ROSS®

Flu-Tech
Fluid Control Specialists

บริษัท ฟลูเทค จำกัด
Flu-tech co.,ltd

# ElectroGuard® *Plus*

## Energy Isolation System – Electric, Pneumatic, Hydraulic


ROSS™
a global family

### Standardize on a New Level for Machine Energy Isolation

## ElectroGuard® *Plus*

The ROSS ElectroGuard® *Plus*, provides a new level of machine operator safety and can contribute to enhanced productivity. The flexibility and capabilities make it ideal in virtually any application where operators work within the machine. This system integrates world-class products to offer a system you can trust and the highest level of safety available.

The ElectroGuard® *Plus* system has the ability to isolate electrical, pneumatic, and hydraulic energy for a whole machine or by zone in a multi-zone machine system.

The ElectroGuard® *Plus* system takes signals from the individual Remote Lockout Stations (RLS) and performs the entire energy isolation procedure, including verification, after which a lock is applied by the operator or maintenance worker. This simple procedure eliminates the downtime that is normally wasted on traveling to and from the isolation devices and locking out every energy source on the machine (or in the zone). Of course, this time savings is realized when restarting as well - all of which makes for a rapid return on investment. Furthermore, the ability to control multiple zones separately provides the added benefit of not always having to shut down the entire machine which can also contribute to the rapid return on investment.


## ElectroGuard® *Plus* – A System Approach to Machine Energy Isolation

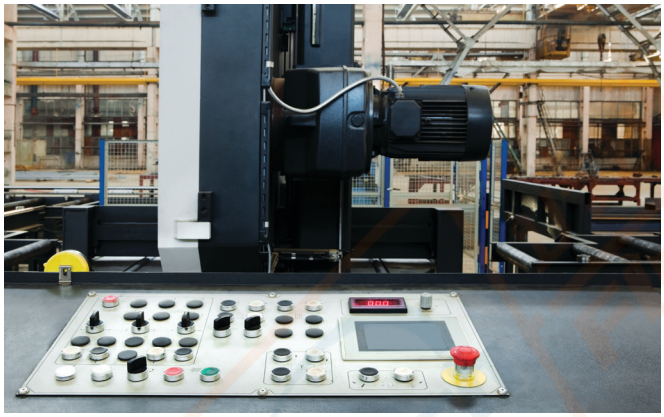
The ElectroGuard® *Plus* system sets a new standard for hazardous energy isolation by greatly easing the task of the machine operator or maintenance personnel to properly perform Lockout/Tagout procedures consistently. Which, in turn, can offer greater assurance of compliance along with the added value of improved productivity.

ElectroGuard® *Plus* systems use a modular approach for maximum scalability and flexibility. ElectroGuard® *Plus* systems include low-voltage remote lockout stations and modular control panels, factory-sealed and certified to Category 4/PL e (pending), with options for pneumatic and hydraulic isolation to provide the complete solution in a flexible, scalable, maintainable, and cost-effective system.

# *Why use an Energy Isolation System?*

## ElectroGuard® *Plus* provides many features to benefit your business:

- Helps reduce workplace injuries resulting from complicated Lockout/Tagout procedures
- A cost-effective solution to conform with OSHA requirements for control of hazardous energy
- Simplifies operator Lockout/Tagout procedures to help improve productivity
- Modular, pre-wired for quick installation
- Improves Safety by eliminating errors and omission of steps during complex lockout/tagout procedures
- Higher cycle life than mechanical disconnects, for reduced downtime



## With ElectroGuard® *Plus* you benefit from:

- Fewer lost time accidents
- Improved productivity
- A standard procedure throughout your facility
- Greater plant operation accuracy due to downtime communication
- Ease of specifying, purchasing, setup and maintenance

