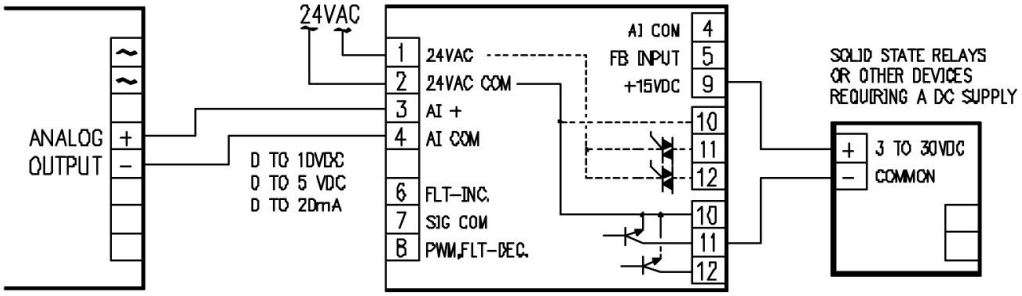
PULSE WIDTH MODULATION OR TRI-STATE FLOATING TO OPEN COLLECTOR OUTPUT



The UIPCM-DC is used to convert a Pulse Width Modulated (PWM) or Tri-State floating (FLT) signal to a PWM, or FLT output signal. A PWM or FLT input configuration is selected by switching dip switches 3 & 4, and making J1 or J2, (provides input load for unused Ai input), and J3 for pulsed inputs. The UIPCM-DC outputs uses two open collector transistors rated @ .5 Amps, to switch the DC voltage to ground. The output pulse is updated every 30 seconds. For a given input signal, the output will pulse for a proportional percentage of the chosen output time base. In the case of reverse PWM selection, the output will pulse for the compliment of the input signal percentage of the output time base selected. See the FIELD SETUP AND CALIBRATION for more information.

APPLICATION 10

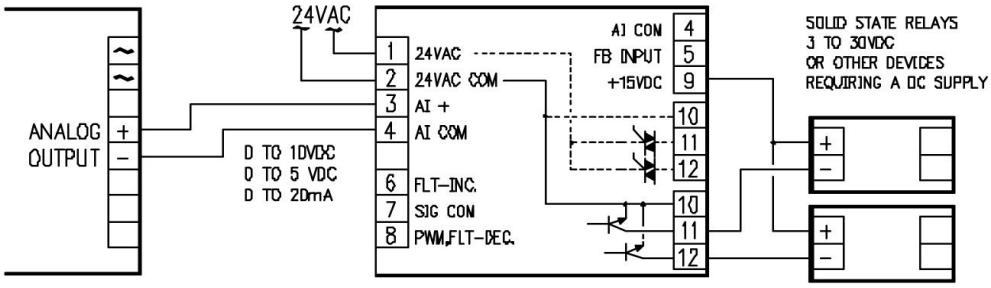
ANALOG INPUT TO PWM OPEN COLLECTOR OUTPUT



The UIPCM-DC is used to convert an analog input signal to a pulse width modulation (PWM), or Tri-State floating (FLT) output. By making one of the three input selection jumpers, the input may be set for a 0-5VDC (J3), 0-10VDC (J2), or 0-20mA (J1) input signal. The UIPCM-DC outputs uses two open collector transistors rated @ .5 Amps, to switch the DC voltage to ground. The output is updated every 30 seconds. The output time base selected will determine the length of each adjustment pulse within that 30 second window. A 100% call for adjustment will give a 25% of the output time base selected. For a given input signal, the output will pulse for a proportional percentage of the chosen output time base. In the case of reverse PWM selection, the output will pulse for the compliment of the input signal percentage of the output time base selected. See the FIELD SETUP AND CALIBRATION for more information.

