

# ACCESS CONTROL SYSTEM WIRE GAUGE SIZE & DISTANCE CHART

## FOR 12V AND 24V AC/DC

To determine the correct wire gauge to use on one circuit the following information is required:

- The quantity, voltage and current draw of all lock(s) and other powered devices on one circuit.
- The distance in feet from the power supply to the furthest lock.

Add together the current draw (amps) of all locks on the same circuit. Cross reference the total amps with the distance between the power supply and the furthest lock to determine the wire gauge required.

“One circuit” implies that two wires are being run from the power supply to one or more locks in parallel. The last lock on the pair of wires should not exceed the maximum distance number shown on the chart for that gauge of wire and total current draw in Amps.

If the wire gauge size or maximum distance is inadequate for your application, divide the quantity of locks on that circuit to create two or more separate circuits and use the chart to figure each new circuit independently. SDC recommends that two fuse protected circuits be provided for each opening, one circuit for the locking device (inductive loads) and one circuit for access controllers and signaling devices (resistive loads). This allows for significantly smaller gauge wire, increased distance and protects access control and signaling devices from potential damage caused by inductive load devices

All wiring must be installed in accordance with all state and local codes.

<b>Minimum Wire Gauge for 12 volts AC or DC</b>											
Maximum Distance Allowable For a 5% Voltage Drop From the Power Supply to the Furthest Load On One Circuit											
AMPS	25ft	50ft	75ft	100ft	150ft	200ft	250ft	300ft	350ft	400ft	500ft
0.125	20	20	20	20	20	20	20	18	18	18	16
0.25	20	20	20	20	18	18	16	16	16	14	14
0.35	20	20	20	18	18	16	16	14			
0.50	20	20	18	18	16	14	14				
0.75	20	18	18	16	14	14					
1.00	20	18	16	14	14						
1.50	18	18	16	14							
2.00	18	16	14	14							
2.50	18	14	14	14							
3.00	16	14	14								
3.50	16	14									
4 to 6	14										

<b>Minimum Wire Gauge for 24 volts AC or DC</b>											
Maximum Distance Allowable For a 5% Voltage Drop From the Power Supply to the Furthest Load On One Circuit											
AMPS	25ft	50ft	75ft	100ft	150ft	200ft	250ft	300ft	350ft	400ft	500ft
0.125	20	20	20	20	20	20	20	20	20	20	20
0.25	20	20	20	20	20	20	20	18	18	18	16
0.35	20	20	20	20	20	18	18	18	16	16	14
0.50	20	20	20	20	18	18	16	16	16	14	14
0.75	20	20	20	18	16	16	16	14	14	14	
1.00	20	20	18	18	16	16	14	14			
1.50	20	18	18	16	16	14					
2.00	18	18	16	16	14						
2.50	18	18	16	14	14						
3.00	18	16	14	14	14						
3.50	18	16	14	14							
4	16	16	14								
5	16	14	14								

# Ohms Law

## To Determine an Unknown Voltage: $E = I \times R$

E = Volts

I = Current, Amps

R = Resistance, Ohms

*Example: .25 Amps (I) x 96 Ohms (R) = 24 Volts (E)*

## To Determine an Unknown Current: $I = P / E$

E = Volts

I = Current, Amps

P = Power, Watts

*Example: 6 Watts (P) ÷ 24 Volts (E) = .25 Amps (I)*

## To Determine an Unknown Current: $I = E / R$

E = Volts

I = Current, Amps

R = Resistance, Ohms

*Example: 24 Volts (E) ÷ 96 Ohms (R) = .25 Amps (I)*

## To Determine an Unknown Wattage: $P = E \times I$

E = Volts

I = Current, Amps

P = Power, Watts

*Example: 24 Volts (E) x .25 Amps (I) = 6 Watts (P)*

## To Determine an Unknown Resistance: $R = E / I$

E = Volts

I = Current, Amps

R = Resistance, Ohms

*Example: 24 Volts (E) ÷ .25 Amps (I) = 96 Ohms (R)*

