

Isolated DIN Rail Mount Loop-Powered 2-Wire Signal Conditioners

DRLP Series

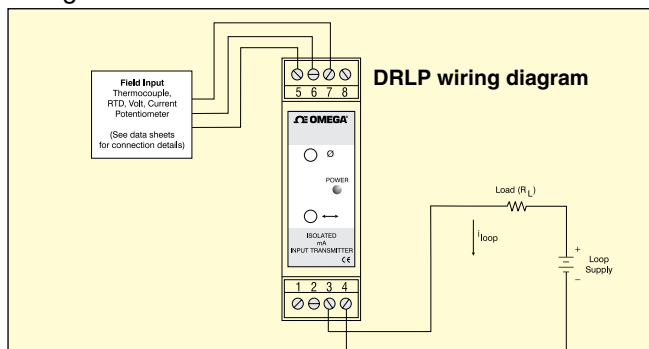


- ✓ $\pm 0.03\%$ Accuracy (Typical)
- ✓ $\pm 0.01\%$ Linearity
- ✓ 1500Vrms Transformer Isolation and 240Vrms Field-Side Protection
- ✓ ANSI/IEEE C37.90.1 Transient Protection
- ✓ Wide Loop Supply Voltage, 10.8V to 60V
- ✓ 5-Pole Low-Pass Filtering
- ✓ Up to 160 dB CMR
- ✓ 85dB NMR at 60Hz, 80dB at 50Hz
- ✓ Protected Against Reverse Connection of Loop Voltage
- ✓ -40 to 80°C (-40 to 176°F) Operating Temperature
- ✓ Mounts on DIN Rail EN 50022, 35 x 7.5 or 35 x 15
- ✓ CSA C/US Certified (Class I, Division 2, Groups A, B, C, D)
- ✓ CE Compliant
- ✓ Manufactured per RoHS Directive 2002/95/EC

The new DRLP Series of loop powered 2-wire transmitters consists of seven family groups with a total of 48 transmitter models that interface to a wide variety of voltage, current, temperature and position measuring devices. The DRLP Series provides superior specifications such as $\pm 0.03\%$ accuracy, five poles of filtering, 1500 Vrms continuous isolation, low output noise, and much more.

The DRLP Series 2-wire transmitter conditions and sends analog signals from sensors located in the "field" to monitoring and control equipment, usually computers, located thousands of feet away in central control areas. The DRLP Series accepts a wide range of inputs, including millivolt, volt, milliamp, thermocouple, RTD, potentiometer, and slide wire. It operates on power from a 2-wire signal loop and modulates the supply current to represent the input signal within a 4 to 20-milliamp range.

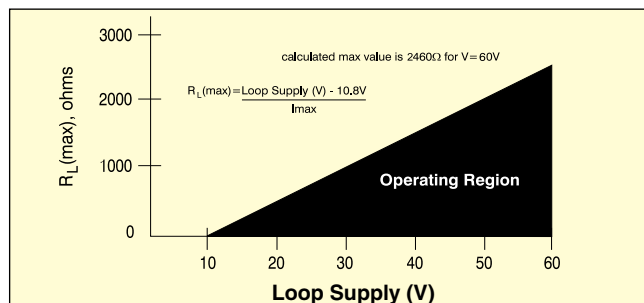
Two-wire transmission loops are very economical methods for connecting sensors to distant control rooms. Since the DRLP Series operates from the signal loop current, no additional, expensive power and wiring are required. Only low cost, twisted pair wiring is needed.



DRLP Series shown smaller than actual size.

DRLP Loop Drive Capability

The DRLP Series transmitter's wide range of loop supply voltage (10.8V to 60V) makes it a versatile device which can be used in most any current loop. The maximum loop resistance is determined by subtracting the transmitter's minimum loop supply voltage from the total loop supply voltage and dividing the result by the maximum loop current (see graph). The low loop supply voltage of 10.8V allows the DRLP to be used in applications with low output power supplies and the high Loop Supply Voltage of 60V allows use in applications with long distance current loops.



COMMON SPECIFICATIONS

Input Protection

Continuous: 240 Vrms maximum
Transient: ANSI/IEEE C37.90.1

CMV, Input to Output

Continuous: 1500 Vrms maximum
Transient: ANSI/IEEE C37.90.1

Noise

Output: 100 kHz: 3μArms

Output Range: 4 to 20 mA

Output Protection

Reverse Polarity: Continuous
Over-Voltage: 240 Vrms continuous
Transient: ANSI/IEEE C37.90.1
Loop Supply Voltage: 10.8V to 60V
Loop Supply Sensitivity: $\pm 0.0005\%/V$



Turn-On Delay: 400 ms

Environmental

Operating Temperature Range: -40 to 80°C
(-40 to 176°F)

Storage Temperature Range: -40 to 80°C
(-40 to 176°F)

Relative Humidity: 0 to 95% non-condensing

Emissions EN61000-6-4: ISM, Group 1

Radiated, Conducted: Class A

Immunity EN61000-6-2: ISM, Group 1

RF: Performance A $\pm 0.5\%$ span error

ESD, EFT: Performance B

Mechanical Dimensions: 75 H x 22.5 W x 105 mm D
(2.95 x 0.89 x 4.13")

