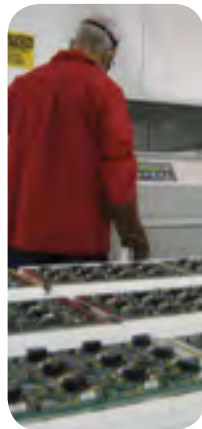


# PRODUCT CATALOG

2015

- Current Sensing Switches
- AC Current Transducers
- DC Current Transducers
- Ground Fault Protection
- Voltage Transducers
- Power Sensing Products
- Signal Converters
- Current Transformers
- AMPFlasher™ Current Indicator
- Accessories





Current Sensors for Automation

## A Company Built Upon A History Of Innovation

Founded in 1982, when Maynard Kuljian saw the need for an economical way to measure current draw, Neilsen-Kuljian, Inc., became the first to develop the low-cost solid-state current sensing technology that underlies the industry today.

True to this heritage, NK Technologies has maintained a focus on developing and manufacturing innovative, cost-effective current sensing products designed to add value and to meet or exceed our customers' performance expectations. With a portfolio of over 1300 models, NK Technologies remains a leading supplier of current measurement solutions to the industrial and factory automation markets. As the needs of these markets change, NK Technologies is well-positioned to respond with sophisticated new product designs and improved product functionality necessary to meet those applications.

As a leader in the industry, NK Technologies takes its commitment to customers seriously and considers customer satisfaction a top priority. Timely response to customer inquiries; knowledgeable technical support; a willingness to develop custom solutions to meet specific customer needs; and an organizational commitment to delivering reliable, quality product on time are the hallmarks of excellence which our customers have come to rely on and expect from NK Technologies, a company built upon a history of innovation



[www.nktechnologies.com](http://www.nktechnologies.com)

Go online for more information

- Up-to-date Product Information
- Application Examples
- Engineering Resource Articles
- Sign up for Product updates
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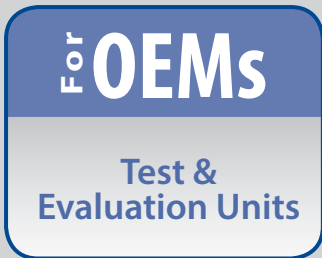


For over three decades, NK Technologies has remained the premier manufacturer of Current Sensors and Transducers serving the factory and industrial automation markets.

*With one of the broadest product portfolios in the industry, NK Technologies provides reliable, innovative current sensing products designed to add value and exceed our customers' expectations. "From motor monitoring to heater status, semiconductor tools to water/wastewater plants, NK Technologies has a family of current sensors to meet your application needs." — Phil Gregory, President*

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AS1, AS1 Compact Case, AS1 DODC, AS1 NOR-FT-GO, AS3, ASL, ASM, ASC, ASD, AS0, ASX, ASXP, ATS, ASXP-LS, DS1, DS3	AG, AGT, AGL	<b>Accessories</b> ..... 108
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	CTRC, ProteCT™, Current Transformers	• ISO 9001 DNV Certification
		• Terms & Conditions



## We will help you ... for FREE!

*The New NK Technologies Test & Evaluation Program can expedite your evaluation process by getting the right product in your engineers hands for evaluation fast and free!*

- ✓ **Are you an OEM using switches and transducers on the equipment you sell to your customers?**
- ✓ **Are you looking for a test & evaluation unit?**
- ✓ **Would you like to avoid the time & hassle associated with buying a unit?**

Get your design moving forward by simply following these simple steps.

#1 - Complete following form at [www.nktechnologies.com/testunit/](http://www.nktechnologies.com/testunit/)

#2 - Meet either in person or by telephone with our Application Engineering team to discuss your product selection so we can confirm the product you have selected is best for your application.

#3 - NK Technologies will ship you your test & evaluation unit at no cost.

#4 - You agree to meet either in person or by phone sometime in the next 60 days to review your product operation, analyze test results and coordinate a plan to move forward with the design.

**It's that easy ... so start today!**



# Current Sensing Switches

*Ideal for off/on status, overload or underload indication, current sensing switches from NK Technologies combine a CT, signal conditioner and output contacts into a single package for use with industrial and factory automation equipment.*

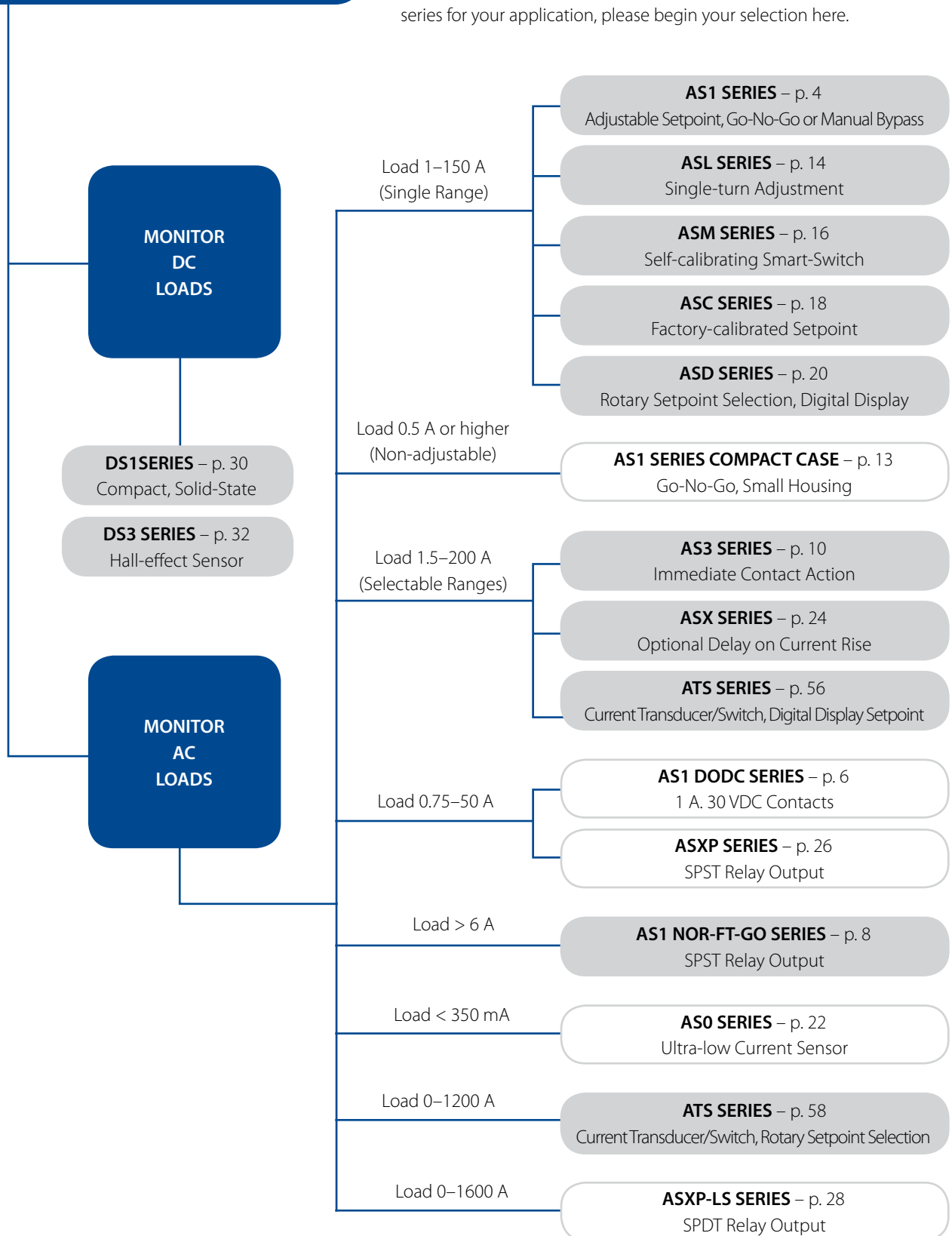
Features:

- Multiple output ranges
- Adjustable or fixed setpoints
- Models with integral time delay available
- Choice of N.O or N.C., AC or DC Contacts
- Self-powered and split-core options

• <b>AS1 SERIES</b>	Current Sensing Switches .....	page 4
• <b>AS1 SERIES COMPACT CASE</b>	AC Current Sensing Switches .....	page 13
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## CURRENT SENSING SWITCHES Selection Chart

Our wide range of current sensing switches guarantees that you'll find exactly what you need. We currently offer 17 series of current sensing switches in AC or DC configurations. To assist in guiding you to the right series for your application, please begin your selection here.



# AS1 SERIES

## Current Sensing Switches

AS1 Series Current Sensing Switches combine a current transformer, signal conditioner and limit alarm into a single package for use in status monitoring or proof of operation applications. Offering an extended setpoint range of 1–150 A and universal, solid-state outputs, the self-powered AS1 can be tailored to provide accurate and dependable digital indication of over-current conditions across a broad range of applications. Available in solid-core case styles or in a split-core case to maximize ease of installation.



### Current Sensing Switch Applications

#### Electronic Proof of Flow

- Current sensing switches eliminate the need for multiple pipe or duct penetrations and is more reliable than electromechanical pressure or flow switches.

#### Conveyors

- Detects jams and overloads.
- Interlocks multiple conveyor sections.

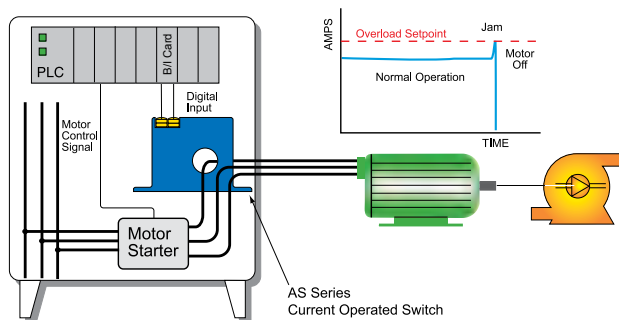
#### Lighting Circuits

- Easier to install and more accurate than photocells.

#### Electrical Heaters

- Faster response than temperature sensors.

#### Pump Jam & Suction Loss Protection



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

### Current Sensing Switch Features

#### Universal Output

- N.O. or N.C. solid-state switch for control circuits up to 240 VAC/DC.
- Compatible with most automation systems.

#### Self-powered

- Cuts installation and operating costs.

#### Easily Adjustable Setpoint

- Speeds startup.

#### Solid or Split-core Case

- Versions tailored for each installation.

#### LED Indication

- Provides quick visual indication of contact status.

#### Built-in Mounting Feet

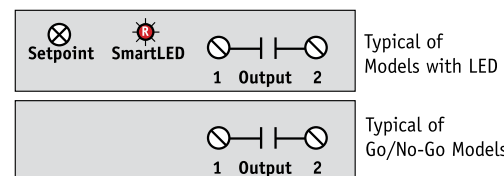
- Simple, two-screw panel mount or attach with optional DIN rail brackets.\*

#### UL, CUL and CE Approval

- Accepted worldwide.

\*For information on the DIN rail accessories kit, see page 113.

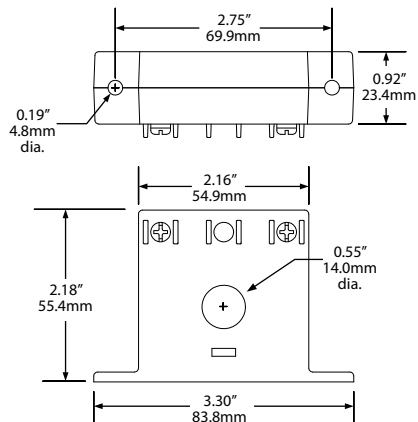
### Current Sensing Switch Connections



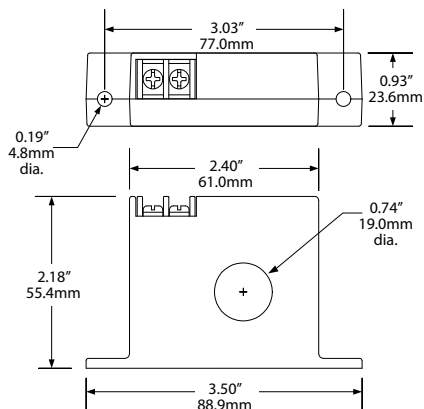
**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

Current Sensing Switch Dimensions

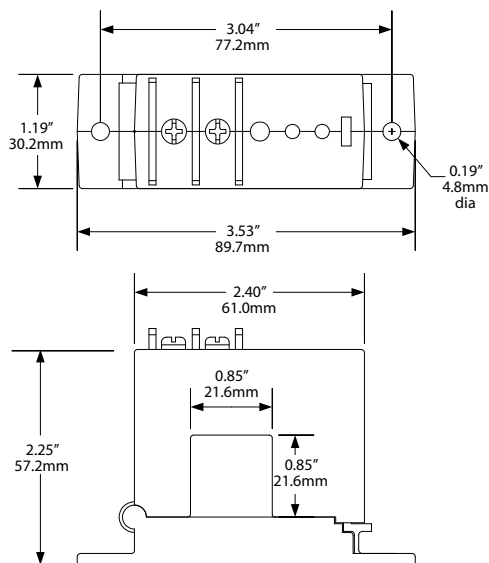
FF Case



FT Case



SP Case



Current Sensing Switch Specifications

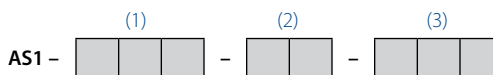


<b>Power Supply</b>	None—Self-powered		
<b>Output</b>	Magnetically isolated solid-state switch		
<b>Output Rating</b>	<ul style="list-style-type: none"> <li>• N.O. Version: 0.15 A @ 240 VAC or VDC</li> <li>• N.C. Version: 0.2 A @ 135 VAC or VDC</li> <li>• Not polarity sensitive</li> </ul>		
<b>Off-State Leakage</b>	<10 $\mu$ A		
<b>Response Time</b>	120 ms		
<b>Setpoint Range</b>	<ul style="list-style-type: none"> <li>• Solid-core: 1–150 A (adjustable)</li> <li>• Split-core: 1.75–150 A (adjustable)</li> </ul>		
<b>Hysteresis</b>	5% of setpoint		
<b>Overload</b>	MODEL	6 SEC	1 SEC
	• -GO (NOU)	• 500 A	• 1000 A
	• -GO (NCU)	• 400 A	• 1000 A
	• All other	• 400 A	• 1000 A
<b>Isolation Voltage</b>	UL listed to 1270 VAC, tested to 5000 VAC		
<b>Frequency Range</b>	6–100 Hz		
<b>Sensing Aperture</b>	<ul style="list-style-type: none"> <li>• -FF Case: 0.55" (14 mm) dia.</li> <li>• -FT Case: 0.74" (19 mm) dia.</li> <li>• -SP Case: 0.85" (21.6 mm) sq.</li> </ul>		
<b>Case</b>	UL94 V0 Flammability Rated		
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing		
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada), CE		

Current Sensing Switches

Current Sensing Switch Ordering Information

Sample Model Number: AS1-NOU-SP  
Adjustable AC current sensing switch, normally open, split-core.



(1) Output Rating

NOU	Normally Open
NCU	Normally Closed

(2) Case Style

FF	Solid-core, Front Term.
FT	Solid-core, Top Term.
SP	Split-core

(3) Options

GO	Non-adjustable; output changes with min. current present (solid-core 0.75 A, split-core 1.25 A)
NL	No LED
Y39	Output Bypass Switch (not UL listed) – available for FT case only
	With LED (Blank)



# AS1 DODC SERIES

## Current Sensing Switches

AS1 DODC Series Current Sensing Switches with dual output are ideal for applications where users want to monitor multiple loads simultaneously and alarm when cumulative current draws reach or exceed desired setpoints. Combining the setpoint, LED indication and output functions of multiple sensors into one space-saving package, the AS1 DODC Series allows OEMs to tailor individual trip points to specific processes and trigger independent contacts. The AS1 DODC may serve as an effective over/undercurrent monitor by energizing alarm contacts whenever sensed current falls outside the low and high band setpoints.

### Current Sensing Switch Applications

#### Equipment Motor Protection

- Sense brush motor overloads due to entanglements with bumpers, mirrors, guards, carriers, etc.
- Monitor pump motors for overloads or failure due to drive problems, restrictions, or dry run.
- Monitor blower motor status for under/over current conditions or to determine when multiple blowers are operating.
- Monitor booms or conveyor motors for overload due to obstructions.

#### High Inrush or Temporary Overload Current

- Start-up/delay timer provides two-second delay to avoid nuisance tripping from high inrush or temporary overload conditions.



### Current Sensing Switch Features

#### Fixed Start-up Delay and Adjustable Trip Timer

- Fixed start-up delay of 2 seconds reduces nuisance trips on inrush.

#### Choice of Dual Independent N.O. Relay Outputs

- Contact rating of 1 A @ 30 VDC provides adequate switching capacity for status or alarm indication in most motor control systems without shared common.

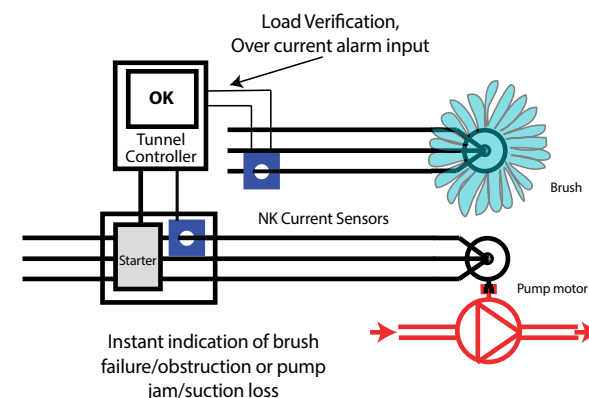
#### Improved Ease of Installation and Use

- Self-powered design eliminates power supply wiring.
- Multiple status LEDs give quick visual indication of sensor operation.
- Models available for low (0.75–20 A) and mid-range (20–50 A) applications.

#### Industrial Grade Performance

- Highly accurate setpoint adjustment, consistent hysteresis, and fast response time deliver quality performance.

#### Status Alarming



Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.

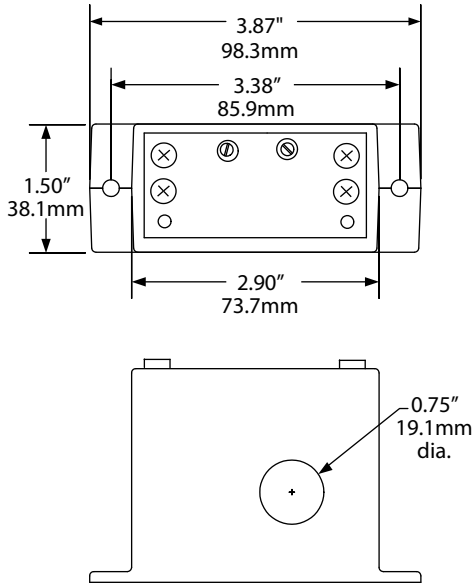


For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

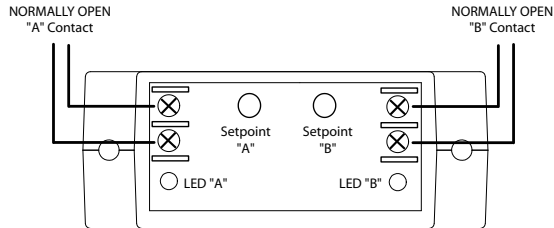


Current Sensing Switch Dimensions

FL Case



Current Sensing Switch Connections

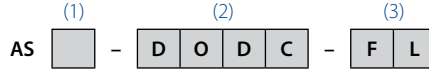


Current Sensing Switch Specifications

<b>Power Supply</b>	None—Self-powered
<b>Output</b>	Dual N.O. solid-state switches, polarity sensitive
<b>Output Rating</b>	1 A @ 30 VDC
<b>Trip Point Range (adjustable)</b>	• AS1: 0.75–20 A • AS2: 20–50 A
<b>Time Delay</b>	Start-up: 2.0 seconds (fixed)
<b>Input Range</b>	• AS1: 0–20 A • AS2: 20–50 A
<b>Max. Inrush</b>	500 A (5 sec. duration)
<b>Hysteresis</b>	<8% (max.)
<b>Response Time</b>	100 ms
<b>Isolation Voltage</b>	Tested to 5 KV
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Sensing Aperture</b>	0.75" (19.1 mm) diameter

Current Sensing Switch Ordering Information

Sample Model Number: AS1-DODC-FL  
 AC current sensing switch, fixed 2 second delay, two N.O. 1 A @ 30 VDC outputs, 0.75–20 A range, solid-core case.



(1) Range

1	0.75–20 A
2	20–50 A

(2) Output Type

DODC	Dual N.O. 1 A @ 30 VDC
------	------------------------

(3) Case Style

FL	Solid-core
----	------------



# AS1 NOR-FT-GO SERIES

## Current Sensing Switches

AS1 NOR-FT-GO Series Current Sensing Switches are a specialized current sensing switch providing an electromechanical relay contact. This output allows the sensor to control much more current than other AS1 models. This contact can control loads up to 5 A, AC or DC. Solid-state contacts generally have a much lower capacity, making this sensor much more versatile than most self-powered models. Available in a solid-core case only.



### Current Sensing Switch Applications

#### Electronic Proof of Flow

- Current sensing switches eliminate the need for multiple conduits or duct penetrations and are more reliable than electromechanical pressure or flow switches.

#### Compressor Monitoring

- Detect when the compressor is running.
- Allows for time of use logging; helps maintenance scheduling.

#### Heaters

- Sense system operation.

#### Fan Interlocks

- Sense system operation.
- Use to turn on a duct booster fan when clothes dryer is energized.

### Current Sensing Switch Features

#### Electromechanical Output

- N.O. mechanical output relay for detection of current; closes on current increase.

#### Fixed Setpoint

- Cuts installation and operating costs.

#### Self-Powered

- Reduces installation time and costs.

#### Integral Mounting Feet

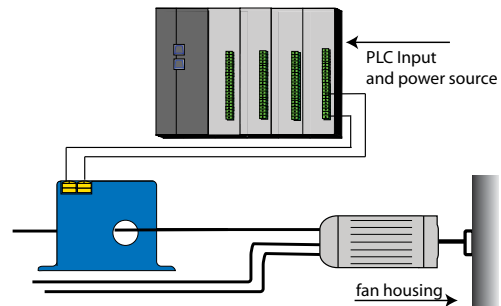
- Molded in feet for direct panel mounting or attachment of DIN-compatible brackets.\*

#### Agency Approved

- UL and CUL.

\*For information on the DIN rail accessories kit, see page 113.

### Current Sensing Switch Monitoring a Fan Load



Motor current causes the relay contact to close, and if the coupling breaks the current falls and the sensor output opens again

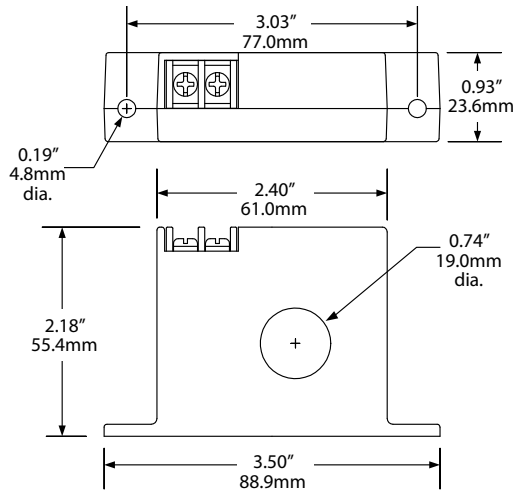
- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.



Current Sensing Switch Dimensions

FT Case

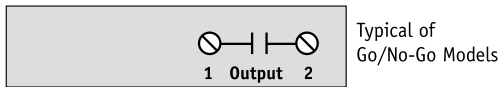


Current Sensing Switch Specifications

<b>Power Supply</b>	None—Self-powered		
<b>Output</b>	Electromechanical relay		
<b>Output Rating</b>	<ul style="list-style-type: none"> <li>NOR - N.O. Version:                             <ul style="list-style-type: none"> <li>5 A @ 250 VAC</li> <li>5 A @ 30 VDC</li> </ul> </li> </ul>		
<b>Off-State Leakage</b>	None		
<b>Response Time</b>	120 ms		
<b>Setpoint Range</b>	Go/No-go Fixed Trip Point - NOR: 5.8 A AC		
<b>Hysteresis</b>	5% of setpoint		
<b>Overload</b>	MODEL	6 SEC	1 SEC
	• NOR-GO	• 400 A	• 1000 A
<b>Isolation Voltage</b>	UL listed to 1270 VAC, tested to 5000 VAC		
<b>Frequency Range</b>	6–100 Hz		
<b>Sensing Aperture</b>	0.74" (19 mm) dia.		
<b>Case</b>	UL94 V0 Flammability Rated		
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing		
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada)		

Current Sensing Switches

Current Sensing Switch Connections



Current Sensing Switch Ordering Information

Sample Model Number: AS1-NOR-FT-GO  
AC current operated switch, solid-core, non-adjustable trip point (5.6 A), self-powered, normally open relay contact output rated to 5 A.



(1) Output Rating

NOR	Normally Open (mechanical)
-----	----------------------------

(2) Case Style

FT	Solid-core, Top Terminals
----	---------------------------

(3) Options

GO	Go/no-go version (fixed-setpoint)
----	-----------------------------------



# AS3 SERIES

## Current Sensing Switches

AS3 Series Current Sensing Switches provide the same dependable indication of status offered by the AS1, but with the added benefit of increased setpoint accuracy. A choice of three, jumper-selectable input ranges allows the AS3 to be tailored to an application, providing more precise control through improved setpoint resolution. Self-powering, isolated solid-state outputs, 1–6 A, 6–40 A and 40–200 A input ranges, and a choice of split- or solid-core case are standard.

### Current Sensing Switch Applications

#### Electronic Proof of Flow

- No need for pipe or duct penetrations.
- More reliable than electro-mechanical pressure or flow switches.

#### Conveyors

- Detects jams and overloads.
- Interlocks multiple conveyor sections.

#### Lighting Circuits

- Easier to install and more accurate than photocells.

#### Electrical Heaters

- Faster response than temperature sensors.



### Current Sensing Switch Features

#### Choice of N.O. or N.C. Solid-State Outputs

- 1 A @ 240 VAC, 0.15 A @ 30 VDC.
- 15 A @ 120 VAC (-15 model).
- 3 A @ 120 VAC output optional.

#### Self-powered

- Cuts installation and operating costs.

#### Easily Adjustable Setpoint

- Speeds startup.

#### Solid- or Split-core Case

- Choose the appropriate version for each installation.

#### LED Indication

- Provides quick visual indication of contact status.

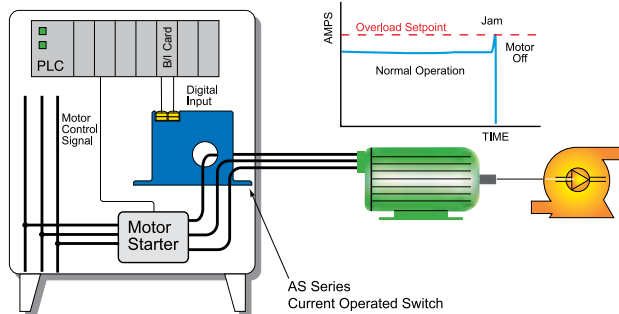
#### Built-in Mounting Feet

- Provides the secure installation inspectors require.

#### UL, CUL and CE Approval

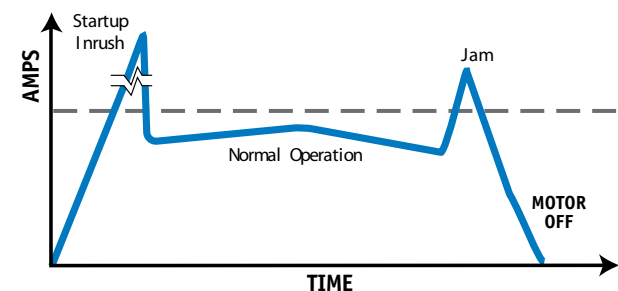
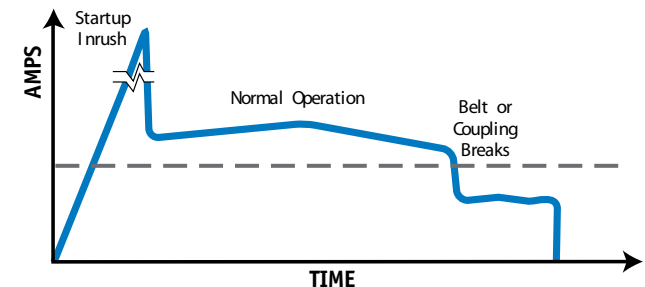
- Accepted worldwide.

### Pump Jam & Suction Loss Protection



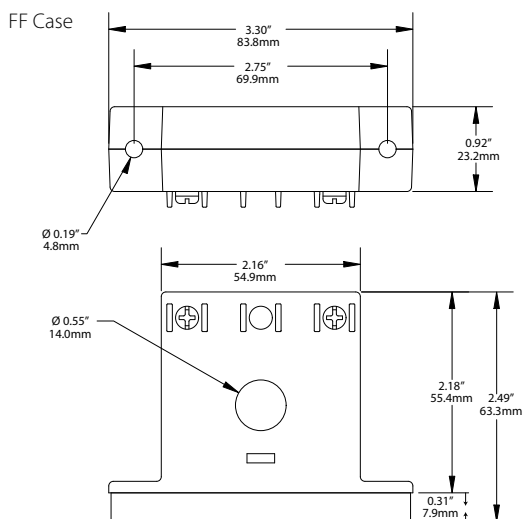
- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

### AS1, AS3, ASX, ASXP Series Sample Output



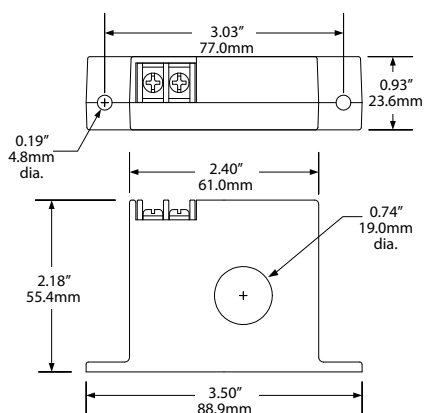
**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

### Current Sensing Switch Dimensions

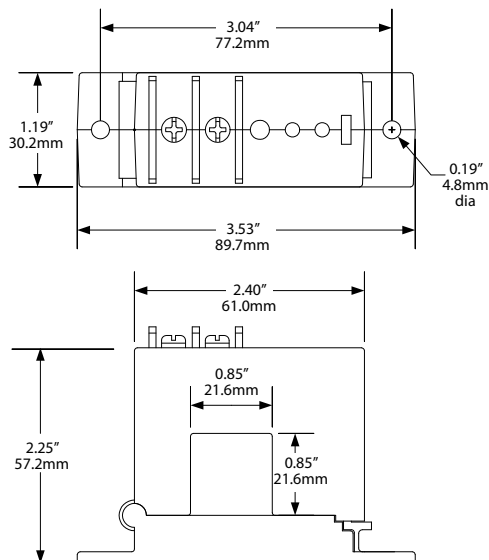


Note: The bottom 0.31" applies to -15 option only.

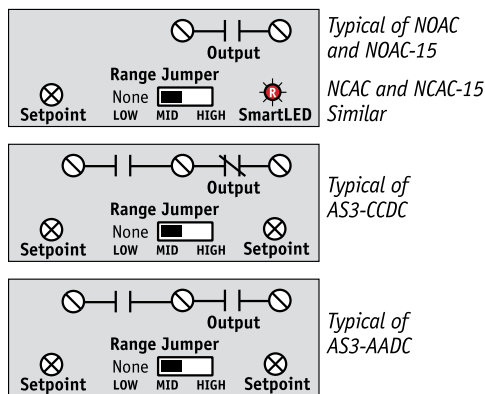
### FT Case



### SP Case



### Current Sensing Switch Connections



Note: Terminals are #6 screws. DC contacts are polarity sensitive.

### Current Sensing Switch Specifications



<b>Power Supply</b>	None—Self-powered		
<b>Output</b>	Isolated solid-state relay; shared common (CCDC)		
<b>Output Rating</b>	<ul style="list-style-type: none"> <li>1.0 A @ 240 VAC (Standard AC Units)</li> <li>0.15 A @ 30 VDC (Standard DC &amp; Multi-pole Units)</li> <li>15 A @ 120 VAC, 10 A @ 240 VAC (-15 Option)</li> </ul>		
<b>Off-state Leakage</b>	<ul style="list-style-type: none"> <li>NOAC: &lt;10 μA</li> <li>NCAC: 2.5 mA</li> <li>AADC: &lt;10 μA</li> </ul>	<ul style="list-style-type: none"> <li>NODC: &lt;10 μA</li> <li>NCDC: 1.4 mA</li> <li>CCDC: 0.3 mA (NC Terminal)</li> </ul>	
<b>Response Time</b>	40–120 ms		
<b>Setpoint Range</b>	<ul style="list-style-type: none"> <li>Solid-core: 1–6, 6–40 &amp; 40–175 A</li> <li>Split-core: 1.75–6, 6–40 &amp; 40–200 A</li> </ul>		
<b>Hysteresis</b>	Low: 0.15 A, Mid: 0.3 A, High: 0.9 A		
<b>Overload</b>	Range	6 Sec	1 Sec
	<ul style="list-style-type: none"> <li>1–6 A</li> <li>6–40 A</li> <li>40–175 A</li> </ul>	<ul style="list-style-type: none"> <li>400 A</li> <li>500 A</li> <li>800 A</li> </ul>	<ul style="list-style-type: none"> <li>600 A</li> <li>800 A</li> <li>1200 A</li> </ul>
<b>Isolation Voltage</b>	UL listed to 1270 VAC, tested to 5000 VAC		
<b>Frequency Range</b>	6–100 Hz		
<b>Sensing Aperture</b>	<ul style="list-style-type: none"> <li>-FF Case: 0.55" (14 mm) dia.</li> <li>-FT Case: 0.74" (19 mm) dia.</li> <li>-SP Case: 0.85" (21.6 mm) sq.</li> </ul>		
<b>Case</b>	UL94 V0 Flammability Rated		
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing		
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada)*, CE		

\* UL listing for -FF and -SP models only.



**Current Sensing Switch Ordering Information**

Sample Model Number: AS3-NOAC-FF-NL  
Adjustable AC current sensing switch, normally open AC contacts, solid-core, without indicating LED.



(1) Output Rating

NOAC	Normally Open, 1 A @ 240 VAC
NCAC	Normally Closed, 1 A @ 240 VAC
NODC	Normally Open, 0.15 A @ 30 VDC
NCDC	Normally Closed, 0.15 A @ 30 VDC
AADC	Dual, Normally Open, 30 VDC (-FF only)
CCDC	"Super" Form C SPDT, 0.15 A @ 30 VDC (-FF only)

(2) Case Style

FF	Solid-core, Front Term.
SP	Split-core
FT	Solid-core, Top Term.*

\*Available with 3 A @ 120 VAC output.

(3) Options

NL	No LED
15	15 A @ 120 VAC (-FF only)
	(Blank is standard)



The AS3 series current sensing switches are the go-to models for a huge variety of applications. The models designed to control AC circuits can be manufactured with 1, 3 or 15 A capacities. The models with DC capabilities can be manufactured with dual contacts, adjustable between the selected ranges. NK Technologies' original designs are refined to a wide range of application.

# AS1 SERIES COMPACT CASE

## AC Current Sensing Switches

The AS1 Series Compact Case Current Sensing Switches are a compact, inexpensive, easy-to-use ring which slips onto a conductor to give a solid-state contact for indication of current flow. Ideal for use in control panels, or wherever confirmation of current flow is desired, AS1 Series-CC current sensing switches are a cost-effective way to detect live conductors and see current flow to fans, heaters, pumps, lighting or other AC powered devices.



### Current Sensing Switch Applications

- Quick reporting of electric motor load status.
- Identify open heater circuit connection.
- Independent verification that the load is energized.
- Confirmation of operation for critical lighting or equipment.

### Current Sensing Switch Features

#### Low Sensitivity Turn-On Point

- Detect currents as low as 0.5 A with a single conductor pass, eliminates the need to wrap conductors multiple times to increase sensitivity.

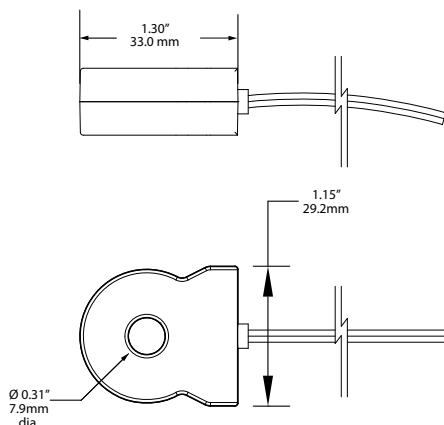
#### Reliable Solid-state Output

- No moving parts provide a nearly unlimited number of operations, and powered from the monitored circuit.

#### Choice of Outputs

- Normally Open or Normally Closed connection. Connect the leads 24" long leads to a local controller or to a terminal block for remote operation.

### Current Sensing Switch Dimensions



### Current Sensing Switch Specifications

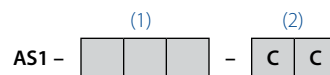


<b>Output/Indication</b>	Standard: • Solid-state contact, normally open • Solid-state contact, normally closed
<b>Indicating Range</b>	0.5 A trip point
<b>Output Rating</b>	150 mA, 120 VAC or DC max.
<b>Dimensions</b>	• Overall: 1.125"W x 0.56"D x 1.5"H • Aperture: 0.30"ID • Pigtails: 24"
<b>Case</b>	UL94 V0 Flammability Rated
<b>Mounting</b>	Slides directly onto monitored conductor
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0-95% RH, non-condensing
<b>Frequency Response</b>	50-400 Hz
<b>Listings</b>	UL/cUL, CE

### Current Sensing Switch Ordering Information

Sample Model Number: AS1-NOU-CC

Adjustable AC current sensing switch, normally open, solid-core.



#### (1) Output Rating

NOU	Normally Open
NCU	Normally Closed

#### (2) Case Style

CC	Compact Case
----	--------------

- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.



# ASL SERIES

## AC Current Sensing Switches

The ASL Series Current Sensing Switches provide a current operated solid-state contact powered from the monitored circuit. The trip point adjustment uses a single turn potentiometer. This means the installer can set the point where the output changes state when the monitored circuit is not energized, by turning the adjustment arrow to the current magnitude needed, and install the sensor over the conductor. Proper installation couldn't be easier.

Features a Patent Pending Linear Setpoint Adjustment



### Current Sensing Switch Applications

#### AC Motor Loads

- Set a normally open contact over the normal running current level and it will open if the drive belt breaks or comes off the sheaves.
- Set a normally closed contact below the normal run current level and it will open on over loaded conditions.
- Monitor up to 150 A loads.

#### Critical Lighting Loads

- Monitor security lighting and water navigational indicators.

#### Heating Loads

- Receive independent verification that an element is working properly.
- Monitor drying and curing processes remotely.

### Current Sensing Switch Features

#### Easily Established Contact Actuation Point

- Patented potentiometer setpoint selection (patent pending).
- Trip point indicated on the labeling.
- Trip point can be set with no load present, adding a large measure of safety.
- Two-second delay before contact action upon initial energization allows the output to ignore motor inrush current.

#### Isolation

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

#### Solid-state Reliability

- No moving components for switching.
- No need for periodic maintenance or calibration.

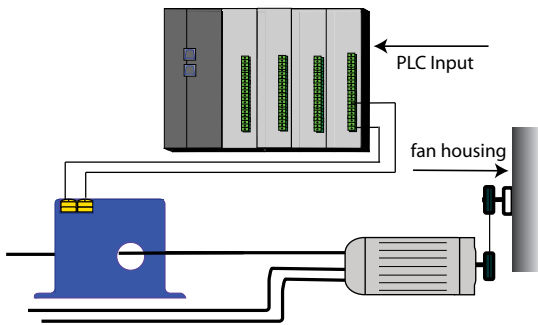
#### Panel Mounted Solid- or Split-Core Case

- Split-core housing allows installation without disturbing existing wiring and can be mounted in any position. Either case can be attached to a panel, hung on the conductor or on a DIN rail using adaptors (DIN-2 accessory).\*
- Solid or split-core housings provide windows large enough for 150 A loads, non-contact design provides complete isolation between primary circuit and control circuitry.

#### No External Power Needed

- Sensor is powered from the monitored AC circuit.
- Choose normally open (closing on current increase) or normally closed (opening on current increase).
- Fast action contact reacts quicker than RTD, thermocouples, or bimetallic thermal elements.

\*For information on the DIN rail accessories kit, see page 113.



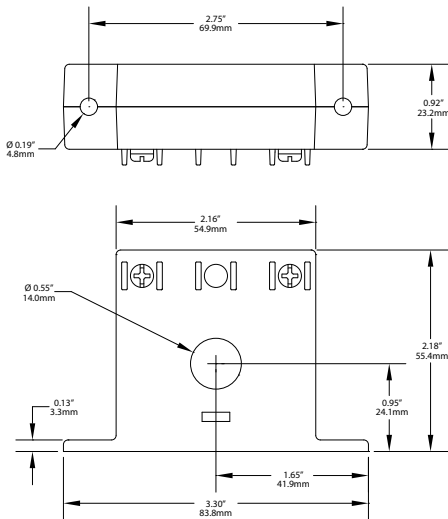
Motor current causes the solid-state contact to close, and if the coupling or drive belt breaks the current falls and the sensor output opens again.

