

## SPECIFICATIONS

### Input

#### Voltage Input

Range Limits: 10mV to 100V  
Impedance: >100K $\Omega$   
Overload: 400 VRMS, max.

#### Current Input

Range Limits: 1mA to 100mA  
Impedance: 20 $\Omega$ , typical  
Overcurrent: 170mA RMS, max.  
Overvoltage: 60VDC  
Zero Turn-Up: 50% of full scale input

Span Turn-Down: 50% of full scale input

#### Common Mode (Input to Ground)

1800 VDC, max.

### Output (DRG-SC-DC-U)

#### Voltage Output

Output: 0-5V, 0-10V  
Source Impedance: <10 $\Omega$   
Drive: 10mA, max.

#### Current Output

Output: 0-1mA, 4-20mA, 0-20mA  
Source Impedance: >100K $\Omega$   
Compliance:  
0-1mA: 7.5V, max (7.5K $\Omega$ )  
4-20mA: 12V, max (600 $\Omega$ )  
0-20mA: 12V, max (600 $\Omega$ )

### Output (DRG-SC-DC-B)

#### Voltage Output

Output: -5 to +5V, -10 to +10V  
Impedance: <10 $\Omega$   
Drive: 10mA, max.

### LED indication (green)

#### Input Range

>110%(approx) input: 8Hz flash  
< -10%(approx) input: 4Hz flash

### Accuracy (Including Linearity,

#### Hysteresis)

<2mA/<20mV:  $\pm$  0.35% of full scale, typical; 0.5%, max.  
>2mA/>20mV:  $\pm$  0.1% of full scale, typical; 0.2%, max.

### Response Time (10-90%)

200mSec., typical

### Stability (Temperature)

$\pm$ 0.025% of full scale/ $^{\circ}$ C, typical;  
 $\pm$ 0.05%/ $^{\circ}$ C, max.

### Common Mode Rejection

DC to 60Hz: 100dB

### Isolation (Input to Output)

1800VDC between input, output and power

### EMC Compliance (CE Mark)

Emissions: EN50081-1  
Immunity: EN50082-2  
Safety: EN50178

### Mean Time Between Failures

60K Hours (DRG-SC-DC)

### Humidity (Non-Condensing)

Operating: 15 to 95% (@ 45 $^{\circ}$ C)  
Soak: 90% for 24 hours (@ 65 $^{\circ}$ C)

### Temperature Range <sup>1</sup>

Operating: 0 to 55 $^{\circ}$ C (32 to 131 $^{\circ}$ F)  
Storage: -25 to 70 $^{\circ}$ C (-13 to 158 $^{\circ}$ F)

### Wire Terminal

Screw terminals for 12-22AWG

### Power

Consumption: 1.5W typical, 2.5W max.  
Range: 9 to 30VDC

### Mounting

32mm or 35mm DIN rail

### Weight

.5lbs

### Agency Approvals

CSA certified per standard C22.2, No. 0-M91 and 142-M1987 (File No. LR42272).  
UL recognized per standard UL508 (File No. E99775). CE Conformance per EMC directive 89/336/EEC and low voltage 73/23/EEC (Input  $\leq$  75VDC).

### PIN CONNECTIONS

11 DC Power (+)  
12 DC Power (-)  
21 DC Power (+)  
22 DC Power (-)  
41 Input (+)  
42 Input (-)  
51 Output (+)  
52 Output (-)



## DRG-SC-DC DC Input Field Configurable Isolator

Instruction Sheet M2394/0796

### DESCRIPTION

The DRG-SC-DC is a DIN rail mount, DC input signal conditioner with 1800VDC isolation between input, output and power. The field configurable input and output offers flexible, wide ranging capability for DC current and voltage signals.

The input of the DRG-SC-DC can be configured for any one of 12 voltage ranges from 10mV to 100V or 6 current ranges from 1mA to 100mA (see table 1). The output is linear to the input and can be set for either 0-5V, 0-10V, 0-1mA, 0-20mA or 4-20mA (for model DRG-SC-DC-U) and -5 to +5V or -10 to +10V (for model DRG-SC-DC-B).

