NK Technologies

Current Sensors For Industrial Automation

PRODUCT CATALOG

NK Technologies

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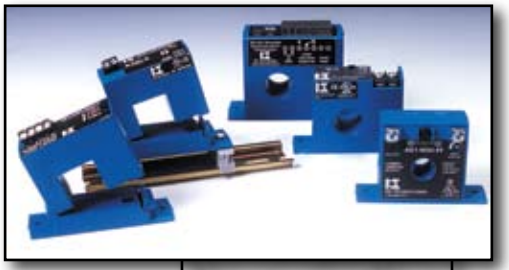
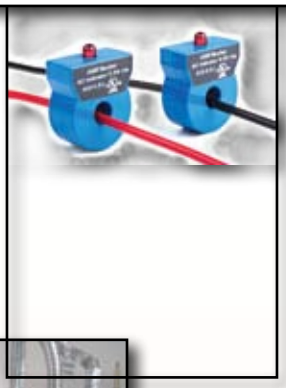
NK Technologies—A Company Built Upon A History Of Innovation

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 1,300 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.





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MADE IN USA

AS1 Series Current Operated 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 set point range of 1–150A 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 enclosure styles or in a split-core case to maximize ease of installation.

AS1 SERIES
Current Operated Switches

Applications

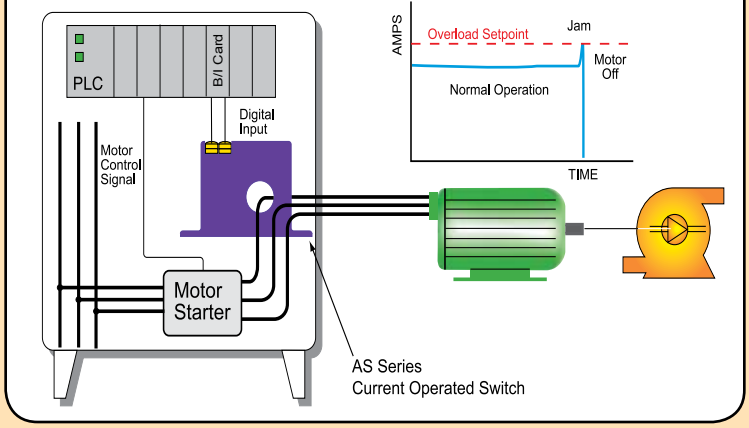
Electronic Proof of Flow
- Current operated switches eliminate the need for multiple pipe or duct penetrations and is more reliable than electromechanical pressure or flow switches.

Conveyors
- Detects jams and overloads.
- Interlocks multitple conveyor sections.

Lighting Circuits
- Easier to install and more accurate than photocells.

Electrical Heaters
- Faster response than temperature sensors.

Pump Jam & Suction Loss Protection



Features

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

Self-powered
- Cuts installation and operating costs.

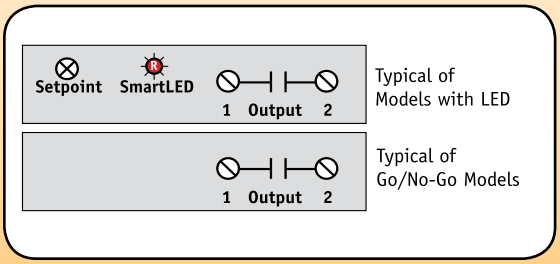
Easily Adjustable Setpoint
- Speeds startup.

Solid or Split-core Case
- Versions tailored for each installation.

LED Indicaton
- Provides quick visual indication of contact status.