Mounting: DIN EN 50022 35 x 7.5 mm or
35 x 15 mm rail

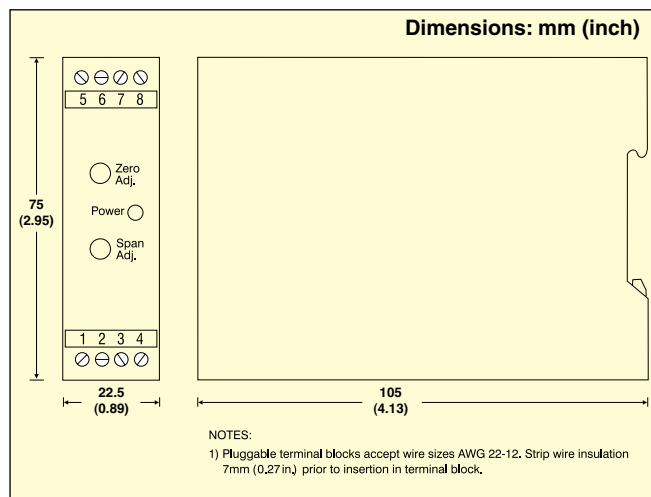
DRLP-MV/DRLP-V **DIN Rail Loop Powered** **Analog Voltage Input Transmitters**

- ✓ Accepts Millivolt and Voltage Level Signals
- ✓ Process Current Output
- ✓ 1500 Vrms Transformer Isolation
- ✓ ANSI/IEEE C37.90.1 Transient Protection
- ✓ Input and Output Protected to 240 Vac Continuous
- ✓ Up to 60V Loop Voltage
- ✓ 160 dB CMR
- ✓ 85 dB NMR at 60 Hz, 80 dB at 50 Hz
- ✓ $\pm 0.03\%$ Accuracy
- ✓ $\pm 0.01\%$ Linearity
- ✓ Easily Mounts on Standard DIN Rail
- ✓ CSA C/US Certified
- ✓ CE Compliant

Each DRLP-MV and DRLP-V voltage input transmitter provides a single channel of analog input which is filtered, isolated, amplified, and converted to a process current output (Figure 1). Signal filtering is accomplished with a five-pole filter, which provides 85 dB of normal-mode rejection at 60 Hz and 80 dB at 50 Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four are on the process loop side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges.

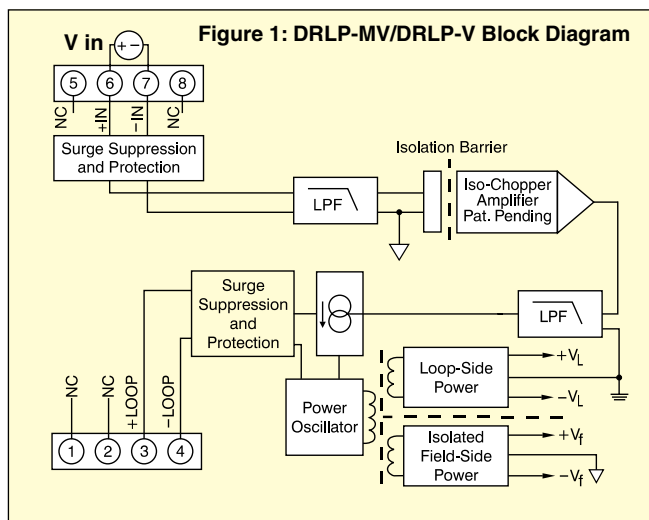


DRLP-MV shown actual size.



Special input and output circuits on the DRLP-MV and DRLP-V transmitters provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Signal and loop power lines are secured to the module using screw terminals, which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration, however, zero and span settings are adjustable up to $\pm 10\%$ to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.



DRLP-V shown actual size.

Specifications

Typical at $T_A = +25^\circ\text{C}$ and $+24\text{V}$ Loop Voltage-V

Input Range:

DRLP-MV: $\pm 10\text{ mV}$ to $\pm 100\text{ mV}$

DRLP-V: $\pm 1\text{V}$ to $\pm 20\text{V}$

Input Bias Current:

DRLP-MV: $\pm 0.5\text{ nA}$

DRLP-V: $\pm 0.05\text{ nA}$

Input Resistance

Normal

DRLP-MV: $50\text{ M}\Omega$

DRLP-V: $2\text{ M}\Omega$

Power Off

DRLP-MV: $66\text{ k}\Omega$

DRLP-V: $2\text{ M}\Omega$

Overload

DRLP-MV: $66\text{ k}\Omega$

DRLP-V: $2\text{ M}\Omega$

CMR (50 or 60 Hz): 160 dB

NMR: 85 dB at 60 Hz , 80 dB at 50 Hz

Adjustability: $\pm 10\%$ zero and span

Accuracy*: $\pm 0.03\%$

Conformity: $\pm 0.01\%$

Stability

Offset: $\pm 20\text{ ppm}/^\circ\text{C}$

Gain: $\pm 80\text{ ppm}/^\circ\text{C}$

Bandwidth, -3dB: 3 Hz

Response Time, 90% Span: 165 ms

Output Limits

Under-Range: 2.8 mA

Over-Range: 29 mA

* Includes linearity, hysteresis and repeatability.

