ELKHART BRASS
Fire Fighting Equipment

Industrial Electric Remote Controlled Monitor Systems Components
Frequently Asked Questions
Revised January 8, 2016

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System Configuration

System Setup

Technical Reference Information and Specifications

What components are required?

1. A monitor, nozzle, and monitor motor control panel (MMCP). These always go as a set of 1 each.
2. A local operator control panel (Local OCP or LOCP)
3. Optionally a remote operator control panel (Remote OCP or ROCP)
4. Optionally a main control console (MCC)

See some of the diagrams below.

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What part numbers make up a basic system?

08394053 - Spitfire Monitor
03783001 - SM-1250BE-HL Nozzle (one per monitor)
81471068 – MMCP (Monitor Motor Control Panel) (one per monitor)Replaces 81471058. Adds dry contact valve and auxiliary outputs.
24359000 - OCP (Operator Control Panel)
Controls up to 2 monitors and can be configured as either local or remote.

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What voltages are accepted?

OCP – 120/240 VAC, 50/60Hz single phase
MMCP - 120/240 VAC, 50/60Hz single phase, 480 VAC 50/60Hz single phase
Note that 220 VAC single phase can usually be easily derived from 380 VAC 3 phase between one phase and neutral.
Monitors – 120 VAC (power is supplied by MMCP)
Valves - 120/240 VAC, 50/60Hz single phase

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What are the system power requirements?

MMCP (includes Monitor) – 480 VA (350VA typical max.)
OCP (2 Monitor Control) – 240 VA (36VA typical Max.)
HMI console – 480 VA
Butterfly Valve – 300 VA
The power is given in VA which is the product of the voltage multiplied by the current in Amps (Volts x Amps) and is generally considered to be equivalent to Watts. Numerical conversions are easily performed.

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I need a system to operate with 50 Hz, not 60 Hz. What do I do?

Our systems are designed to operate on either 50 or 60 Hz and are UL labeled accordingly. Monitor speeds are 17% slower at 50 Hz due to the motors being synchronized with the line frequency of the voltage. If used with our OCP with Park and Oscillate it will be an option to select during setup.

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I ordered the wrong panels, I needed a different operating voltage.

As long as you have one of the voltages listed inside the panel enclosure the instructions are there to re-configure the panels for any of those voltages. A different panel is not required. The OCP will accept input voltages from 120 VAC to 240 VAC. Follow the installation instructions in the manual for proper power connections.

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I have 117 VAC available, will this work?

Local power variations also list these voltages commonly as 110 VAC, 117 VAC, and 125 VAC, and the components should operate fine.

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How are they connected?

There are hard wire connections between the LOCP and the MMCP and between the MMCP and the Monitor. The wire numbers typically connect the same number on each of the panels together with very few exceptions. For example wire terminal number 61 on the LOCP connects to 61 on the MMCP. Unfortunately experience has shown that the underlying cause of most installation issues is traceable to wiring errors.

The connections between OCP's, HMI's, and the RF unit are network connections and can be either fiber optic or Cat5 copper depending on the length.

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What are the electrical interconnect wiring size requirements? What are the limitations of the panel interconnections?

WIRE SIZE FOR CONNECTION BETWEEN THE MONITOR MOTOR CONTROL PANEL AND THE OPERATOR CONTROL PANEL	
UP TO 750 FEET	**18 - AWG**
750 TO 1500 FEET	**16 - AWG**
1500 TO 2500 FEET	**14 - AWG**
2500 TO 3500 FEET	**12 - AWG**

WIRE SIZE FOR CONNECTION BETWEEN THE MONITOR MOTOR CONTROL PANEL AND THE MONITOR JUCTION BOX	
UP TO 75 FEET	**18 - AWG**
75 TO 100 FEET	**16 - AWG**
100 TO 200 FEET	**14 - AWG**
200 TO 400 FEET	**12 - AWG**

If using a simple control panel without a separate power supply it will be necessary to double the actual wiring distance since the current needs to travel both directions.

Longer connections are possible but the wire diameters are prohibitively large from an expense consideration and the panel terminal blocks cannot accommodate larger conductors.

Please see the individual drawings for more details.

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What enclosures are used?

All standard modular electric systems are constructed in 24"x 30" stainless steel, NEMA 4X panels that weigh approximately 100 lbs. each. Mounting lugs are provided on the top and bottom at the back surface of the panels with instructions given in the manuals. This panel size is chosen for a number of reasons:

1. It is a size and weight that can be installed without extra equipment or personnel.

2. Combining more operators into one panel does not significantly reduce the size or weight per monitor controlled as the space is determined largely by the layout of the joysticks, buttons, lights, etc., therefore the increase is more than expected.
3. A combination of two sets of controls allows for larger systems to be constructed by combining more panels.
    a. Both sets can operate the same monitor if desired and be available for future expansion.
4. By using a common panel, parts can be shipped from inventory without the delay for custom design, drawing approval, and fabrication.
5. Avoids costs for custom panel manufacturing.

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The panels have no holes for conduit. Why? Can they be added?

The panels are shipped with no holes in the bottom to keep them sealed from the environment or pests at the installation site and during transport. All fielded wiring and cable glands or conduit hubs for interconnecting of the panels to maintain area classification is the responsibility of the installer. Punching holes in the bottom of the enclosure will not void the UL Listing on this panel if the installation is done in accordance with the requirements in the NEC (NFPA 70) Article 501.10 and Article 501.15. The components used will need to meet the Class and Division requirements of the area that the panels are installed in and also conform to any local code requirements. There are also special installation requirements for any conduit connections that lead to Class I, Division 1 enclosures that are called out in the NEC document. Most competent electrical contractors familiar with these sites should already be aware of these requirements since they are already working with them.

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How are the components certified?

The panel designs are UL listed and labeled for Class I, Division2/Zone2 installation and are built to NEC requirements. The design has been extensively tested and evaluated by UL before the UL label is applied. The monitors and nozzles use synchronous motors that are UL recognized for Class I, Division 2 use. The monitor itself, and the nozzle is not certified as it is not an electrical machine that UL has an appropriate category that meets the intended application. There are no printed documents of conformity or certification available from UL other than the labels and UL controls the component suppliers so that the label is only put on equipment that meets their requirements.

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Is any other certification available?

Currently the monitors, nozzles, and MMCP's are available with an ATEX certification. The monitor and Nozzle have an FM certification for Class I, Division 2. An RF control is also available with ATEX and Canadian certifications for Class I, Division 2.

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Can I expand the system?

