

WR-4040-xx - 120:24VAC 40VA Transformer



Project Name: _____
Part Numbers: _____ Date: _____

**Features**

- 40VA steady draw, 40VA pulsed draw
- Current limiting and internally fused with a one-time event fuse
- 120V Primary: 24VAC Secondary

The transformer supplies the switching power for Douglas 2-wire relay control provides a step down voltage form 120 to 24VAC @ 40VA.

Douglas relays do not use any power while in the latched on or off state, power is only used when the relay switches over. In most panels only 1 transformer per relay panel is required. Theoretically, there is no limit to the amount of relays that can be switched by 1 transformer in sequence.

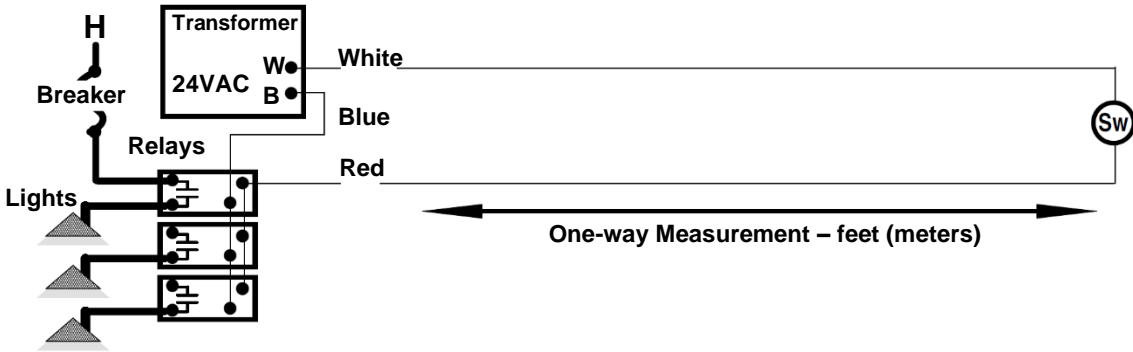
There are Douglas devices other than relays that do use low amounts of steady state power. For example, the LEDs of the LED style switches use power. Relay scanners, time clocks, and other electronic devices also use power. If many these devices are powered by one transformer, do a "LOADING CALCULATION" to ensure that there is no overload. In the rare case there is an overload, split the circuits and use more than 1 transformer.

**Typical Applications:** Provides 24VAC step down voltage for UniversalDouglas Relay Control Panels

PART NUMBER	DESCRIPTION
WR-4040-120	120/277:24VAC 40VA Transformer

\* Secondary voltage varies from 24V to 29V depending upon load.

**Wiring Distances**



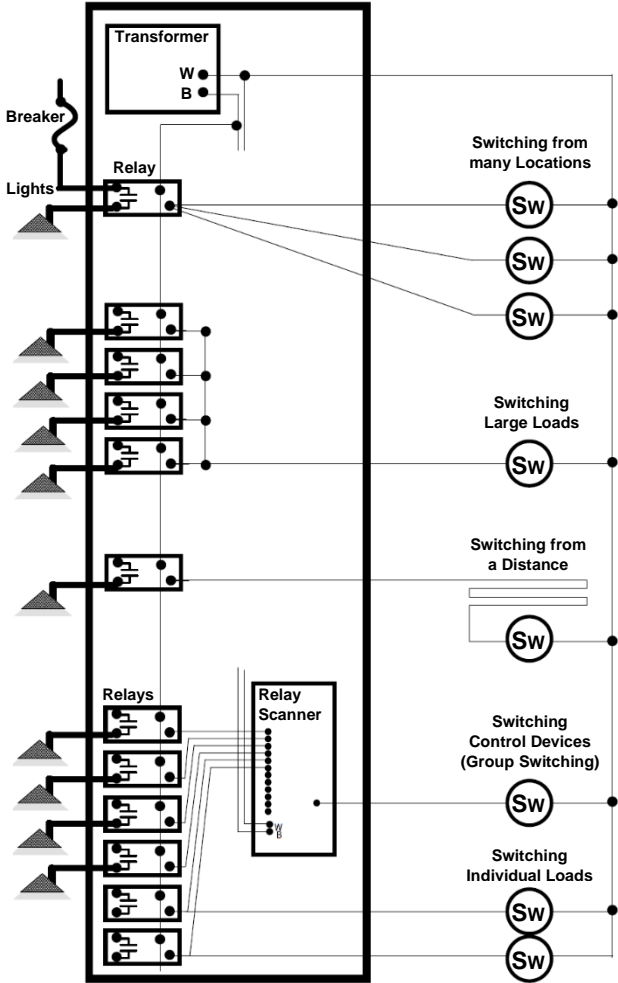
WIRE DISTANCE CHART - 18Ga Wire			
Number of Relays per Switch		Wire Length One way measure in feet (meters)	Wire Gauge American Wire Gauge
<b>1.5A &amp; 3.0A rated switches</b> (WR-8001, WR-8501, WR-8503)	1	2000 (600)	18 AWG
	2	1500(450)	18 AWG
	3	1000(300)	18 AWG
	4	500(150)	18 AWG
<b>3.0 A rated switches</b> (WR-8001, WRK-8201)	6	300(90)	18 AWG
	8	160(50)	18 AWG

\*Patent Pending

Rev 8/1/2022

Douglas Lighting Controls

### Relay Panel Schematic



### TRANSFORMER LOADS

Douglas relays do not use any power while in the latched on or off state. Power is only used when the relay switches over. In most cases, only 1 transformer per relay panel will be all that is required. Theoretically, there is no limit to the amount of relays that can be switched by 1 transformer. There are Douglas devices other than relays that do use low amounts of steady state power. For example, the LEDs of the LED style switches use power. Relay scanners, time clocks, and other electronic devices also use power. If a large number of these devices are powered by one transformer, do a "LOADING CALCULATION" to ensure that there is no overload. In the rare case there is an overload, split the circuits and use more than 1 transformer.