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

Connections



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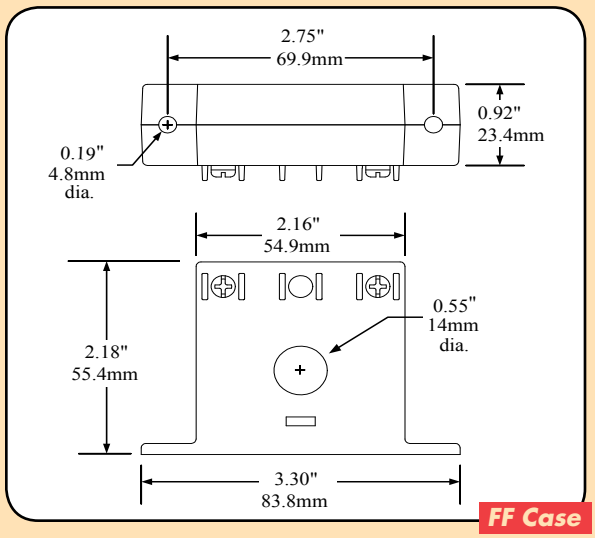
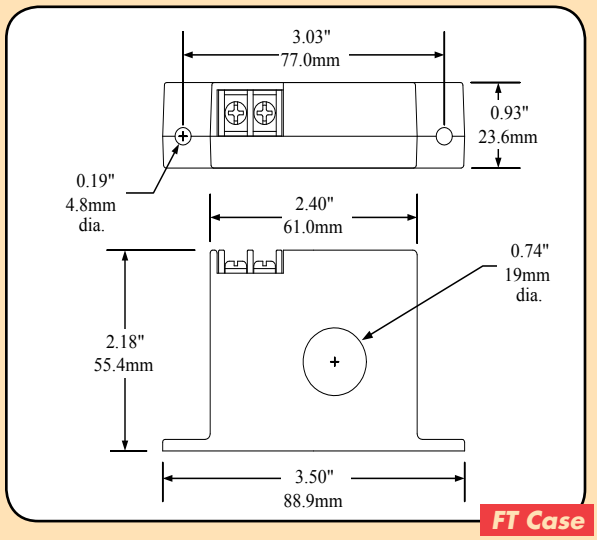
Dimensions



FF Case



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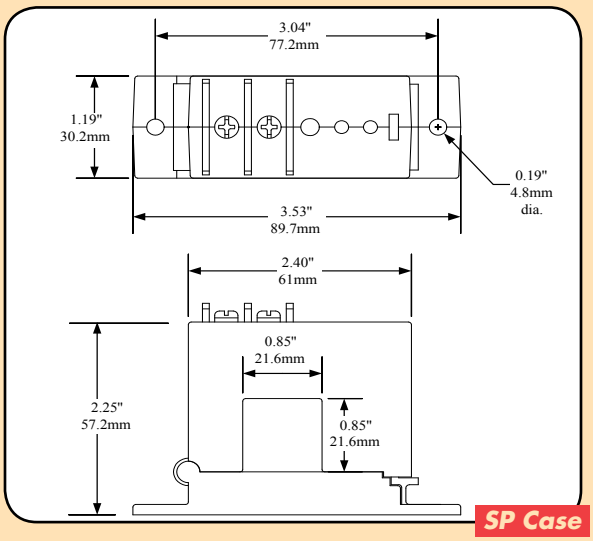

SP Case

Specifications

Power Supply	None—Self-powered		
Output	Magnetically Isolated Solid-State Switch		
Output Rating	• N.O. Version: 0.15A @ 240VAC or VDC • N.C. Version: 0.2A @ 135VAC or VDC • Not polarity sensitive		
Off-State Leakage	<10µA		
Response Time	120 ms		
Setpoint Range	• Solid-core: 1–150A • Split-core: 1.75–150A		
Hysteresis	5% of Setpoint		
Overload	MODEL	6 SEC	1 SEC
	• -GO(NOU) • -GO(NCU) • All other	• 500A • 400A • 400A	• 1000A • 1000A • 1000A
Isolation Voltage	UL Listed to 1270VAC, tested to 5000VAC		
Frequency Range	6–100Hz		
Sensing Aperture	• -FF Case: 0.55" (14mm) dia. • -FT Case: 0.74" (19mm) dia. • -SP Case: 0.85" (21.6mm) sq.		
Case	UL94 V0 Flammability Rated		
Environmental	-58 to 122°F (-50 to 50°C) 0–95% RH, non-condensing		

Ordering Information

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

AS1 - (1) - (2) - (3)

(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	Go/No-go Version (Fixed Setpoint)
NL	No LED
	With LED (Blank)

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MADE IN USA

AS1 DODC Series
Current Operated Switches

AS1 DODC Series current relay with dual output is 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.

