SPECIFICATIONS

Input
- Voltage Input
- Full Scale Range: 10mV to ±200mV (Table 1).
- Impedance: >1MΩ
- Overvoltage: 400Vrms, max. (intermittent); 264Vrms, max. (continuous).
- Common Mode (Input to Ground): 1800VDC, max.
- Zero Turn-Up: 50% of full scale range
- Span Turn-Down: 50% of full scale range
- Operation: direct or reverse acting

Output
- Voltage Output
  - Output: 0-5V, 0-10V
  - Impedance: <10Ω
  - Drive: 10mA, max. (1KΩ, min. @ 10V)
- Current Output
  - Output: 0-1mA, 0-20mA, 4-20mA
  - Impedance: >100KΩ
  - Compliance: 0-1mA; 7.5V, max.(7.5KΩ, max.) 0-20mA; 12V, max. (600Ω, max.) 4-20mA; 12V, max. (600Ω max.)

Bridge Excitation
1 to 10VDC, 120mA max.

Accuracy (Including Linearity, Hysteresis)
±0.1% typical, ±0.2% maximum of selected range at 25°C.

Stability
±0.025%/°C typical, 0.05%/°C maximum, of selected full scale range.

Output Noise (maximum)
0.1% of span, rms, or 10mV whichever is greater.

Response Time (10 to 90%)
<200mSec., typical.

Common Mode Rejection
DC to 60Hz:[3]120dB
[3]100dB (0 -1mA, range)

Isolation
1800VDC between input, output and power.

EMC Compliance
Emmissions: EN50081-1
Immunity: EN50082-2
Safety:EN50178

LED Indication (green)
Input Range (approx.)
>110% input: 8Hz flash
<0% input: 4Hz flash

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

Temperature Range[1]
Operating: 0 to 55°C (32 to 131°F)
Storage: -25 to 70°C (-13 to 158°F)

Power
- Consumption: 1.5W typical, 2.5W max. (one 350Ω bridge), 4W max. (four 350Ω bridges).
- Range: 18 to 30VDC

Wire Terminations
Screw terminals for 12-22 AWG

Mounting:
32mm or 35mm DIN Rail

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 Con formance per EMC directive 89/336/EEC and low voltage 73/23/EEC.

PIN CONNECTIONS

11	DC Power (+)
12	DC Power (-)
13	No Internal Connection
21	DC Power (+)
22	DC Power (-)
23	No Internal Connection
41	Bridge Input (+)
42	Bridge Input (-)
43	Excitation (+)
51	Output (+)
52	Output (-)
53	Excitation (-)

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DRG-SC-FR
Frequency Input, Field Configurable Signal Conditioner
Instruction Sheet M2392/0796

DESCRIPTION
The Model DRG-SC-FR is a DIN rail mount, frequency input signal conditioner with 1800VDC isolation between input, output and power. The field configurable input and output offer flexible, wide ranging capability for variable frequency drives, magnetic pick-ups, turbine flow meters, and other pulse or frequency output transducers.

The input of the DRG-SC-FR can be configured for any frequency span from 2Hz to 10,000Hz. Pulse threshold sensitivity can be adjusted from 50mVp to 150Vrms to ensure accurate frequency measurement and minimize transient noise related errors. The output can be set for either 0-5V, 0-10V, 0-1mA, 0-20mA or 4-20mA.

Advanced digital technology allows the DRG-SC-FR to be field configured for virtually any frequency input to DC signal output within the ranges specified. Calibration utilizes 'Touch-Sample' technology where the user simply applies the minimum and maximum input frequencies, touching a recessed button to configure the corresponding minimum and maximum output range.

The very narrow DRG Series housing enables installations of up to 24 unit per linear foot. The wide ranging power supply is inverter isolated and accepts any voltage between 9 and 30VDC.

APPLICATION
The DRG-SC-FR field configurable frequency input signal conditioner is useful in eliminating ground loops and interfacing pulse output transducers, such as turbine flow meters and magnetic pick-ups, to data acquisition and control systems.

Advanced digital technology, combined with ASIC technology, provides a stable output at low frequencies for higher accuracy, and three way isolation which completely eliminates ground loops from any source.

'TOUCH-SAMPLE' TECHNOLOGY
The DRG-SC-FR utilizes 'Touch-Sample' technology which greatly simplifies configuration. To set the input frequency range, the user simply applies the high input frequency and pushes the CAL button while the INPUT LED is lit. The low input frequency is then input and pushing the CAL button again stores the low frequency input.

The high and low ranges are stored in non-volatile memory and correspond to the high and low output range which is selected via DIP switches.

To precisely adjust the output, the user adjusts the input frequency while the OUTPUT LED is lit until the desired output level is achieved. The output levels are locked-in by pushing the CAL button. Status LEDs show the operation mode of the device.

