DC Current Transducers

Current Transducers are designed to provide an analog current reading for monitoring, data logging and panel meter applications. NK Technologies’ current transducers offer a choice of 0–5 VDC, 0–10 VDC or 4–20 mA outputs common to PLC and energy management system controllers for monitoring of DC motor conditions, solar panel installations, welding processes and transportation applications.

Features:
• Jumper selectable ranges
• Solid-core, split-core and large aperture models

- DT SERIES, 3-WIRE
  DC Current Transducers ........................................ page 64
- DT SERIES, 4-WIRE
  DC Current Transducers ........................................ page 66
- DT SERIES, LARGE APERTURE
  DC Current Transducers ........................................ page 60
- DLT SERIES
  DC Current Transducers ........................................ page 62
Our wide range of current transducers guarantees that you’ll find exactly what you need. We currently offer three series of current transducers in DC configurations. To assist in guiding you to the right series for your application, please begin your selection here.

**DC CURRENT TRANSDUCERS**

Selection Chart

- **DT SERIES, LARGE APERTURE** - p. 60
  - Measures up to 1200 A

- **DT SERIES** - p. 64
  - 3-wire (24 VDC Powered)

- **DT SERIES** - p. 66
  - 4-wire (24 or 120 V Powered)

- **DLT SERIES** - p. 62
  - 2-wire (Loop Powered)
DT SERIES, LARGE APERTURE
DC Current Transducers

DT Series, Large Aperture DC Current Transducers combine a Hall effect sensor and signal conditioner into a single package for use in DC current applications up to 1200 A. The DT Series, Large Aperture DC Current Transducers have factory set and calibrated ranges and industry standard 4–20 mA, 0–5 VDC or 0–10 VDC outputs. The DT Series, Large Aperture DC Current Transducers are available in solid-core DIN rail mounted enclosures.

DC Current Transducer Applications

Battery Banks
- Monitor load and charging currents.
- Verify operation.

Transportation
- Measure traction power or auxiliary loads.

Wind and Solar Generated Power
- Measure the current produced or consumed.
- Detect mechanical problems before failure occurs.

Monitor DC Powered Motors
- Monitor current of cranes, saws, sorters and positioning equipment.

Battery Charging System

DC Current Transducer Features

Factory Set and Calibrated Ranges
- No need for field calibration.
- Eliminates zero and span pots.

Isolation
- Output is magnetically isolated from the input for safety.
- Eliminates insertion losses, no added burden.

Internal Power Regulation
- Works well, even with unregulated power.
- Cuts installation cost.

DIN Rail Mounted Enclosure
- Makes installation a snap.
- No drilling or screws to lose.
- Optional DIN Rail kit available for chassis mounting.*

*For information on the DIN Rail accessories kit, see page 109.

For additional Application Examples, see page 110 and www.nktechnologies.com

Free program expedites evaluation process. See page 1 for details.
DC Current Transducers

**DC Current Transducer Dimensions**

- **1.875” dia.** (46 mm)
- **1.44”** (37 mm)
- **3.0”** (76.2 mm)
- **3.25”** (82.6 mm)
- **2.69”** (68 mm)
- **1.50”** (38 mm)

**DC Current Transducer Connections**

- **SUPPLY POWER**
  - 24V or 120V
- **OUTPUT SIGNAL**
  - 4–20 mA, 0–5 VDC, 0–10 VDC

**DC Current Transducer Output Type**

- **Unipolar Output:**
  - 0–20 mA
  - 0–5 VDC
  - 0–10 VDC
- **Bipolar Output:**
  - 4–20 mA
  - 0–5 VDC
  - 0–10 VDC