To Order Visit omega.com/drlp_series for Pricing and Details

| MODEL NO. | INPUT RANGE |
|-----------|----------------------|
| DRLP-MV1 | $\pm 10\text{ mV}$ |
| DRLP-MV2 | $\pm 50\text{ mV}$ |
| DRLP-MV3 | $\pm 100\text{ mV}$ |
| DRLP-MV4 | 0 to 10 mV |
| DRLP-MV5 | 0 to 50 mV |
| DRLP-MV6 | 0 to 100 mV |
| DRLP-V1 | $\pm 1\text{V}$ |
| DRLP-V2 | $\pm 5\text{V}$ |
| DRLP-V3 | $\pm 10\text{V}$ |
| DRLP-V4 | 0 to 1V |
| DRLP-V5 | 0 to 5V |
| DRLP-V6 | 0 to 10V |
| DRLP-V7 | $\pm 20\text{V}$ |
| DRLP-V8 | 0 to 20V |

Accessories

| MODEL NO. | DESCRIPTION |
|-----------|-----------------------------------|
| RAIL-35-1 | 35 mm DIN rail, 1 m (3.3') length |
| RAIL-35-2 | 35 mm DIN rail, 2 m (6.6') length |

Ordering Example: DRLP-V5 isolated DIN rail mount loop-powered 2-wire signal conditioner with 0 to 5 V input and 4 to 20 mA output and OCW-1 OMEGECARE 1-year extended warranty (adds 1 year to standard 1 year warranty).

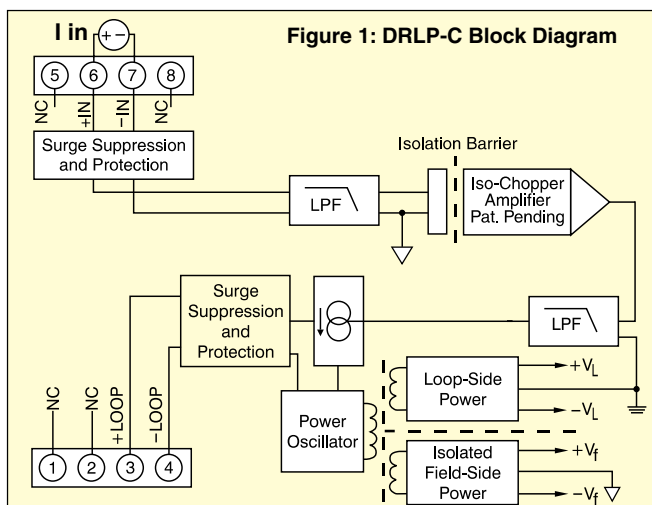
DRLP-C DIN Rail Loop Powered Analog Current Input Transmitters

- ✓ Accepts Milliamp Level Signals
- ✓ Process Current Output
- ✓ 1500Vrms Transformer Isolation
- ✓ ANSI/IEEE C37.90.1 Transient Protection
- ✓ Input and Output Protected to 240 Vac Continuous
- ✓ Up to 60V Loop Voltage
- ✓ 105 dB CMR
- ✓ $\pm 0.03\%$ Accuracy
- ✓ $\pm 0.01\%$ Linearity
- ✓ Easily Mounts on Standard DIN Rail
- ✓ CSA C/US Certified
- ✓ CE Compliant

Each DRLP-C current input transmitter provides a single channel of analog input which is filtered, isolated, amplified, and converted to a process current output (Figure 1). Signal filtering is accomplished with a five-pole filter, which provides 80dB per decade of normal-mode rejection above 100Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four are on the process loop side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges.

Special input and output circuits on the DRLP-C transmitters provide protection against accidental connection of power-line voltages up to 240 Vac and against transient events as defined by ANSI/IEEE C37.90.1. Signal and loop power lines are secured to the module using screw terminals, which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration, however, zero and span settings are adjustable up to $\pm 10\%$ to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.



DRLP-C shown actual size.

Specifications

Typical at $T_A = +25^\circ\text{C}$ and +24V Loop Voltage

Input Range: 0 to 20 or 4 to 20 mA

Current Conversion Resistor: 50.00W

CMR (50 or 60 Hz): 105 dB

NMR (-3 dB at 100 Hz): 80 dB/decade above 100 Hz

Adjustability: $\pm 10\%$ zero and span

Accuracy*: $\pm 0.03\%$

Conformity: $\pm 0.01\%$

Stability

Offset: ± 30 ppm/ $^\circ\text{C}$

Gain: ± 90 ppm/ $^\circ\text{C}$

Bandwidth, -3 dB: 100 Hz

Response Time, 90% Span: 5 ms

Output Limits

Under-Range: 2.8 mA

Over-Range: 29 mA

* Includes linearity, hysteresis and repeatability.

