



DESCRIPTION

Analogue input/output blocks connect to the basic I/O highway of any GEM 80 controller. They provide a robust interface between an electrically noisy plant environment and the GEM 80 controller.

The analogue I/O 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.
- Complete electrical isolation for each signal.
- Mechanical coding of block type.
- Current or voltage options.

SPECIFICATION

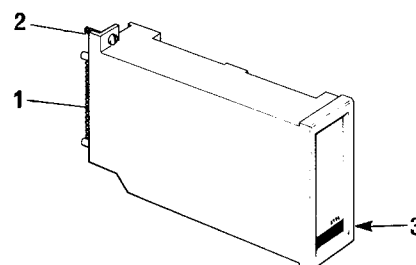
Signals per block	:	1
Nominal signal range:-		
Input	8996	: $\pm 10V$ or $\pm 20mA$ depending on which terminals used
Output	8997	: $\pm 10V$
	8987	: 0 to $\pm 20mA$
Resolution		: 11 bits + sign
		: 1 in 4095 (2047 for 8987)
Accuracy	0 to 25°C	: $\pm 0.2\%$ of full scale (voltage or current)
	0 to 60°C	: $\pm 0.5\%$ of full scale (voltage)
		: $\pm 1\%$ of full scale (current)
Conversion time:-		
Input		: 24ms + 5ms filter
Output		: 2ms
Scaling in data table		: $\pm 2000 = \pm$ nominal range
		: $\pm 2047 = \pm$ total range
(current output uses absolute value of table contents i.e. ignores sign bit)		
Electrical isolation		: optical isolation between signal and basic I/O highway
		: transformer isolation of 24V d.c. power input
		: 200V pk continuous common mode
Input impedance		: 500 kilohm (voltage)
		: 250 ohm (current)

8996

Analogue Input Block

8997/87

Analogue Output Block



1. Plug for electrical connections to panel.
2. Captive screw to retain block on panel.
3. Colour code and type number.

Output load	voltage	: 2 kilohm minimum ($\pm 5mA$)
	current	: 500 ohm maximum ($\pm 10V$)
		using internal $\pm 15V$ source; compliance up to 24V using external power source
	protection	: continuous short circuit on load terminals
Plant side power requirement		: 24V d.c. $\pm 20\%$ - 10%
(block contains isolated 24V d.c. to $\pm 15V$ d.c. convertor)		
Power supply available for plant devices:-	8996	8997 8987
	mA @ $\pm 15V$	: 60 30 10
	mA @ $\pm 15V$	: 60 60 60
Power consumption from host controller (mA @ $\pm 15V$ via basic I/O ribbon)		: 5 6 6
Power consumption from plant side supply (mA @ $\pm 24V$)	No load	: 62 23 29
Full output load (no $\pm 15V$ load)		: - 34 53
Extra for $\pm 15V$ load = 1.1 x total of $\pm 15V$ and $\pm 15V$ loads.		
Temperature		: 0 to 60°C operating
		: -20 to 70°C storage
Humidity		: 10 to 90% non-condensing
Weight		: 0.46kg
Front panel colour code		: blue (input)
		: red (output)
Mechanical coding (factory preset)	8996	8997 8987
	U4	U5 U5
	L3	L1 L2

APPLICATION NOTES

1. USER CONNECTIONS

1.1 Relationship to signal ground.

IMPORTANT. Both the incoming 24V supply and the block +15/0/-15 supply must have a path to signal ground (can be indirect). This is necessary to avoid a floating supply exceeding the common mode voltage range.

