



DESCRIPTION

The 8991/2 counter blocks enable a GEM 80 controller to keep track of events which occur more frequently than the controller can scan its I/O.

Each time the host controller scans a counter block it reads the number of pulses since the last scan.

The counter blocks are from the GEM 80 range of compatible numeric I/O blocks. The I/O blocks plug into a panel which provides terminals for the plant cables. The 8957 Numeric I/O Assembly data sheet describes the termination and mounting arrangements.

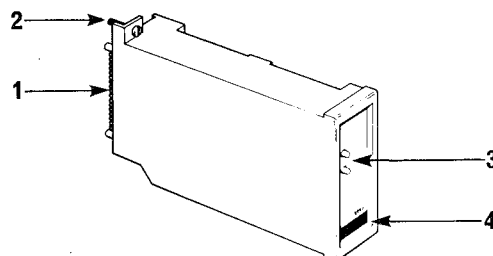
FEATURES

- Suitable for industrial applications in an electrically noisy environment.
- Rugged plug-in moulded block.
- Optical isolation.
- Lamp indication of pulses present.
- Mechanical coding of block type.
- Suitable for range of operating voltages including 12, 24 & 48V DC

SPECIFICATION

	8991	8992
Number of inputs	: 1	: 2
Counter capacity	: 65535	: 255(each) (see Application Note 6)
Operation	: increments on positive going input transitions	
	: count reset to zero on each scan	
	: no loss of pulses during I/O scan	
Counting rate	: up to 5kHz	
Pulse width (positive or negative going pulse)	: 100 μ s minimum to guarantee increment of count	
	: 10 μ s maximum to guarantee no increment of count	
Input voltage for ON state	: 9V minimum 66V maximum	

8991 1 x 16 Bit Counter Block 8992 2 x 8 Bit Counter Block



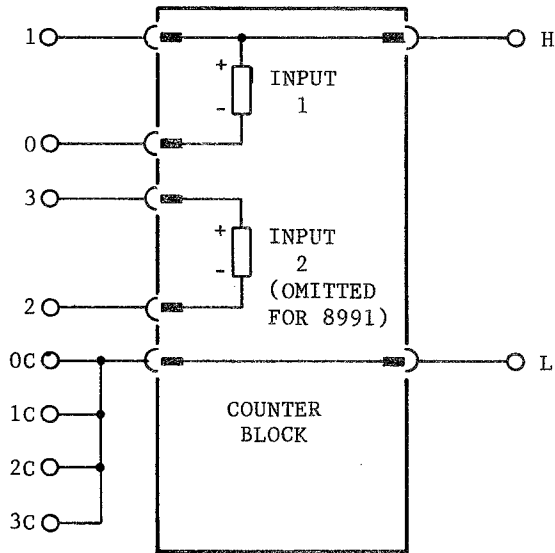
1. Plug for electrical connection to panel.
2. Captive screw to retain block on panel.
3. "Pulses present" indicating lamps (one per counter).
4. Colour code and type number.

Input current for ON state	: 7 to 14mA typical over range 9 to 66V
Input voltage for OFF state	: 0V nominal 4.5V maximum
Input current for OFF state	: 40 μ A maximum
Common mode isolation voltage	: 1kV pk transient 300V continuous
Differential no damage voltage	: 66V pk continuous including supply reversal
"Pulses present" indication	: pulse stretcher for visible flashes at low pulse rate : lamp appears on continuously for moderate pulse rate
Power consumption from host controller	: 8991 15 to 33mA @ + 15V : 8992 15 to 45mA @ + 15V (consumption depends on input data)
Temperature	: 0 to 70°C operating : -20 to 70°C storage
Humidity	: 10 to 90% non-condensing
Weight	: 0.38kg
Front panel colour code	: blue
Mechanical coding (factory preset)	8991 8992 : U4 U4 : L1 L2

APPLICATION NOTES

1. USER CONNECTIONS

All user connections are made to terminals on a numeric I/O termination panel.

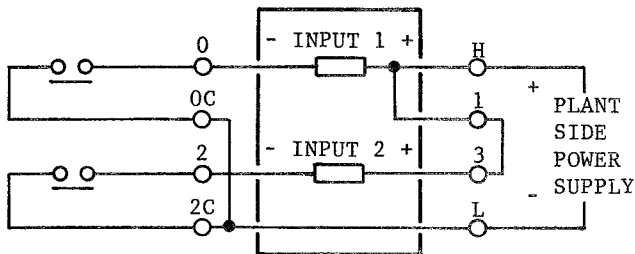


To distinguish the terminal numbers for different numeric blocks it is recommended that the user should prefix the terminal numbers with the appropriate data table reference e.g. A12/1 for terminal 1 on right hand block position on panel ref A12/A13.