Wide ranging, precision zero and span pots allow 50% adjustability of offset and span turn-down within each of the 18 switch selectable ranges. For example, the 0-2mA input range could be turned down to 0-1mA and provide a full scale output signal (e.g. 4-20mA), or turned down and offset to achieve a 1-2mA/4-20mA I/O combination.

The DRG-SC-DC accepts bipolar inputs (e.g. 10V range set to bipolar = -10 to +10V) and offers selectable normal, or reverse operation (e.g. 4-20mA/20-4mA). The ASIC based I/O channel is optically isolated to 1800VDC and is transformer isolated from the power supply.

### APPLICATION

The DRG-SC-DC field configurable isolator is useful in eliminating ground loops, converting signal levels, and providing signal drive. The field configurable, wide ranging capability ensures maximum flexibility for most DC to DC applications, minimizing spare part requirements.

### DIAGNOSTIC LED

The DRG-SC-DC is equipped with a dual function LED signal monitor. The green, front mounted LED indicates both DC power and input signal status. Active DC power is indicated by an illuminated LED. If the input signal is more than 110% of the full scale range, the LED will flash at 8Hz. Below -10%, the flash rate is 4Hz.

### CONFIGURATION

A major advantage of the DRG-SC-DC is its wide ranging capability and ease of configuration. The DRG-SC-DC has 18 input range settings. Trim potentiometers allow 50% input zero and span adjustability within each of the 18 full scale input ranges.

Unless otherwise specified, the factory presets Model DRG-SC-DC-U and DRG-SC-DC-B as follows:

#### DRG-SC-DC-U

Input Range: 4-20mA  
Output Range: 4-20mA

#### DRG-SC-DC-B

Input Range: 4-20mA  
Output Range: -10 to +10V

The DC power input accepts any source between 9 and 30V; typically a 12V or 24VDC source is used.

Redundant (parallel) power terminals are provided as a wiring convenience. When multiple units are powered from the same source, power can be connected from one unit to the next, in parallel strings of up to 24 units (5 Amps maximum).

**WARNING! Do not attempt to change any switch settings with power applied. Severe damage will result!**

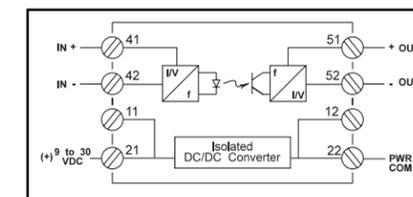


Figure 1: DRG-SC-DC block diagram.

Refer to Tables 1 through 5 for the proper switch settings. Use the switches on SW3 to select the input type (voltage or current), SW1 to select the desired input range and function setting and SW2 to select the desired type of output.

### CALIBRATION

1. After configuring the dip switches, connect the input to a calibrated DC source. Connect the output to the actual device load (or a load approximately equivalent to the actual device load value) and apply power.

*Note: To maximize thermal stability, final calibration should be performed in the operating installation, allowing approximately 1 to 2 hours for warm up and thermal equilibrium of the system.*

2. Set the calibrator to the desired minimum input and adjust the zero potentiometer for the desired minimum output.

3. Set the calibrator to the desired maximum input and adjust the span potentiometer for the desired maximum output.

4. Repeat steps 2 and 3, as necessary, for best accuracy.



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### RETURN REQUEST/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence. The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:

1. P.O. number under which the product was PURCHASED.
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product

FOR NON-WARRANTY REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. P.O. number to cover the COST of the repair.
2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

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WARNING: These products are not designed for use in, and should not be used for, patient connected applications.

Table 1: Input Range Selector- Switch settings for both DRG-SC-DC-U and DRG-SC-DC-B.

Input Ranges		SW1			
Voltage	Current	1	2	3	4
20mV	2mA			■	■
50mV	5mA		■		
100mV	10mA		■		
200mV	20mA		■		
500mV	50mA		■		
1 V	100mA	■			
2 V		■			
5 V		■			
10 V		■			
25 V		■			
50 V		■			
100 V		■			

Table 2: Input Range and function settings for both DRG-SC-DC-U and DRG-SC-DC-B.