To Order Visit omega.com/drlp_series for Pricing and Details

| MODEL NO. | INPUT RANGE |
|-----------|-------------|
| DRLP-C1 | 4 to 20 mA |
| DRLP-C2 | 0 to 20 mA |

Accessories

| MODEL NO. | DESCRIPTION |
|-----------|-----------------------------------|
| RAIL-35-1 | 35 mm DIN rail, 1 m (3.3') length |
| RAIL-35-2 | 35 mm DIN rail, 2 m (6.6') length |

Ordering Example: DRLP-C1 isolated DIN rail mount loop-powered 2-wire signal conditioner with 4 to 20 mA input and 4 to 20 mA output and OCW-1 OMEGACARE 1-year extended warranty (adds 1 year to standard 1 year warranty).

DRLP-RTD **DIN Rail Loop Powered** **Linearized 2- or 3-Wire** **RTD Input Transmitters**

- ✓ Interfaces to 100 Ω Platinum or 120 Ω Nickel RTDs
- ✓ Linearizes RTD Signal
- ✓ Process Current Output
- ✓ 1500Vrms Transformer Isolation
- ✓ ANSI/IEEE C37.90.1 Transient Protection
- ✓ Input and Output Protected to 240 Vac Continuous
- ✓ Up to 60V Loop Voltage
- ✓ 160 dB CMR
- ✓ 85 dB NMR at 60 Hz, 80 dB at 50 Hz
- ✓ $\pm 0.1\%$ Accuracy
- ✓ $\pm 0.025\%$ Conformity
- ✓ Easily Mounts on Standard DIN Rail
- ✓ CSA C/US Certified
- ✓ CE Compliant

Each DRLP-RTD RTD input transmitter provides a single channel of RTD input which is filtered, isolated, amplified, linearized, and converted to a process current output (Figure 1). Signal filtering is accomplished with a five-pole filter, which provides 85dB of normal-mode rejection at 60Hz and 80dB at 50Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four are on the process loop side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges.

RTD excitation is provided from the transmitter using a precision current source. The excitation currents are very small (0.26mA max for 100 Ω Pt and 120 Ω Ni) which minimizes self-heating of the RTD. Linearization is achieved by creating a non-linear transfer function through the module itself. This non-linear transfer function is configured at the factory and is designed to be equal and opposite to the specific RTD non-linearity. Lead compensation is achieved by matching two current paths thus canceling the effects of lead resistance.

The specifications listed are for a 3-wire connection. A 2-wire connection of the RTD to the module is also possible and is achieved by adding a jumper between pin 5 (+EXC) and pin 6 (+IN) on the terminal block and connecting the RTD leads between pin 6 (+IN) and pin 7 (-IN). The 2-wire connection nullifies the lead resistance compensation feature of the module.

Special input and output circuits on the DRLP-RTD transmitters provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Signal and loop power lines are secured to the module using screw terminals, which are in pluggable terminal blocks for ease of system assembly and reconfiguration.



DRLP-RTD shown actual size.

The modules have excellent stability over time and do not require recalibration, however, zero and span settings are adjustable up to $\pm 3\%$ to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

Specifications

Typical at TA = 25°C and 24V Loop Voltage

DRLP-RTD

Input Range: -200 to 850°C (-328 to 1562°F) (100 Ω Pt); -80 to 320°C (-112 to 608°F) (120 Ω Ni)

Input Resistance

Normal: 50 M Ω

Power Off: 66 k Ω

Overload: 66 k Ω

CMR (50 or 60 Hz): 160 dB

NMR: 85 dB at 60 Hz, 80 dB at 50 Hz

Adjustability: $\pm 3\%$ zero and span

Accuracy: See ordering information

Conformity: $\pm 0.025\%$

Stability

Offset: ± 50 ppm/°C

Gain: ± 100 ppm/°C

Sensor Excitation Current: 0.260 mA

Lead Resistance Effect: $\pm 0.02^\circ\text{C}/\Omega$

Bandwidth, -3dB: 3 Hz

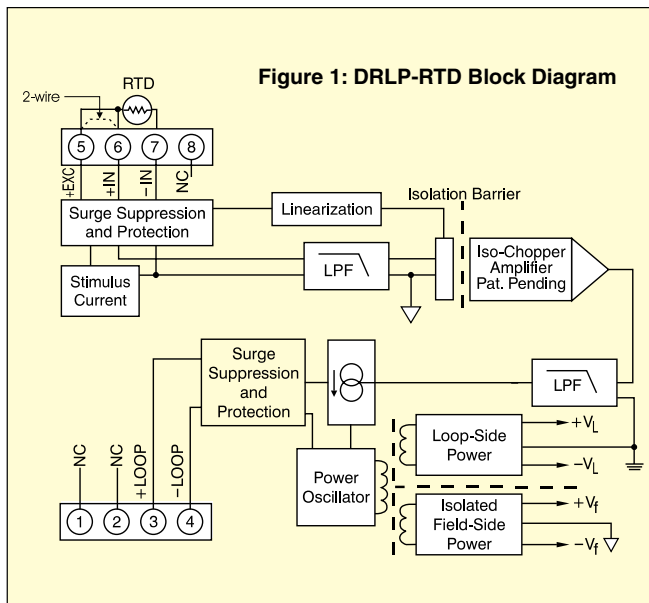
Response Time, 90% Span: 165 ms

Output Limits

Under-Range: 3 mA

Over-Range: 29 mA

Figure 1: DRLP-RTD Block Diagram



**RTD Standards

| Type | Alpha Coefficient | DIN | JIS | IEC |
|-----------------|-------------------|-----------|-----------------|---------|
| 100 Ω Pt | 0.00385 | DIN 43760 | JIS C 1604-1989 | IEC 751 |
| 120 Ω Ni | 0.00672 | — | — | — |

