



DynAmp

DCEVT BUS / EARTH ISOLATOR SYSTEM 2500 VDC

Installation, Operation and Service Manual

Manual Item No. 047206

Rev. B

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DYNAMP, LLC WARRANTY

Items and components manufactured by DynAmp, LLC for permanent installation are warranted to be free from defects in material and workmanship for a period of two (2) years from the date of shipment.

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While all information presented is believed to be reliable and in accordance with accepted engineering practices, DynAmp, LLC makes no warranties as to the completeness of the information.

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INTRODUCTION

Safety Precautions and Hazard Warning

This equipment is designed to be connected to hazardous electric voltages. Ignoring the installation precautions and warnings can result in severe personal injury or equipment damage.

About this Manual

This manual is intended primarily for personnel who install, operate or service the Bus Isolator System in the field. Detailed descriptions of the Bus Isolator System, detailed specifications, installation instructions, troubleshooting and service instructions and theory of operation are presented.

Related Documentation

The complete set of documentation consists of this manual and applicable drawings.

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HAZARD WARNING!**GENERAL**

All installation, maintenance and service must be performed by qualified technicians who are familiar with the warnings and instructions of this manual.

Use of the equipment in a manner not specified by the manufacturer can impair the protection provided within.

DynAmp does not assume liability for the customer's failure to comply with the rules and requirements provided in this manual.

**HAZARDOUS
VOLTAGE**

This equipment is designed for use where the operator is either totally electrically isolated or essentially at the same potential as the bus. Ignoring the installation precautions and warnings can result in severe personal injury or equipment damage.

To avoid the risk of electrical shock or fire, the safety instructions and guidelines in this manual must be followed. The electrical specifications must not be exceeded and the unit must be installed according to directions provided.

**INSTALLATION**

This equipment is intended for indoor or outdoor use. The ambient temperature must not exceed 70°C.

For mounting considerations that fall outside the recommended specifications provided in this manual, the factory should be contacted for approval.

This unit is rated for installation category III, 300V and pollution degree 2.

Symbol Identification:

General definitions of safety symbols used on equipment and manual.



Caution/Warning: Refer to accompanying documents for instructions.

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DYNAMP, LLC CUSTOMER SUPPORT & SERVICE ASSISTANCE

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MANUAL REVISIONS

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all	New	New Manual	06/18
15	A	ECR # 2216 – update drawing revisions	07/18
15	B	ECO #3352 – update drawings 83B109564 & 83B109590	04/19

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1. SAFETY

1.1 OVERVIEW

This equipment is designed to be connected to hazardous electric voltages. Ignoring the installation precautions and warnings can result in severe personal injury or equipment damage. The following are general guidelines that should be followed when installing, operating and servicing the Bus Isolator System.

- Qualified technicians who are familiar with the warnings and instructions of this manual should perform all installation, maintenance and service procedures.
- Always follow all local and plant safety procedures.
- Hazardous voltage potentials exist inside the isolator system enclosure and in the vicinity of the desired voltage measurements. Use locally approved safety procedures when working near these hazardous potentials.
- Always use appropriate gloves and/or equipment specifically approved for hazardous voltages when working around hazardous potentials.
- Disconnect power to the system before servicing or replacing fuses. Replace fuse with the same type and size as originally supplied with the unit.
- Do not place the equipment in the rain, or under water, or submerge any part of the system.
- The equipment is not intrinsically safe. Do not place in explosive atmospheres.
- Use of the equipment in a manner not specified by the manufacturer can impair the protection provided.

DynAmp, LLC does not assume liability for the customer's failure to comply with the rules and requirements provided in this manual.

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2. PRODUCT DESCRIPTION

The DynAmp, LLC Bus Isolator System is designed to isolate DC process voltage and ground leakage current in a corrosive industrial environment. The system consists of:

- (2) 3000 VDC 6.3A Fuses, with appropriate fuse holders
- (1) Circuit breaker
- (2) 400k Ohm resistor networks
- (2) High voltage isolators
- (6) Low voltage isolators

All terminal blocks are finger-safe (IP20 rated). The resistor network is mounted on an FR4 insulator. All components are panel mounted and protected by a transparent polycarbonate cover. The panel assembly is housed in a fiberglass/polyester NEMA 4X / IP66 enclosure.

