


## Ground Fault Protection

### DSP OHMNI Accessory: DSP-CA(S) Cable Adapter

### Instruction Manual




7615 Kimbel Street,  
Mississauga,  
Ontario Canada L5S 1A8  
Tel: (905)673-1553  
Fax: (905)673-8472  
Toll Free: 1-888-RESISTR 737-4787  
[www.i-gard.com](http://www.i-gard.com)

 <b>iGARD</b>	<b>INSTRUCTION MANUAL</b> <b>DSP-CA(S) CABLE ADAPTER</b>	<b>C-415EM</b>
		<b>April 2007</b>


## 1. Introduction

- 1.1. The DIN –Rail mounted DSP Ground Fault Protection system from IPC Resistors is used exclusively with High-Resistance Grounded (HRG) power systems. The DSP can be used on multi-source substations such as double-ended main-tie-main board arrangements. In the case of a utility outage on one of the sources of such a system, the main breaker on one side will open and the tie breaker will close (through key interlock or other controls) so that power on the 'dead' side is supplied from the 'live' side to maintain service to both sides of the board.
- 1.2. The DSP system includes priority allocation to each feeder breaker depending on its importance. On a double-ended station there will be two DSP systems – one on each side of the board. Normally they will operate independently of each other. However, when the tie breaker is closed the two DSP systems will not prioritize breakers on the other side of the board and in the event of a fault involving both sides of the board, then two breakers would trip.
- 1.3. To prioritize the combined system it is possible to join the two priority buses together when the tie breaker is closed using an 8-conductor shielded cable. The cable can connected at either end through IPC cable adapter modules types DSP-CA or DSP-CAS.
- 1.4. The DSP-CA and DSP-CAS are similar 70mm DIN rail mounted units that tie into the DSP system with standard 20 position ribbon cable connectors (IPC Resistors RC-3) the 8-conductor cable then may be connected to either an 8-position terminal block or plugged into a RJ-45 8-8 Modular Jack at the discretion of the installer. The DSP-CA and DSP-CAS modules simply act as junction boxes to connect the priority bus lines to the appropriate ribbon cable terminals.
- 1.5. The DSP-CAS includes an electronic switch to connect or disconnect the priority bus from the DSP bus. This switch is controlled by a contact closure across the two input terminals (1 and 2). A yellow ON LED indicates that the switch is activated.
- 1.6. The DSP-CA module is simply a junction box without switching. One of each module is required to interface the cable to the DSP Modules.


*Note: A DSP-CAS can be used instead of a DSP-CA if necessary, but the input terminals would have to be permanently shorted.*

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## 2. Installation

 <b>DANGER</b>
<b><i>Hazard of Electrical Shock, Burn or Explosion</i></b>
<b>Qualified personnel must perform all installation, servicing and testing referred to in this manual. All power should be disconnected prior to removing covers or enclosures and where live conductors may otherwise be exposed.</b>
<b>Failure to observe these precautions may result in death or severe personal injury.</b>

- 2.1. The DSP-CA(S) modules may be connected to the DSP Feeder Modules DSP-DFM by the use of either of the two ribbon cable connectors from either side as desired. See Figure 2.1 (a) and (b)
- 2.2. Terminal 13 should connect to terminal 13 on both sides of the board in a double-ended situation, terminal 14 to terminal 14 etc. for 7 conductors (terminals 13 to 19).
- 2.3. The connecting cable should be 22 AWG, shielded, with the shield grounded to terminal 20 at one end only to avoid shield currents.
- 2.4. The two-conductor cable from the tie-breaker contacts need not be shielded and may be as small as 22AWG.
- 2.5. If it is desired, then RJ-45 Modular plugs can be used with a suitable 8-conductor, straight cable which connects pin 1 to pin 1, pin 2 to pin 2 etc on the modular jacks. Pin 8 of this connector should be connected to the shield at one end.

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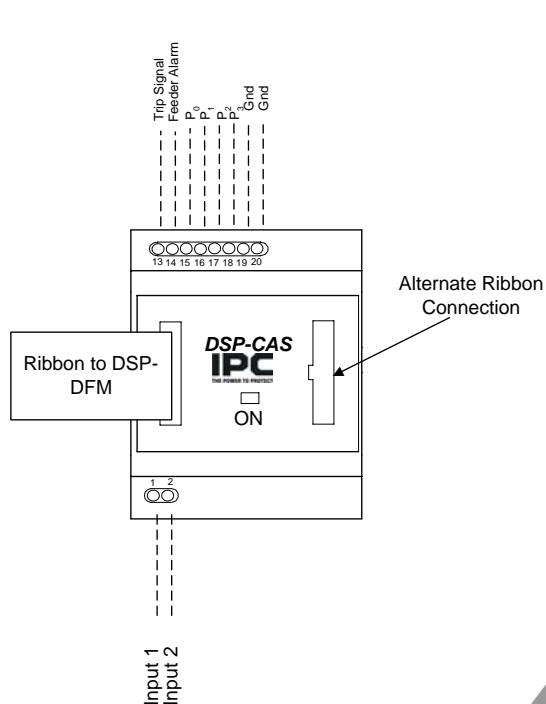