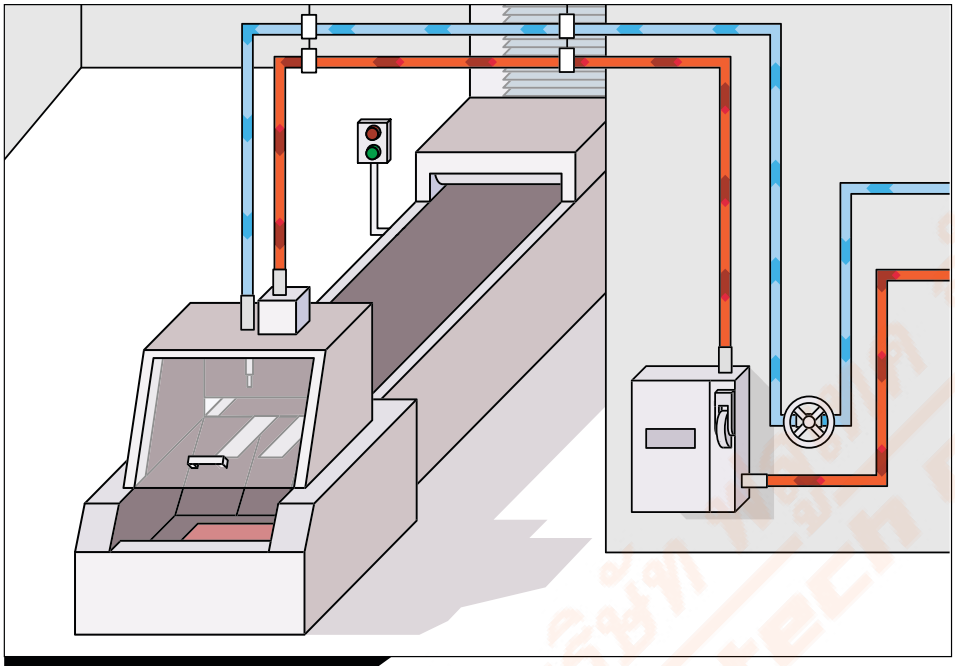
## ElectroGuard® *Plus* is ideal for applications where machines have:

- Multiple access locations requiring operator travel time to the disconnecting devices
- Frequent interruptions due to jams, lubrication, etc., causing loss of productivity during the time of proper isolation
- Multiple sources of energy requiring a complex Lockout/Tagout procedure
- Maintenance personnel operating electrical disconnects within the hazardous zone

| FEATURES | BENEFITS |
|---|---|
| **Safety** | |
| ■ System approach to simplify hazardous energy isolation procedures | ➜ When the energy sources are controlled by the ElectroGuard® *Plus* system, it enhances safety by eliminating the need for locking multiple locations, helping reduce the chances of an energy source being overlooked |
| ■ Remote Lockout Stations (RLS) | ➜ The operator switches a low power device, without the flash hazard associated with typical electrical disconnect switches |
| ■ "System Isolated" light on RLS | ➜ The "System Isolated" light is a positive indication of the ElectroGuard® *Plus* sources' zero energy state, notifying the operator it is safe to enter the machine |
| ■ Certified to ISO 13849-1 Category 4, PL e (pending) | ➜ Highest functional safety performance possible to help improve workplace safety |
| ■ Redundant, independent, self monitoring, functional design | ➜ ElectroGuard® *Plus* faults are detected in time to prevent loss of the safety function |
| ■ Grounding contactor | ➜ Safety features to guard against capacitive coupling, inertial regeneration or other sources that may cause residual voltage |
| ■ Ground loss monitor | ➜ Additional safety features to detect the loss of system ground |
| ■ Electrical interlock devices on isolation contactors | ➜ Multiple technologies used for fault protection |
| ■ Factory-sealed panels | ➜ Tamper evident seals for system integrity |
| ■ ROSS CONTROLS® energy isolation valves<br>DM² Pneumatic<br>HBB Hydraulic | ➜ Maintain system integrity with control-reliable pneumatic and hydraulic valve isolation systems |
| ■ Conformity to UL standards (reference page 3 for complete industry standards list) | ➜ Pre-engineered conformity to meet industry standards |
| **Productivity** | |
| ■ Single Point Lockout/Tagout | ➜ Isolate electrical, pneumatic, and hydraulic energy in a single action, reducing the time to put the machine into a safe mode |
| ■ Low-voltage Remote Lockout Station | ➜ Easy to operate device |
| ■ Multiple Remote Lockout Stations (RLS) | ➜ Allows placement of lockout device near every access point |
| ■ Standardized System | ➜ Similar lockout/tagout procedure between machines, throughout the facility |
| ■ Status Communication | ➜ Use to measure # cycles, cycle time, location of lockout/tagout occurrences |
| ■ Multi-Zone Control | ➜ Increase productivity by only locking out the appropriate zone where access is needed instead of the whole machine |
| **Maintenance** | |
| ■ Electrical isolation using power contactors | ➜ Dramatically increased cycle life compared with mechanical disconnects |
| ■ Modular design | ➜ Ease of trouble-shooting to the panel/module level |
| ■ Removable, factory sealed panels | ➜ Quick replacement of failed panels |
| ■ System approach | ➜ Common look and feel to each system in the facility |
| ■ Safety PLC-based system with HMI for advanced troubleshooting | ➜ Ease of troubleshooting |
| **Installation** | |
| ■ Low voltage Remote Lockout Stations | ➜ Low install cost |
| ■ Compact size Remote Lockout Station | ➜ Easy to locate on machine |
| ■ Expandable | ➜ Simple to add more options after installation |