Functions	SW1	
	5	6
Unipolar	■	X
Bipolar		X
Normal	X	
Reverse	X	■

KEY ■ = ON  
X = Don't Care

Table 3: Input Voltage or Current Selector- Switch settings for both DRG-SC-DC-U and DRG-SC-DC-B.

Input	SW1	
	7	8
Voltage	■	
Current		■

Table 4: Output Range Selector-Switch settings for DRG-SC-DC-U.

Output Ranges	SW2							
DRG-SC-DC-U	1	2	3	4	5	6	7	8
0 to 5V	■	■	■	■				
0 to 10V	■							
0 to 1mA		■	■					
4 to 20mA						■	■	■
0 to 20mA	■	■						

Table 5: Output Range Selector-Switch settings for DRG-SC-DC-B.

Output Ranges	SW1	
DRG-SC-DC-B	9	10
-5 to +5V	X	■
-10 to +10V	X	

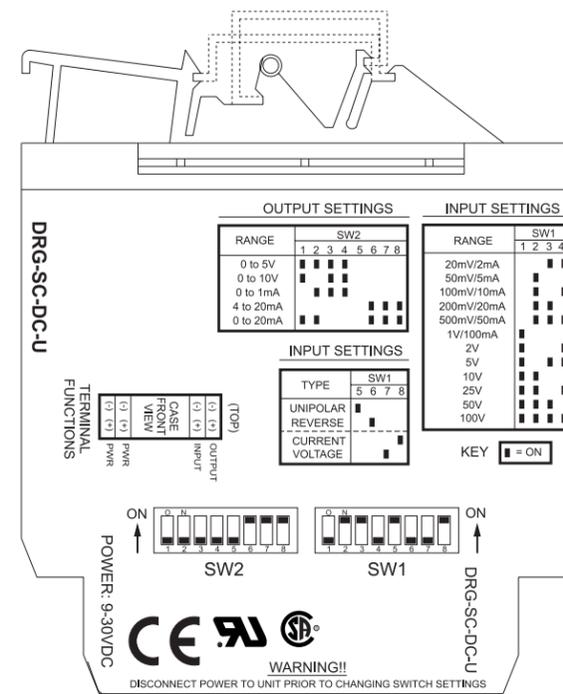


Figure 2: DRG-SC-DC-U factory calibration; 4-20mA, unipolar input, normal operation, 4-20mA output.

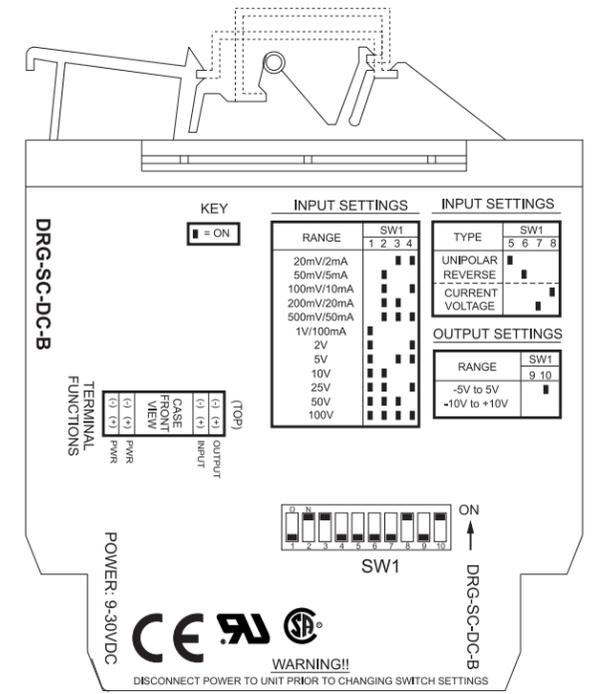


Figure 3: DRG-SC-DC-B factory calibration; 4-20mA, unipolar input, normal operation, -10 to +10V output.