The modular design allows for expansion to occur. Depending on what is required it may be possible to do this by only connecting the added panels and performing a simple setup configuration. Custom programming may be required in some cases, but it is allowed for in the design. There is a limit of 16 PLC's on the network without any custom programming.

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Can the system have a portable wireless controller?

Portable wireless controllers are available in a "Belly Pack" configuration that has joysticks and a small hand held unit. Push buttons control the valves and other functions. Configuration options on this feature can accommodate the same operational controls as seen on the OCP but normally it is not desired to have all of them present due to the nature of how it is used.

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Do I have to wait for all components before a partial shipment can be made?

This depends on the configuration of the system and how your order was placed. These details need to be discussed with our sales and customer service department before the order is placed to avoid extra costs and delays.

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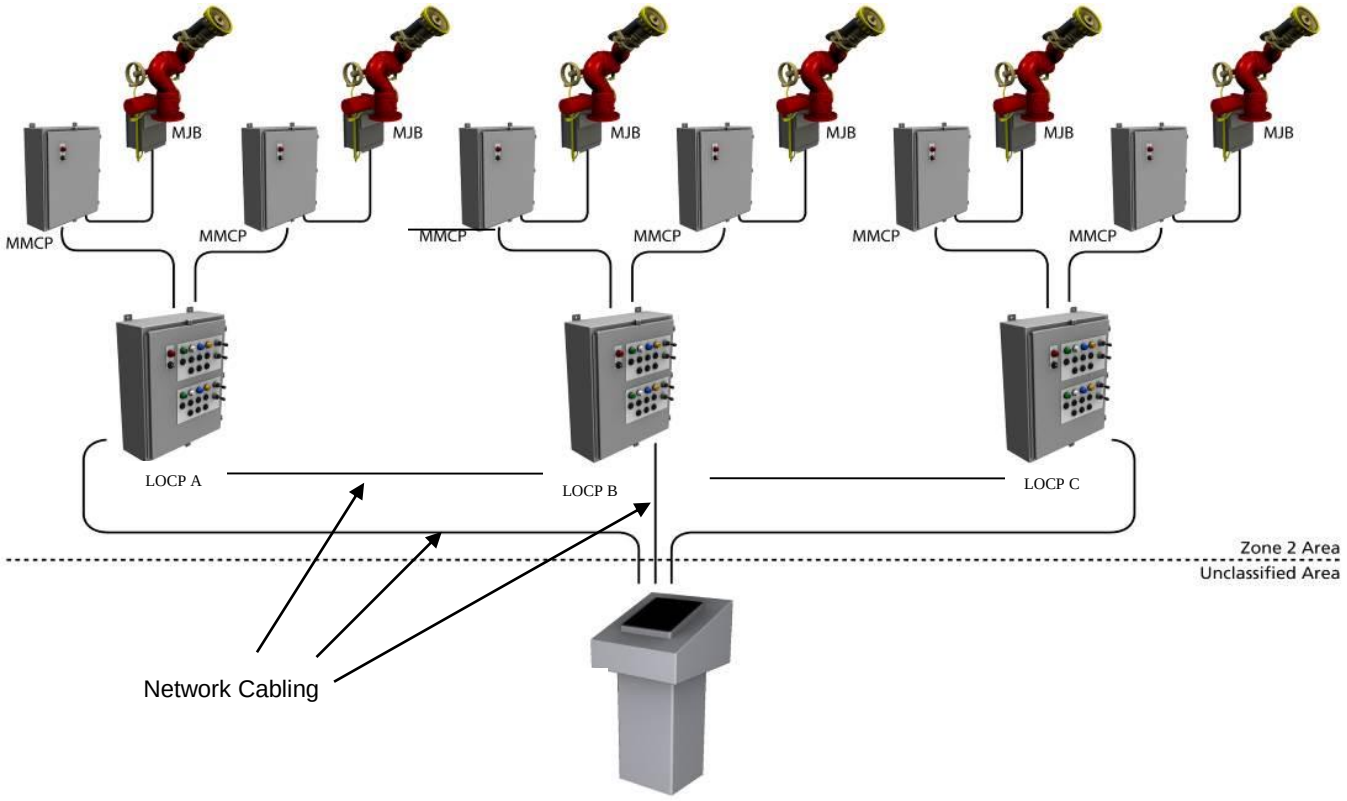
How many network communication connections are required between the Operator Control Panels (OCP's)?

This is almost entirely up to the customer. The minimum would be to provide a send and a receive path to each panel with connections daisy chained from one end to the other. The connections can also be between each and every panel in a mesh, in a loop, or single runs from one panel to all of the others, or any combination of these. Making more interconnections between panels provides greater redundancy of the network. This means that some connections can be lost and the network will still operate without problems. Any combination can work as long as each panel is connected to the entire network by at least one path. Our standard panels provide for a maximum of 2 duplex fiber pairs and 6 Cat 5/5e/6 Ethernet connections per panel; however 2 Ethernet connections are used to provide network connections between the two PLC controllers in each panel.



Mesh network: This is the most complete and reliable network configuration and is shown above. Each panel is connected to every other panel. This provides the greatest reliability as multiple links could be lost and the network will still operate by communicating through another path. Note that as supplied there are only two fiber ports installed in the HMI. If additional ports are required for implementing radial or mesh networks a spare managed switch or special order will be required.

Ring Network: The network cables between the MCC and LCB B, and LCB A and LCP C would be eliminated. Loss of any single remaining cable could be tolerated and the network will still be operational since any panel can find a path to any other panel. All necessary ports (two fiber) are supplied to implement this configuration.

Radial Network: Network cabling radiates from one location and is typically the MCC. This would eliminate the network cables between LCP A, B, and C. Failure of any cable means that communication will be lost for monitors on that leg. This is the least reliable installation. Note that as supplied there are only two fiber ports installed in the HMI. If additional ports are required for implementing radial or mesh networks a spare managed switch or special order will be required.

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What kind of cabling can be used for the network?

Each panel requires at least 2 fibers (one transmit and one receiver) or one Cat5/5e/6 Ethernet cable to connect it to the network. A Cat5e/Cat6 cable contains both transmit and receive signals. The recommended Optical fiber is 62.5/125 with SC connectors. The managed switch will also accept 50/125 cable with SC but it is less common and typically costs more. More information can be found at by googling Optical Fiber Network. Lanshack.com has had good information in the past.

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How long can the fiber optic cable be?