Applications

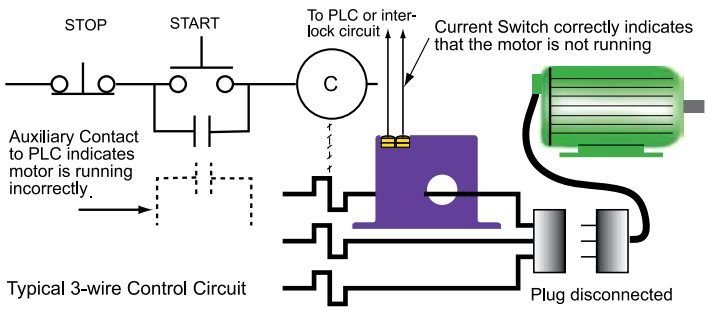
Equipment Motor Protection

- 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.

Status Alarming



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 1A @ 30VDC 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 (0.75–20A) and mid-range (20–50A) applications.

Industrial Grade Performance

- +/- 2% accuracy on setpoint, minimal hysteresis and fast response time deliver quality performance.

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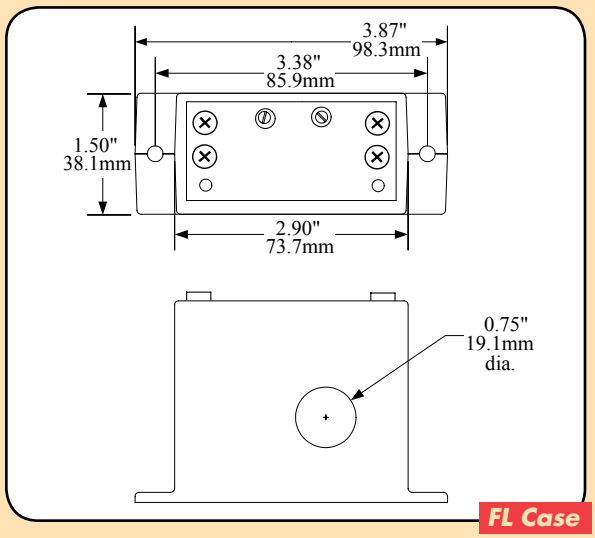
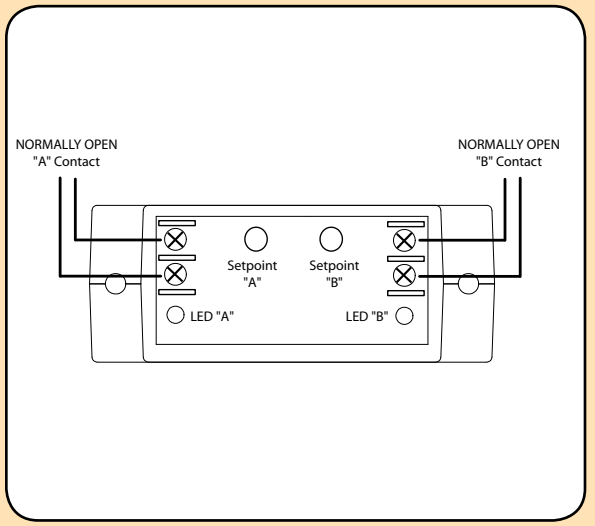
Dimensions



FL Case

Connections



Specifications

Power Supply	None—Self-powered
Output	Dual N.O. Solid State Relays, polarity sensitive
Output Rating	1A @ 30VDC
Trip Point Range (adjustable)	• AS1: 0.75–20A • AS2: 20–50A
Time Delay	Start-up: 2.0 seconds (fixed)
Input Range	• AS1: 0–20A • AS2: 20–50A
Max Inrush	500A (5 sec. duration)
Hysteresis	<8% (max)
Response Time	100 ms
Isolation Voltage	1,250 VAC (monitored)
Case	UL94 V0 Flammability Rated
Environmental	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
Sensing Aperture	0.75" (19.1mm) diameter

Ordering Information

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

	(1)		(2)				(3)	
AS		-	D	O	D	C	F	L

(1) Range

1	0.75–20A
2	20–50A

(2) Output Type

DODC	Dual N.O. 1A @ 30VDC

(3) Case Style

FL	Solid-core

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AS3 SERIES
Current Operated Switches

AS3 Series Current Operated 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, 1–6A, 6–40A and 40–200A input ranges, and a choice of split- or solid-core enclosures are standard.