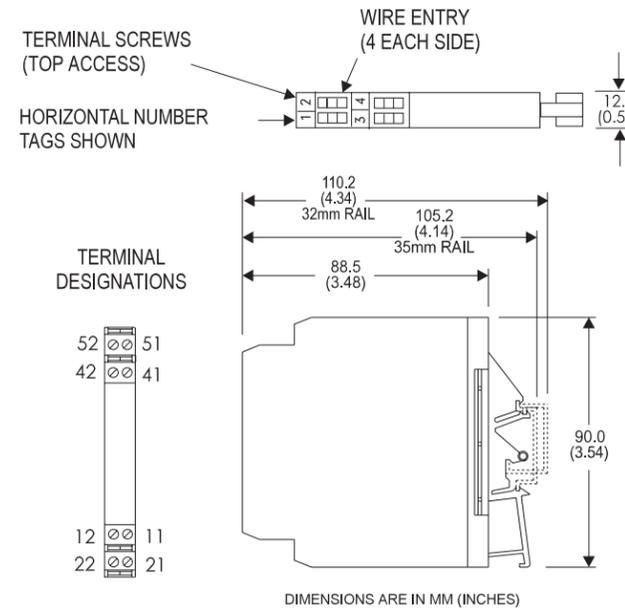
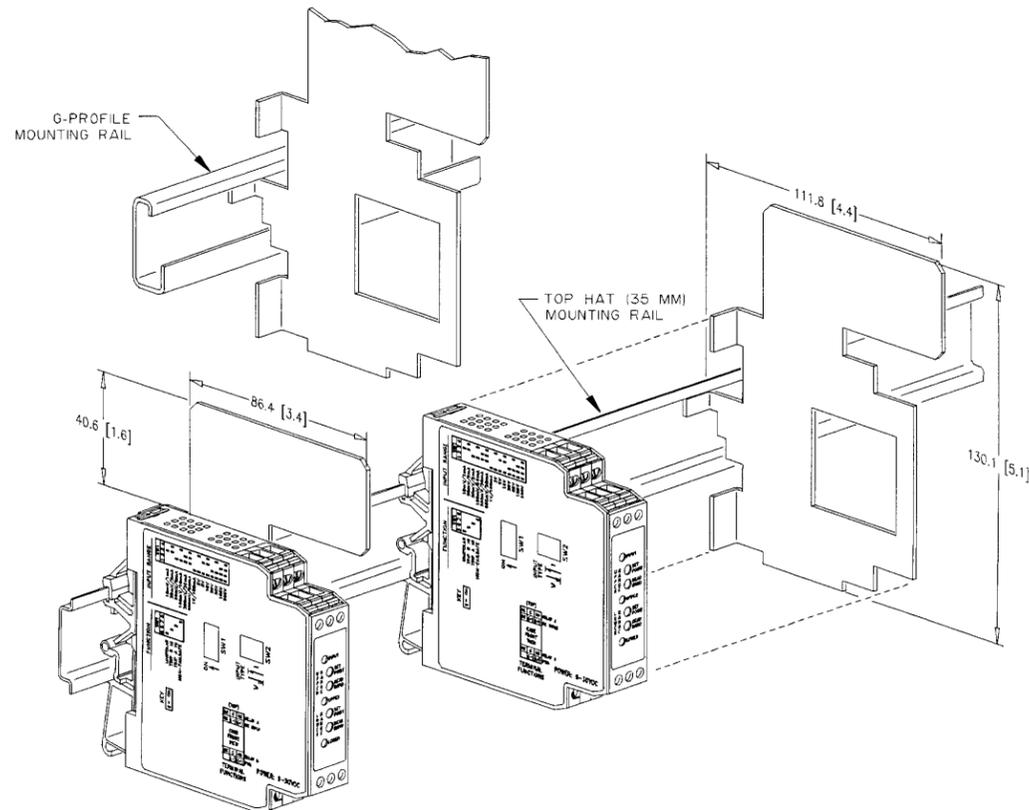


Figure 4: Mechanical dimensions for both DRG-SC-DC-U and DRG-SC-DC-B.