STATUS LEDS
The DRG-SC-FR utilizes three status LEDs. One is to display the frequency level of the input signal and the other two are used while calibrating the device.

The green LEVEL (LVL) LED is on (or flashing) when there is a signal being sensed at the input to the device and in the calibration mode. Its intensity varies with the frequency of the input signal during normal operation.

The yellow INPUT (IN) LED, when on, denotes input programming modes. The red OUTPUT (OUT) LED, when on, denotes output programming modes (see Configuration, Calibration and Figure 4 for details).

CONFIGURATION
A major advantage of the DRG-SC-FR is its wide ranging capabilities and ease of configuration. The DRG-SC-FR enables virtually 99% zero and span adjustability. Any 2Hz range from 0 to 10,000Hz can be converted to a full scale output signal (e.g. 0-2Hz /4-20mA or 9998-10,000Hz/4-20mA).

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

Input Range: 0 to 1000Hz
Sensitivity: 1Vrms
Output Range: 4 to 20mA

Note: Sensitivity refers to the noise rejection level or the trigger threshold of the input.

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

For other I/O ranges, refer to Table 1 for output range (SW1) switch settings and Figure 5 for sensitivity switch setting. For quick and easy calibration mode reference, see the step by step flow chart in Figure 4.

1. With DC power off, choose the desired output voltage/current range from Table 1 and set position 1 through 8 of output switch selector (SW1).

2. Set the input sensitivity switch to LO for input amplitudes between 150mVp and 50Vrms, with noise rejection to 1Vp. Set SW2 to HI for input amplitudes between 500mVp and 150Vrms, with noise rejection up to 10Vp.

CALIBRATION

1. After configuring the DIP switches, connect the input to a calibrated frequency source. Connect the output to the actual device load (or a load approximately equivalent to the actual device load value) and apply power (see wiring diagram, Figure 2).

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

2. Adjust the input frequency to the desired maximum and observe that the green LEVEL LED increase intensity as the frequency is increased. If this is not observed, turn the sensitivity potentiometer in a counter clockwise direction until the green LEVEL LED varies with frequency.

Note: The LEVEL LED may not appear to be on, if the new range is less than 10% of the previously calibrated range.

3. With the green LED illuminated press the CAL button once to enter the calibration mode. The yellow and green LEDs should now be on.

WARNING: Do not attempt to change any DIP SWITCH settings for the output (SW1) while power is applied. Severe damage will result!

4. Input the maximum desired frequency (if not done already) and press the CAL button to store. The yellow INPUT LED should now be the only LED on.

5. Input the minimum desired frequency and press the CAL button to store. The green and red LEDs should now be on.

Note: The most reliable way to input 0Hz is to short circuit the input pins (42 and 41)

6. To precisely adjust the maximum output, adjust the input frequency until the output reads within ±0.1% of the maximum selected output range. This typically occurs near 90% of the HI input frequency. Press the CAL button to store the value. The red LED will now be on.

7. To precisely adjust the minimum output, lower the input frequency until the output reads within ±0.1% of the minimum selected ouput. This typically occurs near 10% of the HI input frequency. Press the CAL button to store the value. The yellow and Red LEDs should be on. The green LED should be dim.

8. Press the CAL button one final time to exit the calibration mode. The green LED should now be on and its intensity should increase with an increasing input frequency.

9. Check the minimum and maximum input to output calibration. Repeat steps 1 through 8 if calibration is not within desired specifications.

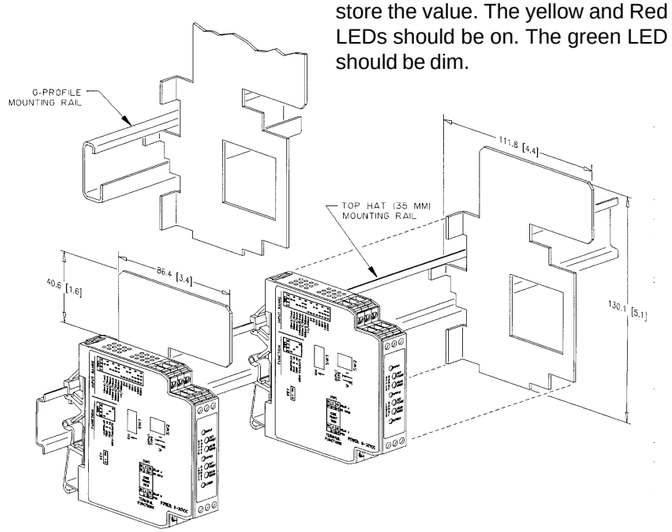
Note 1: To skip Steps 6 and 7 (output adjustment), press CAL button two times after Step 5.

Note 2: Removing power to the unit at any time prior to Step 8 will restore previous settings and calibration.

OPTIMAL SENSITIVITY

If the amplitudes of the input frequency is within the sensitivity parameters (i.e. 150mVp - 1Vp for LO and 0.5Vp - 10Vp for HI), then the sensitivity parameters can be set for optimum noise rejection.

