Installation Information for the DC390

IMPORTANT NOTICE

THIS INFORMATION SHEET CONTAINS INSTRUCTIONS FOR INSTALLING A DC390 DOOR CONTROLLER. FAILURE TO COMPLY WITH THESE MAY RESULT IN EQUIPMENT DAMAGE AND MAY PREJUDICE WARRANTY PROTECTION.

IT IS ESSENTIAL TO INSTALL THE GROUND CONNECTIONS AS DESCRIBED. FAILURE TO CONNECT THE GROUND SYSTEM CAN RESULT IN AN UNSAFE SITUATION, DAMAGE TO SENSORS, ACTUATORS AND ELECTRONIC SYSTEMS AND IMPROPER SYSTEM OPERATION.

SPHERE SYSTEMS PTY LTD CANNOT ACCEPT RESPONSIBILITY FOR INCORRECTLY INSTALLED EQUIPMENT AND MAY, AT ITS OPTION, CHARGE A SERVICE FEE FOR PROBLEMS RELATED TO INCORRECT INSTALLATIONS.

1. Mechanical & Environmental

The DC390 is to be installed in 3.25" wide snap track fixed inside metal enclosures. Individual modules are snapped into place and can be removed by using the screwdriver cutouts along both edges of each board. Care must be taken not to apply excessive twist to the board during installation or removal. The printed circuit board must be mounted in a vertical plane. All wiring must be kept away from the components on the board and it is recommended that wiring be installed in conduits located parallel to each row of snap track.

The allowable operating temperature range is from –10C to +45C, non-condensing.

2. Power Supply

The DC390 is designed to accept a range of input voltages between 12V and 20V AC. The recommended power supply is a 16V AC plug-pack. The VA rating of the plug-pack can be calculated from the following formula:

VA rating = 2 x (maximum continuous DC current drawn from board through relays and aux outputs + 200mA) x 12

For typical installations a 1.5A plug pack should be adequate.All power must be removed from the system during field wiring connections. This includes power to the DC390, readers, locks and other power which could cause damage due to inadvertent shorts from loose wiring.

3. Communication cables

The DC390 communication interface can be selected to be RS232 or RS485 by means of two jumpers as shown in the above diagram. When a single jumper is connected as shown by the solid bar, the DC390 is configured with a RS232 interface. When two jumpers are inserted as shown by the empty boxes, the DC390 is configured to run with a RS485 interface. To use the DC390 on a network controlled by a DP11, RS485 must be selected.

3.1 RS232

The RS232 mode allows the DC390 to be connected to a PC. The communication parameters are 9600 baud, 8 data bits, one stop bit and no parity. The RS232 connection is a via a 10 pin ribbon cable. It is pin compatible with a PC 9 pin COM1 connector. The matching connector is a female type allowing the use of standard extension cables. When extending this cable the RS232 specification should be followed and the cable length should be kept to below 15 metres. Longer lengths ***may*** work but are not guaranteed to work. PC 9 pin connections are as follows:

Pin number	Connection
1	**DCD***
2	**RXD**
3	**TXD**
4	**DTR***
5	**GND**
6 - 9	**No connection**

The DCD and DTR connections are only used when the DC390 is directly connected to a modem. To connect the DC390 to COM2 a 25 to 9 way cable is required. For either COM port you will need to use a null modem.

MC-DP 9 pin	**9 Pin conversion**	
	MODEM	**Null MODEM**
1 DCD	**1 DCD**	**1 DCD**
2 RXD	**2 TXD**	**3 RXD**
3 TXD	**3 RXD**	**2 TXD**

DC390 to DP 9 pin	**25 Pin conversion**	
	MODEM	**Null MODEM**
1 DCD	**8 DCD**	**8 DCD**
2 RXD	**2 TXD**	**3 RXD**
3 TXD	**3 RXD**	**2 TXD**
4 DTR	**20 DTR**	**20 DTR**

3.2 RS485

RS485 is used when the DC390 is networked. The network cable must be a constant impedance, shielded, twisted pair meeting the EIA485 standard. The cable must be installed as a single run with no stubs or tees. The cable must be terminated by resistors at each end. For connections between the DP11 network processor and the DC390 a single pair is required connected to the *COM+* and *COM-* terminals. Beyond a repeater two twisted pairs are required with the second pair connected to the *TRX+* and *TRX-* terminals. The polarity of all pairs must be maintained, ie COM+ to COM+ etc.