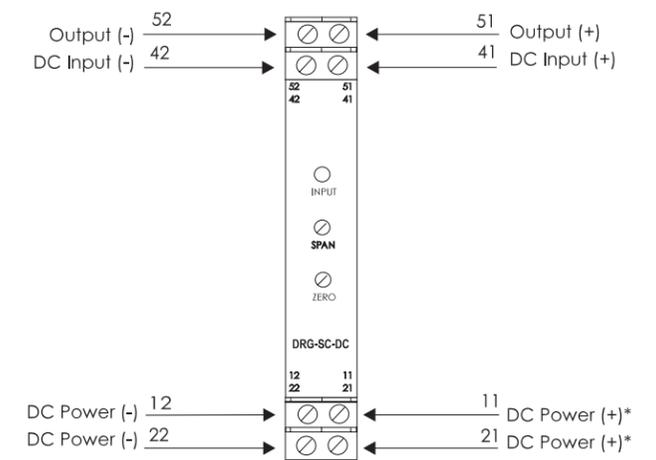


Figure 5: Wiring diagram for both DRG-SC-DC-U and DRG-SC-DC-B

Note1: All DRG series modules are designed and tested to operate in ambient temperatures from 0 to 55°C, when mounted on a horizontal DIN rail. When five or more modules are mounted on a vertical rail, circulating air or model DRG-HS01 Heat Sink is recommended.

\*NOTE: Redundant (parallel) power terminals are provided to daisy chain power connections in high density applications.

## SPECIFICATIONS

### Input

#### Voltage Input

Range Limits: 10mV to 100V  
Impedance: >100KΩ  
Overload: 400 VRMS, max.

#### Current Input

Range Limits: 1mA to 100mA  
Impedance: 20Ω, typical  
Overcurrent: 170mA RMS, max.  
Overvoltage: 60VDC  
Zero Turn-Up: 50% of full scale input  
Span Turn-Down: 50% of full scale input

#### Common Mode (Input to Ground)

1800 VDC, max.

### Output

Output: 0-5V, 0-10V

Source Impedance: <10Ω  
Drive: 10mA, max.

#### Current Output

Output: 0-1mA, 4-20mA, 0-20mA  
Source Impedance: >100KΩ  
Compliance:  
0-1mA: 7.5V, max (7.5KΩ)  
4-20mA: 12V, max (600Ω)  
0-20mA: 12V, max (600Ω)

### LED indication (green)

#### Input Range

>110%(approx) input: 8Hz flash  
< -10%(approx) input: 4Hz flash

### Accuracy (Including Linearity, Hysteresis)

<2mA/<20mV: ± 0.35% of full scale, typical; 0.5%, max.  
>2mA/>20mV: ± 0.1% of full scale, typical; 0.2%, max.

### Response Time (10-90%)

200mSec., typical

### Stability (Temperature)

±0.025% of full scale/°C, typical;  
±0.05%/°C, max.

### Common Mode Rejection

DC to 60Hz: 100dB

### Isolation (Input to Output)

1800VDC between  
input, output and power

### ESD Susceptibility

Meets IEC 801-2, Level 2 (4KV)

### Mean Time Between Failures

60K Hours

### Humidity (Non-Condensing)

Operating: 15 to 95% @ 45°C  
Soak: 90% for 24 hours (@ 65°C)

### Temperature Range <sup>1</sup>

Operating: 0 to 55°C (32 to 131°F)  
Storage: -25 to 70°C (-13 to 158°F)

### Wire Terminal

Screw terminals for 12-22AWG

### Power

Consumption: 1.5W typical,  
2.5W max.

Range: 9 to 30VDC

### Agency Approvals

CSA certified per standard C22.2, No. 0-M91 and 142-M1987 (File No. LR42272).

UL recognized per standard UL508 (File No. E99775). CE Conformance per EMC directive 89/336/EEC and low voltage 73/23/EEC (Input ≤ 75VDC).

### PIN CONNECTIONS

11 DC Power (+)  
12 DC Power (-)  
21 DC Power (+)  
22 DC Power (-)  
41 Input (+)  
42 Input (-)  
51 Output (+)  
52 Output (-)



## DRG-SC-DC-U

### DC Input Field Configurable Isolator

Instruction Sheet M2394/0796

### DESCRIPTION

The DRG-SC-DC is a DIN rail mount, DC input signal conditioner with 1800VDC isolation between input, output and power. The field configurable input and output offers flexible, wide ranging capability for DC current and voltage signals.