APPLICATION 11

ANALOG INPUT TO FLT OPEN COLLECTOR OUTPUT



The UIPCM-DC is used to convert an analog input signal to a Pulse Width Modulation (PWM), or Tri-State floating (FLT) output. By making one of the three input selection jumpers, the input may be set for a 0-5VDC (J3), 0-10VDC (J2), or 0-20mA (J1) input signal. The UIPCM-DC outputs uses two open collector transistors rated @ .5 Amps, to switch the DC voltage to ground. The output is updated every 30 seconds. The output time base selected will determine the length of each adjustment pulse within that 30 second window. A 100% call for adjustment will give a 25% of the output time base selected. For a given input signal, the output will pulse for a proportional percentage of the chosen output time base. See the FIELD SETUP AND CALIBRATION section for more information.

FIELD SETUP AND CALIBRATION INSTRUCTIONS

The UIPCM has two distinct output selection options: Pulse Width Modulation (PWM), and Tri-State floating (FLT).

The pulse width modulated output selection will be updated at the end of each period. The period is determined by the output time base selected. For example, if the 10 second output time base is selected, the output will be updated every 10 seconds. The pulse width is modulated proportionally to the input signal being applied. The output in this mode is non-latching, that is to say, that it will never remain ON or OFF for the entire period. There will always be a short ON pulse when the input is at 0% and there will always be a short OFF pulse when a 100% input is applied.

The Tri-State floating output behaves quite differently depending upon whether a feedback signal is being used or not. When there is a feedback signal, the output will be calculated based on the difference between the input signal provided and the feedback signal indicating the control element position. When there is no feedback provided, the output will be an arbitrary calculation based on an assumed position of the control element. In this mode the UIPCM will be trying to maintain a 50% input signal. Any adjustment requirement above 50% will pulse the INC output proportionally. Conversely, any input signal below 50% will pulse the DEC output proportionately. There is a 30 second period or window in which all adjustments are made. The output time base selected will determine the output pulse time. A 100% call for adjustment will provide 25% of the output time base selected. For example, if the 120 second output time base is chosen, and a 100% call for adjustment is required, the output pulse length will be 30 seconds. If the 60 second output time base is chosen and the same 100% request is made, the output pulse length will be 15 seconds. This allows the UIPCM to peck its way into the set point without overshooting.

The UIPCM has a three position jumper that is used to select between an analog voltage input, and current input, (Ai terminals 3 & 4), and selects between pulse inputs or phase cut input (on terminals 7 & 8). The four input options are:

1. For pulse input of either PWM or FLT, make sure the jumper is installed in the position marked PI (J3).
2. For an analog input of 0-10VDC, or 10-90% phase cut, the jumper must be in the position marked 10V (J2).
3. For an analog input of 0-20 mA, the jumper must be in the position marked Ma (J1).
4. For an analog input of 0-5VDC the jumper must be removed completely.

The UIPCM has an eight position DIP switch that are used to select input and output type and time base. The DIP switch is set up in accordance with the table below. A logic 0 is the OFF or OPEN switch position. Note that the DIP switch is marked as to which side is OPEN. When the switch is down towards the side marked OPEN then it is in the logic 0 state.

OUTPUT MODE			INPUT MODE			OUTPUT TIMING			INPUT TIMING		
S1	S2		S3	S4		S5	S6		S7	S8	
0	0	TRI-STATE FLT	0	0	PHASE CUT	0	0	2.5 SECONDS	0	0	2.5 SECONDS
0	1	TRI-STATE W/FB	0	1	TRI-STATE FLT	0	1	10 SECONDS	0	1	10 SECONDS
1	0	PWM DIRECT	1	0	PWM	1	0	60 SECONDS	1	0	60 SECONDS
1	1	PWM REVERSE	1	1	PWM DIRECTED	1	1	120 SECONDS	1	1	120 SECONDS

A single turn auto/ man potentiometer is provided so that a minimum position can be established. The voltage setting for this potentiometer can be measured at TP1. When the auto/ man potentiometer is set at 0 volts, then the unit will operate normally. When the potentiometer is set at any voltage other voltage level, then the unit will not allow the output signal level to fall below a corresponding percentage of operation. For example: if the auto/ man potentiometer is set at 2.5 volts (50%) then the output will not be allowed to fall below 50%.

