MODELS

PM2A3
PM2A5
PM2A9
PM2B3
PM2B5
PM2B9

POSITROL

INSTALLATION & OPERATING INSTRUCTIONS

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Proprietary Notice

The information contained in this publication is derived in part from proprietary and patent data. This information has been prepared for the expressed purpose of assisting operating and maintenance personnel in the efficient use of the instrument described herein. Publication of this information does not convey any rights to use or reproduce it or to use for any purpose other than in connection with the installation, operation and maintenance of the equipment described herein.

WARNING

This instrument contains electronic components that are susceptible to damage by static electricity. Proper handling* procedures must be observed during the removal, installation, or handling of internal circuit boards or devices.

*Handling Procedure

1. Power to unit must be removed.

2. Personnel must be grounded, via wrist strap or other safe, suitable means, before any printed circuit board or other internal device is installed, removed or adjusted.

3. Printed circuit boards must be transported in a conductive bag or other conductive container. Boards must not be removed from protective enclosure until the immediate time of installation. Removed boards must be placed immediately in protective container for transport, storage, or return to factory.

Comments

This instrument is not unique in its content of EDS (electrostatic discharge) sensitive components. Most modern electronic designs contain components that utilize metal oxide technology (NMOS, CMOS, etc.). Experience has proven that even small amounts of static electricity can damage or destroy these devices. Damaged components, even though they appear to function properly, exhibit early failure.

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WARRANTY

DESCRIPTION

Application:
Any position monitoring application where 2 alarm setpoints and a 6 digit LED display is needed. Such as blade positioning, box making and many other machine shop and industrial applications.

Description:
Featuring 6 digits of bright, 7-segment LED displays, this unitl is a position monitor which accepts signal inputs up to 30 KHz. A 5 digit floating decimal scale factor allows a readout in true engineering units. The unit has two, programmable alarm set points from -99999 to 99999 and a selectable start point. These setpoints control two 10 Amp relays. A two stage panel lock prohibits menu changes from unauthorized personnel.

Specifications:
Display
6 digit, .55" high, 7 segment, red orange, LED.

Input Power:
24, 110, 220 VAC ± 15% or 12 to 15VDC.
Current: maximum 300 mA DC or 8.0 VA at rated AC voltage.
Output Power:
(AC powered units only) + 12VDC @ 50mA **unregulated** -10 +50%
Temperature:
Operating:+32°F (0°C) to +130°F (+54°C).
Storage:-40°F (-40°C) to +200°F (93°C).
Memory:
EEPROM stores data for ten years if power is lost.
Inputs:DC pulse input open or 0-1 VDC (low), 4-30 VDC (high), 30KHz speed max.
Reset:
Front Panel: resets display to view (start) value.
Remote: 4-30VDC positive edge, Resets display to view (start) value.
Lockout:
Unauthorized front panel changes can be prevented by entering a user selected, 5 digit code. The lockout feature can be programmed to lock the entire front panel or lock the menu items and leave the presets and reset accessable. In either mode the locked items can be viewed but not changed.
Control Outputs:
2 each N.O. Relays - 10Amp @ 120/240 VAC or 28 VDC. (N.C. Relay contacts or NPN sink from 10 VDC to .5 VDC @ 100 mA available with solder jumpers). The output will remain active when the display is equal to or greater than the set point. If the display falls below the set point, the output becomes inactive.
Set Points:
Two control set points are provided. The set points can be programmed for any number from minus 99999 to plus 99999. The position monitorl will recognize new set point values without the need to reset the unit. The unit also has a starting point which can be viewed or changed by pressing the "view" button. When the reset is activated, the display will reset to the view (start) value.
Shipping Weight:
2 pounds.