Applications

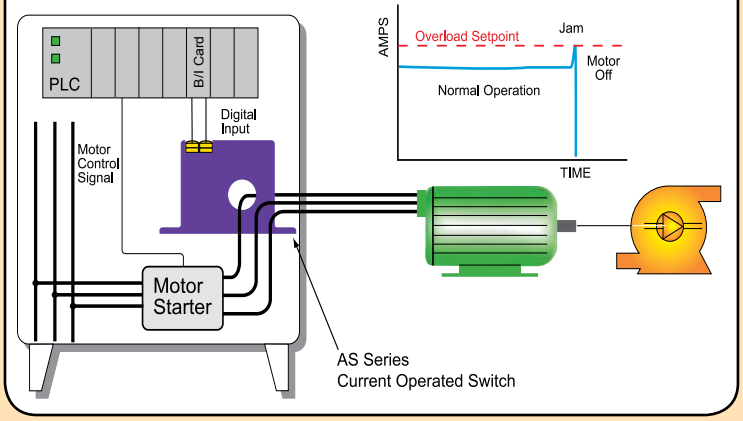
Electronic Proof of Flow
- No need for pipe or duct penetrations.
- More reliable than electro-mechanical pressure or flow switches.

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.

Pump Jam & Suction Loss Protection



Features

Choice of N.O. or N.C. Solid State Ouputs
- 1A @ 240VAC, 0.15A @ 30VDC.
- 15A @ 120VAC (-15 model).
- 3A @ 120VAC output optional, consult factory.

Self-powered
- Cuts installation and operating costs.

Easily Adjustable Setpoint
- Speeds startup.

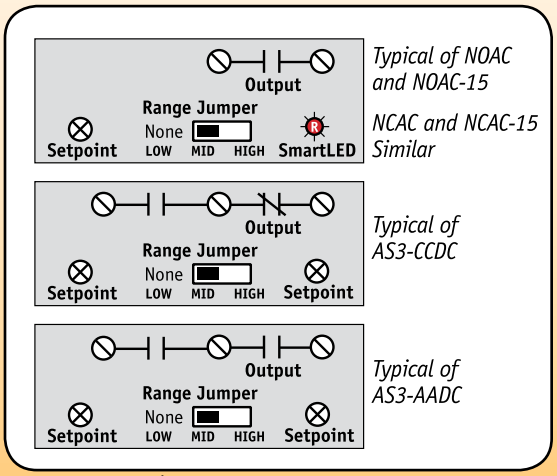
Solid or Split-core Case
- Choose the appropriate version for each installation.

LED Indicaton
- Provides quick visual indiction of contact status.

Built-in Mounting Feet
- Provides the secure installation inspectors require.

UL, CUL and CE Approval
- Accepted worldwide.