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

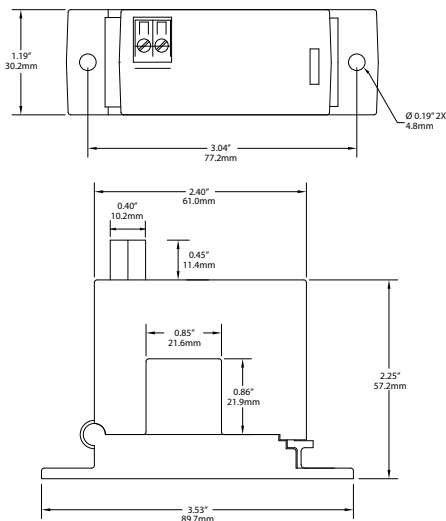


Current Sensing Switch Dimensions

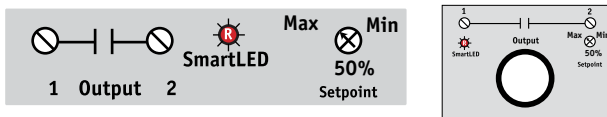
FF Case



SP Case



Current Sensing Switch Connections



Current Sensing Switch Output Type

Normally open universal AC or DC solid-state contact, 150 mA to 240 V (maximum load across output contact) or normally closed universal AC or DC solid-state contact, 200 mA to 135 V (maximum load across output contact).

Notes:

- Zinc plated screw terminals solid-core.
- Deadfront enclosed terminals split-core.
- 12–22 AWG solid or stranded.
- Not polarity sensitive.

Current Sensing Switch Specifications

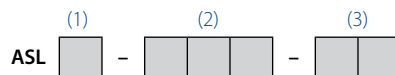


<b>Output Type</b>	Solid-state universal contact (AC/DC)
<b>Accuracy</b>	±1%
<b>Repeatability</b>	1.0% FS
<b>Response Time</b>	100 ms (to 90% step change)
<b>Frequency Range</b>	AC 10–100 Hz
<b>Power Supply</b>	Self-powered from the monitored circuit
<b>Relay Capacity</b>	150 mA up to 240 VAC/DC NO 200 mA up to 135 VAC/DC NC
<b>Linearity</b>	1.00% FS
<b>Current Ranges</b>	Ranges from 1–150 A
<b>Sensing Aperture</b>	FF Case: 0.55" (19 mm) diameter SP Case: 0.85" (21.6 mm) diameter
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	UL/cUL, CE

Current Sensing Switch Ordering Information

Sample Model Number: ASL1-NOU-FF

Solid-core AC current sensing switch with single turn setpoint adjustment, Smart LED standard.



(1) Full Scale Range

1	1–10 A (solid-core) 2–20 A (split-core)
2	10–50 A (solid-core) 20–50 A (split-core)
3	50–100 A
4	100–150 A

(2) Output Type

NOU	Normally Open
NCU	Normally Closed

(3) Case Style

FF	Solid-core, Front Terminals
SP	Split-core

Current Sensing Switches



# ASM SERIES

## Self-calibrating Smart-Switches

The newly designed ASM Series Self-calibrating Smart-Switch is more accurate and easier to use than previous models. This Smart-Switch uses the actual load current to set the trip point. It takes just a couple of seconds of steady running conditions before the sensor locks onto the normal current level. The ASM Series is designed for overload, underload or operating window applications. Upon sensing an average operating current, the ASM self-learns and establishes a limit-alarm trip point based on 85–125% of normal current (overload/underload model only). Available in a solid- or split-core case.



### Current Sensing Switch Applications

#### Conveyors (-OL option)

- Detects jams and overloads.
- Interlocks multiple conveyor sections.

#### Electronic Proof of Flow (-UL option)

- More reliable than electro-mechanical pressure or flow switches. No need for pipe or duct penetrations.

#### Pump Protection (-OU option)

- Provides overload (jams) and underload (suction loss) indication.
- Interlocks multiple conveyor sections.

### Current Sensing Switch Features

#### Self-powered and Self-calibrating

- Speeds start-ups, cuts installation costs.

#### Status Monitoring, Overload, and Operating Window Options

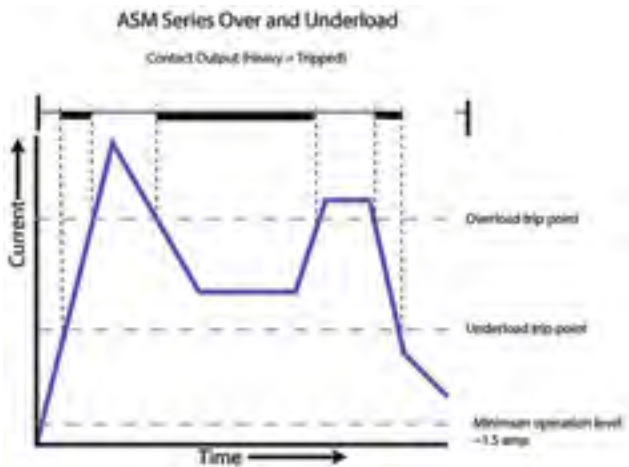
- Choose the operating style that matches your application.

#### Universal Output

- AC or DC compatibility with any automation system.

#### UL, CUL and CE Approval

- Accepted worldwide.



For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

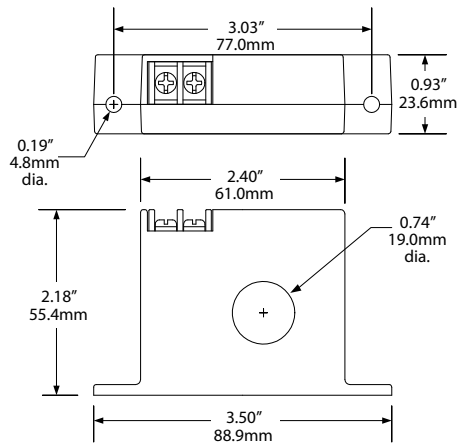
OEMs

Test & Evaluation Units for OEMs

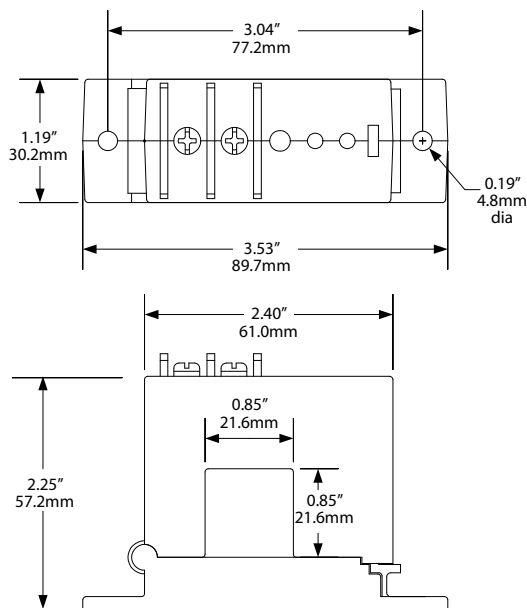
Free program expedites evaluation process. See page 1 for details.

Current Sensing Switch Dimensions

FT Case



SP Case



Current Sensing Switch Specifications



<b>Power Supply</b>	None—Self-powered
<b>Output</b>	Magnetically isolated solid-state relay
<b>Output Rating</b>	<ul style="list-style-type: none"> <li>• N.O. Version: 0.30 A @ 135 VAC or VDC</li> <li>• N.C. Version: 0.20 A @ 135 VAC or VDC</li> <li>• Not polarity sensitive</li> </ul>
<b>Off-state Leakage</b>	<10 $\mu$ A
<b>Response Time</b>	200 ms
<b>Setpoint Range</b>	<ul style="list-style-type: none"> <li>• Solid-core: 1.5–150 A</li> <li>• Split-core: 2.8–150 A</li> </ul>
<b>Setpoint</b>	<ul style="list-style-type: none"> <li>• Overload: +25% of Load (-OL)</li> <li>• Underload: -15% of Load (-UL)</li> <li>• Over/Underload: -15 to +25% of load (OU)</li> </ul>
<b>Hysteresis</b>	5% of setpoint
<b>Overload</b>	500 A @ 6sec., 1000 A @ 1sec.
<b>Isolation Voltage</b>	UL listed to 1270 VAC, tested to 5000 VAC
<b>Frequency Range</b>	6–100 Hz
<b>Dimensions</b>	3.50" x 2.25" x 1.20", Aperture: 0.74"–0.85"
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	UL/cUL, CE

Current Sensing Switches

Current Sensing Switch Ordering Information

Sample Model Number: ASM-NOU-OL-SP  
AC current sensing switch, normally open, self-calibrating overload operation in a split-core case.



(1) Output Rating

NOU	Normally Open
NCU	Normally Closed

(2) Operation

OL	Overload
UL	Underload
OU	Over/Underload

(3) Case Style

FT	Solid-core, Top Term
SP	Split-core



# ASC SERIES

## Factory-calibrated Current Operated Switches

ASC Series Current Operated Switches are precision calibrated at the factory per customers' specifications and guaranteed within 1% accuracy. Because the switch is factory calibrated eliminating the need to turn the potentiometer to the correct position in the field, installation time is substantially reduced resulting in a significant cost savings. The ASC combines a current transformer, signal conditioner and limit alarm into a single package for use in status monitoring or proof of operation applications and is perfect for OEM applications where the need for a limit alarm is required. Available in a solid-core or a split-core case to maximize ease of installation.

### Current Sensing Switch Applications

#### Electronic Proof of Flow

- Current operated switches eliminate the need for multiple pipe or duct penetrations and are more reliable than electromechanical pressure or flow switches.

#### Conveyors

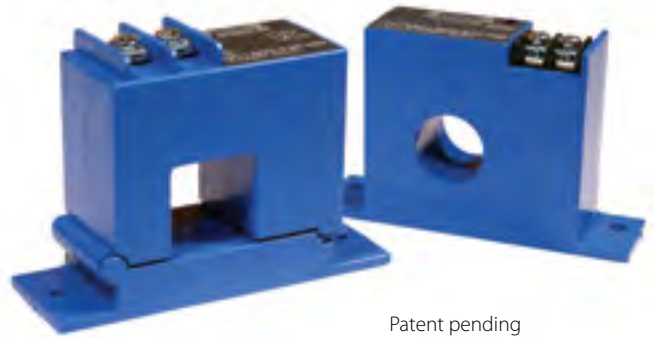
- Detects jams and overloads.
- Interlocks multiple conveyor sections.

#### Lighting Circuits

- Easier to install and more accurate than photocells.

#### Electrical Heaters

- Faster response than temperature sensors.



Patent pending

### Current Sensing Switch Features

#### Universal Output

- N.O. or N.C. solid-state switch for control circuits up to 135 VAC/DC.
- Compatible with most automation systems.

#### Self-powered

- Cuts installation and operating costs.

#### Precision-Calibrated Factory Set Trip Point

- Speeds startup.
- Improves safety.

#### Solid- or Split-core Case

- Versions tailored for each installation.

#### LED Indication

- Provides quick visual indication of contact status.

#### Built-in Mounting Feet

- Simple, two-screw panel mount or attach with optional DIN rail brackets.\*

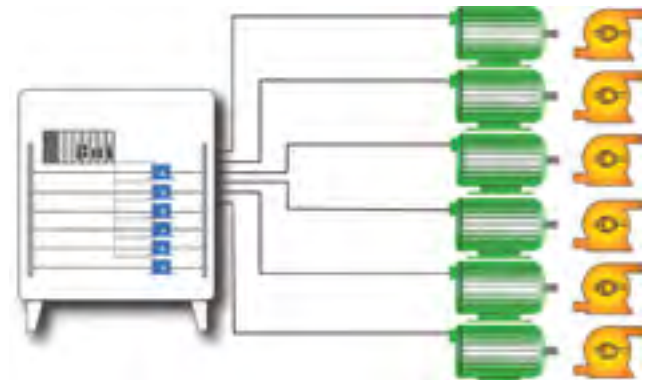
#### Designed to Meet UL, CUL and CE Approval

- Accepted worldwide.

\*For information on the DIN rail accessories kit, see page 113.

#### Air Handling Fan Protection

Factory-set trip points are ideal when there are several loads, all using the same motor to drive the fan blades.



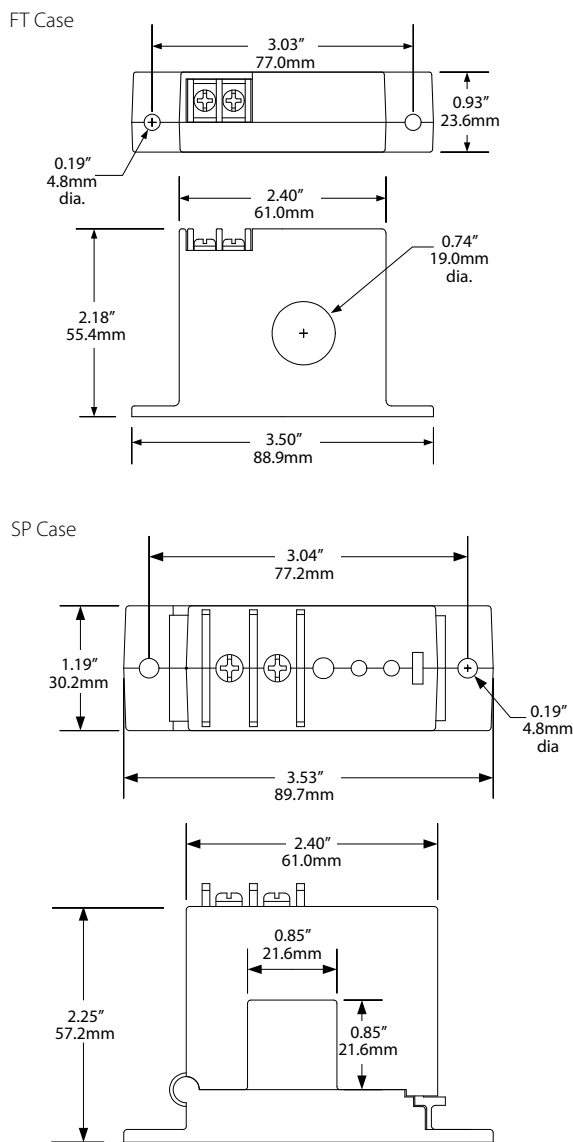
For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

OEMs

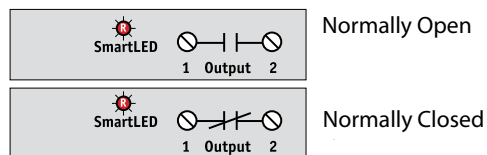
Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.

### Current Sensing Switch Dimensions



### Current Sensing Switch Connections

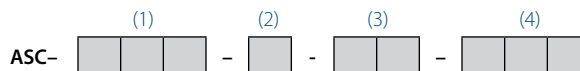


### Current Sensing Switch Specifications

<b>Power Supply</b>	None—Self-powered		
<b>Output</b>	Magnetically isolated solid-state switch		
<b>Output Rating</b>	<ul style="list-style-type: none"> <li>• N.O. Version: 0.3 A @ 135 VAC or VDC</li> <li>• N.C. Version: 0.3 A @ 135 VAC or VDC</li> <li>• Not polarity sensitive</li> </ul>		
<b>Off-State Leakage</b>	<10 $\mu$ A		
<b>Accuracy</b>	1%		
<b>Response Time</b>	120 ms		
<b>Setpoint Range</b>	<ul style="list-style-type: none"> <li>• Solid-core: 2–150 A (factory set)</li> <li>• Split-core: 3–150 A (factory set)</li> </ul>		
<b>Hysteresis</b>	5% of setpoint		
<b>Overload</b>	MODEL	6 SEC	1 SEC
	• All	• 400 A	• 1000 A
<b>Isolation Voltage</b>	Tested to 5000 VAC		
<b>Sensing Aperture</b>	<ul style="list-style-type: none"> <li>• -FT Case: 0.74" (19 mm) dia.</li> <li>• -SP Case: 0.85" (21.6 mm) sq.</li> </ul>		
<b>Case</b>	UL94 V0 Flammability Rated		
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing		
<b>Listings</b>	Designed to meet UL 508 Industrial Control Equipment (USA & Canada)		

### Ordering Information

Sample Model Number: ASC-NOU-6-SP-090  
 Factory set AC current operated switch, normally open, 60 HZ frequency, split-core case, 90 A trip point.



#### (1) Output Rating

NOU	Normally Open
NCU	Normally Closed

#### (2) Primary Circuit Frequency

6	60 Hz
5	50 Hz

#### (3) Case Style

FT	Solid-core, Top Term.
SP	Split-core

#### (4) Factory Set Trip Point

002 to 150	Solid-core Model Factory Set Trip Point in Amps.
003 to 150	Split-core Model Factory Set Trip Point in Amps.



# ASD SERIES

## Current Sensing Switches

ASD series sensors provide a limit alarm contact with the easiest adjustment method ever designed. The single turn potentiometer, allows the trip point to be set before the sensor is installed, or before the monitored circuit is energized. The LED display provides a quick visual indication of where the contact changes.



Features a single turn potentiometer and LED display.

### Current Sensing Switch Applications

#### Electronic Proof of Operation

- Current operated switches eliminate the need for multiple pipe or duct penetrations and are more reliable than electromechanical pressure or flow switches.

#### Conveyors

- Detects jams and overloads.
- Interlocks multiple conveyor sections.

#### Pump Control

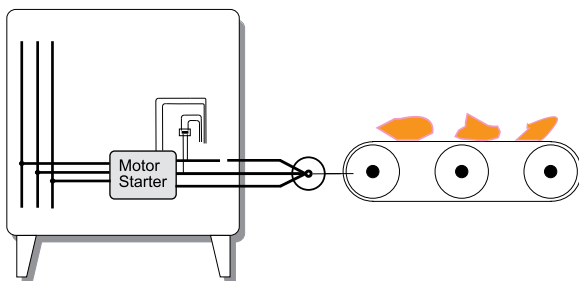
- Output contact is adjusted so it is closed during normal operation, opening if the pump runs dry or there is a loss of head pressure for any reason.

#### Cooling Towers

- Monitor for over-current conditions caused by open duct access doors or under-current from a broken drive belt or coupling.

#### Conveyor Protection

If the conveyor jams, the solid-state contact opens to stop the in feed or drive motor.



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

### Current Sensing Switch Features

#### Solid-State Output

- N.O. or N.C. solid-state switch for control circuits up to 240 VAC.
- Compatible with most automation systems.

#### External Powered

- Allows for higher accuracy.

#### Easily Adjustable and Precise Setpoint

- Speeds startup.
- Improves the safety by allowing the trip point adjustment with no power through the sensing window.

#### LED Display

- Provides quick visual indication of where the contact changes.
- Easiest and most accurate setpoint adjustment available.

#### Built-in Mounting Feet

- Simple, two-screw panel mount or attach with optional DIN rail brackets.\*

#### Designed for UL, CUL and CE Approval

- Accepted worldwide.

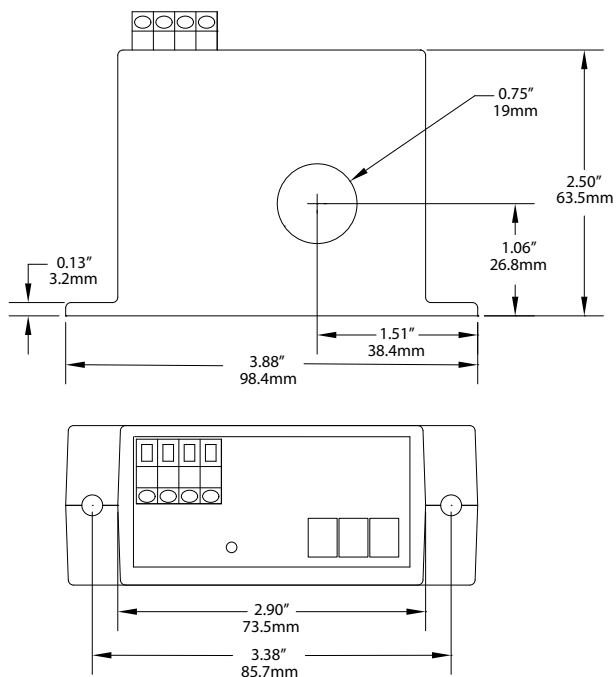
\*For information on the DIN rail accessories kit, see page 113.

OEMs

**Test & Evaluation Units for OEMs**

Free program expedites evaluation process. See page 1 for details.

Current Sensing Switch Dimensions

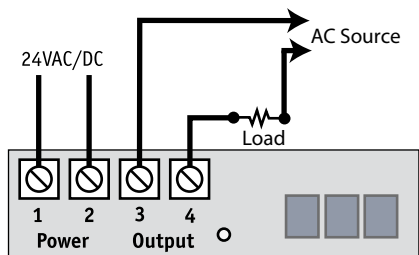


Current Sensing Switch Specifications

<b>Power Supply</b>	24 VAC/DC (< 2 VA consumption)
<b>Digital Output</b>	Magnetically isolated solid-state switch
<b>Output Rating</b>	• Max.: 1.0 A up to 240 VAC • AC only
<b>Off-State Leakage</b>	• <10 $\mu$ A normally open • 2.5 mA normally closed
<b>Contact Response Time</b>	40–120 ms
<b>Setpoint Range</b>	• ASD1: 1–50 A (adjustable) • ASD2: 4–200 A (adjustable)
<b>Hysteresis</b>	5% of setpoint
<b>Isolation Voltage</b>	Tested to 5000 VAC
<b>Frequency Range</b>	6–100 Hz
<b>Sensing Aperture</b>	0.74" (19 mm) diameter
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	Designed to meet UL 508 Industrial Control Equipment (USA & Canada)

Current Sensing Switches

Current Sensing Switch Connections



Ordering Information

Sample Model Number: ASD1-NOAC-24U-FL  
Adjustable AC current operated switch, normally open, solid-core.



<b>(1) Range</b>	
1	1–50 switch adjustment
2	4–200 switch adjustment
<b>(2) Output Contact</b>	
NOAC	Normally Open, closes on current rise, AC control only
NCAC	Normally Closed, opens on current rise, AC control only
<b>(3) Power Supply</b>	
24U	24 VAC or DC
<b>(4) Case Style</b>	
FL	Solid-core



# ASO SERIES

## Current Sensing Switches

ASO Series Low-current Current Sensing Switches are specialized current sensing switches that combine an ultra-sensitive current transformer and signal conditioning electronics into a single package for sensing AC current from 3–350 mA. Useful for signal or lamp status monitoring, detecting low level fault currents or fan status proofing, the ASO Series features solid-state outputs and jumper-selectable ranges, which make it a versatile choice for low-current status indication applications.



### Current Sensing Switch Applications

#### Fan Monitoring

- Fan status in heating and drying applications.
- Identify lamp outages or other malfunctions through changes in current consumption.

#### Fractional HP Motors

- Ideal for monitoring small motors used in critical applications, for example, fan status proofing on a crucial cooling fan.

#### Fault Current Sensing

- Detects extremely low levels of current resulting from fault conditions.

### Current Sensing Switch Features

#### Wide Range of Output Options

- Dependable, solid-state relay N.O. or N.C. contacts rated at 240 VAC or 30 VDC.
- Compatible with most automation controllers.

#### Isolated Inputs and Outputs

- Inductive sensing eliminates insertion loads on monitored circuits, effectively isolating it from the unit.
- Isolated outputs simplify wiring and enhance safety.

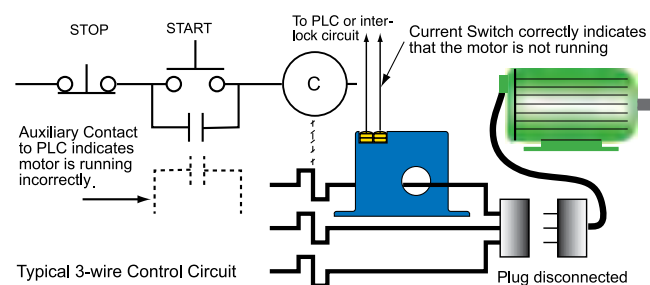
#### Adjustable Setpoints

- Setpoints are field-adjustable from 3 mA to 350 mA, speeding installation and allowing for tailored applications.

#### UL, CUL and CE Approval

- Accepted worldwide.

#### Status Alarming



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

OEMs

Test &amp; Evaluation Units for OEMs

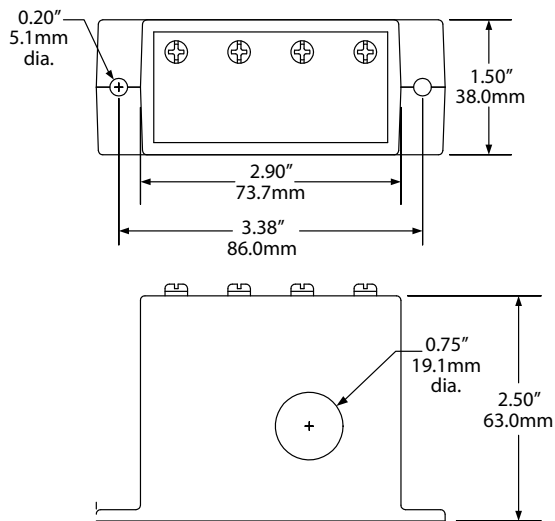
Free program expedites evaluation process. See page 1 for details.





### Current Sensing Switch Dimensions

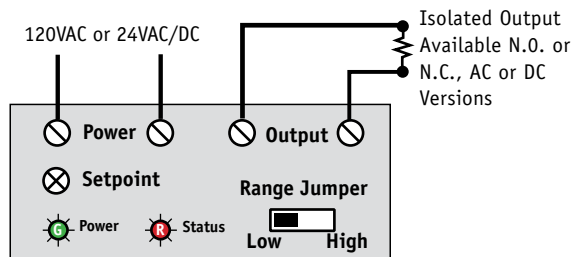
Case



### Current Sensing Switch Specifications

<b>Power Supply</b>	Operates from $\pm 20\%$ of nominal voltages
<b>Nominal Voltages</b>	120 VAC (50–400 Hz) or 24 VAC/DC
<b>Power Consumption</b>	2.5 Watts
<b>Output Rating</b>	<ul style="list-style-type: none"> <li>AC Version: 1 A @ 240 VAC</li> <li>DC Version: 0.15 A @ 30 VDC</li> </ul>
<b>Response Time</b>	<ul style="list-style-type: none"> <li>150 ms @ 5% above setpoint</li> <li>100 ms @ 50% above setpoint</li> </ul>
<b>Setpoint Range</b>	<ul style="list-style-type: none"> <li>Low Range: 3–15 mA field-adjustable</li> <li>High Range: 15–350 mA field-adjustable</li> </ul>
<b>Max. Input</b>	10 A
<b>Isolation Voltage</b>	UL listed to 1270 VAC
<b>Frequency Range</b>	50–400 Hz (Monitored Circuit)
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	UL listed (USA and Canada), most models

### Current Sensing Switch Connections



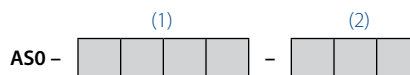
Notes:

- Terminals are #6 screws.
- Use up to 14 AWG solid or stranded.
- Power connections are not polarity sensitive.
- DC output connections are polarity sensitive.

### Current Sensing Switch Ordering Information

Sample Model Number: AS0-NODC-120

Ultra low current sensing switch, normally open solid-state DC output and 120 VAC power supply.



#### (1) Output Type

NCAC	Normally Closed, 1 A @ 240 VAC
NOAC	Normally Open, 1 A @ 240 VAC
NCDC	Normally Closed, 0.15 A @ 30 VDC
NODC	Normally Open, 0.15 A @ 30 VDC

#### (2) Power Supply

24U	24 VAC/DC
120	120 VAC



# ASX SERIES

## Current Sensing Switches

ASX Series Current Sensing Switches are high performance current sensing switches with field-adjustable time delay to help minimize nuisance trips during start-up and operation. Designed for motor status applications where setpoint accuracy and repeatability are critical, the ASX Series offers a linear setpoint characteristic and constant hysteresis. Standard features include self-powering, jumper-selectable ranges and a choice of outputs and cases.



### Current Sensing Switch Applications

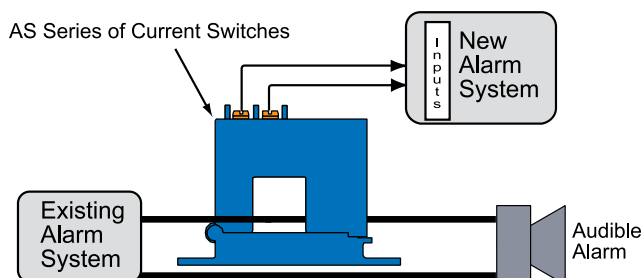
#### Motor Protection

- Serves as an electronic proof-of-operation; detects current draw changes in motors when they encounter problems such as pumps running dry or pending bearing failure.
- Non-intrusive, less expensive to install than differential pressure flow sensors or thermal switches.
- Much quicker response time than Class 10 overload switches.

#### High Inrush or Temporary Overload Current

- Adjustable start-up/delay timer allows 0.2–15 second delay to eliminate nuisance trips from high inrush or short overload conditions.

#### Isolated Alarm System Interfacing



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

### Current Sensing Switch Features

#### Adjustable Start-up/Delay Timer

- Field-adjustable from 0.2–15 seconds to eliminate nuisance alarms due to start-up inrush or temporary overcurrent conditions.

#### Choice of N.O./N.C. AC or Universal Outputs

- Contact ratings of 1.0 A @ 240 VAC or universal outputs of 0.15 A @ 240 VAC/DC (N.O. models) and 0.2 A @ 135 VAC/DC (N.C. models) for use with most standard motor control systems.

#### Improved Ease of Installation and Use

- 1.0 A AC rating eliminates need for time delay relay.
- Self-powered, split-core models simplify installation.
- Status LED provides visual indication of setpoint trip and contact action.

#### Industrial Grade Performance

- Constant hysteresis and linear response characteristics enhance setpoint accuracy.

#### Agency Approved

- UL listed, CE pending.

OEMs

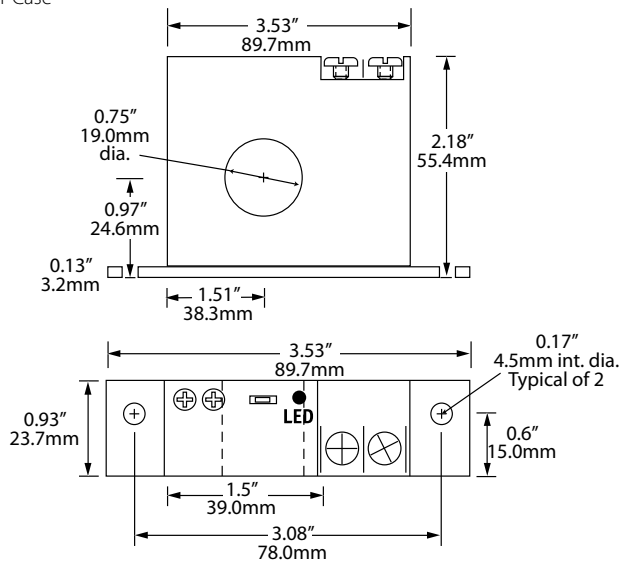
Test &amp; Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.

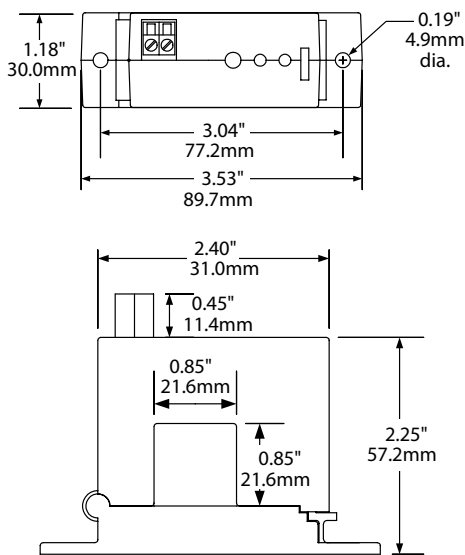


### Current Sensing Switch Dimensions

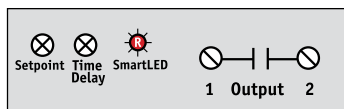
FT Case



SP Case



### Current Sensing Switch Connections



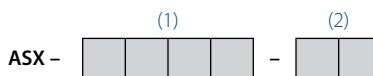
### Current Sensing Switch Specifications

<b>Power Supply</b>	None—Self-powered
<b>Output</b>	Isolated solid-state relay
<b>Output Rating</b>	<ul style="list-style-type: none"> <li>• NOAC/NCAC: 1 A @ 240 VAC</li> <li>• NOU: 0.15 A @ 240 VAC or VDC</li> <li>• NCU: 0.2 A @ 135 VAC or VDC</li> </ul>
<b>Off-state Leakage</b>	NOU, NCU & NOAC versions: <10 micro A NCAC versions: 2.5 mA
<b>Response Time</b>	Adjustable 0.2 to 15 seconds
<b>Setpoint Range</b>	Jumper-selectable: 1.5–12 A, 12–55 A, 50–200 A
<b>Hysteresis</b>	5% (constant)
<b>Overload</b>	<ul style="list-style-type: none"> <li>• 1.5–12 A range: 600 A max.</li> <li>• 12–55 A range: 800 A max.</li> <li>• 50–200 A range: 1200 A max.</li> </ul>
<b>Isolation Voltage</b>	UL listed to 1270 VAC
<b>Frequency Range</b>	50–100 Hz
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada)*, CE (pending)

\*Consult factory for UL listed models.

### Current Sensing Switch Ordering Information

Sample Model Number: ASX-NOAC-SP  
Current sensing switch with adjustable time delay, N.O. 1.0 A @ 240 VAC output, jumper-selectable input ranges, split-core case.



(1) Output Type

NOAC	Normally Open, 1 A @ 240 VAC
NCAC	Normally Closed, 1 A @ 240 VAC
NOU	Normally Open, 0.15 A @ 240 VAC/DC
NCU	Normally Closed, 0.2 A @ 135 VAC/DC

(2) Case Style

FT	Solid-core
SP	Split-core

Current Sensing Switches



# ASXP SERIES

## Current Sensing Switches

ASXP Series Current Sensing Switches are powered versions of our popular current switches with integral time delay. A fixed two-second delay upon initial energization of monitored load minimizes nuisance alarms during start-up and operation in motor or heater status applications. After startup a separate 0–20 second delay can be set. For use with 24 VAC/DC or 120 VAC supplies, this high performance product offers OEM-caliber accuracy, precision tolerances, low hysteresis and an operation range between 40 and 100 Hz. Available with status LED and solid-core case as standard.



### Current Sensing Switch Applications

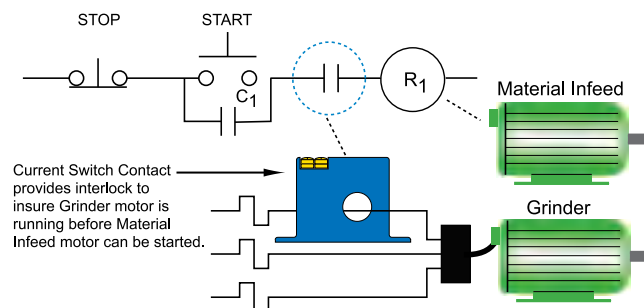
#### Motor Protection

- Serves as an electronic proof-of-operation; detects current draw changes in motors when they encounter problems such as pumps running dry or impending bearing failure.
- Non-intrusive, less expensive to install than differential pressure flow sensors or thermal switches.
- Much quicker response time than Class 10 overload switches.

#### High Inrush or Temporary Overload Current

- Factory-set two-second delay on startup eliminates nuisance trips from high inrush or short overload conditions. After startup, a second 0–20 second user-adjustable delay is available.

#### Safety Interlocks



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

OEMs

#### Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.

### Current Sensing Switch Features

#### Fixed Startup/Delay Timer

- Factory calibrated trip timer set to 2 seconds to eliminate nuisance alarms due to start-up inrush or temporary overcurrent conditions.

#### Form C Electro-mechanical Relay Output

- Contact rating of 1 A, up to 120 VAC, provides adequate switching capacity for use with most motor control systems.

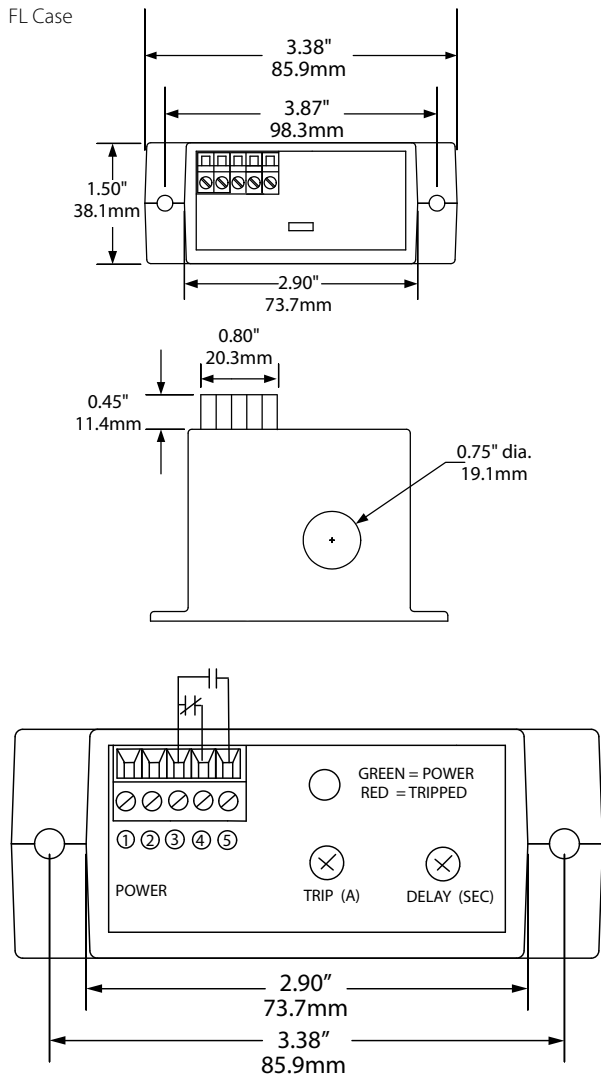
#### Improved Ease of Installation and Use

- Eliminates need for separate time delay relay.
- Choice of 24 VAC/DC or 120 VAC supply models.
- LED provides indication of trip point contact status.
- Setpoint-adjustable from 1–80 A.

#### Industrial Grade Performance

- Repeatable performance, precise time delay setpoint, constant hysteresis and linear trip point adjustment.

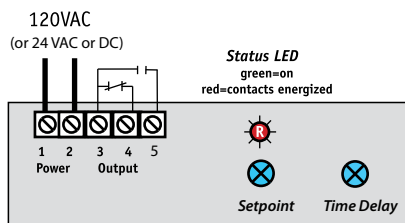
### Current Sensing Switch Dimensions



**Terminal Identification:**  
 1 & 2 - Power Connection  
 3 - Output Common  
 4 - Output Normally Closed Contact  
 5 - Output Normally Open Contact

Use up to 12 AWG copper wire.  
 Tighten terminals 4.4 to 5.3 lbs.- in. torque.

### Current Sensing Switch Connections



### Current Sensing Switch Specifications

<b>Power Supply</b>	24 VAC/DC or 120 VAC, (±10%), 2 VA max.
<b>Output</b>	Electromechanical SPDT relay, auto reset
<b>Output Rating</b>	1 A, up to 120 VAC
<b>Trip Point Range</b>	• ASXP1: 1–20 A • ASXP2: 20–50 A • ASXP3: 50–80 A
<b>Time Delay</b>	2.0 sec (fixed on startup) 0–15 sec (adjustable after startup)
<b>Max. Inrush Current</b>	500 A (5 second duration)
<b>Hysteresis</b>	5% (constant)
<b>Isolation Voltage</b>	Tested to 5 KVAC
<b>Frequency Range</b>	40–100 Hz
<b>Sensing Aperture</b>	0.75" (19.1 mm) dia.
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	Designed to meet UL508 requirements

### Current Sensing Switch Ordering Information

Sample Model Number: ASXP1-SDT-120-FL  
 AC current sensing switch, fixed 2 sec. delay, SPDT 1 A, 120 VAC output, 120 VAC/DC supply, solid-core case.



<b>(1) Input Range</b>	
1	1–20 A
2	20–50 A
3	50–80 A
<b>(2) Output Type</b>	
SDT	SPDT 1 A @ 120 VAC
<b>(3) Power Supply</b>	
24U	24 VAC/DC
120	120 VAC
<b>(4) Case Style</b>	
FL	Solid-core



# ASXP-LS SERIES

## Current Sensing Switches

ASXP-LS Series Current Switches combine a current transformer and signal conditioner into a single package. The large, easy-to-install, split-core design allows for installation over existing conductors without the need to disconnect the load, even in applications where there are multiple conductors per phase. For new installations, the installation is just as easy. Just remove the top portion of the sensing ring, place the conductors inside, and snap the top back in place. The switch output is externally powered, and the setpoint is adjustable between a very wide range. The mechanical relay contact provides a trouble free, long lasting, and very durable alarm or interlock, improving safety and overall system reliability.

### Current Sensing Switch Applications

#### Monitor Large Machines

- Detect over or under-current conditions before they cause break downs, or interlock one process with another.

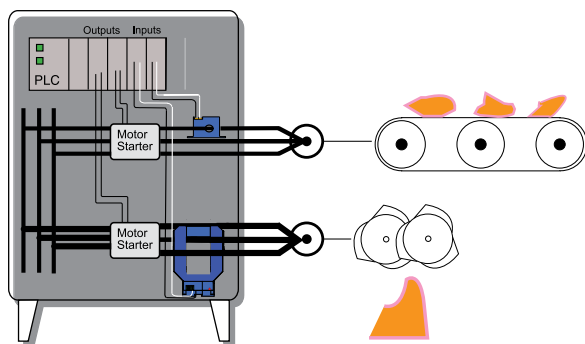
#### Water Delivery and Treatment

- Detect open discharge lines.
- Sense clogged filters or blocked intake to pumps.

#### Generators

- Shed noncritical loads when demand reaches a set level.

Interlock Infeed Conveyor with Main Crusher



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)



### Current Sensing Switch Features

#### Electromechanical Relay Output

- Provides both normally open and normally closed contacts.
- Compatible with most automation and control systems.