DRLP-P DIN Rail Loop Powered Potentiometer Input Transmitters

- Interfaces to Potentiometers up to 10 k Ω
- Process Current Output
- 1500 Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input and Output Protected to 240 Vac Continuous
- Up to 60V Loop Voltage
- 160 dB CMR
- 85 dB NMR at 60 Hz, 80 dB at 50 Hz
- $\pm 0.03\%$ Accuracy
- $\pm 0.01\%$ Linearity
- Easily Mounts on Standard DIN Rail
- CSA C/US Certified
- CE Compliant

Each DRLP-P potentiometer input transmitter provides a single channel of potentiometer input which is filtered, isolated, amplified, and converted to a process current output (Figure 1). Signal filtering is accomplished with a five-pole filter, which provides 85dB of normal-mode rejection at 60Hz and 80dB at 50Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four are on the process loop side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges.

To Order Visit omega.com/drlp_series for Pricing and Details

| MODEL NO. | INPUT RANGE | ACCURACY* |
|--------------------|----------------------------------|---|
| 100 Ω Pt ** | | |
| DRLP-RTD1 | -100 to 100°C (-148 to 212°F) | $\pm 0.1\%$ span $\pm 0.2^\circ\text{C}$ |
| DRLP-RTD2 | 0 to 100°C (32 to 212°F) | $\pm 0.1\%$ span $\pm 0.1^\circ\text{C}$ |
| DRLP-RTD3 | 0 to 200°C (32 to 392°F) | $\pm 0.1\%$ span $\pm 0.2^\circ\text{C}$ |
| DRLP-RTD4 | 0 to 600°C (32 to 1112°F) | $\pm 0.1\%$ span $\pm 0.6^\circ\text{C}$ |
| DRLP-RTD5 | 0 to 400°C (32 to 752°F) | $\pm 0.1\%$ span $\pm 0.4^\circ\text{C}$ |
| 120 Ω Ni ** | | |
| DRLP-RTD6 | 0 to 300°C (32 to 572°F) | $\pm 0.1\%$ span $\pm 0.3^\circ\text{C}$ |

* Includes conformity, hysteresis and repeatability.

Accessories

| MODEL NO. | DESCRIPTION |
|-----------|-----------------------------------|
| RAIL-35-1 | 35 mm DIN rail, 1 m (3.3') length |
| RAIL-35-2 | 35 mm DIN rail, 2 m (6.6') length |

Ordering Example: DRLP-RTD5 isolated DIN rail mount loop-powered 2-wire signal conditioner with 100 Ω Pt RTD input and 4 to 20 mA output and **OCW-1** OMEGACARE 1 year extended warranty (adds 1 year to standard 1 year warranty).



DRLP-P shown actual size.

Potentiometer excitation is provided from the transmitter using a precision current source. The excitation current is small (less than 0.26mA) which minimizes self-heating of the potentiometer. Lead compensation is achieved by matching two current paths which cancels the effects of lead resistance.

Special input and output circuits on the DRLP-P transmitters provide protection against accidental connection of power-line voltages up to 240 Vac and against transient events as defined by ANSI/IEEE C37.90.1. Signal and loop power lines are secured to the module using screw terminals, which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration, however, zero and span settings are adjustable up to $\pm 10\%$ to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

