

OPERATOR'S MANUAL

9000U ISOLATOR

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Note: Information in this manual is subject to change without prior notice or permission.



Warning Symbol

The symbol calls attention to the operating procedure, practice or the like which if not correctly performed or adhered to, could result in personal injury or damage to or destruction of part or all of the product and system. Do not proceed beyond a warning symbol until the indicated condition are fully understood and met.



Class-2 Type of instrument

Note: Class-2 – Instrument is using Line & Neutral for Power Supply Input.

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The contents of this manual are subject to change without prior notice.

Every effort has been made to ensure that the details of this manual are accurate. However, should any errors be found or important information be omitted, please contact your nearest Masibus representative or our sales office.

1. INTRODUCTION

1.1. Purpose of The Manual:

1.1.1. How to read this manual???

Installer: Read Chapters 1, 3, 7.

System Designer and New User: Read All Chapters

Expert User: Read Chapters 4, 7.

1.1.2. Regarding This User's Manual

- This manual should be provided to the end user. Keep an extra copy or copies of the manual in a safe place.
- Read this manual carefully to gain a thorough understanding of how to operate this product before starting operation.
- This manual describes the functions of this product. Masibus does not guarantee the application of these functions for any particular purpose.
- Under absolutely no circumstances may the contents of this manual, in part or in whole, be transcribed or copied without permission.
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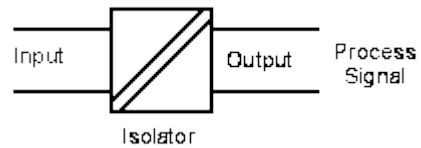
1.2. Description

1.2.1 The need for Isolation

Safety isolation is important for both manufacturers and consumers. Its purpose is to electrically separate hazardous circuits and transient sources from users and to protect products and their surroundings. Galvanic isolation is the most popular method. Transformers and opto isolators are examples of galvanic isolation. Transformers use separate windings to magnetically convert power from inputs to outputs. Opto isolators convert input signals into light and then convert it back for the output signals.

1.2.2 What Is Signal Isolator

Figure1: Signal Isolator



The Signal isolator is used to provide galvanic isolation from one signal (input) to another (output) and usually combines the converter function.

- Isolator is normally used to Provide isolation at three levels:

- (a) Between Power to Input & Output
- (b) Between Input to Output
- (c) Between Output and output.

1.3. Product Order Code

Model: 9000U

Input Type	APS		No of O/P & type				
X	XX		X		X		
C	4-20mA	U1	90-265 VAC	1	One	1	4-20mA
D	0-20mA	U2	18-36 VDC	2	Two	2	0-20mA
E	1-5VDC			3	Three	3	1-5VDC
F	0-5VDC			4	Four	4	0-5VDC
G	0-10VDC					5	0-10VDC
S	Special					S	Special

Table1: Product Ordering Code

- X – Specify from table1
- S – Specify from table 3, consult factory

For Example,
 Universal Linear Isolator with 4-20mA input & Dual output 4-20mA with 90-265 VAC aux. supply order code will be

9000-C-U1-2-1

2. SAFETY / WARNING PRECAUTIONS

2.1. Safety Precautions

Dangerous voltages capable of causing death are sometimes present in this instrument. Before installation or beginning of any troubleshooting procedures the power to all equipment must be switched off and isolated. Units suspected of being faulty must be disconnected and removed first and brought to a properly equipped workshop for testing and repair. Component replacement and interval adjustments must be made by a company person only.



2.2. Warning Precautions

- Before wiring, verify the label for correct model no. and options.
- Wiring must be carried out by personnel, who have basic electrical knowledge and practical experience.
- It is recommended that power of these units to be protected by fuses, circuit breakers or external over current rated at the minimum value possible.
- All wiring must confirm to appropriate standards of good practice and local codes and regulations. Wiring must be suitable for voltage, current, and temperature rating of the system.
- Beware not to over-tighten the terminal screws.
- Unused control terminals should not be used as jumper points as they may be internally connected, causing damage to the unit.
- Verify that the ratings of the output devices and the inputs as specified in Chapter 6 are not exceeded.
- Upon receipt of the shipment remove the unit from the carton and inspect the unit for shipping damage. If any damage due to transit, report and claim with the carrier. Write down the model number and serial number for future reference when corresponding with our *Customer Support Division*.
- Do not use this instrument in areas such as excessive shock, vibration, dirt, moisture, corrosive gases or rain. The ambient temperature of the areas should not exceed the maximum rating specified.