## How does ElectroGuard® *Plus* Integrate into your Machine?

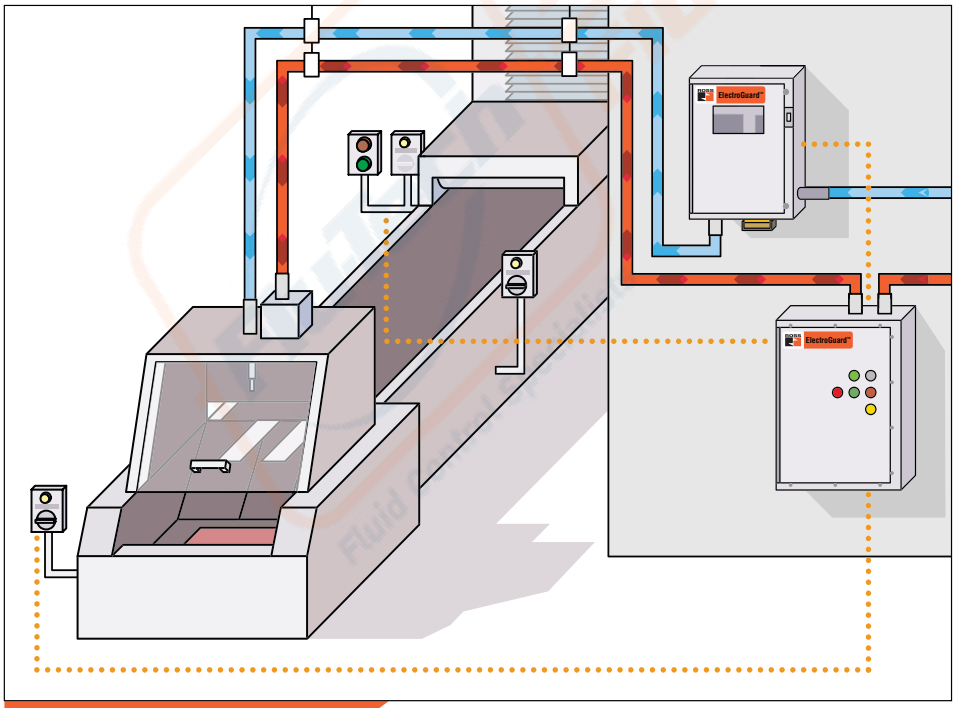
***Here's an example of a typical machine having energy isolation devices located on a wall, close to the machine, and a single start/stop station.***



**Before ElectroGuard® *Plus***

When a process jam occurs the operator must travel around between the start/stop station and the energy isolation devices (LOTO) and the jam to get production running again. The clearing of the jam is only a small portion of the production down time; the remaining time is spent on the proper LOTO procedure. Operator travel time and manually locking of two isolation devices is a large portion of the total recovery time.

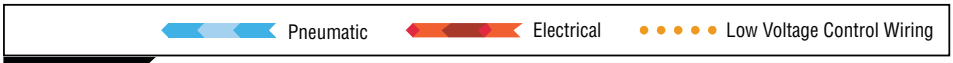
***Time: 70 seconds.***




**With ElectroGuard® *Plus***

The ElectroGuard® *Plus* system is installed in place of the manual isolation devices, while multiple Remote Lockout Stations are installed near the machine access locations. With this simplified LOTO procedure and close proximity of the Remote Lockout Stations, the clearing of a jam is now the largest percentage of the downtime.

