

INTELLECT Counter - Timer

Installation & Operating Instructions

FEATURES

- * 6 large, brilliant red-orange LED digits
- * Field scalable from 1 to 100 inputs per count
- * 6 digit preset
- * Contact closure, 3 to 30 Volt DC count pulses, start/stop pulses
- * AC or DC powered
- * Screw terminal connections
- * 10 Amp relay or open coll. output
- * Standard DIN cut-out dimension

DESCRIPTION

The INTELLECT 1 COUNTER - TIMER is a microprocessor based instrument which will count pulses or time from: dry contact closures, 3 to 30 Volt pulses. Operating up to 1000 counts per second, it can be scaled to represent almost any measurement unit. The large, brilliant, 0.6", red-orange LED's show the count or time, preset and scaling factor on demand. The unit is housed in a fire retardant DIN standard panel mount enclosure.

SPECIFICATIONS

Mounting - Standard DIN cut-out. 3.622" (92mm) wide, 1.772" (45mm) high, 4.4" (111.8mm) max. depth behind panel.

Display - Six .6" x .32" red-orange seven (7) segment LED's. Shows time or counts, scaling factor and presets with decimal points.

Power Supply - 110 VAC 50 to 60 Hz., 220 VAC 50 to 60 Hz., 12 VDC -10% to 24 VDC +10%.

Counter Accuracy - Over full temperature range, digital accuracy of 100% up to a maximum counting speed of 1000 counts per second. 0.5ms min pulse width.

Timer Accuracy - Over full temperature range, an accuracy of 0.05% Full Scale is obtained by the use of an internal crystal time base oscillator.

Standby System - Internal non-volatile RAM retains counts or time, scale factor, preset and output status for up to ten years without power.

Housing - Standard high impact ABS 94-0 plastic case.

Temperature - Operating +32°F (0°C) to +130°F (+54°C). Storage -40°F (-40°C) to +200°F (+93°C).

Signal Input - 3 to 30 Volt DC pulses of 0.5 ms. minimum duration.

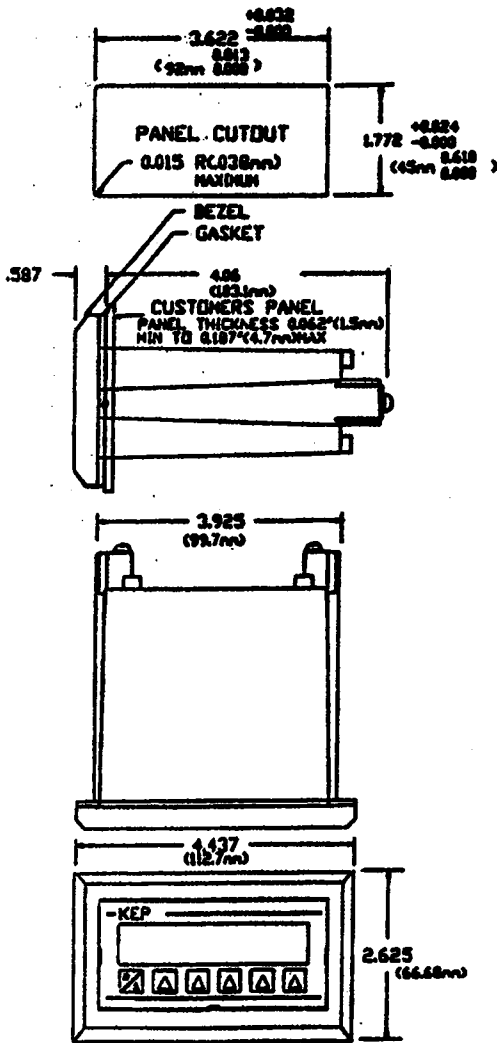
BCD Output - Parallel TTL 5VDC compatible positive true logic four lines per digit. Six full digits of data.

Preset Output - Single 10 Amp SPDT relay or 400mA. Open collector transistor.

