Safety Circuits

The Control Panel includes twoone circuit safety components.

- GFCI (Ground Fault Circuit Interrupter) / Circuit Breaker
- LIM (Line Insulation Monitor)

See the Pre-Dive Preparations section of the Quick Start Instructions for information on testing these components.

GFCI (Ground Fault Circuit Interrupter) / Circuit Breaker

The GFCI / Circuit Breaker protects the operator from shock from the AC circuit of the power source, and protects the equipment from a current overload. The GFCI has two operating switches and a test button. To energize the control panel, both switches need to be turned on. If the GFCI detects a differential current between the supply and ground poles of the power source, it will trip, or open the circuit. If the circuit breaker detects a current greater than it's rating, it will trip. The test button can be used to simulate these conditions and pressing and holding the test button should cause the switches to open, or turn off. If the GFCI continues to trip, the system should be inspected for a fault before being used.

The standard control panel has the GCFI built into the control panel.

The IP65 Control Panel uses a power cord inline GFCI. Plug the male plug of the inline GFCI into a power source and plug the Control Panel into the female socket of the Inline GFCI.

When connecting to a GFCI equipped power outlet, the inline GFCI for the IP65 control panel is not needed.

LIM (Line Insulation Monitor)

The LIM protects the operator and persons in the water nearby from shock from the DC circuit of the tether. While the GFCI switches are part of the GFCI component and must be turned on to operate the control panel, the LIM switches are separate components and the LIM does not need to be turned on. The LIM switches include Reset and Test. When power is applied to the control panel, the LIM is active. The LIM operates on a principle similar to the GFCI and detects differential current. If the differential current exceeds a threshold, the LIM will trip. When the LIM trips, the yellow LIM Alarm LED will turn on. The LIM can be reset by pressing and holding the Reset button. The yellow LIM Alarm light should turn off. To test the LIM, press and hold the Test button. If the LIM continues to trip, the system should be inspected for a fault before being used.

The Test and Reset buttons must be held until the action occurs. This can take from several seconds up to a minute. The LIM will not automatically reset even if power is no longer applied. The LIM must be reset manually.