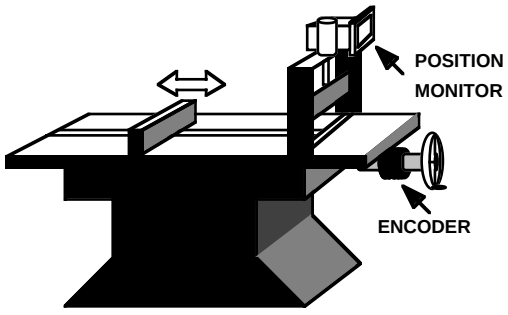
TYPICAL APPLICATION:

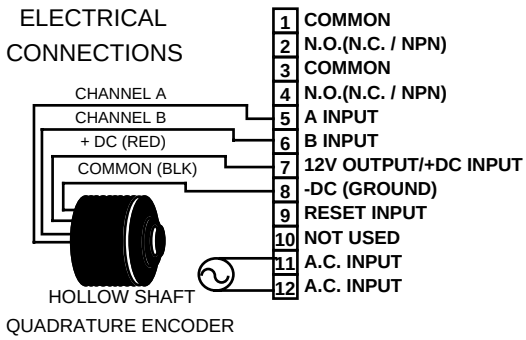
The position monitor can be used in many position applications. When two units are used, both X and Y axes positions can be monitored. The application below involves monitoring of the X axis only.

In this application the STOP position on a sheet metal shear must be monitored. A quadrature encoder was placed on the screw drive shaft. The Encoder outputs 100 pulses per revolution. Each revolution of the screw drive equals a .15 inch movement of the STOP. To calculate the scale factor simply divide 100 by .15 (100 ÷ .15) = 666.66 pulses per inch. This would be the scale factor if the display was to be read in inches. In this application the STOP movement must be accurate to .01 inches. Therefore the factor 666.66 must be divided by 100 (666.66 ÷ 100) = 6.6666 pulses per .01 inch.

The unit has two alarm set points which activate two relays. The unit also has a programmable preset starting point. At any time the preset start point can be viewed or changed by pressing the view button. The two relay outputs can be used to signal alarms when the desired position has been reached.

This unit is the perfect solution for position monitoring applications where a low cost, scalable monitor is needed.