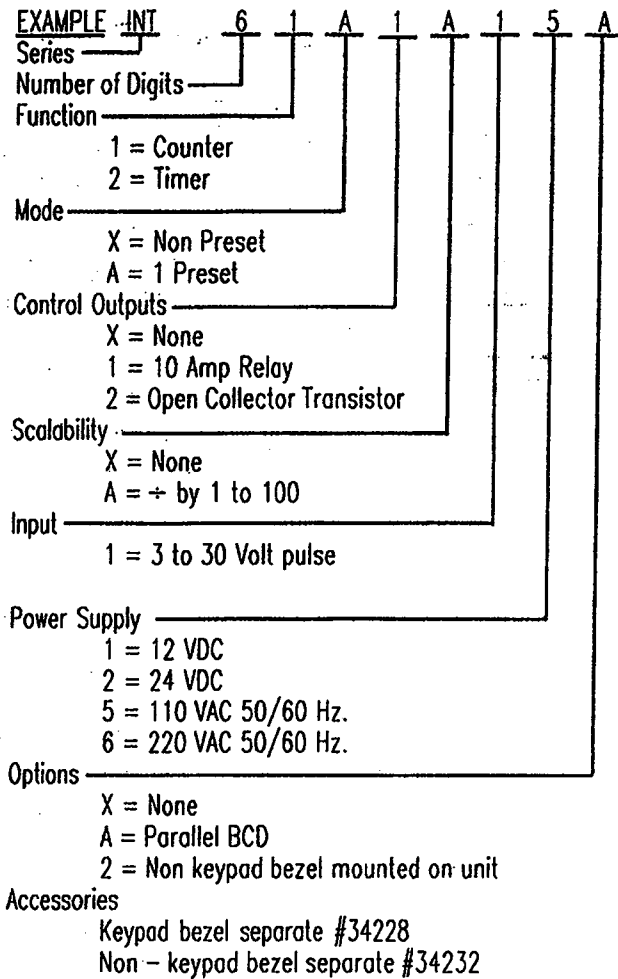
+5 Volt DC Output - Up to 100mA of +5 volt regulated power is available to supply peripheral devices such as encoders and proximity devices.

Power Consumption - Less than 425mA required for DC operation with all options. Less than 260mA without BCD output option. AC power consumption less than 5 watts with all options.

Dimensions



Decoding Part Number



KEYBOARD OPERATION

Setting Scaling Factor - First press the key which is the second from the right and then, while holding this, press the left-hand key (R). The letters SCL will appear on the left of the display and two digits will appear on the right. These numbers indicate the present scaling factor. Any whole number from 1 to 100 may be entered at this time by pressing either of the keys directly under the digit to be changed. Press as long as or as many times as needed to bring the scaling number to the value desired. Holding either key down will cause the digit above to increment at about a 2 count per second rate. **NOTE:** If 100 inputs per count are desired, enter 00.

In order to enter the scaling factor into memory and leave the setting mode, press the left-hand key (R) until the scale factor display just disappears then release. After the preset number has been entered in this manner, the (R) key will function as a panel RESET.

When 1 count per input is required, set scaling factor to 1. Standard units are shipped from the factory set for 1 count per input unless otherwise specified with the order.

Setting Preset Number - For 6 digit or less preset numbers, first press the right-hand key and then while holding this, activate the remote reset by applying a 3 to 30 VDC signal momentarily to Terminal 9. Then all of the decimal points will light with the exception of any that may have been previously set and the previous preset will also appear. To change the number, press any of the 6 keys, as above, until the digit above it increments to the desired value. Each digit will count from 0 to 9 without carrying so this may be done in any order. After the correct number has been entered, again activate the remote reset momentarily as above. This will enter the new value of the preset into memory. Also the previously lighted decimal points will now turn off and the unlighted one, if any, will turn back on.

If the preset value will be five digits or less, then you may follow a similar procedure except that now the left-hand (R) key may be used instead of the remote reset input.

In the five digit or less mode using the panel reset (R) key to enter, only the right hand five keys may be used to enter the preset. Pressing the (R) key will automatically exit the preset mode. When exiting, use the shortest time possible to load the number into memory since holding

the reset active for longer than two seconds will also reset any counts that may have been accumulated. If it is desired to reset, then either hold the reset longer than two seconds or press reset again. The value 0 cannot be preset on the Intellect 1. If 0 is entered, a default to a preset of 1 will occur.