#### Externally Powered

- Provides a choice of fail-safe\* or standard operation.

#### Simple Field Setpoint Adjustment

- Single turn potentiometer with setpoint shown on label.
- Adjustable start delay to bypass inrush current.

#### Split-core Case

- Sensing window provides ample space for bus bar, single or multiple conductors.

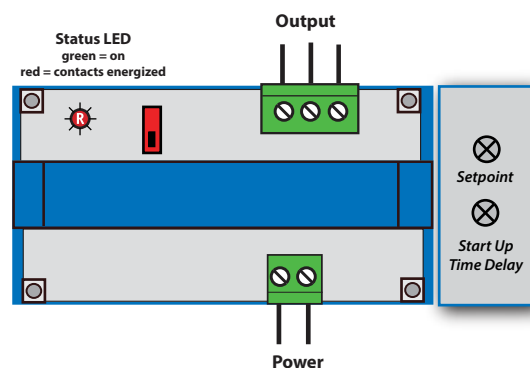
#### DIN Rail or Panel Mount

- Simple snap onto DIN rail or attach with screws to a panel for secure mounting.

#### Designed for UL, CUL and CE Approval

- Accepted around the world.

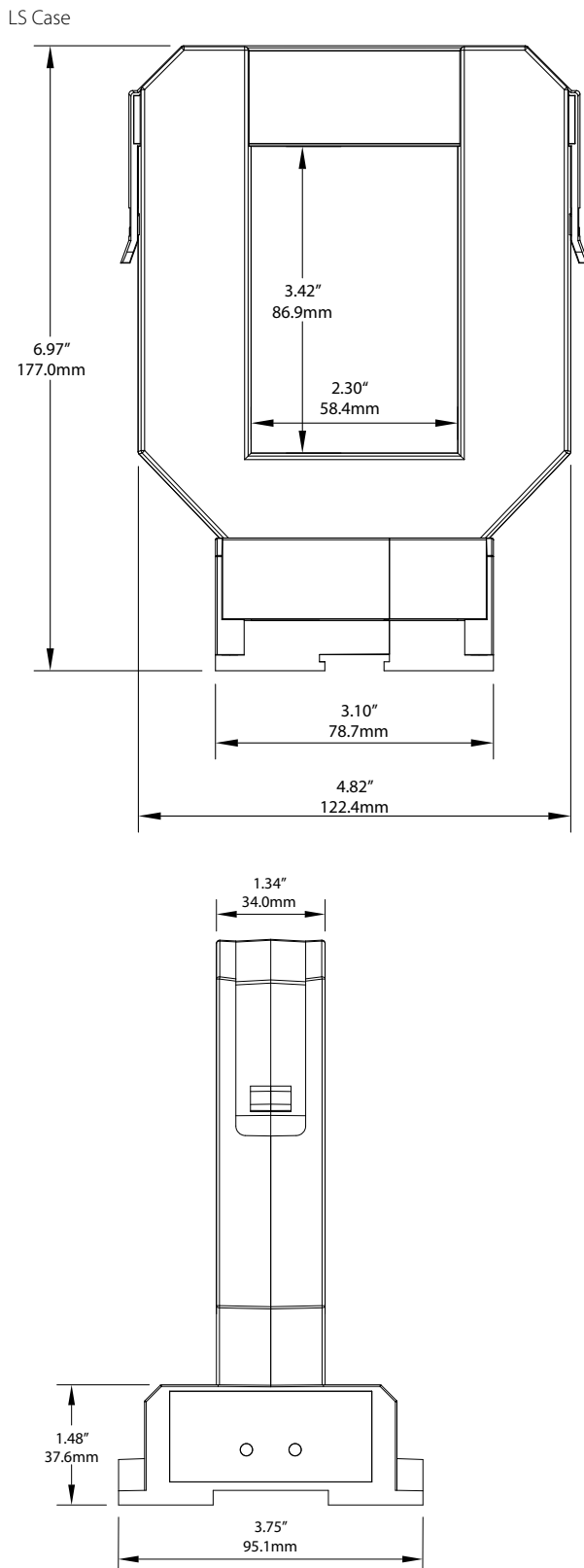
### Current Sensing Switch Connections



\*For a description of fail-safe operation, see the installation instructions.

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

Current Sensing Switch Dimensions



Note: Drawings are not to scale

\*For a description of fail-safe operation, see the installation instructions.

Current Sensing Switch Specifications

<b>Power Supply</b>	120 VAC or 24 VAC/DC (22-36 V)
<b>Consumption</b>	<4 VA
<b>Output</b>	Electromechanical relay 1 A @ 120 VAC, 2 A @ 30 VDC Max.
<b>Hysteresis</b>	5% of setpoint
<b>Indicating Bi-Color LED</b>	Green: Power on, current within range Red: Power on, current over Setpoint Off: Power off or current less than 20% of range
<b>Response Time</b>	100 ms (Current 90% over setpoint)
<b>Output Operation</b>	Selectable: Normal or Fail-Safe*
<b>Start Delay</b>	0.5 to 16 seconds
<b>Ranges</b>	8: 200–800 A 10: 400–1000 A 12: 600–1200 A 16: 1000–1600 A
<b>Isolation Voltage</b>	Tested to 5000 VAC
<b>Frequency Range</b>	6–100 Hz to 10–100 Hz
<b>Sensing Aperture</b>	LS Case: 2.3" (58.42 mm) x 3.42" (86.87 mm)
<b>Case</b>	UL94 V0 Flammability Rated DIN Rail mounting
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	Designed to meet UL 508 Industrial Control Equipment (USA & Canada)

Current Sensing Switches

Current Sensing Switch Ordering Information

Sample Model Number: ASXP8-SDT-24U-LS  
AC current transducer, 200–800 A range, single pole, SDT relay (Form C), 24 VAC/DC, split-core case, DIN rail mounting.



(1) Range

8	200–800 A
10	400–1000 A
12	600–1200 A
16	1000–1600 A

(2) Output Type

SDT	SPDT Relay (Form C)
-----	---------------------

(3) Power Supply

24U	24 VAC/DC
120	120 VAC

(4) Power Supply

LS	Split-core, Base Terminals, DIN Rail mounting
----	---



# DS1 SERIES

## DC Current Sensing Switches

The DS1 Series Current Sensing Switches are designed to trip a solid-state contact when there is DC current through the sensor window. The sensor can be used to interlock two operations for safety. When one load is energized, the contact will keep another from also energizing. The power supply voltage and the controlled circuit voltage can be derived from a single source or separate sources. The monitored circuit can be any DC voltage and any amount of current as long as the conductor will pass through the window. The monitored circuit is completely isolated from the control circuit. If there is 3/4 of one amp through the aperture, the output will change state.



### Current Sensing Switch Applications

- As a Safety Interlock, it is a non-intrusive method to keep personnel safe.
- Alarm contact when a load is operating or when it is not energized.
- Detect PV system leakage by monitoring the earth bond conductor.
- Use the contact to turn on a lighting circuit when a load is energized.
- Instant indication of equipment status.

### Current Sensing Switch Features

#### Compact, One-piece Design

- Fits in easily amongst motor starters and power supplies in crowded control cabinets.

#### Input Isolation

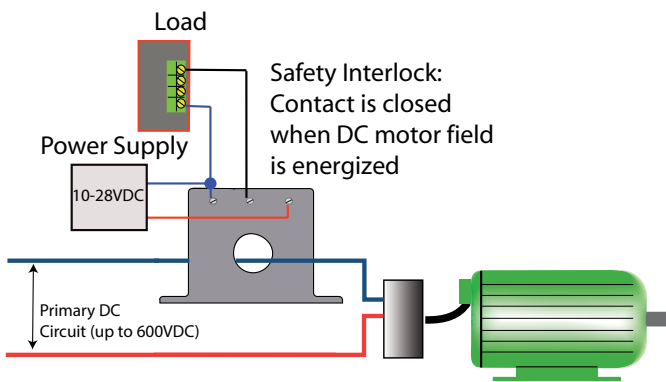
- Safer than shunt/relay combinations.

#### Unique Power Supply Connection

- Sensor power and switched load share a common point making installation easy.

#### Built-in Mounting Feet

- Simple, two-screw installation allows for secure mounting.



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

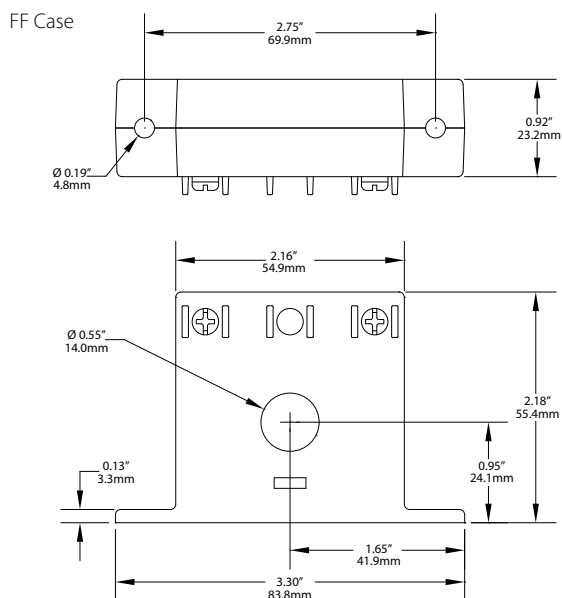
OEMs

#### Test & Evaluation Units for OEMs

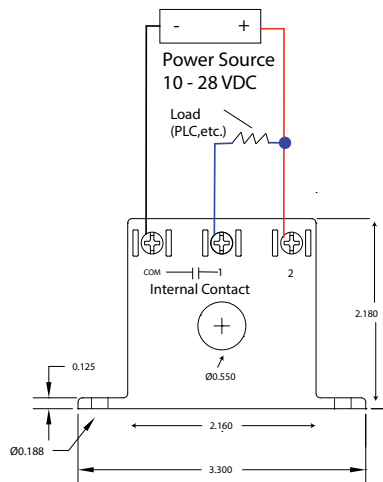
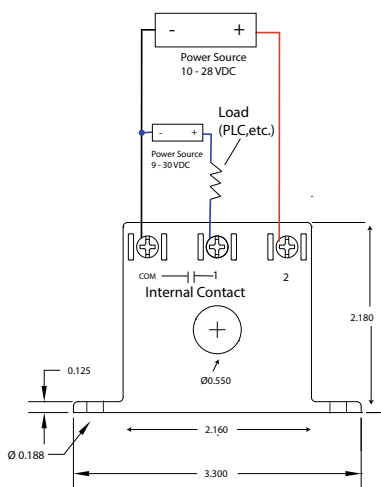
Free program expedites evaluation process. See page 1 for details.



### Current Sensing Switch Dimensions



### Current Sensing Switch Connections



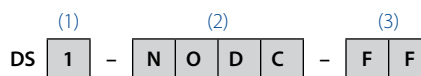
Notes:  
 Zinc plated screw terminals solid-core.  
 Deadfront enclosed terminals split-core.  
 12–22 AWG solid or stranded.  
 Not polarity sensitive.

### Current Sensing Switch Specifications

<b>Output Type</b>	Solid-state contact
<b>Response Time</b>	100 ms
<b>Isolation Voltage</b>	Tested to 3 KV
<b>Off-state Leakage</b>	<1 micro A
<b>Frequency Range</b>	DC
<b>Power Supply</b>	10–28 VDC <2 VA
<b>Current Ranges</b>	Trips at 0.75, max. 1000 A for 5 seconds, 500 ADC continuous
<b>Sensing Aperture</b>	0.55" (14 mm) diameter
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing

### Current Sensing Switch Ordering Information

Sample Model Number: DS1-NODC-FF  
 Solid-core DC current sensing switch closes with 0.75 ADC, normally open, front terminal solid-core case.



(1) Range

1	0.75 ADC
---	----------

(2) Output Type

NODC	Normally Open (1 A @ 28 VDC)
------	------------------------------

(3) Case Style

FF	Solid-core, Front Terminals
----	-----------------------------



# DS3 SERIES

## Current Sensing Switches

DS3 Series Current Sensing Switches combine a Hall effect sensor, signal conditioner and a limit alarm into a single package. The DS3 Series offers three jumper-selected current input ranges and frequency response from DC to 400 Hz. Available in a solid-core case with choice of relay or a universal solid-state output.



### Current Sensing Switch Applications

#### Welders and Platers

- Instant indication of equipment status.

#### Large Drive Motors

- Provides enhanced field loss protection.

#### Power Supplies

- Signals over-current before equipment fails.

#### Machine Operation

- Instant status of motors, lamps and other loads.

#### Telecom Sites

- Monitors battery output.

### Current Sensing Switch Features

#### Compact, One-piece Design

- Fits in easily amongst motor starters and power supplies in crowded control panels.

#### Input Isolation

- Safer than shunt/relay combinations.

#### Output Installation

- Isolated output greatly simplifies wiring.

#### Tough

- Designed to handle harsh industrial environments.

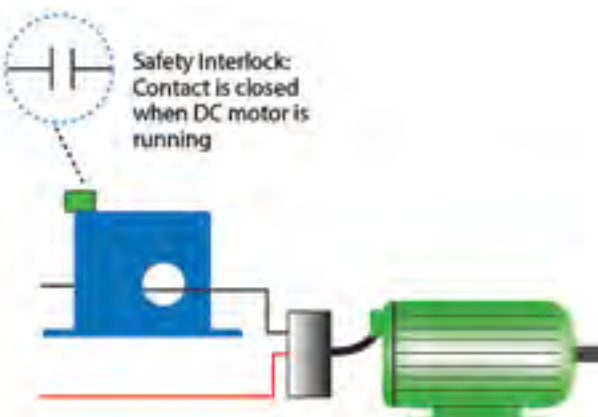
#### Adaptive Hysteresis

- Hysteresis is 5% of setpoint, allowing closer control than fixed hysteresis switches.

#### Built-in Mounting Feet

- Simple, two-screw installation allows for secure mounting.

Failure Detection



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

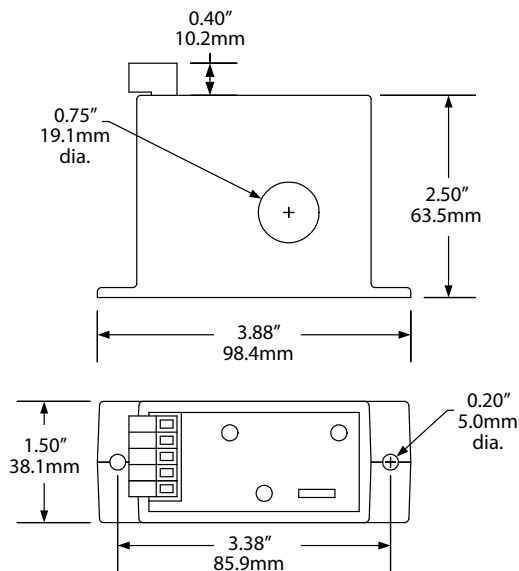
OEMs

Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.

### Current Sensing Switch Dimensions

Case



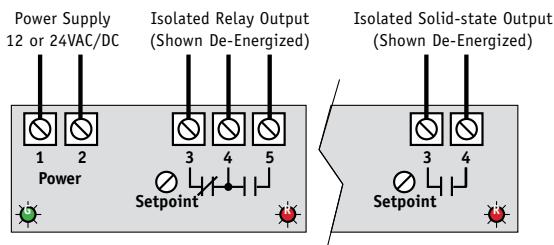
### Current Sensing Switch Specifications



<b>Output</b>	Isolated Dry Contact
<b>Output Rating</b>	<ul style="list-style-type: none"> <li>Solid-state: 0.15 A @ 240 VAC or VDC (N.O. Only)</li> <li>Relays: 5.0 A @ 240 VAC, 5.0 A @ 30 VDC (SPDT)</li> </ul>
<b>Off-state Leakage</b>	<10 $\mu$ A
<b>Response Time</b>	<ul style="list-style-type: none"> <li>100 ms (10% above setpoint)</li> <li>20 ms (100% above setpoint)</li> </ul>
<b>Setpoint Range</b>	2–20, 10–50 and 20–100 A (DC) jumper-selectable (derate by $\sqrt{2}$ for AC)
<b>Hysteresis</b>	5% of setpoint
<b>Isolation Voltage</b>	3 KV
<b>Frequency Range</b>	DC to 400 Hz
<b>Sensing Aperture</b>	0.75" (19.1 mm) dia.
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada), CE

Current Sensing Switches

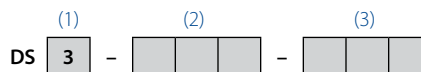
### Current Sensing Switch Connections



Notes:  
 Pressure plate screw terminals.  
 12–22 AWG solid or stranded.  
 Field-adjustable setpoint.

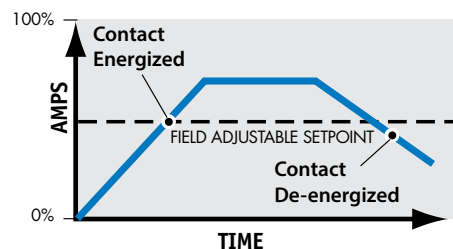
### Current Sensing Switch Ordering Information

Sample Model Number: DS3-SDT-24U  
 DS current sensing switch with SPDT relay contacts and 24 VAC/DC power supply.



(1) Setpoint Range	
3	2–20, 10–50 and 20–100 A, jumper-selectable
(2) Output Type	
SDT	SPDT Relay (Form C)
NOU	Solid-state N.O. AC/DC
(3) Power Supply	
24U	+24 VAC/DC
12U	+12 VAC/DC

### DS3 Series Sample Output/Power Supply



# AC 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 average responding or True RMS outputs. Self-powered and split-core options make these a cost-effective choice as a PLC input in motor status applications or where VFDs are involved.*

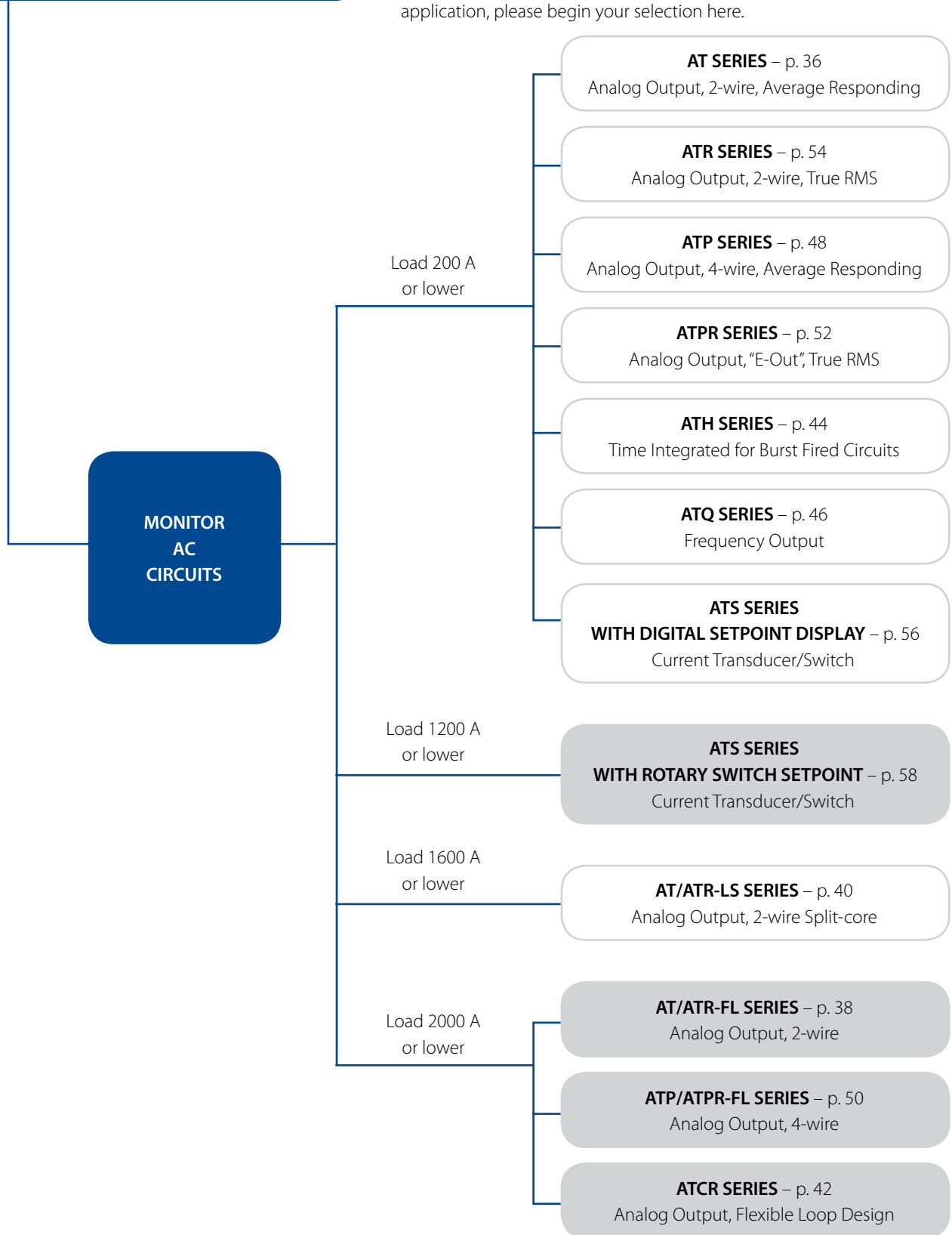
Features:

- Average responding or True RMS output
- Jumper-selectable ranges
- Solid-core, split-core and large aperture models

• <b>AT SERIES</b> AC Current Transducers.....	page 36
• <b>AT/ATR-FL SERIES</b> AC Current Transducers.....	page 38
• <b>AT/ATR-LS SERIES</b> AC Current Transducers.....	page 40
• <b>ATCR SERIES</b> AC Current Transducers.....	page 42
• <b>ATH SERIES</b> AC Current Transducer with Time Integration.....	page 44
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• <b>ATP/ATPR-FL SERIES</b> AC Current Transducers.....	page 50
• <b>ATPR "E-OUT" SERIES</b> AC Current Transducers.....	page 52
• <b>ATR SERIES</b> AC Current Transducers.....	page 54
• <b>ATS SERIES WITH DIGITAL SETPOINT DISPLAY</b> AC Current Transducer/Switch.....	page 56
• <b>ATS SERIES WITH ROTARY SWITCH SETPOINT</b> AC Current Transducer/Switch.....	page 58

## AC CURRENT TRANSDUCERS Selection Chart

Our wide range of current transducers guarantees that you'll find exactly what you need. We currently offer 12 series of current transducers in AC configurations. To assist in guiding you to the right series for your application, please begin your selection here.



# AT SERIES

## AC Current Transducers

AT Series AC Current Transducers combine a current transformer and signal conditioner into a single package. These current transducers have jumper-selectable current input ranges and industry standard 4–20 mA, 0–5 VDC or 0–10 VDC outputs. The AT Series AC Current Transducers are designed for application on 'linear' or sinusoidal AC loads and are available in a split-core case or two types of solid-core cases.



### AC Current Transducer Applications

#### Automation Systems

- Analog current reading for remote monitoring and software alarms.

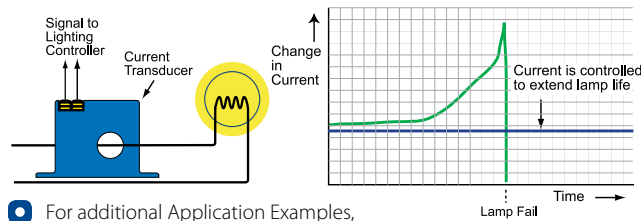
#### Data Loggers

- Self-powered transducer helps conserve data logger batteries.

#### Panel Meters

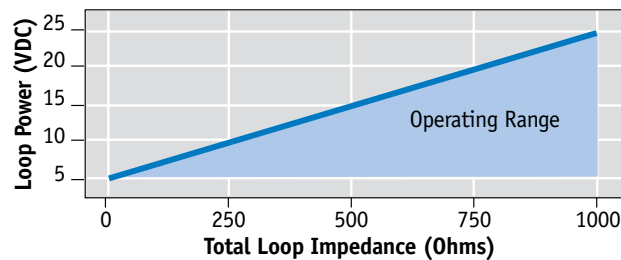
- Simple connection displays power consumption.

#### Preventative Maintenance of a Critical Lighting System



For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

### AT Series Power Supply



### AC Current Transducer Features

#### Accurate

- Factory matched and calibrated single piece transducer is more accurate than traditional two-piece field installed solutions.

#### Average Responding

- "Average Responding" algorithm gives an RMS output on pure sine waves. Perfect for constant speed (linear) loads.

#### Jumper-selectable Ranges

- Reduces inventory.
- Eliminates zero and span pots.

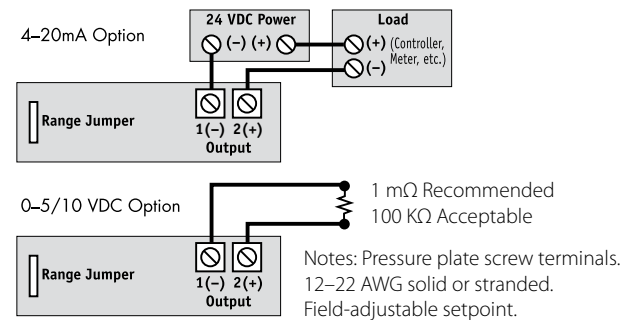
#### Isolation

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

#### UL, CUL and CE Approval

- Accepted worldwide.

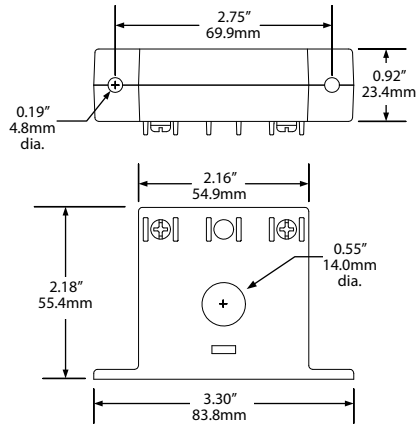
### AC Current Transducer Connections



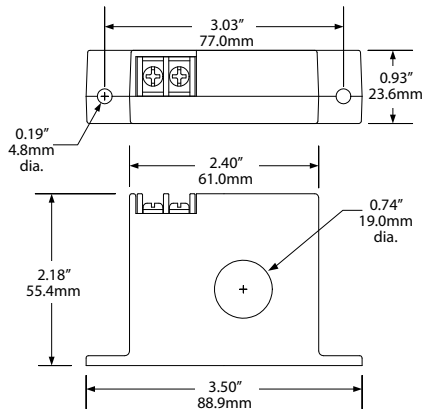
**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

AC Current Transducer Dimensions

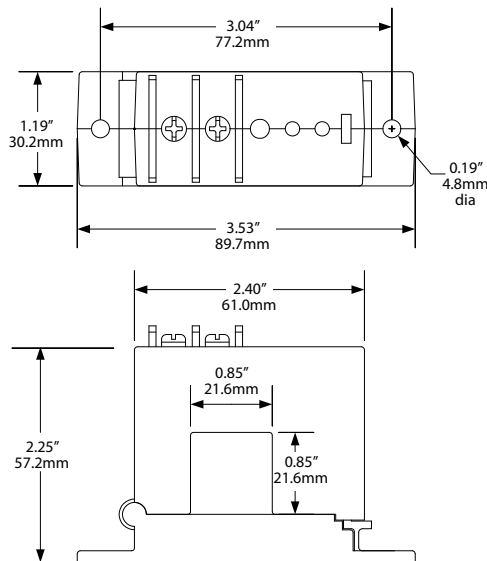
FF Case



FT Case



SP Case



AC Current Transducer Specifications



	-005 Model	-010 Model	-420 Model
<b>Output Signal</b>	0-5 VDC	0-10 VDC	4-20 mA
<b>Output Limit</b>	8.2 VDC	15 VDC	32 mA
<b>Accuracy</b>	1.0% FS		
<b>Response Time (10-90% step change)</b>	100 ms		300 ms
<b>Frequency Range</b>	50-60 Hz		20-100 Hz*
<b>Other Frequencies</b>	Special calibration available for any frequency from 10-400 Hz*		
<b>Power Supply</b>	Self-powered		12-40 VDC, Loop-powered
<b>Loading</b>	1 megohm min., 100 KΩ add 1.3% error		Contact factory for power requirements
<b>Isolation Voltage</b>	UL listed to 1270 VAC, tested to 5 KV		
<b>Input Ranges</b>	Field-selectable ranges from 0-200 A; custom ranges available; consult factory.		
<b>Sensing Aperture</b>	<ul style="list-style-type: none"> <li>-FF Case: 0.55" (14 mm) dia.</li> <li>-FT Case: 0.74" (19 mm) dia.</li> <li>-SP Case: 0.85" (21.6 mm) sq.</li> </ul>		
<b>Case</b>	UL94 V0 Flammability Rated		
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0-95% RH, non-condensing		
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada), CE		

\*For sinusoidal waveforms only. Select ATR Transducers for distorted waveforms.

AC Current Transducers

AC Current Transducer Ordering Information

Sample Model Number: AT1-005-000-SP

AC current transducer, 10/20/50 A range, self-powered with a 0-5 VDC output in a split-core case.



(1) Full Scale Range

0	2 & 5 A (4-20 mA only)
1	10, 20, 50 A
2	100, 150, 200 A

(2) Output Signal

420	4-20 mA
005	0-5 VDC
010	0-10 VDC

(3) Power Supply

24L	24 VDC Loop-powered (4-20 mA output ONLY)
000	Self-powered (0-5/0-10 VDC output ONLY)

(4) Case Style

FF	Solid-core, Front Term.
FT	Solid-core, Top Term.
SP	Split-core



# AT/ATR-FL SERIES

## AC Current Transducers

AT/ATR-FL Series AC Current Transducers combine a current transformer and a signal conditioner into a single package for applications from 100 A to 2000 A. The AT version is Average Responding for use on linear (sinusoidal) loads. The ATR version is True RMS for use on distorted waveforms found in VFD or SCR outputs. The AT/ATR-FL Series AC Current Transducers are available in a solid-core case.

### AC Current Transducer Applications

#### Large Pumps

- Detect dry run electronically.

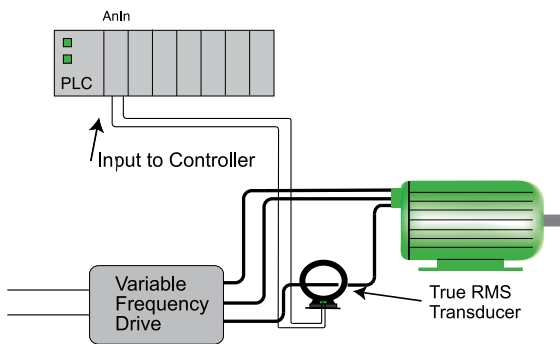
#### Power Generation

- Measure the output of generators.

#### Electric Heating Elements

- Monitors heater loads.
- Faster response than temperature sensors.

Motor Load Monitoring



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)



### AC Current Transducer Features

#### Large Aperture

- Accommodates large conductors or wire bundles.

#### Select the Right Output

- True RMS technology is accurate on distorted wave form like those associated with VFD or SCR outputs.
- Average Responding for use with linear, sinusoidal waveforms.

#### Jumper-selectable Ranges

- Reduces inventory.
- Eliminates zero and span pots.

#### Isolation

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

#### Agency Approved

- UL, CUL approved.

#### Selecting the right transducer:

The current waveform of a typical linear load is a pure sine wave. AT transducers measure the peaks of these sine waves, then calculate the average amperage. This works well on constant speed linear loads in “clean” power environments. Select AT transducers for strictly linear loads on “clean” power.

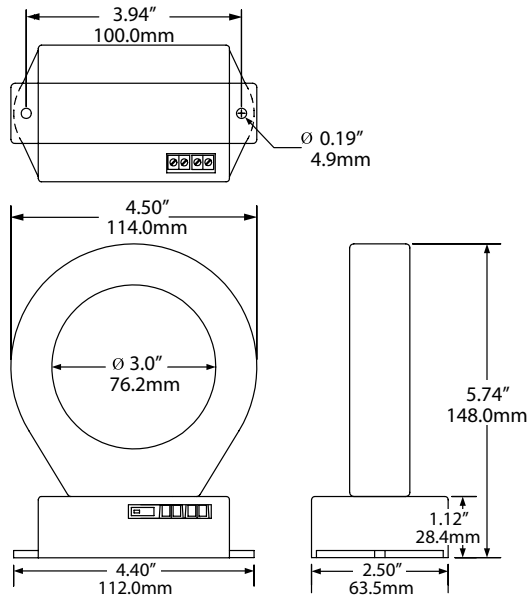
VFD and SCR output waveforms are rough approximations of a sine wave. There are numerous spikes and dips in a mathematical algorithm called “True RMS,” which integrates the actual waveform over time. The output is the amperage component of the true power (heating value) of the AC current waveform. True RMS is the only way to accurately measure distorted AC waveforms. **Select ATR transducers for nonlinear loads on “noisy power.”**

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.



AC Current Transducer Dimensions

FL Case



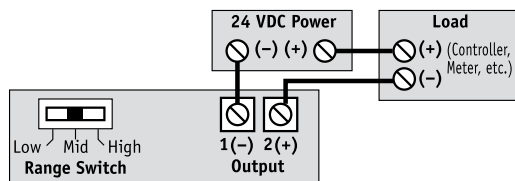
AC Current Transducer Specifications



<b>Output Signal</b>	4–20 mA, Loop-powered
<b>Output Limit</b>	23 mA
<b>Accuracy</b>	1.0% FS accuracy, True RMS
<b>Measurement</b>	True RMS or Average Responding (See Ordering Information)
<b>Response Time</b>	600 ms (to 90% step change)
<b>Frequency Range</b>	• ATR: 10–400 Hz • AT: 50–60 Hz, Sinusoidal
<b>Power Supply</b>	24 VDC Nominal, 12–40 VDC
<b>Isolation Voltage</b>	600 VAC
<b>Input Ranges</b>	• AT/ATR2: 100, 133, 200 A • AT/ATR3: 375, 500, 750 A • AT/ATR4: 1000, 1333, 2000 A
<b>Sensing Aperture</b>	3.0" (76.2 mm) dia.
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada), CE

AC Current Transducers

AC Current Transducer Connections



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

AC Current Transducer Ordering Information

Sample Model Number: ATR3-420-24L-FL  
True RMS AC current transducer, 24 VDC, powered with a 4–20 mA output, 375/500/750 A ranges in a solid-core case.



(1) Measurement

R	True RMS
	Average Responding (Blank)

(2) Full Scale Range

2	100, 133, 200 A
3	375, 500, 750 A
4	1000, 1333, 2000 A

(3) Output Signal

420	4–20 mA
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(4) Power Supply

24L	24 VDC Loop-powered
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(5) Case Style

FL	Solid-core
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# AT/ATR-LS SERIES

## AC Current Transducers

AT/ATR-LS Series Current Transducers combine a current transformer and signal conditioner into a single package. The large, easy-to-install, split-core design allows for installation over existing conductors without the need to disconnect the load, even in applications where there are multiple conductors per phase. For new installations, the installation is just as easy. Just remove the top portion of the sensing ring, place the conductors inside, and snap the top back in place. The transducer uses two wires to connect to the power supply and the load, programmable logic controller, panel meter or data acquisition system.

### AC Current Transducer Applications

#### Monitor Large Machines

- Measure the current use to detect over or under current conditions before they cause break downs.

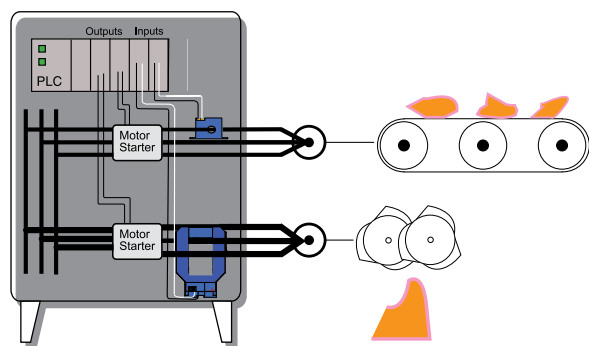
#### Water Delivery and Treatment

- Detect open discharge lines.
- See clogged filters or blocked intake to pumps.

#### Generators

- Keep the power system running by monitoring the output.

#### Pump Jam & Suction Loss Protection



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)



### AC Current Transducer Features

#### Industry Standard Output

- 4–20 mA signal proportional to the AC current.
- Compatible with most automation systems.

#### Loop-powered

- Use the “live zero” output to verify proper connections (sensor output with no current flowing confirms the system is ready to go).

#### Factory Calibrated

- Eliminates zero and span potentiometer adjustment.

#### Split-core Case

- Sensing window provides ample space for bus bar, single or multiple conductors.

#### DIN Rail Mount\*

- Simple snap onto DIN rail for secure mounting.

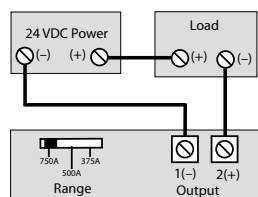
#### Designed for UL, CUL and CE Approval

- Accepted around the world.

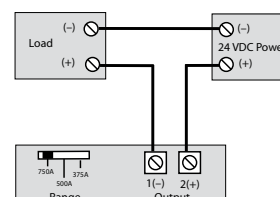
\*For information on the DIN rail accessories kit, see page 113.

### AC Current Transducer Connections

#### Standard Connection



#### Alternate Connection

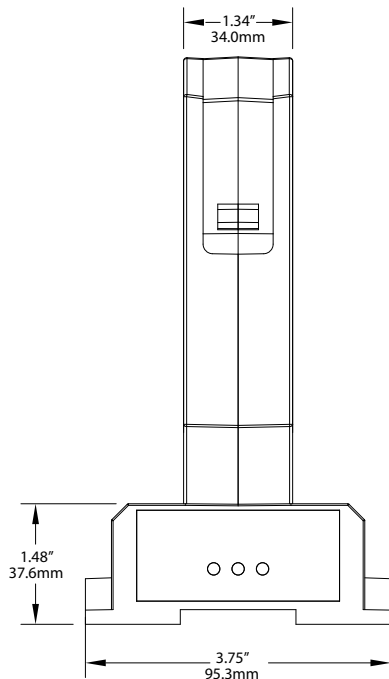
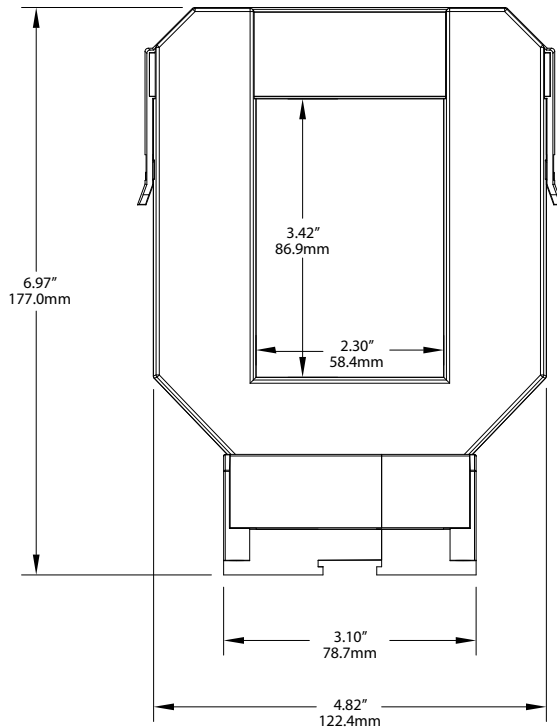


**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.



### AC Current Transducer Dimensions

LS Case



Note: Drawings are not to scale

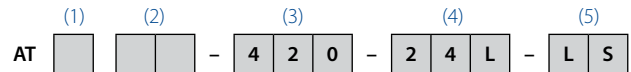
### AC Current Transducer Specifications

<b>Power Supply</b>	24 VDC nominal (12-32 VDC)								
<b>Output</b>	4–20 mA loop-powered								
<b>Output Limit</b>	23 mA								
<b>Accuracy</b>	1% FS								
<b>Response Time</b>	600 ms (90% step change)								
<b>Ranges</b>	<table border="1"> <tr> <td><b>8</b></td> <td>0–800 A</td> </tr> <tr> <td><b>10</b></td> <td>0–1000 A</td> </tr> <tr> <td><b>12</b></td> <td>0–1200 A</td> </tr> <tr> <td><b>16</b></td> <td>0–1600 A</td> </tr> </table>	<b>8</b>	0–800 A	<b>10</b>	0–1000 A	<b>12</b>	0–1200 A	<b>16</b>	0–1600 A
<b>8</b>	0–800 A								
<b>10</b>	0–1000 A								
<b>12</b>	0–1200 A								
<b>16</b>	0–1600 A								
<b>Isolation Voltage</b>	Designed to meet UL 508								
<b>Frequency Range</b>	<ul style="list-style-type: none"> <li>• AT: 50/60 Hz (average responding)</li> <li>• ATR: 20–400 Hz (True RMS responding)</li> </ul>								
<b>Sensing Aperture</b>	2.30" (58.42 mm) X 3.42" (86.87 mm)								
<b>Case</b>	UL94 V0 Flammability Rated DIN rail mounting								
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing								
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada)								

AC Current Transducers

### AC Current Transducer Ordering Information

Sample Model Number: ATR10-420-24L-LS  
AC current transducer, 0–1000 A range, RMS output 4–20 mA, loop-powered, large split-core case, DIN rail mounting.



(1) Frequency

	Average responding (blank)
R	True RMS responding output for distorted current

(2) Range

8	0–800 A
10	0–1000 A
12	0–1200 A
16	0–1600 A

(3) Output Type

420	4–20 mA
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(4) Power Supply

24L	24 VDC Loop-powered
-----	---------------------

(5) Case Style

LS	Split-core, base terminals, DIN rail mounting
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# ATCR SERIES

## AC Current Transducers

ATCR Series AC Current Transducers combine a sensing coil and a True RMS signal conditioner as a matched, factory-calibrated set. The ATCR Series AC Current Transducers are designed to produce an analog 4–20 mA signal proportional to AC current up to 2000 A. Coil opens to pass over the installed conductors. When connected to a controller or data logger, the sensor output is directly proportional to the primary current.



