



Description of system:

A garage door opener is a very useful machine that opens the door to a garage by pulling the door up a pair of tracks using a chain or belt and a motor. Included in this system are safety sensors to prevent damage or harm to obstructions in the path of the closing door.

Control System:

This system uses the on/off control method

Input:
Infrared Switch - DI
Pressure Switch - DI

AND Logic - Microcontroller

Output:
Motor - DO
Light - DO

Logical Continuity

The garage door will close and continue to close when a timer parameter has been met AND the infrared switch circuit remains closed AND the pressure switch circuit remains untriggered.

Electrical System:

System Power Input:
120 Vac 1 Ph
12 Amps

Motor



115 Vac PH 1
11 Amps

Light Bulb



120 Vac
0.5 Amps

Main Controller Board



Mechanical System:

Assumptions:
Weight of garage door = 300lbs
Door travel distance/height = 7ft
Calculation:
 $300 \text{ lbs} \times 7 \text{ ft} = 2100 \text{ ft-lbs}$
 $2100 \text{ ft-lbs} / 7 \text{ sec} = 300 \text{ ft-lbs/sec}$
 $300 / 550 \text{ ft-lbs/sec} = 0.55 \text{ HP}$

Gear



Assist Spring

Chain



Size: 25
Pitch: 1/4"
Width: 1/8"