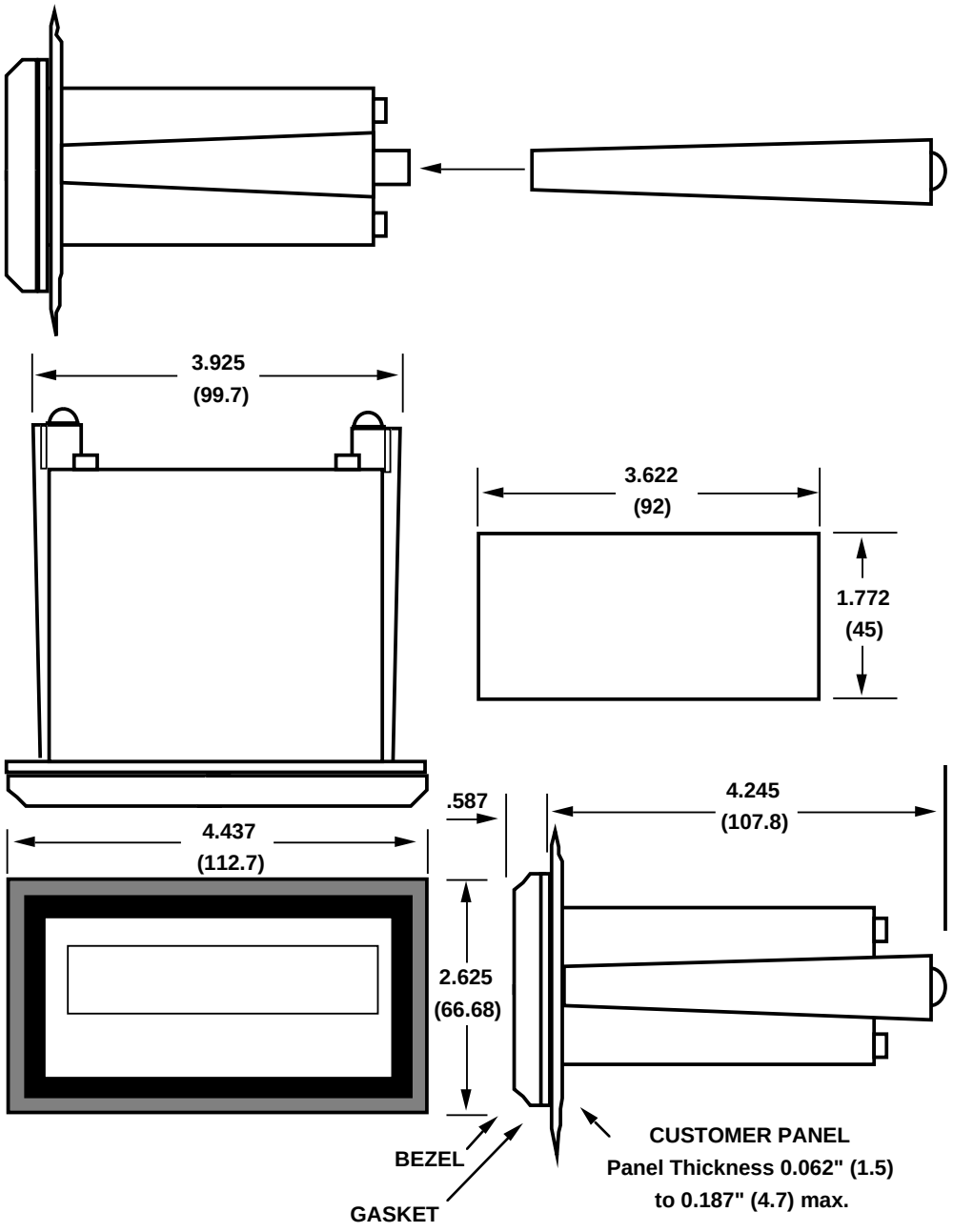
MOUNTING

HOW TO MOUNT:

Slide the body of the unit through the rubber gasket. Insert the unit into the panel. Slide the brackets up the groove to press against the back of the panel, as shown in "FIG. A". Insert the screws into the rear of the brackets.

Tighten the screws evenly and alternately. A panel less than .1" may distort if the clamps are screwed too tightly. Do not over tighten! A normal level of torque is required. Maximum torque should be 3" pounds.

FIG. A



WIRING

AC / DC CONNECTIONS:
NOTE: Connect power only after other connections are finished. Do not touch the live AC power terminals. The unit has been designed with an isolated AC input, therefore polarity is not a concern for the AC power. The chasis is plastic, therefore earth ground is not used. For DC operation, connect +DC to terminal 7 and -DC to terminal 8.

Although the unit is designed to be immune from line or RF interference, the unit is controlled by a microprocessor and an electrically "noisy" environment could cause operating problems. The input power lines should not be common to power lines for motors, pumps, contactors, etc.

Four sources of noise can occur:

1) AC power line noise- If the unit cannot be connected to an electrically clean power source, an inductive load supressing device (MOV as GE#V130LA1 or Resistor Capacitor as Paktron# .2uf/220 ohm @ 400V) can be installed. Although locating the suppressor across the AC supply at the unit should help, best results are obtained by connecting the suppressor across the leads of the "load" at the device causing the spikes.

2) Input line noise- The noise is carried on the input and DC ground lines. Make sure the input wires are not run into the unit in a bundle with power input lines. We recommend using shielded cable. Connect the shield to DC ground of the unit and "earth" at one point in the circuit preferably at the DC ground terminal of the unit.

3) Output lines- The unit has Two relay outputs. When these outputs are used to run external relays or solenoids, spikes can be generated upon activation. This noise can spread through the instrument causing operating problems. If the source is a D.C. operated device, a general purpose diode (IN4004) placed across the solenoid prevents electrical noise spikes. Connect the cathode (banded side) to the more positive side of the coil. If the source is an A.C. operated device, use a Resistor Capacitor or MOV across the coil.

4) 12 VDC output supply- Noise can be generated on the 12 VDC output supply if it is used to drive inductive loads or if the current draw exceeds 50 mA. Insure that all inductive loads have a diode (such as IN4004) across the coil and that the current does not exceed 50 mA.