### AC Current Transducer Applications

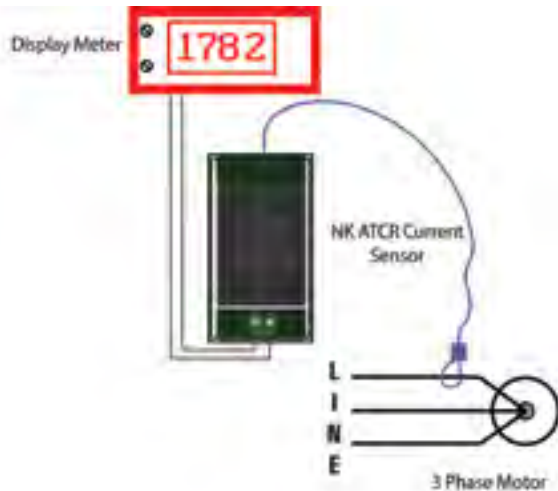
#### Monitor Large Machines

- Monitoring resistive or inductive load to detect current.
- Industry standard 4–20 mA output for connection to PLC or data loggers.

#### Flexible Coil Surrounds Conductors Without Disturbing Wiring

- Install over bus bars, single or multiple conductors easily.
- Fast response to changes in operating conditions.

Two-Wire Loop-Powered Output



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

### AC Current Transducer Features

#### True RMS Output

- True RMS technology is accurate on distorted waveforms like VFD or phase angle-fired SC outputs.

#### Single Range

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

#### Isolation

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

#### UL, CUL and CE Approved

- Accepted worldwide.

#### Compact DIN Rail Mount Case\*

- Space saving 35 mm wide enclosure mounts quickly.

\*For information on the DIN rail accessories kit, see page 113.

#### AC current monitoring of large loads:

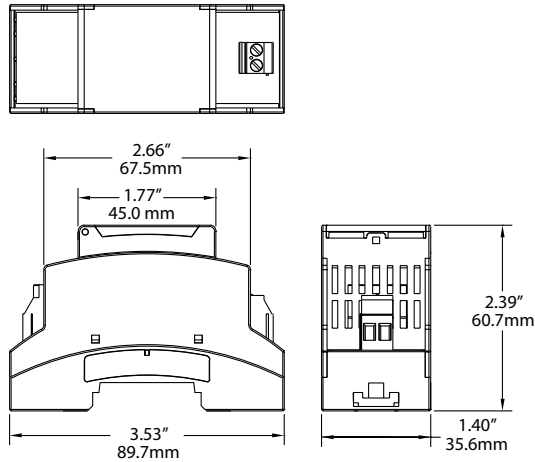
Loads drawing large amounts of power are connected to the supply using large wire or bus bar. Disconnecting the conductors and threading them through a solid sensing ring or current transformer is difficult and time consuming. With this new design, the sensing is accomplished using a coil without a magnetically permeable core. This allows the installer to pass the coil around the conductors after they are connected with a no need to disconnect. The coil is attached to a signal conditioning circuit, and the output signal is powered from the 24 VDC nominal loop voltage. Simple, easy to install, can monitor sinusoidal or distorted current wave forms at frequencies to 400 Hz, and designed for industrial uses.

OEMs

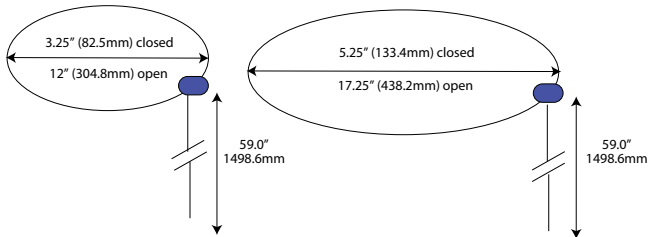
Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.

AC Current Transducer Dimensions



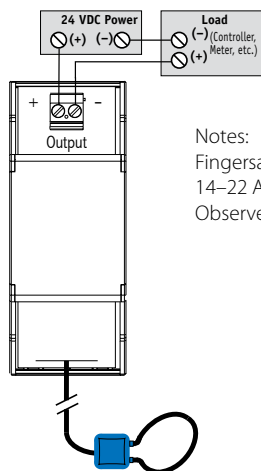
Base



Coil



AC Current Transducer Connections



Notes:  
 Fingersafe captive screw terminals.  
 14–22 AWG solid or stranded.  
 Observe polarity.

AC Current Transducer Specifications

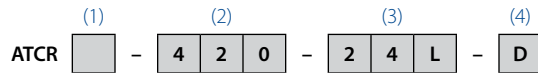


<b>Output Signal</b>	4–20 mA, Loop-powered, True RMS
<b>Output Limit</b>	23 mA
<b>Accuracy</b>	1.0% FS (10–100% of range)
<b>Response Time</b>	600 ms (to 90% step change)
<b>Frequency Range</b>	40–400 Hz
<b>Power Supply</b>	24 VDC nominal, 36 VDC max.
<b>Isolation Voltage</b>	UL listed to 1270 VAC, tested to 5 KV
<b>Input Ranges</b>	Single range, custom ranges available; consult factory.
<b>Sensing Aperture</b>	<ul style="list-style-type: none"> <li>0–500 A approx. 12" long (3.5" OD)</li> <li>0–1000–2000 A approx. 17.25" (5.25" OD)</li> </ul>
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada), CE

AC Current Transducers

AC Current Transducer Ordering Information

Sample Model Number: ATCR1-420-24L-D  
 True RMS AC current transducer, 500 A range, 4–20 mA output, 24 VDC loop-powered, coil sensor connected to DIN rail mounting case.



(1) Full Scale Range

1	500 A
2	1000 A
3	1500 A
4	2000 A

(2) Output Signal

420	4–20 mA
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(3) Power Supply

24L	24 VDC Loop-powered (4–20 mA output ONLY)
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(4) Case Style

D	Coil connected to DIN rail mounting case
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# ATH SERIES

## AC Current Transducer with Time Integration

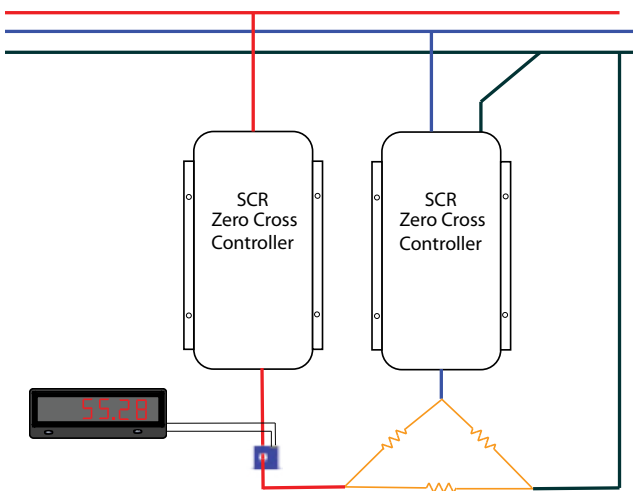
ATH Series (patented) AC Current Transducers are the latest innovation from NK Technologies. Monitoring the current or power controlled by silicon-controlled rectifiers (SCRs) can be a challenge, especially the current used by heaters. When used to monitor zero-crossing (burst) fired SCRs, the ATH will provide an output signal directly proportional to the RMS amperage. Zero-crossing fired controls allow current to flow to the circuit for as short of a time period as one cycle, and off for several cycles. Most current sensors will not work well when there is no current present. This capability is important in case a heating element fails but the process continues operating, which could result in scrapped material.

### AC Current Transducer Applications

#### Electrical Heaters

- Faster response than temperature sensors.
- Simplest method to monitor pulsed wave forms.

Burst-Fired Heating Controls



For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)



### AC Current Transducer Features

#### Industry Standard Outputs

- 4–20 mA, 0–5 or 0–10 VDC.
- Compatible with most automation systems.

#### External Powered

- Split-core models available powered with 24 VAC or DC.
- Solid-core models powered with 24 VAC or DC or 120 VAC.

#### Factory Calibrated

- No need for zero and span adjustment potentiometers.

#### RMS Output

- Accurate measurement of sinusoidal or pulsed current wave shapes.

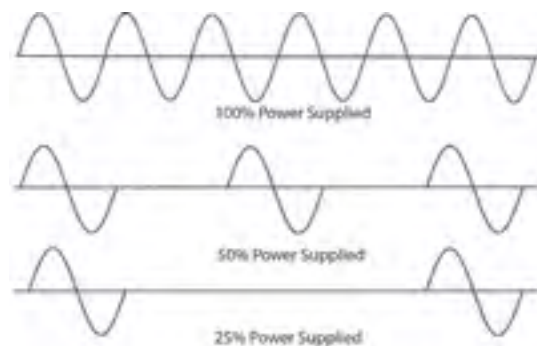
#### Built-in Mounting Feet

- Simple, two-screw panel mount or attach with optional DIN rail brackets.\*

#### Designed for UL, CUL and CE Approval

- Accepted worldwide

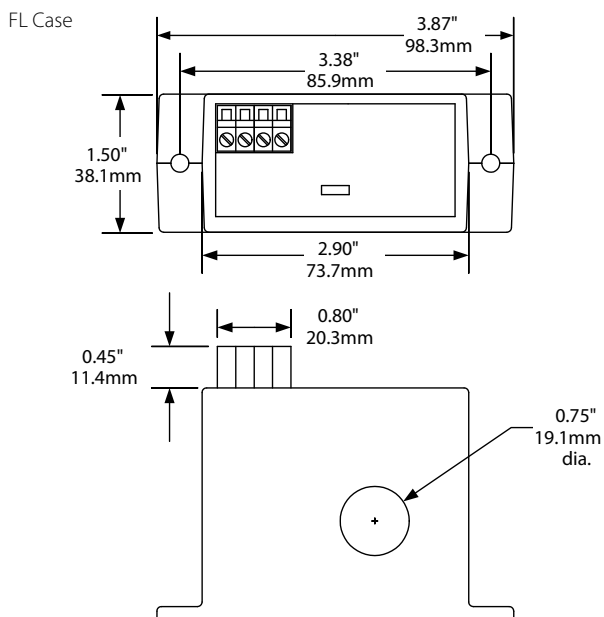
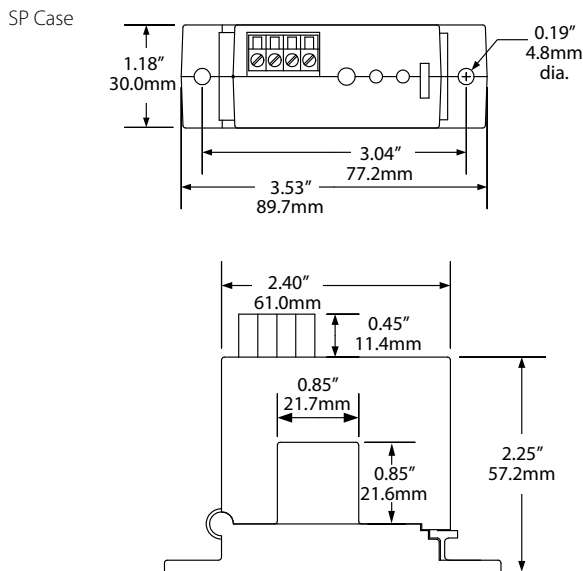
\*For information on the DIN rail accessories kit, see page 113.



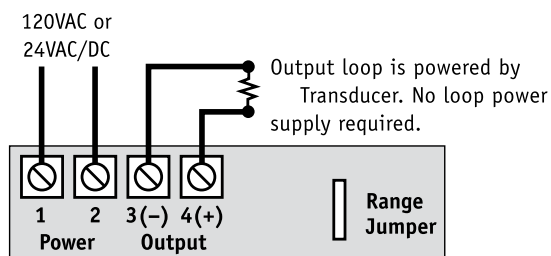
ATH AC current transducers will produce a signal proportional to the current used even when the controller is supplying power in one cycle increments. This is quite common as the “burst-fired” zero crossing switching method produces less harmonic distortion than phase-angle fired controls.

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

AC Current Transducer Dimensions



AC Current Transducer Connections



AC Current Transducer Specifications

<b>Power Supply</b>	120 VAC (solid-core only)
<b>Output</b>	4–20 mA 0–5 VDC 0–10 VDC
<b>Response Time</b>	600 ms max., 250 ms at 100% power
<b>Loading</b>	• 0–5 or 0–10 VDC: 10 ohm impedance min. • 4–20 mA: 500 ohm max.
<b>Isolation Voltage</b>	Tested to 5000 VAC
<b>Frequency Range</b>	40–400 Hz
<b>Sensing Aperture</b>	• -SP Case: 0.85" (21.6 mm) sq. • -FL Case: 0.74" (19 mm) dia.
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	Designed for approval to UL 508 Industrial Control Equipment (USA & Canada)

AC Current Transducers

AC Current Transducer Ordering Information

Sample Model Number: ATH1-420-24U-SP  
AC current transducer, time proportioned, 4-20 mA output, 24 VAC or DC power supply, split-core case.



<b>(1) Range</b>	
0	2 and 5 A
1	10, 20 and 50 A
2	100, 150 and 200 A
<b>(2) Output Type</b>	
420	4–20 mA
005	0–5 VDC
010	0–10 VDC
<b>(3) Power Supply</b>	
24U	24 VAC or DC
120	120 VAC
<b>(4) Case Style</b>	
SP	Split-core
FL	Solid-core



# ATQ SERIES

## Frequency Output AC Current Transducers

ATQ Series AC Current Transducers have a patented frequency output design used as an input to high-speed counter or frequency PLC modules, panel meters or programmable relays. Use where no analog inputs are available. Eight ranges, from 0–2 to 0–200 A, across three models provide the best available resolution. The ATQ Series AC Current Transducers are designed with a split-core case for easy installation.



### AC Current Transducer Applications

#### Motion and Motor Control

- Pump, grinder, and fan motor status monitoring.
- Belt jam sensing in conveyor applications.
- Motor control in deburring/brush operations.
- Detect strain, acts as an electronic shear pin.

#### Current Measurement

- Measure current use in machine tools, polishing, and cutting operations where a small PLC has sufficient capacity to accept the sensor inputs measuring speed, time of use and electrical demands of the equipment.

### AC Current Transducer Features

#### True RMS Output

- True RMS technology is accurate on distorted waveforms like VFD or SCR outputs.

#### Jumper-selectable Ranges

- Reduces inventory.
- Eliminates zero and span pots.

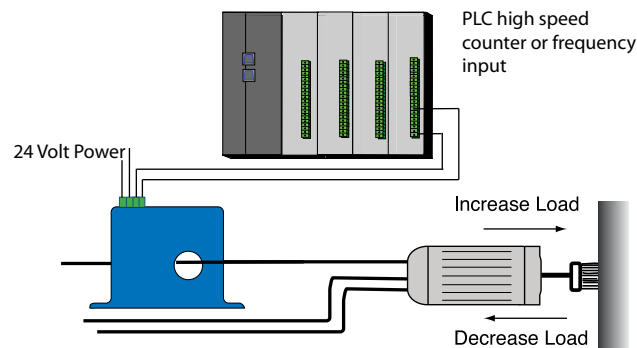
#### Isolation

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

#### Easy Installation

- Split-core case means the monitored conductor does not need to be disconnected to install the sensor.

Frequency Output Control



For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

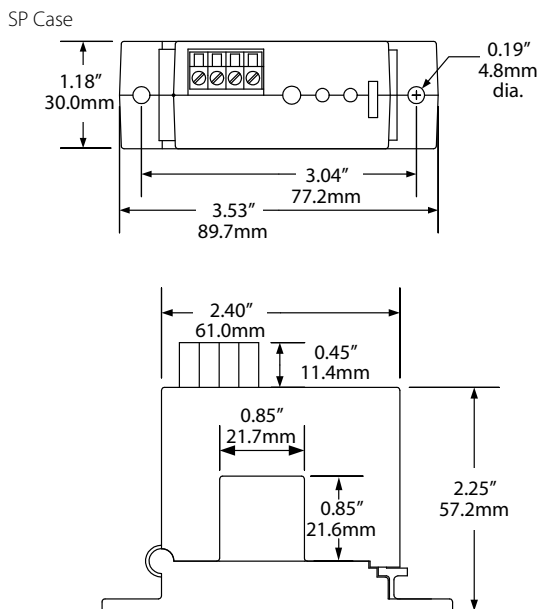
OEMs

Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.



AC Current Transducer Dimensions



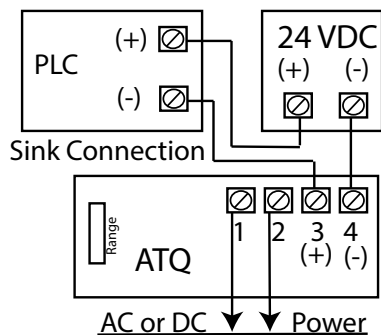
AC Current Transducer Specifications

<b>Power Supply</b>	24 VAC/DC, <1 VA (sensor only)
<b>Output</b>	• 5K Hz at full range current • 10K Hz at full range current
<b>Response Time</b>	100 ms (to 90% step change)
<b>Input Frequency</b>	10–400 Hz
<b>Pulse Width</b>	• 5k: 90–100 m sec. • 10k: 45–50 m sec. On: 40 m sec. Off: Variable
<b>Isolation Voltage</b>	Tested to 5000 VAC
<b>Frequency Range</b>	6–100 Hz
<b>Sensing Aperture</b>	0.85" (21.6 mm) square
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing

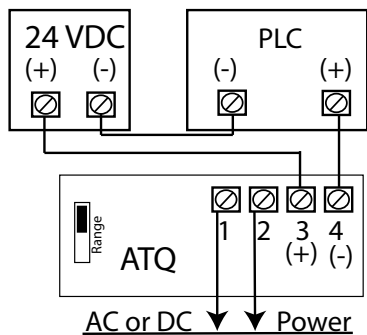
AC Current Transducers

AC Current Transducer Connections

Sinking Input Connection



Sourcing Input Connection



AC Current Transducer Ordering Information

Sample Model Number: ATQ1-05K-24U-SP  
AC current transducer, 5K frequency at 10, 20 or 50 A, split-core case.



(1) Range

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

(2) Frequency Output

05K	5K Hz
10K	10K Hz

(3) Power Supply

24U	24 VAC/DC Power (External)
-----	----------------------------

(4) Case Style

SP	Split-core
----	------------



# ATP SERIES

## AC Current Transducers

ATP Series Powered AC Current Transducers sense currents from 0–200 A and provide a proportional analog VDC or mA output. Powered by 120 VAC/DC or 24 VAC/DC, the ATP Series Powered AC Current Transducers eliminate the need for costly power supplies or voltage rectifiers inside the control panel. Designed for motor control applications with standard sinusoidal waveforms, the ATP Series Powered AC Current Transducers feature user-selectable input ranges, a choice of outputs and split-core or solid-core cases.

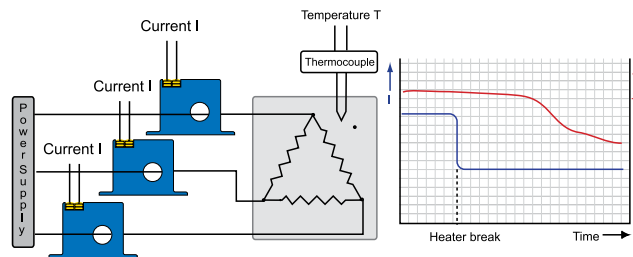


### AC Current Transducer Applications

#### Commercial and Industrial Motor Control Centers

- 120 VAC/DC power supply option allows for powering off of readily available supplies; ideal for pumping, water/wastewater, boiler and other industrial applications.
- Eliminates the need for 24 VDC power supply or AC rectifiers within the control panel; saves space, material and labor associated with power supplies.

#### Heater Failure Detection



For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

### AC Current Transducer Features

#### Fast, Accurate RMS Measurement

- Unique ‘average responding’ algorithm provides RMS output on pure sine wave and constant speed loads, offering improved accuracy over two-piece solutions.

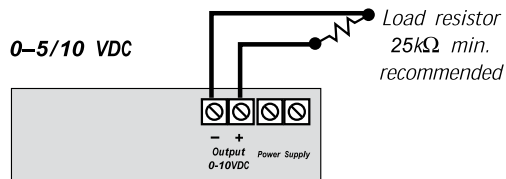
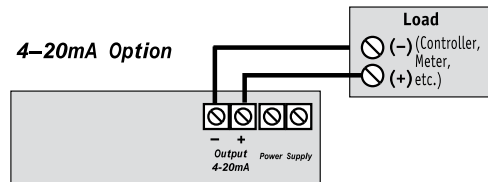
#### Jumper-selectable Input Ranges

- Each unit has multiple input range capability and can be used for a variety of applications, reducing the need for separate models.

#### Isolation Output

- Output is magnetically isolated from the input for enhanced safety and elimination of insertion losses.

### AC Current Transducer Connections

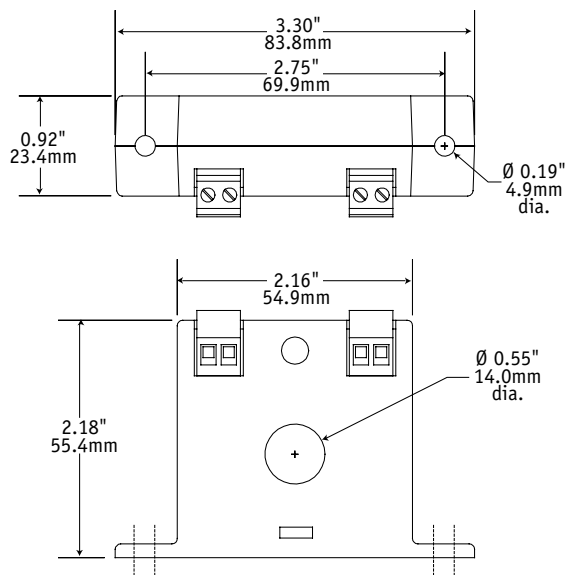


Notes:  
Terminals are deadfront captive screw terminals.  
Use 12–22 AWG solid or stranded.

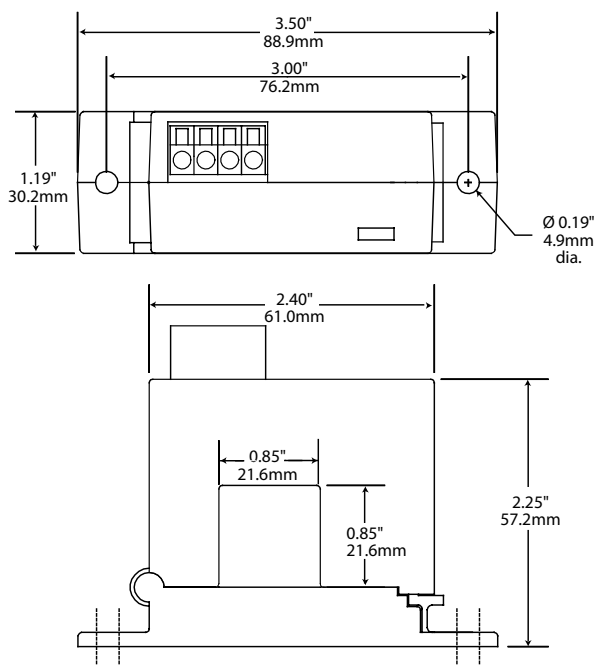
**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

### AC Current Transducer Dimensions

FF Case



SP Case



### AC Current Transducer Specifications

	-005 Model	-010 Model	-420 Model
<b>Output Signal</b>	0–5 VDC	0–10 VDC	4–20 mA
<b>Output Limit</b>	112% (5.6 V)	112% (11.2 V)	112% (22.4 mA)
<b>Loading</b>	25 K $\Omega$ min.: VDC Models 500 $\Omega$ max.: 4–20 mA Models		
<b>Response Time</b>	100 ms (10–90% step change)		
<b>Frequency Range</b>	40–100 Hz standard. Special calibration for frequencies 100–400 Hz, consult factory.		
<b>Accuracy</b>	1.0% FS		
<b>Power Supply</b>	120 VAC/DC or 24 VAC/DC, 2 VA max.		
<b>Isolation Voltage</b>	Tested to 5 KV		
<b>Input Ranges</b>	0–200 A jumper-selectable		
<b>Sensing Aperture</b>	• -FF Case: 0.55" (14 mm) dia. • -SP Case: 0.85" (21.6 mm) sq.		
<b>Case</b>	UL94 V0 Flammability Rated		
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing		

AC Current Transducers

### AC Current Transducer Ordering Information

Sample Model Number: ATP1-420-120-SP  
 Powered AC current transducer, jumper-selectable 0–10/20/50 A range, 4–20 mA output, 120 VAC/DC power supply, split-core case.



(1) Full Scale Range

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

(2) Output Signal

005	0–5 VDC
010	0–10 VDC
420	4–20 mA

(3) Power Supply

120	120 VAC/DC
24U	24 VAC/DC with isolated output

(4) Case Style

FF	Solid-core
SP	Split-core



# ATP/ATPR-FL SERIES

## AC Current Transducers

ATP/ATPR-FL Series Powered High-AC-Current Transducers are large-format solid-core transducers designed for high current applications from 200 A to 2000 A. Powered by 120 VAC or 24 VAC/DC, the ATP/ATPR-FL Series Powered High-AC-Current Transducers take advantage of available power supplies and eliminate the need for costly control power transformers. Options include average responding and True RMS versions, 0–5/10 VDC or 4–20 mA analog outputs and switch-selectable input ranges.



### AC Current Transducer Applications

#### Commercial and Industrial MCC's

- Fits conveniently in motor control centers, senses current on industrial motors and provides analog inputs back to PLC or controller.

#### VFD or SCR Controlled Loads, Electronic Ballasts

- Helpful in monitoring VFD-controlled motors to provide operational status. ATR Series also provides accurate measurement of ballast input power and phase angle fired SCRs.

#### Large Pumping Applications

- Ideal for proof-of-flow in water/wastewater, boiler and other industrial pumping applications 150 HP and over. 120 VAC/DC or 24 VAC/DC supply options allow for powering off of readily available supply, eliminating need for CPTs.

#### Power Distribution Centers (PDCs)

- Monitors current output on commercial generation equipment and serves as a current input for use in power consumption calculations.

### AC Current Transducer Features

#### Large Aperture

- Accommodates large conductors or wire bundles.

#### Select the Right Output

- True RMS technology is accurate on distorted wave form like those associated with VFD or SCR outputs.
- Average Responding for use with linear, sinusoidal waveforms.

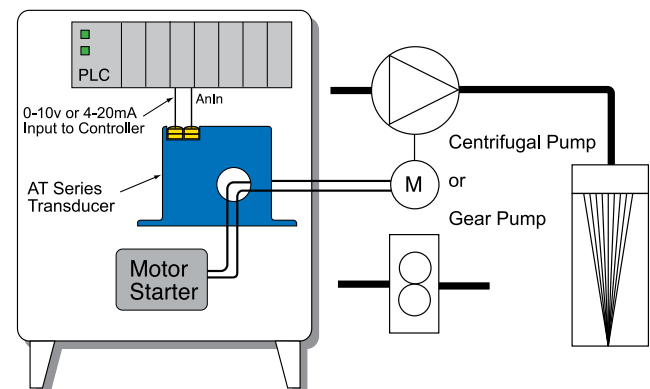
#### Jumper-selectable Ranges

- Reduces inventory.
- Eliminates zero and span pots.

#### Isolation

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

Centrifugal Pump Monitoring

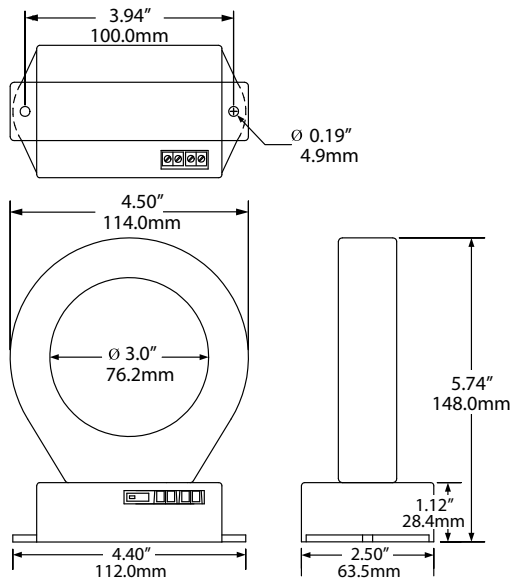


- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

AC Current Transducer Dimensions

FL Case

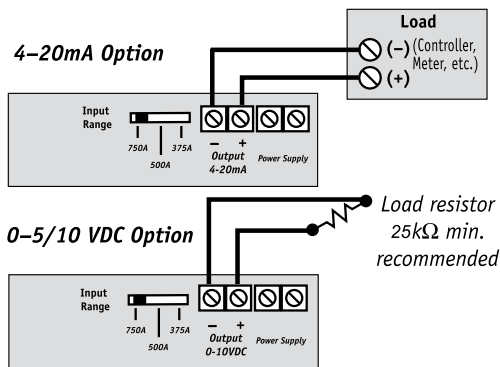


AC Current Transducer Specifications

Model	-005 Model	-010 Model	-420Model
Output Signal	0–5 VDC	0–10 VDC	4–20 mA
Output Limit	112% (5.6 V)	112% (11.2 V)	112% (22.4 mA)
Loading	25 K $\Omega$ min.: VDC models 500 $\Omega$ max.: 4–20 mA models		
Response Time	• ATP: 100 ms (10–90% step change) • ATPR: 600 ms (10–90% step change)		
Frequency Range	• ATP: 40–100 Hz, sinusoidal • ATPR: 10–400 Hz		
Accuracy	1.0% FS		
Power Supply	120 VAC/DC or 24 VAC/DC, 2 VA max.		
Isolation Voltage	600 VAC		
Input Ranges (switch-selectable)	• ATP3/ATPR3: 0–375 A/500 A/750 A • ATP4/ATPR4: 0–1000 A/1333 A/2000 A		
Sensing Aperture	3.0" (76.2 mm) dia.		
Case	UL94 V0 Flammability Rated		
Environmental	5 to 122°F (-15 to 50°C) 0–95% RH, non-condensing		

AC Current Transducers

AC Current Transducer Connections



Notes:  
Terminals are deadfront captive screw terminals.  
Use 12–22 AWG solid or stranded.

AC Current Transducer Ordering Information

Sample Model Number: ATPR-3-420-120-FL  
True RMS AC current transducer, 120 VAC/DC, powered with a 4–20 mA output, 375/500/750 A ranges in a solid-core case.



(1) Measurement	
R	True RMS
	Average Responding (blank)
(2) Full Scale Range	
3	375, 500, 750 A
4	1000, 1333, 2000 A
(3) Output Signal	
005	0–5 VDC
010	0–10 VDC
420	4–20 mA
(4) Power Supply	
24U	24 VAC/DC
120	120 VAC/DC
(5) Case Style	
FL	Solid-core



# ATPR “E-OUT” SERIES

## AC Current Transducers

ATPR RMS AC Current Transducers combine a current transformer with a true RMS signal conditioner in a single package. ATPR Series AC Current Transducers produce a 0–5 or 0–10 VDC RMS output on distorted waveforms found in the output of variable frequency drives, phase angle fired heating controls and on linear loads in “noisy” power environments. The ATPR Series AC Current Transducers are available in split-core case only.



### AC Current Transducer Applications

#### VFD Controlled Loads

- Monitor the output of variable frequency driven loads, even when the unit is in bypass mode.

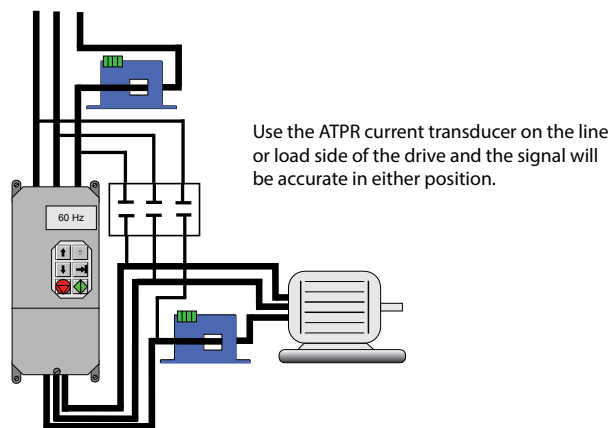
#### SCR Controlled Loads

- Accurate measurement of phase angle fired heating controls.
- Current measurement produces a quicker response to element failure than temperature controls.

#### Switching Power Supplies and Electronic Ballasts

- True RMS sensing is the most accurate way to measure power supply and ballast input power.

Monitoring a Variable Frequency Drive



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

OEMs

#### Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.

### AC Current Transducer Features

#### True RMS Sensing

- Sensor output is proportional to the current flowing in the circuit, even with high distortion or harmonic loads.
- Compatible with most automation systems.

#### External Powered

- Provides the highest degree of accuracy and response.

#### Range-selectable

- One sensor covers a wide variety of loads.
- Field-selectable ranges keep spare part inventory at a minimum and allow for changes in load conditions.

#### Split-core Case

- Simple installation, release the latch and snap over the conductor.

#### DC Voltage Output

- Perfect for data acquisition systems, panel meters or controllers with only voltage inputs available.

#### Built-in Mounting Feet

- Simple, two-screw panel mount or attach with optional DIN rail brackets.\*

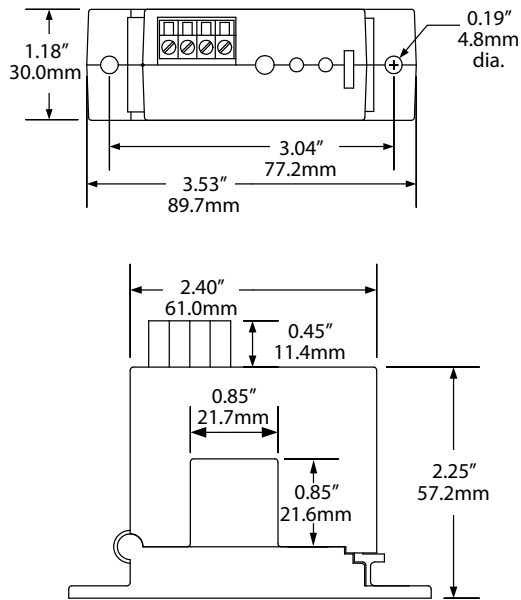
#### Designed for UL and CUL; CE Approval

- Accepted worldwide.

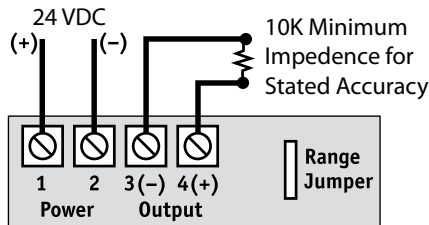
\*For information on the DIN rail accessories kit, see page 113.

AC Current Transducer Dimensions

SP Case



AC Current Transducer Connections



AC Current Transducer Specifications

<b>Power Supply</b>	24 VDC nominal (20–28 VDC)
<b>Output</b>	0–5 VDC, proportional to RMS current 0–10 VDC, proportional to RMS current
<b>Response Time</b>	600 ms
<b>Loading</b>	100 KΩ
<b>Output Range</b>	• 0–2 or 0–5 A • 0–10, 20 or 50 A • 0–100, 150 or 200 A
<b>Output Ripple</b>	1% max.
<b>Isolation Voltage</b>	UL listed to 1270 VAC, tested to 5000 VAC
<b>Frequency Range</b>	10–400 Hz
<b>Sensing Aperture</b>	0.85" (21.6 mm) sq.
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	Designed to meet UL 508 Industrial Control Equipment (USA & Canada)

AC Current Transducers

AC Current Transducer Ordering Information

Sample Model Number: ATPR1-010-24D-SP  
True RMS AC current transducer, 10/20/50 A FS input ranges, 0–10 VDC output, 24 VDC power supply, split-core case.



(1) Full Scale Range

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

(2) Output Type

005	0–5 VDC, True RMS
010	0–10 VDC, True RMS

(3) Power Supply

24D	24 VDC nominal (20–28 VDC)
-----	----------------------------

(4) Case Style

SP	Split-core
----	------------



# ATR SERIES

## AC Current Transducers

ATR Series AC Current Transducers combine a current transformer and a True RMS signal conditioner into a single package. The ATR Series AC Current Transducers provide True RMS output on distorted waveforms found on VFD or SCR outputs, and on linear loads in “noisy” power environments. The ATR Series AC Current Transducers are available in a solid- or split-core case.



### AC Current Transducer Applications

#### VFD Controlled Loads

- Monitoring VFD output indicates how the motor and attached load are operating.

#### SCR Controlled Loads

- Accurate measurement of phase angle fired (time proportioned) SCRs.
- Current measurement gives faster response than temperature measurement.

#### Switching Power Supplies and Electronic Ballasts

- True RMS sensing is the most accurate way to measure power supply or ballast input power.

### AC Current Transducer Features

#### True RMS Output

- True RMS technology is accurate on distorted waveforms like VFD or SCR outputs.

#### Jumper-selectable Ranges

- Reduces inventory.
- Eliminates zero and span pots.

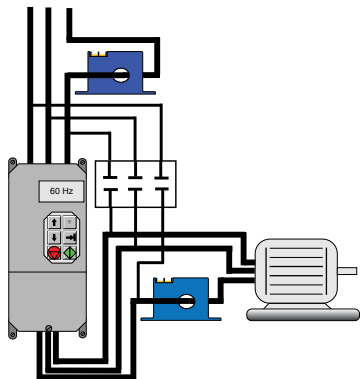
#### Isolation

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

#### UL, CUL and CE Approval

- Accepted worldwide.

Current Transformer Monitoring



Use the ATR current transducer on the line or load side of the drive and the signal will be accurate in either position.

- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

### Selecting the right transducer:

The current waveform of a typical linear load is a pure sine wave. In VFD and SCR applications, however, output waveforms are rough approximations of a sine wave. There are numerous spikes and dips in each cycle. ATR transducers use a mathematical algorithm called “True RMS” which integrates the actual waveform over time. The output is the amperage component of the true power (heating value) of the AC current waveform. True RMS is the only way to accurately measure distorted AC waveforms. **Select ATR transducers for nonlinear loads in “noisy” power environments.**

OEMs

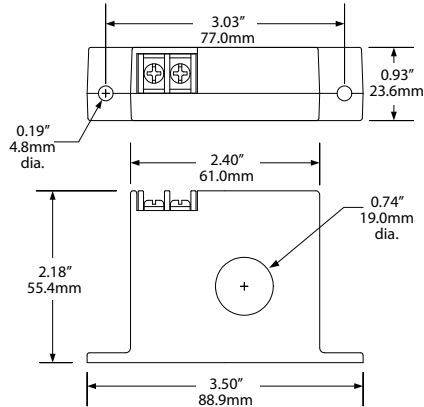
Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.

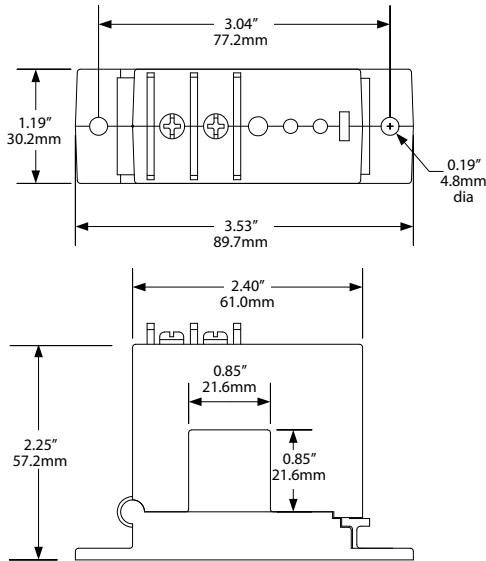


AC Current Transducer Dimensions

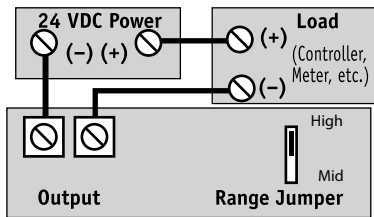
FT Case



SP Case



AC Current Transducer Connections



4-20mA

Notes:  
 Deadfront captive screw terminals (-SP case).  
 12-22 AWG solid or stranded.  
 Observe polarity.

AC Current Transducer Specifications



<b>Output Signal</b>	4-20 mA, Loop-powered, True RMS
<b>Output Limit</b>	23 mA
<b>Accuracy</b>	1.0% FS
<b>Response Time</b>	600 ms (to 90% step change)
<b>Frequency Range</b>	10-400 Hz
<b>Power Supply</b>	24 VDC nominal, 12-40 VDC max.
<b>Isolation Voltage</b>	UL listed to 1270 VAC, tested to 5 KV
<b>Input Ranges</b>	Field-selectable ranges from 0-200 A; custom ranges available; consult factory.
<b>Sensing Aperture</b>	• -FT Case: 0.74" (19 mm) dia. • -SP Case: 0.85" (21.6 mm) sq.
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0-95% RH, non-condensing
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada), CE

AC Current Transducers

AC Current Transducer Ordering Information

Sample Model Number: ATR1-420-24L-SP

True RMS AC current transducer, 10/20/50 A ranges, 4-20 mA output, 24 VDC loop-powered in a split-core case.



(1) Full Scale Range

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

(2) Output Signal

420	4-20 mA
-----	---------

(3) Power Supply

24L	24 VDC Loop-powered (4-20 mA output ONLY)
-----	---

(4) Case Style

FT	Solid-core, Top Term.
SP	Split-core



# ATS SERIES

## AC Current Transducer/Switch with Digital Setpoint Display

ATS Series AC Current Sensors combine a current operated switch and transducer into a single package. The FL model features a digital display that gives visual indication of the setpoint for greater accuracy. The sensor provides a solid-state contact which will change state when the current exceeds an adjustable level or falls below the normal running current. This means reduced installation time, plus the option to have local control of a starter coil while at the same time sending the analog signal back to a controller housed in a separate cabinet.