Connections



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

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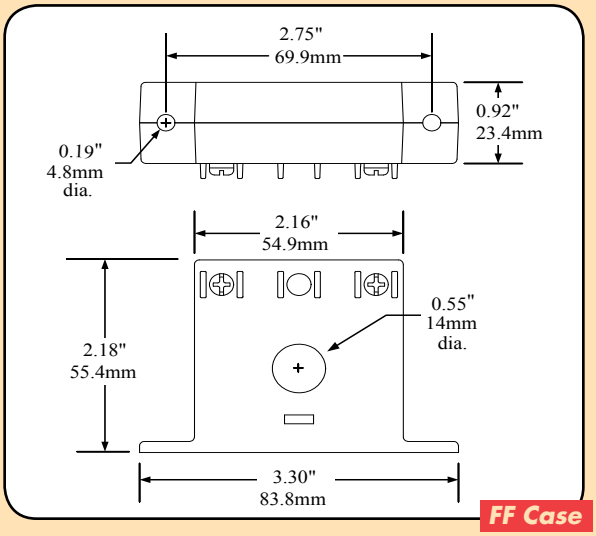
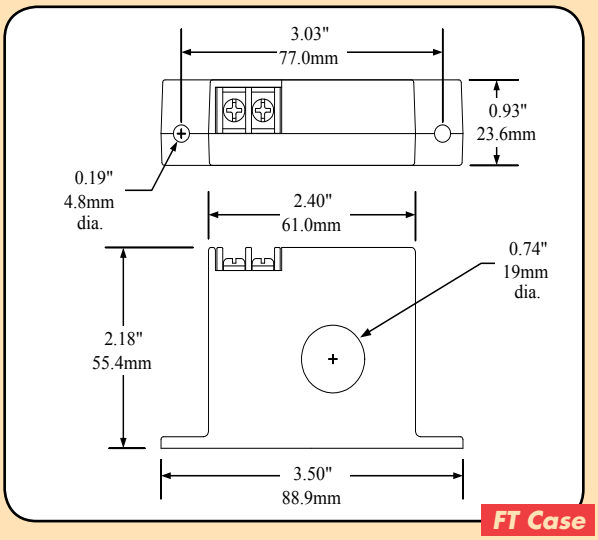
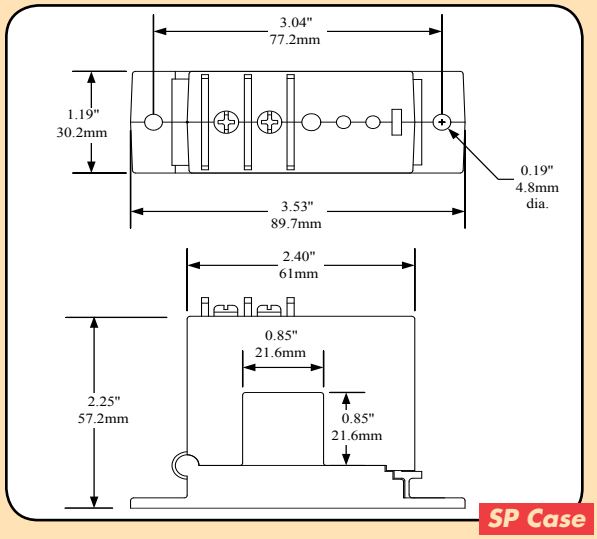
Dimensions



FF Case



FT Case



SP Case

Specifications

Power Supply	None—Self-powered		
Output	Isolated Solid-state Switch; Shared Common (CCDC)		
Output Rating	• 1.0A @ 240VAC (Standard AC Units) • 0.15A @ 30VDC (Standard DC & Multi-pole Units) • 15A @ 120VAC, 10A @ 240VAC (-15 Option) • 3.0A @ 120VAC* (-FT only)		
Off State Leakage	• NOAC: <10µA • NCAC: 2.5mA • AADC: <10µA	• NODC: <10µA • NCDC: 1.4mA • CCDC: 0.3mA (NC Terminal)	
Response Time	40–120ms		
Setpoint Range	• Solid-core: 1–6, 6–40 & 40–175A • Split-core: 1.75–6, 60–40 & 40–200A		
Hysteresis	Low: 0.15A, Mid: 0.3A, High: 0.9A		
Overload	Range	6 Sec	1 Sec
	• 1–6A • 6–40A • 40–175A	• 400A • 500A • 800A	• 600A • 800A • 1,200A
Isolation Voltage	UL Listed to 1,270VAC, tested to 5,000VAC		
Frequency Range	6–100Hz		
Sensing Aperture	• -FF Case: 0.55" (14mm) dia. • -FT Case: 0.74" (19mm) dia. • -SP Case: 0.85" (21.6mm) sq.		
Case	UL94 V0 Flamability Rated		
Environmental	-58 to 122°F (-50 to 50°C) 0–95% RH, non-condensing		
Listings	UL 508 Industrial Control Equipment (USA & Canada), CE		

*N.O/N.C. 3A @ 120VAC output please consult factory.

Ordering Information

Sample Model Number: AS3-NOAC-SP-NL

Adjustable AC current operated switch, normally open AC contacts, split-core, without indicating LED.

AS3 - (1) - (2) - (3)

(1) Output Rating

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

*N.O/N.C. 3A @ 120VAC output please consult factory.

(2) Case Style

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

**Available with 3A @ 120VAC output only.

(3) Options

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

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AS1 SERIES

Current Operated Switch w/Output Bypass

AS1 Series with output bypass is a standard AS1 current switch with the additional feature of allowing a user to bypass sensor operation and force the output contacts into their energized state. This feature is beneficial whenever commissioning or servicing a system as it allows the output circuit to be tested without the sensor having to be operational. Available in -FT solid-core enclosure style only (See AS1 dimensional drawing on page 3).

