

The logo features a dark green oval with a light green gradient. Inside the oval, the text "DeviceNet" is written in a green, stylized font at the top, and "Electrical Installation" is written in a yellow, stylized font at the bottom. A yellow circular seal with the word "requirements" written vertically is positioned on the right side of the oval. Three horizontal lines (red, blue, and black) cross the oval.

*DeviceNet*  
*Electrical Installation*

requirements



# DeviceNet Electrical Installation Requirements

---

**SUBJECT: DEVICENET ELECTRICAL INSTALLATION REQUIREMENTS**

**SECTION VERSION**  
ONE

**PAGE**  
1 of 20

**VERSION**  
DNEIR

---

## *DeviceNet Electrical Installation Requirements*



# DeviceNet Electrical Installation Requirements

**SUBJECT: DEVICENET ELECTRICAL INSTALLATION REQUIREMENTS**

**SECTION VERSION**  
ONE

**PAGE**  
2 of 20

**VERSION**  
DNEIR

## *Copyright Notice*

This ODVA NZ document is copyright-protected by the ODVA NZ/Australia User Group Inc. While the reproduction of working drafts or committee drafts in any form for use by participants in the ODVA NZ standards development process is permitted without prior permission from ODVA NZ, neither this document nor any extract from it may be reproduced, stored or transmitted in any form for any other purpose without prior written permission from ODVA NZ.

Requests for permission to reproduce this document for the purpose of commercial use should be addressed as shown below or to;

ODVA New Zealand / Australia User Group Inc P.O Box 41 Tauranga New Zealand.

OR; Email fernbrook @wave.co.nz

*[Indicate :  
the full address  
telephone number  
fax number  
telex number  
and electronic mail address*

Reproduction for commercial use may be subject to royalty payments or a licensing agreement.

Violators may be prosecuted.



# DeviceNet Electrical Installation Requirements

**SUBJECT: DEVICENET ELECTRICAL INSTALLATION REQUIREMENTS**

**SECTION VERSION**  
ONE

**PAGE**  
3 of 20

**VERSION**  
DNEIR

## *Contents*

<i>Section</i>	<i>Subject</i>	<i>Page</i>
	<b>Copyright Notice</b>	<b>2</b>
	<b>Contents</b>	<b>3 &amp; 4</b>
	<b>Foreword</b>	<b>5</b>
<b>0</b>	<b>Introduction</b>	<b>6</b>
	0.1 Background	
	0.2 Benefits Gained	
	0.3 Context of DeviceNet Technology and the ODVA.	
	0.4 Users of this Standard	
<b>1.0</b>	<b>DeviceNet Electrical Installation Requirements</b>	<b>7</b>
<b>1.1</b>	<b>DeviceNet Power Supply Installation</b>	<b>7</b>
	1.1.1 Capacity	
	1.1.2 Location	
	1.1.3 Protection	
	1.1.4 Location	
	1.1.5 Grounding	
	1.1.6 Application of Power to a Network	
<b>1.2</b>	<b>DeviceNet Cable Types</b>	<b>9</b>
	1.2.1 Thick Cable	
	1.2.2 Thin Cable	
	1.2.3 Flat Cable	
	1.2.4 Pre-Moulded Connections	
<b>1.3</b>	<b>DeviceNet Connection Types</b>	<b>10</b>
	1.3.1 Mini Style	
	1.3.2 Micro Style	
	1.3.3 Open Connector	
	1.3.4 Insulation Displacement Connectors (IDC)	
	1.3.5 Tees	
	1.3.6 Connection Boxes	
	1.3.7 Daisy Chaining	



