

# Understanding the OP-1212 Panel

## Overview

The OP-1212 Lamp/Pushbutton panel provides various features and options that can be used together or stand alone with your logic program. The link to the PLC is one of the important aspects of the configuration process. Part of this link is called “memory mapping”. Once the panel has been mapped and configured correctly, you will be able to use the many functions the OP-1212 provides. This section will discuss the functions and get you more familiar with the panel itself before showing the actual configuration and programming examples.

## Memory Mapping

Memory mapping is a technique that tells the panel what part of the PLC memory you want to use. These memory areas are frequently referred to as registers. Once you have selected a memory address, you will be able to manipulate the data via your ladder logic program. The OP-1212 will occupy a bank of 6 contiguous registers as illustrated in the tables below. In the first table, **m+0** represents the first register of the bank of memory required for mapping the OP-1212. This can be any address in your PLC that can be used for data storage. The second table shows the bit orientation for each panel feature. These mapping assignments will be the same for any PLC type, the only difference being the address location selected for mapping. The information for specific PLC types will be discussed in the **Applying Ladder Logic** section.

MSB			LSB														
			12	11	10	9	8	7	6	5	4	3	2	1	m+0	←	Indicator Lamp
			12	11	10	9	8	7	6	5	4	3	2	1	m+1	←	Indicator Lamp Flash
			12	11	10	9	8	7	6	5	4	3	2	1	m+2	←	Button LEDs ON/OFF
			12	11	10	9	8	7	6	5	4	3	2	1	m+3	←	Button LEDs Flash
			12	11	10	9	8	7	6	5	4	3	2	1	m+4	←	Button ON/OFF
M1	M2	M3	12	11	10	9	8	7	6	5	4	3	2	1	m+5	←	Force Data & Comm

## Pushbuttons

The 12 pushbuttons on the OP-1212 panel provide a means of control for any process connected to your PLC. The pushbuttons can be configured as either **momentary** or **maintained** (also called alternate). The momentary pushbuttons remain ON for as long as you are manually pressing them while the maintained will change status every time you press them. You can select either operation for each pushbuttons when you are configuring the panel. When the PLC and panel are properly mapped, the pushbuttons are used just like relay contacts. If you refer to the table above, the pushbuttons status will be determined by the status of the bits in the **m+4** memory register.

## Lamps

There are 12 Lamps available on the OP-1212 panel that are arranged in 3 rows of four. The panel is shipped with all red Lamps, however, you can order additional red, green, and yellow packs of lamps for more customized arrangements. Refer to our catalog for the lamp kit part numbers and prices.

After the PLC and panel have been properly mapped, the lamps can be activated by writing a 1 to its associated bit in the **m+0** address location. The bit is turned on via your ladder logic usually through activation of a contact. The contact can also be one of the 12 pushbuttons on the OP-1212 panel. We will provide examples of these applications in the **Applying Ladder Logic** Section of this manual.

**Flashing the Lamps**

Another feature of the Lamps is there ability to flash. This feature is also controlled via your ladder logic. The flashing feature requires that the lamp is activated first, then the corresponding bit in memory location **m+1** is activated. Again, this accomplished by activating a coil.

**LEDs and Separation Mode**

Each of the 12 pushbuttons on the OP-1212 have corresponding LEDs located on the upper left hand corner. The LEDs are usually used as an indication of the pushbutton status however, they can be configured to work independently. When configuring the OP-1212 panel, you have the option to select **LED separation mode**. If this option is selected, the LEDs will work in the same manner as the Lamps using the ladder logic to control the status of the LED. Also, the pushbutton itself **must be configured as a momentary pushbutton**. To activate an LED in this configuration, the appropriate bit in memory location **m+2** must be energized.

**Flashing the LEDs**

Just like the Lamps, the LEDs have the ability to flash. This feature is also controlled via your ladder logic. The flashing feature requires that the LED is activated first (memory location **m+2**), then the corresponding bit in memory location **m+3** is activated. Again, this is accomplished by activating a coil. As mentioned previously, the LED is used for the status of its associated pushbutton unless it is configured for **LED separation mode**. This also applies to flashing the LEDs independently of the pushbuttons.

**Force Functions**

The OP-1212 has the capability to “force” a pushbutton ON or OFF through your ladder logic. For example, you might have a pushbutton that starts a process, and you want to turn it off after the process has completed. Pressing the pushbutton would start the process (turns the pushbutton ON) and the ladder logic would turn the pushbutton OFF after the process was complete. Since the pushbuttons **must be configured as maintained (alternate)** for the force function to work, the process would be halted until the pushbutton was activated again. The force function feature and pushbutton option is enabled during the configuration of the panel.

There are three modes of force function available which are located in the three most significant bits of memory location **m+5**.

**Mode 1 (M1)-forces all Pushbuttons to reflect the status** stored in **m+5**. For example, the data shown below would force Pushbuttons 3, 4 and 12 to ON and all the others would be forced OFF. Notice that bit M1 of **m+5** is set to 1 for this mode. M2 and M3 are set to 0's.

**Mode 2 (M2)-forces ON only those Pushbuttons matching the bits set** in register **m+5**. The bits not set do not affect the status of the Pushbuttons. You would set M2 to 1 while M1 and M3 are set to 0.

**Mode 3 (M3)-forces OFF only those Pushbuttons matching the bits set** in register **m+5**. The bits not set do not affect the status of the Pushbuttons. You would set M3 to 1 while M1 and M2 are set to 0.

Force Function Registers	M1	M2	M3	12	11	10	9	8	7	6	5	4	3	2	1	← pushbutton number	
	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	<b>m+5</b>



**NOTE:** Forcing is similar to a one-shot process. That is, once you have set the mode in **m+5**, the bit patterns in **m+4** are changed (according to the mode selected), and then, all of the bits in **m+5** are set to zero. What this means is that all pushbuttons return to normal manual operation after the forcing is completed.