**DC Current Transducer Specifications**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Signal</td>
<td>4–20 mA, 0–5 VDC, 0–10 VDC</td>
</tr>
</tbody>
</table>
| Output Limit                   | 4–20 mA: 23 mA  
0–5 VDC: 5.75 VDC  
0–10 VDC: 11.5 VDC          |
| Accuracy                       | 2% FS                                              |
| Repeatability                  | 1.0% FS                                            |
| Response Time                  | 100 ms (to 90% of step change)                     |
| Frequency Range                | DC                                                 |
| Power Supply                   | 24 VAC/DC, isolated from output, 120 VAC           |
| Power Consumption              | 2 VA                                               |
| Loading                        | 4–20 mA: 650 Ω maximum  
0–5 VDC: 25 kΩ minimum  
0–10 VDC: 50 kΩ minimum       |
| Isolation Voltage              | 3 KV (monitored line to output)                    |
| Linearity                      | 0.75% FS                                           |
| Current Ranges                 | Ranges from 0–1200 A DC                            |
| Sensing Aperture               | 1.875” dia. (46 mm)                               |
| Case                           | UL94 V0 Flammability Rated                         |
| Environmental                  | -4 to 122°F -20 to 50°C  
0–95% RH, non-condensing       |
| Listings                       | UL 508 Industrial Control Equipment, CE (pending) |

**DC Current Transducer Ordering Information**

Sample Model Number: DT6-420-24U-U-DL
Solid-core DC current transducer, 0–500 A range, 4–20 mA, 24 VAC/DC powered, unipolar output.

<table>
<thead>
<tr>
<th>(1) Full Scale Range</th>
<th>(2) Output Signal</th>
<th>(3) Power Supply</th>
<th>(4) Output Polarity</th>
<th>(5) Case Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>300 A</td>
<td>24U</td>
<td>U</td>
<td>DL Solid-core, DIN mount</td>
</tr>
<tr>
<td>6</td>
<td>500 A</td>
<td>120</td>
<td>BP</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>750 A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1000 A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1200 A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>420</td>
<td>4–20 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>005</td>
<td>0–5 VDC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>010</td>
<td>0–10 VDC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- Deadfront captive screw terminals.
- 12–22 AWG solid or stranded.
- Observe polarity.
- Unipolar Output: Signal with current flowing in one direction only.
DLT SERIES
DC Current Transducers

DLT Series DC Current Transducers combine a hall effect sensor and a signal conditioner into a single package. The DLT Series DC Current Transducers are designed to produce an analog 4–20 mA signal proportional to the DC current in the primary conductor. The DLT Series DC Current Transducers are available in a solid-core or split-core case design. Lower current ranges make this sensor ideal for use in photovoltaic panel combiner boxes.

DC Current Transducer Applications

DC Current Monitoring
- PV Array combiner boxes.
- Wind generators.
- DC heating applications.
- UPS system monitoring.

Photovoltaic Arrays

For additional Application Examples, see page 110 and www.nktechnologies.com

DC Current Transducer Features

4–20 mA Loop-powered Output
- Industry standard connections, positive indication of correct field wiring.

Single Range
- No chance of field range selection errors.
- Eliminates zero and span pots.

Isolation
- Output is magnetically isolated from the primary circuit for safety.
- Eliminates insertion loss (voltage drop).

Agency Approval
- UL 508 Industrial Control Equipment (USA & Canada).

Monitoring PV Arrays:

The current produced by a photovoltaic module or array can be easily monitored by using the DLT series current sensors over the conductor exiting the collectors. A simple two-wire connection, powered by 24 VDC nominal in series with the sensor output, and the sensor will produce a signal in real time that is directly proportional to the current being produced.

If a single cell fails, or a module quits operating properly, the current output will drop, and the current sensor will reflect the change.

Safer and more stable than shunts, non-contact current sensors are a simple answer to measuring DC current at any point in the PV system.
**DC Current Transducer Dimensions**

**FF Case**

**SP Case**

**DC Current Transducer Connections**

- **Load (Centrelit, (-) Meter, etc.)**: (+)
- **24 VDC Power**: (-)
- **4–20 mA Output**: 1(-) 2(+)

Notes:
- Fingersafe captive screw terminals.
- 12–22 AWG solid or stranded.
- Observe polarity.