# DeviceNet Electrical Installation Requirements

## SUBJECT: DEVICENET ELECTRICAL INSTALLATION REQUIREMENTS

SECTION VERSION  
ONE

PAGE  
4 of 20

VERSION  
DNEIR

<b>1.4</b>	<b>Terminating Resistors</b> 1.4.1 Location 1.4.2 Resistor Type	<b>12</b>
<b>1.5</b>	<b>Environmental Considerations</b> 1.5.1 Corrosion 1.5.2 IP Rating 1.5.3 Exterior Installations 1.5.4 Wire-Ways and Cable Supports	<b>13</b>
<b>1.6</b>	<b>Networking Testing</b> 1.6.1 Design for Testing 1.6.2 Testing for Correct Earth Connections 1.6.3 CAN_H_&_CAN_L Cable Resistance Tests 1.6.4 Voltage Tests	<b>14</b>
<b>1.7</b>	<b>Documentation</b> 1.7.1 DeviceNet Network Drawing 1.7.2 I/O Wiring Diagrams	<b>15</b>
<b>2.0</b>	<b>DeviceNet Automation Requirements</b>	<b>16</b>
<b>2.1</b>	<b>DeviceNet Network Design Requirements</b> 2.1.1 Topology 2.1.2 Node Number Designation 2.1.3 Spare Capacity for Future Additions 2.1.4 Communication Rates 2.1.5 Scanners 2.1.6 Network Configuration Software 2.1.7 Network Configuration Port 2.1.8 Electronic Data Sheets 2.1.9 Power Supplies 2.1.10 Conformance Tested Products 2.1.11 Special DeviceNet Interfaces	<b>16</b>
<b>3.0</b>	<b>Specific Installations</b>	<b>19</b>



# DeviceNet Electrical Installation Requirements

## SUBJECT: DEVICENET ELECTRICAL INSTALLATION REQUIREMENTS

SECTION VERSION  
ONE

PAGE  
7 of 20

VERSION  
DNEIR

### 1.0 DEVICENET ELECTRICAL INSTALLATION REQUIREMENTS

#### Scope

All installations where DeviceNet is used must conform to the following requirements as a minimum standard and also be in accordance with the automation requirements for DeviceNet installations found in Section 2.0.

### 1.1 DEVICENET POWER SUPPLY INSTALLATION

#### 1.1.1 Power supply capacity

The 24Vdc ( $\pm 1\%$ ) power supplies shall be of a rating sufficient to supply current for all attached nodes.

**Important :** The power supply capability must be equal to or greater than the load requirement on your network and shall have a minimum spare capacity at the acceptance of design stage of 30% to allow for addition or modification.

The conductor size from the power supply to the trunk cable shall have the same current carrying capabilities as the trunk cable.

#### 1.1.2 Location

The connection of the 24 VDC power supplies to the network shall be in accordance with the calculations as shown in Table 10.1 and 10.2 for sizing a power supply as found in the ODVA DeviceNet Specification.

**Table 10.1 Max Current Available (amps) based on Thick Cable Network Length**

Network Length (m)	0	25	50	100	150	200	250	300	350	400	450	500
Maximum Current in amps	8.00	8.00	5.42	2.93	2.01	1.53	1.23	1.03	0.89	0.78	0.69	0.63

**Table 10.2. Max Current Available (amps) based on Thin Cable Network Length**

Network Length (m)	0	10	20	30	40	50	60	70	80	90	100
Current in amps	3.00	3.00	3.00	2.06	1.57	1.26	1.06	0.91	0.80	0.71	0.64



# DeviceNet Electrical Installation Requirements

**SUBJECT: DEVICENET ELECTRICAL INSTALLATION REQUIREMENTS**

**SECTION VERSION**  
ONE

**PAGE**  
8 of 20

**VERSION**  
DNEIR

No more than 8 amps may be consumed on any segment of a trunk line but a centrally located 16 Amp power supply may be used to supply 8 amps to both sides of a power tap.

Where multiple power supplies are installed, the AC supply to all power supplies should be fed from a common source that can be switched to allow all power to be applied to the network simultaneously.

Networks should be designed to keep the cable length to a minimum and the use of nodes that do not source the load power from the network with isolated I/O are preferred to reduce power supply consumption and provide segregation from field faults or transient noise.

It is not recommended to create a network that has even half the permissible voltage drop as variances in ambient conditions can adversely effect the long term reliability of the network.

### **1.1.3 Protection**

The power supplies shall have their own current limit protection installed to provide fuse protection for each segment of the cable system with any section leading away from a power supply having its own protection.

Where two or more power supplies are connected to the same segment (no break in the V+), a Schottky diode must be used at the power tap to prevent back feeding.

### **1.1.4 Location**

The power supply shall be located in a suitable enclosure with adequate ventilation and environmental protection.

The source of the 230volt supply to the power supply shall be indicated and labelled.

### **1.1.5 Grounding**

The drain and V- of the DeviceNet network shall be grounded to a good earth or building ground in only one location at a point as close as possible to the physical centre of the network using at least a 6 mm<sup>2</sup> cable up to **3 m maximum in length**.

Grounding at more than one location will produce ground loops while not grounding will increase the sensitivity to Electrostatic damage and outside noise sources.

Where more than one power supply is installed on the network, the drain wire/shield shall be connected at ONE supply only, preferably near the centre of the network.

When using non-isolated nodes it is important that additional network grounding does not occur when mounting the node or through external connections to the node.