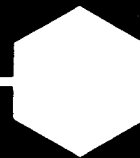


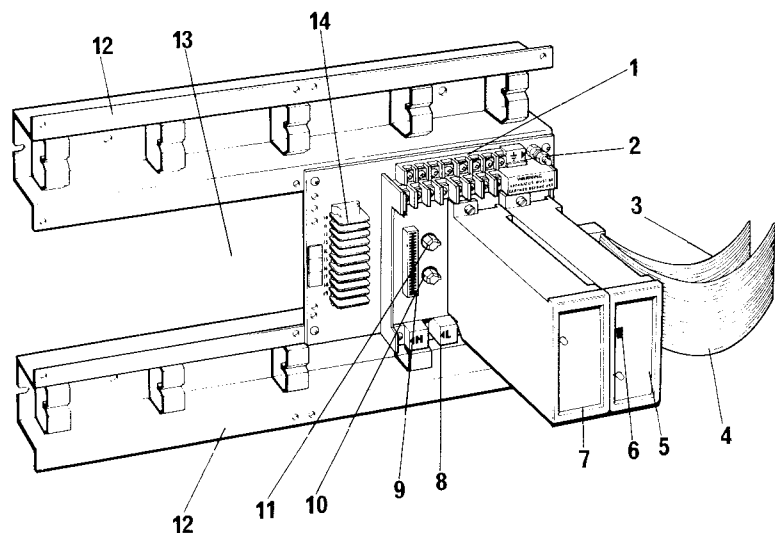
GEC Electrical Projects Limited

GEC Industrial Controls Limited

GEM 80



8957 Numeric I/O Assembly



1. Plant terminals.
2. Earth stud.
3. Basic I/O ribbon from processor.
4. Basic I/O ribbon to next panel.
5. Decoder block.
6. Panel address setting.
7. Typical I/O block.
8. Power supply terminals.
9. Socket for electrical connection to I/O block.
10. Lower mechanical coding pillar.
11. Upper mechanical coding pillar.
12. Two mounting kits, each one shared with adjacent panel.
13. Space for another I/O assembly.
14. Unconnected terminals for looping.

DESCRIPTION

The GEM 80 numeric I/O system provides an interface for analogue and pulse train signals from the plant into a GEM 80 controller.

The system comprises a range of numeric input and output blocks which plug into termination panels. The blocks provide optical isolation between the plant signals and the GEM 80 central electronics.

Each termination panel accommodates one or two numeric I/O blocks in addition to a decoder block. The setting of a switch on the decoder block distinguishes the panels one from another.

Each numeric I/O block corresponds to one data table location. Depending on the block type the table location may contain a single I/O value or a composite code representing a pair of I/O values.

Plant wiring is connected directly to terminals on the termination panel. Electrical connections between the panel and the I/O blocks are by socket and edge connector. Connections from the panel to the GEM 80 controller are routed via the decoder block and a ribbon cable.

The numeric I/O assembly includes the termination panel and decoder block. The mounting kit is an optional extra. The I/O blocks are specified separately.

FEATURES

- Suitable for industrial applications.
- Cable terminations suitable for up to 2.5mm² plant conductors.
- I/O blocks interchangeable without disturbing plant cables.
- Mechanical coding of block type.
- Mounting kit includes cable channel.

SPECIFICATION

Number of I/O blocks	: 2
	: each block either input or output
Temperature	: 0 to 70°C operating
	: -20 to 70°C storage
Humidity	: 10 to 90% non-condensing
Weights:-	
Termination panel	: 0.55kg
Decoder block	: 0.37kg
Mounting kit	: 2.5kg
Dimensions:-	
Termination panel	: (high x wide x deep)
	: 155 x 241 x 40mm
Each block	: 112 x 48 x 198mm
Mounting	: half rack width on two mounting channels at 5U (222mm) centres.
Plant terminals	: 4mm screw with captive washer
	: up to 2.5mm ² conductors

Power consumption : 16mA @ +15V for decoder
from host controller plus extra for each I/O
block

Block presence : senses presence of block

APPLICATION NOTES

1. WARNING

BLOCKS SHOULD NOT BE REMOVED WITH POWER ON.

