



DynAmp

BUS ISOLATOR SYSTEM

Installation, Operation and Service Manual

Manual Item No. 047686

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.

Items and components manufactured by DynAmp, LLC for portable and temporary use in more than one location are warranted to be free from defects in material and workmanship for a period of eighteen (18) months from the date of shipment.

Extended warranties may be available for purchase for some products. Extended warranties are provided on a serial number by serial number basis as noted on DynAmp's original invoice and/or packing list.

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Warranty repair shall be, at DynAmp's option, in the form of repair or replacement of the defective items or components. Concerning warranty repairs, DynAmp, LLC will be responsible for DynAmp provided time, material and transportation costs (shipping or travel). Actual method of warranty repair / correction will be determined by DynAmp, LLC at DynAmp's sole option. Such warranty repair shall constitute a fulfillment of all DynAmp, LLC liabilities in respect to said items and components. In no event shall DynAmp, LLC be liable for consequential damages.

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This manual is part of the complete set of product documentation that includes installation, operation, and service instructions, drawings and test results. Users should evaluate the information in the context of the complete set of product documentation and their particular applications. DynAmp, LLC assumes no liability for any incidental, indirect, or consequential damages arising from the use of this documentation.

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.

All trademarks used in association with Bus Isolator are trademarks of DynAmp, LLC

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TABLE OF CONTENTS

<u>Paragraph</u>	<u>Title</u>	<u>Page</u>
DYNAMP, LLC WARRANTY	_____	III
TABLE OF CONTENTS	_____	V
HAZARD WARNING!	_____	VII
SAFETY	_____	IX
DYNAMP, LLC CUSTOMER SUPPORT & SERVICE ASSISTANCE	_____	XI
MANUAL REVISIONS	_____	XIII
INTRODUCTION	_____	XV
1. HANDLING AND STORAGE	.....	1
2. PRODUCT DESCRIPTION	.....	3
3. PRODUCT SPECIFICATIONS	.....	5
4. INSTALLATION	.....	7
4.1 HANDLING PRECAUTIONS	_____	7
4.2 UNPACKING THE EQUIPMENT	_____	7
5. THEORY OF OPERATION	.....	9
5.1 OVERVIEW	_____	9
6. TROUBLESHOOTING AND SERVICE	.....	11
6.1 ROUTINE MAINTENANCE	_____	11
6.2 CLEANING INSTRUCTIONS	_____	11
6.3 CALIBRATION	_____	11
6.4 SPARE PART REPLACEMENT	_____	12
6.5 RECOMMENDED SPARE PARTS	_____	12
7. DRAWINGS	.....	13
FIGURES, FORMS & TABLES	_____	
Figure #	Title.....	Page
Table 6.1	Spare Parts List.....	12
Table 7.1	Drawing List	13

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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.

Disconnect power to the system before servicing.

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 use only. It should be mounted in a well-ventilated area, away from high heat, dust, and corrosive atmosphere. The ambient temperature must not exceed specified limits.

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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SAFETY

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 to be followed during installation, operation and service of the Bus Isolator System.

- All installation, maintenance and service must be performed by qualified technicians who are familiar with the warnings and instructions of this manual.
- Always follow all local and plant safety procedures.
- Hazardous 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 within.

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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DYNAMP, LLC CUSTOMER SUPPORT & SERVICE ASSISTANCE

For further assistance, contact DynAmp, LLC Customer Support at:

Americas:

Telephone: +1 614.871.6900

Fax: +1 614.871.6910

8:00 AM to 5:00 PM USA Eastern Time

From first Sunday in November to second Sunday in March – 13:00 GMT to 22:00 GMT

From second Sunday in March to first Sunday in November – 12:00 GMT to 21:00 GMT

After Hours Critical Service Emergency:

Telephone: +1 614.871.6906

5:00 PM to 8:00 AM USA Eastern Time

From first Sunday in November to second Sunday in March – 22:00 GMT to 13:00 GMT

From second Sunday in March to first Sunday in November – 21:00 GMT to 12:00 GMT

Central e-mail:

help@dynamp.com

DynAmp web:

www.dynamp.com

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MANUAL REVISIONS

<u>Page</u>	<u>Rev</u>	<u>Reason For Revision</u>	<u>Date</u>
all	New		09/19
3, 5, 13	A	ECR 2275, Update Product Spec, Product Description pages and Drawing Revisions to 02B109678A and 84B109677A.	10/19
3, 5, 9, 12, 13	B	ECR 2295 – Updated specs in Section 4, changed F2 and F3 voltage from 1000V to 1500V, update drawing revisions to 75A109679A, 02B109675A and 84B109677B on Table 7.1	02/20

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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. I.

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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1. HANDLING AND STORAGE

DynAmp products are engineered and manufactured for use in industrial environments. However, they contain sensitive electronic and mechanical components which may be damaged and fail if not handled and stored properly. All products must be handled and stored with the same care as any precision measurement instrument. Severe bumps or jolts may damage internal parts and cause malfunction or premature failure. DynAmp products are designed and assembled with conformal coating, shock mounting, and environmental seals, when appropriate or when specified. However, this protection requires that the product must be properly installed and operational before the protection is fully functional. Therefore, adequate protection from humidity, shock, and temperature must be provided during handling and storage prior to installation.

The handling and storage of equipment must be sufficient to meet the storage temperature and humidity specifications of the product and to prevent any condensation or contact with water or any other liquid. The storage location and container or crate must provide adequate protection from precipitation (rain, snow, ice) and direct water contact. Adequate shelter must be provided to prevent the accumulation of precipitation (rain, snow, ice) and water which can lead to the deterioration or failure of shipping containers or crates and cause water ingress. Storage in coastal or industrial areas subject to salt-laden or corrosive air or areas of wind-driven sand or other abrasive dust must be adequate to prevent the deterioration or failure of shipping containers or crates and cause ingress. Frequent inspection of storage areas and storage containers or crates is required to ensure proper storage conditions are being maintained.

If the shipping container or crate is opened and/or the equipment is removed for inspection prior to installation, the equipment must be repackaged in the original undamaged container or crate in the same manner as it was shipped to prevent environmental damage or placed in a storage location that meets the required environmental and storage conditions.

General product storage temperature and humidity requirements:

Storage Temperature: -40 to 70° C
 -40 to 158° F

Storage Humidity: Maximum 85%, non-condensing

DynAmp, LLC does not assume liability for the customer's failure to comply with handling and storage requirements.

For further assistance, contact DynAmp customer support.

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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 ea) 1500 VDC 6A Fuses, with a salt-spray proof fuseholder
- (1 ea) Voltage-to-current resistor networks
- (2 ea) High voltage isolators

All terminal blocks are finger-safe (IP20 rated). The resistor network is housed in a DIN-rail mounted enclosure with a clear protective cover. All components above are mounted on “Transducer Panel”, which is housed in a fiberglass/polyester NEMA 4X / IP66 enclosure.

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3. PRODUCT SPECIFICATIONS

Dimensions:

18.58" H x 17.00" W x 10.49" D
(471.9 x 431.6mm x 266.4) mm

Weight

25 lbs (11.3kg)

Temperature

Temperature Coefficient (Bus voltage)	100 ppm / °C
Temperature Coefficient (Ground leakage)	100 ppm / °C
Working Temperature	- 10 °C to + 70 °C

Electrical

Signal Input 1 (Bus voltage)	0 to 1000 VDC
Signal Input 2 (Ground leakage)	-10 mA to 0 to +10 mA
Signal Outputs (Both units)	4 to 20 mA
Working Voltage (basic Insulation)	2200 V AC/DC