Figure 2.1 (a) DSP-CAS Connections

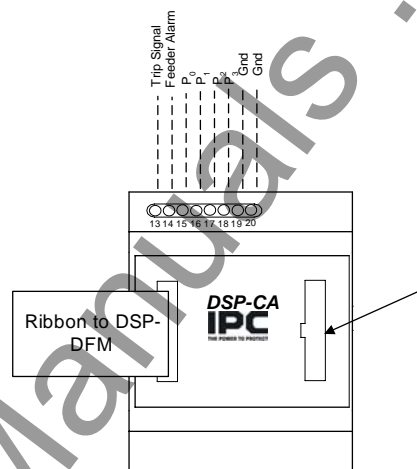



Figure 2.1(b) DSP-CA Connections

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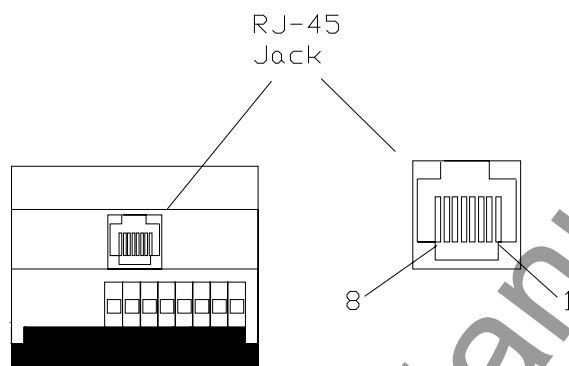


Figure 2.2 Modular Jack connections

On the modular jack the pin-out connections are in the same order as for the terminal block assignment. i.e.


Pin 1 signal is TRIP SIGNAL  
Pin 2 signal is FEEDER ALARM  
Pin 3 signal is P0  
Pin 4 signal is P1  
Pin 5 signal is P2  
Pin 6 signal is P3  
Pin 7 and Pin 8 is GND

Pin 7 or 8 can be used to connect the shield of a cable to ground at one end only .

The connection should be the same at both ends of the cable i.e. pin 1 of one plug should connect to pin 1 on the other plug and pin 2 to pin 2, and so on.

### 3. Testing

- 3.1. A digital multimeter can be used to verify that the connection is working. With the DSP energized, connect a digital meter set to read ohms or continuity, between terminal 13 on the left side adapter (whether it be DSP-CA or DSP-CAS does not matter) and terminal 13 on the right side adapter. There should be no continuity (2 Megohms, or greater) when there is no short across terminals 1 and 2 of the DSP-CAS and when shorted there should be low resistance between the two terminals (less than 100 ohms). Repeat for the other terminals 14 to 18.

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#### 4. Outline Dimensions

Figure 4.1 shows typical Dimensional details of the Polymeric enclosures used for the two modules. DSP-CA and DSP-CAS

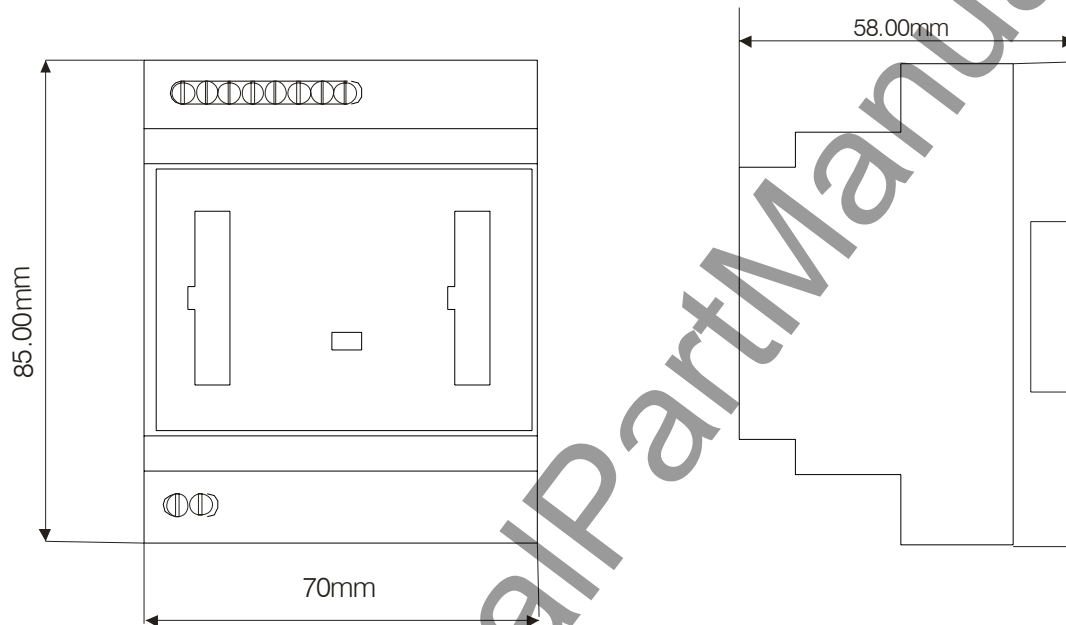



Figure 4.1 Dimensional Details DSP-CA(S)

#### 5. Typical Installation Diagrams

5.1. Figures 5.1 and 5.2 illustrate the use of the DSP systems in double and triple ended substations. Note the diagrams are simplified and do not show the DDR2 resistors or sensors and Trip circuit wiring, for clarity.

