George A. Shrokman Jr.
Specializing in Megadoor ® Service Training

Dual Motor Control Panel Information

The System 1000 Dual Motor control panel is PLC based. The PLC control system keeps adjusting the door automatically as long as the limit switch plungers and motor brake operate properly. The system makes up for small lifting belt stretch, and stopping short of the floor due to heavy wind loading.

Basic Design Features:

1) The condition of each electrical component can be monitored by looking at “Lights” located on the face of the PLC and Relays.
   A) The PLC provides lights for easy troubleshooting. You can be standing on the floor and diagnose where you must search for a problem.
      1) Lights 1 thru 6 correspond to limits LS1 thru LS6.
      2) Each pushbutton and safety device is wired to a separate input.
   B) Each Crank Limit is wired to a Pilot Light Relay that has Push to Test Capabilities.
      1) The switches are mounted next to the PLC.
      2) This allows you to check the crank limit located up at the motor when you are standing on the floor at the control panel.
   C) The reversing relay has a pilot light indicator that is on when the reversing edge system is operating properly.
2) The PLC program does not allow safety systems to be bypassed.
   A) PLC monitors changes, and when there is a problem the system “Shuts Down”.
3) Manual Motor Protectors are provided to automatically monitor motor conditions.
   A) Protectors eliminate 6 fuses, and provide phase monitoring for EACH motor.
4) Maintenance Mode for door service.
   A) Provides a safe and easy way for maintenance personnel to operate each motor separately.
5) Because each limit is wired to an input, the PLC program can provide the following.
   A) Provide two slope timer set points.
   B) Automatically close the door completely to the fully closed position when the door is under extreme wind load.

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Component Features

Enclosure

The standard steel enclosure meets the following Industry standards:

NEMA Type 4, 12, & 13
UL Listed Type 4 & 12
CSA Type 4 & 12
IEC 60529 IP 66

The standard enclosure is constructed of 0.075" carbon steel. Seams are continuously welded and ground smooth. There is a Flange through collar around all sides of the door opening, with an Oil-resistant gasket. Enclosures are furnished with mounting holes in the back of the enclosure, and the mounting hardware includes sealing washers and hole plug to keep the Industry Standard Rating. The finish is ANSI-61 gray urethane polyester power coating inside and out over phosphatized surfaces.

Stainless Steel and Fiberglass Enclosures are also available. NEMA Explosion Hazardous Area enclosures are also available.

Disconnect Switch

The standard system is provided with a door mounted rotary disconnect. An OPTIONAL flange mounted disconnect is available.

Each Disconnect Features:

Nema 4 /4x rating
Padlocking Capability
Door Interlocks in ON and OFF position.
Separate action required to release door in "off" position.
Interlock can be defeated in the "on" position by using a tool.

Each disconnect is provided with 3 (qty) Class J Fuses. Fuse sizes are coordinated with the Manual Motor Protectors

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Fusing and Motor Protection

This Dual Motor System uses Coordinated Fusing and Motor Protectors to provide motor protection, as well as safety to the user. Manual Motor Protectors are used in place of fuses on the two drive motors. When fuses are used, a single fuse can go bad and create potential motor failure. Not only do we safe room by eliminating 6 fuses, if either protector detects a fault the system will shut down. You cannot mask problems by installing a bigger fuse.

Manual Motor Protectors provide the following features:

- # Class 10, ambient compensated overload relay
- # Single phase sensitivity
- # Instantaneous magnetic trip
- # Trip test mechanism
- # Provisions for padlocking in the OFF position
- # Touch safe terminals

Because of the harsh environments the doors are located in, the Dual Motor System utilizes the maximum fuse ratings allowed per NEC and CSA. This is very important in extremely cold climates, and under heavy wind load conditions.

The control transformers have circuit breaker protection on both the primary and secondary sides.

Phase and Motor Rotation Protection

It is very important that the correct phasing is applied to the motors. Many times the building phasing gets changed, and there is a potential of the motors operating backwards, or not at all. A thee phase monitor is provided to detect proper phasing.

Dual protection is provided for Phase Loss. The Phase Monitor detects phase loss, as well as low voltage. The Manual Motor Protectors also monitor phase loss.

The Phase Monitor and Manual Motor Protectors are wired in series in the “System On” circuit.

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Contactors

IEC grade motor contactors are used. Contactors are sized per motor and voltage application, and are protected by the Manual Motor Protectors.

The system is designed to prevent the contactors from being manually pressed. If a contactor is pressed manually, the PLC will shut the system down. A “Maintenance Mode” system is provided for special movement of the door. Please see the section “Maintenance Mode” for more information.

PLC and Relays

A PLC is used to provide the base logic. When accessories are required, isolation relays are provided to protect the outputs.

Details of the PLC operation are provided later on in this document.