WIRING CONNECTIONS

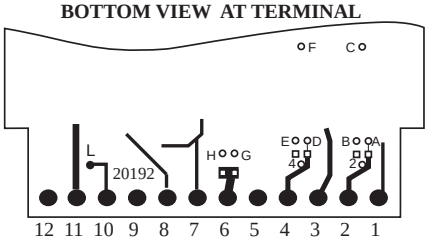
- ☐ 1. COMMON — A
- ☐ 2. N.O. (N.C. / NPN) — A
- ☐ 3. COMMON — B
- ☐ 4. N.O. (N.C. / NPN) — B
- ☐ 5. A INPUT
- ☐ 6. B INPUT
- ☐ 7. 12 V OUTPUT / +DC INPUT
- ☐ 8. -DC (GROUND)
- ☐ 9. RESET INPUT
- ☐ 10. NOT USED
- ☐ 11. AC INPUT
- ☐ 12. AC INPUT

Output Jumper Selections

Before making any board modifications, be sure power is disconnected and locate the plastic extender to the case at the rear of the unit. To remove the extender locate and remove the two screws which hold it in place. After the extender is removed the PC board will be exposed.
The unit must be removed from the case to access jumpers C & F, all other jumbers can be accessed by removing the plastic extender.

FUNCTION	MODIFICATION	
"A" RELAY N.C. OUTPUT	CUT AT "A"	JUMPER "B" TO "2"
"B" RELAY N.C. OUTPUT	CUT AT "D"	JUMPER "E" TO "4"
"A" PRESET TRANSISTOR (NPN)	CUT AT "A"	JUMPER "C" TO "2"
"B" PRESET TRANSISTOR (NPN)	CUT AT "D"	JUMPER "F" TO "4"

BOTTOM VIEW AT TERMINAL



DEFINITIONS

Count - COUNT; This portion of the programming menu sets up the count input data.
dPLoC - DECIMAL POINT LOCATION; This sets a fixed decimal for the count and preset values.
LoCPS - LOW COUNTS PER SECOND; This sets the input for a low count speed input (0 to 40Hz).
HiCPS - HIGH COUNTS PER SECOND; sets the input for a high count speed input (0 to 30KHz).
dPFA - DECIMAL POINT FOR FACTOR A; This sets a decimal point for factor A.
LoC - LOCK; This portion of the programming menu sets up the panel lock configuration and code.
LCALL - LOCK ALL; This sets the unit to lock the entire front panel when the lock is "on". Preset values can be viewd but not changed.
LCPrG - LOCK PROGRAM; This sets the unit to lock the program when the lock is "on". Presets values can be viewd and changed.
CodE - CODE; This message flashes for approximately 3 sec. and is followed by the existing lock code.

CALCULATING THE K FACTORS

The K factor (divider) is the number of pulses per the desired unit of measure. The K factor can be any 5 digit number from .0001 to 99999. The K factor can be easily calculated by following two simple steps.

STEP 1 - Calculate a base K factor:
The base K factor is the number of pulse per the known unit of measure. Calculate the base K factor using:

$$\frac{\text{Pulses}}{\text{Known Units value}} = \text{Base K factor}$$

EXAMPLE #1:
An Encoder with 100 pulses per revolution is sensing material. 1 Revolution of the shaft equals 1 foot of material.

$$\text{Base K factor} = \frac{100 \text{ (pulses)}}{1 \text{ (foot)}} = 100$$

EXAMPLE #2:
An inductive proximity sensor is sensing a notch on a paper roll (1 pulse per revolution). Each revolution of the paper roll equals 3 meters of paper.

$$\text{Base K factor} = \frac{1 \text{(pulse)}}{3 \text{ (meters)}} = .3333$$

STEP 2 - Calculate the count K factor:
The count K factor is the actual number to be programmed into the unit. Caculate the count K factor using:

$$\text{Count K factor} = \frac{\text{Base K factor}}{\text{Units conversion factor}}$$

UNITS CONVERSION FACTORS

To convert:	Divide by:
ft to in	12
in to ft	0.0833
ft to m	0.3048
ft^2 to m^2	0.0929
ft^3 to m^3	0.0283
m to ft	3.2808
m^2 to ft^2	10.763
m^3 to ft^3	35.315

EXAMPLE #1:
Using the base K factor from example #1 above, the desired reading is meters.