***Time: 35 seconds.***




**Legend**

## Modular by Design

***ElectroGuard® Plus Main Control Panel (MCP)***

***Electrical Isolation Module***
*Power Contactors for isolation and grounding.*

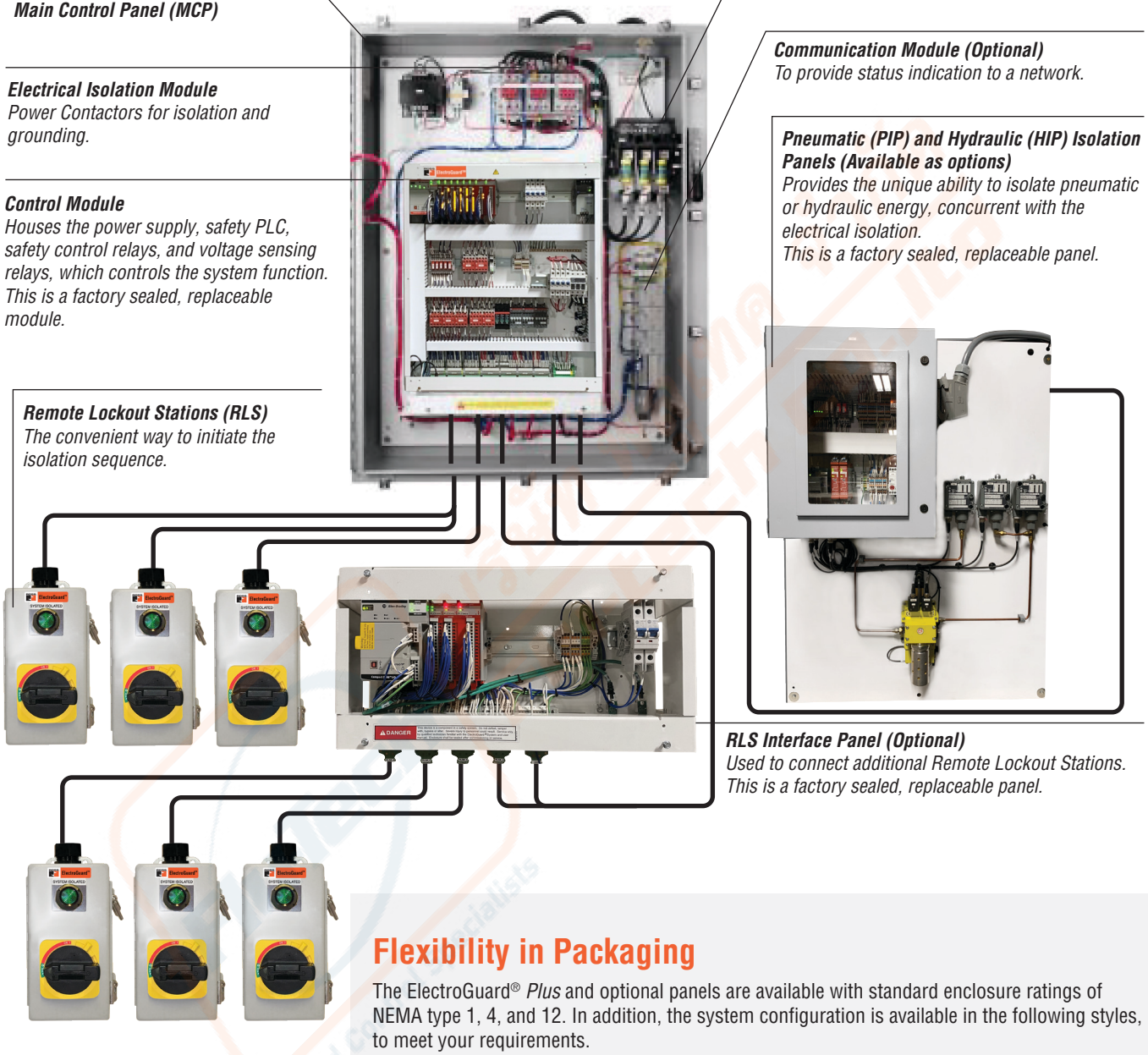
***Control Module***
*Houses the power supply, safety PLC, safety control relays, and voltage sensing relays, which controls the system function. This is a factory sealed, replaceable module.*

***Remote Lockout Stations (RLS)***
*The convenient way to initiate the isolation sequence.*

***Branch Circuit Protection (Optional)***
*Application-rated branch circuit protection device.*

***Communication Module (Optional)***
*To provide status indication to a network.*

***Pneumatic (PIP) and Hydraulic (HIP) Isolation Panels (Available as options)***
*Provides the unique ability to isolate pneumatic or hydraulic energy, concurrent with the electrical isolation.*
*This is a factory sealed, replaceable panel.*



***RLS Interface Panel (Optional)***
*Used to connect additional Remote Lockout Stations.*
*This is a factory sealed, replaceable panel.*

## Flexibility in Packaging

The ElectroGuard® *Plus* and optional panels are available with standard enclosure ratings of NEMA type 1, 4, and 12. In addition, the system configuration is available in the following styles, to meet your requirements.

- Standard ElectroGuard® *Plus* configuration as a wall mounted or floor standing panel
- Motor Control Center style enclosure, available with power bus structure

## Ease of Maintenance

The ElectroGuard® *Plus* modular design allows for trouble-shooting to a factory sealed panel, and replacement of the failed panel.

Flexibility for "Behind the Seal" maintenance includes the following:

- Return to repair services
- Purchase on-site start-up services from ROSS CONTROLS®

# ElectroGuard® *Plus* – Unsurpassed Advantages

**The main goal of the ElectroGuard® *Plus* Energy Isolation System is to optimize Lockout & Tagout procedures in order to enhance safety and productivity.**

- All ElectroGuard® *Plus* systems utilize an AB Compact Guardlogix 5380 Safety PLC with 5069 Safety IO and certified Safety Instructions that are used in ROSS Controls' Add-On Instructions (AOI's). The AOI's are locked and uneditable by users of the ElectroGuard® *Plus* system.