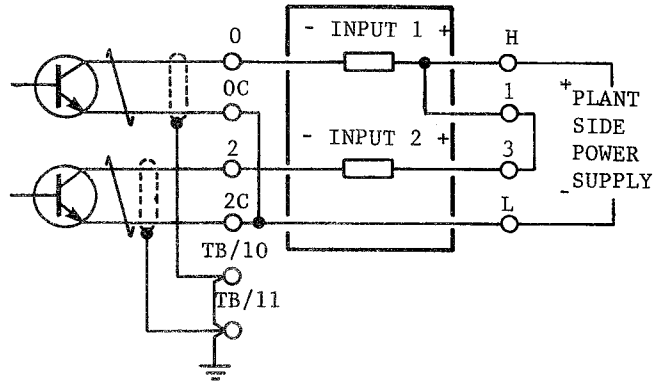
A group of ten unconnected terminals TB/10 to TB/19 are provided at the left hand end of the termination panel for looping and marshalling purposes, and for terminating cable screens.

2. TYPICAL CIRCUITS

2.1 Volt-free contacts

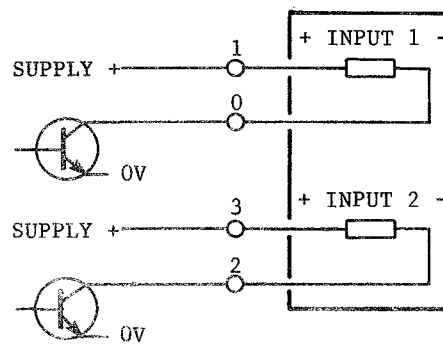


2.2 Open collector transistors

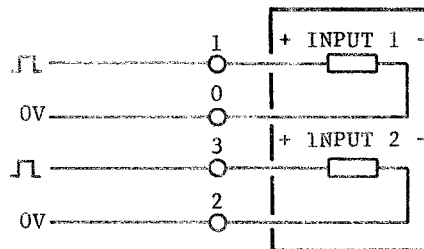


If pulse generators require a power supply, wires can be run from terminals 1 and 3 respectively.

2.3 Self powered pulse generators



2.4 Voltage source pulse generators

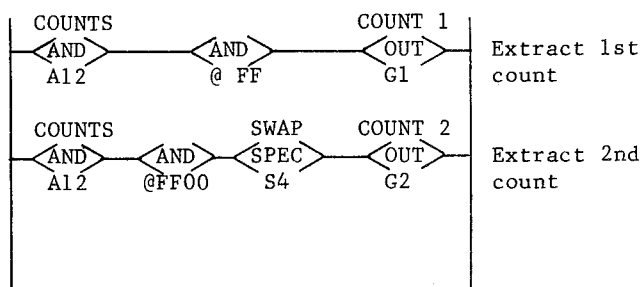


3. EXTRACTING COUNTS FROM 2x8 BIT COUNTER

The data table location associated with a dual counter will contain a composite hexadecimal code representing input 1 (lower byte) and input 2 (upper byte). Although for monitoring purposes the composite code can be inspected in hex, for control purposes it is usually necessary to separate the two numbers, and this enables them to be monitored as decimal values.

Simple rungs in the GEM 80 control program may be used to extract the two counts. Special function SWAP may be used to interchange upper and lower bytes, and the AND instruction may be used to mask the unwanted byte.

Example:-



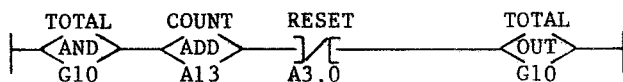
Typical monitored values:-

A12 = @132A (meaningless in decimal)
 G1 = @2A = 42 (decimal)
 G2 = @13 = 19 (decimal)

4. ACCUMULATING TOTAL PULSES

Although the counter block itself is reset to zero on every scan of the I/O, it is simple to program the GEM 80 controller to accumulate the total number of pulses.

Example:-



For a dual counter block it would be necessary first to extract the two separate counts.

5. COUNTER OVERFLOW

Each counter performs a cyclic count with no indication of overflow. The user is unlikely to encounter overflow with a 16 bit counter block because a full count takes several seconds at the maximum pulse rate. However an 8 bit counter will overflow in only 51 ms at 5000 pulse/s. When choosing the dual counter the user is advised to check carefully that the count cannot exceed 255 between program scans, and to use the 16 bit counter if the possibility arises.

6. LARGE VALUE COUNTS

It is unusual for a 16 bit counter ever to count above ten thousand per scan. If the count reaches 32767 the next transition causes a jump to -32768, thereafter it counts up towards zero.

7. CONTROLLER HALT STATUS

When a GEM 80 controller is halted the I/O scanning continues without the user program being executed. Since the scanning repeatedly zeros the counter it is not possible for a large count to accumulate. With test inputs status a large count can accumulate but this will never be apparent because the controller has to be halted to change from test to normal inputs.

ORDERING CODES

1 x 16 bit counter block	8991
2 x 8 bit counter block	8992

Note The Company's policy is one of continuous development and improvement and therefore the right is reserved to supply products which may differ in detail from those described and illustrated in this publication. All our products and materials are sold subject to Conditions of Sale available from us on request

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