→ Provide power from a single-phase instrument power supply. If there is a lot of noise in the power line, insert an insulating transformer into the primary side of the line and use a line filter on the secondary side. As counter measures against noise, do not place the primary and secondary power cables close to each other.

3.0 INSTALLATION GUIDELINES

3.1. Mounting Details:

Universal Linear Isolator is DIN rail mounting type.

Max ambient conditions are tested for units kept under ideal test conditions, where the air around the test unit is moving and the unit is open to atmosphere from all sides. **In cases, where multiple units are mounted close to each other both vertically and horizontally, the conditions are very much different than the test conditions, in terms of air movement and ability of the unit to shed out its internal heat. It is therefore advised to make provision for ventilation and good air circulation inside the panel for long and reliable operation.**

Recommended way of mounting multiple Universal Linear Isolator-9000U units is shown below.

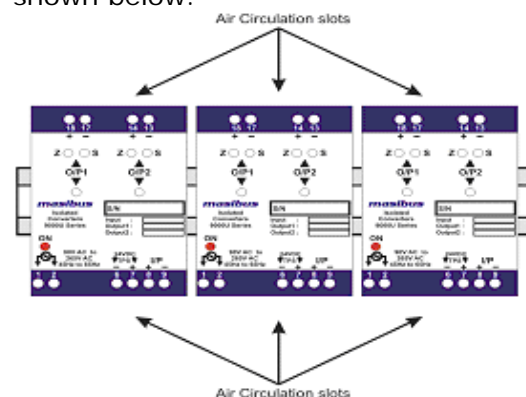


Figure2: DIN RAIL Mounting Details [For DOP 55mm]

As air vents are provided on the top and bottom part as shown in above figure of the unit, the (horizontal) mounting arrangement shown here, allows good vertical air circulation. It is also

recommended to keep adequate gap between two units. **Vertical mounting arrangement of multiple units is strictly not advised.**

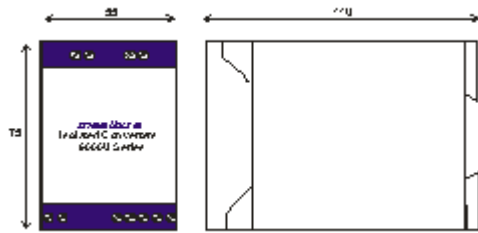


Figure3: Mechanical Drawing [For DOP 55mm]

3.2 Terminal Connection:

Connect rated power at appropriate terminals as marked on the front label. Label of default configuration is shown below.

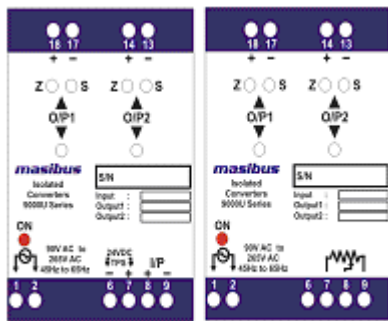
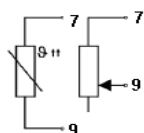


Figure4: Front Sticker Details [For DOP 55mm]

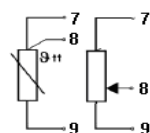
The "ON" LED will glow when power is applied to the unit. Connect Output-1 and Output-2 as shown here

Connect input between "IN+" and "IN-" symbol shown on the front label.

*** 2-Wire Resistance Measurement**



**** 3 - Wire Resistance Measurement**



*Short terminal 7 and 8.