The cable must be installed according to the Austel Customer Premises Wiring Standard. RS485 cabling is vulnerable to electrical noise. This may be caused by high currents or spikes on power wiring. This can damage network components. Keep data cabling well clear of all power wiring. **It is absolutely essential that a DC390 network is only grounded at one point. Failure to do this will result in errors in data transmission and may result in equipment damage due to differences in building ground potentials.**

The correct installation is for all network nodes and their power supplies to be isolated from the building ground. The required ground reference between network nodes is provided through the communication cable shield. **At one and only one point in the network is the shield tied to ground for safety.**

4. Connections for Field Wiring

Relay Outputs

The relays on the DC390 can be configured to either:

Switch 12 volts between the NO and NC relay outputs, or

Provide dry contact switching between common and NO and NC.

See PCB notes below for configuration details.

It is absolutely essential that reverse-biased diodes be fitted across any solenoids connected to the digital outputs. These diodes must be located as close as possible to the solenoids (within 10cm). The DC390 is protected against short circuits on the outputs by means of a fuse. Any short circuit on the output will stop the DC390 from operating until the fuse blows. The fuse is rated at 1A. The maximum current that can be drawn from the DC390 to power electric locks is 500mA continuous.

Battery Charging

The DC390 supports the use of a sealed lead acid backup battery. The charging circuit is designed for 12Volt 7AH batteries and the use of smaller batteries could result in them being charged by higher currents than recommended by the battery manufacturer. Larger capacity batteries can be used without any problems. The battery should be connected across the BATT+ and BATT- terminals. **Do not use these terminals for any other purpose**.

Auxiliary power output

The DC390 provides a pair of terminals (+12 VDC and Ground) located next to the battery terminals from which external 12 volt power can be drawn. These terminals are specifically designed to support the use of add-on digital output boards which require a 12V supply although these terminals can be used for other purposes as well. The maximum current which can be drawn from the DC390 is 1Amp. Thus if the door solenoids draw 500mA then you not more than 500mA can be supplied from the auxiliary power terminals. These outputs are protected against short circuits by a 1A fuse. Under no circumstances can you draw more than 1A from the auxiliary output. Under NO circumstances should you drive unprotected inductive loads from this supply.

Entry and Exit readers

These terminals are designed to drive Wiegand interface readers or Dallas buttons. The connections are made using flat 6-wire telephone cable. These cables are designed to terminate either in a Wiegand or Dallas interface card and can only be used with these cards supplied by Sphere Systems. The inputs will not support other manufacturers interfaces. The maximum length of the cables permitted depends on the type of interface. Flat telephone cable can be used for runs of up to 5 meters. For cable runs longer than this you must place the interface card close to the DC390

and use the cabling appropriate to the reader. For Wiegand interfaces it is recommended that you use shielded cable as specified by the reader manufacturer. For Dallas buttons the primary problem is the capacitance of the cable. The standard Dallas interface card can support a maximum cable capacitance of about 1000pF which equates to a cable run of about 20m. For longer runs you must use the **active driver board** which supports capacitances of up to about 10,000pF (typically 200m of cable). Dallas buttons can be driven using coaxial cable such as RG58U or RG59U or UTP Category 5 cable. **DO NOT** use telephone cable for long runs. The use of coaxial cable provides inherent shielding against electrostatic pick-up but only provides 2 conductors so the LED on the readers has to be driven through a separate wire. On the standard Dallas interface card the LED is an essential part of the circuitry and omitting the LED will not allow the card to work. A LED can be attached directly on the card. The active driver board will operate with or without a LED connected.