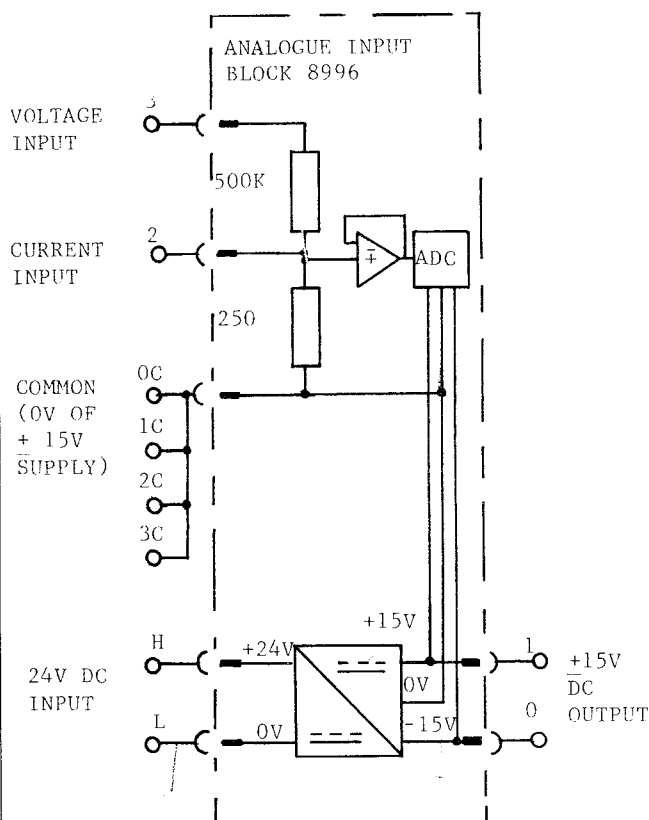
1.2 Terminal identification

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

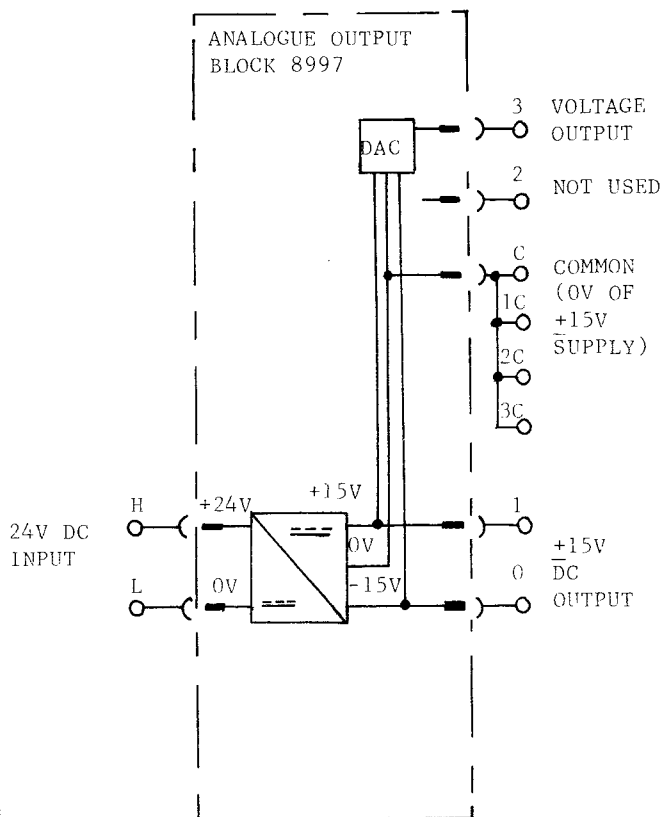
To distinguish the terminal numbers for different numeric blocks it is recommended that the user should prefix the terminal numbers with the appropriate data table reference e.g. A12/1 for terminal 1 on right hand block position on panel ref. A12/A13.

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.