Figure5: Connection Details

Connect input between TERMINAL 8 & 9 shown on the front label for 2-Wire Resistance Measurement input type

**Connect input between TERMINAL 7(OPEN), 8(WIPER), and 9(CLOSE) shown on the front label for 3-Wire Resistance Measurement input type.

For the potentiometric input type trim pot is provided for the input configuration

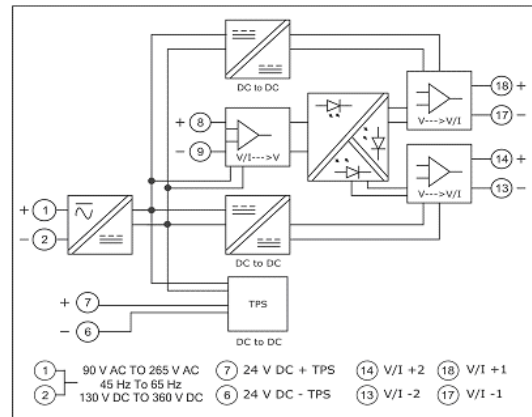


Figure6: Details For 90-265V AC Operated Unit [For DOP 55mm]:

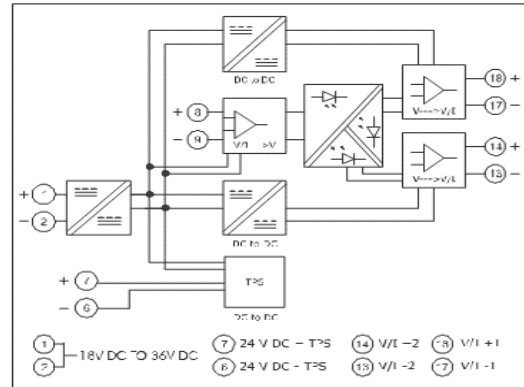


Figure7: Details For 18-36V DC Operated Unit [For DOP 55mm]:

4.0 OPERATION GUIDELINES

4.1 Test Setup:

Turn on the equipment. Connect the equipment as shown in figure.

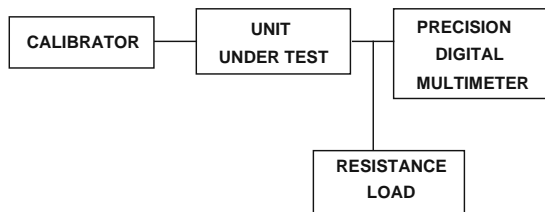


Figure8: Test Setup

This equipment requires an external power source, connect to an appropriate source.

The Unit gives the output according the Input feed from the appropriate source.

4.2 CALIBRATION PROCEDURE

Calibration for the unit should be carried out by an experienced engineer only. Equipment used for the calibration should be of high accurate (0.05% or better) and good stability.

Isolator output has to be calibrated at two points: Zero (Desired O/P value at minimum I/P value) at minimum Input value and Span (Desired O/P value at maximum I/P value) at full scale value.

For example: I/P is -1V to +1V and the desired o/p is 4mA to 20mA. So first at -1V I/P, O/P must be set to 4mA using zero pot and after that at 1V I/P, O/P must be set to 20mA using span pot.

In the calibration procedure the zero and span of the unit needs to be calibrated. There are two zero and two span pots, one zero and span pot pair is for trimming the output 1 of the unit and another zero and span pot pair is for trimming output 2 of the unit. For calibration zero of output 1, set the input at zero or minimum input, then using the zero pot adjust the reading on multimeter to 4.00mA, after that make input at maximum (max. Input value) and in this condition adjust the reading on multimeter to 20.00mA using span pot.

Check the zero again and repeat the procedure until zero and span are adjusted correctly. Now the zero and

span adjustment of the output 1 card are calibrated. Similarly calibrate output 2 of the unit. Trim pots are identified by "Z" for zero and "S" for span calibration for both output separately. For checking the Linearity takes reading in steps of 25%. Repeat the same procedure for calibrating the other output.

Similarly for the potentiometric input type the output has to be calibrated at two points: Zero (Desired O/P value at minimum I/P value) at minimum Input value and Span (Desired O/P value at maximum I/P value) at full scale value. Variable Resistance Box can be used for calibration

Note: For FOP calibrate output 3 & 4 of the unit as per above calibration procedure.