Note: The Auto/Man pot should only be used with PWM output signals. The use of this adjustment with Tri-State floating outputs will cause erroneous operation.

Note: All TP measurements are in reference to TP Ground or terminal 2.

There is also a zero and a span potentiometer on the board.

Note: *These potentiometers are for adjusting the input signal for sequencing or other custom applications. If you are not performing either of these operations, do not adjust these potentiometers. If you require an adjustment to these potentiometers, refer to the back page for instructions. If you are not sure, please call one of our applications engineers before adjusting them.*

The zero adjustment is an absolute position that biases the input signal off of the normal starting position. The zero potentiometer would need to be adjusted to the desired bias voltage. The zero can be set up by measuring the voltage at TP2. When the voltage at TP2 is 0 volts, there is no bias on the input. Any other voltage will place a bias on the input. The zero potentiometer can be adjusted between 0 and 5VDC. The percentage of bias is directly proportional to the voltage set on the zero potentiometer.

Example: If a 50% bias is needed, then 50% of 0-5 volts is 2.5V; set the zero potentiometer to this voltage and the bias will be at 50%.

The span is set up to provide 64 windows of input attenuation or gain. The center position on the SPAN potentiometer (2.5VDC as measured at TP3) is the gain of 1 or no change position. There are 32 windows below that position that will attenuate the input signal (minimum of 1/3x) and 32 windows above it that will amplify the input signal (maximum of 3x). The output timing can be adjusted by using the SPAN potentiometer by selecting the time base above the desired one and calculating how much attenuation it needs to reach the desired time base. Please refer to the table below for voltage settings.

Note: All TP measurements are in reference to TP ground or terminal 2.

TP3 Volts	% Adjust
.078 V	33.3%
.156 V	35.4%
.234 V	37.5%
.312 V	39.6%
.390 V	41.7%
.468 V	43.8%
.546 V	45.8%
.624 V	47.9%

TP3 Volts	% Adjust
.702 V	50.0%
.780 V	52.1%
.858 V	54.2%
.936 V	56.3%
1.014 V	58.3%
1.092 V	60.4%
1.170 V	62.5%
1.248 V	64.6%

TP3 Volts	% Adjust
1.326 V	66.7%
1.404 V	68.8%
1.482 V	70.8%
1.560 V	72.9%
1.638 V	75.0%
1.716 V	77.1%
1.794 V	79.2%
1.872 V	81.3%

TP3 Volts	% Adjust
1.950 V	83.3%
2.028 V	85.4%
2.106 V	87.5%
2.184 V	89.6%
2.262 V	91.7%
2.340 V	93.8%
2.418 V	95.8%
2.496 V	97.9%

TP3 Volts	% Adjust
2.574 V	106.3%
2.652 V	112.6%
2.730 V	118.8%
2.808 V	125.1%
2.886 V	131.3%
2.964 V	137.6%
3.042 V	143.8%
3.120 V	150.1%

TP3 Volts	% Adjust
3.198 V	156.3%
3.276 V	162.6%
3.354 V	168.8%
3.432 V	175.1%
3.510 V	181.3%
3.588 V	187.6%
3.666 V	193.8%
3.744 V	200.1%

TP3 Volts	% Adjust
3.822 V	206.3%
3.900 V	212.6%
3.978 V	218.8%
4.056 V	225.1%
4.134 V	231.3%
4.212 V	237.6%
4.290 V	243.8%
4.338 V	250.1%

TP3 Volts	% Adjust
4.446 V	256.3%
4.524 V	262.6%
4.602 V	268.8%
4.680 V	275.1%
4.758 V	281.3%
4.836 V	287.6%
4.875 V	293.8%
5.000 V	300.0%