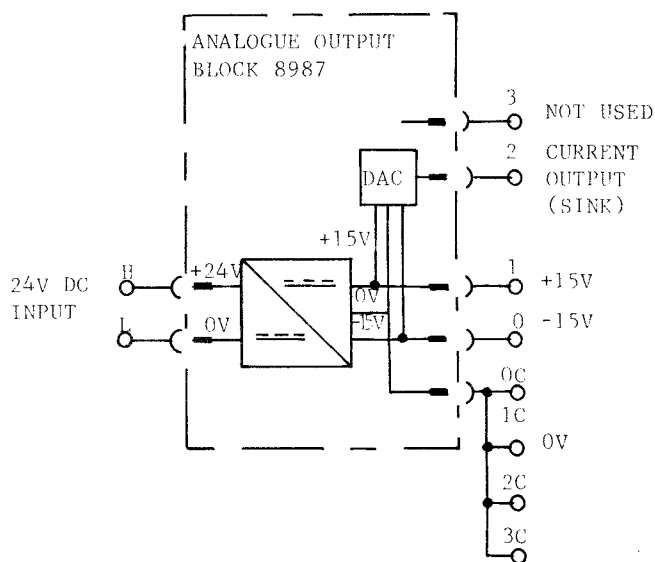
1.3 Analogue input



1.4 Analogue voltage output



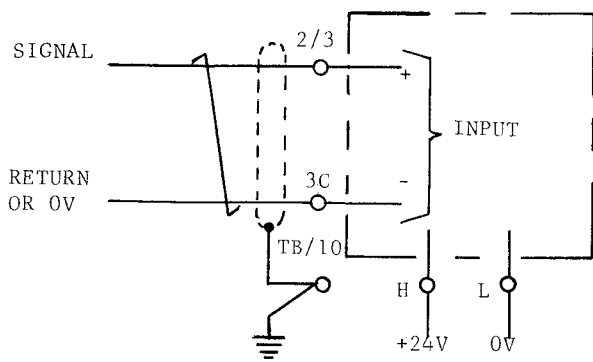
1.5 Analogue current output



Terminal 1 may be used as signal positive (current source). Alternatively, if a higher compliance voltage up to 24V is required, an external supply up to +29V may be used as the current source, with the negative side connected to the 0V of the block's +15V rails.

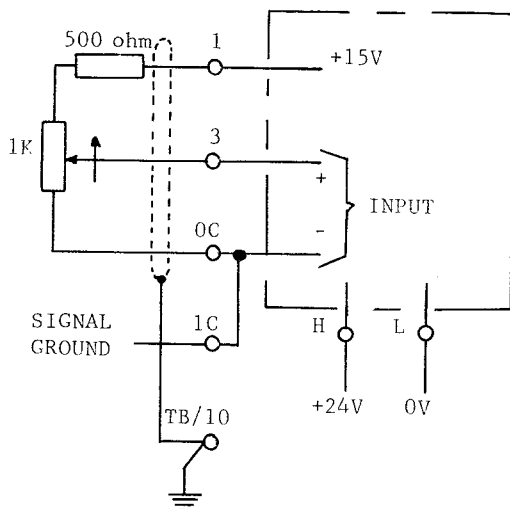
2. TYPICAL ANALOGUE INPUT CIRCUITS

2.1 Input from active source



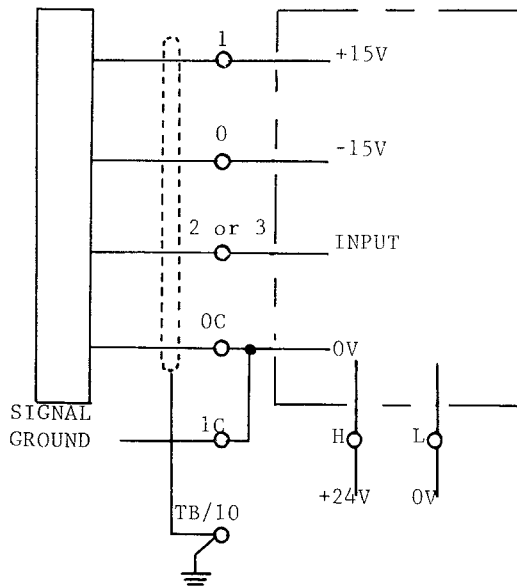
Positive signal gives positive value in data table
Negative signal gives negative value in data table

2.2 Input from potentiometer



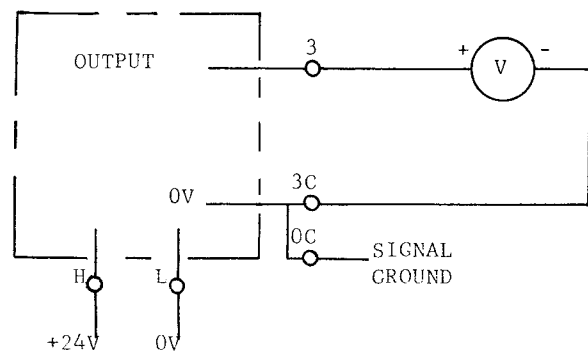
Turning knob clockwise gives data table value increasing nominally from 0 to + 2000.