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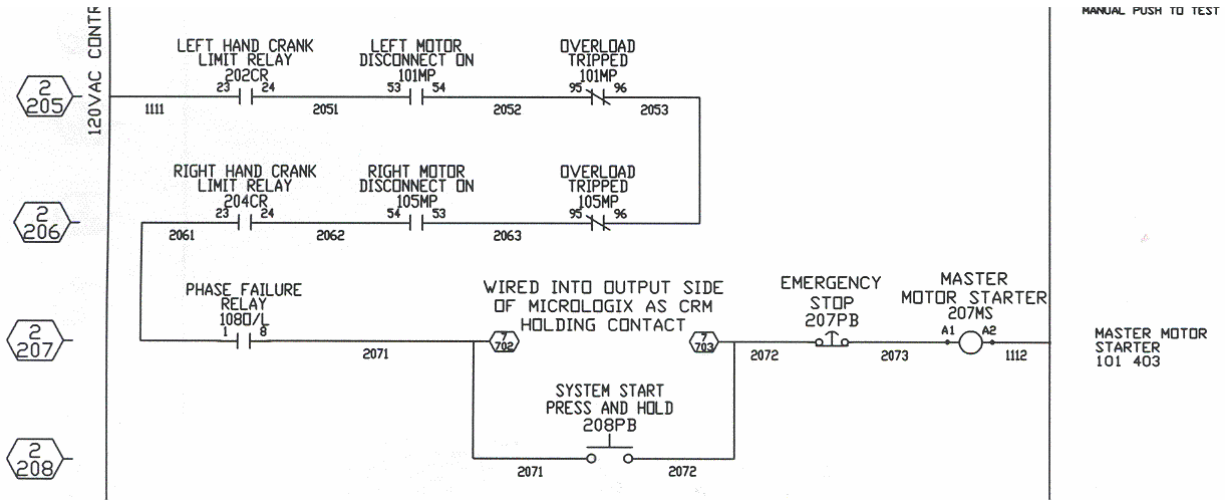
System Operating Features

System Start Button

The system cannot be started until certain safety measures have been taken.



1. The left crank limit arm must be stored.
2. The right crank limit arm must be stored.
3. The left motor overload must be enabled.
4. The right motor overload must be enabled.
5. The right motor control panel disconnect must be on.
6. The left motor control panel disconnect must be on.
7. The phase failure relay must be receiving proper 3 phase input power.
8. The PLC program must be receiving the proper input information.
9. The Emergency STOP button must be in the operate position.

When all of these conditions are met, the Master Motor Starter 207MS will power on when the System Start 208PB is pressed.

The failure of ANY of these components will cause the Master Starter 207MS to turn off.

Note that is any of the motor contactors are ‘Manually Pressed” the PLC will automatically turn the system off.

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Note: For Shrokman Designed Control Systems Only

System ON Light

A System On light 806LT has been provided to indicate that the system has been properly enabled. If the light is out there is a problem in the Master Relay circuit.

Once the system light is on, the door is ready to operate.

Open – Close – Stop Button Operation

Momentary pressure on the Open or Close button sends the door to the fully open position. Pressing the Stop button at any time stops the door in any position.

Reversing Door Bottom

The reversing door bottom edge is in operation when the door is closing. If the bottom edge strikes an object on the way down, an electric pulse from the edge stops and reverses the door to the fully open position. If any component in the reversing edge system fails, the door will run to the fully open position and remain there. The system is designed for temporary operation with a failed edge by removing the Reversing Edge Relay 310CR from the socket. When removed, the PLC changes the sequence of operations, and the Close button must be held in at all times for the door to run closed. Once the edge system is repaired, the relay may be plugged in and the system will operate properly.

Slope Timer

Internal to the PLC, the slope timer is used to indicate when the bottom beam is out of level. This internal timer only allows one motor to run 1 ½ seconds longer than the other before shutting down. When the timer shuts the door off, the Slope Timer Pilot Light 508PBPLT light comes on. This is a combination light and pushbutton unit, and must be pressed to reset the system.

This light does not necessarily indicate a problem with the system. It's primary purpose is to prevent problems before they happen. The number one cause of Slope Timer faults is bent or dirty limit box plungers. The limit switches rely on properly operating plungers to quickly operate.

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Maintenance Mode

On the back panel of the control panel are two selector switches for Maintenance Mode Operation. The left selector switch enables the Maintenance Mode, and the right selector selects which motor to run.

Part of the PLC safety system is a provision that shuts the system down when a motor contactor is pressed by hand. If the bottom beam gets out of level, you CANNOT manually press a motor contactor to level it out. Some versions of the PLC programs totally disable the door when the contactors are pressed by hand. That is why the Maintenance Mode selector switches have been provided.

To operate the door in Maintenance Mode, turn the Maintenance Mode selector switch to “ON”. When this switch is on, you must PRESS AND HOLD the Open or Close button to move the door. There is an internal timer that only allows the motor to run 3 seconds at a time. After 3 seconds, the motors turn off, you must release the button and press it again for the motors to run another 3 seconds.

To level the bottom beam, just turn the “Spring to Center” motor selector switch to the left or right to operate the appropriate motor. Only the selected motor will run when the selector switch is held. Each motor will only run for 3 seconds, before you have to release the button and press it again.

The maintenance mode selector is used during installation to run individual belts up and down. It is also used to correct out of level bottom beams due to bad or sticky limit plungers, or pinched guide rails.

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