### LOADING CALCULATIONS

If a large number of devices are being connected to a transformer, check to ensure that the transformer loading is correct. The example shown below illustrates the method of calculation.

EXAMPLE: A system has the following components.

- 100 LED switches
- 48 2-wire relays
- 2 Relay scanners
- 1 Photocell controller

Check how many relays can be switched at one time.

A) Calculate the maximum number of relays that can be switched at one time ignoring wiring distance:

- 1) Total the steady state current requirement  
 Led Switches  $100 \times 4mA = 400mA$   
 Relays  $48 \times 0mA = 0mA$   
 Relay Scanners  $2 \times 100mA = 200mA$   
 Photocell Controller  $1 \times 100mA = 100mA$   
 700mA

2) Check that the steady state current requirement does not exceed 1.6 Amperes. In the rare cases that the steady state current exceeds 1.6 A, extra transformers will have to be added and circuitry will have to be split.

For this example, the steady state current is 700mA which is less than 1.6 amperes (1600mA).

3) Subtract the steady state current from the total momentary current available to obtain the amount of current available for switching relays.

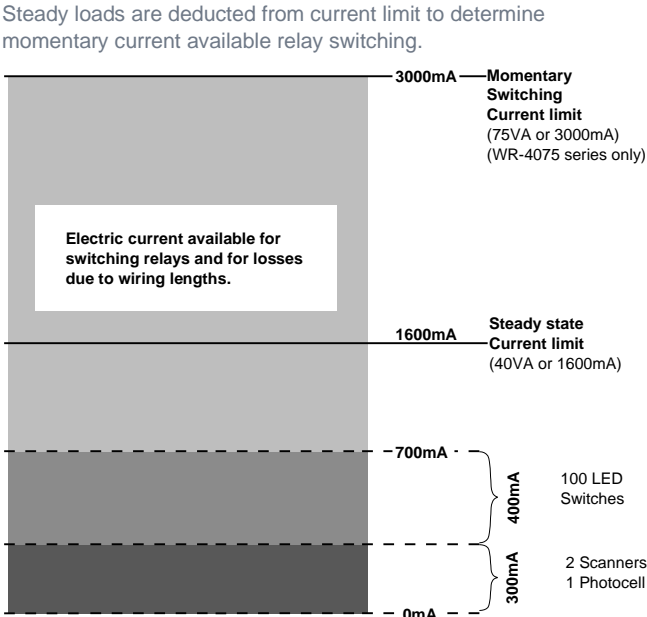
Total current available from a WR-4075 series transformer for a momentary switching pulse is 3000mA (75VA). For this example, the current available for switching relays is 2300mA (3000 - 700).

4) Divide the total available relay current by the current draw of a relay (350mA) to obtain the maximum number of relays that can be switched at one time.

$2300 \div 350 = 6.57$  - Round the answer down to 6 relays.  
 B) The maximum number of relays that can be switched at one time is either the value obtained by the above calculation or the value determined by the maximum wiring distance allowed - WHICHEVER IS LESS.

If the wire distance is 600 feet and the wire gauge is #18 AWG, then the limit is 4 relays, not 6 relays (see wire distance chart).

### Transformer Loading Diagram



\*Patent Pending

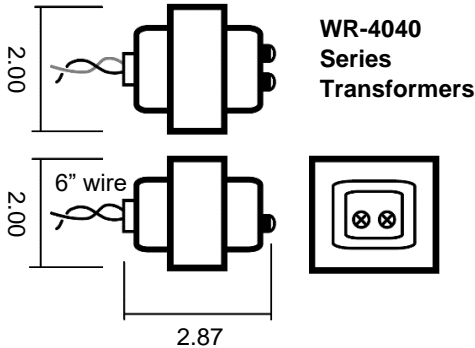
Rev 8/1/2022

Douglas Lighting Controls

**Dimensions**

Inches [mm]

Universal Douglas transformers have a nipple & mounting nut suited for a 7/8" hole (1/2" pipe hole & tread size)



**Technical Details**

<b>INPUT VOLTAGE</b>	<ul style="list-style-type: none"> <li>Line voltage 120,240,277 or 347V. Select correct model for line voltage</li> </ul>
<b>OUTPUT VOLTAGE</b>	<ul style="list-style-type: none"> <li>24VAC at full load. At no or low loads, the voltage is 29V. As the current draw increases, the transformer voltage decreases. A fully loaded class 2 transformer will output 24V</li> <li>Universal Douglas products are designed to operate correctly over the entire range of voltages provided by the transformer</li> </ul>
<b>CURRENT</b>	<ul style="list-style-type: none"> <li>Transformers that are approved for powering Class 2 circuits are current limited to prevent excessive currents caused by shorts. This is a key safety feature to help prevent fires from shorts</li> <li>The Class 2 current limiting feature permits the use of wire that is of a light gauge and has less stringent insulation requirements.</li> </ul>
<b>APPROVALS</b>	<ul style="list-style-type: none"> <li>UL Approved</li> <li>CSA Certified</li> </ul>
<b>ENVIRONMENT</b>	<ul style="list-style-type: none"> <li>Indoors, stationary, non-vibrating, non-corrosive atmosphere and non-condensing humidity</li> <li>Ambient temperature: -20°F to +120°F (-28°C to +50°C)</li> </ul>
<b>WARRANTY</b>	<ul style="list-style-type: none"> <li>Standard 5-years</li> </ul>

\*Patent Pending

Rev 8/1/2022

Douglas Lighting Controls