Digital Setpoint Display (patent pending)

### Applications

#### Electronic Proof of Operation

- Current operated switches eliminate the need for multiple pipe or duct penetrations and are more reliable than electromechanical pressure or flow switches.

#### Conveyors

- Detects jams and overloads.
- Interlocks multiple conveyor sections.

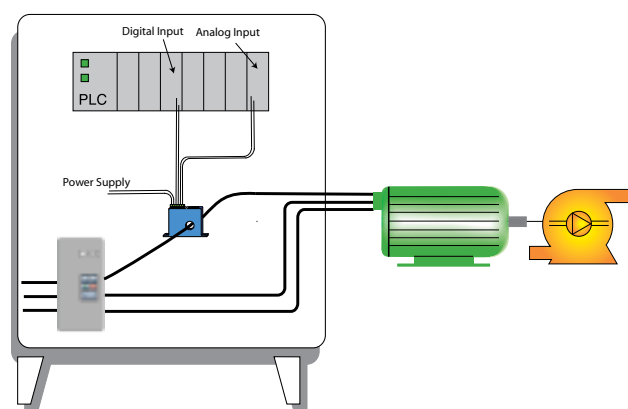
#### Pump Control

- Provides signal to measure current and shuts down the pump if the current rises over the setpoint.

#### Cooling Towers

- Analog monitors time of use and contact opens if a filter clogs.

Pump Jam & Suction Loss Protection



### Features

#### Solid-State Output

- N.O. or N.C. solid-state switch for control circuits up to 240 VAC.
- Compatible with most automation systems.

#### Externally Powered

- Allows for higher accuracy.

#### Easily Adjustable and Precise Setpoint

- Speeds startup.

#### Analog Output

- Measure the current used at all times.

#### LED Display

- Provides quick visual indication of where the contact changes.
- Easiest and most accurate setpoint adjustment available.

#### Built-in Mounting Feet

- Simple, two-screw panel mount or attach with optional DIN rail brackets.\*

#### Designed for UL, CUL and CE Approval

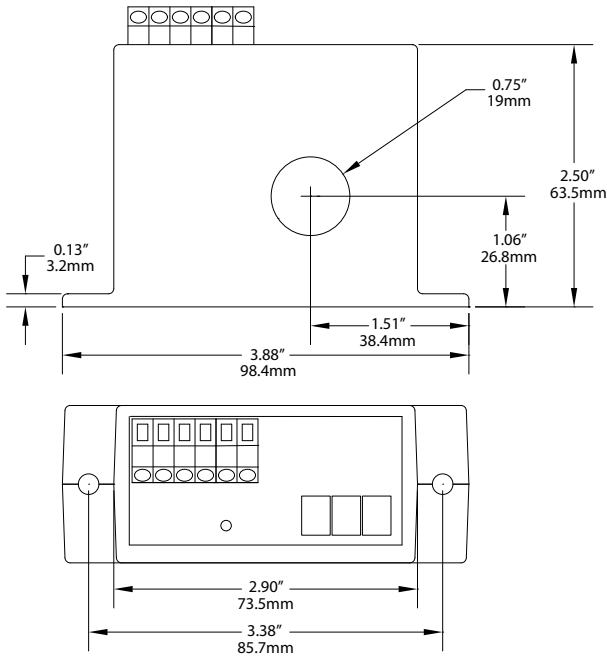
- Accepted worldwide.

\*For information on the DIN rail accessories kit, see page 113.

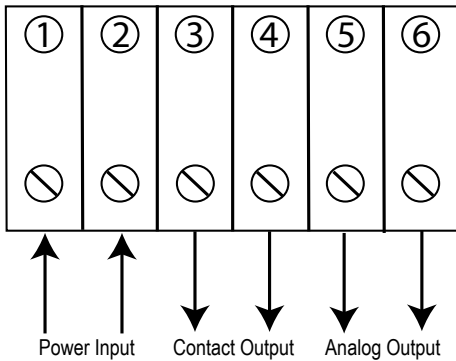
- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

AC Current Transducer Dimensions



AC Current Transducer Connections

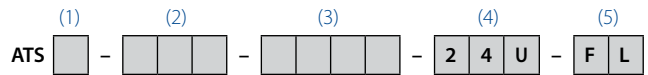


AC Current Transducer Specifications

<b>Power Supply</b>	18–30 VAC/DC (40–70 mA consumption)		
<b>Digital Output</b>	Magnetically isolated solid-state switch		
<b>Contact Rating</b>	• 1.0 A up to 240 VAC max. (AC only)		
<b>Off-State Leakage</b>	• <10 $\mu$ A normally open • 2.5 mA normally closed		
<b>Contact Response Time</b>	• <500 ms (5% above setpoint) • <200 ms (50% above setpoint) • <150 ms (100% above setpoint)		
<b>Setpoint Range</b>	• ATS1: 1–50 A (adjustable) • ATS2: 4–200 A (adjustable)		
<b>Hysteresis</b>	5% of setpoint		
<b>Analog Output</b>	• ATS1: 0–50 A • ATS2: 0–200 A		
<b>Analog Signal Loading</b>	• 4–20 mA: 500 ohm max. • 0–5 or 0–10 VDC: 5 K ohm min.		
<b>Analog Response Time</b>	• <300 ms (90% step change) • <400 ms (100% step change)		
<b>Overload</b>	MODEL	6 SEC	1 SEC
	• ATS1	• 400 A	• 600 A
	• ATS2	• 800 A	• 1200 A
<b>Isolation Voltage</b>	Tested to 5000 VAC		
<b>Frequency Range</b>	40–400 Hz		
<b>Sensing Aperture</b>	0.74" (19 mm) dia.		
<b>Case</b>	UL94 V0 Flammability Rated		
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing		
<b>Listings</b>	Designed to meet UL 508 Industrial Control Equipment (USA & Canada)		

AC Current Transducer Ordering Information

Sample Model Number: ATS1-420-NOAC-24U-FL  
Adjustable AC current operated switch/transducer, normally open, solid-core.



(1) Range

1	0–50 Analog, 1–50 switch adjustment
2	0–200 Analog, 4–200 switch adjustment

(2) Analog Signal Type

420	4–20 mA (powered by sensor)
005	0–5 VDC
010	0–10 VDC

(3) Output Contact

NOAC	Normally Open, closes on current rise, AC control only
NCAC	Normally Closed, opens on current rise, AC control only

(4) Power Supply

24U	24 VAC or DC
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(5) Case Style

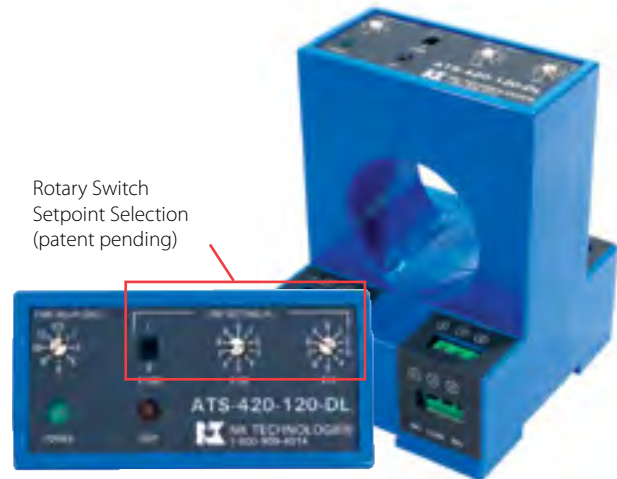
FL	Solid-core
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# ATS SERIES

## AC Current Transducer/Switch with Rotary Switch Setpoint

The ATS Series AC Current Sensors combine a current operated switch and transducer into a single package for use in AC current applications up to 1200 A. The large sensing window provides complete isolation between the primary circuit and the controls. The DIN rail mounting makes installation a breeze, and provides a very secure mount that is resistant to conductor movement.



### AC Current Transducer Applications

#### Large AC Motor Loads

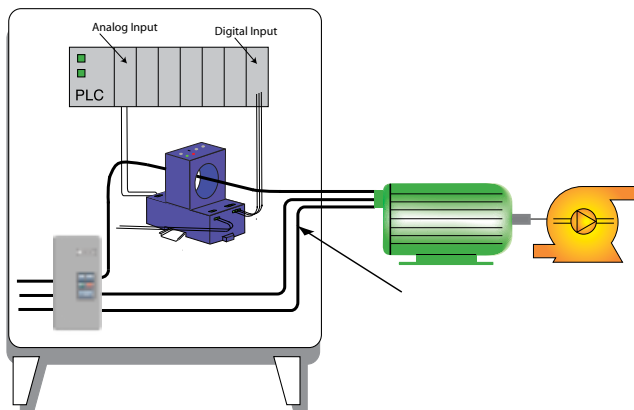
- Produces an analog signal at all times to detect increases or decreases in current.
- Provides limit alarm contacts for over or under current conditions.
- Extra large aperture allows for single or multiple conductor passage.

#### Main Service Entrance

- Allows a viewer to see the amount of current used at any time when connected to a standard panel meter.

#### Generators

- Measure the AC current produced or consumed.
- Detect mechanical problems before failure occurs.



For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

### AC Current Transducer Features

#### Easily Established Relay Actuation Point

- Patented rotary switch setpoint selection (patent pending).
- Trip point indicated on the labeling.

#### Isolation

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

#### Analog Signal Available At All Times

- 4–20 mA signal proportional to 0–1200 AC A.
- Reduces components by combining transducer and limit alarm (current switch).
- Analog signal powered from the sensor; no loop powered required.

#### DIN Rail Mounting\*

- Integral DIN rail mount with spring loaded mounting clips.
- Makes installation a snap.

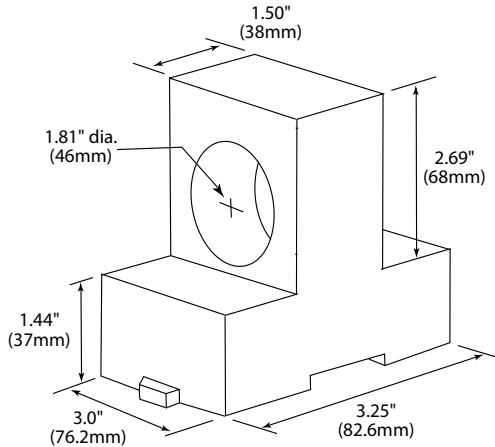
#### Fail-Safe Relay Action

- Single Pole Double Throw Relay changes state with power to the sensor.
- LED indication if power is removed from the sensor or primary current exceeds the adjustable trip point.
- Field-adjustable time delay from 0.5 to 12 seconds.

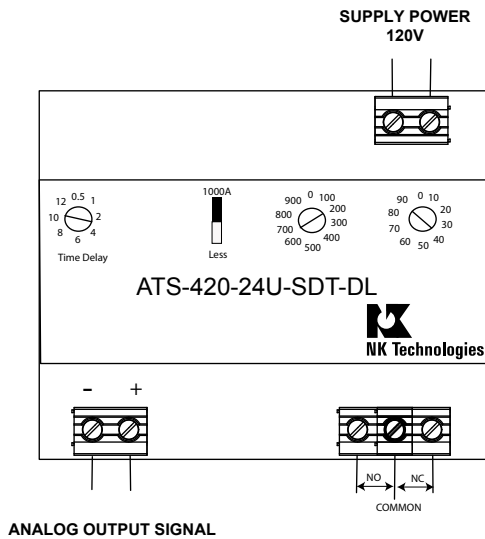
\*For information on the DIN rail accessories kit, see page 113.

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

AC Current Transducer Dimensions



AC Current Transducer Connections



AC Current Transducer Output Type

Single pole, double throw relay-adjustable from 10 to 1200 A in 10 A increments. 4–20 mA signal proportional to 0–1200 A. Analog signal capped at 6 mA when trip point <150 A, 8 mA if trip point <300 A, 23 mA if the trip point is 310 or higher.

Notes:

Dead front captive screw terminals.  
12–22 AWG solid or stranded.  
Observe polarity.

AC Current Transducer Specifications

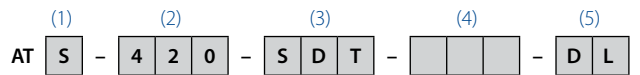


<b>Output Signal</b>	4–20 mA
<b>Output Limit</b>	4–20 mA: 23 mA (if trip point is <150 A, max. signal is 6 mA, if <300 A, max. signal is 8 mA)
<b>Transducer Accuracy</b>	1% FS
<b>Repeatability</b>	1.0% FS
<b>Response Time</b>	• Relay Output: 200 ms to 90% of step change • Transducer: 600 ms to 90% step change
<b>Frequency Range</b>	AC 10–100 Hz
<b>Power Supply</b>	120 VAC or 24 VDC, isolated from output
<b>Power Consumption</b>	5 VA
<b>Loading</b>	4–20 mA: 650 Ω max.
<b>Contact Rating</b>	1 A @ 125 VAC, 2 A @ 30 VDC
<b>Isolation Voltage</b>	Tested to 5 KV
<b>Linearity</b>	1.00% FS
<b>Current Ranges</b>	Ranges from 0–1200 A
<b>Sensing Aperture</b>	1.875" (46 mm) diameter
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada), Designed to meet CE

AC Current Transducers

AC Current Transducer Ordering Information

Sample Model Number: ATS-420-SDT-24D-DL  
Solid-core AC current operated switch / transducer combination, 0–1200 A range, 4–20 mA analog output, 24 VDC powered, adjustable relay trip point.



(1) Full Scale Range	S	Combination (switch and transducer)
(2) Output Signal	420	4–20 mA
(3) Contact Type	SDT	SPDT Relay
(4) Power Supply	24D	24 VDC
	120	120 VAC
(5) Case Style	DL	Solid-core, DIN rail mount*

\*DIN rail kit available. See DIN rail accessories page.



# 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

● <b>DT SERIES, 4-WIRE</b>	
DC Current Transducers.....	page 62
● <b>DT SERIES, 3-WIRE</b>	
DC Current Transducers.....	page 65
● <b>DT SERIES, TEMPERATURE COMPENSATED</b>	
DC Current Transducers.....	page 67
● <b>DT SERIES, LARGE APERTURE</b>	
DC Current Transducers.....	page 69
● <b>DLT SERIES</b>	
DC Current Transducers.....	page 71

## DC CURRENT TRANSDUCERS Selection Chart

### MONITOR DC CIRCUITS

Our wide range of current transducers guarantees that you'll find exactly what you need. We currently offer five series of current transducers in DC configurations. To assist in guiding you to the right series for your application, please begin your selection here.

**DT SERIES** – p. 62  
4-wire (24 or 120 V Powered)

**DT SERIES** – p. 65  
3-wire (24 VDC Powered)

**DT SERIES,  
TEMPERATURE COMPENSATED** – p. 67  
33 mVDC or 0–5/0–10 VDC Output

**DT SERIES,  
LARGE APERTURE** – p. 69  
Measures up to 1200 A

**DLT SERIES** – p. 71  
2-wire (Loop-powered)



# 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. DT transducers are available in a split-core or solid-core case.



### 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.

### DC Current Transducer Features

#### Single Range or Three Jumper-selectable Ranges

- Reduces set-up time.
- Reduces inventory.
- Eliminates zero and span pots.

#### Isolation

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

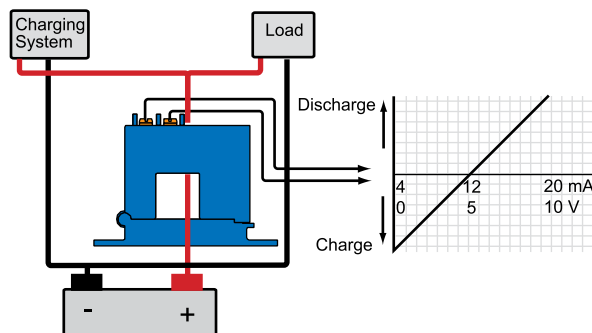
#### Internal Power Regulation

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

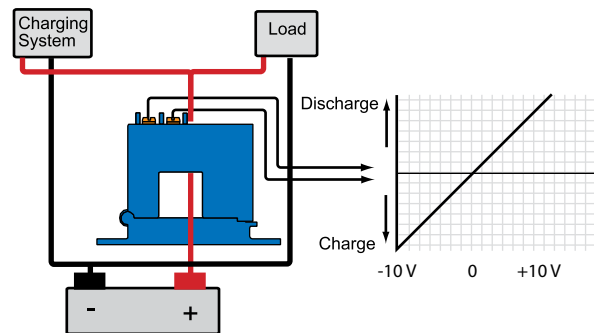
#### Split-core Design/Built-in Mounting Brackets

- Makes installation a snap.

Battery Charging System - Bipolar Output



Battery Charging System - Bidirectional Output



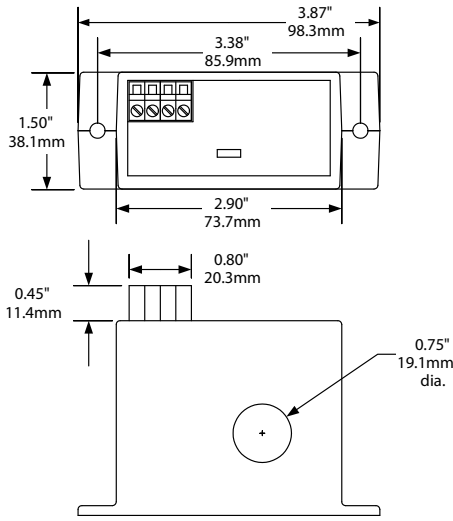
For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

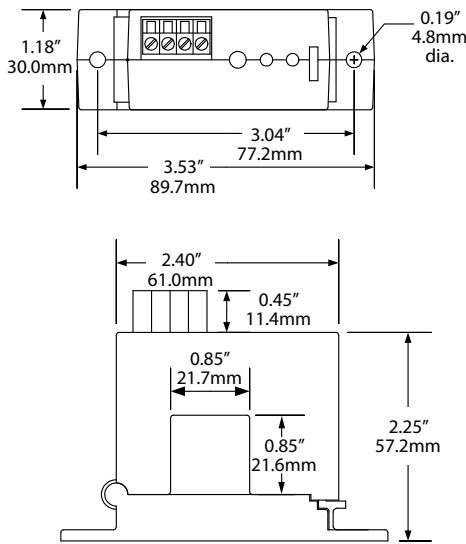


DC Current Transducer Dimensions

FL Case

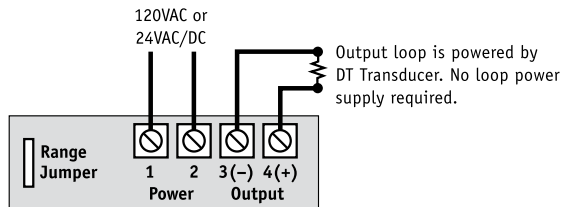


SP Case



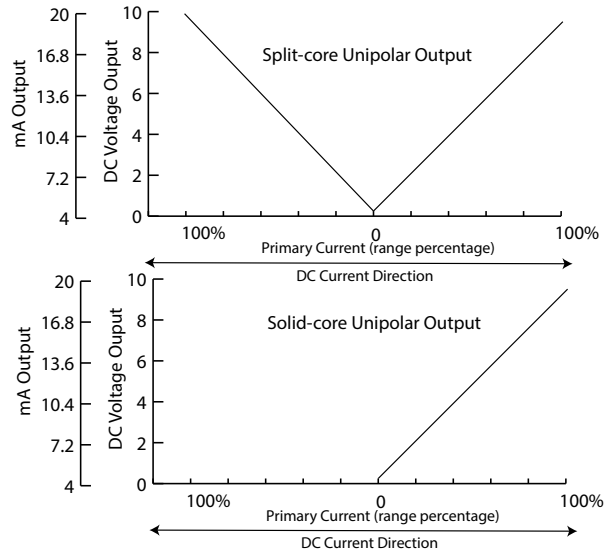
DC Current Transducer Connections

DT Series Unipolar and Bipolar Output Models



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

DC Current Transducer Unipolar Output



DC Current Transducer Specifications



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

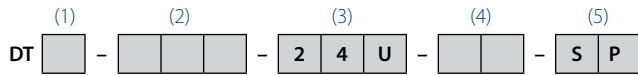


DC Current Transducer Ordering Information

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

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

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



(1) Full Scale Range

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

(2) Output Signal

020	0–20 mA
420	4–20 mA

003	0–3 VDC
005	0–5 VDC
010	10 VDC

(3) Power Supply

24U	+24 VAC/DC
-----	------------

(4) Output Polarity

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

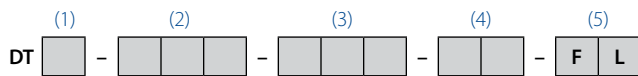
(5) Case Style

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.



(1) Full Scale Range

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

(2) Output Signal

020	0–20 mA
420	4–20 mA
003	0–3 VDC

005	0–5 VDC
010	10 VDC

(3) Power Supply

24U	+24 VAC/DC
120	120 VAC

(4) Output Polarity

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

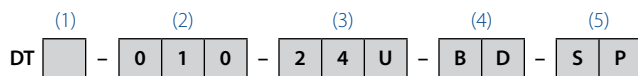
(5) Case Style

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.



(1) Full Scale Range

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

(2) Output Signal

010	10 VDC
-----	--------

(3) Power Supply

24U	+24 VAC/DC
-----	------------

(4) Output Polarity

BD	Bidirectional
----	---------------

(5) Case Style

SP	Split-core
----	------------

# 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.

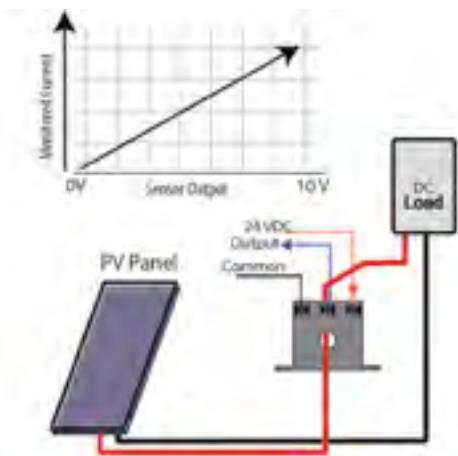
#### DC Motor Protection

- Detect imminent bearing failures.

#### Wind Driven Generators

- Measure and monitor power production from alternative sources.

Monitoring a Photovoltaic Panel Power Output



OEMs

Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.



### 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-core 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

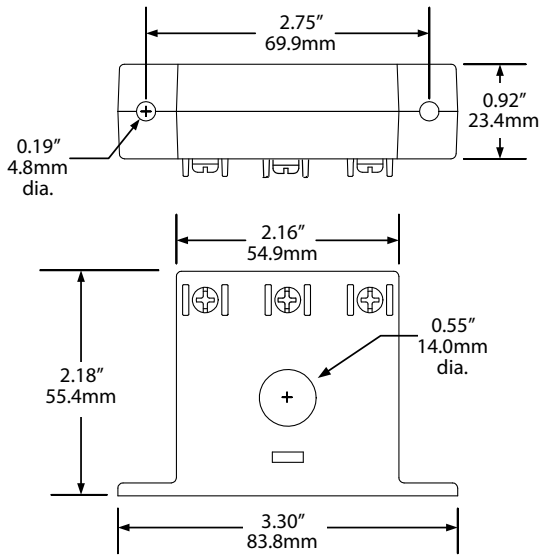
- Accepted worldwide.

\*For information on the DIN rail accessories kit, see page 113.

- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

DC Current Transducer Dimensions

FF Case

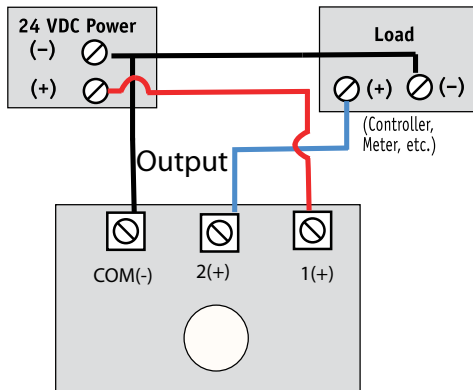


DC Current Transducer Specifications

<b>Power Supply</b>	24 VDC, <2 VA
<b>Output</b>	0–5 or 0–10 VDC
<b>Response Time</b>	500 ms
<b>Range</b>	• 0–50 A • 0–100 A
<b>Accuracy</b>	±1% FS
<b>Isolation Voltage</b>	Designed to UL 508 1270 VAC, tested to 5000 VAC
<b>Frequency Range</b>	DC
<b>Sensing Aperture</b>	0.55" (14 mm) dia.
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	Designed to meet UL 508 Industrial Control Equipment (US & Canada)

DC Current Transducers

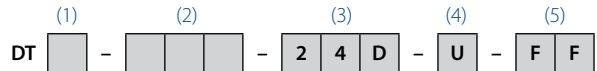
DC Current Transducer Connections



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.



(1) Range

B	0–50 ADC
C	0–100 ADC

(2) Output Type

005	0–5 ADC
010	0–10 ADC

(3) Power Supply

24D	24 VDC
-----	--------

(4) Output Design

U	Unipolar (output with current in one direction)
---	---

(5) Case Style

FF	Solid-core, Front Terminals
----	-----------------------------

# DT SERIES, TEMPERATURE COMPENSATED DC Current Transducers

The DT Series of Temperature Compensated DC Current Transducers is ideal for energy management system inputs where the controller is designed to accept 333 mV signals, commonly found in power monitoring applications. Other output options available are a 0–5 VDC signal used in building energy management systems or a 0–10 VDC signal seen more often in industrial controllers. Additionally, this series features a patent-pending method that improves the sensor accuracy as the ambient temperature changes. The sensor output is automatically adjusted as the temperature increases or decreases, eliminating one of the biggest issues with Hall effect based products.

## DC Current Transducer Applications

### Photovoltaic Panel Output Measurement

- The sensor output rises and falls as the panel produces more or less power.

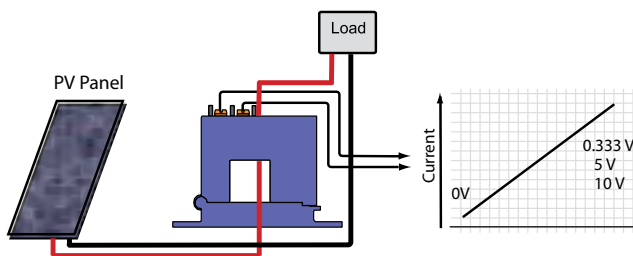
### DC Motors

- Detects jams and overloads.
- Provides early notification of impending bearing failure.

### Electrical Heaters

- Detects open or shorted elements quickly.

#### Photovoltaic Panel Output Measurement



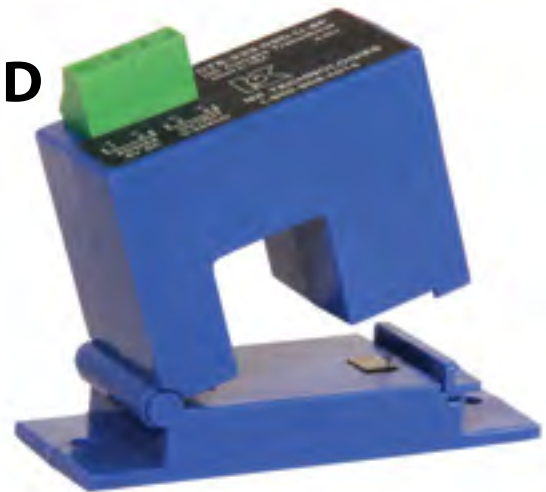
The DT sensor will produce a signal directly proportional to the current produced by the panel or string of panels, with an output to match the controller being used.

- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

OEMs

Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.



Patent-pending temperature compensation design.

## DC Current Transducer Features

### Voltage Output

- 333 mVDC, 5 or 10 VDC proportional to DC current.
- Compatible with many monitoring systems.

### 5 VDC Powered

- Use with data collection systems.
- Available with 333 mVDC output.

### 12 VDC Powered

- Available with 0.333, 5 or 10 VDC output.

### Ranges to Suit Your Needs

- 0–50 A DC.
- 0–100 A DC.

### Temperature Compensated

- Remains accurate with rise or fall of ambient temperature.

### Built-in Mounting Feet

- Simple, two-screw panel mount or attach with optional DIN rail brackets.\*

### Split-core Case

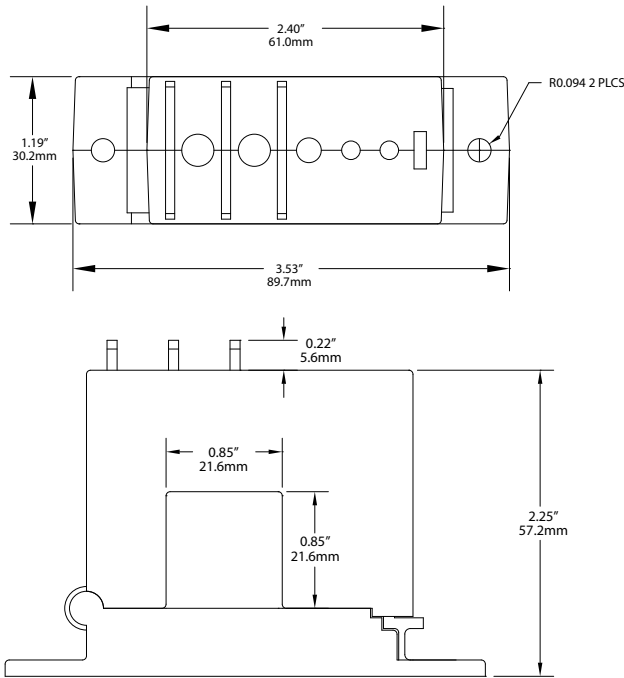
- Open to snap the sensor over existing conductor; no need to disconnect the load to install.

### Designed for UL, CUL and CE Approval

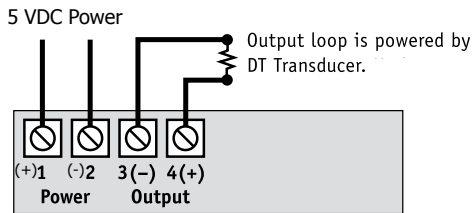
- Accepted worldwide.

\*For information on the DIN rail accessories kit, see page 113.

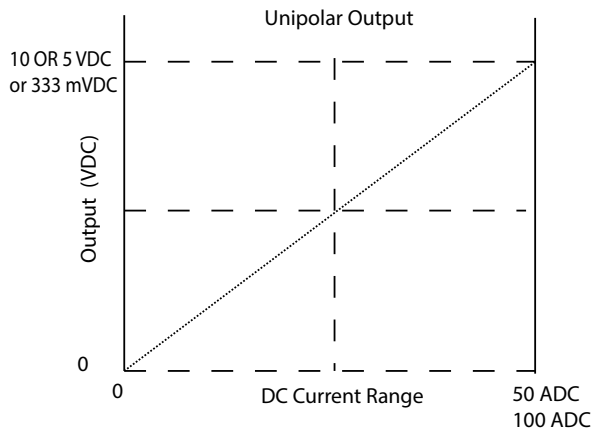
DC Current Transducer Dimensions



DC Current Transducer Connections



DC Current Transducer Output Type



Output remains accurate even as the temperature rises and falls from -20°C to +50°C (-4 to +122 °F) with our patent pending design.

DC Current Transducer Specifications

<b>Power Supply</b>	5-6 VDC (5.1-5.9 VDC recommended)	12 VDC (11.5-13.2)
<b>Output</b>	0-333 mVDC	0-5 VDC or 0-10 VDC
<b>Response Time</b>	400 ms (90% step change)	
<b>Consumption</b>	< 8.5mA (no load) (333 mVDC output)	n/a
<b>Output Loading</b>	50 ohm minimum, 20 mA maximum (333 mVDC)	10K ohm minimum (0-5 or 0-10 VDC output)
<b>Accuracy</b>	1% Full Scale, across temperature range	
<b>Isolation Voltage</b>	Tested to 5000 VAC	
<b>Frequency Range</b>	DC	
<b>Sensing Aperture</b>	0.85" (21.6mm) sq	
<b>Case</b>	UL94 V0 Flammability Rated	
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0-95% RH, non-condensing	
<b>Listings</b>	Designed to comply with UL 508	

DC Current Transducer Ordering Information

Sample Model Number: DTB-333-05D-U-SP  
Split-core DC current transducer, 0-50 A range, 0-333 mVDC, 5 VDC powered, unipolar output.



(1) Range

B	0-50 A
C	0-100 A

(2) Output Signal

333	333 mVDC
005	5 VDC
010	10 VDC

(3) Power Supply

05D	5 VDC (0-0.333 VDC output only)
12D	12 VDC (0-0.333, 0-5 or 0-10 VDC output only)

(4) Signal Response Type

U	Unipolar (Output with current in one direction only)
---	--

(5) Case Style

SP	Split-core
----	------------

# 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 Transducers have factory set and calibrated ranges, industry standard 4–20 mA, 0–5 VDC or 0–10 VDC outputs, and are available in solid-core DIN rail mounted case.



## 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.

## 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

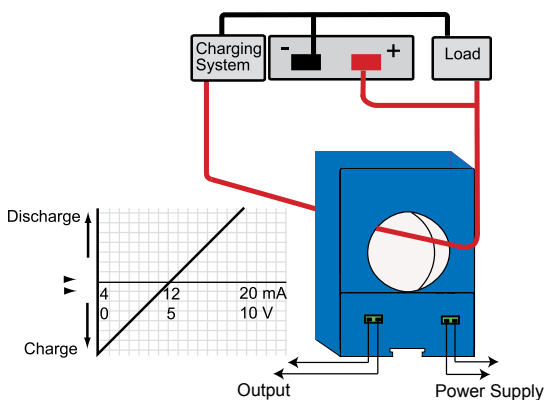
- Works well, even with unregulated power.
- Cuts installation cost.

### DIN Rail Mounted Case

- 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 113.

Battery Charging System



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

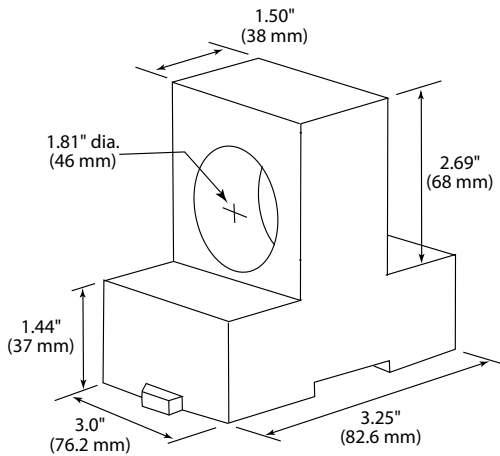
OEMs

Test & Evaluation Units for OEMs

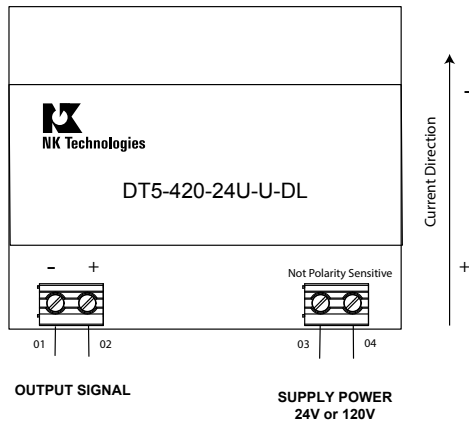
Free program expedites evaluation process. See page 1 for details.



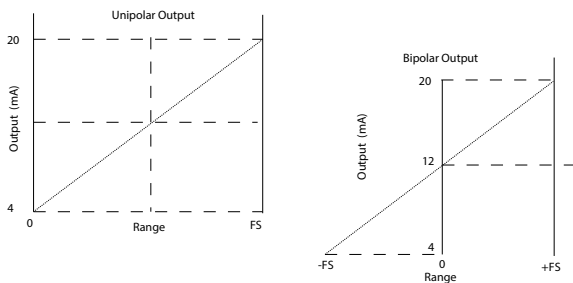
DC Current Transducer Dimensions



DC Current Transducer Connections



DC Current Transducer Output Type



Notes:  
 Deadfront captive screw terminals.  
 12–22 AWG solid or stranded.  
 Observe polarity.  
 Unipolar Output: Signal With Current flowing in one direction only.

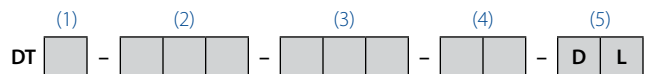
DC Current Transducer Specifications



<b>Output Signal</b>	4–20 mA, 0–5 VDC, 0–10 VDC
<b>Output Limit</b>	<ul style="list-style-type: none"> <li>4–20 mA: 23 mA</li> <li>0–5 VDC: 5.75 VDC</li> <li>0–10 VDC: 11.5 VDC</li> </ul>
<b>Accuracy</b>	2% FS
<b>Repeatability</b>	1.0% FS
<b>Response Time</b>	100 ms (to 90% of step change)
<b>Frequency Range</b>	DC
<b>Power Supply</b>	24 VAC/DC, isolated from output 120 VAC
<b>Power Consumption</b>	2 VA
<b>Loading</b>	<ul style="list-style-type: none"> <li>4–20 mA: 650 Ω max.</li> <li>0–5 VDC: 25 KΩ min.</li> <li>0–10 VDC: 50 KΩ min.</li> </ul>
<b>Isolation Voltage</b>	3 KV (monitored line to output)
<b>Linearity</b>	0.75% FS
<b>Current Ranges</b>	Ranges from 0–1200 A DC
<b>Sensing Aperture</b>	1.875" (46 mm) dia.
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	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.



(1) Full Scale Range

5	300 A
6	500 A
7	750 A
8	1000 A
9	1200 A

(3) Power Supply

24U	+24 VAC/DC
120	120 VAC

(4) Output Polarity

U	Unipolar
BP	Bipolar

(2) Output Signal

420	4–20 mA
005	0–5 VDC
010	0–10 VDC

(5) Case Style

DL	Solid-core, DIN rail mount
----	----------------------------





# 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. These 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.

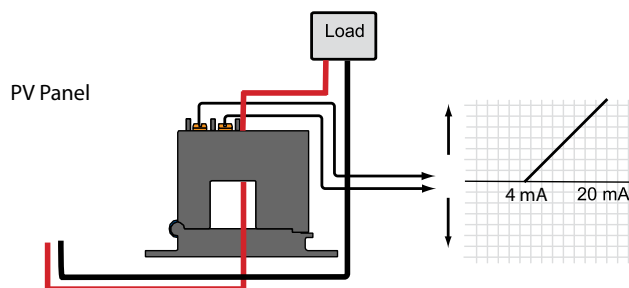


### DC Current Transducer Applications

#### DC Current Monitoring

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

Photovoltaic Arrays



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

### 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.

OEMs

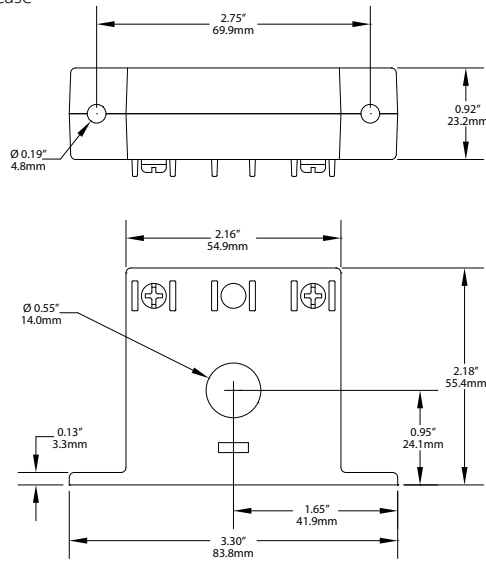
Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.

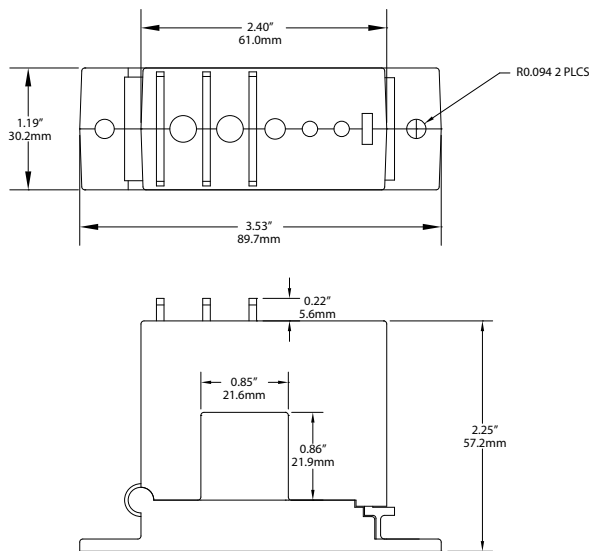


DC Current Transducer Dimensions

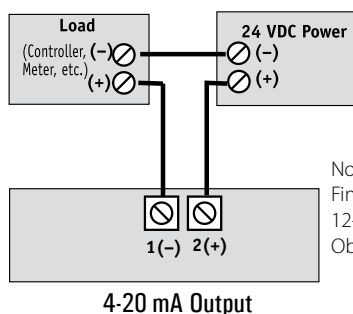
FF Case



SP Case



DC Current Transducer Connections



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

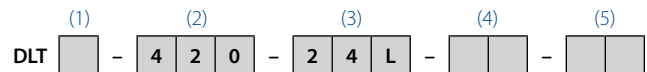
DC Current Transducer Specifications



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



(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 (max. range 0–100 A)
SP	Split-core (min. range 0–50 A)

\*Bulk packaging only.