1)Set the input near midrange (50% input) or to a frequency that exhibits the minimum pulse amplitude.
2)Turn the sensitivity pot (SENS) clockwise (CW) until the output drops to minimum.
3) Turn the sensitivity pot counter-clockwise(CCW) a turn or two until the output returns to the previous level.
4)Run the input through the full frequency range to make sure that the pulses are sensed at both the low and high input frequencies. If the output drops out during this test, when the input freq. >0% then turn the sensitivity pot counter-clockwise another turn or two until the output picks up. Repeat to validate sensitivity settings.



Note1: All DRG series modues 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 DGR-HS01 Heat Sink is recommended.

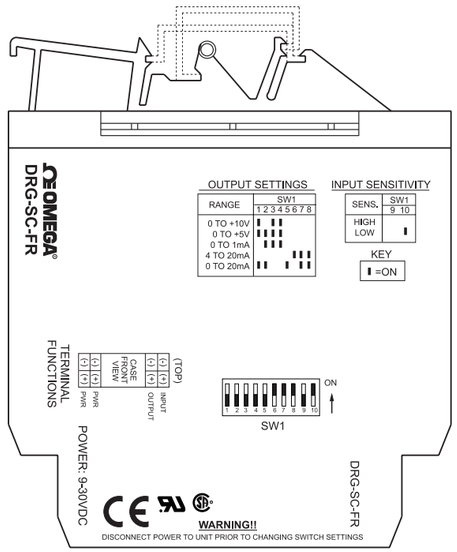


Figure 1: Factory Calibration; 0 to 1,000Hz, 1Vrms, 4-20mA

WARNING: Do not attempt to change any switch settings with power applied. Severe damage may occur!

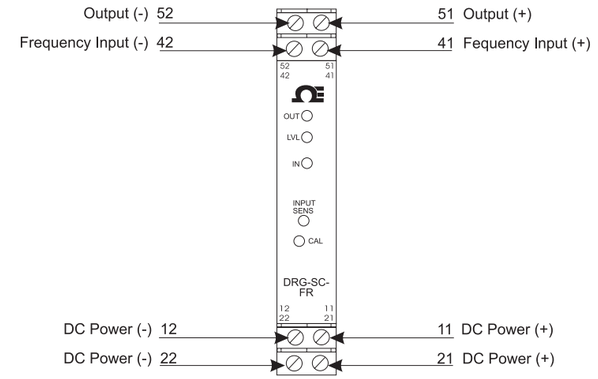


Figure 2: Wiring Diagram for DRG-SC-FR

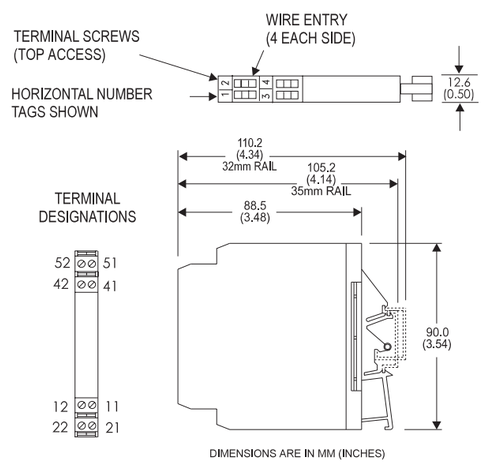


Figure 3: Mechanical Dimensions for DRG-SC-FR

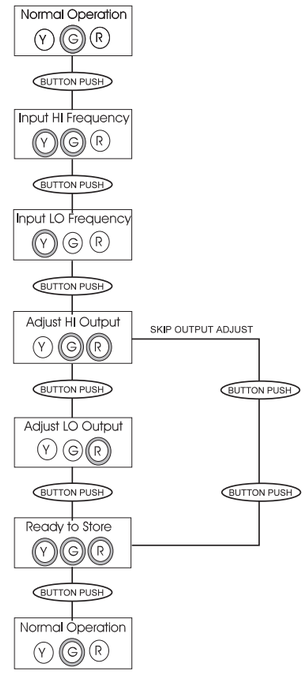


Figure 4: DRG-SC-FR Calibration Flow Chart

Table 1: Output Switch Settings (SW1, 1 through 8)

RANGE	SW1 1 2 3 4 5 6 7 8
0 TO +10V	▮ ▮▮
0 TO +5V	▮▮▮▮
0 TO 1mA	▮▮▮
4 TO 20mA	▮▮▮
0 TO 20mA	▮▮ ▮▮

KEY: ▮ =ON

SENS.	SW1 9 10
HIGH	
LOW	▮

HIGH: 0.5-10Vp 150Vrms max.
LOW: 150mVp-1Vp 50Vrms max.

Figure 5: Input Sensitivity Settings (SW1, 9 & 10)