5.0 APPLICATION

Why Is Isolation So Important?

In most processes there are pieces of electronic measurement and control equipment from many different manufactures. The signals from these instruments are interconnected to each other and to sensors, transducers and output devices connected in the process loop. In any such measurement and control system there are several problems that are likely to occur, all of which can be solved by incorporating the appropriate isolation between signals.

APPLICATION AREA:

A typical application could be where the signal has to be distributed for indication on local panel, field control room, main control room and DCS system.

The Isolator provides a good protection for sensitive system parts against voltage spikes etc.

6.0 Specifications

6.1 Input:

Please Refer Sheet 1 attached at last of this document. Note here any of these I/O combinations are

Universal Linear Isolator 9000U

Ref No.: m92A/om/101

Issue No: 10

available with factory set. They are not field settable.

Input Impedance:

For Current I/P 51Ω

For Voltage I/P ≥ 5 MΩ

6.2 Power Supply:

90VAC to 265VAC 45Hz to 65Hz Std.

18VDC to 36VDC on request.

Power Consumption:

Less than 10VA

6.3 Output:

Please Refer Table 3 attached at last of this document.

Auxiliary Output:

Transmitter Power Supply 24VDC

Preferred Max load: 1.2KΩ

Max current Limit: 26mA Electronic

6.4 Isolation:

1.5KV AC between

Input to All Output

Output to Output

Input to Power

All Output to Power

6.5 Accuracy:

± 0.1% of FS

6.6 Environmental:

Humidity:

30 to 95% RH (Non-Condensing)

Ambient:

0 to 55 °C

Temperature Coefficient:

<100ppm

6.7 CMRR:

>100dB

6.8 NMRR:

>70dB

6.9 Mounting:

DIN RAIL (35 mm) Mounting

6.10 Load Resistance:

The table below shows corresponding load according to current or voltage ratings.

Load Resistance	O/Ps
750Ω	0mA to 20mA and 4mA to 20mA
910Ω	-10mA to +10mA
9.1KΩ	-1mA to +1mA and 0mA to 1mA
200Ω	0V to 1V, 0V to -1V, -1V to 0V, 1V to 0V, -1V to 1V and 1V to -1V
1KΩ	0V to 5V, 0V to -5V, 5V to 0V, -5V to 0V, -5V to +5V and +5V to -5V
2.7 KΩ & more	10V to 0V, -10V to 0V, 0V to 10V, 0V to -10V, -10V to 10V and 10V to -10V

Table2: Output Loading Details

6.11 Size:

Two Outputs:

45mm x 75mm x 110mm

55mm x 75mm x 110mm

Four Outputs:

100mm x 75mm x 110mm

7. TROUBLE SHOOTING

UNIT NOT TURNING ON

The problem can be bad connection / power of incorrect rating.

First check, power on terminal of the instrument itself if it is not present then the fault is in power chord.

⚠ One must take care while dealing with Power wirings because it may create electrical shock.

UNSTABLE READING

Check for loose connections.

First verify that all conventional instrumentation norms have been followed for wiring. Try using shielded cable for sensor input. Make sure that the shield is connected to Earth ONLY at

one end. This cable should not be routed along side with high tension or power cables.

Check for ripple on power supplies of Input section and Output sections. If power supplies have ripples, input voltage may be low or there is some failure on power supply card.

⚠ Please note that this is an isolator, and the Input and Output sections are electrically isolated from each other. Therefore, any power supply measurements should be done with respect to proper grounds.

OUTPUT NOT MATCHING WITH THE EXPECTED VALUE

It is a normal tendency to doubt the instrument performance, when the Output is not matching the expected value. Kindly make sure that the output is really incorrect with respect to input signal, before attempting any re-calibration.

Account for measuring instrument's inaccuracies, lead errors and calibration errors. Care must be taken when measuring Output signal.