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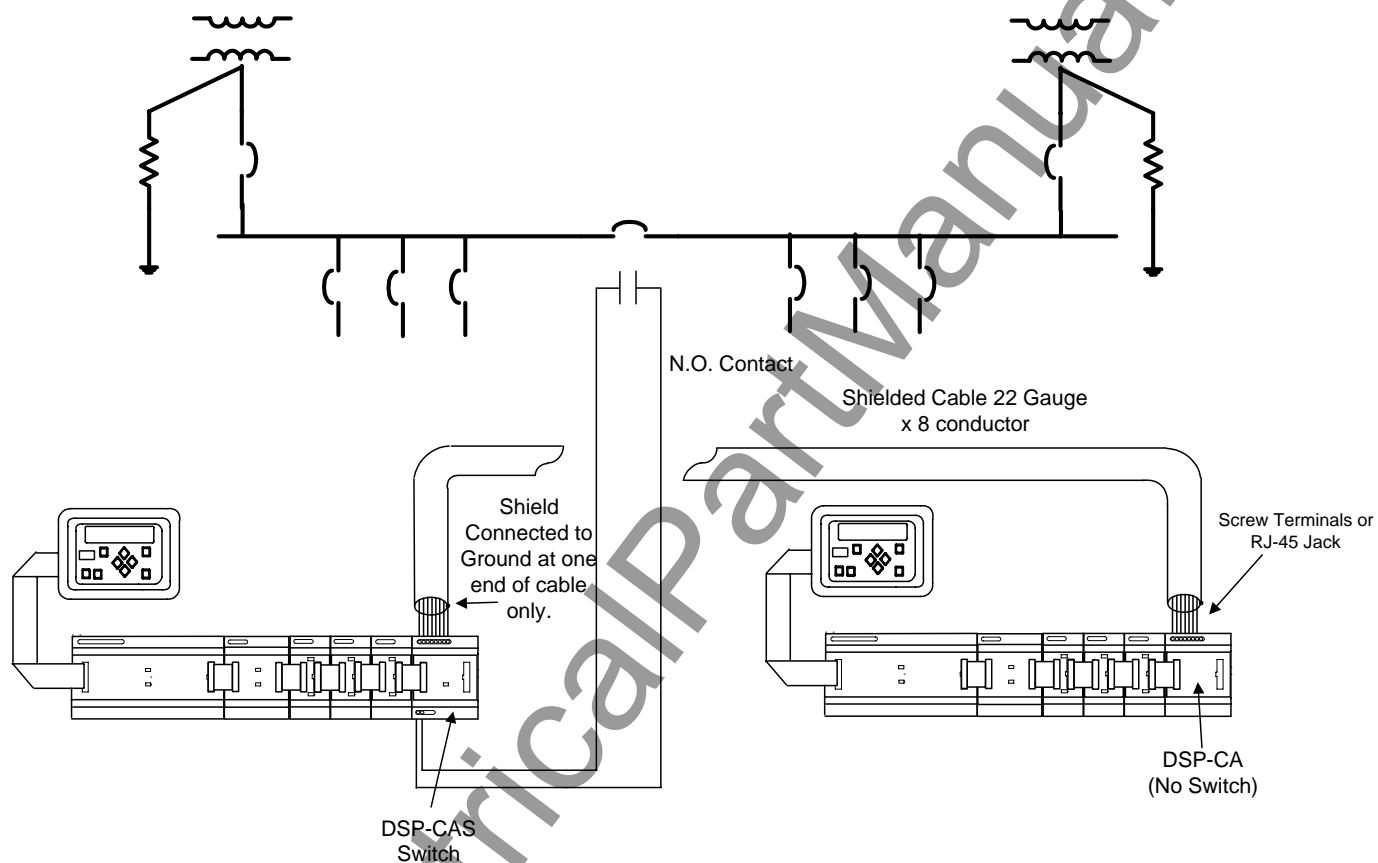


Figure 5.1 Typical Main-Tie-Main Substation with two DSP systems



i-GARD Corp.  
7615 Kimbel St Unit 1  
Mississauga ON  
L5S 1A8

Telephone: (905) 673-1553  
FAX: (905) 673-8472  
e-mail: [info@i-gard.com](mailto:info@i-gard.com)  
Website: [www.i-gard.com](http://www.i-gard.com)

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