Specifications

Power Supply	None—Self-powered		
Output	Magnetically Isolated Solid-State Switch		
Output Rating	• N.O. Version: 0.15A @ 240VAC or VDC • N.C. Version: 0.2A @ 135VAC or VDC • Not polarity sensitive		
Off-State Leakage	<10μA		
Response Time	120 ms		
Setpoint Range	Solid-core: 1–150A		
Hysteresis	5% of Setpoint		
Overload	MODEL	6 SEC	1 SEC
	• -GO(NOU) • -GO(NCU) • All other	• 500A • 400A • 400A	• 1,000A • 1,000A • 1,000A
Isolation Voltage	UL Listed to 1,270VAC, tested to 5,000VAC		
Frequency Range	6–100Hz		
Sensing Aperture	-FT Case: 0.74" (19mm) dia.		
Case	UL94 V0 Flammability Rated		
Environmental	-58 to 122°F (-50 to 50°C) 0–95% RH, non-condensing		

Features

Universal Output
- N.O. or N.C. solid state switch for applications up to 240VAC/VDC. Compatible with most automation systems and equipment.

Bypass Switch
- Switch selectable bypass forces contacts into energized state (i.e., when setpoint has been exceeded) for system commissioning and testing.

Self-Powered
- Reduces installation time and costs.

Adjustable Setpoint
- Trip point adjustment from 1–150A.

Integral Mounting Feet
- Molded in feet screw mounting or attachment of DIN-compatible brackets.

Applications

System Monitoring and Status
- Monitor fan, pump or heater status; sense when equipment is on and operating at normal current draw levels.
- Provide electronic "proof of flow" without duct or pipe sensor installations.

Conveyor Loading or Jam Sensing
- Monitor load on conveyor motors to detect when jams or overloads occur.
- Helpful when interlocking multiple conveyors sections.

Heaters & Lighting Circuits
- Sense system operation; faster reacting than thermal motor overloads and more accurate than photocells in lighting applications.

Ordering Information

Sample Model Number: AS1-NOU-FT-Y39

AS1 - [(1) _ _ _] - [(2) F T] - [(3) Y 3 9]

(1) Output Rating

NOU	Normally Open
NCU	Normally Closed

(2) Case Style

FT	Solid-core, Top Terminals

(3) Options

Y39	Output Contact Bypass

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ASM SERIES
Current Operated Switches

ASM Series Load Monitoring Switches are 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 +/- 15% of the average expected current draw. The ASM is available in solid- or split-core enclosure styles.

Specifications

Power Supply	None—Self-powered
Output	Magnetically Isolated Solid-State Switch
Output Rating	• N.O. Version: 0.30A @ 135VAC or VDC • Not polarity sensitive
Off State Leakage	<10µA
Response Time	200ms
Setpoint Range	• Solid-core: 1.5–150A • Split-core: 2.8–150A
Setpoint	• Overload: +15% of Load (-OL) • Underload: -15% of Load (-UL) • Operating Window +/- 15% of Setpoint
Hysteresis	5% of Setpoint
Overload	500A @ 6sec., 1,000A @ 1sec.
Isolation Voltage	UL Listed to 1,270VAC, tested to 5,000VAC
Frequency Range	6–100Hz
Dimensions	3.50" x 2.25" x 1.20", Aperture: 0.74"–0.85"
Case	UL94 V0 Flammability Rated
Environmental	-58 to 122°F (-50 to 50°C) 0–95% RH, non-condensing
Listings	UL 508 Industrial Control Equipment (USA & Canada), CE (pending)

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.

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.

Ordering Information

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

ASM - (1) [ ][ ][ ] - (2) [ ][ ] - (3) [ ][ ]

(1) Output Rating

NOU	Normally Open (closed while current is within +/-15% window)

(2) Operation

OL	Overload
UL	Underload (Status)
OU	Over/Underload (Operating Window)

(3) Case Style

FT	Solid-core, Top Term
SP	Split-core

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ASX Series Current Operated Switches are high performance current-operated 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.