Recognized industry specifications (EIA/TIA) state a 2 km maximum. However, the maximum distance is highly influenced by the specifications of the particular cable's fiber optic core and the installation quality, both of which are determined by the customer's contractors and is not possible for us to make guarantees. Some hardware suppliers also specify longer distances, but actual performance could also be less. The customer's installation contractor can provide a better estimate.

Going to single mode fiber and other equipment would extend those distances by about 5 times but the equipment costs are considerably more expensive.

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How can I locate the control room farther than 4 km away from the monitor?

Your network installation contractor can provide repeaters as required, or a custom system can be quoted that uses single mode fiber. Our equipment doesn't really care as long as it sees a good Ethernet network. It can even share an existing network if desired but be careful about reliability and IP conflict concerns.

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Is single mode fiber more reliable or better than multimode?

No it is not. Single mode fiber only offers more bandwidth, which is not needed by our system, or longer distances. Basically the single mode fiber optic cable has a small core and only one pathway of light. With only a single wavelength of light passing through its core, single mode realigns the light toward the center of the core instead of simply bouncing it off the edge of the core as with multimode. Multimode fiber optic cable has a large-diameter core that is much larger than the wavelength of light transmitted, and therefore has multiple pathways of light-several wavelengths of light are used in the fiber core. Eventually these multiple pathways interfere with each other and the signal strength is reduced, limiting the distance that multimode fiber can be used.

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Can I use my existing network?

This can be done but may not be advisable. If the other network fails it will not affect the monitor system if they are separate. It also is not possible for anyone to accidentally or intentionally interfere with the monitor system operation if they are not able to connect to the network.

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What does the MMCP do?

The monitors are connected to a Monitor Motor Control Panel (MMCP). The MMCP provides the power at the correct voltage to the monitor motors based on control signals from the local Operator Control Panel (OCP). The MMCP will be connected to the monitor through a junction box located on the monitor. These cables will carry 110/120 VAC only when the monitor motors are operating. At all other times there is no voltage on the cables. The MMCP must be directly connected to an OCP with wiring to provide the 24 VDC control signals for the relays in the MMCP.

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Can a network be connected to an MMCP?

No! There are no PLC's in the MMCP so it cannot be connected directly to a network and must be operated in conjunction with an OCP.

Back to top…**What is a PLC?**

A PLC is a Programmable Logic Controller and its name is relatively self-defining. It interprets the operator inputs from joysticks, push buttons, and other controllers and provides the control functions for the monitor. The particular model we use is an Allen Bradley Micrologix 1400, which also provides for Ethernet communication and provides an operator interface to allow programming configuration at installation for many parameters.

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I don't want to use an MMCP; can I connect the "Local" OCP directly to the monitor?

No. The MMCP is required to provide the motor power at the correct phases to achieve correct operation. These components generate heat that is not desired in the same panel as the programmable control electronics.

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What does an OCP do?

The OCP is the panel that the operator uses to give inputs to the system through joysticks and push buttons. If the OCP is connected directly to an MMCP the commands are sent via 24 VDC control signals to the MMCP and the panel is called a Local OCP. If the OCP is not connected directly to an MMCP it sends those commands over the network to the PLC in the Local OCP, which then controls the monitor through the MMCP. Each PLC has a set of menus to configure monitor Park and Oscillate settings, network addresses, and whether the PLC is connected directly to the MMCP or not.

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I don't want to use a "Local" OCP; can I connect the network directly to the MMCP?

The OCP generates the control signals necessary for the monitor to operate. Components required for monitor operation are located in the MMCP and must be present for the monitor to operate. These components generate heat that is not desired in the same panel as the programmable control electronics. There must be one OCP (or NCP) connected to the MMCP to tell the MMCP how to operate the monitor and nozzle motors and connect it to the network.

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Why do I need a local OCP?

The Local OCP is the panel that actually controls the monitor and must be present for the system to operate.

Due to the heat generation in the MMCP it is not appropriate to locate the control electronics required in the same enclosure in many installations. Therefore the OCP will typically be located near the MMCP and will be connected to another OCP if a more remote control is desired.

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What is an MCP (or CRC)?

This is not really a Master Control Panel as it is commonly referred to since it is not possible to always override every foreseeable condition that could exist. The local OCP is the closest thing to a Master since it is the only panel that can directly control the monitor. The local OCP will often have override control priority since it is directly connected to the MMCP, but that will depend on the particular hardware that comprises the system.

Sometimes it is also called a MCC (Main Control Console) since it is built into a console instead of a panel. A better term would be Control Room Console (CRC) if it is to be located in the control room.

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What if two people try to control a monitor at the same time from different panels?

This is not typically an issue in normal operations. Attempts are made to obey all commands from each panel on the internal network, but ultimately the control panel directly connected to the MMCP will have control in the event of a network failure. It also should have override capability due to proximity of the controls to the monitor. Personnel at this location have the most direct input to the situation. With custom system designs that utilize PLC controls a control hierarchy can be designed in but must be determined in advance of ordering any equipment and will be custom.

With simple control panels the two functions will operate simultaneously unless they are in conflict with each other. In that case they will essentially cancel each other out.

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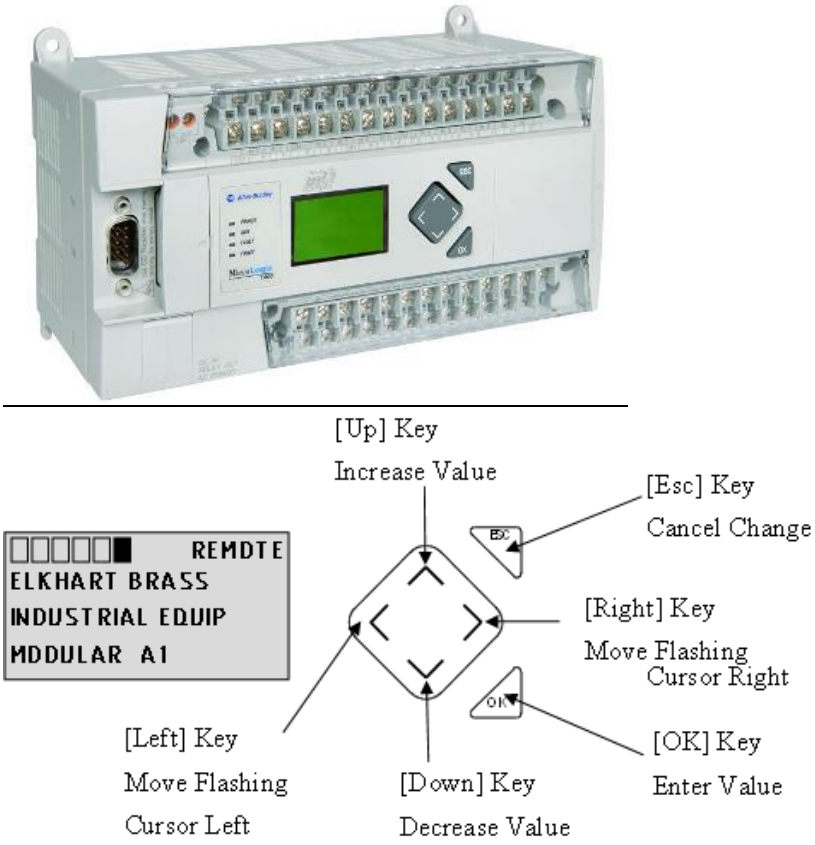
What is involved with the programming set-up of the OCP's?