**DC Current Transducer Specifications**

- **Output Signal**: 4–20 mA, Loop-powered
- **Output Limit**: 23 mA
- **Accuracy**: 1.0% FS
- **Response Time**: 100 ms (to 90% step change)
- **Frequency Range**: DC
- **Power Supply**: 24 VDC Nominal, 40 VDC Maximum
- **Isolation Voltage**: UL listed to 1270 VAC, tested to 5 KV
- **Input Ranges**: 0–20 to 0–400 DC, see Ordering Information
- **Sensing Aperture**: • FF Case: 0.55” (14 mm) dia.
  • SP Case: 0.84” (21.7 mm) dia.
- **Case**: UL94 V0 Flammability Rated
- **Environmental**: -22 to 158°F (-30 to 70°C)
  0–95% RH, non-condensing
- **Listings**: UL 508 Industrial Control Equipment (USA & Canada)

**DC Current Transducer Ordering Information**

Sample Model Number: DLTB-420-24L-BP-FF
DC current transducer, 50 A range, 4–20 mA output, 24 VDC loop-powered in a solid-core case.

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLT</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>–</td>
</tr>
</tbody>
</table>

- **(1) Full Scale Range**
  - A 0–20 A
  - B 0–50 A
  - C 0–100 A
  - D 0–200 A
  - E 0–300 A
  - F 0–400 A

- **(2) Output Signal**
  - 420 4–20 mA

- **(3) Power Supply**
  - 24L 24 VDC Loop-powered

- **(4) Output Polarity**
  - U Unipolar
  - BP Bipolar

- **(5) Case Style (black only)**
  - FF Solid-core, Front Terminals (maximum range 0–100 A)
  - SP Split-core (minimum range 0–50 A)

*Bulk packaging only.*
DT SERIES, 3-WIRE
DC Current Transducers

DT Series DC Current Transducers provide a low cost way of measuring DC current in a small and easy-to-install housing. The series is stable at a wide range of temperatures. The single range design and the use of a common for the power supply and output signal provide a price competitive option in an international market. Similar in concept to the DLT current output sensors, this design produces your choice of 0–5 or 0–10 VDC to interface with controllers or data acquisition systems lacking the current signal capacity.

DC Current Transducer Applications

Photovoltaic Panel Monitoring
- Accurate and reliable indication of how much power is produced by a single panel or a string of panels.

Hoists
- Detect overloads, jams.
- Detect under current conditions from coupling slip or breakage.

DC Motor Protection
- Detect imminent bearing failures.

Wind Driven Generators
- Measure and monitor power production from alternative sources.

Monitoring a Photovoltaic Panel Power Output

DC Current Transducer Features

Industry Standard Outputs
- 0–5 or 0–10 VDC proportional to the DC current
- Compatible with most automation systems.

24 VDC Powered
- Supply and Output share common.

No span or zero adjustments needed
- Reduces field calibration errors.
- Factory calibrated without potentiometers.

Solid Case
- Compact size requiring very little panel space.

Built-in Mounting Feet
- Simple, two-screw panel mount or attach with optional DIN rail brackets.

Designed to Meet UL, CUL and CE Approval
- Accepted worldwide.
### DC Current Transducer Dimensions

**FF Case**

![Dimensions Diagram]

- 2.75" x 0.19"
- 69.9mm x 4.8mm dia.

- 2.16" x 0.92"
- 54.9mm x 23.4mm

- 0.55" x 2.18"
- 14mm x 55.4mm

- 3.30" x 0.92"
- 83.8mm x 23.4mm

### DC Current Transducer Connections

- **Output**
  - (Controller, Meter, etc.)
  - COM(-), 2(+), 1(+)

- **Power Supply**
  - 24 VDC

- **Load**
  - (+), (-)

### DC Current Transducer Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power Supply</strong></td>
<td>24 VDC, &lt;2 VA</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td>0–5 or 0–10 VDC</td>
</tr>
<tr>
<td><strong>Response Time</strong></td>
<td>500 ms</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>• 0–50 A</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>±1% FS</td>
</tr>
<tr>
<td><strong>Isolation Voltage</strong></td>
<td>Designed to UL 508 1270 VAC, tested to 5000 VAC</td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
<td>0–95% RH, non-condensing</td>
</tr>
<tr>
<td><strong>Listings</strong></td>
<td>Designed to meet UL 508 Industrial Control Equipment (US &amp; Canada)</td>
</tr>
</tbody>
</table>

### DC Current Transducer Ordering Information

Sample Model Number: DTB-010-24D-U-FF

DC current transducer, 0–50 A, 0–10 VDC output, 24 VDC powered, unipolar solid-core.