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3. PRODUCT SPECIFICATIONS

Dimensions

27.1" x 20.6" x 11.8"

689mm x 524mm x 300mm

Weight

52 lbs (26.7 kg)

Temperature

Temperature Coefficient (Bus voltage) 100 ppm / °C

Working Temperature - 10 °C to + 70 °C

Electrical

Signal Input 1 & 2 (Bus voltage) 0 to 2500 VDC

Signal Output 1 through 6 4 to 20 mA

Working Voltage (Basic Insulation) 3600 V AC / DC

Accuracy $\pm 0.15\%$

Burden Resistance (maximum) 600 ohm

Cutoff Frequency < 5 kHz

Power Supply Voltage 20 to 253 V AC / DC

Power Supply Input Frequency 48 to 62 Hz (AC), 0 Hz (DC)

Power Consumption (AC) 4 VA

Power Consumption (DC) 2 W

Working Voltage (Bus Voltage) 2500 VDC

Test Voltage

(Input to Output and Input to power supply) 15 kV AC for 1 minute (input to output)

4 kV AC for 1 minute (output to power supply)

3 kV DC for 1 minute (output / input / power supply
to panel)

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4. INSTALLATION

4.1 HANDLING PRECAUTIONS

The Bus Isolator System is intended for use in industrial environments. However, it should be handled with the same care as any precision measurement instrument. Personnel involved in the installation should be experienced with equipment of similar form and function, and should also be familiar with the technical terms, warnings, and instructions in this manual, and all plant safety rules, and be able to follow these.

The complete system should be inspected for shipping damage at the earliest opportunity. Visible damage must be reported to the carrier immediately. Concealed damage (not evident until the system is operated) must be reported to DynAmp, LLC immediately.

4.2 UNPACKING THE EQUIPMENT

Before unpacking any equipment, inspect the exterior packaging for visible damage incurred in transit. Remove the outer wrapping or packaging. Check all items against the packaging slip. If damage is suspected during shipping and handling, contact DynAmp, LLC Customer Support.

Open Enclosure door.

- ◆ Remove (2) metal screws holding RN1 Black Aluminum Mounting Bracket to the panel.
- ◆ Install (2) nylon screws to replace the metal screws just removed.
- ◆ Tighten snug. Do not overtighten.

Repeat for RN2.

For Transparent Fuse / Resistor Network Covers:

- ◆ Install Transparent Cover for F1 / RN1 on fiberglass rods.
- ◆ Secure cover on rods using (2 each) brass washer and nut. Tighten snug. Do not overtighten.
- ◆ Secure High Voltage Wire from F1 to A1 input inside wire duct on side of Cover.

Repeat for F2 / RN2.

4.3 INSTALLATION OF ENCLOSURE

The location of the DCEVT System Enclosure should be determined by the following factors:

1. The DCEVT System Enclosure is designed to be wall-mounted.
2. All holes for cable entry and exit to and from the enclosure must be drilled or punched in the bottom wall of the enclosure.
3. There must be adequate creepage and clearance distance between high voltage conductors, mains and output cables.
4. Appropriate cable glands must be installed on high voltage conductors, mains, and output cables.
5. Ambient air temperature must stay in the specified range at all times.
6. The mounting location should not be exposed to direct sunlight.

7. The mounting system (substrate and fasteners) for the enclosure must be rated for load of 110kG (minimum).
8. The hinged enclosure cover is secured in the closed position via (4) latches located on the enclosure.

4.4 CONNECTION TO PROCESS LINE, MAINS POWER AND SIGNAL OUTPUTS

1. Refer to “Assembly – 2.5kV Bus & Earth Leakage Isolation System (DCEVT)” drawing in manual.
2. Punch / drill holes in enclosure for (+) and (-) process bus connection and earth ground connection cables. Ensure that all cables routed in and out of the enclosure be on the bottom face with appropriate spacing between the high voltage cables and the mains/signal cables.
3. Remove insulating cover on F1 and F2.
4. Run (+) cable through appropriate hole with cable gland.
5. Before (+) cable is connected to the high voltage source, connect (+) cable to F1 fuse holder.
6. Before (-) cable is connected to the high voltage source, connect to Run (-) cable through appropriate hole with cable gland.
7. Connect (-) cable to F2 fuse holder.
8. Connect earth ground cable(s) at TB1-2 and/or TB1-3.
9. Install insulating cover on F1 and F2.
10. Repeat similar steps for mains power and signal cables.
11. The other end of the high voltage cables can now be connected to the related potentials.
12. Switch circuit breaker CB1 to “ON” position to energize the system.
13. Close and secure enclosure by engaging the (4) enclosure latches.

5. TROUBLESHOOTING AND SERVICE

5.1 ROUTINE MAINTENANCE

As is true with any electronic circuitry, proper maintenance will prolong the service life. DynAmp, LLC recommends the following program be performed at the recommended interval to prevent or detect damage to the System and to ensure continuing reliable performance. Always use appropriate measures to correct any problems found. Following the suggested maintenance may assist in early diagnosis of problem(s) to minimize repairs and down time.

CAUTION

All installation, maintenance and service must be performed by qualified technicians who are familiar with the warnings and instructions of the product manual.

Always follow all local and plant safety procedures.

Disconnect and lockout the three cables connected to the process voltage and earth ground at the physical location, where it is connected to the process bus and earth ground.

5.2 CLEANING INSTRUCTIONS

Dust and dirt may be removed from the System (should only be performed after disconnecting power) by gently vacuum cleaning the unit.

