

- Compact 1/8 DIN size case
- ASCII messages from PLC data memory
- Access PLC registers, timers and counters
- Embed register values and bit sensitive text
- Display data in a BAR GRAPH format
- No setup software required
- Data Entry possible

The DMC-162 from Renu Electronics is a low cost addition to the Operator Interface line. Featuring 2 lines of 16 characters backlit LCD, it allows monitoring machine status as messages and change data in the PLC. Cost is saved since the unit uses PLC memory.

Function Keys and LEDs

The DMC-162 has 6 keys which hold a bit ON in the register R023 while the key is pressed. These keys can be used to replace push buttons.

The same keys can also be used to monitor and edit PLC data registers, timers, counters etc. when the unit is in the register display mode.

The DMC-162 has 2 LEDs controlled by 2 bits in R022 in the PLC. These are Bits 0 and 1. The LEDs are ON when the status of these bits is "1" and OFF when the status of bits is "0".

Modes of Operation

Two words are defined in the PLC to control the display and unit operation: CONTROL WORD and OFFSET WORD. In the GE90 PLC, these words are R022 and R021 respectively.

The unit operates in 2 modes. R022 controls the operating mode.

In the message mode, 16 words (MESSG to MESSG+15) are scanned by the DMC-162 and displayed on the LCD where MESSG is the register number stored in R021. Each word has 2 bytes of ASCII characters. The user simply has to put the correct data in these registers to display a message. Data can be embedded in a message by special formats. This mode is used to display alarm or status.

In the Operator mode, a key press initiates the register mode and times out after the specified time period to the message mode. This is useful when normally the machine status is monitored but the operator may change presets etc. once in a while. Note that in this mode, the operator gets access to ALL the PLC registers and bits. Hence, it is advisable to use a password protection created using the PLC data registers and ladder logic before this mode is activated.

If the PLC needs to control the register being viewed and/or edited, the message mode itself can be used effectively using the data embedding feature. When the data is to be edited, the UP and DOWN arrow keys can be used in the PLC to increment or decrement the data. This way, the operator gets access only to those registers as allowed by the PLC ladder logic. Refer to the examples for detailed information on this.

Control Word

The DMC-162 reads R022 (CONTROL WORD) in the PLC which controls the operating mode. R023 has the status of the keypad. The status of each bit mentioned is "1" when key is pressed and "0" when the key is released. The meaning of the individual bits in R022 is as follows:

R022-Bit 0	1: LED0 On 0: LED0 Off	R023-Bit 0	Key F1
R022-Bit 1	1: LED1 On 0: LED1 Off	R023-Bit 1	Key F2
R022-Bit 2-7	Reserved for future use	R023-Bit 2	Key F3
R022-Bit 8-9	00: Message 01: Register 10: Operator 11: Invalid	R023-Bit 3	Key F4
R022-Bit 10-11	Timeout to message mode 00: 10 sec 01: 20 sec 10: 30 sec 11: 40 sec	R023-Bit 4	Key F5
R022-Bit 12-14	Reserved for future use	R023-Bit 5	Key F6
R022-Bit 15	Disable data entry in message mode (ON : Disable)		

Messages

In the Message mode, the unit displays 32 bytes (16 words) from the location given by the Offset register. For example, if the Offset register has number 50 in it, unit will display 32 bytes (16 words) from R050 to R065.

Thus, there are two ways to control the display messages. One is to store messages in the data memory and the ladder logic simply changes the number in the Offset register. Another is, the program memory puts different message data in the MESSG registers by using the MOVEN instruction. Note that the former method uses data memory while the later uses program memory. Combination of the two can also be used.

Embedded Registers and Variables

It is possible to embed R001 to R016 in messages by using a special format in the message mode. When the message words (MESSG to MESSG+15) contain the ASCII bytes which are between 20H to 7FH, the corresponding ASCII characters are displayed. The range 00H to 0BH is used to embed registers in the messages. The range 0CH to 0FH is used to show data in bar graph format. It is possible to embed one data entry field in a messages. It is similar to embedding register, only instead of 0 to F use 10 to 1F hex bytes to address R001 to R016. The registers R001 to R016 can be edited with this feature one at a time in a message. A decimal point can be inserted in the variable. Refer to the example to understand how this can be done. The PLC ladder can control bit sensitive text messages by simply manipulating the ASCII characters based on a bit status.