Connections for Digital Inputs

The input terminals support voltage-free switch closures or resistively terminated lines (tamper proof inputs). For resistive line terminations the switch points can be configured in software allowing the system to support all common resistance terminations. See full manual for details.

The ground terminals (G) adjacent to the input pins should only be used in conjunction with inputs and **must not be used for any other purpose**.

An external switch from an input to ground will be recognised as ON when the switch is closed and OFF when it is open. Mechanical switches do not have polarity associated with them. Electronic switches do require correct polarity and colour-coded wire may assist in maintaining polarity.. For short runs (under 20 metres) it is permissible to use wire such as telephone cable but for long runs it is desirable to use a heavier gauge of cable such as building wire. It is not recommended to use single strand cable where there is movement as repeated flexure of such cable can cause a fracture.

Handle Bolt and Key

The HND, BLT and KEY inputs are designed to connect to these lock connections. When not used for these functions these inputs can be used as general purpose inputs.

Exit Buttons

Digital inputs I6 and I7 are the inputs for exit push buttons.

Static Electricity

Static electricity can be introduced through the Dallas interface where static-prone floor coverings or excessively dry atmospheres are present. Further information can be in the Technical Note - Static Electricity.

Expanded Memory

An Expanded Memeory board can be added to provide additional storage for card details. This card is connected to the DC390 through the SPI Extender socket.

See the DC390 Expanded Memory Option for installation instructions.

Questions

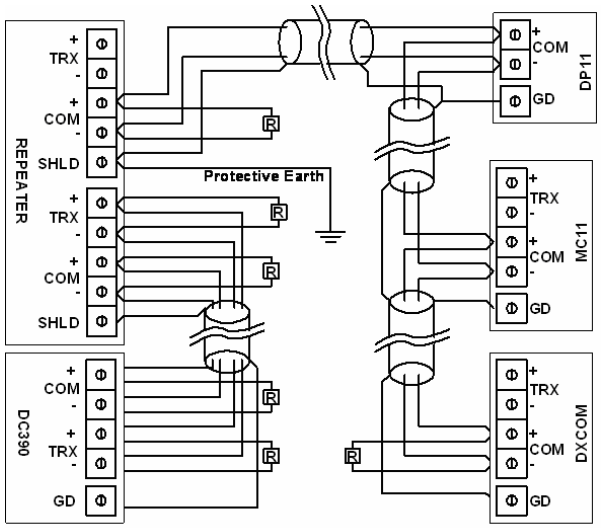
If you are unsure about the compatibility or the connection details of any field equipment with the DC390, contact Sphere Engineering prior to risking damage to any equipment.

Ph: +613 9457 6994

Fax: +613 9457 6995

Email: support@spheresystems.com.au

http://www.spheresystems.com.au



DC390 Door Controller PCB Notes:

1 Network Activity LED

2 RS485/RS232 Selection Jumper

3 Firmware name and revision date

4 DC390 ID Number

5 Power-On initialisation selectors

- 1 Jumper to enable RS485 (see also Note 2)
- 2 Jumper for Cold Reset (DO NOT LEAVE JUMPERED)
- 3 DO NOT USE
- 4 Jumper to set network Baud rate to 41K, remove for 9600 Baud

6 Install jumpers 1 & 2 to supply 12 volt, jumper 3 for dry switching

7 Install jumpers 1 & 2 to supply 12 volt, jumper 3 for dry switching

8 Fuse 1. 1 Amp fuse for Relay Outputs

9 AC Power input. **NOTE: MUST BE ISOLATED FROM GROUND**

10 Fuse 2. 2 AMP fuse for input power.

11 Charging voltage adjustment for battery charger

12 Fuse 3. 1 Amp fuse for auxilliary 12 volt output