The programming set-up of the OCP is a simple, menu driven process and uses the screen on the PLC and input keypad. A typical example is shown below. Refer to the correct installation manual for your system for exact information and procedures.



The basic steps in the A series software are:

1. Screens 1 and 2 report program status and monitor position information and cannot be changed.
2. Screens 3 thru 6 are for setting Monitor Park position and Oscillation information.
3. Screens 7 thru 9 are for setting the monitor ID, local/remote, and IP address information.
4. Data can be changed at the cursor location by using the [UP] key to increase the value or [DOWN] key to decrease the value. Move the cursor by pressing the left or right key.
5. To enter the data that is displayed and move to the next screen press the [OK] key.
6. To cancel any data changes press the [ESC] key. Press [ESC] key again and go back to the first screen.

The C series software is slightly different but no more difficult. The prompts on the screens are better and it may not be required to rely as much on the manual as in the past, but we still recommend referring to the manual as a reference. The menus have been reorganized to allow easier changed in operation once the system has been set up and to provide more clarity in system configuration.

Refer to the Operator Control Panel (OCP) Setup Instructions for more detailed information. The latest documentation is available on our website at www.elkhartbrass.com in the industrial systems section under manuals. Complete drawing packages are also available as well.

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What is an HMI?

HMI (Human Machine Interface) is the industry accepted term for the means for an operator to communicate with machines. We use a Touch Screen panel for our HMI console that is sometimes called an MCC.

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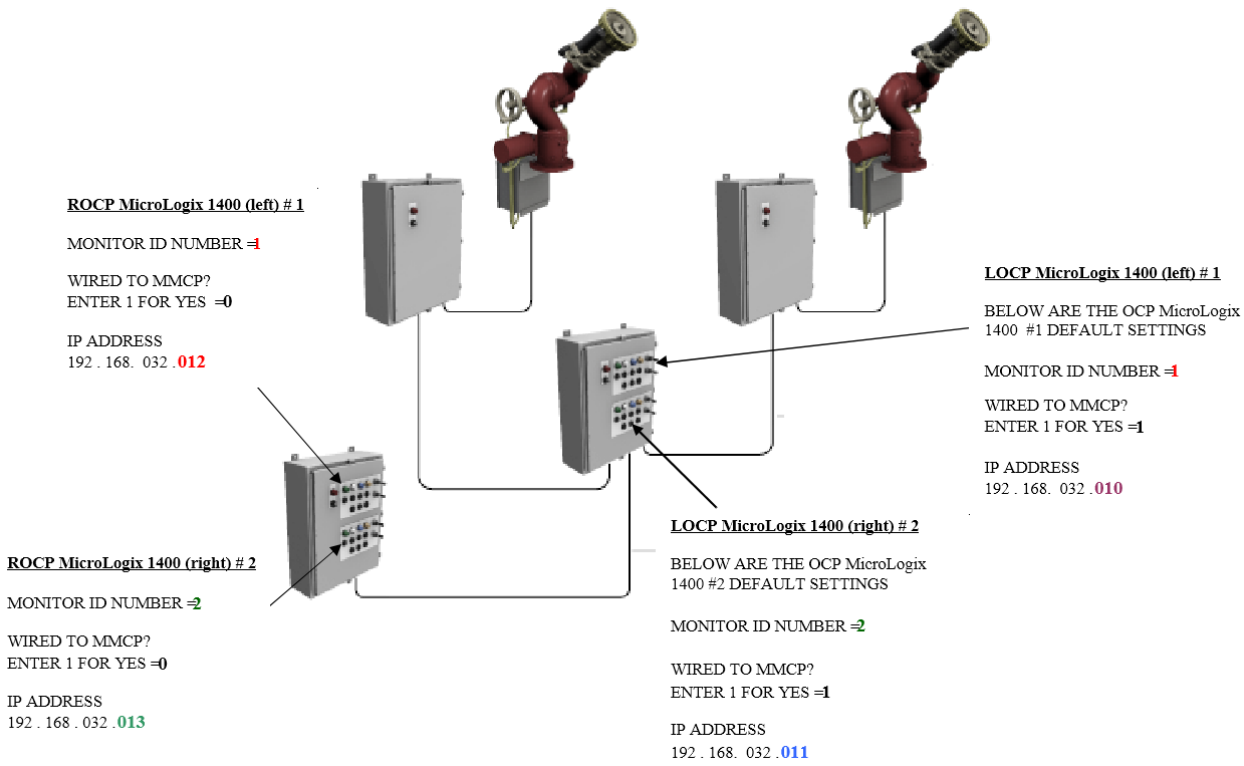
How do panels combine to operate different numbers of monitors?

The panels can be connected directly to the MMCP (Local OCP) or connected to another OCP through a network (Remote OCP). All panels need to be connected to the same network, but they can be mounted physically in any appropriate location. If a two monitor panel is desired to control a single monitor the second PLC can be configured as a "wired to MMCP" in the setup menus so that acts like a remote panel but both PLC's in the panel control the same monitor. Detailed instructions are provided in the setup manual. The latest documentation is available on our website at www.elkhartbrass.com.



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What is the difference between a "Local" OCP and a "Remote" OCP?

How do I know which panels to install at the local and remote locations?

There is no difference between a local and remote panel. They become different based on where they are installed and how the setup menu options are chosen. The local OPC is wired directly to one or two MMCP's and a remote OCP is connected to the local OCP by a network connection. There is a very short and simple setup to be done after they are wired to make sure that they can communicate correctly.

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Can a UPS be provided?