NOTE: Whichever method is used to enter into the preset mode, the same must also be used to exit. EXAMPLE: If the panel (R) key is used to enter the preset, then the panel (R) key must be used to exit.

Setting the Decimal Point Position - First press the key which is the third from the right and then, while holding this, press the left-hand key (R). The letters DP will appear on the left of the display and any previously entered decimal point, press any key except the (R) key and it will change location. To eliminate the decimal point, press the right-hand key. Once the desired location has been achieved, exit the setting mode by pressing the left-hand (R) key just until the DP display disappears; then release. The new decimal point location is now entered. It now should appear on the display in its correct position along with any counts or preset number depending on the condition prior to entering into this mode.

Relay Output Operation - On any preset unit, the relay will turn on whenever the preset number of counts has been reached. If a scaling factor other than one has been entered, then the display will not increment or decrement until that number of input pulses has been reached. A count is considered a change of one on the display. The relay will either latch on or momentarily turn on depending on the setting of the internal program switches.

Open Collector Operation - This output is similar in operation to the relay output except it is not a mechanical device. An NPN transistor is used. When it turns on, it will conduct current to the DC ground. When using this output with any inductive load such as an external relay or solenoid, it is required that an appropriate arc suppressor is used mounted directly across the load. Do not exceed the ratings of this device or it will be damaged. The limits are 30 volts DC at 400mA or less.

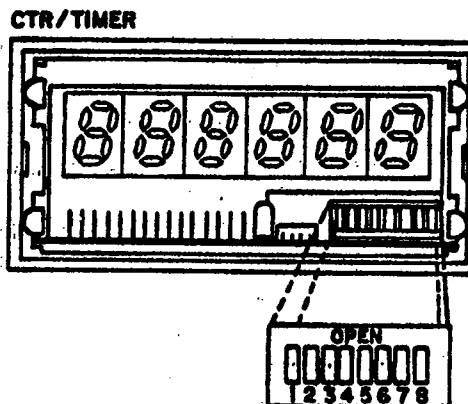
Typical arc suppression would be a general purpose power diode similar to a IN4005. The cathode (banded end of diode) shall be connected to the power source end of the load, and the anode (other end of diode) shall be connected to the end of the load that will be wired to Terminal 1.

BCD Output Operation - If ordered, the output is a parallel, TTL compatible, 5 VDC positive true logic form of BCD. This is the most common type in use today. All six digits are available at the upper connector at the rear panel. Four lines are dedicated to each digit. When connecting to another device, the signal ground must be connected between each item in the system. It must be of sufficient capacity to carry all of the system current. A minimum size of 20 gauge wire is recommended. If any errors in the data are noted, recheck this connection first; then recheck the accuracy of all the BCD wiring. Do not try to extend this type of data transmission to a distance of more than 50 feet as excessive noise pickup and signal loss will cause poor results.

Program Switch Settings - Behind the front panel are eight switches located in the lower right-hand corner. To access these switches, the bezel must be removed.

CAUTION: Most of the components are easily damaged by static electricity. Do not attempt to uncase this unit unless you are familiar with CMOS handling procedures.

Remove all power from the unit. Locate and remove the phillips head screws on both sides of the case. Press gently on the back connector to slide the printed circuit board and front bezel out the front of the case. This will allow access to the switches, ribbon cable connector and printed circuit board. (Non keypad units do not have a ribbon cable connected to the front bezel.) In either case, care should be taken to prevent damage due to scratching or excessive bending during removal and replacement. Reverse procedure for recasing.



COUNTER SWITCH SETTINGS

Set the switches to the desired functions according to the programming instructions following. (OFF is up, ON is down)

- Switch 1 OFF Reset to Zero
- ON Reset to Preset
- Switch 2 OFF Separate up and down
- inputs
- ON One count input and
- one up/down control line
- Switch 3 OFF This switch must be
- in this position to
- be a counter

Switch 4 & 5 Sets count speed

SW 4	SW 5	Max. Count Speed
OFF	OFF	1000 CPS
ON	OFF	120 CPS
OFF	ON	50 CPS
ON	ON	20 CPS

Switch 6	OFF	Outputs latched until reset
	ON	250 ms. output (momentary)
Switch 7	OFF	Display continues to count thru preset
	ON	Display recycles at preset
Switch 8		Has no function in count mode

NOTE: After selecting the proper switch configuration, the reset (R) key or the remote reset must be activated to input the new parameters into the microprocessor function memory. If this is not done, the unit will function as before a reset command is given.