The input of the DRG-SC-DC-U can be configured for any one of 12 voltage ranges from 10mV to 100V or 6 current ranges from 1mA to 100mA (see table 1). The output is linear to the input and can be set for either 0-5V, 0-10V, 0-1mA, 0-20mA or 4-20mA.

Wide ranging, precision zero and span pots allow 50% adjustability of offset and span turn-down within each of the 18 switch selectable ranges. For example, the 0-2mA input range could be turned down to 0-1mA and provide a full scale output signal (e.g. 4-20mA), or turned down and offset to achieve a 1-2mA/4-20mA I/O combination.

The DRG-SC-DC-U accepts bipolar inputs (e.g. 10V range set to bipolar = -10 to +10V) and offers selectable normal, or reverse operation (e.g. 4-20mA/20-4mA). The ASIC based I/O channel is optically isolated to 1800VDC and is transformer isolated from the power supply.

### APPLICATION

The DRG-SC-DC-U field configurable isolator is useful in eliminating ground loops, converting signal levels, and providing signal drive. The field configurable, wide ranging capability ensures maximum flexibility for most DC to DC applications, minimizing spare part requirements.

### DIAGNOSTIC LED

The DRG-SC-DC-U is equipped with a dual function LED signal monitor. The green, front mounted LED indicates both DC power and input signal status. Active DC power is indicated by an illuminated LED. If the input signal is more than 110% of the full scale range, the LED will flash at 8Hz. Below -10%, the flash rate is 4Hz.

### CONFIGURATION

A major advantage of the DRG-SC-DC-U is its wide ranging capability, ease of configuration and the 18 input range settings. Trim potentiometers allow 50% input zero and span adjustability within each of the 18 full scale input ranges.

Unless otherwise specified, the factory presets Model DRG-SC-DC-U as follows:

Input Range: 4-20mA  
Output Range: 4-20mA

The DC power input accepts any source between 9 and 30V; typically a 12V or 24VDC source is used.

**WARNING! Do not attempt to change any switch settings with power applied. Severe damage will result!**

Refer to Tables 1 through 5 for the proper switch settings. Use the switches on SW3 to select the input type (voltage or current), SW1 to select the desired input range and function setting and SW2 to select the desired type of output.

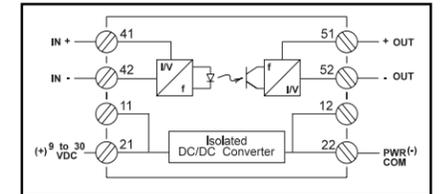


Figure 1: DRG-SC-DC-U block diagram.

### CALIBRATION

1. After configuring the dip switches, connect the input to a calibrated DC source. Connect the output to the actual device load (or a load approximately equivalent to the actual device load value) and apply power.

Note: To maximize thermal stability, final calibration should be performed in the operating installation, allowing approximately 1 to 2 hours for warm up and thermal equilibrium of the system.

2. Set the calibrator to the desired minimum input and adjust the zero potentiometer for the desired minimum output.

3. Set the calibrator to the desired maximum input and adjust the span potentiometer for the desired maximum output.

4. Repeat steps 2 and 3, as necessary, for best accuracy.



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### WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of manufacturing defects for the life of the product. If the unit should malfunction, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

### RETURN REQUEST/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence. The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:

1. P. O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product

FOR NON-WARRANTY REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. P. O. number to cover the COST of the repair,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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It is the policy of OMEGA to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct but OMEGA Engineering, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, patient connected applications.

Table 1: Input Range Selector- Switch settings for DRG-SC-DC-U.

Input Ranges		SW1			
Voltage	Current	1	2	3	4
20mV	2mA			■	■
50mV	5mA		■		
100mV	10mA		■		
200mV	20mA		■	■	
500mV	50mA		■	■	■
1 V	100mA	■			
2 V		■			
5 V		■			
10 V		■	■		
25 V		■	■	■	
50 V		■	■	■	■
100 V		■	■	■	■

Table 2: Input Range and function settings for DRG-SC-DC-U.

TYPE	SW1			
	5	6	7	8
UNIPOLAR	■			
REVERSE		■		
CURRENT				■
VOLTAGE			■	

Table 3: Output Range Selector-Switch settings for DRG-SC-DC-U.