Technically this is possible, but not very practical due to the distributed nature of the systems. A UPS system in a hazardous area is not practical at all so it would need to be located in a safe area and power distribution for the entire system would be routed from there. Storage battery size is usually larger than expected and becomes a problem for most customers as does the required maintenance to keep it ready. This is something that is best handled by the installation contractor using locally sourced components.

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Why only 2 monitors per control panel?

With any more than two monitors controlled in one panel, the panel becomes too large and too heavy. Each OCP is really two control units in one enclosure that use a common power supply and a common communication switch. Each panel has a PLC to provide the control signals for each pair of joysticks. The enclosure size has been chosen for a variety of reasons including cost, ease of installation, and practical utilization of multiple system configurations. A four monitor OCP would be approximately twice as large and twice as heavy as a two monitor OCP.

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Are the fuses UL listed for Class I, Division 2?

Some parts are not UL listed specifically for hazardous locations and must be evaluated by the inspector. Fuses and wire as two examples of this. These components are not required to be listed to meet the UL requirements and the UL inspector evaluates not only the components used, but the construction methods as well before allowing the label to go on the panel. The fuse holder is the more critical item and it is UL listed.

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Why did the fuses blow when I first powered up the system?

It is most likely that there is a wiring error but it also could be a procedural issue. When powering up the panels it is recommended that no control functions be active, such as oscillate or park.. The easiest way to avoid this is to power up the MMCP first. If an OPC or MCC is running a routine that operates the monitors it is possible for the safety circuitry in the MMCP to blow a fuse. We recommend powering all panels up before any functions are selected, or allowing all selected functions to complete or be turned off before powering up other panels. This has only been experienced on occasion during initial start-up of new or expanded systems, and should not be an issue with ongoing operation.

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What cables are supplied?

Cables are supplied to connect the monitor motors and the Nozzle motor to the monitor junction box. Other installation cables and cable glands, etc. are not supplied and should be planned by the installer to meet local code requirements.

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Water (or Foam) valves open but I can't close them (or I can close them but can't open them)

There was a jumper inserted between terminals 10 and 14, and 15 and 19 to allow panel circuits to be tested without the valves connected. Most valves have a number of switch contacts that can be used to indicate if the valve is opened or closed, but they are not always used. If they are not and the panel is wired according to the installation instructions there will be no issue. However, if the jumper is still in place and the feedback wiring is utilized there may be a problem where the valve control will not operate correctly. Most likely it will be that the valve can be opened but this jumper will keep powering the open circuit and it will not be able to be closed. Removing the jumper will resolve the problem.

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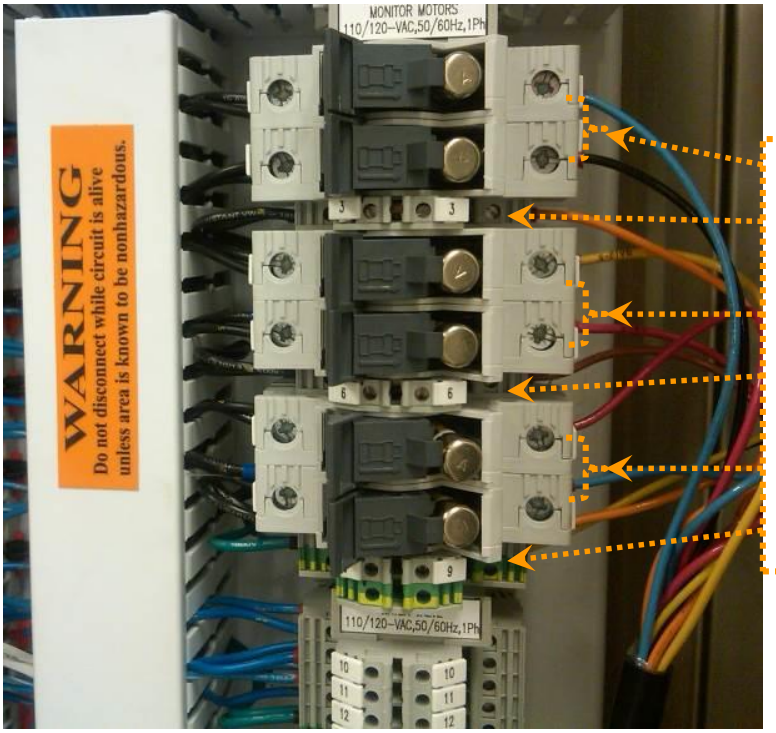
The monitor or nozzle moves but not always the correct direction and torque is very low. In some cases the monitor (or nozzle) hums but does not move.

This could be from several causes and where to look for the issue will be slightly different.

New System Installations - Just because the monitor moves it does not mean that it is wired correctly. It is possible for field wiring interconnections to cause problems. Each motor has 4 wires: a ground, a common, and one for each winding. If the common becomes exchanged with one of the winding connections the monitor may appear to operate but will be erratic and may move in the wrong direction, or even change direction. The motor will also not generate the amount of torque it should. If the fuses F1 through FF8 are opened the resistance of the motor windings can easily be measured between the fuse block terminals in the MMCP. The correct values should be the same between the common wire and each of the windings and should be approximately 260 ohms for the nozzle motor and 17 ohms for the monitor motors.



Nozzle Fuses F3, F4 (Term. 1, 2)
Nozzle Common (Term 3)

Vertical Monitor Fuses F5, F6 (Term 4, 5)
Vertical Common (Term 6)

Horizontal Monitor Fuses F7, F8 (Term 7, 8)
Horizontal Common (Term 9)

With some systems a buzzing can be heard when the motor is trying to move but it will not actually move. If there is a wiring issue as described above it can also cause this condition, but in most cases there will actually be some movement.

If the nozzles or monitors are allowed to set for long periods of time without maintenance it also could be corrosion on the nozzle or the grease has gotten stiff in the monitor. Please see the respective device manuals for correct maintenance procedures.

Replaced Cables – If the cables have been replaced please see the section above for diagnosis of wiring errors. The difference is that the error will probably be in the monitor junction box. Also note that if the cable was pulled apart by monitor movement there may also be a blown fuse in the associated circuit. If the fuse is blown it will light the LED, but only if the current is being applied to the motor, which can be done by holding the joystick. With the monitor stationary there is no applied current and the LED will not light up.