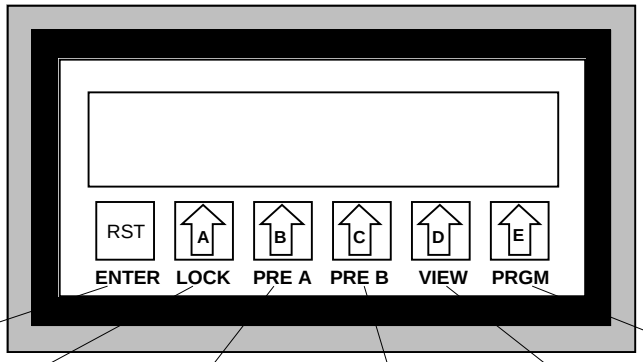
$$\text{Count K factor} = \frac{100 \text{ (base K factor)}}{0.3048 \text{ (units factor)}} = 328.08$$

EXAMPLE #2:
Using the base K factor from example #2 above, the desired rate reading is Feet

$$\text{Count K factor} = \frac{.3333 \text{ (base K)}}{3.2808 \text{ (units factor)}} = 0.1016$$

The Count K factor is the number to enter in the factor section of the program menu (see Programming Step 1).

FRONT PANEL OPERATIONS



Press to RESET to view value in operating mode; Press to "ENTER" in programming mode.

Press to "enter LOCK code for panel lock.

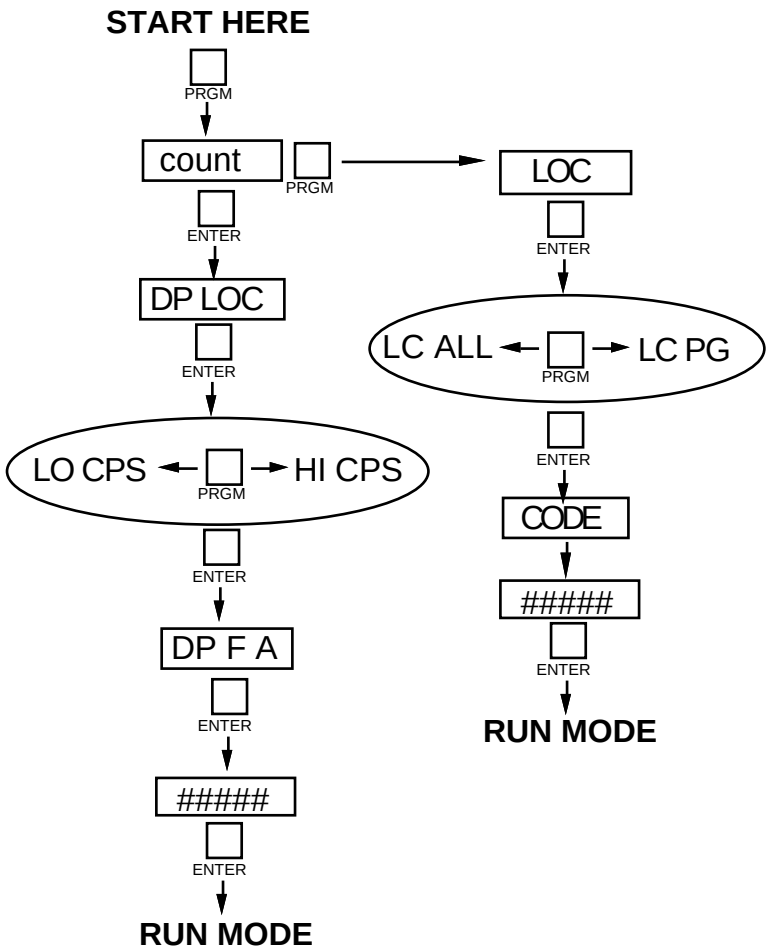
Press to view or change Preset A.

Press to view or change Preset B.

Press to view or change the start (view) value.

Press to cycle through PROGRAM choices; Press to step through set up choices in program mode.