Output Ranges	SW2							
DRG-SC-DC-U	1	2	3	4	5	6	7	8
0 to 5V	■	■	■	■				
0 to 10V	■		■	■				
0 to 1mA		■	■	■				
4 to 20mA					■	■	■	
0 to 20mA	■	■			■	■	■	

KEY  
 ■ = ON  
 X = Don't Care

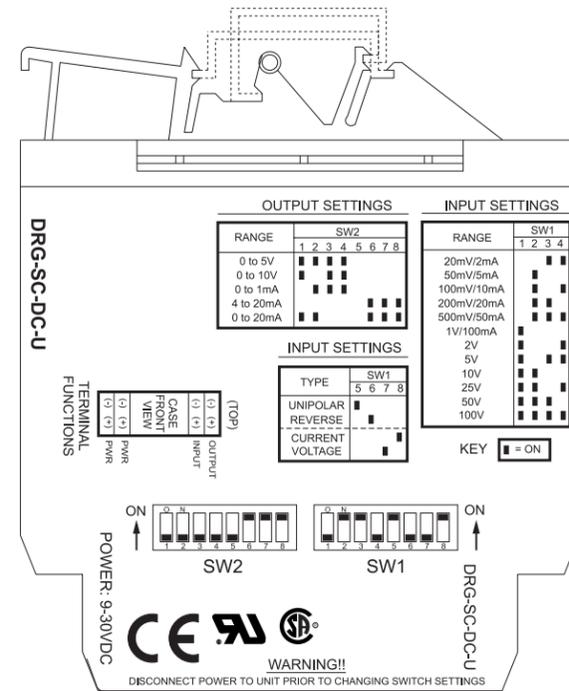


Figure 2: DRG-SC-DC-U factory calibration; 4-20mA, unipolar input, normal operation, 4-20mA output.

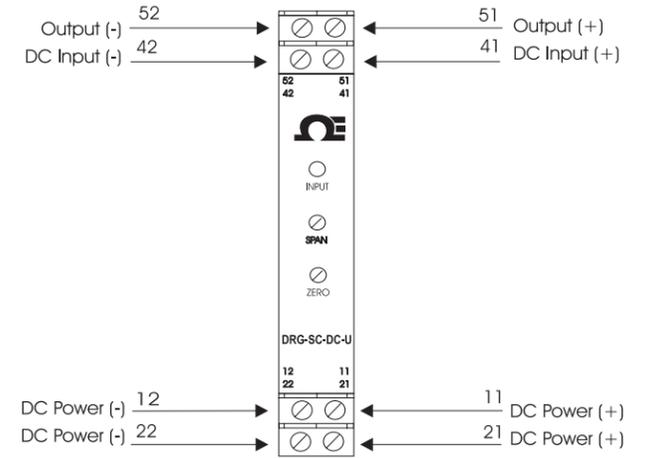
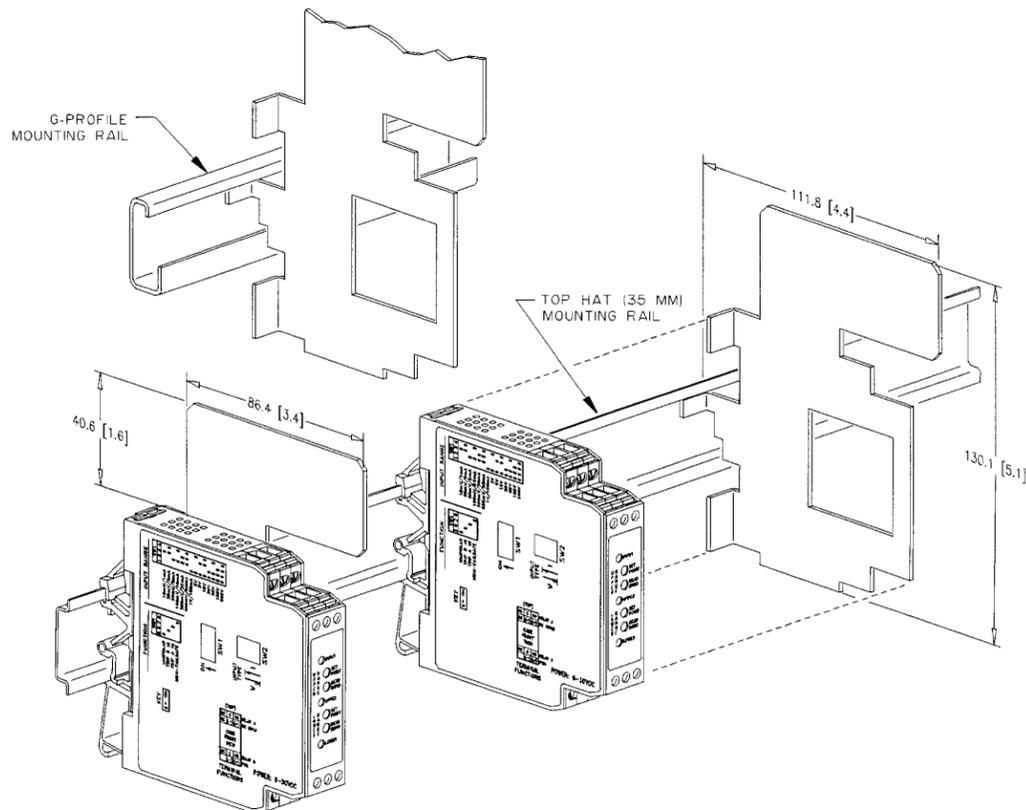