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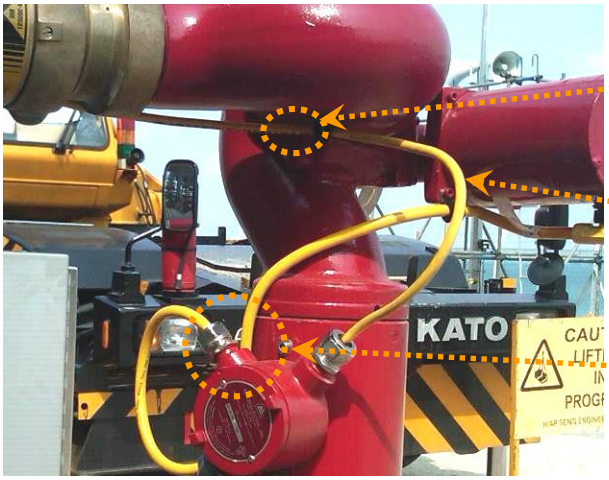
The Nozzle Cable gets caught in the monitor mounted Junction Box

At one time the NFPA specifications require a maximum cable length that many competitors did not meet. To meet this requirement we were compelled to add a junction box to terminate the cable protection. Since it is no longer a requirements we have also eliminated the junction box to avoid

problems. However cable adjustment can resolve the problem. It is also possible to remove the junction box but this is more involved than it appears.

To avoid catching the cables the vertical monitor motor cable needs to be routed so that the cable lies behind the exit from the junction box as shown. If it will not naturally lie in this position disconnect the cable from the motor and twist it so that the natural lie of the cable is as shown below. The nozzle cable needs to be tight from the nozzle connection to the restraining clip located on the bottom of the monitor elbow. Securing it to the clip with a wire tie can help to ensure that this positioning is maintained. All of the nozzle slack must be between the junction box and the restraining clip. This positioning allows the slack in the cables to be used as the monitor rotates without binding or catching causing damage to the cables.



Need Nozzle wire held tight to Monitor between Nozzle and upper cable restraint.

Slack on Nozzle cable to be between junction box and cable restraint in front (outside) the motor cable.

Monitor motor cable to be routed behind junction box as shown. It may be necessary to twist the cable clockwise with the motor connector disconnected to achieve this position

Need Nozzle wire held tight to Monitor between Nozzle and upper cable restraint. Attaching Nozzle wire to the nozzle actuator helps to insure that there are no issues. Alternatively the cable could be routed between the nozzle actuator and nozzle to hold the cable in position.

Slack on Nozzle cable must be between junction box and cable restraint.

Note - Updated requirements no longer call for this mid-mounted junction box as of 2012. If desired, the cables are long enough to be connected directly to the bottom of the junction box, but holes will need to be punched and correct cable glands and hole plugs will be needed to be used to insure compliance with local requirements and codes.

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What is the temperature rating of the system?

The temperature rating of the panels is the environment that the panels can be installed in that all of the components are rated for. For our systems this is -10°C to 60°C (14 ° F to 140° F). Several items should be noted:

1. The outside environment seldom reflects the actual temperature in the panels due to a number of variables that need to be considered such as heat sinking to mounting surfaces, internal heating due to operation, and rejected heat from components in the idle state, etc.
2. A small shade constructed above the panel can have a very significant effect on the panel temperature from solar loading. This shade can be supplied on special build panels but it is more cost effective to have a small shade constructed by the installation contractor.
3. The components are contained within a sealed container with a significant thermal mass so that excursions outside this range will have reduced effect on the component temperatures.
4. These rating are defined as limits for tolerances which we are not sensitive to in most cases. Great effort has been taken to provide a design that is not sensitive to component specification variations.
5. Many items exceed these ratings, such as the monitor, resistors, relays, capacitors, and the storage temperature ratings are greater. These are the minimum ratings guaranteed by every component supplier contained within the assembly.
6. Water flow through the monitor will normalize the monitor temperature to that near the water temperature in moments regardless of the ambient conditions.

Please consult your sales contact for more detailed discussion if required.

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What is the humidity rating of the system?

Since the electrical components are contained within NEMA 4x enclosures there is not a problem with humidity. Many systems have been installed in coastal or equatorial locations with extremes similar to what is seen almost anywhere an industrial site would be located.

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How do I properly define the hazardous area classification?

Most users err on the side of a conservative classification. This is appropriate due to the risk and safety considerations involved, but also adds significant complications for the implementation of a system that meets the actual needs of the site. There are many good guides available and can be found by searching the internet for Hazardous Location Guides, Information, Ratings, etc. A good one is located at http://www.helpelek2.be/atx/pdf/ATX_Haza_loca.pdf but there are many more.

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How fast do the monitors move?

The rate of movement is controlled by the line frequency. For a 60 Hz system the horizontal movement is 7.69 °/sec, and vertical is 5 °/sec. For a 50 Hz system the rate would reduce by the ration of 50/60 or .833.

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Can I use Vortex Cooling or panel purge systems (Z purge)?

Vortex cooling does a great job of cooling, but there are some problems that make them a very poor choice for the environment that our systems are installed in. Since the panel has an opening to the environment they require the use of panel purge systems to maintain the hazardous location certification. These systems are also known as Z-purge systems and generate the cooling by the use of compressed air.

While this sounds ideal as there are no electrical components to maintain, they require a constant air supply to generate the cooling. Unfortunately there are some situations where the air supply may not be available, such as a fire that either involves the compressor area or the air distribution system, or a situation that requires power to be interrupted to the compressor. If the purge system is installed according to the documented requirements it must be connected so that it turns the power off to the panel it is protecting.

In other words, the vortex coolers work well until there is a fire and at that point they may be required to shut down your ability to fight, contain, control, or otherwise protect your facility. For this reason we do not offer this type of system. Our method of protection is to provide a design that is based on sealed and/or non-incendive components that individually meet the Hazardous location requirement and are further reviewed by UL for compliance allowing the UL label to be applied to the finished product.

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240 VAC, 50 Hz installation current leakage.

There is a problem that some customers have experienced with a current imbalance on the neutral and ground circuits. This could come from one of the safety aspects of our panel design when the panel is powered up. There are relays that connect the capacitors to ground when the power is turned off to discharge them so that a shock hazard is eliminated. The relay contacts will be closed for a very short period when the power is turned on due to the response time of the relay. During this short interval current may flow from the neutral to ground through the motor windings. This condition should be able to be verified by either removing relays 11CR and 12CR, or by opening fuses F3 through F8 when the power is turned on. If the problem does not exist with the relays removed or the fuses opened then the connection between neutral and ground is causing the problem.

There also may be issues depending on the input power configuration and monitoring from the customer's supply that requires the neutrals and ground to remain isolated.