Specifications

Power	: From GE PLC programming port; 1.5 W max
Display	: 2 lines of 16 characters backlit LCD
Bezel	: IP65 rated membrane keypad
Temperature	: Operating: 0 to 50 degrees C Storage: -25 to 80 degrees C
Humidity	: 10% to 90% (Non condensing)
Size	: Bezel: 103 mm X 55 mm; Depth: 32 mm
Panel cutout	: 92 mm X 45 mm (1/8 DIN size cutout)

Communication	: Using the programming port of the GE PLC
Immunity to ESD	: Level 3 as per IEC1000-4-2
Immunity to Transients	: Level 3 as per IEC1000-4-4
Immunity to Radiated RF	: Level 3 as per IEC1000-4-3
Immunity to Conducted RF	: Level 3 as per IEC1000-4-6
Emissions	: EN55011 CISPR A

Example

To display a message such as do the following:

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Oven Status: OK
Bake Time: 24.6s
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Assume the data for Bake time is in register R100. The DMC-162 uses the range R001 to R012 for embedding (R013 to R016 are used for Bar Graph). So, move the data from R100 into one of the embedded register ranges, say R003. Move number say 50 (decimal) in the Offset register. Now, move the string "Oven Status: OK" into R050 and subsequent registers, using the MOVEN instruction. This will fill up registers R050 to R057 as shown in the table below. Then move string "Bake Time: " from register R058 onwards. Now move Hex 03032E03 (or Hex 13132E13 in case of a data entry field) into words R063 and R064. This will display the desired message. Refer to the table below:

Word	ASCII	HEX	Word	ASCII	HEX
R050	"Ov"	4F76H	R058	"Ba"	4261H
R051	"en"	656EH	R059	"ke"	6B65H
R052	" S"	2053H	R060	" T"	2054H
R053	"ta"	7461H	R061	"im"	696DH
R054	"tu"	7475H	R062	"e:"	653AH
R055	"s:"	733AH	R063		2003H
R056	" O"	204FH	R064	" ."	032EH
R057	"K "	4B20H	R065	" s"	0373H

In the same example, if the Bake Time is expected to be changed then embed R003 as data entry field and use UP and DOWN keys to change the Bake Time. When the ENT key is pressed, the data entered is accepted in the PLC register. The CLR key can be used to clear the data field. Since all the keys are sent to the PLC in the pre-defined bit locations, the PLC will know when a key is pressed and will take the necessary action.

In the Register mode, by pressing the REG key, the register types will be accessed as given below : R, AI, AQ, I, Q, G, M, T. The UP and DOWN arrow keys allow changing register or device numbers. To edit the data, press the DATA key. The data field will blink to indicate that the unit is ready to accept new data. The new data can be entered by pressing the UP or DOWN arrow keys followed by the ENT key. This mode is very useful for supervisors who need to access all registers/ devices in the PLC.

Remember to password protect the mode in the PLC ladder!

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PLC REGISTERS USED IN GE90 PLC

Offset Word	R021
Control Word	R022
Embedded Words	R001-R016

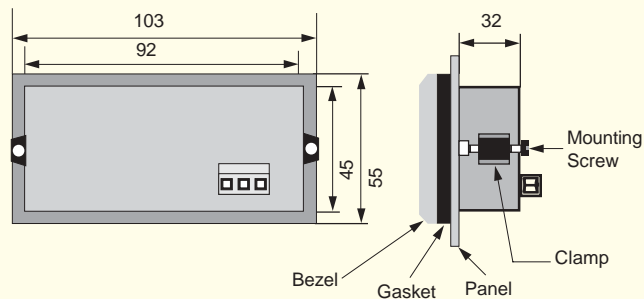
WRITING TO DATA WORDS

In the GE90 PLC, use the MOVEN instruction to write an ASCII text message to the PLC data memory.

The Data Memory Edit screen can also be used to enter data in the data words.

Dimensions

Dimensions in mm.



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