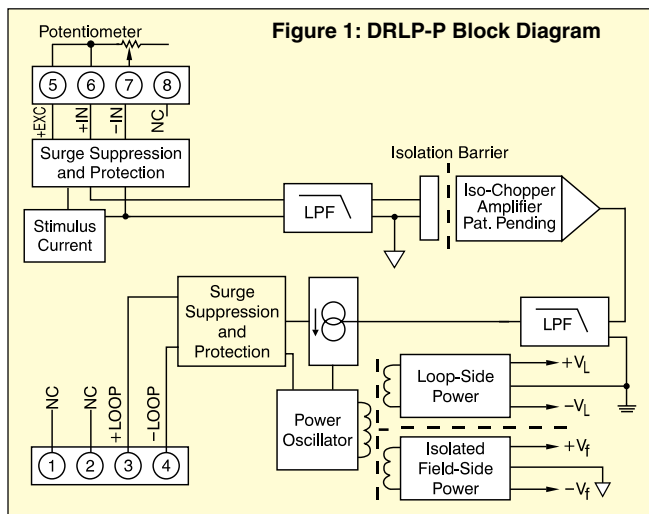


Figure 1: DRLP-P Block Diagram

Specifications

Typical at $T_A = +25^\circ\text{C}$ and +24V Loop Voltage

Input Range: 0 Ω to 10 k Ω

Input Resistance

Normal: 50M Ω

Power Off: 66 k Ω

Overload: 66 k Ω

DRLP-ITC

DIN Rail Loop Powered Non-Linearized Thermocouple Input Transmitters

- ✓ Interfaces to Types J, K, T, E, R, S, B, and N Thermocouples
- ✓ Process Current Output
- ✓ 1500Vrms Transformer Isolation
- ✓ ANSI/IEEE C37.90.1 Transient Protection
- ✓ Input and Output Protected to 240 Vac Continuous
- ✓ Up to 60V Loop Voltage
- ✓ 160 dB CMR
- ✓ 85 dB NMR at 60 Hz, 80 dB at 50 Hz
- ✓ $\pm 0.05\%$ Accuracy
- ✓ $\pm 0.01\%$ Linearity
- ✓ Easily Mounts on Standard DIN Rail
- ✓ CSA C/US Certified
- ✓ CE Compliant

CMR (50 or 60 Hz): 160 dB

NMR: 85 dB at 60 Hz, 80 dB at 50 Hz

Adjustability: $\pm 10\%$ Zero and Span

Accuracy*: $\pm 0.03\%$

Conformity: $\pm 0.01\%$

Stability

Offset: ± 50 ppm/ $^\circ\text{C}$

Gain: ± 100 ppm/ $^\circ\text{C}$

Sensor Excitation Current: 0.26 mA; 100 Ω , 500 Ω sensor; 0.13 mA; 1 k Ω Sensor; 0.065 mA; 10 k Ω sensor

Lead Resistance Effect: $\pm 0.01\Omega/\Omega$; 100 Ω , 500 Ω , 1 k Ω sensor; $\pm 0.02\Omega/\Omega$; 10 k Ω sensor

Bandwidth, -3dB: 3Hz

Response Time, 90% Span: 165ms

Output Limits

Under-Range: 3 mA

Over-Range: 29 mA

* Includes linearity, hysteresis and repeatability.

To Order Visit omega.com/drlp_series for Pricing and Details

| MODEL NO. | INPUT RANGE |
|-----------|--------------------|
| DRLP-P1 | 0 to 100 Ω |
| DRLP-P2 | 0 to 500 Ω |
| DRLP-P3 | 0 to 1 k Ω |
| DRLP-P4 | 0 to 10 k Ω |

Accessories

| MODEL NO. | DESCRIPTION |
|-----------|-----------------------------------|
| RAIL-35-1 | 35 mm DIN rail, 1 m (3.3') length |
| RAIL-35-2 | 35 mm DIN rail, 2 m (6.6') length |

Ordering Example: DRLP-P3 isolated DIN rail mount loop-powered 2-wire signal conditioner with 0 to 1 k Ω input and 4 to 20 mA output and OCW-1 OMEGACARE 1-year extended warranty (adds 1 year to standard 1-year warranty).



DRLP-ITC shown actual size.

Each DRLP-ITC non-linearized thermocouple input transmitter provides a single channel of thermocouple input which is filtered, isolated, amplified, and converted to a process current output (Figure 1). Signal filtering is accomplished with a five-pole filter, which provides 85dB of normal-mode rejection at 60Hz and 80dB at 50Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four are on the process loop side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges.

The DRLP-ITC can interface to eight industry standard thermocouple types: J, K, T, E, R, S, B and N. Each transmitter is cold-junction compensated to correct for parasitic thermocouples formed by the thermocouple wire and screw terminals on the transmitter. Upscale open thermocouple detection is provided by circuitry. Downscale indication can be implemented by installing a 47M Ω , $\pm 20\%$ resistor between screw terminals 6 (+IN) and 8 (-EXC) on the input terminal block. Special input and output circuits on the DRLP-ITC transmitters provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Loop power lines are secured to the module using screw terminals, which are in pluggable terminal blocks for ease of system assembly and reconfiguration. Transmitter zero and span settings are adjustable up to $\pm 10\%$. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

Specifications

Typical at TA=+25°C and +24V Loop Voltage

Input Range: Standard thermocouple temperature limits as per NIST monograph 175, ITS-90