Bus Voltage

Gain Error (Bus voltage)	< 0.3% (of point)
Gain Error (Ground leakage)	< 0.8% (of point)
Cutoff Frequency (Bus Voltage)	>5 kHz
Cutoff Frequency (Ground leakage)	>10 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)	2 VA
Power Consumption (DC)	1 W
Working Voltage (Bus Voltage)	1800 V AC/DC
Working Voltage (Ground Leakage)	1500 VDC

Test Voltage:

(Input to Output and Input to power supply)	7000 VDC for 1 minute (input to output) 5500 VDC for 1 minute (output to power supply)
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4. INSTALLATION

4.1 HANDLING PRECAUTIONS

The Bus Isolator System is intended for use in industrial environments. However they 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.

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5. THEORY OF OPERATION

5.1 OVERVIEW

The Bus Isolator System performs two measurement functions:

- ◆ Measurement of process bus voltage
- ◆ Measurement of process bus leakage to earth

The system uses two high voltage isolators and a balanced resistor network to produce a 4-20mA output proportional to each of the two measurement functions. Refer to the “Wiring Diagram & Schematic” at the end of this manual.

The process bus voltage connections are made via two 1500V / 6A fuses. One fuse is connected to the positive bus, and the other is connected to the negative bus. The positive bus connection is presented to the positive input of a high voltage isolator. The negative bus connection is presented to the negative input of the same high voltage isolator. The 4 to 20mA millivolts output signal of this isolator is proportional to the difference between the positive and negative bus connections. This represents the total process bus voltage.

The positive bus connection (via the 1500V / 6A fuse) is also presented to one side of a balanced resistor network consisting of two 80k ohm elements in series. The negative bus connection (via the 1500V / 6A fuse) is also presented to the opposite side of the balanced resistor network.

The connection point of the two series resistors is presented to the positive input of the second isolator. The negative input of the isolator is connected to earth ground.

An ideal process bus is completely isolated from earth ground. In practice, there is often some amount of leakage from the process bus to earth.

If there is leakage from the process bus to earth ground, a small current will flow through the side of the resistor network where the leakage is present. This current will produce a voltage drop across the associated resistor element. This voltage (with respect to earth ground) is impressed across the input terminals of the isolator. In turn, a proportional output signal will appear at the 4 to 20mA output of the second isolator.

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6. TROUBLESHOOTING AND SERVICE

6.1 ROUTINE MAINTENANCE

As is true with any electronic system, proper maintenance will tend to 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 reliable performance. Always use appropriate measures to correct any problems found. Following the suggested maintenance schedule may assist in early diagnosis of problem(s) to minimize repairs and down time.

CAUTION
To avoid the risk of shock and electrocution, always disconnect the AC power before performing any cleaning or service operation on the metering unit.

6.2 CLEANING INSTRUCTIONS

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

6.3 CALIBRATION

Periodic calibration of the key instruments used in modern plants is a requirement of quality assurance programs such as ISO 9000. The recommended calibration period for the System is two years.

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.

B. PLANT CURRENT TRANSFER STANDARD

(Portable unit or group of units)

-Units used as portable standards should be verified by comparison to a permanent plant reference standard before and after each use. System accuracy can be affected by mishandling.

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

6.4 SPARE PART REPLACEMENT

Requests for spare parts should be directed to the Service group at DynAmp, LLC during normal 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.

6.5 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 often critical, stocking spare parts should be given high priority.

**TABLE 6.1
SPARE PARTS LIST**

Description	Item No.	Quantity
Fuse, 1500V / 6A, 20mm x 127mm Ferrule	047753	1
Fuse, 250V / 1A, Slo-Blo MDA1	012590	1

7. DRAWINGS

**TABLE 7.1
DRAWING LIST**

DRAWING TITLE	NUMBER	REVISION
SVC Nameplate, Data	75A109679	A
Outline and Mounting: Fiberglass Enclosure	02B109678	A
Wiring Diagram, Bus Isolator	02B109675	A
Assembly: Bus Isolator System	84B109677	B