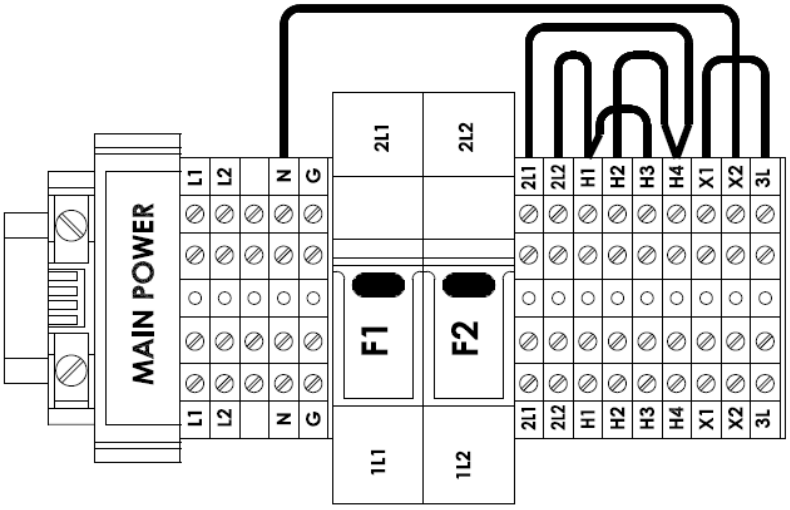
An alternate method of connection could resolve either of these problems. The connections may be confusing if you simply look at the labeling and not the wiring diagram.

1. Connect the jumpers as if it were going to be installed for 220/240 VAC, 60 Hz power. There are charts in the manual and inside the MMCP door to describe these connections and I have attached an updated Jumper diagram.
2. The incoming "N" connection on the panel terminal block is **not to be used**. There should be no external wire connected to the "N" terminal block.
3. Connect the incoming power as follows:

Incoming Power Line	Panel Terminal Block
L1	L1
N	L2
No Connection	N
G	G

This isolates the neutral connection and still grounds the equipment for safety purposes.

The new jumper diagram for all 220/240 VAC installations is:



81471068 CONFIGURED FOR 220/240 VAC, 50/60 Hz.

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How close do I need monitors placed for Gas Mitigation applications?

For Gas Mitigation applications the purpose of the monitor placement is to allow a curtain wall of water to be applied to effectively contain a gas cloud. While the exact placement will be determined by the individual site parameters, general guidelines that are frequently used place the monitors about 40 feet (12 meters) apart to provide effective coverage and allow for some overlap on the stream pattern.

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How do the "Dry Contacts" work in the 81471068 MMCP?

Our 814710678 MMCP contains "Dry Contacts" for the outputs on the Water Valve and Aux. outputs. Essentially these are open switch contacts that are closed by the pressing of the related push button on the OCP. They can be used to provide a variety of control signals depending on what source is connected to one side of the contacts. There are 24 VDC and 120 VAC sources available in the MMCP and circuits appropriate for accepting valve feedback of each are provided. Other valve feedback voltages will require a custom design.

Alternatively, they can also be connected to two terminals of the device being operated, such as a valve, to close a separate circuit.

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The yellow park light is flashing rapidly. What does this mean and how do I stop it?

Basically it means that the MMCP is not ready for operation and is not sending a power signal back to the OCP. This was implemented primarily for use with larger HMI systems where it may not be possible to visually observe the monitor. The normal configuration shipped in our OCP's is with this feature disabled to allow for maximum compatibility with all MMCP's. To use it in needs to be enabled according to the instructions in the OCP setup guide (available on our web site). It is possible for this feature to become enabled while attempting to make the setup entries so it is possible that it has been enabled even if you were not aware of it if the proper sequence was inadvertently entered.

The 81471068 MMCP contains terminal number 77 which is not present on the earlier 81471058 and some earlier custom panels. When circuit 77 is completed between these panels it allows the OCP to be aware of the power status of the MMCP. If the power is not present at terminal 77 it indicates that the

MMCP does not have power and the monitor will not operate. There are several ways that this light can be made to not flash. Any of the below are acceptable and probably

1. If you have the MMCP 81471068 check for correct installation of the wire between terminal 77 at both the MMCP and OCP.
2. It is also possible to connect a wire in the OCP from terminal 51A to terminal 77 on the terminal strip. If there is no terminal 77 then it is unlikely that you have software revision "A4" or later unless it has been upgraded. Terminal 77 could be added by using a spare terminal block and connecting it to input 19 of the PCL. However, if the software is not upgraded the function will not work.
3. If you have the MMCP 81471058 and do not wish to use the feature, there is a procedure in the setup guide manual to disable it. It may be necessary to turn the power off and then back on before entering the keypad sequence [ESC] three times and then [OK], as there are some timing considerations and other keystrokes that could get in the way of a successful setting. Software version C has this feature added to the setup menu selection that is described in the manual in detail.
4. It is also possible to connect 77 in the OCP to any 24VDC power source in the MMCP. This Power should be available on terminal on terminal number 12 in most 81471058 panels **but be sure to verify that it is 24VDC first**.
    a. Other possible terminals are 17, 51 or 51A, but be sure to check the voltage before connecting it. **If it is 120 VAC it will damage the OCP** if connected. For 81471068 you should use terminal 77, or 51A if not present.
    b. If using terminals 12 or 17 please be sure to check if that 24VDC power is coming from the MMCP or from the valve by turning power off to the valve.

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Are fire rated cables available?

As required by the NEC/NFPA, the cable has very specific requirements to be approved for hazardous location use. The cables we use meet these requirements.

Two hour rated cable is currently available in two variations; a mineral insulation and a silicon insulation. The mineral insulation essentially becomes a glass like substance when exposed to excessive temperature and the Silicone insulation remains flexible. Note that many advertise flexible in the context of flexible for installation, not for continuously flexing cables. These "Flexible" cables are intended for a fixed installation in conduit or plenums, and is not appropriate for our monitor motor application.

We are not aware of a fire rated cable that meets the hazardous location requirements for Class I, Division (Zone) 2 applications. Our experience is that there are no suitable fire rated cables that will work in this application and other means of protection should be installed if considered required.

Depending on the customer requirements, and in consideration of the risks of the local situation, it would be understandable to specify that the power distribution to our panels be installed using fire rated cables, but that is in the scope of the installing contractor.

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Park function does not happen but the "Park" light flashes.

The park function will not happen until both the water valve close button is pushed and the water valve light is off. If the water valve was turned on by another controller the close button must be pushed before the system can be parked. Keep in mind that if two OCP's are connected locally to an MMCP

they have no way of knowing that the other exists. Please see the current OCP manual for your software for a more detailed explanation as some of the interactions are different depending on the software version used.