Input Bias Current: -25nA

Input Resistance

Normal: 50M Ω

Power Off: 66 k Ω

Overload: 66 k Ω

CMR (50 or 60 Hz): 160 dB

NMR: 85 dB at 60 Hz, 80 dB at 50 Hz

Adjustability: $\pm 10\%$ zero and span

Accuracy: See ordering information

Stability

Offset: ± 40 ppm/ $^{\circ}\text{C}$

Gain: ± 60 ppm/ $^{\circ}\text{C}$

Cold Junction Compensation

Accuracy, 25°C: $\pm 0.25^{\circ}\text{C}$

Accuracy, 0 to 50°C: $\pm 0.50^{\circ}\text{C}$

Accuracy, -40 to 80°C: $\pm 1.25^{\circ}\text{C}$

Open Input Response: Upscale

Open Input Detection Time: < 5s

Bandwidth, -3dB: 3Hz

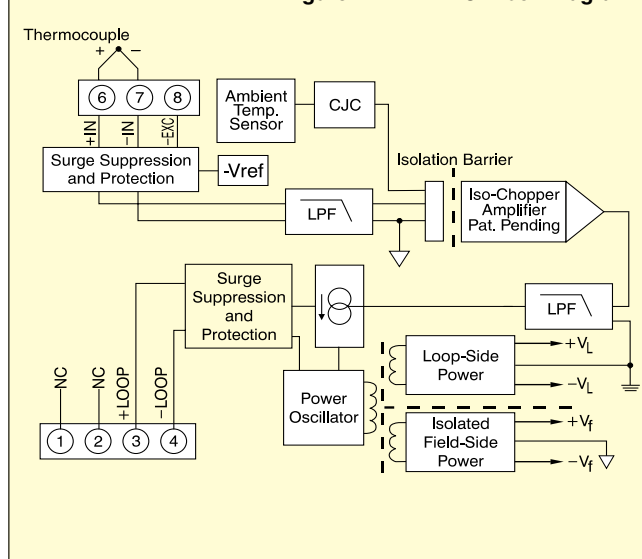
Response Time, 90% Span: 165 ms

Output Limits

Under-Range: 2.8 mA

Over-Range: 29 mA

Figure 1: DRLP-ITC Block Diagram



To Order Visit omega.com/drlp_series for Pricing and Details

| MODEL NO. | TC TYPE | INPUT RANGE | ACCURACY* |
|------------|---------|------------------------------------|---|
| DRLP-ITC-J | J | -100 to 760°C (-148 to 1400°F) | $\pm 0.05\%$ span $\pm 0.43^{\circ}\text{C}$ |
| DRLP-ITC-K | K | -100 to 1350°C (-148 to 2462°F) | $\pm 0.05\%$ span $\pm 0.73^{\circ}\text{C}$ |
| DRLP-ITC-T | T | -100 to 400°C (-148 to 752°F) | $\pm 0.05\%$ span $\pm 0.25^{\circ}\text{C}$ |
| DRLP-ITC-E | E | 0 to 900°C (32 to 1652°F) | $\pm 0.05\%$ span $\pm 0.45^{\circ}\text{C}$ |
| DRLP-ITC-R | R | 0 to 1750°C (32 to 3182°F) | $\pm 0.05\%$ span $\pm 0.88^{\circ}\text{C}$ |
| DRLP-ITC-S | S | 0 to 1750°C (32 to 3182°F) | $\pm 0.05\%$ span $\pm 0.88^{\circ}\text{C}$ |
| DRLP-ITC-B | B | 0 to 1800°C (32 to 3272°F) | $\pm 0.05\%$ span $\pm 0.90^{\circ}\text{C}$ |
| DRLP-ITC-N | N | -100 to 1300°C (-148 to 2372°F) | $\pm 0.05\%$ span $\pm 0.70^{\circ}\text{C}$ |

* Includes conformity, hysteresis, repeatability and CJC error.

Accessories

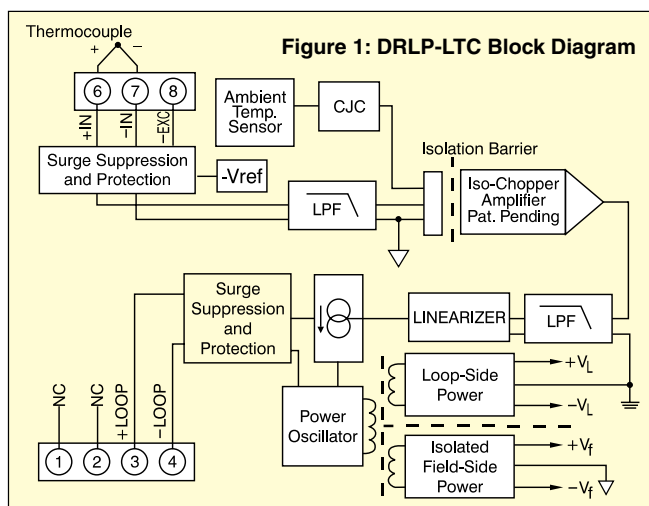
| MODEL NO. | DESCRIPTION |
|-----------|-----------------------------------|
| RAIL-35-1 | 35 mm DIN rail, 1 m (3.3') length |
| RAIL-35-2 | 35 mm DIN rail, 2 m (6.6') length |

Ordering Example: DRLP-ITC-K non-linearized isolated DIN rail mount loop-powered 2-wire signal conditioner with type K thermocouple input and 4 to 20 mA output and OCW-1 OMEGACARE 1-year extended warranty (adds 1 year to standard 1-year warranty).

DRLP-LTC **DIN Rail Loop Powered** **Linearized Thermocouple** **Input Transmitters**

- ✓ Interfaces to Types J, K, T, E, R, S, B, and N Thermocouples
- ✓ Linearizes Thermocouple Signal
- ✓ Process Current Output
- ✓ 1500Vrms Transformer Isolation
- ✓ ANSI/IEEE C37.90.1 Transient Protection
- ✓ Input and Output Protected to 240 Vac Continuous
- ✓ Up to 60V Loop Voltage
- ✓ 160 dB CMR
- ✓ 85 dB NMR at 60 Hz, 80 dB at 50 Hz
- ✓ $\pm 0.10\%$ Accuracy
- ✓ Easily Mounts on Standard DIN Rail
- ✓ CSA C/US Certified
- ✓ CE Compliant

Each DRLP-LTC thermocouple input transmitter provides a single channel of thermocouple input which is filtered, isolated, amplified, linearized, and converted to a process current output (Figure 1). Signal filtering is accomplished with a five-pole filter, which provides 85dB of normal-mode rejection at 60Hz and 80dB at 50Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four are on the process loop side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges.