2.3 Transducer requiring +15V supply

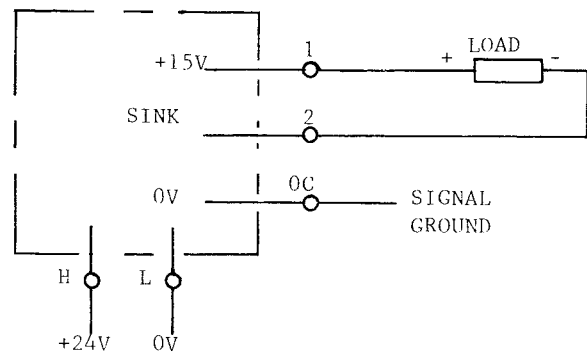


3. TYPICAL OUTPUT CIRCUITS

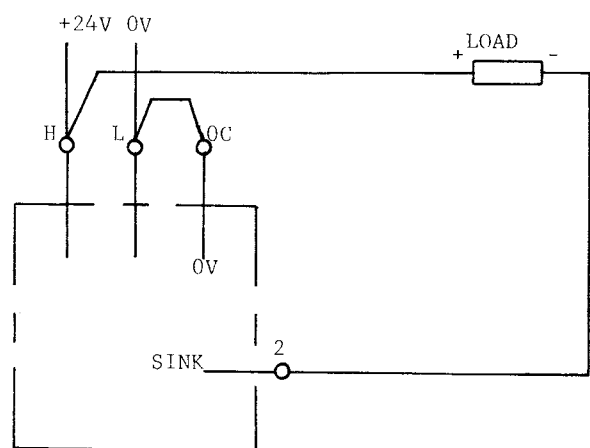
3.1 Meter indicator



3.2 Current output (10V compliance)



3.3 Current output (19V compliance)



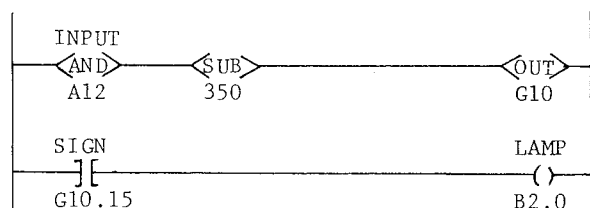
NOTE: It would be necessary to use an independent 24V supply if complete isolation between signals has to be maintained.

4. USER PROGRAM HINTS

4.1 Detecting open circuit input

If a 4 to 20mA signal is used it is simple to detect signal failure or open circuit conditioning using program rungs.

Nominal 4 to 20mA input corresponds to data table range 400 to 2000. To allow a tolerance for accuracy the example below detects any value less than 350.

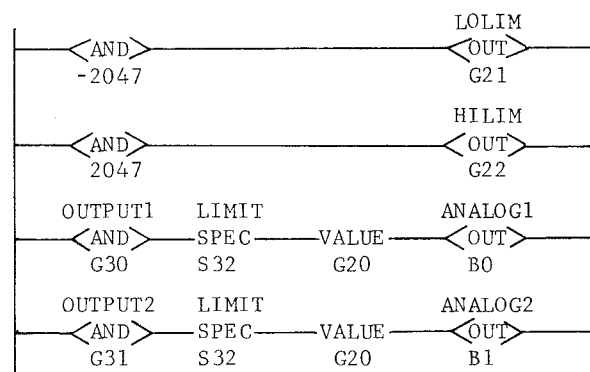


These rungs also detect loss of 24V plant side power supply.

4.2 Limiting range of analogue output values

The analogue output blocks read only the least significant 11 bits and the sign of the output data, discarding the remaining bits. The user should therefore prevent the analogue output value exceeding 2047; for example a value 2048 would give zero output.

Special function LIMIT may conveniently be used to limit the output value range. If there are several analogue outputs they can each use the same "value" data for the limit function, because the limit range is the same in each case.



When using the current output option it is advisable to limit the output value so that it cannot change sign. If this precaution is not taken then a disturbance in a closed loop control could give rise to a sign change, positive feedback and a catastrophic loss of control.

ORDERING CODES

Analogue input block (+10V or +20mA) 8996

Analogue output block (+10V) 8997

Analogue output block (0 to +20mA) 8987

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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