An ordinary 3½ digit multimeter is used it can show reading which deviates from what the instrument is showing as the accuracy of the multimeter may not be as good as the that of the instrument. So use calibrating instrument of accuracy better than 0.1% for purpose of calibration.

If the signal is still found to be out of tolerance, calibration should be attempted as described in the next section.

VAGUE READING

The reason can be reverse input connections.

INFORMATION ABOUT CARDS

This unit consists of five cards:

- (a) SMPS based supply card

- (b) Signal conditioner card
- (c) Terminal Card
- (d) Trim pot Card

SMPS based power supply card

This card contains basic Switch Mode Power Supply with I/P fusible resistor. And two isolated supplies of +/-15V and Non Isolated TPS o/p are generated on this card. Using burg strips this card is connected to terminal card.

⚠ While dealing with SMPS card please take care that it is not connected to mains supply. One may get high voltage shocks.

Signal conditioner Card

This card contains signal conditioner of the input section. This card contains analog Isolation circuit and is connected to terminal plate with the help of burg strips.

⚠ Please note that some of the components on signal conditioning card are not ESD protected. Direct human touch can damage semi conducting devices permanently.

Terminal Card

All input, output and supply terminals are mounted on this card. The other three cards are also attached to this card using mating connections.

Trim pot Card

This card contains "Power On" indication LED, calibration trim pots as well as current O/P indication LEDs.

Table3: Input/Output Ranges

Type Of Signal	INPUTS	OUTPUTS
----------------	--------	---------

Unidirectional Increasing Voltage	0 to 10mV	0 to 1V
	0 to 50mV	
	0 to 100mV	0 to 5V
	0 to 1V	
	0 to 5V	0 to 10V
	0 to 10V	
	0 to 24V	
	0 to 600V	
Unidirectional decreasing Voltage	0 to -10mV	0 to -1V
	0 to -50mV	0 to -5V
	0 to -100mV	
	0 to -1V	0 to -10V
	0 to -5V	
	0 to -10V	
	0 to -24V	
Positive Unidirectional decreasing Voltage	+10mV to 0	+1V to 0
	+50mV to 0	+5V to 0
	+100mV to 0	
	+1V to 0	+10V to 0
	+5V to 0	
	+10V to 0	
Negative Unidirectional decreasing Voltage	-10mV to 0	-1V to 0
	-50mV to 0	-5V to 0
	-100mV to 0	
	-1V to 0	-10V to 0
	-5V to 0	
	-10V to 0	
Bi directional increasing Voltage	-10mV to +10mV	-1V to +1V
	-50mV to +50mV	
	-100mV to +100mV	-5V to +5V
	-1V to +1V	
	-5V to +5V	-10V to +10V
	-10V to +10V	
Bi directional decreasing Voltage	+10mV to -10mV	+1V to -1V
	+50mV to -50mV	+5V to -5V
	+100mV to -100mV	
	+1V to -1V	+10V to -10V
	+5V to -5V	
	+10V to -10V	
Unidirectional Increasing current	0mA to 1mA	0mA to 20mA
	0mA to 20mA	4mA to 20mA
	4mA to 20mA	
Bi directional Increasing Current	-1mA to +1mA	-1mA to +1mA
	-5mA to +5mA	-10mA to +10mA
	-10mA to +10mA	
Bi directional decreasing Current	+1mA to -1mA	+1mA to -1mA
	+5mA to -5mA	+10mA to -10mA
	+10mA to -10mA	

<p>Potentiometric Input type</p>	<p>0 to 10k 0 to 120 ohms 0 to 250 ohms 0 to 1000 ohms & 0 to 2000 ohms (Other on demand)</p>	<p>4mA to 20 mA (if any one of I/P terminal is open then O/P will go high. (max.24mA)).</p>
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Max. Allowable voltage = 200% of full scale.

Note:

Please refer one more manual – page **Appendix A** Terminal Details for FOP - Ref No.: m92A/om/301 [For FOP 100mm and TOP].

Please refer one more manual – page **Appendix B** Terminal Details for DOP - Ref No.: m92A/om/201 [For DOP 45mm].