- Provides simple, and quickly accessible lockout devices wherever needed, reducing the tendency of machine operators to take an unsafe shortcut
- When the energy sources are controlled by the ElectroGuard® *Plus* system, it provides a single point lockout for multiple sources of energy, helping reduce the chances of an energy source being overlooked
- Third party certified conformity to the highest safety category - when ElectroGuard® *Plus* faults occur the safety function is always performed (pending certification)
- Modular for quick and easy maintenance
- Factory sealed panels for system integrity
- Establish uniform energy isolation process for all stations & all sites
- HMI module for advanced, rapid troubleshooting

## Single-zone ElectroGuard® *Plus* System Overview

Single-zone ElectroGuard® *Plus* systems can isolate up to six energy sources (any combination of electrical, pneumatic, & hydraulic), and can utilize as many as thirteen remote lockout stations (RLS).

Potential capacity could be:

- 1 zone
- Up to 6 RLS Stations or up to 13 with external RLS Interface Panel (RIP)
- Controls up to 6 Energy Sources (combination of EIP, PIP, & HIP)

## Single-zone ElectroGuard® *Plus* Systems include:

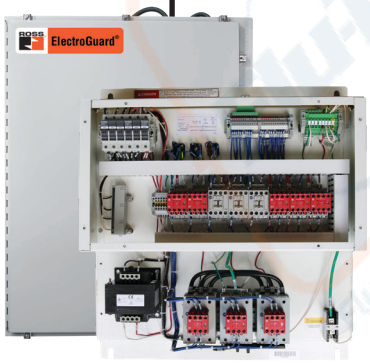
| | |
|---|---|
| ■ Remote Lockout Station (RLS) | Up to 6 or 13 with external RLS Interface Panel (RIP) |
| ■ Main Control Panel (MCP) | Free-standing MCC type or wall-mount cabinet |
| ■ RLS Interface Panel (RIP) | Included when more than 6 RLS are needed |
| ■ Output Control Module (OCM) | Internal to MCP, controls electrical, pneumatic & hydraulic panels - controls up to a combination of 6 EIP, PIP, HIP. IO can be used to measure # of cycles, cycle time, & location of lockout/tagout occurrences. |
| ■ Electrical Isolation Panel (EIP) | 2 isolation contactors & 1 grounding contactor & voltage monitoring relays |
| ■ Pneumatic Isolation Panel (PIP) | With ROSS DM²® Pneumatic Safe Exhaust valve & monitoring pressure switches |
| ■ Hydraulic Isolation Panel (HIP) | With ROSS HBB Hydraulic Block & Bleed valve & monitoring pressure switches |


***Main Control Panel (MCP)***
*(Wall Mount style shown)*

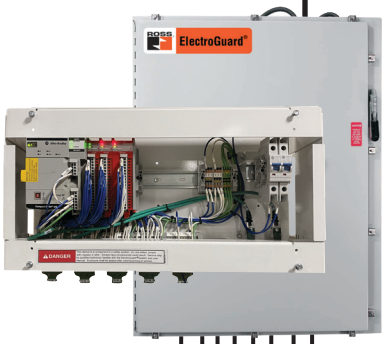
***Pneumatic Isolation Panel (PIP)***

***Hydraulic Isolation Panel (HIP)***

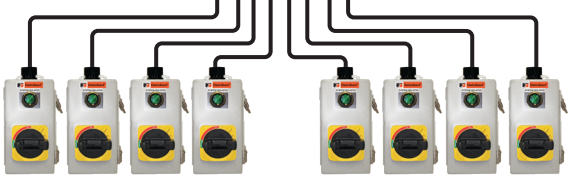
***Remote Lockout Stations (RLS)***




***Electrical Isolation Panel (EIP)***




***RLS Interface Panel (RIP)***



***Remote Lockout Stations (RLS)***

## Multi-Zone ElectroGuard® *Plus* System Overview

**(8 Zones, 69 Remote Lockout Stations, and 32 Energy Sources)**

The ElectroGuard® *Plus* main Control Panel can be extended to include an 8 port or 16 port Ethernet Switch to expand system capacity.

Potential capacity could be:

- 8 zones (Base + 7 remote)
- 69 RLS Stations (Base + 7 RIP)
- 32 Energy Sources (Base + 8 OCP)

