

Claddagh Controls, Inc.

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Escalator Controls

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1.0 Summary

1.1 The modern escalator controller consist of several safety devices to ensure safe operation. The Claddagh Controls controller incorporates the use of a micro-processor programmable control with relay logic. This combination of features are versatile and 'mechanic user friendly'. The programmable modules are pluggable and have LED status indication for all inputs and outputs.

2.0 Missing Step and Up Reversal Monitor

2.1 Two (2) inductive proximity sensors are installed to sense the passing of each step. Each sensor in combination will produce a quadrature signal. This signal is use to detect the direction of the escalator and the presence of each step. If while the escalator is running up and a reversal is detected, the escalator will shutdown and sound a alarm. If a step is missing the escalator will shutdown before the missing step is exposed and will sound a alarm.

3.0 Handrail / Step Chain Speed Monitor

3.1 Three (3) hall-effect speed sensors are installed. One (1) speed sensor is installed on the step chain and the other two (2) speed sensors for each handrail. If a speed deviation of 15% or greater is detected the warning alarm will sound and if the speed error continues for greater than two (2) seconds, the escalator will shutdown.

4.0 Start Operation of the Escalator

4.1 In order to start the escalator, no faults can be present. The Start Up / Down keyed switch must be in the 'off' position before the Start button is pressed. The escalator will start when the Start button is pressed and the Start Up or Start Down keyed is selected.

5.0 Fault Monitor

5.1 The Fault Monitor is connected to the programmable controller via RS-485 communication. The faults are display on a LCD display and can be scrolled for viewing. If and when a fault occurs, the fault is logged on the Fault Monitor. The information is retained in battery-backed memory with date and time of the occurrence.

6.0 Start Permission

6.1 The escalator must use a minimum of two (2) contactors to run the escalator motor and brake, typically 'P', 'U' and 'D' contactors. Before the escalator can be started, a test must be made to ensure that the contactors have returned to their fully de-energized position.

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7.0 Manually Reset Faults

7.1 There are several safety related switches or devices that are required to be reset manually as per ASME A17.1 and RS-18 code. If and when a safety device has tripped the escalator will shutdown. Cycling the power to the escalator will not clear the fault. The only way that the escalator can be restarted is to clear the faulted device by pressing the 'Reset' button on the controller.

7.2 Device faults that must be reset manually:

- Slack / Broken Chain
- Up Reversal
- Step Level
- Handrail Inlet
- Handrail / Step Chain Speed Monitor
- Missing Step

8.0 GE-FANUC 90-30 PLC Programmable Controller

8.1 The GE-FANUC 90-30 PLC consists of several modules. The CPU for the 90-30 is based on the Intel 386EX processor. LED's indicate power is okay, the CPU self-diagnostic watch-dog is functioning properly and the outputs are enabled. The CPU uses flash-memory for program memory retention.

8.2 A 5-slot chassis is provide to mount the power supply & I/O modules.

8.3 Two types of modules are used:

8.3.1 Input Module IC693MLD645E:

This module has 16 isolated inputs. It provides 16 discrete isolated inputs. The inputs are positive logic. LED's indicate the on/off state of each input.

8.3.2 Output Module IC693MDL940:

This module had 16 relay outputs rated at 2 amps. LED's indicate the on/off state of each output.