

# DR9031

## POINT-TO-POINT TRANSCEIVER

### FEATURES

- Two DR9031 products make a bi-directional acquisition and control system
- Send and Receive Data in Both Directions
- Inputs Available For DC Voltage or DC Current, RTD, or Bridge
- Dual DC Voltage or Current Inputs—Individually Isolated
- Bridge Input Provides Precision 10VDC Excitation For 4 Bridges
- Four Digital Inputs For Contact Closure or NPN Transistor Status
- Dual 4-20mA outputs
- Four Optically Isolated NPN Transistor Digital Outputs
- Each DR9031 can have different analog inputs.
- Plug-In Terminals - DIN Rail Mount - Steel Clip
- Line of Sight Range to 20 Miles With 915MHz Band Radio
- Line of Sight Range to 10 Miles With 2.4GHz Band Radio
- 915MHz ISM\* Band - 2 Versions, 14 Hop Sequences
- 2.4GHz ISM\* Band - 1 Version, 7 Hop Sequences
- Spread Spectrum, Frequency Hopping Technology\*
- 5 Year Warranty (1 Year on Radio Module)
- UL/cUL Recognized



### DESCRIPTION

The DR9031 is a 2-way wireless transceiver set which will send 1 or 2 analog channels and 4 digital switch status channels in both directions.

The transmitter input will accept both analog and switch contact inputs. The switch inputs require a standard contact closure or an open collector NPN transistor.

Dual channel DC voltage or current inputs are available. Each channel may be different.

Single channel RTD and Bridge inputs are available. The RTD input accepts 100 ohm platinum, 2 or 3 wire sensors. The Bridge input provides a precision 10VDC excitation supply that will drive four 330 ohm bridges in parallel to provide an average output from the 4 sensors.

The DR9031 provides isolation between analog inputs and power source. The DC Inputs are individually isolated. This isolation makes the product useful for measuring input signals with high common mode voltages and for breaking ground connections to eliminate ground loops.

RTD and Bridge sensors are inherently isolated, therefore the input circuits are only isolated from the power source.

A 12 bit A/D converter is used to digitize the analog data. Analog data and switch status is then transmitted to the companion DR9031 Receiver where the analog signal and switch status is reconstructed.

Dual channel input analog data is reconstructed as dual 4/20mA outputs. Single channel analog inputs are reconstructed as two 4/20mA outputs proportional to the input.

Switch status output is 4 optically isolated NPN transistors.

Three radio modules are available for the DR9031, two 915MHz band versions with 7 Hop sequences each and a 2.4GHz band version with 7 Hop sequences. They use spread spectrum, frequency hopping\* technology. These choices provide 21 different Hop sequences that allow 21 systems to work in the same locale without interfering with each other.

A DIP Switch on the Transmitter PC board is used to set the Hop sequence.

With proper antenna and cable selection and a 915MHz band version radio, the DR9031 can transmit up to 20 miles. The 2.4GHz band version can transmit up to 10 miles.

Screw terminal blocks that plug into the case allow easy wiring and removal of products.

All of the DR Series of products provide transient protection to help eliminate damage from lightning and from other transients created on the power and signal leads.

\* See page 56 for a comprehensive definition.

**INPUT**

## Dual DC

## Current

Min Span = 1mA  
Max Span = 50 mA

## Voltage

Min Span = 100 mV  
Max Span = 150 V

## Accuracy

±0.1% of Span

## Linearity

±0.05% of Span

## Strain Gauge

## Span

0.5 mV/V to 1 V/V

## Accuracy

±0.1% of Span

## Linearity

±0.01% of Span

## Excitation:

10 VDC Precision Supply for  
up to 4 Strain Gauges  
125 mA Maximum

## RTD

100 ° Platinum, 2 or 3 Wire  
.00385 or .00392 Alpha

## Range

-200 to +850°C Maximum  
15°C Span Minimum

## Accuracy

±0.05% of Span

## Linearity

±0.05% of Span

## Open Sensor:

Full Scale

## Switch Input

Open Circuit Voltage  
Equals Power Input  
(12 or 24 VDC)