## Multi-zone ElectroGuard® *Plus* Systems include Base System Capabilities and the following:

| | |
|---|---|
| ■ 8 or 16 Port Ethernet Switch | Up to 8 zones of control - Base zone + 7 remote |
| ■ Remote Lockout Station (RLS) | Rotary or trapped-key actuator - as many as 69 stations |
| ■ RLS Interface Panel (RIP) | Allows connection of 8 RLS per RIP |
| ■ Main Control Panel (MCP) | Free-standing MCC type or wall-mount cabinet<br>MCP includes one Output Control Module with IO that can be used to measure # of cycles, cycle time, & location of lockout/tagout occurrences as well as to control up to 6 energy sources. Could also include an Electrical Isolation Module or Motor Isolation Module. |
| ■ Output Control Panel OCP) | One OCP required per zone of control - has IO capability to control a combination of up to 4 energy sources each through EIP, PIP, HIP, & MIP panels. IO can be used to measure # of cycles, cycle time, & location of lockout/tagout occurrences. |
| ■ Electrical Isolation Panel (EIP) | 2 isolation contactors & 1 grounding contactor & voltage monitoring relays |
| ■ Pneumatic Isolation Panel (PIP) | With ROSS DM²® Pneumatic Safe Exhaust valve & monitoring pressure switches |
| ■ Hydraulic Isolation Panel (HIP) | With ROSS HBB Hydraulic Block & Bleed valve & monitoring pressure |
| ■ Motor Isolation Panel (MIP) | 1 Isolation contactor & 1 grounding contactor & voltage monitoring relays - to be used with a variable frequency drive with Safe-Torque-Off (STO) |

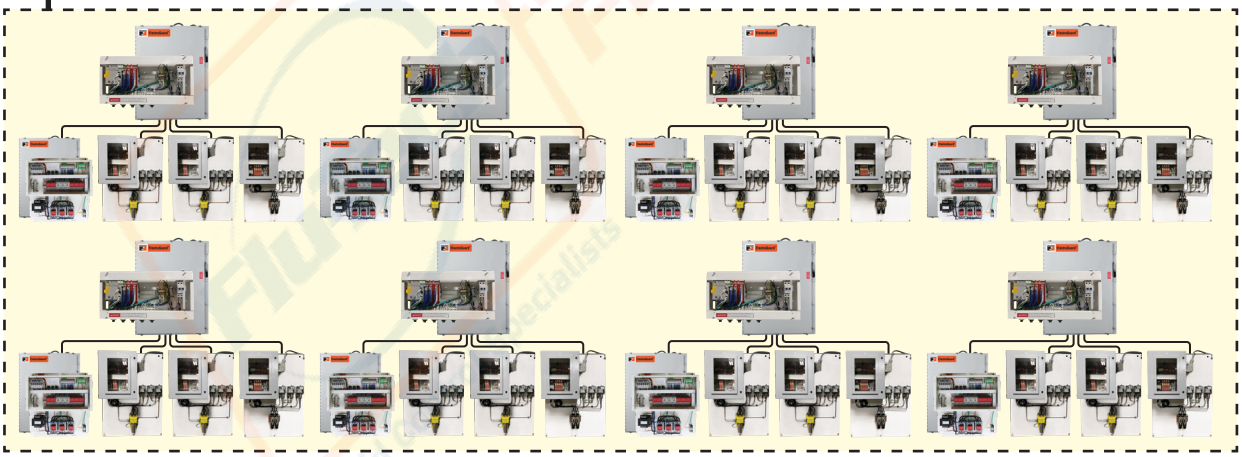
***Main Control Panel (MCP)***
*(MCP shown is a free standing, MCC-type enclosure.)*

***Electrical Isolation Panel (EIP)***

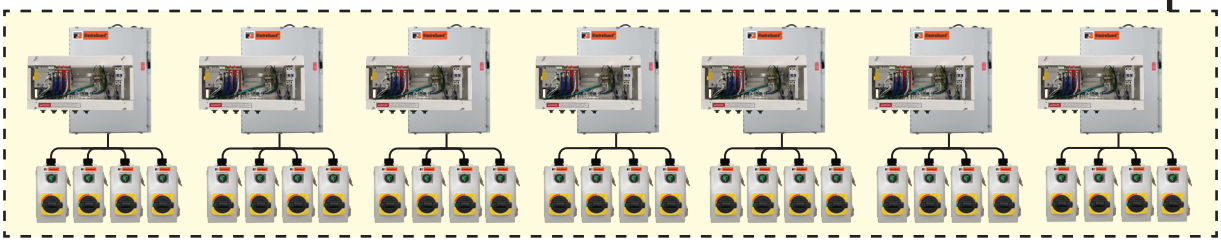
***Pneumatic Isolation Panel (PIP)***

***Pneumatic Isolation Panel (PIP)***

***Hydraulic Isolation Panel (HIP)***



***Multiple Output Control Panels (OCP)***
*For controlling multiple energy sources over multiple zones.*



***Additional RLS Interface Panels (RIP)***
*For multiple Remote Lockout Stations (RLS).*

# ElectroGuard® *Plus*
## Energy Isolation System for Single- or Multi-Zone Machines

### Branch Circuit Protection

Application Rated

- None – incoming line lugs only
- Fusible disconnect
- Circuit Breaker

### Remote Lockout Station

- Provision for top or bottom conduit entry
- Rotary lockable disconnect or trapped key options
- White or green isolation status indicator light
- Multiple enclosure materials/ IP ratings available