COUNTER HOOK-UP INFORMATION

AC Powered Units - Apply 110 or 220 Volts AC as required by the part number to terminals 11 and 12. AC polarity is not important. Connect AC ground to Terminal 8.

DC Powered Units - Apply the correct DC voltage as required by the part number. Connect the negative voltage to Terminal 6 and the positive voltage to Terminal 10.

Reset Input - Contact Closure - Connect a normally open contact between Terminals 9 (reset) and 7 (5 volt out).

Voltage Pulse - Connect negative pulse lead to Terminal 6 (sig. Gnd) and positive pulse lead to Terminal 9 (reset).

Count Inputs - Separate Up and Down Inputs - Either contact closures or voltage pulses will activate these inputs. Terminal 4 is the UP input and Terminal 5 is the DOWN input. For contact closure inputs, connect a normally open contact between Terminal 7 (5 volt output) and the count input desired.

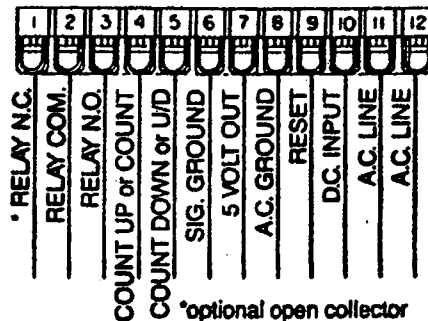
For Voltage Pulse Inputs - Connect the negative pulse lead to Terminal 6 (Sig. Gnd.) and the positive pulse lead to either Terminal 4 or 5 as desired. **NOTE:** Connection can be made to both the UP and DOWN inputs if bi-directional counting is required.

Open Collector Output - On units with an open collector output, connection is made to Terminal 1. This output will handle DC current only.

IMPORTANT

Terminal #8 must be connected to earth ground at all times when in use. This provides a ground path for static electricity which otherwise would cause faulty operation, erroneous data or circuit damage.

COUNTER CONNECTOR DIAGRAM



TIMER SWITCH SETTINGS

Set the switches to the desired function according to the programming instructions following: (OFF is up, ON is down)

Switch 1	OFF	Reset to Zero
	ON	Reset to Preset
Switch 2	OFF	Level Activation (continuous time)
	ON	Pulsed Activation (Start and Stop on same line)

Switch 3 ON This switch must be in this position to be a timer

Switch 4, 5 Sets time base

SW4	SW5	TIME BASE
OFF	OFF	seconds and 1/100
ON	OFF	minutes and 1/100
OFF	ON	hours and 1/100
ON	ON	minutes and seconds

Switch 6 OFF Outputs latched until reset
ON 250 ms. output (momentary)

Switch 7 OFF Display continues to count thru preset
ON Display recycles at preset

Switch 8 OFF Timer will not stop if reset is activated
ON Timer stops on reset and power recovery

NOTE: Refer to note on Page #14

Switch 8 Function - If the timer is used in the pulsed activation mode, Switch No. 8 will effect its operation. If Switch No. 8 is off (UP) and the timer is running when a reset command is given to Terminal No. 9 or the manual reset key is pressed, the timer will reset but will continue to time from the reset value. To stop timing when in this mode, apply another pulse to Terminal No. 4. If Switch No. 8 is on (DOWN) and the timer is running when a reset command is given to Terminal No. 9 or the manual reset key is pressed, the timer will reset to the reset value and stop timing without applying another pulse to Terminal No. 4.

Similarly, if power is lost or removed while timing, the timer will either resume timing if Switch No. 8 is off or not resume timing if Switch No. 8 is on.

TIMER HOOK-UP INFORMATION

AC Powered Units - Apply 110 or 220 VAC as required by the part number to terminals 11 and 12. AC polarity is not important. Connect AC ground to Terminal 8.