Closed Circuit Current  
4 to 8 mA Dual DC

**COMMON MODE REJECTION**

100 dB, DC to 60 Hz

**TEMPERATURE STABILITY**

±(0.01% of Span)/°C Max

**OUTPUT**

## Analog

Dual 4/20 mA DC  
12 VDC Compliance

## Digital

Four Optically Isolated  
Open Collector NPN Transistors  
30 VDC Max Voltage,  
30 mA Max Current  
Operates in Saturated Mode

**RADIO**

## Frequency

915 MHz Band  
908 or 922 MHz  
2.4 GHz Band  
2.4000 - 2.4835 GHz

## Spread Spectrum Type

Frequency Hopping, Direct FM

## I/O Data Rate Tx to Rx:

9600 bps

## Update Rate

Approximately 4/S

## Range / Line of Sight

915 MHz Band - Up to 20 Mi.  
2.4 GHz Band - Up to 10 Mi.

## Receiver Sensitivity:

915 MHz Band  
-110 dBm @ 9600 baud  
2.4 GHz Band  
-105 dBm @ 9600 baud

## Transmitter Power:

915 MHz Band  
100 mW (20 dBm)  
2.4GHz Band  
50 mW (17dBm)

## Connector:

Reverse Polarity SMA Female

**CERTIFICATIONS**

RF Module  
FCC Part 15.247  
DR9031  
UL/cUL Recognized

**OPERATING TEMPERATURE**

-13°F to 167°F  
-25°C to 75°C

**POWER**

12 or 24 VDC  
1.5 Watts Max

**ORDERING INFORMATION**

DC Inputs

**INPUT 1**

**Standard Ranges**

**Select 1 Input**

**Current - DC**

- 0/1 mA
- 4/20 mA

**Voltage - DC**

- 0/1 V
- 1/1 V
- 1/5 V
- 0/5 V
- 5/5 V
- 0/10 V
- 10/10 V

**Other Input Range**

(Must be within minimum to maximum specification)

- VDC
- mADC

Zero Scale

Full Scale

DC Inputs

**INPUT 2**

**Standard Ranges**

**Select 1 Input**

**Current - DC**

- 0/1 mA
- 4/20 mA

**Voltage - DC**

- 0/1 V
- 1/1 V
- 1/5 V
- 0/5 V
- 5/5 V
- 0/10 V
- 10/10 V

**Other Input Range**

(Must be within minimum to maximum specification)

- VDC
- mADC

Zero Scale

Full Scale

**RADIO**     908 MHz Standard     922 MHz Optional     2.4 GHz

**POWER**     12 VDC     24 VDC

**ORDERING  
INFORMATION**

┌── Bridge Input ──┐

**Input Range**

(Must be within minimum  
to maximum specification)

Span

mV/V     V/V

**RADIO**     908 MHz     922 MHz     2.4 GHz  
                  Standard            Optional

**POWER**     12 VDC     24 VDC

**ORDERING INFORMATION**

┌─── RTD Input ───┐

**Input Range**

(Must be within minimum to maximum specification)

Zero Scale

Full Scale

°C       °F

Alpha:

.00385     .00392

**RADIO**     908 MHz     922 MHz     2.4 GHz  
                    Standard            Optional

**POWER**     12 VDC     24 VDC

# DR9031

## ACCESSORIES

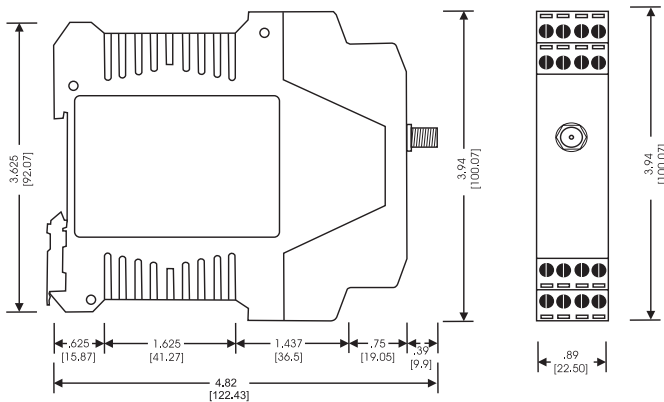
RP = Reverse Polarity

4073	Two Antenna Coupler, Transmit and Receive, 2-Port 900 MHz	QTY _____
4051	Receive Only, 2 to 4 Antenna Coupler 4-Port 900 MHz	QTY _____
4061	Receive Only, 2 to 4 Antenna Coupler 4-Port 2.4 GHz	QTY _____
4062	50 Ohm Termination, For Unused Ports On P/N 4051,4061	QTY _____
4022	PSP24-024S, 24 VDC 1 Amp Power Supply	QTY _____
4026	Bulkhead Connector Type N Female to Type N Female	QTY _____
4011	Bulkhead Surge Protector Type N Male to Type N Female	QTY _____
4035	Bulkhead Surge Protector Type N Female to Type N Female	QTY _____
CBH2	2 Ft WBC195 Cable w/ RP-SMA Male & RP-SMA Female Bulkhead Connector	QTY _____
CBH6	6 Ft WBC195 Cable w/ RP-SMA Male & RP-SMA Female Bulkhead Connector	QTY _____
CBH10	10 Ft WBC195 Cable w/ RP-SMA Male & RP-SMA Female Bulkhead Connector	QTY _____
CBH-X	Custom Length WBC195 Cable w/ RP-SMA Male & RP-SMA Female Bulkhead Connector	QTY _____
CPT2	2 Ft WBC195 Cable w/ RP-SMA Male & Type N Male Connector	QTY _____
CPT6	6 Ft WBC195 Cable w/ RP-SMA Male & Type N Male Connector	QTY _____
CPT10	10 Ft WBC195 Cable w/ RP-SMA Male & Type N Male Connector	QTY _____
CPT-X	Custom Length WBC195 Cable w/ RP-SMA Male & Type N Male Connector	QTY _____

For more accessories and cables, see the ACCESSORIES section of this catalog (Page 51).

### DIMENSIONS

Inches [mm]



### CONNECTIONS

#### RECEIVER

TERMINAL	CONNECTIONS
1	4/20 mADC Output 1 +
2	4/20 mADC Output 1 -
3	4/20 mADC Output 2 +
4	4/20 mADC Output 2 -
5	Switch 1 +
6	Switch 1 -
7	Switch 2 +
8	Switch 2 -
9	Switch 3 +
10	Switch 3 -
11	Switch 4 +
12	Switch 4 -
13	No Connection
14	No Connection
15	Power +
16	Power -

#### DC INPUT TRANSMITTER

TERMINAL	CONNECTION
1	DC Signal Input 1 +
2	DC Signal Input 1 -
3	DC Signal Input 2 +
4	DC Signal Input 2 -
5	Switch 1 +
6	Switch 1 -
7	Switch 2 -
8	Switch 2 +
9	Switch 3 +
10	Switch 3 -
11	Switch 4 -
12	Switch 4 +
13	No Connection
14	No Connection
15	Power +
16	Power -

#### BRIDGE INPUT TRANSMITTER

TERMINAL	CONNECTION
1	Bridge Input +
2	Bridge Input -
3	Shield
4	Shield
5	Switch 1 +
6	Switch 1 -
7	Switch 2 -
8	Switch 2 +
9	Switch 3 +
10	Switch 3 -
11	Switch 4 -
12	Switch 4 +
13	10 VDC Excitation +
14	Excitation Common
15	Power +
16	Power -

#### RTD INPUT TRANSMITTER

TERMINAL	CONNECTION
1	RTD Input +
2	RTD Input -
3	RTD Lead Compensation
4	No Connection
5	Switch 1 +
6	Switch 1 -
7	Switch 2 -
8	Switch 2 +
9	Switch 3 +
10	Switch 3 -
11	Switch 4 -
12	Switch 4 +
13	No Connection
14	No Connection
15	Power +
16	Power -