### Selectable Time Delay

Provision to incorporate a machine cycle stop with the actuation of the Remote Lockout Station

- Adjustable 1 to 30 seconds

### Pneumatic Isolation Module

- Isolates the pneumatic energy
- 30 to 120 psig (2 to 8 bar)
- 3/4" or 1" valve port

### Cover Mounted Metering

- Single- or three-phase voltmeter
- Single- or three-phase ammeter

### Hydraulic Isolation Module

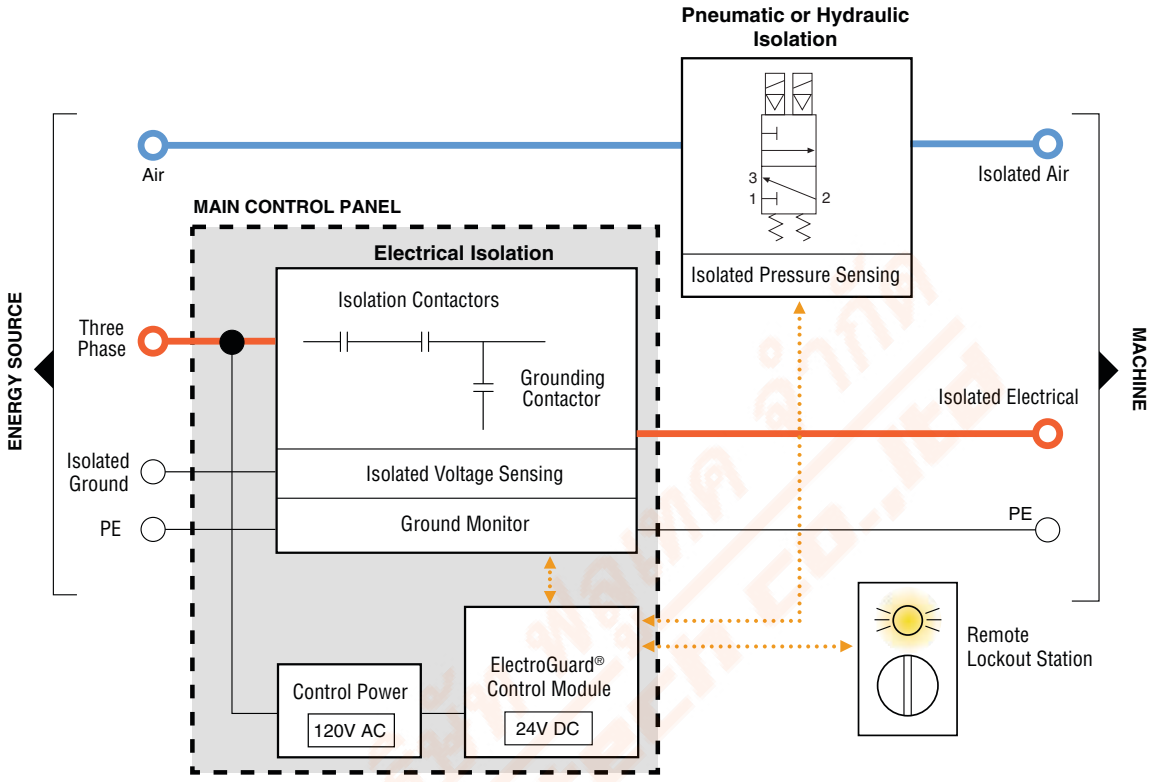
- Isolates the hydraulic energy
- Up to 5000 psig (344 bar)
- 1" valve port

### Safety Interface Signals

Provision to incorporate a machine cycle stop with the actuation of the Remote Lockout Station

- Two machine status inputs
- Two ElectroGuard® *Plus* status outputs

# Operation




The ElectroGuard® *Plus* system is installed between the energy sources and the machine.

The Control Module controls and verifies the ElectroGuard® *Plus* system functions. Every function is commanded and monitored for proper completion, and is comprised of the safety PLC, electromechanical devices, and safety control relays. The Control Module sends and receives signals from the Electrical, Pneumatic, Hydraulic, and Motor Isolation modules and panels as well as the Remote Lockout Stations.

If the ElectroGuard® *Plus* Main Control Panel ground is broken, or a fault occurs within the isolation system, the ElectroGuard® *Plus* system will isolate all energy sources. Under a fault or shutdown condition of the ElectroGuard® *Plus* system, the "system isolated" light will not be illuminated. No light means no entry.

The ElectroGuard® *Plus* system is powered by a 120V AC control transformer in the Main Control Panel and 24V DC power supply within the Control Module.