2. MECHANICAL CODING.

The I/O block termination panel carries a pair of mechanical coding pillars for each of the block mounting locations.

The mechanical coding recesses in the rear of each block are factory preset according to the block type. The decoder block has slots in positions U1 and L2. The codes for I/O blocks are shown on their data sheets.

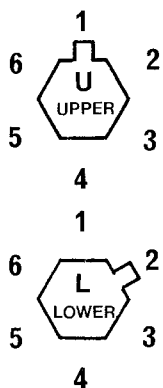


Fig.2 Panel key positions for decoder block

The user is advised to set the keys on the coding pillars to the appropriate positions to ensure that only blocks of the correct type are interchangeable at each mounting location.

The user is recommended to set the keys at any unoccupied mounting locations to code U1 and L1 to prevent insertion of all types of block.

Logic I/O blocks must not be plugged into a numeric I/O termination panel.

3. PANEL LAYOUT

Each half of a numeric I/O panel has an alpha numeric reference which corresponds to the data table location used in the host controller. The reference is determined by whether the block is input or output, which ribbon cable is used, the decoder setting and the position of the block on the panel.

A controller can have any mixture of logic and numeric panels. As analogue and pulse train signals are typically lower power and more noise sensitive than logic signals, it is usually convenient to group the numeric panels.

Fig.3 shows a typical layout of I/O panels rack mounted using the optional mounting channels. Note that the routing of the ribbon cable to the decoder may be more straightforward if the numeric panels are mounted in the right hand positions.

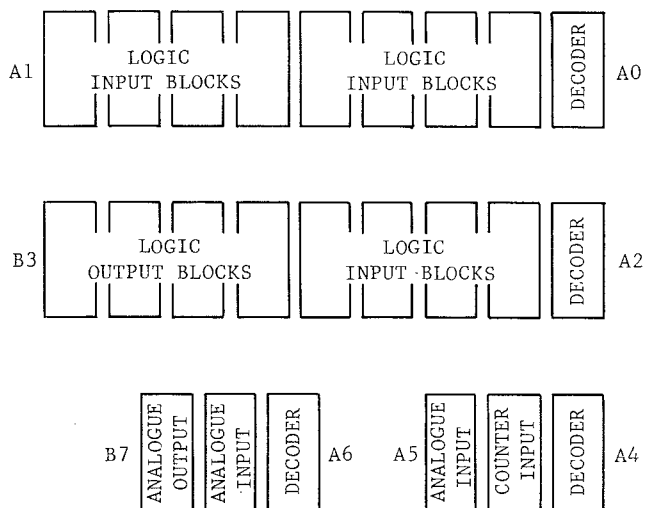


Fig.3 Typical layout of I/O blocks on panels.

Notes

- : All numeric input blocks have reference A.
- : All numeric output blocks have reference B.
- : Block on left hand side numbered one higher than block on right hand side.

4. PANEL ADDRESS SETTING

The setting of the switch on the decoder block distinguishes one panel from the other panels connected to the same basic I/O ribbon cable. The switch setting determines the numerical part of the panel references. Fig.4 shows the window through which the switch setting may be viewed, and indicates the screwdriver access for adjusting the switch position.

1. Ribbon cable connector.
2. Screwdriver adjustment of switch position.
3. Viewing window for position of decoder switch.
4. Lamp on when ribbon cable plugged in and power on.

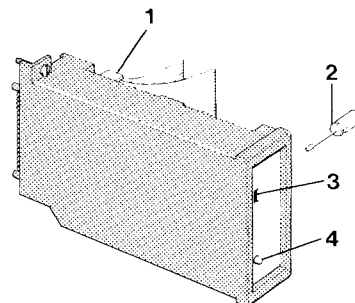


Fig.4 - Decoder block.

Table 1 shows the decoder switch settings for the maximum sixteen panels which can be connected to the two ribbon cables of a basic I/O highway.