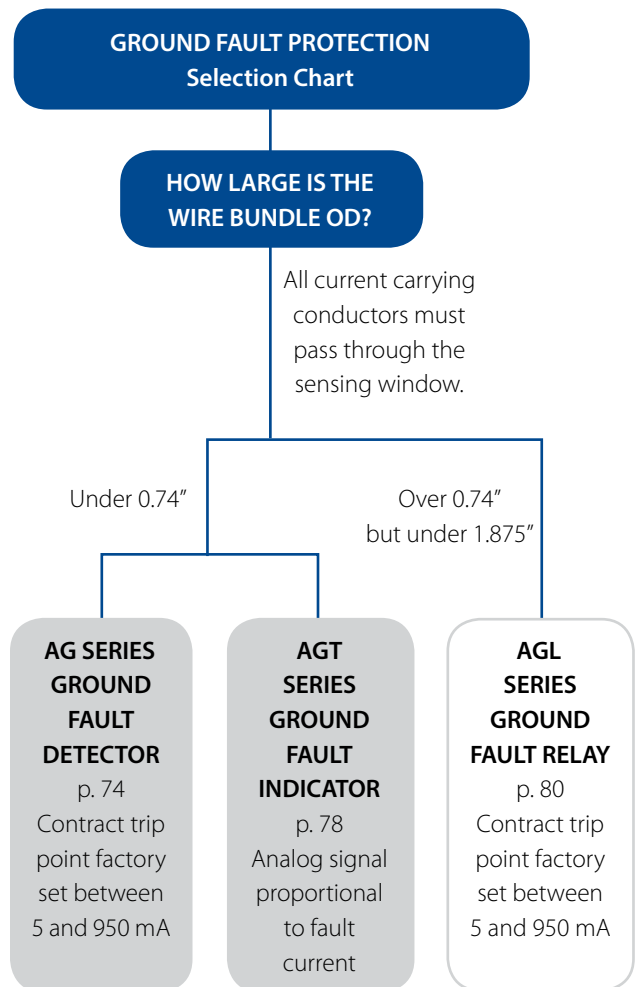
# Ground Fault Protection

*Detecting ground fault conditions and protecting sensitive equipment or personnel from harm are where AG Series sensors can help. A compact design eliminates two-piece solutions while options include factory-set or field-adjustable trip point; N.O. or N.C. latching or auto-reset relays, 24/120/240 V power supply and noise immunity.*

Features:

- N.O./N.C. solid-state switch or mechanical relay outputs
- Field-selectable 5 mA, 10 mA or 30 mA setpoints
- Noise immunity option for EMI/RFI sensitive environments
- UL, CE approved

- **AG SERIES**  
Ground Fault (Earth Leakage) Detectors..... page 74
- **AGT SERIES**  
Ground Fault Indicators..... page 78
- **AGL SERIES**  
Large Aperture Ground Fault Relays..... page 80



# AG SERIES

## Ground Fault (Earth Leakage) Detectors

AG Series Ground Fault Detectors help protect people, products, and processes from damage by ground fault conditions by monitoring all current-carrying conductors in grounded single- and three-phase delta or wye systems.



### Ground Fault Protection Applications

#### Personnel Protection (typically 5 mA)

- Detects sensitive ground fault conditions, which may be injurious to personnel and processes.
- Functions as sensor and alarm trigger when part of an overall ground fault protection system.

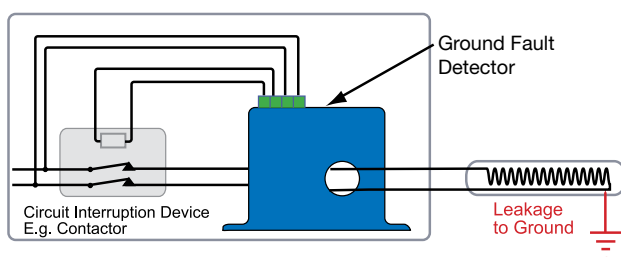
#### Equipment Protection (typically 10 mA or 30 mA)

- For applications where personal protection is not the primary concern, higher setpoint capability helps eliminate nuisance tripping while still providing adequate ground fault detection to protect machine electronics.

#### Regulatory

- Meets requirements as stipulated by governmental and industrial regulatory groups for ground fault sensing.

#### Insulation Breakdown Monitoring



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

### Ground Fault Protection Features

#### Broad Range of Options to Match Application Needs

- N.O./N.C. solid-state switch or mechanical relay outputs.
- Normally energized or normally de-energized contacts.
- Noise Immunity option for use in EMI/RFI sensitive environments.

#### Setpoint Options Maximize Ease-of-Use

- Field-selectable 5 mA, 10 mA or 30 mA setpoints on the AG3 "Tri-set" model makes user adjustments fast, sure and convenient.
- Single factory-calibrated setpoints available from 5 mA to 950 mA.

#### Compatible with Standard Equipment

- Applicable on single- and three-phase systems.
- Ideal for use with shunt trip breakers.
- Magnetically isolated from monitored circuit and control power.

#### Agency Approved

- UL, CE approved.

#### "Zero Sum" Operating Principle:

In three-phase delta and wye systems, under normal conditions current in the 'hot' leg of a two-wire load is equal in magnitude but opposite in sign to the current in the neutral leg. As a result, the electromagnetic fields surrounding these two conductors cancel, producing a "zero sum current." As soon as current leaks to ground (fault condition) the two currents become imbalanced and a net magnetic field results. AG Series detectors monitor this field and trip alarm contacts when the leakage rises above setpoint.

OEMs

Test &amp; Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.



Solid-state Outputs



Mechanical Outputs

**Available Models**

**AG Series with Solid-state Outputs** offer the benefit of reliable, long-lasting solid-state switches. Solid-state design provides unlimited switch operating life, superior resistance to shock and vibration, zero off-state leakage, high switch speeds and high input-output isolation. Available in solid-core case with screw terminals.

**AG Series with Mechanical Outputs** are available in solid-core cases with a choice between a N.O. or N.C. SPST latching relay and a SPDT Form C relay with auto-reset. All mechanical models can be ordered with factory-set, field-adjustable setpoint or with a “Tri-set” option, which provides three factory-set setpoints. A noise immunity option is available for applications in harsh EMI/RFI environments.

**Output Tables**

**Normally Energized Models (-FS Option and -ENE Option)**

Protection from faults and control power loss.

	Control Power Applied		
	No Power	No Fault	Fault
N.C. Normally Closed	closed	open	closed
N.O. Normally Open	open	closed	open

**Normally De-energized Models (-NF and -DEN Options)**

Protection from faults only when power is applied.

	Control Power Applied		
	No Power	No Fault	Fault
N.C. Normally Closed	closed	closed	open
N.O. Normally Open	open	open	closed

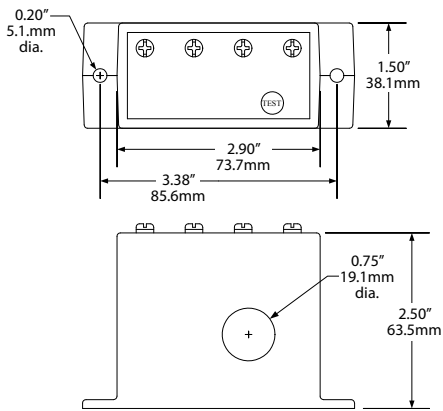
**Latching Models (-LA Option)**

Latching models power up initially in the rest (normal) mode. If there is a fault condition or the test button is pushed, the output contacts will change state and latch. The output will remain latched regardless of whether the fault is cleared or control power is removed. To reset the output apply a momentary contact across “reset” terminals.

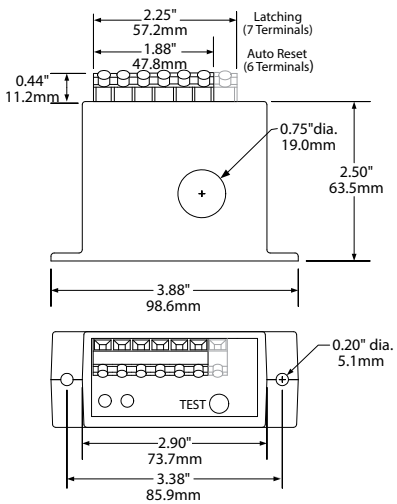


Ground Fault Protection Dimensions

Solid-State

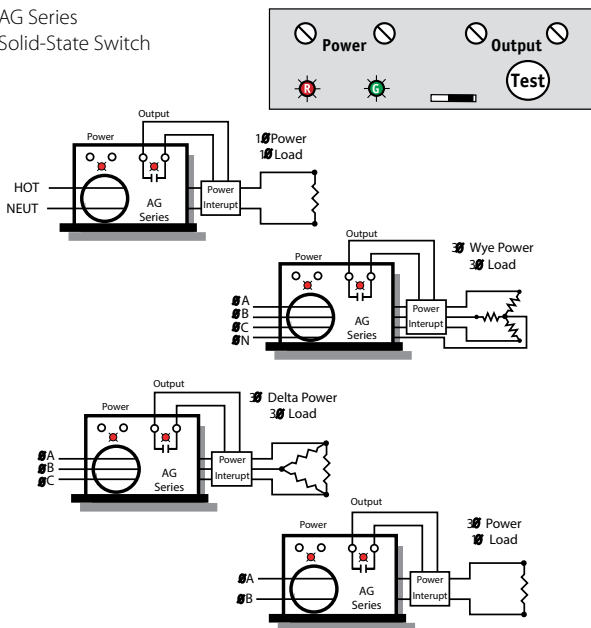


Mechanical

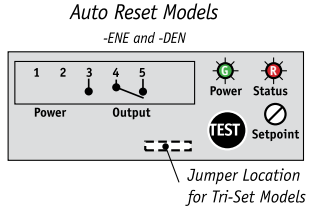
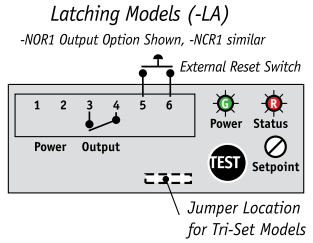


Connections

AG Series  
Solid-State Switch



AG Series  
Mechanical Relay



Ground Fault Protection Specifications



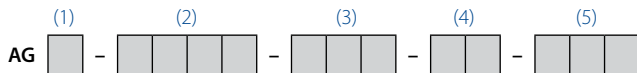
<b>Setpoint Range</b>	Factory-calibrated models (specify when ordering): • AG1: 5–100 mA (005–100) • AG2: 80–950 mA (080–950)	
	TR3 “Tri-set” models (field jumper select): • AG3: 5, 10, or 30 mA	
	<b>Solid-state Output Models</b>	<b>Mechanical Output Models</b>
<b>Output</b>	Isolated dry contact	Mechanical relay
<b>Output Rating</b>	<ul style="list-style-type: none"> <li>Solid-state AC Switch 1 A @ 240 VAC</li> <li>Solid-state DC Switch 0.15 A @ 30 VDC</li> </ul>	<ul style="list-style-type: none"> <li>Auto Reset: SPDT Relay 1 A @ 125 VAC, 2 A @ 30 VDC</li> <li>Latching: SPST Relay 1 A @ 125 VAC, 2 A @ 30 VDC</li> </ul>
<b>Off-state Leakage</b>	<ul style="list-style-type: none"> <li>&lt;10 micro A (N.O.)</li> <li>&lt;2.5 mA (N.C.)</li> </ul>	none
<b>Response Time</b>	<ul style="list-style-type: none"> <li>200 ms @ 5% above trip point</li> <li>60 ms @ 50% above trip point</li> <li>15ms @ 500% above trip point</li> </ul>	
<b>Isolation Voltage</b>	UL listed to 1270 VAC, tested to 5000 VAC	
<b>Frequency Range</b>	50–400 Hz (monitored circuit)	
<b>Noise Immunity Option</b>	N/A	<ul style="list-style-type: none"> <li>EMI/RFI Shielding</li> <li>Power supply noise filtering</li> </ul>
<b>Power Supply</b>	<ul style="list-style-type: none"> <li>120 VAC (55–110% of nominal voltage)</li> <li>24 VAC/DC (±20%)</li> <li>Green LED = Power On indication</li> </ul>	
<b>Loading</b>	2 VA max.	
<b>Case</b>	UL94 V0 Flammability Rated	
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing	
<b>Listings</b>	UL 1053, Class 1 Recognized, CE, UL recognized for monitoring AC circuits from 1 to 600 V	



**Ground Fault Protection Ordering Information**

**Solid-state Output Models**

Sample Model Number: AG1-NOAC-120-FS-005  
 Ground fault detector with normally open solid-state contact output, 120 VAC power supply, 5 mA trip point, fail safe version.



(1) Setpoint Range

1	5–100 mA factory set
2*	80–950 mA factory set
3	5/10/30 mA jumper set

\*Not UL recognized in any configuration.

(2) Output Type

NOAC	Normally Open, 1 A @ 240 VAC
NCAC	Normally Closed, 1 A @ 240 VAC
NODC	Normally Open, 0.15 A @ 30 VDC
NCDC	Normally Closed, 0.15 A @ 30 VDC

(3) Power Supply

120	120 VAC
24U*	24 VAC/DC
240*	240 VAC

\*Not UL recognized in any configuration.

(4) Options

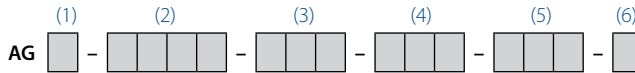
FS	Normally Energized
NF	Normally De-energized

(5) Setpoint

TR3	Tri-set
005 to 950	Factory set trip point in mA

**Mechanical Output Models**

Sample Model Number: AG1-NOR1-120-LA-005  
 Ground fault detector with normally open SPST latching relay output, 120 VAC power supply and 5 mA trip point.



(1) Setpoint Range

1	5–100 mA factory set
2	80–950 mA factory set
3	5/10/30 mA jumper set

(2) Output Type

NCR1	Normally Closed SPST Relay Form B (Available only with -LA option)
NOR1	Normally Open SPST Relay Form A (Available only with -LA option)
SDT1	SPDT Relay (Form C) with auto-reset (Available only with -DEN and -ENE options)

(3) Power Supply

120	120 VAC
24U	24 VAC/DC

(4) Options

ENE	Normally Energized, auto-reset (SDT1 output only)
DEN	Normally De-energized, auto-reset (SDT1 output only)
LA	Latching (NOR1 and NCR1)

(5) Setpoint

TR3	Tri-set
005 to 950	Factory set trip point in mA

(6) Noise Immunity

N	Noise Immunity
	None (blank)

Ground Fault Protection



# AGT SERIES

## Ground Fault Indicators

AGT Series Ground Fault Indicators combine a current transformer and a True RMS signal conditioner into a single package. The AGT Series is designed to produce an analog 4–20 mA signal proportional to earth or ground fault current. Available in a solid-core case. When connected to a controller or data logger, NEC requirements for alarm can be met.



### Ground Fault Protection Applications

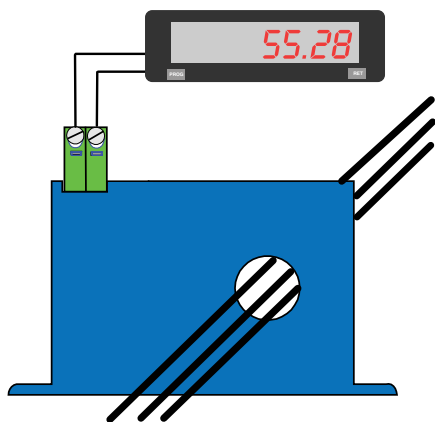
#### Current Leakage Detection

- Monitor heating or other loads to detect increasing leakage current.
- Pass all current carrying conductors through aperture to sense zero-sum current.

#### Very Light Loads

- Accurate measurement of very small but critical loads.
- Current measurement gives faster response than temperature measurement.

Ground Fault Currents



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

### Ground Fault Protection Features

#### True RMS Output

- True RMS technology is accurate on distorted waveforms like VFD or SCR outputs.

#### Single Range

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

#### Isolation

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

#### Agency Approval

- UL, CUL 508 listed.

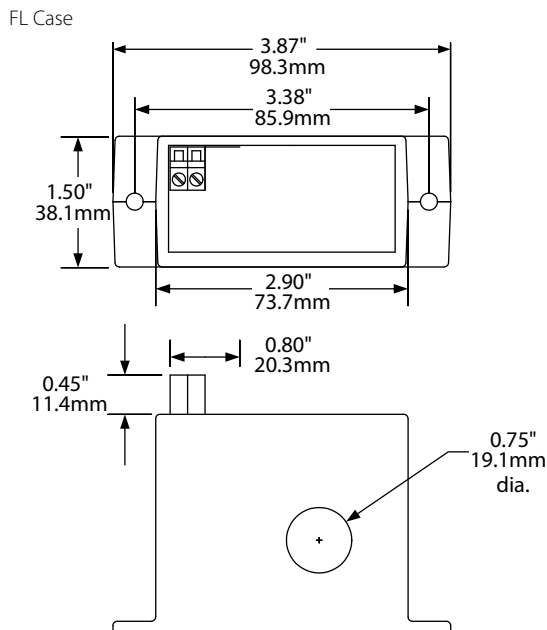
### Selecting the right ground fault detector:

NEC Article 427-22 requires that fault currents be monitored on industrial equipment. However, where maintenance and supervision ensure that only qualified persons will service the equipment and continued circuit operation is necessary for safe operation and processes, alarm indication is also required. A fault current transducer can send a signal to a panel meter with alarm contacts or a controller. As an example, the alarm points can be configured so one alarm is initiated when fault current reaches 30 mA, and another when it rises above 70 mA. Ground fault protection is required in many applications, and NK Technologies has a sensor that can be coupled with your control system to provide this needed alarm or circuit disconnection.





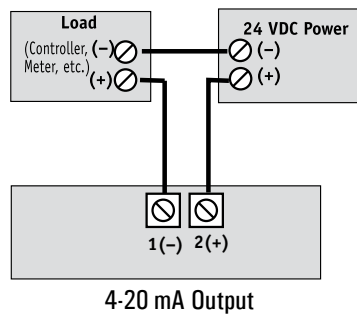
### Ground Fault Protection Dimensions



### Ground Fault Protection Specifications

<b>Output Signal</b>	4–20 mA, Loop-powered, True RMS
<b>Output Limit</b>	23 mA
<b>Accuracy</b>	1.0% FS from 10% to 100% of range
<b>Response Time</b>	600 ms (to 90% step change)
<b>Frequency Range</b>	40–400 Hz
<b>Power Supply</b>	24 VDC Nominal, 12–40 VDC
<b>Isolation Voltage</b>	UL listed to 1270 VAC, tested to 5 KV
<b>Input Ranges</b>	Single range of 0–50 or 0–100 mA; custom ranges available; consult factory.
<b>Sensing Aperture</b>	0.74" (19 mm) dia.
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada)

### Ground Fault Protection Connections



Notes:  
Finger safe captive screw terminals.  
12–22 AWG solid or stranded.  
Observe polarity.

### Ground Fault Protection Ordering Information

Sample Model Number: AGT2-420-24L-FL  
True RMS AC ground fault indicator, 100 mA ranges, 4–20 mA output, 24 VDC loop-powered in a solid-core case.



<b>(1) Full Scale Range</b>	
1	0–50 mA
2	0–100 mA
<b>(2) Output Signal</b>	
420	4–20 mA
<b>(3) Power Supply</b>	
24L	24 VDC Loop-powered (4–20 mA output ONLY)
<b>(4) Case Style</b>	
FL	Solid-core, Top Term.

Ground Fault Protection



# AGL SERIES

## Large Aperture Ground Fault Relays

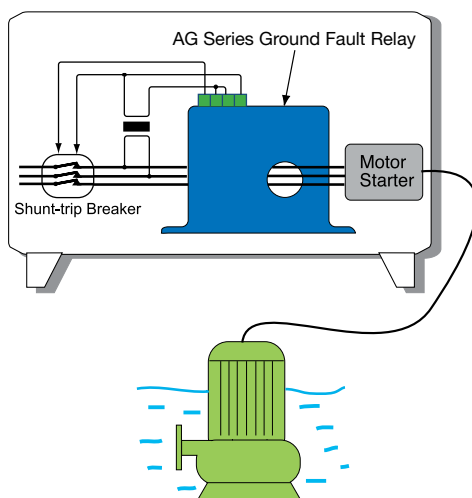
AGL Series are large aperture ground fault relays that offer one of the largest aperture diameters in the industry while maintaining a compact overall profile. Intended for sensing earth leakage in applications up to 300 A, the AGL Series offers a choice of N.O. or N.C. latching relays or an SPDT Form C relay with auto-reset. Case features integral DIN rail mounting as standard and optional noise immunity coatings for applications in harsh EMI/RFI environments.



### Ground Fault Protection Applications

- Replace bulky two-piece sensor solutions which require separate CTs or relay modules.
- Use with shunt trip breakers to provide total ground fault protection to sensitive machine electronics.
- Detect ground faults in resistance/impedance heating, industrial automation and control, theatrical lighting, portable power distribution, and snow melt/heat trace applications.
- Sense progressive levels of ground fault in motors or heating systems to detect deterioration prior to catastrophic failure.

#### Moisture Ingress on a Submersible Pump Motor



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

OEMs

#### Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.

### Ground Fault Protection Features

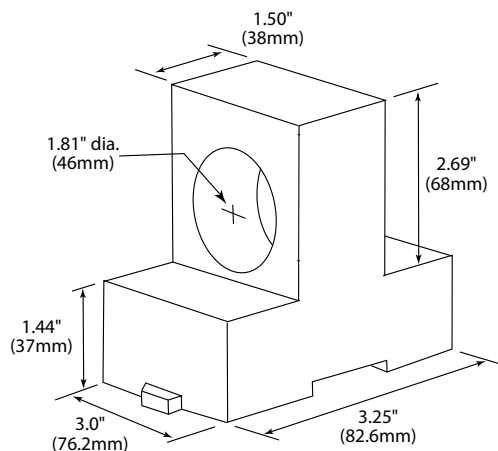
- Integral DIN rail mount with spring loaded mounting clips.\*
- Setpoint options include factory-adjustable setpoint from 5 mA –100 mA or “TR3 Tri-Set” models with field-selectable 5/10/30 mA settings.
- Finger-safe terminals for worry-free installation and operation.
- Aperture orientation is perpendicular to DIN rail, allowing for clean and efficient wiring and minimizing space between multiple components.
- Choice of dependable latching SPST or SPDT (form C) electromechanical relay outputs.
- Uses “Zero Sum” operating principle to reliably sense imbalance in magnetic fields associated with current leakage to ground.
- Typical response times from 15 ms to 200 ms.
- Integral “push-to-test” button with LED indication of contact status.

\*For information on the DIN rail accessories kit, see page 113.



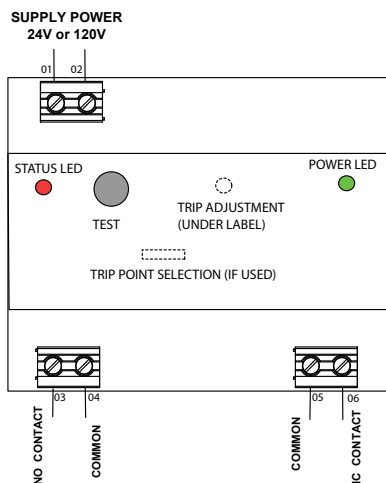
### Ground Fault Protection Dimensions

Case

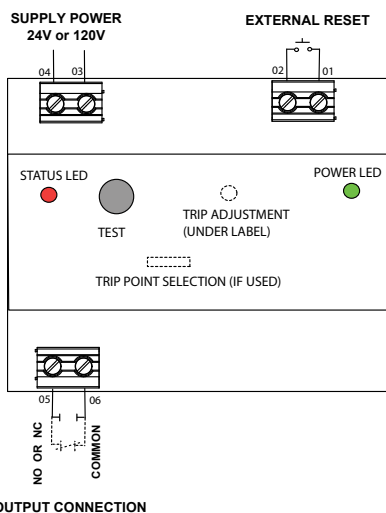


### Ground Fault Protection Connections

Auto-Reset



Latching



### Ground Fault Protection Specifications

<b>Setpoint Range</b>	Factory-calibrated models (specify when ordering): • AGL1: 5–100 mA (005–100) • AGL2: 80–950 mA (080–950) TR3 “Tri-set” models (field jumper select): • AGL3: 5, 10, or 30 mA
<b>Output</b>	• Auto Reset: SPDT Relay 1 A @ 125 VAC, 2 A @ 30 VDC • Latching: SPST Relay 1 A @ 125 VAC, 2 A @ 30 VDC
<b>Response Time</b>	• 200 ms @ 5% above trip point • 60 ms @ 50% above trip point • 15 ms @ 500% above trip point
<b>Isolation Voltage</b>	UL listed to 1270 VAC, tested to 5000 VAC
<b>Frequency Range</b>	50–60 Hz (monitored circuit)
<b>Noise Immunity Option</b>	• EMI/RFI Shielding • Power supply noise filtering
<b>Power Supply</b>	• 120 VAC (55–110% of nominal voltage) • 24 VAC/DC (± 10% of nominal voltage) • Green LED = Power On indication
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada) UL recognized for monitoring AC circuits from 1 to 600 V

Ground Fault Protection

### Output Tables

#### Normally Energized Models (-FS Option and -ENE Option)

Protection from faults and control power loss.

	Control Power Applied		
	No Power	No Fault	Fault
N.C. Normally Closed	closed	open	closed
N.O. Normally Open	open	closed	open

#### Normally De-energized Models (-NF and -DEN Options)

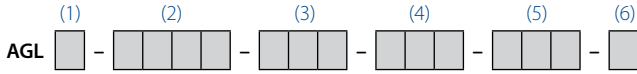
Protection from faults only when power is applied.

	Control Power Applied		
	No Power	No Fault	Fault
N.C. Normally Closed	closed	closed	open
N.O. Normally Open	open	open	closed



**Ground Fault Protection Ordering Information**

Sample Model Number: AGL1-NOR-120-LA-005  
 Ground fault relay with normally open SPST latching relay output, 120 VAC power supply and 5 mA trip point.



(1) Setpoint Range

1	5–100 mA factory set
2	80–950 mA factory set
3	5/10/30 mA jumper set

(2) Output Type

NCR1	Normally Closed SPST Relay Form B (Available only with -LA option)
NOR1	Normally Open SPST Relay Form A (Available only with -LA option)
SDT1	SPDT Relay (Form C) with auto-reset (Available only with -DEN and -ENE options)

(3) Power Supply

120	120 VAC
24U	24 VAC/DC

(4) Options

ENE	Normally Energized, auto-reset (SDT1 output only)
DEN	Normally De-energized, auto-reset (SDT1 output only)
LA	Latching (NOR1 and NCR1)

(5) Setpoint

TR3	Tri-set
005 to 950	Factory set trip point in mA

(6) Noise Immunity

N	Noise Immunity
	None (blank)

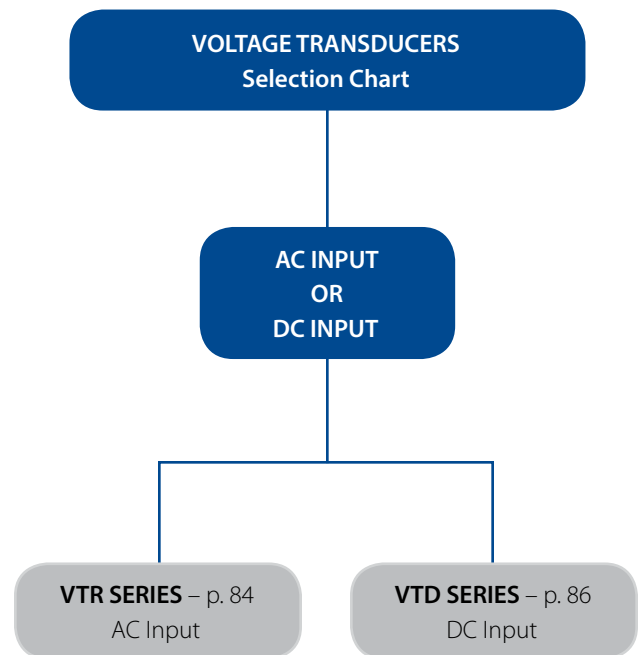
# Voltage Transducers

NK Technologies' voltage transducers are high-performance transducer for sensing voltage in installations. They are available in an AC or DC Series and come in a variety of nominal voltages.

## Features:

- AC or DC models
- Standard 4–20 mA Powered Output  
Industry standard output makes use with existing controllers, data loggers and SCADA equipment easy and reliable
- Input/Output Isolation  
Input and output circuitry electrically isolated for improved safety of use
- Compact DIN rail Mount Case  
Space saving 35 mm wide case mounts quickly for an attractive installation

- **VTR SERIES**  
AC Voltage Transducers..... page 84
- **VTD SERIES**  
DC Voltage Transducers..... page 86



# VTR SERIES

## AC Voltage Transducers

VTR Series AC Voltage Transducers are high-performance True RMS transducers for sensing voltage in single- and three-phase installations. Applicable on circuits of 120 V, 240 V, 480 V and 600 V, the VTR Series voltage transducers provide a fully isolated, 4–20 mA output proportional to rated voltage in both sinusoidal and non-sinusoidal (variable frequency) situations. Housed in a slim, compact, easy-to-install DIN rail mount case, the VTR Series comes in a variety of voltage ranges and with four-wire terminal block connection.

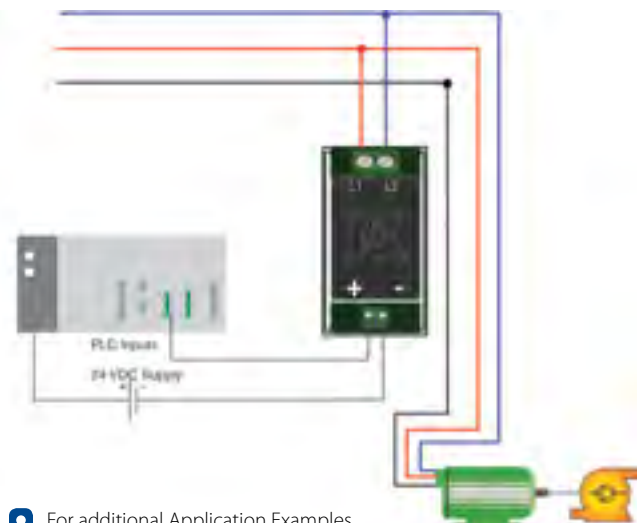


### Voltage Transducer Applications

#### True RMS Voltage Monitoring

- Detect below normal or “brown out” voltage conditions; protect against possible motor overheating.
- Identify phase loss conditions by detecting voltage reduction in one or more phase of three-phase motor.
- Monitor over voltage conditions associated with regenerative voltage to help in diagnosing/avoiding motor drive issues.
- Detect voltage conditions which may cause stress in or damage to soft starter components (SCRs).

Phase Loss Protection



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

### Voltage Transducer Features

#### True RMS Output

- Allows for use in situations where power supplied is non-sinusoidal such as VFD applications, poor power quality installations or other electrically harsh/challenging environments.

#### Standard 4–20 mA Loop-Powered Output

- Industry standard output makes use with existing controllers, data loggers and SCADA equipment easy and reliable.

#### Input/Output Isolation

- Input and output circuitry electrically isolated for improved safety of use.

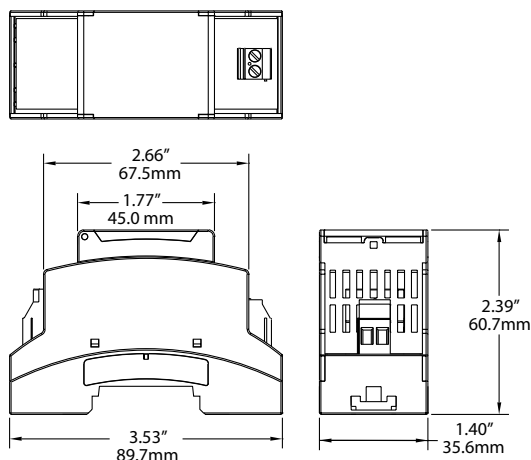
#### Compact DIN Rail Mount Case\*

- Space saving 35 mm wide enclosure mounts quickly for an attractive installation.

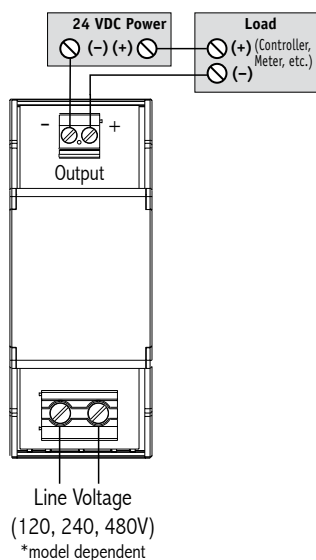
\*For information on the DIN rail accessories kit, see page 113.

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

### Voltage Transducer Dimensions



### Voltage Transducer Connections



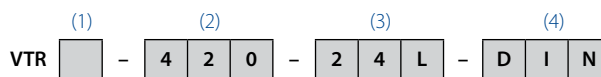
### Voltage Transducer Specifications



<b>Power Supply</b>	24 VDC Loop-powered (12–40 VDC)
<b>Input</b>	120 V, 150 V, 240 V, 480 V, 500 V, 600 V
<b>Output</b>	4–20 mA proportional; capped at 24 mA max.
<b>Response Time</b>	250 ms (to 90% value)
<b>Accuracy</b>	1.0% FS (10–100% of range)
<b>Linearity</b>	<0.5%
<b>Loading</b>	<500 Ω
<b>Isolation Voltage</b>	UL listed to 2500 VAC, tested to 5 kV
<b>Frequency Range</b>	40–100 Hz
<b>Mounting</b>	DIN rail compatible
<b>Case</b>	UL94 V0 Flammability Rated; noncorrosive thermoplastic
<b>Environmental</b>	-22 to 140°F (-30 to 60°C) 0–95% RH, non-condensing
<b>EMC/Immunity</b>	EN50081-1, EN50082-2
<b>Ripple</b>	<1% (peak to peak)
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada), CE

### Voltage Transducer Ordering Information

Sample Model Number: VTR1-420-24L-DIN  
 True RMS voltage transducer with 120 V voltage range, standard 4–20 mA proportional output; 24 V loop-powered with a DIN-compatible case.



#### (1) Voltage Range

1	120 V
2	150 V
3	240 V
4	480 V
5	500 V
6	600 V

#### (2) Output Type

420	4–20 mA
-----	---------

#### (3) Supply Voltage

24L	24 V loop-powered
-----	-------------------

#### (4) Mounting

DIN	DIN rail compatible
-----	---------------------

Voltage Transducers



# VTD SERIES

## DC Voltage Transducers

VTD Series Voltage Transducers are high-performance transducers for sensing voltage in DC powered installations. Applicable for use on circuits to 600 VDC, VTD voltage transducers provide a fully isolated, 4–20 mA output proportional to rated nominal voltage in DC circuits. Housed in a slim, compact, easy-to-install DIN rail mount case, the VTD Series comes in a variety of nominal voltages.



### Voltage Transducer Applications

#### Voltage Monitoring

- Detect below normal or “brown out” voltage conditions; protect against possible motor overheating.
- Identify conductor loss conditions by detecting voltage reduction in one motor lead.
- Monitor over voltage conditions associated with regenerative voltage to help in diagnosing/avoiding motor drive issues.
- Detect voltage conditions that may cause stress or damage to soft starter components (SCRs).

### Voltage Transducer Features

#### Accurate Output

- Several ranges available for your application, from 0–15 VDC to 0–600 VDC.

#### Standard 4–20 mA Sensor Powered Output

- Industry standard output makes use with existing controllers, data loggers and SCADA equipment easy and reliable.

#### Input/Output Isolation

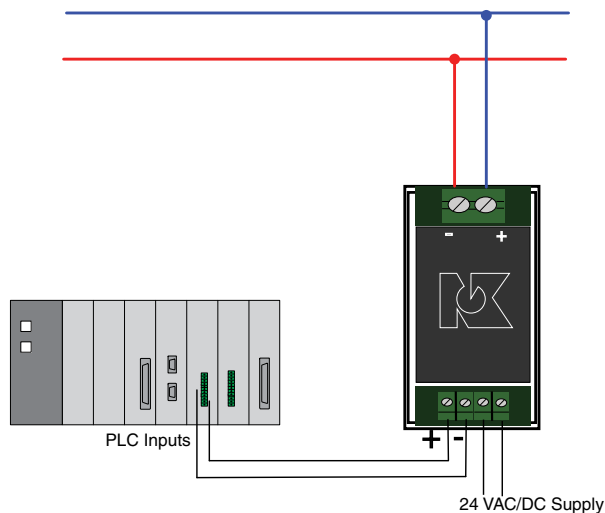
- Input and Output circuitry electrically isolated for improved safety of use.

#### Compact DIN Rail Mount Case\*

- Space saving 35 mm wide enclosure mounts quickly for an attractive installation.

\*For information on the DIN rail accessories kit, see page 113.

DC Voltage Transducer Control



For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

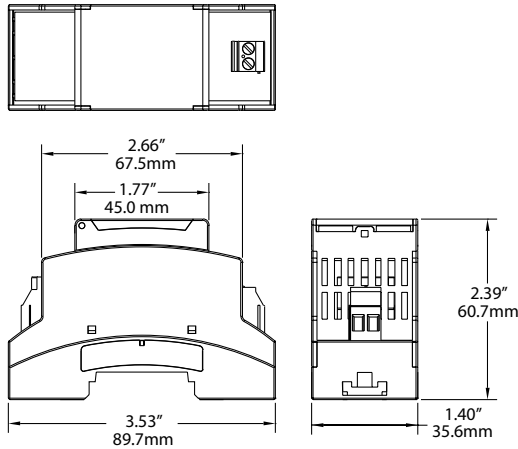
OEMs

Test & Evaluation Units for OEMs

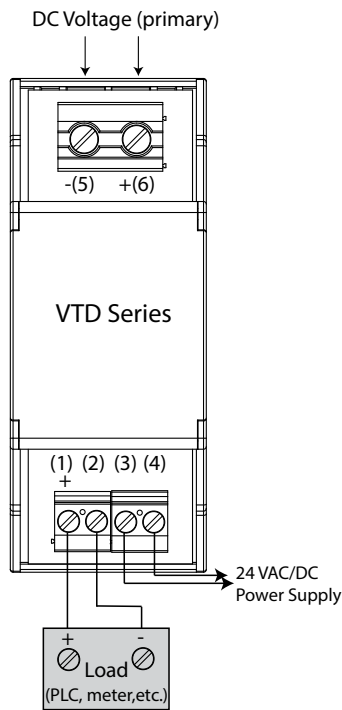
Free program expedites evaluation process. See page 1 for details.



Voltage Transducer Dimensions



Voltage Transducer Connections



Voltage Transducer Specifications



<b>Power Supply</b>	24 VAC/DC (20–45DC, 22–38 VAC)
<b>Input</b>	15 V, 25 V, 50 V, 150 V, 300 V, 600 VDC
<b>Output</b>	4–20 mA proportional; capped at 24 mA max.
<b>Response Time</b>	250 ms (to 90% value)
<b>Accuracy</b>	<1%
<b>Linearity</b>	<0.5%
<b>Loading</b>	<500 Ω
<b>Isolation Voltage</b>	UL listed to 2500 VAC, tested to 5 KV
<b>Frequency Range</b>	DC
<b>Mounting</b>	DIN rail compatible
<b>Case</b>	UL94 V0 Flammability Rated; noncorrosive thermoplastic
<b>EMC/Immunity</b>	EN50081-1, EN50082-2
<b>Ripple</b>	<1% (peak to peak)
<b>Environmental</b>	-22 to 122°F (-30 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada), CE

Voltage Transducer Ordering Information

Sample Model Number: VTD1-420-24U-DIN  
DC voltage transducer with 25 V range, standard 4–20 mA proportional output; 24 V externally powered with a DIN-compatible case.



<b>(1) Nominal Range</b>	
0	0–15 VDC
1	0–25 VDC
2	0–50 VDC
3	0–150 VDC
4	0–300 VDC
5	0–600 VDC
<b>(2) Output Type</b>	
420	4–20 mA
<b>(3) Supply Voltage</b>	
24U	24 V external power supply
<b>(4) Mounting</b>	
DIN	DIN rail compatible



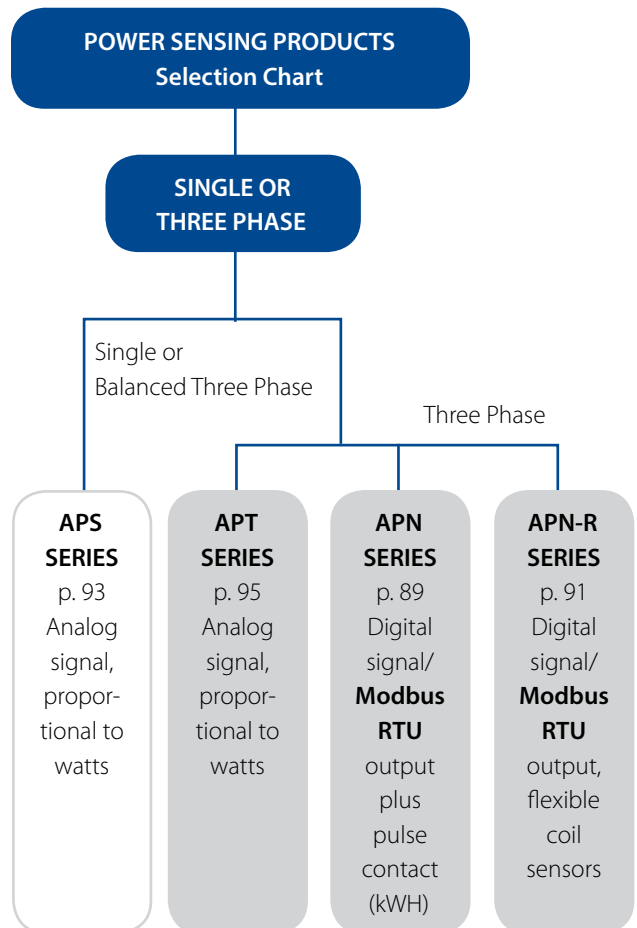
# Power Sensing Products

Our power monitoring sensors measure loads and improve performance by providing instantaneous True Power kW or accumulated kWh data. They are simple, reliable and accurate. Digital communications are available in some models. Contact the factory or a local distributor for more information.