## Sequence of Isolation Operation

1. The operator initiates the isolation sequence by turning the handle on the Remote Lockout Station from the ON to OFF position.
2. The control module responds by commanding all isolation modules & panels - electrical, pneumatic, and hydraulic - to isolate and verify isolation.
   - The Electrical Isolation Module opens the series contactors, the voltage sense circuit monitors the isolated voltage, and, when safe, the grounding contactor connects the isolated electrical lines to the isolated ground. Electrical isolation is completed and verified by the Control Module.
   - The Motor Isolation Module opens the contactor (in series with a VFD with Safe Torque Off functionality), the voltage sense circuit monitors the isolated voltage, and, when safe, the grounding contactor connects the isolated electrical lines to the isolated ground. Electrical isolation is completed and verified by the Control Module.
   - The Pneumatic and Hydraulic Isolation Panels switch off the pneumatic and hydraulic valves, and redundant pressure sensors verify isolation has been completed. Pneumatic and hydraulic isolation is completed and verified by the Pneumatic and Hydraulic Control Panels.
3. After successful isolation, the Control Module illuminates the operator's Remote Lockout Station "system isolated" light.
4. The operator then applies a LOTO lock to the Remote Lockout Station handle, and it is safe to work on the machine.

***This entire sequence takes less than 30 seconds.***

## ElectroGuard® *Plus* – Unmatched in the Industry

| | |
|---|---|
| **Voltage Range** | 208 to 600V AC, 50/60 Hz |
| **Rated Electrical Isolation** | Current Range – 43 to 1250 A |
| **Rated Pneumatic Isolation** | Pressure Range – 30 to 120 psig (2 to 8 bar) |
| **Rated Hydraulic Isolation** | Pressure Range – 500 to 5000 psig (35 to 344 bar) |
| **Remote Lockout Station** | Low Voltage 24V DC, supplied from ElectroGuard® *Plus* Main Control Panel |
| **Expansion Module** | Low Voltage 24V DC, supplied from ElectroGuard® *Plus* Main Control Panel |
| **Enclosure Ratings** | NEMA Type 1, 4, or 12 |
| **Enclosure Styles** | Wall-mount or Free-standing MCC-style Enclosure |

### Conformity to Industry Standards

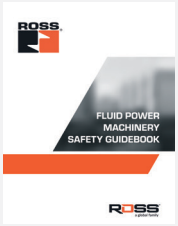
- UL508A with cULus listing (pending)
- Certified to ISO 13849-1 Category 4, PL e (pending)
- Designed to conform to OSHA for control of hazardous energy

## PNEUMATIC & HYDRAULIC SAFETY PRODUCTS SELECTION TOOL

**ROSS offers product selection and configuration tools designed to guide you choose and configure the right safety pneumatic or hydraulic solution for your application.**

**Selection Category include:** Energy Isolation, Safety Exhaust, Safe Cylinder Return, Control and Stop, Position/Load Holding, Soft Start, Hazardous Locations, Broken Hose Protection, Block & Bleed and Block & Stop Valve Systems.

**Technical Tools and Support -** From ROSS' website, you have the ability to access and download 2D and 3D product data that is compatible with today's CAD modeling packages. Technical documentation, certifications, and other product related information is available along with the highest level of customer service and support to answer your questions and needs.




## SAFETY INFORMATION

### Fluid Power Machinery Guidebook

**Overview of topics related to the safe application of fluid power in industrial applications –** Outlines the safety requirements for implementing Fluid Power safety solutions. This includes a review of standards requirements, risk assessment methods and risk reduction measures along with an overview of the safety design and implementation process.

TOTAL MACHINE SAFETY™
ROSS CONTROLS

## SAFETY TRAINING PROGRAM

Total Machine Safety is the first fully-integrated electrical and fluid power machine safeguarding training program.

A comprehensive approach evaluating and designing safety controls systems is critical in the overall success of a safety program. Discussion of global and local standards, risk assessment, and safety control system requirements is bolstered by the inclusion of pneumatic and hydraulic risks and risk reduction.

**Visit ROSS' website at www.rosscontrols.com for more information and scheduled seminars.**

## ROSS SAFETY PRODUCT DATA for SISTEMA LIBRARY USERS

Safety product data library is designed for use with the innovative new Safety Integrity Software Tool for the Evaluation of Machine Applications (SISTEMA). Developed by the Institute for Occupational Safety and Health of the German Social Accident Insurance (IFA, formerly known as the BGIA), SISTEMA is available to download for no charge at the IFA web site. This software tool is expected to prove invaluable to system designers because of its potential time savings and safety implications. The free software tool and data library will help ensure compliance with the EN ISO 13849-1:2015 standard.

The ROSS DM$^{2®}$ Series safety products meet all global requirements for machine safety and are commonly used for exhausting the downstream air to help meet stop-time requirements in machine guarding applications.

**To download a copy of ROSS' Safety Product Data for the SISTEMA Library, visit the Safety Industry page (SISTEMA Library with ROSS' Safety Products) at www.rosscontrols.com.**