- **Range**
  - B: 0–50 ADC
  - C: 0–100 ADC

- **Output Type**
  - 005: 0–5 ADC
  - 010: 0–10 ADC

- **Power Supply**
  - 24D: 24 VDC

- **Output Design**
  - U: Unipolar (output with current in one direction)

- **Case Style**
  - FF: Solid-core, Front Terminals
DT SERIES, 4-WIRE
DC Current Transducers

DT Series DC Current Transducers combine a Hall effect sensor and signal conditioner into a single package for use in DC current applications up to 400 A. The DT Series DC Current Transducers unipolar and bipolar models have jumper selectable current input ranges and industry standard 0–20 mA, 4–20 mA, 0–5 VDC or 0–10 VDC outputs. The DT Series DC Current Transducers are available in split-core or solid-core enclosures.

DC Current Transducer Applications

Battery Banks
• Monitors load current.
• Monitors charging current.
• Verifies operation.

Transportation
• Measures traction power or auxiliary loads.

Welding Processes
• Measures the current used while welding.
• Log processing time and number of operations.

Photovoltaic Panels
• Monitor panel or string current output.
• Monitor combiner box output.

Battery Charging System - Bipolar Output

Battery Charging System - Bidirectional Output

DC Current Transducer Features

Single Range or Three Jumper Selectable Ranges
• Reduces setup time.
• Reduces inventory.
• Eliminates zero and span pots.

Isolation
• Output is magnetically isolated from the input for safety.
• Eliminates insertion loss (voltage drop).

Internal Power Regulation
• Works well, even with unregulated power.
• Cuts installation cost.

Split-core Design/Built-in Mounting Brackets
• Makes installation a snap.

Test & Evaluation Units

For additional Application Examples, see page 110 and www.nktechnologies.com
## DC Current Transducer Dimensions

**FL Case**

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.38&quot;</td>
<td>85.9mm</td>
</tr>
<tr>
<td>3.87&quot;</td>
<td>98.3mm</td>
</tr>
<tr>
<td>1.50&quot;</td>
<td>38.1mm</td>
</tr>
<tr>
<td>0.80&quot;</td>
<td>20.3mm</td>
</tr>
<tr>
<td>0.75&quot;</td>
<td>19.1mm</td>
</tr>
<tr>
<td>dia.</td>
<td></td>
</tr>
</tbody>
</table>

**SP Case**

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.18&quot;</td>
<td>30mm</td>
</tr>
<tr>
<td>2.40&quot;</td>
<td>61mm</td>
</tr>
<tr>
<td>0.45&quot;</td>
<td>11.4mm</td>
</tr>
<tr>
<td>2.25&quot;</td>
<td>57.2mm</td>
</tr>
<tr>
<td>dia.</td>
<td></td>
</tr>
</tbody>
</table>

## DC Current Transducer Connections

**DT Series Unipolar and Bipolar Output Models**

<table>
<thead>
<tr>
<th>Range Jumper</th>
<th>Power</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4(+)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Output loop is powered by DT Transducer. No loop power supply required.

Notes:
- Deadfront captive screw terminals.
- 12–22 AWG solid or stranded.
- Observe polarity.