Table 1 - Decoder switch settings.					
First ribbon cable			Second ribbon cable		
Panel number		Switch setting	Panel number		Switch setting
Left Half	Right Half		Left Half	Right Half	
1	0	0	17	16	0
3	2	1	19	18	1
5	4	2	21	20	2
7	6	3	23	22	3
9	8	4	25	24	4
11	10	5	27	26	5
13	12	6	29	28	6
15	14	7	31	30	7

Note: If switch position 8 or 9 is used then panel cannot be addressed.

5. CONFIGURATION DATA

The preset data table (P table) of the host GEM 80 controller includes "I/O block configuration data" where the user specifies his chosen layout of I/O blocks and which half panels are inputs. Since a numeric block is equivalent to four logic blocks, four adjacent bits in the P table are set ON to specify the presence of a numeric block. The controller automatically minimises the scanning time of the basic I/O by scanning only those parts where blocks are specified.

6. BLOCK PRESENCE SENSING

While the host GEM 80 controller is scanning the basic I/O, it automatically senses the presence/absence of each I/O block as well as transferring the I/O data. If a block, specified as present in the configuration data, is sensed to be missing, then this is indicated in the fault diagnosis data table (F table). A missing numeric block is indicated by four adjacent bits in the F table corresponding to the four equivalent logic blocks.

For the 8996 Analogue Input Block the block presence sensing logic also checks the presence of the internal +15V supply which by implication also proves the +24V plant side power supply.

7. PANEL LABELLING

Holes are provided at each end of an I/O block termination panel for the user to insert inscribed buttons to identify the panel reference decoder switch setting and which basic I/O ribbon cable to be inserted.

Fig.5 shows the buttons for a typical panel connected to a GEM 80/220 controller. The ribbon cable is identified R0/9 since it terminates at rack R0 slot position 9.

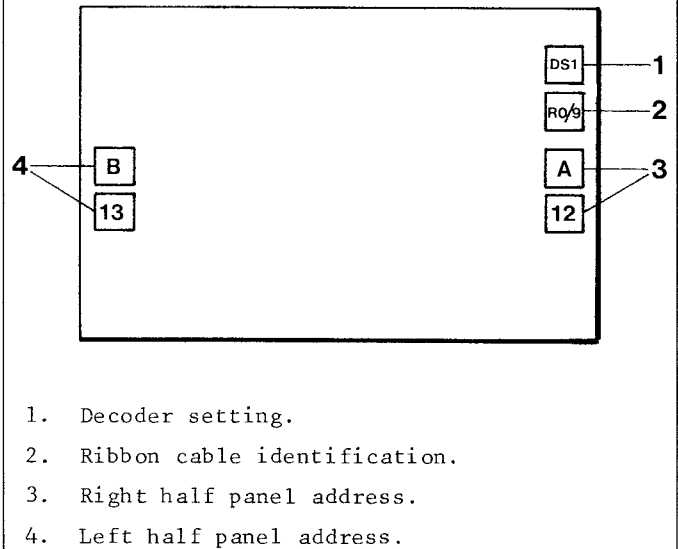
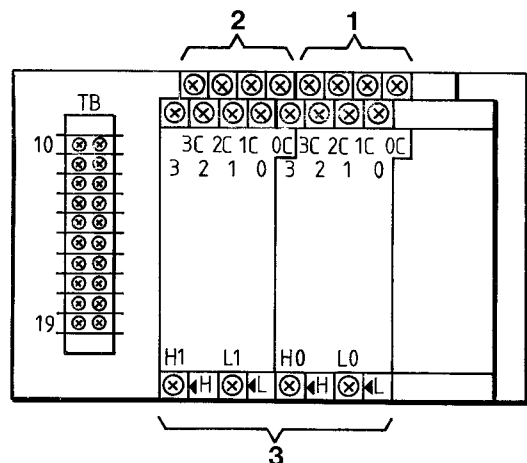


Fig.5 Buttons for panel labelling.