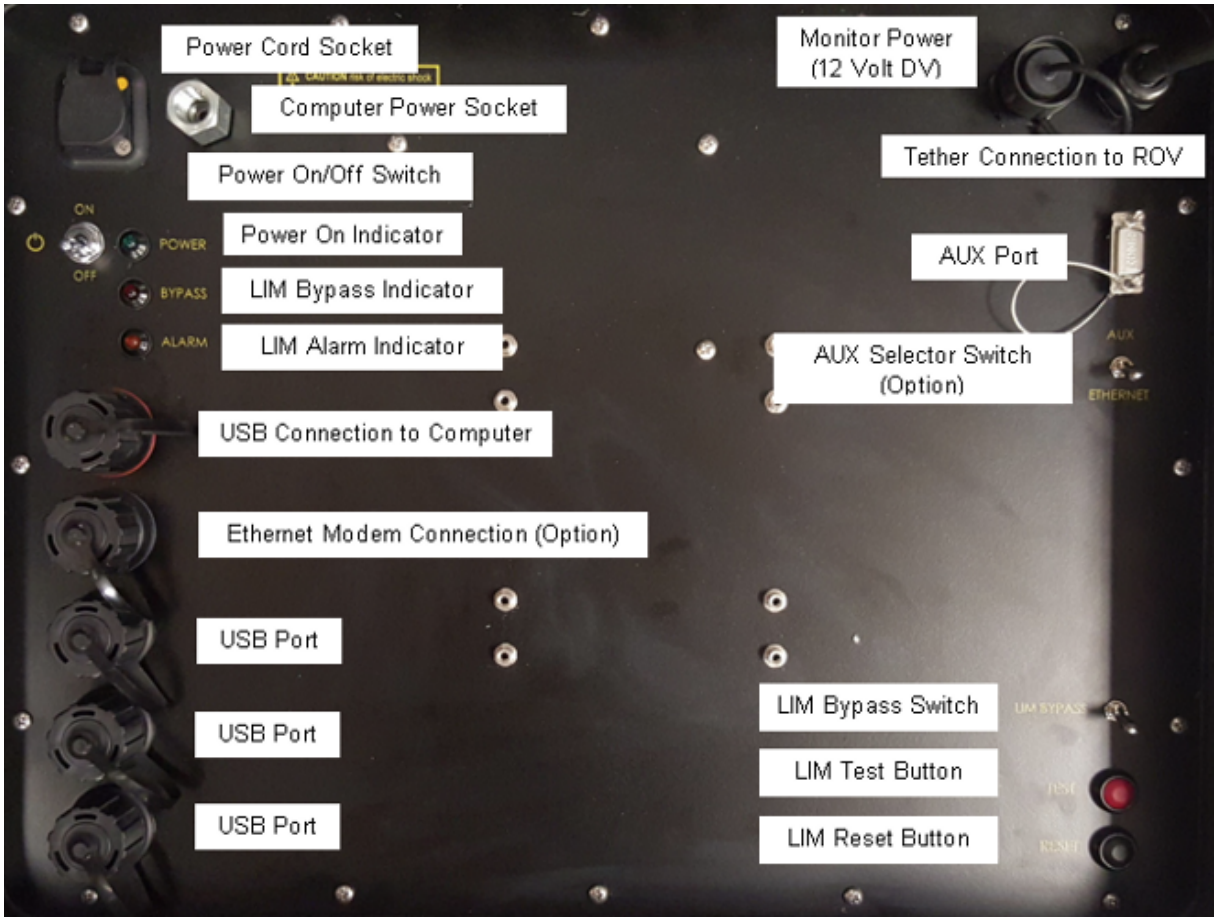
LIM Bypass

In some situations, the LIM may trip, but the system may in fact be safe to use. A common situation that may cause the LIM to trip is using an old tether that has some current leak at its connectors. The LIM is sensitive enough to detect this leak. If it is determined that the cause of the LIM tripping does not represent a potential hazard to the operator or people in the surrounding area, the LIM can be bypassed to continue operations. The LIM can be bypassed by engaging the LIM Bypass switch to the Bypass setting. The LIM Bypass switch is a locking switch and the stem of the switch must be pulled out to switch it. When the LIM is set in Bypass mode, the RED LIM Bypass LED will turn on indicating the system may be unsafe to operate.

DANGER Determining if the system is safe to operate in the LIM Bypass mode requires a trained and qualified technician. Do not operate the system in LIM Bypass mode unless you are trained and qualified and 100% certain that the situation is safe.

Switches and Connections

Control Panel Top



The IP65 control panel cables are twist locking connectors.

Connector	Installation	Removal
Power	Align the release tab with the rear of the panel, turn it slightly left (counter clockwise), insert the connector into its socket and then turn it back to the right (clockwise) and release the tab to secure it in place.	Lift up on the release tab, rotate the connector to the left (counter clockwise) and then lift the connector from its socket.
Monitor / USB / Ethernet	Align the pins and insert the connector into the socket. Turn the locking ring to the right (clockwise) until it clicks to secure it in place.	Turn the locking collar to the left (counter clockwise) and then lift the connector from its socket.

CAUTION The power cable and the monitor cable must be removed before closing the lid of the control panel.

The control panel includes the following switches:

SWITCH	LOCATION	FUNCTION
Power	Control panel top	Turns the control panel on.
LIM Test	Control panel top	Test the LIM by simulating a fault and triggering the alarm state.
LIM Reset	Control panel top	Reset the LIM after a test or a fault has been detected and the alarm state has been triggered.
LIM Bypass	Control panel rear	If the LIM alarm state has been triggered, the LIM can be bypassed by enabling this switch. **DANGER** If the LIM bypass switch is enabled, LIM protection is disabled. This situation can pose a risk to people handling the tether or in the water with the ROV. Do not use the LIM bypass switch unless you have examined the system to make sure it is safe, or are sure that people are not going to be exposed to a possible voltage leak in the tether or ROV.
AUX Port	Control	Switches the APIC circuit between the AUX Port and a dedicated accessory interface, such as an Ethernet connector,

Selector Switch (Optional)	panel rear	if one is included.

The control panel includes the following connections:

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CONNECTION	TYPE	FUNCTION
Power (100-240 Volts AC, 50, 60 Hz)	IEC male	Used to connect the control panel to a power source.
GFCI/Circuit Breaker Protected Power Outlets (2)	IEC female	Used to connect the computer and another device to the control panel to receive power.
Tether Whip (Specifications)	8 pin round female	Used to connect the control panel to the tether for power, communications, video and accessory support.
Monitor Power		Provides 12 Volts DC. Used to provide power to the monitor.
Analog Video Out	RCA female	Provides a composite video signal. Can be used to connect an analog video recording device.
USB PC	Type B female	Used to connect the control panel to the computer.
USB Accessory pass through (3)	Type A male	Can be used to connect USB devices to the computer via the control panel.
AUX Port (Specifications listed below)	DB-9 male	Provides access the APIC (Auxiliary Pair of Independent Conductors) in the tether. Can be used with ROV accessories that need to rely on the APIC for communications.
Ethernet (Optional)	RJ-45 female	Can be used to connect the control panel to the computer for Ethernet based ROV accessories.
BlueView Pole Mount (Optional)		Used to connect the BlueView Pole Mount system to the control panel.

AUX Port Specifications

PIN	FUNCTION
1	No connection
2	No connection
3	No connection
4	No connection
5	No connection
6	No connection
7	AUX + (Connects to tether pin 4 and ROV accessory port pin 4)
8	AUX - (Connects to tether pin 6 and ROV accessory port pin 6)
9	No Connection

Connector Type - DB-9 Male.