Figure 3: Wiring diagram for both DRG-SC-DC-U.



Note1: All modules are designed and tested to operate in ambient temperatures from 0 to 55°C, when mounted on a horizontal DIN rail. When five or more modules are mounted on a vertical rail, circulating air or model DRG-HS01 Heat Sink is recommended.

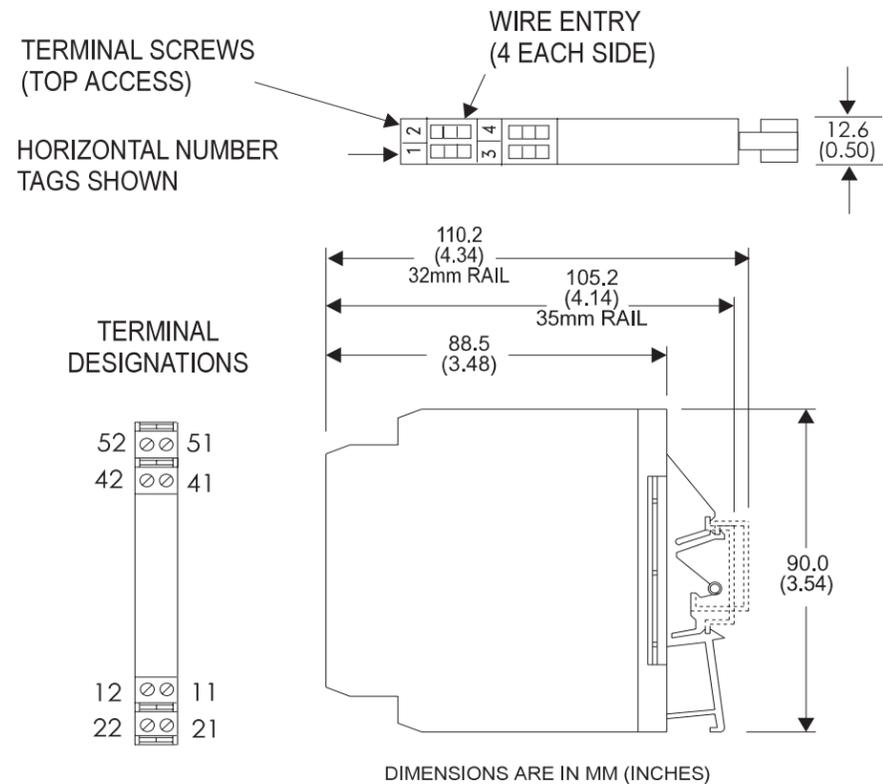


Figure 4: Mechanical dimensions for DRG-SC-DC-U.