5.3 VERIFICATION

Periodic verification of the key instruments used in modern plants is a requirement of quality assurance programs such as ISO 9000.

A. PERMANENTLY INSTALLED SYSTEM

-Typically 48 months or as required by plant specific programs. The measurement system should be checked if there is an excessive difference between the measurement of the primary measurement system and a secondary (back up) system. Verification should also be performed if any change in the difference between the primary measurement system and secondary system is noted.

-Any time the accuracy or proper operation of a unit or units is in question.

5.4 SPARE PART REPLACEMENT



CAUTION: HAZARDOUS VOLTAGE PRESENT

To replace a spare part on Isolator System, **ensure that cables to process bus are disconnected from the source and locked out.** Unlatch to open the Isolator System enclosure door.

Replace a blown **fuse**:

- ◆ Remove (2) brass washer and nut holding fuse cover to panel.
- ◆ Pull fuse from fuse holder.
- ◆ Replace fuse with identical model and type.
- ◆ Replace the fuse cover on panel, replace brass washer and nut and tighten snug.

Replace a **circuit breaker**:

- ◆ Remove the wires from the terminals on the circuit breaker.
- ◆ Using a flat head screwdriver, release rail tab to remove the circuit breaker from the DIN rail.
- ◆ Install new circuit breaker on DIN rail.
- ◆ Replace wires on terminals, torquing to 22 in-lbs. / 2.5 Nm.

Replace an **isolator**:

- ◆ Remove wires from the terminals on the isolator.
- ◆ Using a flat head screwdriver, release rail tab to remove the circuit breaker from the DIN rail.
- ◆ Install new isolator on DIN rail.
- ◆ Replace wires on terminals, torquing to 4.4 in-lbs. / 0.5 Nm.

Close Isolator System enclosure door and latch to secure door closed. Reconnect the cables to process bus and unlock.

Requests for spare parts should be directed to the Service group at DynAmp, LLC during normal business hours. When contacting us, please present as much information as possible, such as the related equipment Model and Serial Numbers (available on the equipment tag); the required part name; its DynAmp, LLC item number (and other identifying or vendor number(s); and your time needs. An approved Purchase Order Number should be given with your order.

5.5 RECOMMENDED SPARE PARTS

The following table lists the minimum recommended quantities for spare parts for the Bus Isolator System. As spares are used, replacements should be ordered. Since continuous operation of measurement systems is usually critical, stocking spare parts should be given high priority.

**TABLE 5.1
SPARE PARTS LIST**

Description	Item No.	Quantity
Isolator, 0-2500Vin / 4-20mA	045867	1
Fuse, 3000V / 6.3A, 27mm x 178mm Ferrule	045860	2
Circuit Breaker, 277VAC 1A 2P	045170	1

5.6 RECOMMENDED REPLACEMENT INTERVAL

The design life of DynAmp systems is typically 15 years. With that in mind, the recommended replacement interval for this equipment is 15 years. However, specific site environmental, duty cycle, shock/vibration, electrical and physical handling conditions may shorten this interval for individual system components and /or the system overall.

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6. THEORY OF OPERATION

6.1 OVERVIEW

The positive process voltage is connected to the high voltage isolator input A1 (+) input via fuse F1. The positive process voltage is also connected to one end of 400 k Ohm resistor network RN1. The (-) input of A1 and the other end of RN1 are connected to earth ground.

The negative process voltage is connected to the high voltage isolator input A2 (-) input via fuse F2. The negative process voltage is also connected to one end of 400 k Ohm resistor network RN2. The (+) input of A2 and the other end of RN2, are connected to earth ground.

High voltage isolators A1 and A2 produce a 4 to 20 mA output signal that is proportional to the absolute value of each 0-2500 Vdc input voltage. The output of A1 and A2 are each galvanically isolated from the process voltage.

The 4 to 20 mA output of A1 is connected as the series input to three signal isolators, each with a 4 to 20 mA output (A3, A4 and A5). Outputs A3 through A5 are identical and are each proportional to the absolute value of the (+) 0-2500 Vdc input voltage.

The 4 to 20mA output of A2 is connected as the series input to three signal isolators, each with a 4 to 20 mA output (A6, A7 and A8). Outputs A6 through A8 are identical and are each proportional to the absolute value of the (-) 0-2500 Vdc input voltage.

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7. DRAWINGS

**TABLE 7.1
DRAWING LIST**

DRAWING TITLE	NUMBER	REVISION
Outline and Mounting, Bus/Earth Isolation System (DCEVT)	02B109622	B
Wiring Diagram & Schematic, 2.5kV Isolation System (DCEVT) 3x2 Output No. 1	83B109564	C
Wiring Diagram & Schematic, 2.5kV Isolation System (DCEVT) 3x2 Output No. 2	83B109590	C
Assembly, 2.5kV Bus & Earth Leakage Isolation System (DCEVT)	84B109563	A