 The AUX Port provides access to the APIC. Some accessories use the AUX port directly and the topside device requires a female DB-9 connector. Some accessory interfaces can be built into the control panel. For control panels that have built-in accessory interfaces, there is a switch on the back of the control panel that determines whether the APIC is connected to the AUX port, or to the accessory interface inside the control panel. The switch must be set to the proper position depending upon whether you want to use an external device or the built-in accessory interface. Set the switch to AUX if you want to use an external accessory device on the topside. Set the switch to the correct setting for any built-in accessory device that you want to use. For built-in accessories, there is either another dedicated connector (to connect to the laptop), or the accessory might use USB (to connect to the laptop), in which case a separate connector is not necessary. See the instructions that come with each accessory for more information.

Set Up Help

See the Pre-dive Preparations section of the Quick Start Guide and Connections Summary for information on how to connect the ROV to the rest of the system.

Amrel IP65 Series Computers

The Amrel IP65 series computers have been set up with a "VideoRay" user account and there is no password assigned.

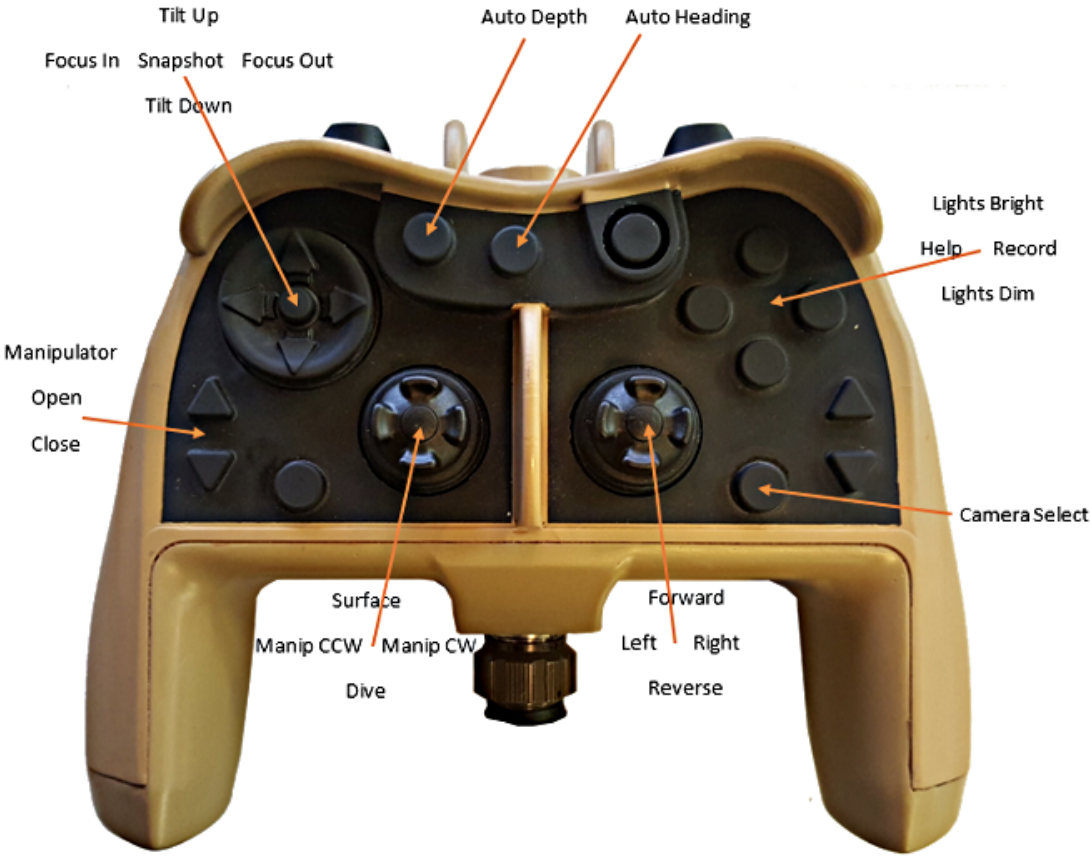
The mount that holds the computer to the control panel is designed to tilt to provide optimal viewing of the second monitor if one is available and to allow easier access to the side ports. To tilt the computer, lift it straight up and then pull it towards the operator. As it comes towards the operator, the back will start to drop. Continue pulling until the back rests on the control panel.

The Amrel uses specialized IP65 rated computer connections. These are shown in the following image:

The LAN, VGA and USB connectors are push on, and pull off. For removal, you must pull from the narrow barrel (with the white dot) on the connector to release the connector.

The power connector uses a twist lock connection.

IP65 Controller



Hand Controller Connection

CONNECTION	TYPE	FUNCTION
USB	Type A male cable connection	Used to connect the hand controller to a USB port on the control panel or the computer.