8. USER CONNECTIONS

The user connections to an I/O block are made to terminals on the termination panel. Fig.6 shows the terminals provided. An identical set of terminals is provided for each of the block positions; it is recommended that the user should identify individual terminals using the data table reference as a prefix. A group of ten unconnected terminals TB/10 to TB/19 are available for looping and marshalling purposes.



1. Terminals for 1st block; typical designations A12/0 to A12/3 and A12/0C to A12/3C (common).
2. Terminals for 2nd block; typical designations B13/0 to B13/3 and B13/0C to B13/3C (common).
3. Plant side power terminals, typical designations A12/H0, A12/L0, B13/H1, B13/L1.

Fig.6 Terminals for user connections.

9. POWER CONSUMPTION

Each I/O block uses two independent power supplies with electrical isolation within the block between the host controller +15V supply and the external plant side power supply.

A panel with only a decoder block consumes a steady 16mA at +15V from the host controller. An extra 30mA load arises when the decoder is addressed; only one panel is addressed at a time.

Full details of the power consumption of numeric I/O blocks are quoted in their data sheets.

Typical load on +15V supply of host controller:-

Panel & decoder	16mA
16 bit counter block	33mA
2 x 8 bit counter block	45mA
analogue input block	5mA
analogue output block	6mA

10. MOUNTING

The optional mounting channel enables numeric I/O panels to be rack mounted with the panels supported in front of the plane of the rack. Cable retaining clips in the channel hold the plant cables behind the plane of the panel terminals giving clear access to the terminals. Two numeric panels can be mounted side by side between a pair of mounting channels.

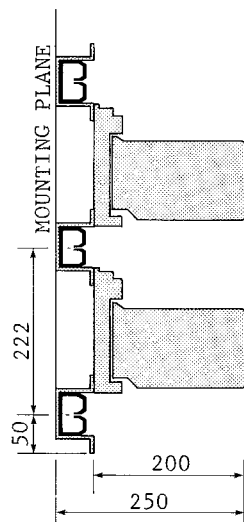
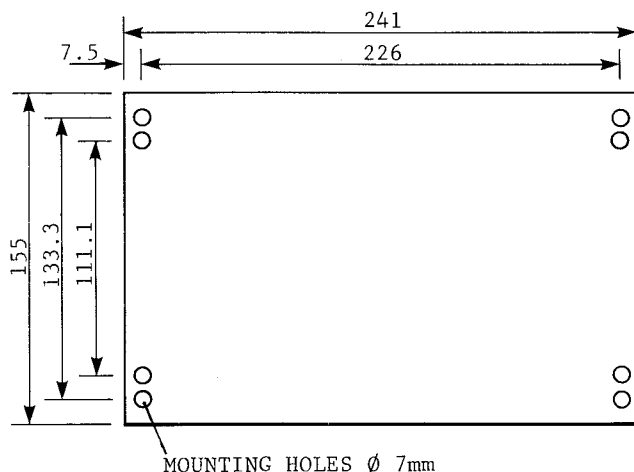


Fig.7 Side view showing mounting details.



Holes at 133.3 centres for mounting on channels at 222 (5U) centres; holes at 111.1 centres for close packing on channels at 200 (4U) centres.

Fig.8 Mounting dimensions

ORDERING CODES

1. Equipment

Numeric I/O assembly 8957
comprises:- 1 termination panel
(for 2 I/O blocks)
1 decoder block

2. Optional extras

Mounting channel 8959

For details of inscribed buttons for panel labelling refer to data sheet of host controller.

3. Spares

Numeric I/O termination panel 8956
Decoder block 8999

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

GEC Electrical Projects Limited

Boughton Road, Rugby, Warwickshire, England.

Telephone Rugby (0788) 2144 Ext 306 Telex 311335

GEC Industrial Controls Ltd.,

Kidsgrove, Stoke-on-Trent, Staffordshire ST7 1TW, England.

Telephone Kidsgrove (078 16) 3511 Telex 36293

Holding Company The General Electric Company p.l.c. 1 Stanhope Gate, London W1A 1EH, England

T239 Issue 1 09.81

© 1981 The General Electric Company p.l.c. of England.

Printed in England