Features:

- 4–20 mA, 0–10 VDC, and/or networked outputs
- Accepts standard 5 A or 0–333 mV CT inputs
- DIN rail compatibility

- **APN SERIES**  
Power Monitor..... page 89
- **APN-R SERIES**  
Power Monitor..... page 91
- **APS SERIES**  
Power Transducers..... page 93
- **APT SERIES**  
Power Transducers..... page 95



# APN SERIES

## Power Monitor

APN Series Power Monitors measure three phases of current and voltage and compute fourteen values necessary to track power usage. The monitor uses current transformers to measure the amperes. The line voltage connects directly to the transducer, up to 600 VAC. The result is 14 data points in the RS485 **Modbus RTU** format. There is also a pulse contact which opens and closes as watt hours are accumulated. The APN can be configured to accept 5 A secondary current transformers or the safer ProteCT™ low voltage output CTs. Either type will produce an accurate set of data to help you save energy and avoid utility surcharges.

### Power Sensing Applications

#### Plant Energy Management

- Measure the power usage of a single piece of equipment, an area of a plant, or the entire facility.

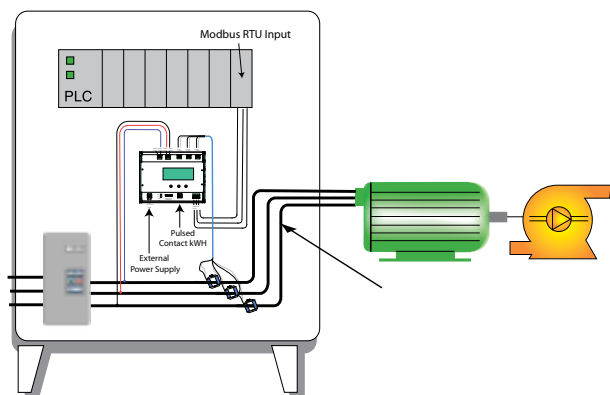
#### Conveyors

- Detect jams and overloads.
- Check that the belt is loaded properly by measuring the power consumption.

#### Pump Monitoring

- Detect dry run from clogged, intake, or discharge line.
- Monitor impeller cavitation and bearing wear.

Pump Jam & Suction Loss Protection



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

OEMs

#### Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.



A low profile housing reduces cabinet depth requirements.



### Power Sensing Features

#### Modbus RTU Output

- RS485 communication protocol reduces the cost involved with proprietary data logging software.
- Compatible with most automation systems.

#### Externally Powered

- Improves reliability when used in conditions where power interruptions and voltage sags are common.

#### Compact DIN Mounted Case\*

- Clearly labeled terminals provide quick installation.
- Low profile reduces cabinet depth requirements.

#### LED Displays Network Communication

- Provides quick visual indication that network is operational.

#### Finger Safe Terminals

- Safe and secure connectors.

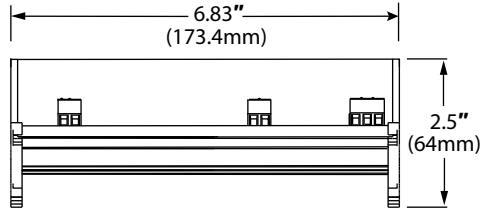
#### Designed to Meet UL, CUL and CE Approval

- Accepted worldwide.

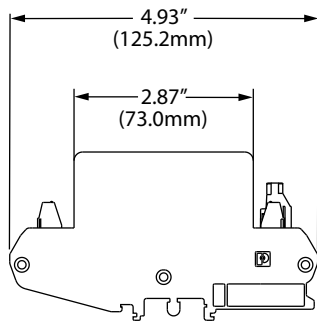
\*For information on the DIN rail accessories kit, see page 113.

Power Sensing Dimensions

Case Side View

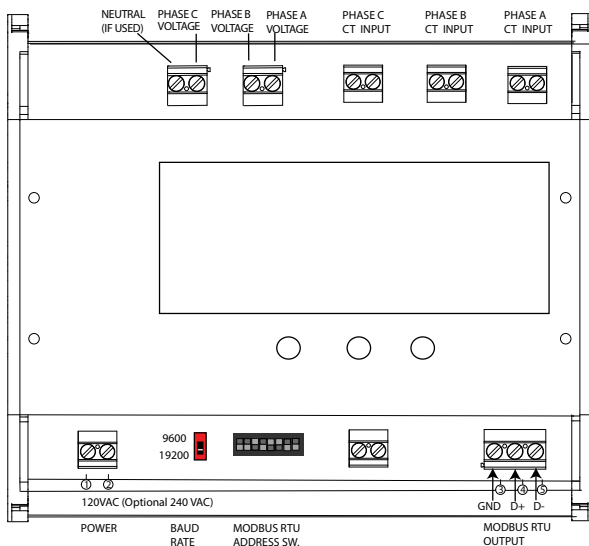


Case Top View



Note: Drawings are not to scale.

Power Sensing Connections



Power Sensing Specifications

<b>Power Supply</b>	24 VAC/DC, 120 VAC or 240 VAC
<b>Output</b>	• Modbus RTU - 14 Data Points • Pulsed Contact kWh
<b>Display</b>	4X20 LCD (Four lines, 20 characters each)
<b>Voltage Ranges</b>	100 to 600 VAC
<b>Response Time</b>	120 ms
<b>Isolation Voltage</b>	2200 VAC to meet UL standards
<b>Frequency Range</b>	50–60 Hz
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	Designed to meet UL 508 Industrial Control Equipment (USA & Canada)

Power Sensing Data Point Table

	Phase A	Phase B	Phase C	Type
<b>Current</b>	*	*	*	RMS
<b>Voltage</b>	*	*	*	RMS
<b>kW</b>	*	*	*	Active
<b>Power Factor</b>	*	*	*	Instantaneous
<b>Power Factor</b>				Average
<b>kWH</b>				Total

Power Sensing Ordering Information

Sample Model Number: APN-600--MV-120-MOD  
AC Power transducer, 600 VAC maximum input, ProteCT™ current inputs, 120 VAC powered, RS485 Modbus output with pulse contact for kWh.



(1) Maximum Primary Voltage

600	600 VAC
-----	---------

(2) Current Input Type

MV	ProteCT™ current transformers, 333 mVAC secondary
5 A	5 A secondary current transformers

(3) Rating Power Supply

24U	24 VAC/DC (100 mA max.)
120	120 VAC (50 mA max.)
240	240 VAC (25 mA max.)

(4) Output Type

MOD	Modbus RTU (RS485), pulse contact for kWh
-----	---

# APN-R SERIES

## Power Monitor

The APN -R Series Power Monitor measures three phases of current and voltage and computes fourteen values necessary to track power usage. The monitor uses flexible current sensors to measure the amperes, and the line voltage connects directly to the transducer, up to 600 VAC. The result is 14 data points in the RS485 **Modbus RTU** format. There is also a pulse contact which opens and closes as watt hours are accumulated. The APN-R is factory configured with specifically matched flexible coils. The ease of installation over multiple conductors or bus assemblies will speed installation and produce an accurate set of data to help you identify areas of excessive energy consumption and allow intervention to reduce demand.



### Power Sensing Applications

#### Plant Energy Management

- Measure the power usage of a single piece of equipment, an area of a plant, or the entire facility.

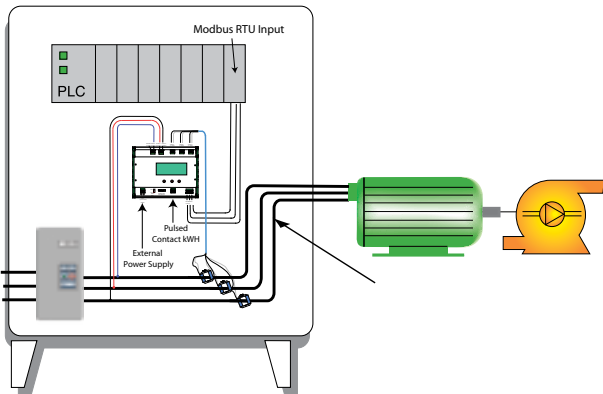
#### Conveyors

- Detect jams and overloads.
- Check that the belt is loaded properly by measuring the power consumption.

#### Pump Monitoring

- Detect dry run from clogged, intake, or discharge line.
- Monitor impeller cavitation and bearing wear.

Pump Jam & Suction Loss Protection



### Power Sensing Features

#### Modbus RTU Output

- RS485 communication protocol reduces the cost involved with proprietary data logging software.
- Compatible with most automation systems.

#### Externally Powered

- Improves reliability when used in conditions where power interruptions and voltage sags are common.

#### Compact DIN Mounted Case\*

- Clearly labeled terminals provide quick installation.
- Low profile reduces cabinet depth requirements.

#### LED Displays Network Communication

- Provides quick visual indication that network is operational.

#### Finger Safe Terminals

- Safe and secure connectors.

#### Designed to Meet UL, CUL and CE Approval

- Accepted worldwide.

\*For information on the DIN rail accessories kit, see page 113.

- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

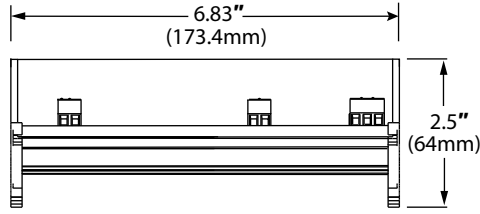
**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.



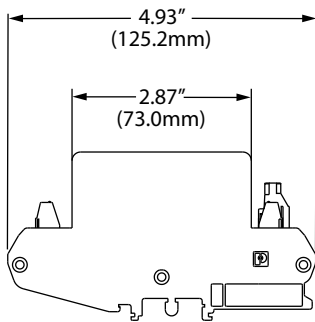
Power Sensing Products

Power Sensing Dimensions

Case Side View

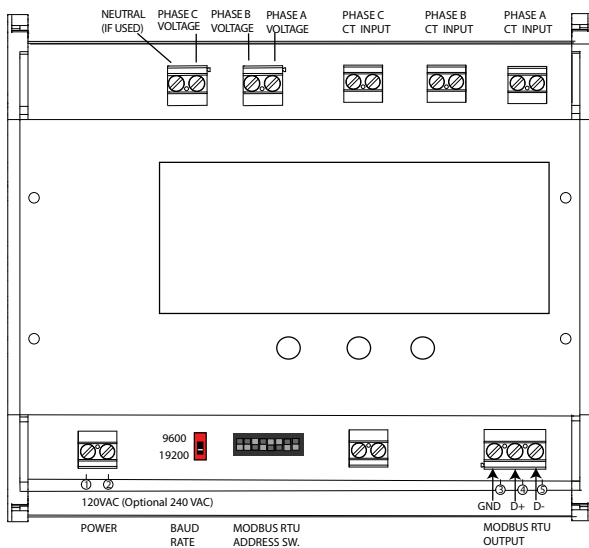


Case Top View



Note: Drawings are not to scale.

Power Sensing Connections



Power Sensing Specifications

<b>Power Supply</b>	24 VAC/DC, 120 VAC or 240 VAC
<b>Output</b>	• Modbus RTU - 14 Data Points • Pulsed Contact kWh
<b>Display</b>	4X20 LCD (Four lines, 20 characters each)
<b>Voltage Ranges</b>	100 to 600 VAC
<b>Response Time</b>	120 ms
<b>Isolation Voltage</b>	2200 VAC to meet UL standards
<b>Frequency Range</b>	50–100 Hz
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	Designed to Meet UL 61010 Measurement Control and Laboratory Use (USA & Canada)

Power Sensing Data Point Table

	Phase A	Phase B	Phase C	Type
<b>Current</b>	*	*	*	RMS
<b>Voltage</b>	*	*	*	RMS
<b>kW</b>	*	*	*	Active
<b>Power Factor</b>	*	*	*	Instantaneous
<b>Power Factor</b>				Average
<b>kWH</b>				Total

Power Sensing Ordering Information

Sample Model Number: APN-600--RC1-120-MOD  
AC Power transducer, 600 VAC maximum input, flexible current inputs (0-500 A range), 120 VAC powered, RS485 Modbus output with pulse contact for kWh.



(1) Maximum Primary Voltage

600	600 VAC
-----	---------

(2) Current Input Type

RC1	Flexible coil sensors 0–500 A range
RC2	Flexible coil sensors 0–2000 A range

(3) Rating Power Supply

24U	24 VAC/DC
120	120 VAC
240	240 VAC

(4) Output Type

MOD	Modbus RTU (RS485), pulse contact for kWh
-----	---

# APS SERIES Power Transducers

APS Series kWh Power Transducers offer an inexpensive way to measure kWh on single- and three-phase balanced loads. The APS Series constantly measures motor power consumption, which is proportional to the amount of work being done and an indication of the motor load. Ideal for mixing, grinding, machining and pumping applications where power measurement is needed, the APS Series includes a CT, voltage sensor and output signal conditioner in a single package designed for easy installation. Available for input currents up to 180 A and voltages up to 600 VAC.



### Power Sensing Applications

#### Grinding and Milling Control

- Measure grinder horsepower; optimize feed rates.

#### Viscosity Control

- Continuously calculate mixer kW draw; monitor viscosity without entering vessel.

#### Tool Monitoring and Jam Protection

- Measure drive motor HP to determine tool travel or contact with work.
- Monitor motor horsepower to provide an indication of motor jams.

### Power Sensing Features

#### True Power Measurement

- Measures true power (HP or kW) on balanced loads; accounts for voltage and power factor fluctuations and improves sensitivity to load changes.
- Requires only one or two power legs for installation.

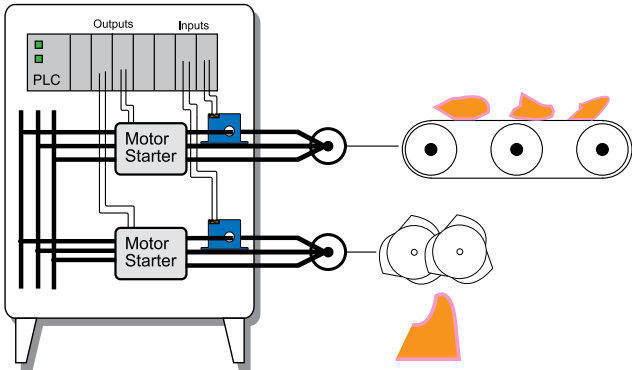
#### Fast and Easy Installation

- Current and voltage sensors in one package and 24 VDC loop-powered supply allows for quick and easy two-wire installation.

#### Factory-calibrated Ranges

- Single range factory calibrated to ensure accuracy.

Crusher/Grinder/Shredder Motor Interlocks



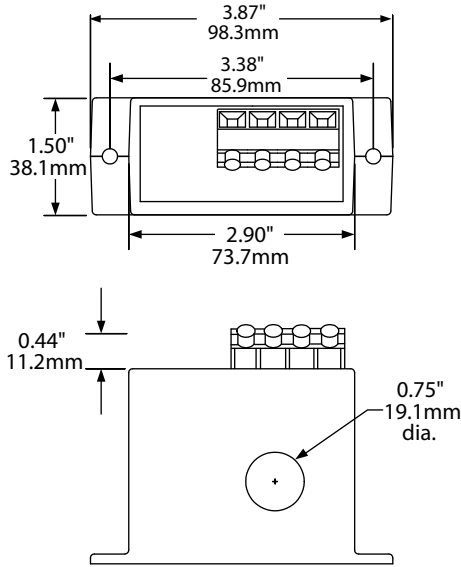
- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

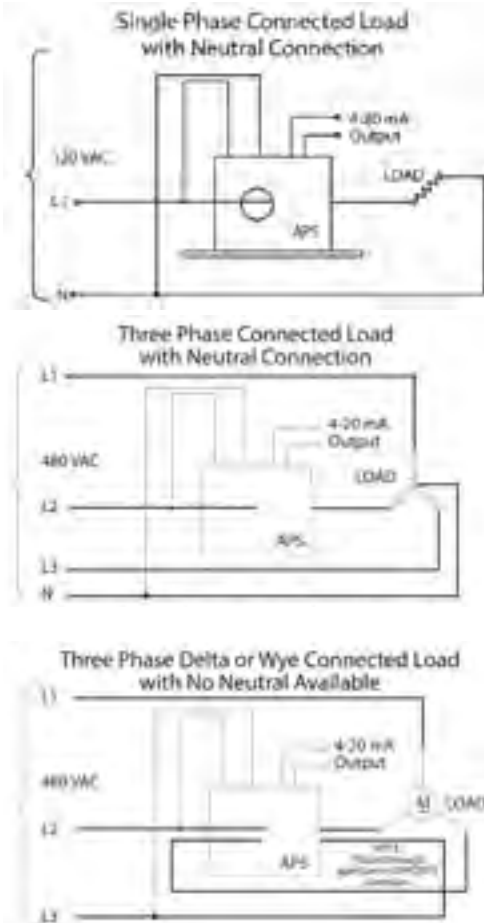


Power Sensing Dimensions

FL Case



Power Sensing Connections



Power Sensing Specifications



<b>Power Supply</b>	24 VDC nominal loop-powered (40 VDC max.)
<b>Output</b>	4–20 mA proportional to max. kW; 25 mA limit
<b>Input Range(s)</b>	120, 240, 480 or 600 VAC
<b>Response Time</b>	100 ms (to 90% of step change)
<b>Accuracy</b>	1% FS
<b>Indication</b>	Power on LED
<b>Max. Inrush Current</b>	300% FS (6 sec. duration)
<b>Input Range</b>	0.5 KW to 100 KW; 1/4 HP @ 120 VAC to 150 HP @ 480 VAC
<b>Frequency Range</b>	50–60 Hz
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada)

Power Sensing Ordering Information

Sample Model Number: APS4-420-24L-10.0

Single phase watt transducer, 10 kW range, 480 VAC input, may be wired with two opposite current wire passes, 4–20 mA output, loop-powered.



(1) Input Voltage

1	120 VAC
2	240 VAC
4	480 VAC
6	600 VAC (not UL listed)

(2) Output Signal

420	4–20 mA
-----	---------

(3) Power Supply

24L	24 VDC Loop-powered
-----	---------------------

(4) Input Range

0.5	0.5 KW
0.75	0.75 KW
1.0	1.0 KW
5.0	5.0 KW
10.0	10 KW
20.0	20 KW
50.0	50 KW
75.0	75 KW
100	100 KW

Note: Not all ranges available for every voltage range. Minimum current for stated accuracy is 2 A, maximum current 180 A.



# APT SERIES

## Power Transducers

APT Power Transducers measure three phases of current and voltage, and produces an industry standard analog signal proportional to the watts used. The monitor uses current transformers to measure the amperes, and the line voltage connects directly to the transducer, up to 600 VAC. The APT power transducer can be configured to accept 5 A secondary current transformers or the safer ProteCT™ low voltage output sensors. Either type of current sensing will produce an accurate output signal to help you identify areas of excessive energy consumption and allow intervention to reduce demand.

### Power Sensing Applications

#### Plant Energy Management

- Measure the power usage of a single piece of equipment, an area of a plant or the entire facility.

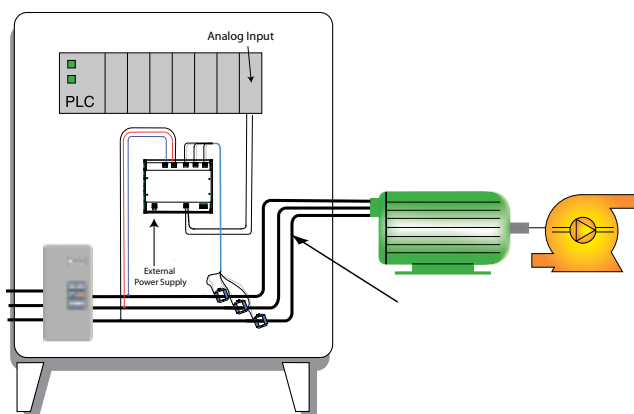
#### Conveyors

- Detects jams and overloads.
- Check that the belt is loaded properly by measuring the power consumption.

#### Pump Monitoring

- Detect dry run from clogged intake or discharge line.
- Monitor impeller cavitation and bearing wear.

Pump Jam & Suction Loss Protection



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.



### Power Sensing Features

#### Industry Standard Analog Outputs

- Choose 4–20 mA, 0–5 or 0–10 VDC.
- Compatible with most automation systems.

#### Externally Powered

- Improves reliability when used in conditions where power interruptions and voltage sags are common.

#### Compact DIN Mounted Case\*

- Clearly labeled terminals provide quick installation.
- Low profile reduces cabinet depth requirements.

#### Finger Safe Terminals

- Safe and secure connectors.

#### Designed to Meet UL, CUL and CE Approval

- Accepted worldwide.

\*For information on the DIN rail accessories kit, see page 113.

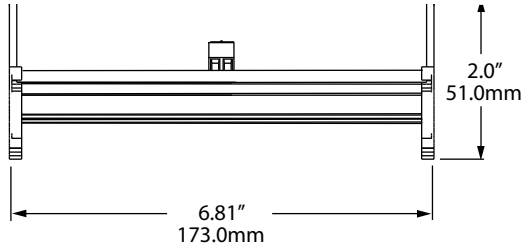
### APT Output Values

APT Power Transducers produce full range output when the current transformer is producing its maximum signal, the primary voltage is at the range maximum and power factor is at unity. As an example, using the APT-480-5 A-120-420 with 400:5 current transformers, the transducer will produce 20 mA when there is 400 A through the CT and the primary voltage is 480. If the transducer is used to monitor a three phase circuit using three CTs, 20 mA represents 332,544 watts. The equation for three phase wattage is voltage times amperage, times the square root of three (1.732) times power factor. If this transducer is used to monitor a three phase load using two CTs, the transducer will produce 14.67 mA, or the output will represent 2/3 of the actual watts being used under the same conditions: 480 V primary voltage, 400 A through 400:5 CTs and unity power factor.

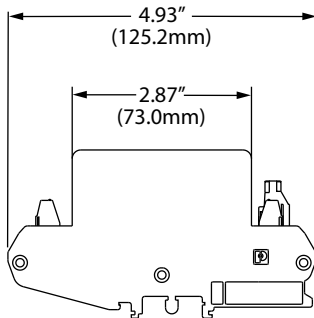


Power Sensing Dimensions

Case Side View

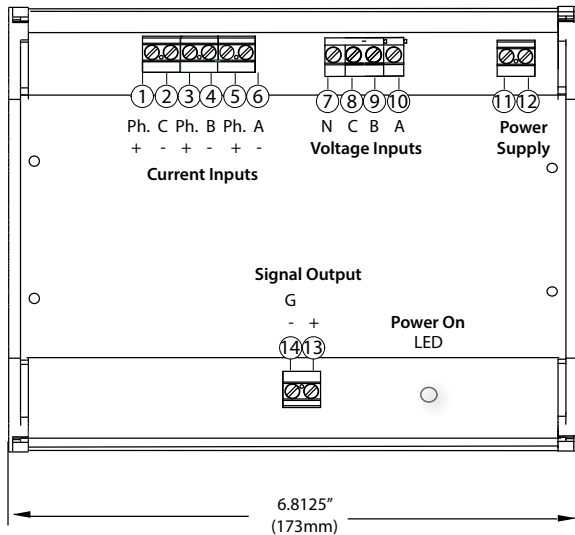


Case Top View



Note: Drawings are not to scale.

Power Sensing Connections



Power Sensing Specifications

<b>Power Supply</b>	24 VAC/DC, 120 VAC or 240 VAC
<b>Output</b>	• 4–20 mA current • 0–5 or 0–10 VDC
<b>Voltage Ranges</b>	0–600 VAC
<b>Response Time</b>	120 ms
<b>Isolation Voltage</b>	2200 VAC
<b>Frequency Range</b>	6–100 Hz
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	Designed to meet UL 508 Industrial Control Equipment (USA & Canada)

Power Sensing Ordering Information

Sample Model Number: APT-480-MV-120-420  
AC power transducer, 480 VAC input, ProteCT™ current inputs, 120 VAC powered, 4–20 mA output, DIN rail mounting.



(1) Primary Voltage

120	120 VAC
240	240 VAC
480	480 VAC
600	600 VAC

(2) Current Input Type

MV	ProteCT Current Transformers, 333mVAC secondary
5 A	5 A Secondary Current Transformers

(3) Power Supply

24U	24 VAC/DC
120	120 VAC
240	240 VAC

(4) Output Type

420	4–20 mA proportional to wattage (see calculation example under APT Output Values)
005	0–5 VDC
010	0–10 VDC

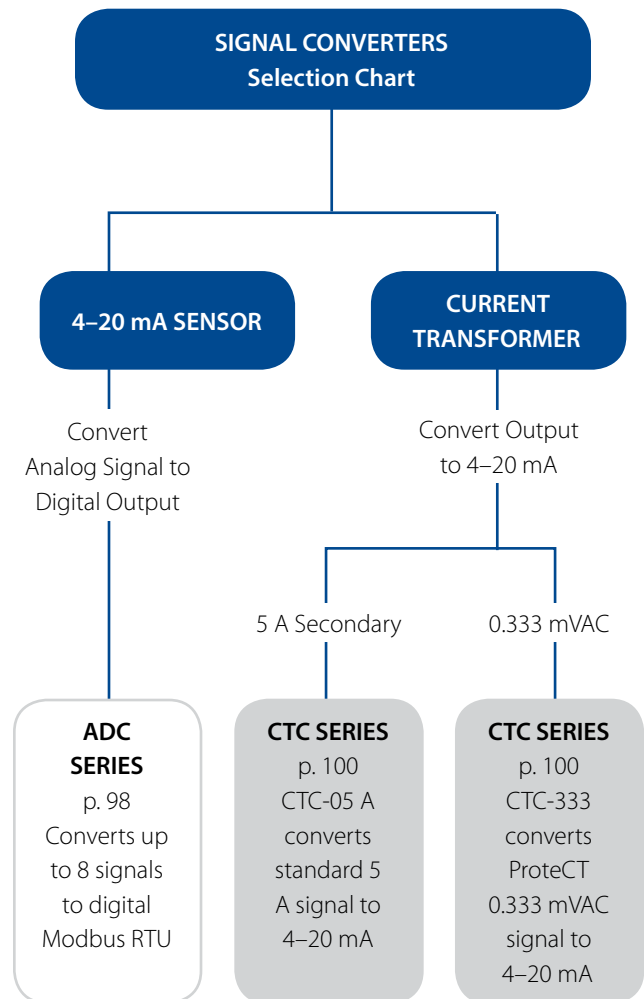
# Signal Converters

NK Technologies' ADC series signal converters use sensor outputs (4–20 mA, 0–5 and 0–10 VDC) and convert these to digital RS485 outputs. The CTC series accept either 5 A secondary current from current transformers or 0.333 VAC secondary voltage from our ProteCT™ series sensors and convert them to 4–20 mA loop-powered output for use with PLCs, panel meters or data loggers.

Features:

- DIN rail mounting makes installation a snap
- Industry standard outputs

- **ADC SERIES**  
Analog to Digital Converter ..... page 98
- **CTC SERIES**  
Signal Converter ..... page 100



# ADC SERIES

## Analog to Digital Converters

The ADC Series Signal Converter connects up to eight 4–20 mA loop-powered analog sensors, or up to eight separately powered 4–20 mA output sensors, or up to four of each. This will produce a digital signal representing 0–100% of each sensor output. It is the perfect solution for photovoltaic power production system monitoring. The ADC converter allows for individually-ranged devices to interface with the industry-standard **Modbus RTU** serial protocol. The device can accept analog signals from current, voltage or temperature sensors, allowing the installer great versatility and higher accuracy. It was designed and built to meet NK Technologies' trusted standards of reliability and ease of use.

### Signal Converter Applications

#### Photovoltaic Power Production

- Measure current output accurately using a sensor sized appropriately.
- Measure current from a panel and after the combiner with the same device.
- Measure voltage output, temperature, or any parameter sensor 4–20 mA output.

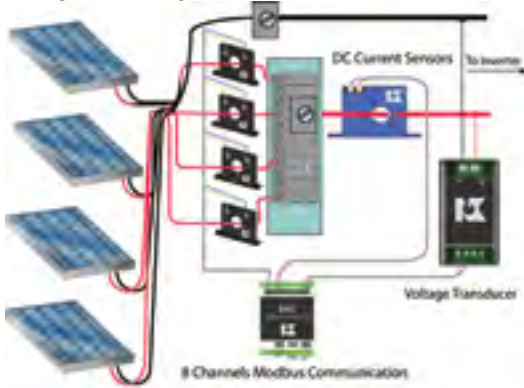
#### Machine Control

- Combine several analog signals into a single **Modbus** address to enable web viewing of data.

#### SCADA System

- Report and record current, voltage, power, pressure, frequency and flow by using existing sensors but adding network communication easily.

Analog Sensor to Digital Network Conversion



### Signal Converter Features

#### Eight Points of Data

- Convert up to eight 4–20 mA sensor outputs using a single network address.
- Sensor loop power is supplied by the converter: No DC power supply is required.
- Models for 8 loop-powered (2-wire) and 8 externally powered (4-wire) or 4 of each type.

#### Fast and Easy Installation

- DIN rail mounted converter with finger-safe terminals clearly marked for field installation speed.

\*For information on the DIN rail accessories kit, see page 113.

#### Application Versatility

- Convert any standard sensor output to **Modbus RTU** digital network format.

#### Choice of Power Supplies

- ADC converter can be factory set for 120 VAC, 240 VAC or 24 VDC power supplies.

#### Communication Baud Rate Choices

- Field-selectable 9600 or 19200 baud rate speeds.

Use any 4–20 mA output sensor as an input to the NK Technologies ADC analog-to-**Modbus** converter: Current, voltage, temperature, or any parameter that the application calls for. With the digital **Modbus** output scaled for zero (4 mA) to 100 percent (20 mA) the signal will represent whatever you may need to measure.

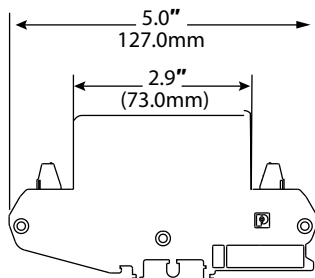
- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

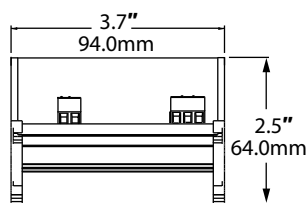


### Signal Converter Dimensions

Side View



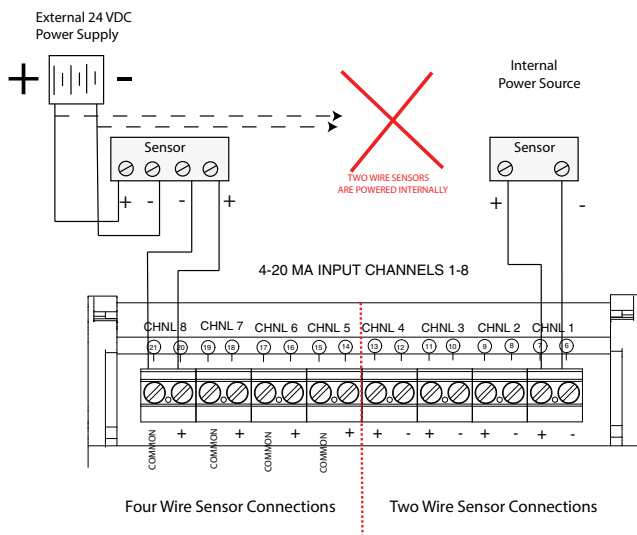
End View



### Signal Converter Specifications

<b>Power Supply</b>	24 VDC, 120 VAC 50–60 Hz, 240 VAC optional
<b>Output</b>	<b>Modbus RTU</b> Slave 8 Channels (RS485)
<b>Output Protocol</b>	1 start bit, 8 data bits (LSB first), 1 bit for even parity, 1 stop bit
<b>Output Functions</b>	Function 04, “Read Input Registers”
<b>Input Range(s)</b>	4–20 mA (Power from converter or external)
<b>Accuracy</b>	1.0% FS
<b>Indication</b>	Green Power On LED, Yellow Busy LED, Red Fault LED
<b>Addressing</b>	8 wide binary switch (1 to 247)
<b>Output Range</b>	0–120% (4 mA = 0, 20 mA = 100%)
<b>Dimensions</b>	3.7”H x 5.0”W x 2.0”D (94 mm H x 127 mm W x 51 mm D)
<b>Weight</b>	9.6 oz. (270 grams)
<b>Case</b>	DIN rail mounting, UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	UL508 Industrial Control Equipment

### Signal Converter Connections

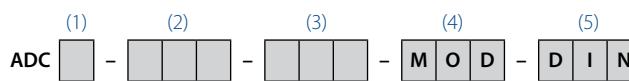


**Wiring Notes for Installation:**

1. Connect sensors to input channel terminals 6–21.
2. Set **Modbus** network address 1–247.
3. Connect 120 VAC power (240 VAC optional).

### Signal Converter Ordering Information

Sample Model Number: ADC1-420-120-MOD-DIN  
Eight-channel 4–20 mA input converter, 120 VAC powered.



(1) Input channels	
1	Eight 4–20 mA loop-powered input channels
2	Four loop-powered, four external powered (4-wire)
3	Eight external-powered inputs
(2) Sensor Input Type	
420	4–20 mA inputs
005	0–5 VDC
010	0–10 VDC as inputs available
(3) Power Supply	
120	120 VAC
240	240 VAC
24D	24 VDC
(4) Output Type	
MOD	<b>Modbus RTU</b>
(5) Case Style	
DIN	DIN rail mounting

Signal Converters



# CTC SERIES

## Signal Converters

CTC Series Signal Converters allow you to use an existing standard 5 A secondary or low-voltage ProteCT™ current transformer over a conductor to produce an industry standard 4–20 mA two-wire, loop-powered signal. The signal is proportional to the current in the primary circuit. The CTC series snaps onto a standard DIN rail. The output is connected to the load and a 24 VDC source and the current transformer is connected.



### Signal Converter Applications

#### Adding Current Monitoring for System Upgrades

- Measure entire plant current consumption or individual machine usage.

#### Detect Problems Before Failure Occur

- Detect bearing failures on drive motors, open discharge lines on pumps.

#### Tool Monitoring and Jam Protection

- Measure drive motor HP to determine tool travel or contact with work.
- Monitor motor current use to provide an indication of motor jams.
- Use existing current transformers to monitor the current, and transmit 4–20 mA industry standard output.

### Signal Converter Features

#### Uses any Standard 5 A Current Transformer or the Safer ProteCT™ Low Voltage Design

- Produces a 4–20 mA signal proportional to the AC current through the CT based on CT ratio.
- Two wires in, two wires out: Couldn't be easier.

#### Fast and Easy Installation

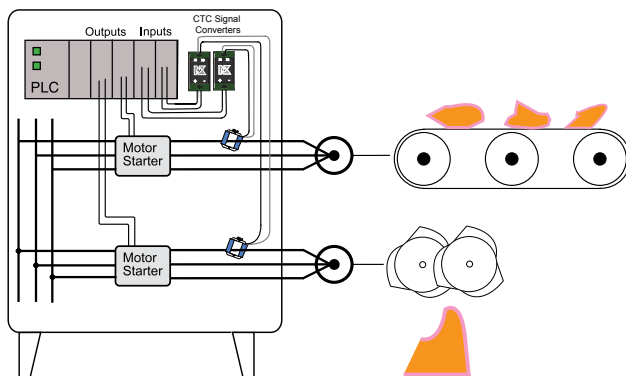
- DIN rail mounting\* and 24 VDC loop-powered supply allows for quick and easy two-wire installation.

#### No Calibration Needed

- The primary current transformer ratio provides the scaling required without any other installer intervention.

\*For information on the DIN rail accessories kit, see page 113.

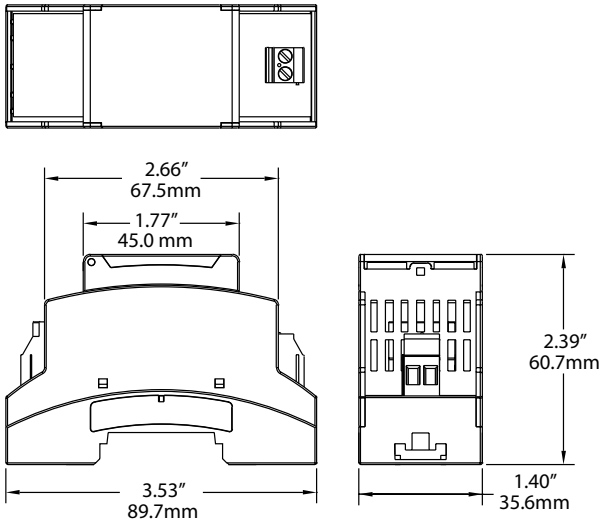
Crusher/Grinder/Shredder Motor Interlocks



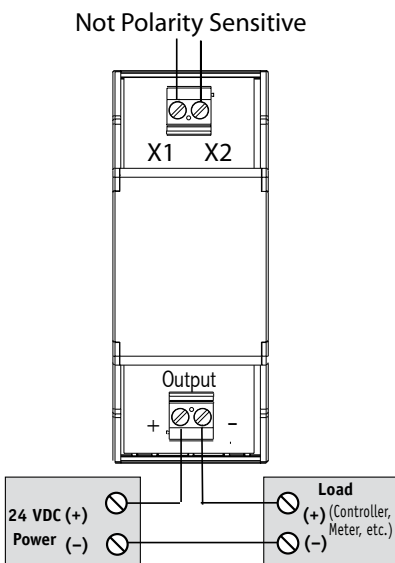
- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

Signal Converter Dimensions



Signal Converter Connections



Notes:

With 5 A secondary current transformers, the secondary must be connected to a load (NK Technologies' CTC converter or other load) when energized.

With ProteCT™ type (low voltage output) current sensors, there is no chance that dangerous voltages will result if the secondary is open when there is current through the sensing window.

Signal Converter Specifications



<b>Power Supply</b>	24 VDC nominal loop-powered, 36 VDC max.
<b>Output</b>	4–20 mA proportional to max. current
<b>Input Range(s)</b>	Based on current sensor ratio
<b>Accuracy</b>	1.0% FS
<b>Response Time</b>	100 ms (to 90% step change)
<b>Max. Inrush Current</b>	300% FS (6 sec. duration)
<b>Frequency Range</b>	10–100 Hz
<b>Case</b>	Polycarbonate
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	UL508 Industrial Control Equipment

Signal Converter Ordering Information

Sample Model Number: CTC333-420-24L-DIN  
Transducer accepts 333 VAC inputs from ProteCT™ current sensors, and produces a corresponding 4–20 mA signal.



(1) Input CT Type

333	0.333 VAC low voltage ProteCT™
05 A	5 A secondary

(2) Output Signal

420	4–20 mA
-----	---------

(3) Power Supply

24L	24 VDC loop-powered
-----	---------------------

(4) Case Style

DIN	DIN rail mounting case
-----	------------------------



# Current Transformers

We offer current transformers (CTs) for use with power transducers, panel meters, and in two-piece installations with transducers and switches to extend ranges for high amperage/ large conductor applications.

Features:

- 5 A or 0–333 mV secondary outputs
- Split-core or solid-core case
- Agency approved
- 5 A secondary ratios available from 50 A to 3000 A and higher

- **CTRC Series**  
AC Current Transformer  
ProteCT Type 333 mVAC Output.....page 103
- **ProteCT™ Series**  
mV Current Transformers.....page 105
- **Current Transformers**  
5 A Secondary.....page 106



# CTRC SERIES

## AC Current Transformer

### ProteCT™ Type 333 mVAC Output

CTRC AC Current Transformers monitor circuits up to 2000 A and produces a safe, low voltage output proportional to the RMS current value. This output is designed as an input to a power monitor or transducer, replicating the AC wave shape with phase angle resolution better than 2 degrees. The flexible coil design allows the sensor to be installed over multiple conductors or bus assemblies easily, and the cable requires very little space to fit between adjacent phase conductors. The design eliminates the magnetically permeable core of standard current transformers while providing excellent isolation, sensing only the magnetic field of the phase inside the loop.

#### Current Transformer Applications

##### Power Monitoring

- Accurate representation of current without the weight or hazards created by 5 A secondary current transformers.

##### Individual Machines

- Measure power use for cost allocation.
- Detect voltage sags and spikes.

##### Monitor Entire Building Power Usage

- Locate unneeded power consumption.



#### Current Transformer Features

##### 333 mVAC Output

- Specifically designed for connection to power monitors and transducers.
- Safe, with no need for shorting blocks.

##### 24 VAC or DC Powered

- Supply and Output are optically isolated.

##### Factory Calibrated

- Reduces field calibration errors.
- Coils matched with signal conditioning.

##### DIN Rail Mounted Case\*

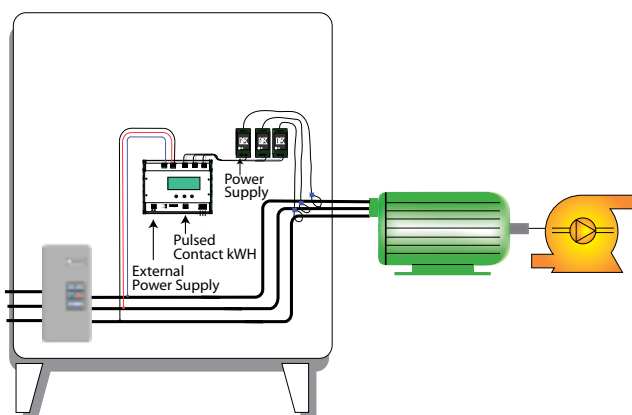
- Compact size requiring very little panel space.
- Simple snap fit to standard rails.

##### UL and CUL Approval

- Accepted worldwide.

\*For information on the DIN rail accessories kit, see page 113.