## DC Current Transducer Unipolar Output

### DC Current Transducer Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output Signal</strong></td>
<td>0–20 mA, 4–20 mA, 0–5 VDC, 0–10 VDC (Bidirectional models only)</td>
</tr>
<tr>
<td><strong>Output Limit</strong></td>
<td>0–20 mA, 4–20 mA: 23 mA</td>
</tr>
<tr>
<td></td>
<td>0–5 VDC: 5.75 VDC</td>
</tr>
<tr>
<td></td>
<td>0–10 VDC: 11.5 VDC</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>Solid-core: 1% FS</td>
</tr>
<tr>
<td></td>
<td>Split-core: 2% FS</td>
</tr>
<tr>
<td><strong>Repeatability</strong></td>
<td>1.0% FS</td>
</tr>
<tr>
<td><strong>Response Time</strong></td>
<td>Solid-core: 20 ms (to 90% of step change)</td>
</tr>
<tr>
<td></td>
<td>Split-core: 100 ms (to 90% of step change)</td>
</tr>
<tr>
<td><strong>Frequency Range</strong></td>
<td>DC</td>
</tr>
<tr>
<td><strong>Power Supply</strong></td>
<td>120 VAC (split-core only)</td>
</tr>
<tr>
<td></td>
<td>24 VAC/DC, 2 VA max.</td>
</tr>
<tr>
<td><strong>Power Consumption</strong></td>
<td>2 VA</td>
</tr>
<tr>
<td><strong>Loading</strong></td>
<td>0–20 mA, 4–20 mA: 500 max.</td>
</tr>
<tr>
<td></td>
<td>0–3 or 5 VDC: 25 KΩ min.</td>
</tr>
<tr>
<td></td>
<td>0–10 VDC: 50 KΩ min.</td>
</tr>
<tr>
<td><strong>Isolation Voltage</strong></td>
<td>3 KV (monitored line to output)</td>
</tr>
<tr>
<td><strong>Linearity</strong></td>
<td>0.75% FS</td>
</tr>
<tr>
<td><strong>Current Ranges</strong></td>
<td>Solid Core 0–200 max.</td>
</tr>
<tr>
<td></td>
<td>Split Core 0–50 min., 0–400 max.</td>
</tr>
<tr>
<td><strong>Sensing Aperture</strong></td>
<td>FL Case: 0.75” (19.1 mm) dia.</td>
</tr>
<tr>
<td></td>
<td>SP Case: 0.85” (21.6 mm) sq.</td>
</tr>
<tr>
<td><strong>Case</strong></td>
<td>UL94 V0 Flammability Rated</td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
<td>-4 to 122°F (20 to 50°C)</td>
</tr>
<tr>
<td></td>
<td>0–95% RH, non-condensing</td>
</tr>
<tr>
<td><strong>Listings</strong></td>
<td>UL 508 Industrial Control Equipment (USA &amp; Canada), CE</td>
</tr>
</tbody>
</table>
## DT SERIES

### DC Current Transducer Ordering Information

**DT Series Unipolar and Bipolar Output Models, Split-Core Models**

Sample Model Number: DT2-420-24U-SP

DC current transducer, 0–100/150/200 A range, 4–20 mA output, 24 VAC/DC powered, unipolar polarity, split-core case.

**DT** (1) Full Scale Range

| 1 | 50, 75, 100 A |
| 2 | 100, 150, 200 A |
| 3 | 150, 225, 300 A |
| 4 | 200, 300, 400 A |

**Output Signal**

| 020 | 0–20 mA |
| 420 | 4–20 mA |

**Power Supply**

| 003 | 0–3 VDC |
| 005 | 0–5 VDC |
| 010 | 10 VDC |

**Output Polarity**

| U | Unipolar (Output with current in either direction) |
| BP | Bipolar |

**Case Style**

| SP | Split-core |

---

**DT Series Unipolar and Bipolar Output Models, Solid-Core Models**

Sample Model Number: DT2-420-24U-U-FL

DC current transducer, 0–100/150/200 A range, 4–20 mA output, 24 VAC/DC powered, unipolar polarity, solid-core case.

**DT** (1) Full Scale Range

| 0 | 5, 10, 20 A |
| 1 | 50, 75, 100 A |
| 2 | 100, 150, 200 A |

**Output Signal**

| 020 | 0–20 mA |
| 420 | 4–20 mA |
| 003 | 0–3 VDC |

**Power Supply**

| 003 | 0–3 VDC |
| 005 | 0–5 VDC |
| 010 | 10 VDC |

**Output Polarity**

| U | Unipolar (Output with current in one direction only) |
| BP | Bipolar |

**Case Style**

| FL | Solid-core |

---

**DT Series Bidirectional Output Models**

Sample Model Number: DT2-010-24U-BD-SP

DC current transducer, 0–200 A range, ±10 VDC output signal, 24 VAC/DC powered, split-core case.

**DT** (1) Full Scale Range

| 1 | 100 A |
| 2 | 200 A |
| 3 | 300 A |
| 4 | 400 A |

**Output Signal**

| 010 | 10 VDC |

**Power Supply**

| 24U | +24 VAC/DC |

**Output Polarity**

| BD | Bidirectional |

**Case Style**

| SP | Split-core |

---