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Can I connect two OCP's (or more) to a single MMCP?

This is **not recommended**, but is possible. It also could be damaging to the OCP unless special installation practices are observed.

All of the functions will operate from each panel but they will not coordinate any of those functions with the other panel since they have no way of knowing that the other OCP exists and the software is not intended for this configuration. Functions that are most problematic are Park and Oscillate and the related indicator lights. There are some interlocks with water valve and auxiliary control that are not well supported with this configuration as well and results can be difficult to predict. Experience has shown that if the user is aware that the monitor is being controlled by two independent controllers and develops a protocol specific to their application it can work well, but not all functions are supported or operate exactly as documented.

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My monitor does not operate at low temperatures.

Your customer service or sales contact can help you determine if the problem is an electrical issue, mechanical issue, or an application issue.

Our standard Spitfire monitor has been tested to operate to -28°C without water flowing. Note that if water is needed and the valve is opened the flowing water will very quickly warm the monitor to a temperature above freezing. Interestingly the FM Certification requirements for -40° only require monitor operation at room temperature, **not at -40°**. If operation is required without water at -40° please consult us for a different part number that will be operational at -40° without water flowing. Depending on the installation special software may be required.

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My remote OCP does not operate.

If this is a new installation first check the network installation (done by others) and the configuration according to the Setup Guide. Depending on the power up sequence of the panels, what functions are selected right after power up, and what configuration settings have been made we have found it possible to put the system into a state where a remote OCP may not operate as expected, or at all, but this is not very common. This issue has only been observed in some installations of software revision A4 as shown on the LCD display on the PLC and can be rectified by scrolling through the setup screens on the plc after the system has powered up. If desired an update to a later software revision can resolve this situation.

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The Yellow light flashes in a double flash pattern.

Starting with Software version C there will be several errors tracked and reported by the Yellow light. The constant flashing yellow indicates that there is no power at the MMCP as in previous versions. Additional errors are now indicated by the yellow light flashing in a double flash sequence. The errors present will be displayed on the LCD display or are available on the HMI touchscreen if included. Errors include communication errors between panels and RF receivers, Low Battery, in addition to programming issues that should not be seen in the field. If the error corrects itself the condition will

reset and the flashing will stop. An example would be that the communication was not present due to a panel not being turned on. When the panel is turned on the communication would be found and the condition is no longer present so the flashing and error are canceled.

A double flash yellow is a warning and does not necessarily mean that the system will not function, but it does mean that attention is needed. If the error is due to a low battery all functions will be present, but the battery must be replaced to avoid program lost if the power should be shut down. **Please see the OCP manual for replacement instructions to avoid loss of program.** If it is due to a communication error the panel with the issue needs to be located and the communication issue corrected. If it is a new install it is likely an incorrect setting or a panel not powered up. Existing installations will probably find either the power has been turned off to a panel or there is a bad cable or fiber connection.

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Can I use foam tubes with my ERCM system?

The foam tubes are not really an industrial part and not totally compatible with our industrial systems. There could be interference with motors or other structural components. They will fit on the nozzles fine and will perform as expected, but some applications will need to plan more frequent replacement due to environmental attack on the foam tube hardware. If the system has no park function then the foam tube can be used successfully used but care will need to be exercised to not move the monitor to the extreme down position while rotating past the motors to avoid damage to any components.

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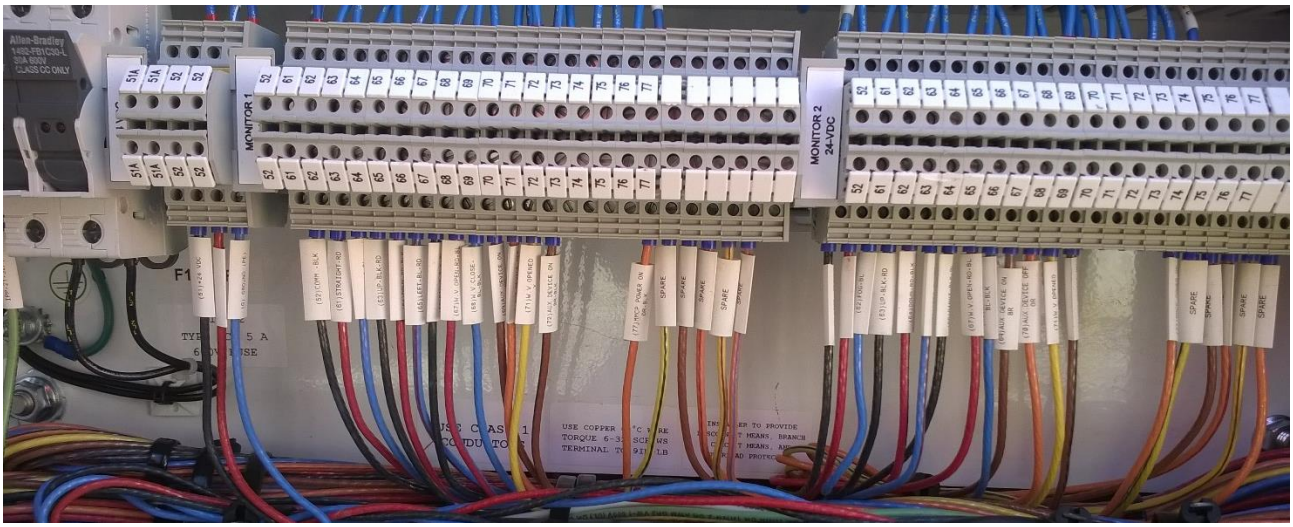
I do not get the desired results when operating the joysticks or button. Sometimes the monitor does more than one thing at a time.

If the OCP generates responses at the monitor but they are not correct the problem is most likely in the wiring between panels. Please verify that all of the wires are connected to the correct terminals that correspond with the panel at the other end of the cabling. If multiple functions are active upon selection of one function it could be that terminal 52 (common) has been switched with another wire (most likely 61, Straight Stream). This can have the effect of putting multiple functions in parallel with each other and cause unpredictable results. Selection of multi-colored cabling with labels such as shown below would make this error less likely to occur during installation.



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How long can the Cat5 cable be?

The specifications for Cat5 communication are actually longer than what we recommend. This is because many times the installation does not follow the guidelines and additional interference is introduced causing reduced performance of the network. In addition, the cost of fiber optic cable would be less before the maximum Cat5 length is achieved.

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