DRLP-LTC shown actual size.

Linearization is achieved by creating a non-linear transfer function through the module itself. This non-linear transfer function is configured at the factory and is designed to be equal and opposite to the thermocouple non-linearity.

The DRLP-LTC can interface to eight industry standard thermocouple types: J, K, T, E, R, S, B and N. Each transmitter is cold-junction compensated to correct for parasitic thermocouples formed by the thermocouple wire and screw terminals on the transmitter. Upscale open thermocouple detection is provided by circuitry. Downscale indication can be implemented by installing a 47M Ω , $\pm 20\%$ resistor between screw terminals 6 (+IN) and 8 (-EXC) on the input terminal block.

Special input and output circuits on the DRLP-LTC transmitters provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Loop power lines are secured to the module using screw terminals, which are in pluggable terminal blocks for ease of system assembly and reconfiguration. Transmitter zero and span settings are adjustable up to $\pm 3\%$. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.



DRLP Series shown smaller than actual size.

Specifications

Typical at TA=+25°C and +24V Loop Voltage

Input Range: Standard thermocouple temperature limits as per NIST monograph 175, ITS-90

Input Bias Current: -25 nA

Input Resistance

Normal: 50 MΩ

Power Off: 66 kΩ

Overload: 66 kΩ

CMR (50Hz or 60Hz): 160 dB

NMR: 85 dB at 60 Hz, 80 dB at 50 Hz

Adjustability: ±3% zero and span

Accuracy: See ordering information

Stability

Offset: ±60 ppm/°C

Gain: ±80 ppm/°C

Cold Junction Compensation

Accuracy, 25°C: ±0.25°C

Accuracy, 0 to 50°C: ±0.50°C

Accuracy, -40 to 80°C: ±1.25°C

Open Input Response: Upscale

Open Input Detection Time: < 5s

Bandwidth, -3 dB: 3Hz

Response Time, 90% Span: 165 ms

Output Limits

Under-Range: 2.8 mA

Over-Range: 29 mA

Accessories

| MODEL | DESCRIPTION |
|-----------|-----------------------------------|
| RAIL-35-1 | 35 mm DIN rail, 1 m (3.3') length |
| RAIL-35-2 | 35 mm DIN rail, 2 m (6.6') length |

Ordering Example: DRLP-LTC-K1 linearized isolated DIN rail mount loop-powered 2-wire signal conditioner with type K thermocouple input [0 to 1000°C (32 to 1832°F) temperature range] and 4 to 20 mA output and OCV-1 OMEGACARE 1 year extended warranty.

To Order

Visit omega.com/drlp_series for Pricing and Details

| MODEL NO. | TC TYPE | INPUT RANGE | ACCURACY* |
|-------------|---------|------------------------------------|-----------------------|
| DRLP-LTC-J1 | J | 0 to 760°C (32 to 1400°F) | ±0.1% span ±0.76°C |
| DRLP-LTC-J2 | | -100 to 300°C (-148 to 572°F) | ±0.1% span ±0.40°C |
| DRLP-LTC-J3 | | 0 to 500°C (32 to 932°F) | ±0.1% span ±0.50°C |
| DRLP-LTC-K1 | K | 0 to 1000°C (32 to 1832°F) | ±0.1% span ±1.00°C |
| DRLP-LTC-K2 | | 0 to 500°C (32 to 932°F) | ±0.1% span ±0.50°C |
| DRLP-LTC-K3 | | -100 to 1350°C (-148 to 2462°F) | ±0.1% span ±1.45°C |
| DRLP-LTC-K4 | | 0 to 1200°C (32 to 2192°F) | ±0.1% span ±1.20°C |
| DRLP-LTC-T1 | T | -100 to 400°C (-148 to 752°F) | ±0.1% span ±0.50°C |
| DRLP-LTC-T2 | | 0 to 200°C (32 to 392°F) | ±0.1% span ±0.20°C |
| DRLP-LTC-E | E | 0 to 1000°C (32 to 1832°F) | ±0.1% span ±1.00°C |
| DRLP-LTC-R | R | 500 to 1750°C (932 to 3182°F) | ±0.1% span ±1.25°C |
| DRLP-LTC-S | S | 500 to 1750°C (932 to 3182°F) | ±0.1% span ±1.25°C |
| DRLP-LTC-B | B | 500 to 1800°C (932 to 3272°F) | ±0.1% span ±1.30°C |
| DRLP-LTC-N | N | -100 to 1300°C (-148 to 2372°F) | ±0.1% span ±1.40°C |

* Includes conformity, hysteresis, repeatability and CJC error.