PROGRAMMING FLOWCHART



PROGRAMMING

	PRESS	DISPLAY	REMARKS
STEP 1 **SETTING THE COUNTER**	PRGM	Count	This section of the menu is used to set the counter parameters.
	ENTER	dP LoC	Key in the desired decimal location and press ENTER.
	ENTER	Lo CPS or Hi CPS	Press the PRGM key to step through choices. Press ENTER to "enter" displayed choice..
	ENTER	dP F A	Key in the desired decimal location for K factor A and press ENTER .
	ENTER	#####	Key in the desired scaling K factor for input A and press ENTER .
STEP 2 **SETTING PANEL LOCK**	PRGM	Count	
	PRGM	LoC	
	ENTER	LC ALL or LC Pr9	Press the PRGM key to step through choices. Press ENTER to "enter" displayed choice.
	ENTER	CodE flashes followed by... #####	This is the security lock code. To change press the keys under the digits to be canged and press ENTER to "enter" displayed value. **RECORD THIS NUMBER FOR FUTURE USE!!**

THE PROGRAMMING IS COMPLETE !

SETTING THE PRESETS & PANEL LOCK

	PRESS	DISPLAY	REMARKS
SETTING THE PRESETS	 **VIEW**	PrESEt Followed by... ##### (Start value)	This value is the reference point (preset) that the unit will reset to when the "Reset" is activated.If the displayed value is not the desired preset, press the key(s) under the digit to be changed. A negative preset can be entered by pressing the A button until the digit passes nine and steps through -0 to -9.
	 **PRE A**	PrE A Followed by... ##### (Preset A value)	PRE A = Preset A; The set point at which output A will trigger. If the displayed value is not the desired preset, press the key(s) under the digit to be changed. A negative preset can be entered by pressing the A button until the digit passes nine and steps through -0 to -9.
	 **PRE B**	PrE b Followed by... ##### (Preset B value)	PRE B = Preset B; The set point at which output B will trigger. If the displayed value is not the desired preset, press the key(s) under the digit to be changed. A negative preset can be entered by pressing the A button until the digit passes nine and steps through -0 to -9.
SETTING THE LOCK STATUS	 **LOCK**	CodE Followed by... 0	Key in the lock code (see programming step 3) by pressing the keys under the digits to be changed. Each time a key is pressed the digit will increment one. Press the ENTER key to enter the displayed code.
	 **ENTER**	LoC or unLoC	After the code is entered the unit will display LOC (unit is locked) or UN LOC (unit is unlocked). This message will be displayed for approximately 3 seconds before the unit returns to the run mode.

TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSES	SOLUTIONS
Power is applied to unit but the display does not light.	1. AC or DC power wiring is incorrect.	1. Recheck power wiring.
Unit works but occasionally the display freezes or skips counts.	1. Line noise is effecting the processor due to a current spike or surge.	1. Use a different power supply or install a surge suppressor.
Input signal is connected but the unit does not count.	1. Input wiring is incorrect 2. Scaling K factor is incorrect. 3. Transmitting device is defective. 4. Wrong debounce filtering setting selected. 5. Unit is defective.	1. Recheck input wiring. 2. Recheck K factor settings. 3. Replace transmitting device. 4. Recheck debounce filtering selection ("HI CPS" or "LO CPS"). 5. To confirm, set K factor @ 1. Connect a wire to pin 7 (12V out) and touch it to pin 5 (Input A). Each time pin 5 is pulsed the counter should count once. If not call factory for an RMA#.

IF YOU HAVE ANY OTHER PROBLEMS, PLEASE CALL THE FACTORY.

We hope you will be pleased with our product. If you have any questions concerning our warranty, repair, modification or returned goods process, please contact your local distributor.

WARRANTY

This product is warrantied against defects in materials and workmanship for a period of two (2) years from the date of shipment to Buyer.

The Warranty is limited to repair or replacement of the defective unit at the option of the manufacturer. This warranty is void if the product has been altered, misused, dismantled, or otherwise abused.

ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, ARE EXCLUDED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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HOW TO ORDER:

SAMPLE: PM2 A 3

Series
PM2
Position Monitor

Operating Voltage
A = 110 VAC ± 15% or 12 to 15 VDC
B = 220 VAC ± 15% or 12 to 15 VDC
C = 24 VAC ± 15% or 12 to 15 VDC

Inputs
3 = Separate Up / Down Inputs
5 = One Count Input, One Up / Down Control
9 = Quadrature Input

Accessories
Separate non keyboard panel order # 34235
Separate keyboard panel order # 34237