Monitoring Power Usage of a Motor Driven Pump



- For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

OEMs

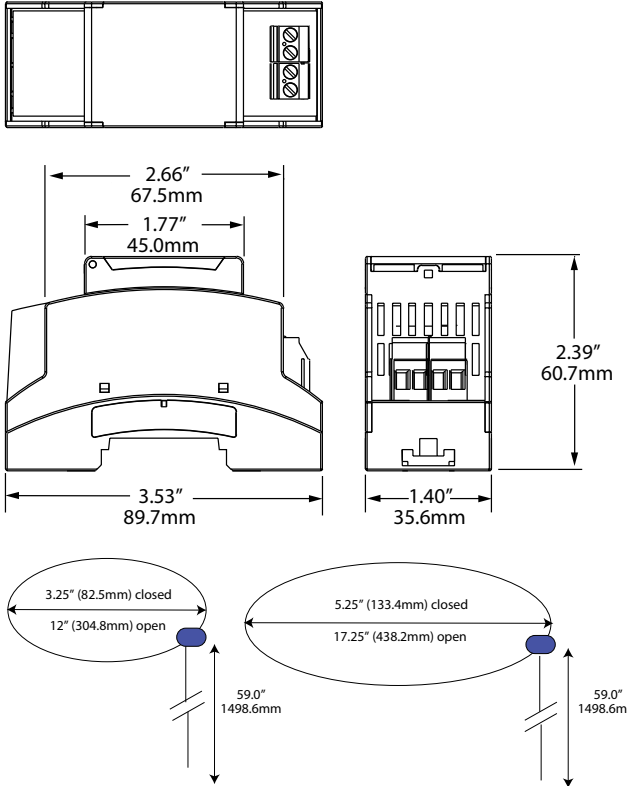
Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.



Current Transformer Dimensions

DIN Case



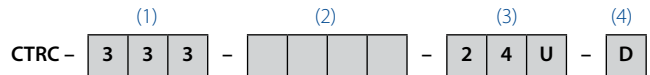
Current Transformer Specifications



<b>Power Supply</b>	24 VAC or DC, <2 VA
<b>Output</b>	333 mVAC
<b>Response Time</b>	2 ms
<b>Range</b>	<ul style="list-style-type: none"> <li>• 0–300</li> <li>• 0–500</li> <li>• 0–1000</li> <li>• 0–1500</li> <li>• 0–2000</li> </ul>
<b>Accuracy</b>	±1% FS
<b>Isolation Voltage</b>	Designed to UL 508 1270 VAC, tested to 5000 VAC
<b>Frequency Range</b>	40–400 Hz
<b>Sensing Aperture</b>	<ul style="list-style-type: none"> <li>• 0–300 &amp; 500 approximate 3.5 inches ID</li> <li>• 0–1000, 1500 &amp; 2000 approximate 5.25 inch ID</li> </ul>
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Listings</b>	UL 508 Industrial Control Equipment Standards, Designed to meet CE

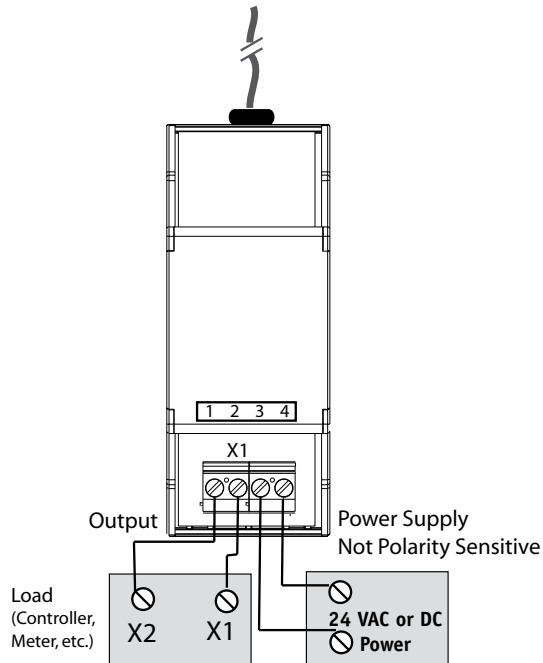
Current Transformer Ordering Information

Sample Model Number: CTRC-333-500-24U-D  
Flexible loop current sensor, 0–500 A AC produces 0–333 mVAC, DIN rail mounted case.



(1) Output Type	
333	333 mVAC
(2) Full Scale Range	
300	300 A AC
500	500 A AC
1000	1000 A AC
1500	1500 A AC
2000	2000 A AC
(3) Power Supply	
24U	24 VAC or DC
(4) Case Style	
D	DIN Rail Mounting

Current Transformer Connections



# ProteCT™ SERIES

## mV Current Transformers

ProteCT™ Series Current Transformers are intended for use with APT and APO/APN Series power transducers. ProtectCT™ low voltage output current transformers provide easy sensing of current on three-phase applications with the added safety of a 333 mV output secondary. Available in split-core case as standard.

### Current Transformer Applications

- Tailored for use with AP Series AutoPhase KW/KWH transducers.
- Self-powered design works well in data logger applications.
- Excellent response time for power monitoring applications.

### Current Transformer Features

#### 0.333 VAC Output Secondary

- Unique low voltage output allows safe opening of transformer secondary, protecting installers from shock hazards found on traditional 5 A CTs.

#### Eliminates Need for “Shorting Blocks”

#### Standard Split-core Case Design

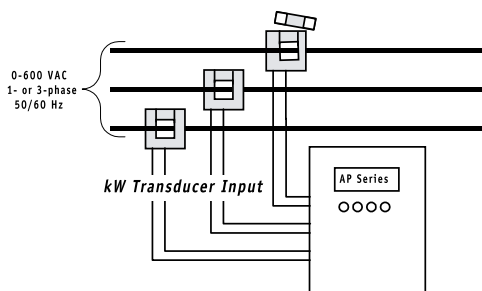
- Snap close case speeds installation and eases retrofits for existing jobs.
- Eliminates need to power down or disconnect system to install CT, maximizing up time.

#### High-Impact, UL94 V0 Rated Polymer Housing

- No exposed metal parts on assembled ProteCT™ devices.

#### Choose From Three ID's: 0.85", 1.25", 2.0"

### Current Transformer Connections

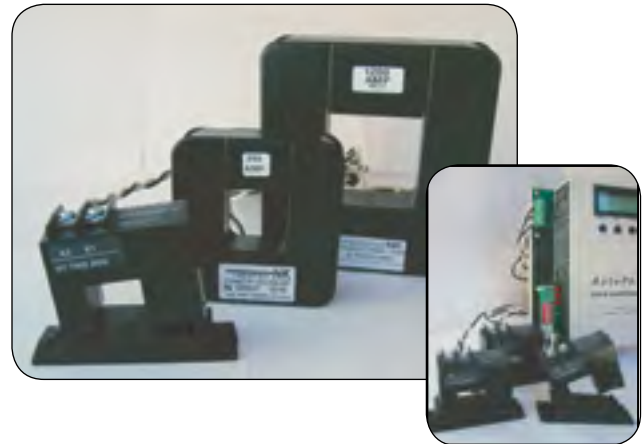


For additional Application Examples, go to [www.nktechnologies.com/applications](http://www.nktechnologies.com/applications)

OEMs

#### Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.



### Current Transformer Dimensions

in (mm)	NKP-075-xxx	CTP-125-xxx	CTP-200-xxx
<b>Width</b>	2.25 (57.2)	3.25 (82.55)	4.75 (120.65)
<b>Height</b>	2.40 (61.0)	3.35 (85.09)	5.00 (122.5)
<b>Depth</b>	1.18 (30.0)	1.00 (25.4)	1.20 (30.48)
<b>Window</b>	0.85 (22.0)	1.25 (31.75)	2.00 (50.80)

### Current Transformer Specifications

<b>Power Required</b>	None—Self-powered
<b>Accuracy</b>	±1% NKP, ±2% CTP models
<b>Output</b>	0–0.333 VAC
<b>Phase Angle</b>	<1 degree, 2 degrees @ 50% range
<b>Response Time</b>	<1 ms
<b>Isolation Voltage</b>	600 VAC
<b>Max. Primary Voltage</b>	5000 VAC (insulated conductor)
<b>Max. Inrush Current</b>	300% FS (6 sec. duration)
<b>Environmental</b>	0 to 122°F (-18 to 50°C) 0–95% RH, non-condensing

### Current Transformer Ordering Information

Model	Input Range
<b>0.85" (22 mm) Window</b>	
NKP-075-005SP	0–5 A
NKP-075-015SP	0–15 A
NKP-075-030SP	0–30 A
NKP-075-050SP	0–50 A
NKP-075-070SP	0–70 A
NKP-075-101SP	0–100 A
NKP-075-15 1SP	0–150 A
NKP-075-201SP	0–200 A
<b>1.25" (31.75 mm) Window</b>	
CTP-125-101	0–100 A
<b>2.0" (50.8 mm) Window</b>	
CTP-125-151	0–150 A
CTP-125-201	0–200 A
CTP-125-251	0–250 A
CTP-125-301	0–300 A
CTP-125-401	0–400 A
CTP-125-601	0–600 A
CTP-200-601	0–600 A
CTP-200-801	0–800 A
CTP-200-102	0–1000 A
CTP-200-122	0–1200 A
CTP-200-152	0–1500 A

# CURRENT TRANSFORMERS

## 5 A Secondary

5 A Secondary Current Transformers offer a compact, cost-effective means of measuring primary current and providing 0–5 A secondary output proportional to the primary current being sensed. Available in solid-core or split-core case.

### Current Transformer Applications

- Serves as current input for use with APT and APN Series KW transducers.
- Save space in control panels by remotely locating CTs closer to load.
- 5 A secondary compatible with standard products offering a 5 A analog input option.
- Broad line accommodates primary currents from 50 A to 3000 A.

### Current Transformer Features

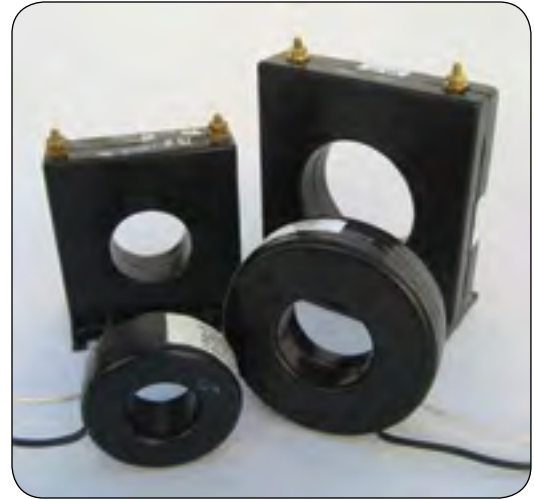
- Solid-core case; choice of round with flying leads or integral feet for panel mount with terminals.
- Optional split-core case for easy installation without disconnecting wiring.
- Aperture diameters from 1.13" to 5.5".
- Agency approved.

### Current Transformer Specifications

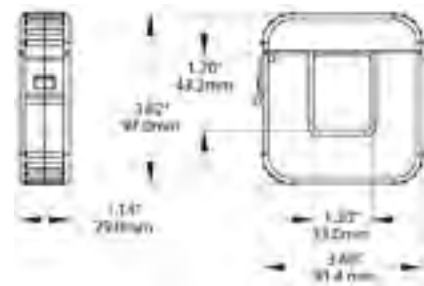
<b>Power Supply</b>	Self-powered
<b>Current Ranges</b>	See Ranges/VA Burdens
<b>Output Signal</b>	0–5 A (AC)
<b>Frequency</b>	50–400 Hz
<b>Insulation Class</b>	0.6 KV BIL, 10 KV full wave
<b>Accuracy</b>	ANSI rated, (<2.0%)
<b>Allowable Burden</b>	See Ranges/VA Burdens
<b>Rating Factor</b>	2.0 @ 30°C amb.

### Current Transformer Dimensions

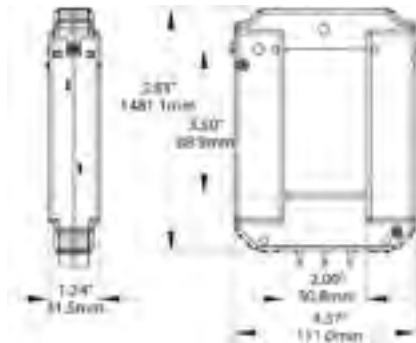
Series	Aperture Size	Series	Aperture Size
2	1.13" (28.7 mm)	WC4	1.3" x 1.7"
5	1.56" (39.6 mm)	WC5	2.0" x 5.0"
7	2.50" (63.5 mm)	WC6	2.0" x 5.5"



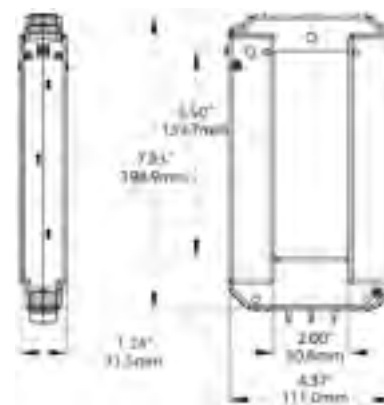
WC4



WC5



WC6



Current Transformer Ranges/VA Burdens

Model	CT Ratio:5	Solid-core Series			Split-core Series		
		2	5	7	WC4	WC5	WC6
500	50	1	0.75	0.5			
750	75	2	1.25	1			
101	100	2.5	2.25	2	1.5		
151	150	4	5	2.5			
201	200	5	5	5	1.75	1.75	
251	250	7.5	12.5	5			
301	300	10	12.5	5	2.25		
401	400		12.5	12.5	2.75	2.25	
501	500		25	15			
601	600		25	25		2.75	2.75
801	800		30	35		3.75	4.0
102	1000		35	35		4.5	
122	1200		40	40			5.25
152	1500			50			
162	1600			50			6.25
202	2000						8.0
252	2500						
302	3000						

Notes:

1. See table for Allowable Burden. Add any other resistance such as terminations, etc.
2. Lead length is the TOTAL wire run (out and back). Divide by two to get the lead distance.
3. Resistance for 5 A output CTs.

Allowable Burden Expressed as <sup>1</sup>		Allowable Lead Length in Feet For Copper AWG Wire <sup>2</sup>					
VA	Ohm <sup>3</sup>	18	16	14	12	10	8
1	0.04	4.7	7.6	12.3	19.5	31.0	49.4
1.5	0.06	7.1	11.3	18.4	29.3	46.5	74.2
2	0.08	9.5	15.1	24.5	39.0	62.0	98.9
3	0.12	14.2	22.7	36.8	58.5	93.0	148.3
4	0.16	18.9	30.2	49.1	78.0	124.0	197.8
5	0.20	23.7	37.8	61.3	97.6	155.0	247.2
6	0.24	28.4	45.4	73.6	117.1	186.0	296.7
7	0.28	33.1	52.9	85.9	136.6	217.1	346.1
8	0.32	37.9	60.5	98.2	156.1	248.1	395.6
9	0.36	42.6	68.1	110.4	175.6	279.1	445.0
10	0.40	47.3	75.6	122.7	195.1	310.1	494.4
12	0.48	56.8	90.7	147.2	234.1	372.1	593.3
14	0.56	66.3	105.9	171.8	273.2	434.1	692.2
16	0.64	75.7	121.0	196.3	312.2	496.1	791.1
18	0.72	85.2	136.1	220.9	351.2	558.1	890.0
20	0.80	94.7	151.2	245.4	390.2	620.2	988.9
25	1.00	118.3	189.0	306.7	487.8	775.2	1236.1
30	1.20	142.0	226.8	368.1	585.4	930.2	1483.3
35	1.40	165.7	264.7	429.4	682.9	1085.3	1730.5
40	1.60	189.3	302.5	490.8	780.5	1240.3	1977.8
45	1.80	213.0	340.3	552.1	878.0	1395.3	2225.0
50	2.00	236.7	378.1	613.5	975.6	1550.4	2472.2

Current Transformer Ordering Information

Solid-core CTs:

Sample Model Number: 2RL-501-NK



(1) Series

2, 5, or 7	
------------	--

(2) Case

RL	Round doughnut
SFT	Square, integral mounting feet

(3) Model

XXX	See Ranges/VA Burdens
-----	-----------------------

Split-core CTs:

Sample Model Number: 7SP-600-00-L24-NK



(1) Series

1SP	100–400 A
3SP	200–1200 A
5SP	300–2000 A
7SP	600–3000 A

(2) CT Ratio

XXXX	See Ranges/VA Burdens
------	-----------------------

(3) Output

00	5 A secondary
----	---------------

(4) Lead Type

L36	36" lead wires
-----	----------------



# AMPFlasher™ Current Indicator and Accessories

The AMPFlasher™ is a compact, inexpensive, easy-to-use LED ring that slips onto a conductor to give a flashing indication of current flow. Available options include models with pigtail outputs for remote LED applications.

Features:

- 5/16" ID suitable for conductors up to 100 A
- Low sensitivity turn-on point detects current as low as 0.5 A with a single conductor pass
- High visibility flashing LED gives visual status
- Compact 1" case with cable tie for secure mounting

## AMPFlasher™ ACI SERIES

AC Current Indicators.....page 109

## WRT SERIES

Wireless Data Transmitter/Receiver.....page 110

Easy to install and configure wireless data communications solution for any RS485 network protocol.

## PBR SERIES

PowerBASE™ Relays.....page 112

Industrial grade relays specially designed for quick connection to AS and AT Series switches, providing additional relay flexibility.



PowerBASE™ Relays



## DIN RAIL KITS .....page 113

DIN rail and DIN-2 kits allow NK Technologies' switches, transducers and ground fault protection to be mounted on DIN rail.



DIN rail with VTR Voltage Transducer



DIN rail with AGL Ground Fault Sensor

# AMPFlasher™ ACI SERIES

## AC Current Indicators

The AMPFlasher™ ACI Series Current Indicator is a compact, inexpensive, easy-to-use LED ring which slips onto a conductor to give a flashing indication of current flow. Ideal for use in control panels, or wherever confirmation of current flow is desired, AMPFlasher™ current indicators are a cost-effective way to detect live conductors and see current flow to fans, heaters, pumps, lighting or other powered devices.



### AC Current Indicator Applications

- Quick visual status of electric motor load.
- Identify open heater circuit connection.
- Provide panel mounted indication of current draw on monitored load.
- Confirmation of operation for critical lighting or equipment.

### AC Current Indicator Features

#### Low Sensitivity Turn-On Point

- Detect currents as low as 0.5 A with a single conductor pass, eliminates the need to wrap conductors through multiple times to increase sensitivity.

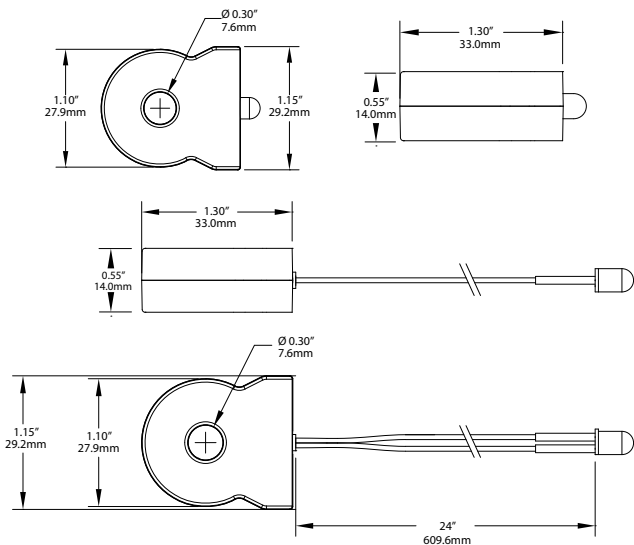
#### High Visibility Flashing LED

- Flashing LEDs perform better in daylight conditions and from multiple angles than constant on LEDs.

#### Choice of Outputs

- LED output standard, optional LED on 24" pigtailed for remote indication.

### AC Current Indicator Dimensions



Note: Panel opening should be 0.267–0.273", panel thickness 0.32 to 0.125"

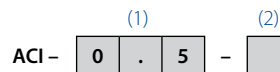
### AC Current Indicator Specifications



<b>Output/Indication</b>	• Standard: LED (flashing, red) • Optional: 24" Pigtailed for Remote LED
<b>Indicating Range</b>	0.5 A–100 A
<b>LED On/Relay Trip Point</b>	<500 mA (factory set)
<b>Dimensions</b>	• Overall: 1.125"W x 0.56"D x 1.5"H • Aperture: 0.30"ID • Pigtailed: 24"
<b>Case</b>	UL94 V0 Flammability Rated
<b>Mounting</b>	Slides directly onto monitored conductor
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
<b>Frequency Response</b>	50–400 Hz
<b>Listings/Certifications</b>	UL 508 Industrial Control Equipment (USA & Canada)

### AC Current Indicator Ordering Information

Sample Model Number: ACI-0.5-L  
Current Indicator with 0.5 A sensitivity and red flashing LED.



(1) Sensitivity Level

0.5	500 mA
-----	--------

(2) Indication/Output

L	LED (flashing, red)
P	24" Pigtailed for remote LED



#### Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.



# WRT SERIES

## Wireless Data Transmitter/Receiver

NK Technologies offers an easy to install and configure wireless data communication solution for any RS485 network protocol. Each WRT radio can be configured as a master or slave and set at the factory to transmit **Modbus RTU** formatted packets. Network address and channel frequency switches are always visible for field selection to suit the specific application and environmental conditions. The system allows for wired and wireless equipment mixes to avoid radio obstacles. It is simple to configure for existing network packet parameters, provides LED indication of network status, and is completely transparent to present equipment. Wiring to the terminal block does not require any tools, simply insert the power supply and equipment network cable conductors into the well marked position.



### Wireless Data Transmitter/Receiver Applications

#### Retrofit Wired to Wireless

- No need to change existing RS485 equipment.

#### Communication From Master to One or Multiple Slaves

- Transmit up to 800 meters line of sight.
- IEEE 802.15.4 (2.4 GHz) standard.

#### Automatic Route Detection

- Self-forming, self-healing networking.
- 100 nodes per network maximum through 15 channels.

#### Avoid Cabling Expense

- Reliably monitor process conditions without drilling holes, running conduits or network cables.

Note: Use NK Technologies' ADC analog to digital converter for up to 8 sensing points, and transmit the data seamlessly via 2.4 GHz radio signals.

### Wireless Data Transmitter/Receiver Features

#### Compact Housing - Unobtrusive Styling

- Pivoting antenna for cramped enclosure spaces.
- Compatible with most automation systems.

#### Easy Wiring

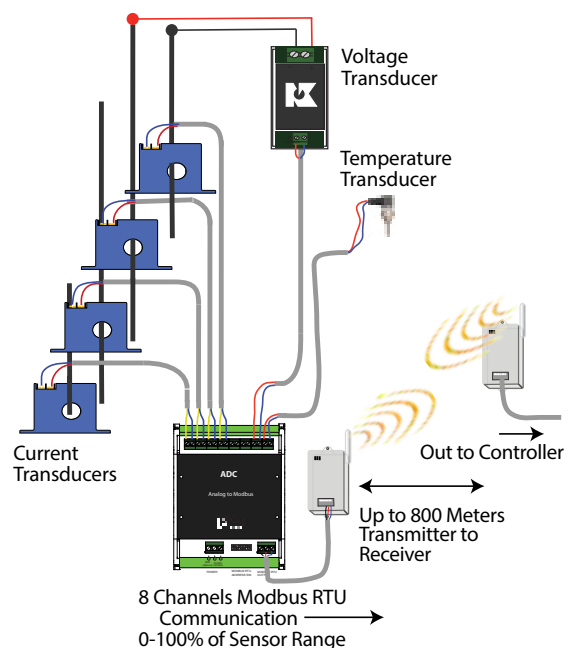
- Strip and insert, no screws to tighten.

#### Easily Adjustable Address and Channel Frequencies

- Speeds startup.

#### Plastic Case

- Install on a wall or in a non-metallic enclosure.

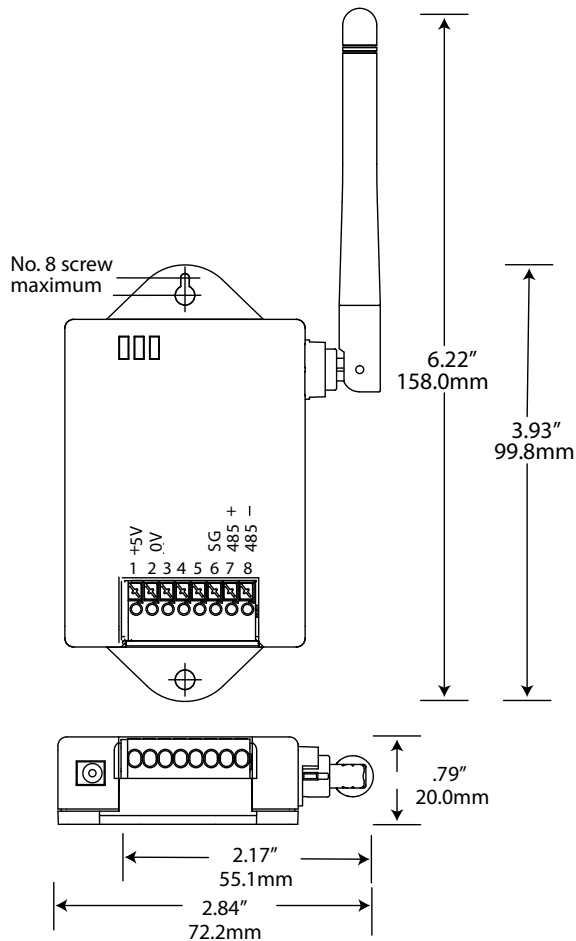


**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.





### Wireless Data Transmitter/Receiver Dimensions

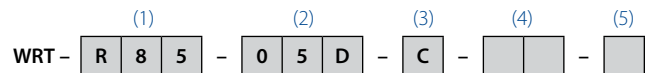


### Wireless Data Transmitter/Receiver Specifications

<b>Power Supply</b>	5 VDC 100 mA
<b>Output</b>	<b>Modbus RTU/ASII</b>
<b>Radio Specifications</b>	4 GHz (IEEE 802.15.4)
<b>Transmit Power</b>	10 mW
<b>Channel Frequencies</b>	15, field-selectable
<b>Network ID</b>	00 to 99, field-selectable
<b>Group ID</b>	16 field-selectable
<b>Baud Rate</b>	2.4 to 115.2 kbps, factory set at 9.6 kbps
<b>Case</b>	UL94 V0 Flammability Rated
<b>Environmental</b>	-4 to 122°F (-20 to 50°C) 0-95% RH, non-condensing
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada)

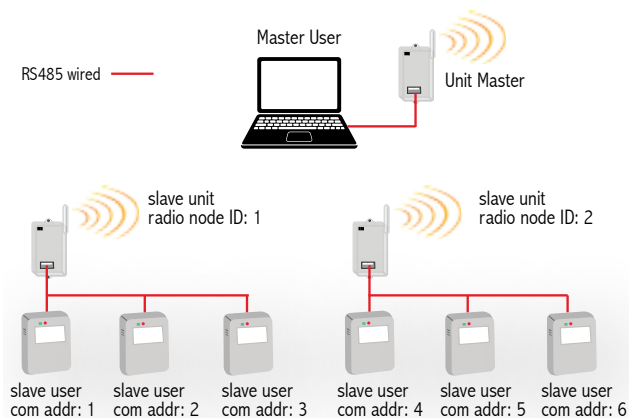
### Wireless Data Transmitter/Receiver Ordering Information

Sample Model Number: WRT-R85-05D-C-0-S  
Radio transmitter/reciver **Modbus RTU/ASII** RS485 communication with 5 VDC power supply, common housing, 2 zones, and slave node.



(1) Input/Output	
R85	<b>Modbus RTU</b> RS485 Input/Output
(2) Power Supply	
05D	5 VDC
(3) Housing	
C	Common
(4) Zones	
0	Slave node operation
1	Single zone, master node operation
2	2 zones, 63 inputs each (99 max.)
4	4 zones, 31 inputs each
7	7 zones, 15 inputs each
13	13 zones, 7 inputs each
(5) Node Type	
M	Master node
S	Slave node (Must be 0)

### Sample Network: Multiple 485 Connections



# PBR SERIES

## PowerBASE™ Relays

PBR PowerBASE™ Series are industrial-grade relays in a specially designed case. PBR relays quick connect to NK Technologies' top terminal AS and AT series current operated switches and transducers. This compact combination provides added function and flexibility.

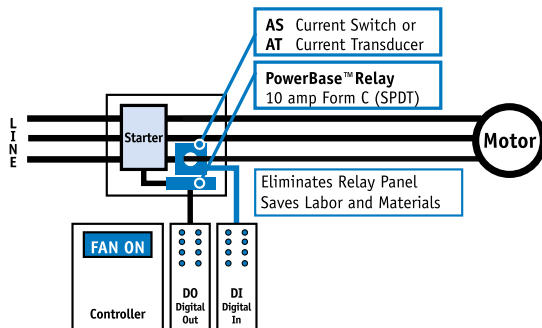
### PowerBASE™ Applications

#### Motor Control

- Switches up to NEMA size 5 starter (200HP motor).
- Directly controls fractional HP loads.

#### Heaters and Lamp Control

- Eliminates contactors for loads to 10 A.



### PowerBASE™ Features

#### PowerBASE™ Relay and Current Sensor Combo

- Acts as an interposing relay.
- Isolates controller from line voltage.

#### Cuts Installation Costs

- Reduces electrician's labor.
- Eliminates need for relay panel.

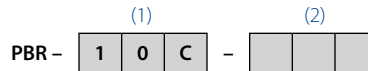
#### UL, CUL and CE Approved

- Accepted worldwide.

### PowerBASE™ Ordering Information

Sample Model Number: PBR-10C-24U

PowerBASE™ Relay with 10 A contacts and universal 24 V coil.



#### (1) Contact Rating

10C	10 A Form C
-----	-------------

#### (2) Coil Voltage (see specifications)

12U	12 VAC/DC, Low Current
24U	24 VAC/DC, Low Current

### PowerBASE™ Specifications



<b>Contacts</b>	10 A resistive, 7.2 A inductive @ 240 VAC
<b>Coils</b>	12U: 12 VAC/DC ±30%, 18.5 mA 24LU: 24 VAC/DC ±30%, 10 mA
<b>Dimensions</b>	2.65" W x 1.5" D x 0.9" H, 4.5" Base
<b>Case</b>	UL94 V0 Flammability Rated
<b>Compatibility</b>	All "FT" and "SP" case models
<b>Environmental</b>	0 to 122°F (-18 to 50°C) 0-95% RH, non-condensing
<b>Listings</b>	UL 508 Industrial Control Equipment (USA & Canada)



#### Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.



# DIN RAIL KITS

## DIN Kit or DIN-2 Adapter Kit

DIN Rail Kits provide a convenient method to facilitate the mounting of the ADC, AGL, APN, APT, CTC, VTD, and VTR Series of NK Technologies’ sensors. The kits can also be used to mount other products to a panel as needed.

### DIN Rail Kit Features

#### DIN Rail Kit

- Includes two end stops and a bichromated galvanized steel rail.
- High mechanical and corrosion resistance.
- Slotted design allows for attachment to most suitable surfaces.
- Rail can be cut in field to desired length.



#### DIN-2 Adapter Kit

- Includes two plastic brackets and attachment screw to mount the sensor to the rail.
- Compatible with “top hat” or “G” type rail.

“Top Hat” type rail.



“G” type rail.



AGL Ground Fault Sensor



### DIN Rail Kit Specifications

#### DIN Rail Kit

<b>Rail Material</b>	Rail is galvanized steel; 35 mm x 7.5 mm x 175 mm
<b>Rating</b>	Conforms to EN50035, 50022, DIN 46277

#### DIN-2 Adapter Kit

<b>Rail Compatibility</b>	“Top Hat” Type: 35 x 15 mm, 35 x 7.5 mm “G” Type 32 x 15 mm
<b>Bracket Material</b>	UL 94-V2 Rated Thermoplastic
<b>Temp Range</b>	-40 to 212°F (-40 to 100°C)

### DIN Rail Kit Ordering Information

Part Number for DIN Rail Kit: DINKIT

Part Number for DIN-2 Adapter Kit: DIN-2

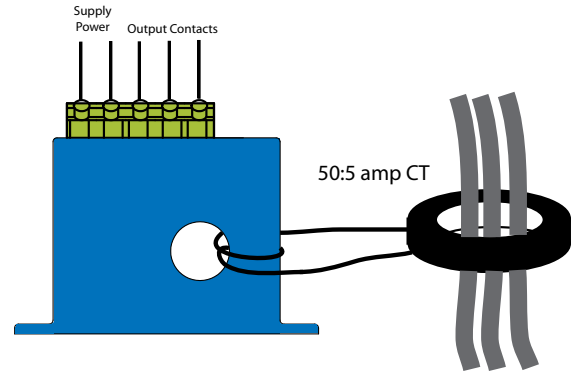
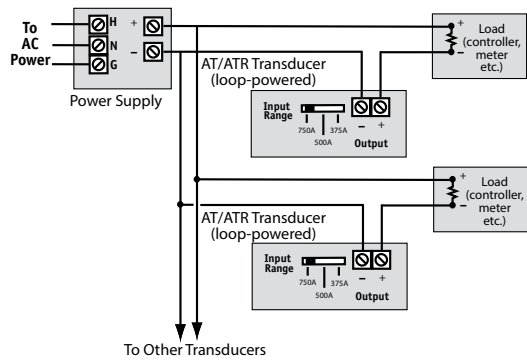
OEMs

Test & Evaluation Units for OEMs

Free program expedites evaluation process. See page 1 for details.



# SUPPLEMENTAL APPLICATIONS

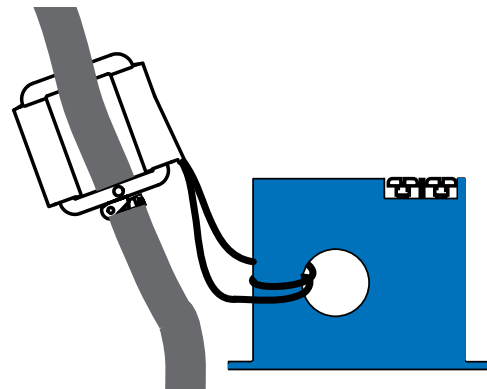
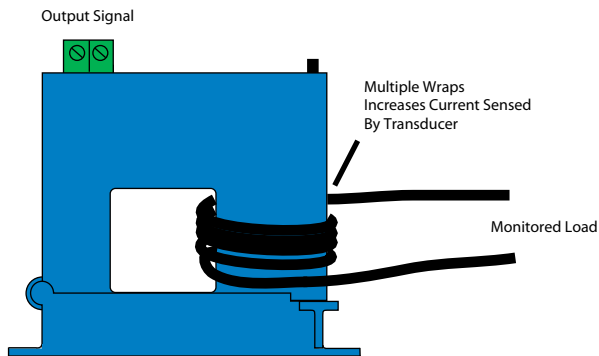


## Powering Multiple Transducers From a Single Supply

For applications where multiple loop-powered (4–20 mA output) transducers are installed, it may be cost-effective to power multiple transducers from one power supply as shown.

## Use of Auxiliary CT to Monitor Fault Currents in Large Conductors

By using an auxiliary CT to fit around large conductors, ground fault currents of 25 mA and up may be sensed by using multiple turns of the CT secondary through the aperture of the ground fault sensor as shown. As the number of turns required varies based on CT value, desired trip points and sensor setpoint, contact factory for assistance in this application.



## Sensing Ultra Low Currents with AT/ATR Series Transducers

In an instance where the monitored current is well below 1 A nominal, it may be practical to wrap the conductor through the aperture multiple times to magnify the signal. For transducer applications, care must be taken to correctly scale PLC/Controller inputs to correct values as each pass of the conductor through the aperture increases the amperage sensed by the transducer. For example, a 100 mA signal passed through 5 times will be read as a 500 mA signal and yields an output signal of 8 mA on an ATO and ATRO Series transducer.

## Two-Piece Solution for Sensing Current in High Amperage or Large Conductor Applications

For situations where conductor size and/or current rating exceed sensor or transducer specifications, an auxiliary CT can be used in conjunction with an AS Series current switch or AT/ATR Series current transducers. As shown in above, the 5 A secondary of a 1200:5 split-core CT is passed through the aperture of an NK Technologies' sensor with the trip point or output set accordingly.

**OEMs** Test & Evaluation Units for OEMs  
Free program expedites evaluation process. See page 1 for details.

## RoHS 2 CERTIFICATION OF COMPLIANCE

### European Directive 2011/65/EU on the Restriction of Hazardous Substances

The European Community (EC) directive 2002/95/EC, also known as the RoHS 2 Directive, restricts the use of hazardous substances listed below in the manufacture and sale of electrical and electronic equipment.

Based on the information provided to us by the suppliers of raw materials used in the manufacture and delivery of our products and services, NK Technologies maintains a list of specific model numbers and product families designated as RoHS 2 Compliant for orders placed on or after October 1, 2006.

#### RoHS 2 Compliance shall be taken to mean that,

- With regard to existing designs, RoHS 2 certified substitutions for all materials and components have been specified.
- Components used in the production of compliant parts are certified RoHS 2 compliant and our suppliers have confirmed this compliance status.
- Soldering operations involved in the production of compliant products are performed using lead-free solder.
- Products bear an RoHS 2 compliance logo indicating their status.

#### Additionally, RoHS 2 Compliance production safeguards assume,

- Where appropriate, process reviews have been performed to ensure the absence of restricted substances.
- Compliant components and materials are segregated from non-compliant components and materials while in inventory.

For purposes of RoHS 2 certification, any Product/Model Number so designated shall contain less than the concentration value of restricted substances by weight in homogenous materials specified as follows:

- Lead .....0.1%
- Mercury .....0.1%
- Hexavalent Chromium.....0.1%
- Polybrominated Biphenyls .....0.1%
- Polybrominated Diphenyl Ethers .....0.1%
- Cadmium .....0.01%



2011/65/E

**Please contact our factory for information regarding the RoHS 2 compliance status of any NK Technologies product and/or to obtain specific RoHS 2 Compliance Certificates.**

## ISO 9001 AND ISO 14001 REGISTRATIONS

NK Technologies' commitment to quality and the environment goes beyond compliance to international standards. We have developed and implemented an integrated quality and environmental management system to ensure our business and manufacturing processes provide customer confidence and satisfaction while being good stewards of our environment.

**The foundation of our consolidated system is based on the ISO 9001 and ISO 14001 standards.** However we go above and beyond basic compliance to continuously improve all of our quality and environmental related operations. Our unwavering goal is to always achieve customer satisfaction with everything we do.

As an ISO registered organization our customers can buy with confidence knowing that NK Technologies designs and manufactures its products within a formal quality assurance system periodically audited by an independent third party auditor. Engaging an appropriately ANAB accredited auditor ensures we do not deviate from documented procedures that provide objective evidence of compliance to the ISO standards.



**Please visit our website for more information about our Quality Standards and our ISO 9001 Certification:**  
[www.nktechnologies.com/quality-policy.html](http://www.nktechnologies.com/quality-policy.html)

## TERMS AND CONDITIONS OF SALE

### 1. Price and Delivery

All prices are FOB shipping point or our factory, San Jose, CA. Delivery shall be established by mutual agreement and/or defined as acknowledged by NK Technologies. All orders are subject to a \$100 minimum order total. Drop shipments are done on an as needed basis and may incur an additional handling charge.

### 2. Shipping and Risk of Loss

NK Technologies shall package products for normal shipping considerations. Further NK Technologies may arrange and prepay all transportation charges with the understanding that all costs associated with the delivery beyond the FOB point will be billed to and assumed by the purchaser. All risk of loss or damage to the products pass to the buyer upon delivery to the carrier at the FOB point: the carrier acting as the buyer's agent. No third party freight billing can be permitted.

### 3. Terms of Payment

Payment shall be made in full within thirty (30) days from the date of product shipment. NK Technologies reserves the right to require full or partial payment in advance of shipment or otherwise change payment terms.

### 4. Title

Title to the products will pass to the buyer upon delivery to the carrier at the FOB point; provided however, NK Technologies will retain a purchase money security interest in each product until all of its claims arising out of the furnishing of such products have been satisfied in full.

### 5. Warranty

NK Technologies warrants that all NK Technologies manufactured products will be free from defects in material and workmanship for the period of five (5) years after receipt by the buyer unless otherwise stated in the product literature. This warranty does not apply to any products or parts not manufactured by NK Technologies, however NK Technologies does agree to assign and transfer to the buyer, insofar as it is permitted by contract or by law, the manufacturer's warranty pertaining to any such products. In any product fails to conform to the warranty applicable to such product, NK Technologies' sole and exclusive liability shall be, at its option, to repair, replace or credit the purchaser's account with an amount equal to the price paid for such products which are returned by the purchaser during the acceptable warranty period with such products' manufacturing date code intact. The foregoing warranties are in lieu of all other warranties, express or implied, including without limitation, any warranties of merchantability or fitness for a particular purpose. All warranties (other than those expressly set forth above) are hereby disclaimed and excluded by NK Technologies. NK Technologies neither assumes nor authorizes any person to assume any other liabilities in connection with the sale or use of any products.

### 6. Returns

Unless agreed to in advance by NK Technologies, all sales are considered final and all merchandise shall be considered the property of the purchaser. At its discretion, NK Technologies may allow for the return of product purchased within the last 180 days in exchange for a restocking charge of twenty-five (25) percent and/or an offsetting order for a value amount equal to or exceeding that of the product returned. Returns of product categorized as "N-R", non-returnable is prohibited. Any merchandise, warranty or other type of product return shall require a Return Material Authorization (RMA) issued by authorized NK Technologies factory personnel. Unless agreed to in advance by NK Technologies, all products returned shall be shipped at the expense of the purchaser.





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and up-to-date information...

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For expert technical help, contact your local Authorized Representative or Authorized Distributor.

