

Optical isolator



Why use optical isolators?

The electronic circuitry for RS232-C communication works at 12V, and higher voltages on the line can damage the hardware on the PC and CNC machine. An optical isolator is a protection device which prevents high voltages in the serial connection between the PC and machine. Signal transfer across it is optical instead of through a physical connection. Optical isolators can withstand voltage surges up to 2500V.

High voltage can occur in the serial communication line due to the following reasons :

1. Improper earthing at power source of the PC or CNC machine.
2. Voltage fluctuations.
3. Voltage surges
4. Lightning strikes.

Possible damage due to high voltage

1. Damage to communication ICs on the PC.
2. Damage to communication ICs on intermediate DNC hardware like multi-port serial cards.
3. Damage to communication ICs on the CNC.

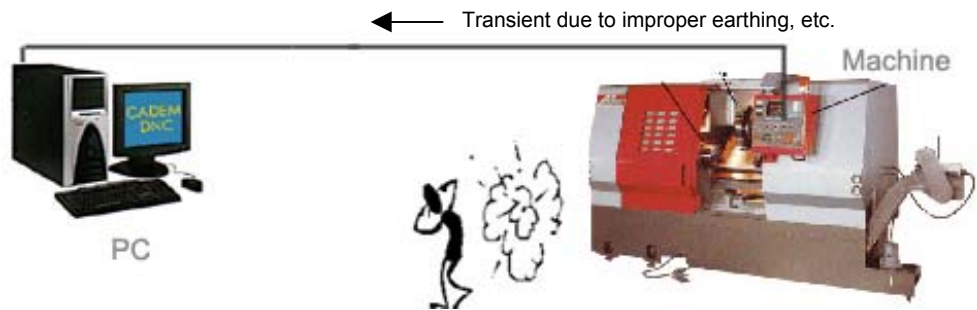
Damage caused to PC can be rectified and costs around US\$ 40. Total cost, repair charges and machine down time, of rectifying the damage caused to the CNC may be around US \$ 1600.

Preventive measures

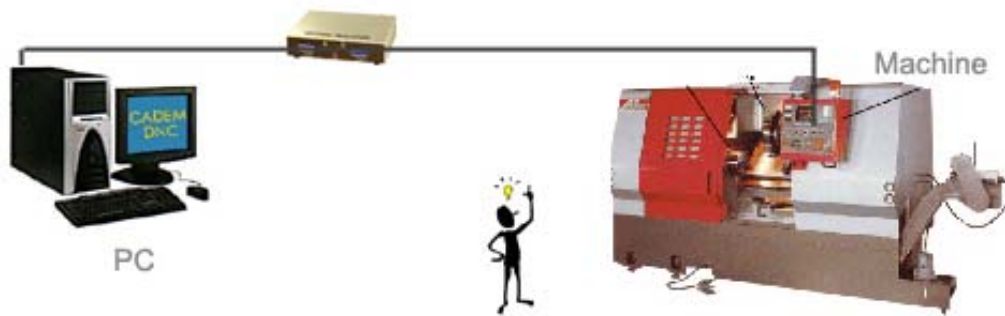
- Provision of optical isolators on each line.
- Proper earthing at power sources for PC and CNC. Ensure that voltage between neutral and earth is less than 5 V at the PC and machine.
- Ensure that the SMPS on the PC is working properly.

Use of optical isolators is strongly recommended.

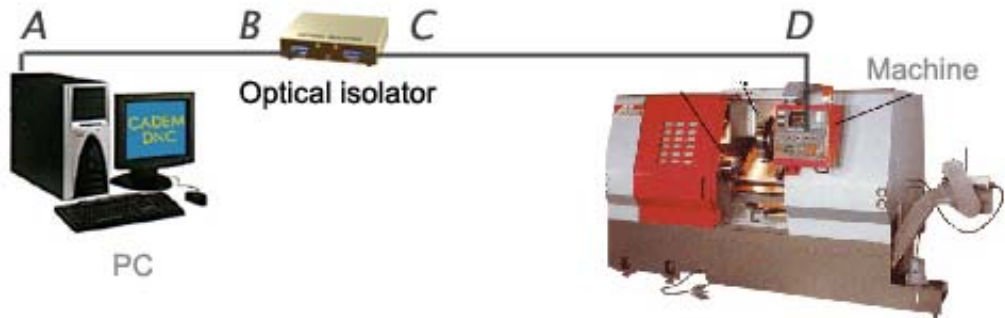
DNC without optical isolation



DNC with optical isolation



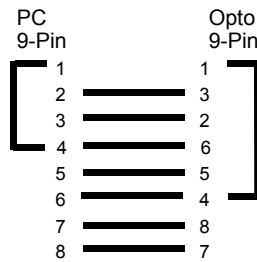
Connection through optical isolator



Pin details on optical isolator

Pin No	Signal
1	DCD Data Carrier Detect
2	TD Transmit Data
3	RD Receive Data
4	DTR Data Set Ready
5	GND Signal Ground
6	DSR Data Set Ready
7	RTS Ready To Send
8	CTS Clear To Send

PC - optical isolator connection [cable A – B]



Machine - optical isolator connection [cable C – D]