DC Powered Units - Apply the correct DC voltage as required by the part number. Connect the negative voltage to Terminal 6 and the positive voltage to Terminal 10.

Reset Input - Contact Closure - Connect a normally open contact between Terminals 9 (reset) and 7 (+5 Volts out).

Timing Input - Contact Closure Inputs - Depending on the setting of Switch 2 (see Program Switch Setting) a contact or level can be connected between Terminal No. 7 (+5 Volts) and Terminal No. 4 (Activate Timer) to initiate or control timing.

Voltage Inputs - Applying a DC voltage of from +3 to +30 volts to Terminal No. 4 (Activate Timer) and its return or negative to Terminal No. 6 (Ground) will activate the timer in exactly the same way as above.

Level Activation - This mode of operation causes the timer to continue to accumulate time as long as the "Activate Timer" input is held active or high. De-activating this input will stop the time from accumulating. Upon re-activating this input, the timing will resume from where it stopped. For this mode, Program Switch 2 will be off (UP).

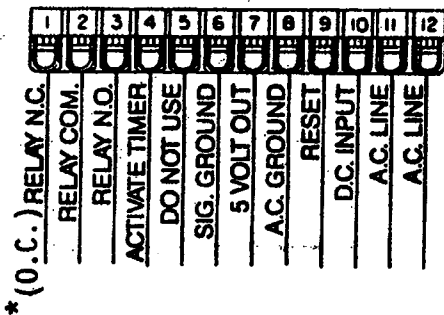
Pulsed Activation - This mode of operation will cause the timer to accumulate time starting with the beginning of the first pulse applied to Terminal No. 4 and ending with the beginning of the second pulse applied to the same terminal. Upon the application of a third pulse, additional time will be accumulated. This type of operation will

continue with successive pulses. For this mode, Program Switch 2 will be on (DOWN).

IMPORTANT

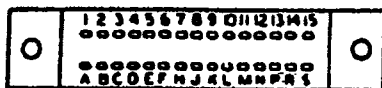
Terminal #8 must be connected to earth ground at all times when in use. This provides a ground path for static electricity which otherwise would cause faulty operation, erroneous data or circuit damage.

TIMER CONNECTOR DIAGRAM



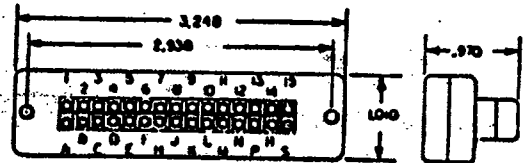
**STANDARD BCD CONNECTOR
(Edge connector)**

30 terminal gold plated and bifurcated card edge connector. It is configured as two rows of 15 terminals labeled 1 through 15 and A through S. Solder terminals will accept up to three soldered wires up to #22 AWG.



**OPTIONAL BCD CONNECTOR
(Screw terminal connector)**

30 terminal gold plated and bifurcated card edge connector. It is configured as two rows of 15 terminals labeled 1 through 15 and A through S. Screw terminals will accept up to one #14 AWG wire per terminal.



BCD DATA CONNECTOR DIAGRAM

<u>UPPER ROW</u>		<u>LOWER ROW</u>	
<u>Pin#</u>	<u>Data</u>	<u>Pin#</u>	<u>Data</u>
1	2 (1b)	A	1 (1a)
2	4 (1c)	B	
3	8 (1d)	C	
4	10 (2a)	D	
5	20 (2b)	E	
6	40 (2c)	F	
7	80 (2d)	H	
8	100 (3a)	J	8,000
(4d)			
9	200 (3b)	K	4,000
(4c)			
10	400 (3c)	L	2,000
(4b)			
11	800 (3d)	M	1,000
(4a)			
12	10,000 (5a)	N	800,000 (6d)
13	20,000 (5b)	P	400,000 (6c)
14	40,000 (5c)	R	200,000 (6b)
15	80,000 (5d)	S	100,000 (6a)

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WARRANTY

Kessler-Ellis Products Co. warrants its products 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 KEP. This Warranty is void if the product has been altered, misused, dismantled, or otherwise abused.

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