ASX SERIES
Current Operated Switches

Applications

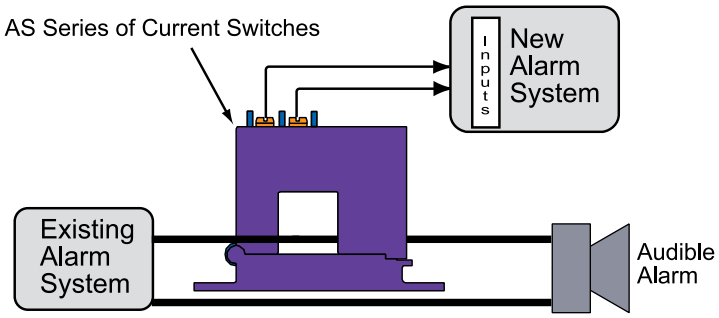
Motor Protection

- 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 relays.

High Inrush or Temporary Overload Current

- Adjustable start-up/delay timer allows 0–15 second delay to eliminate nuisance trips from high inrush or short overload conditions.

Isolated Alarm System Interfacing



Features

Adjustable Start-up/Delay Timer

- Field-adjustable from 0–15 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 1.0A @ 240VAC or universal outputs of 0.15A @ 240VAC/VDC (N.O. models) and 0.2A @ 135VAC/VDC (N.C. models) for use with most standard motor control systems.

Improved Ease of Installation and Use

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

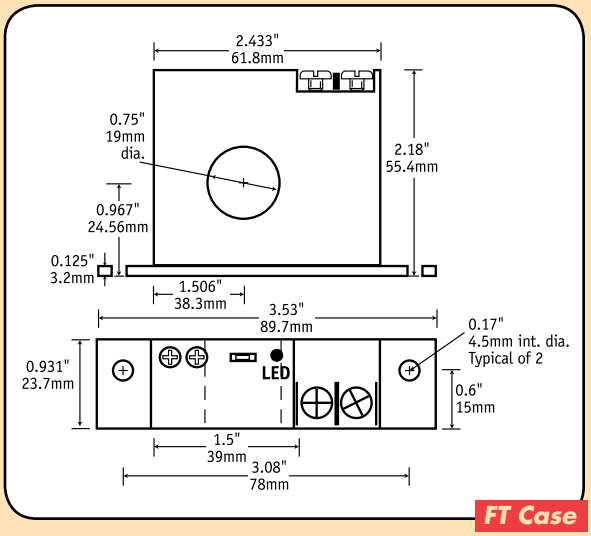
Industrial Grade Performance

- Constant hysteresis and linear response characteristic enhance setpoint accuracy.

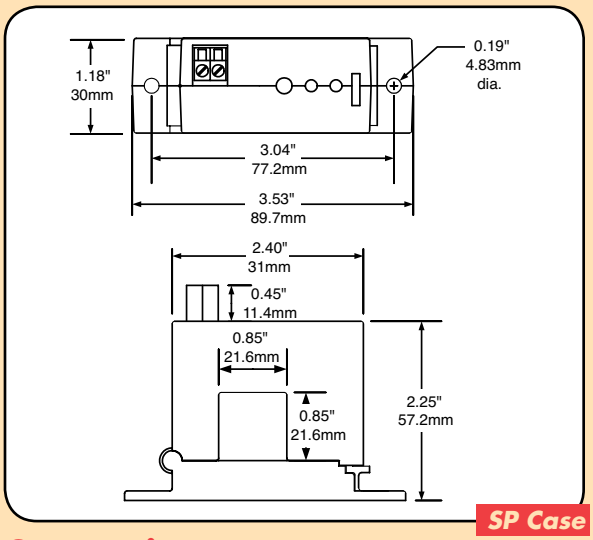
Agency Approved

- UL listed, CE pending.

Dimensions

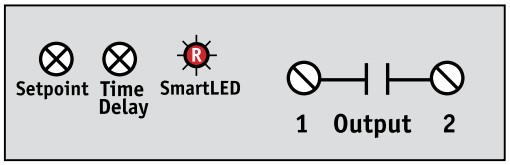


FT Case



SP Case

Connections



Specifications

Power Supply	None—Self powered
Output	Isolated Solid-State Switch
Output Rating	• NOAC/NCAC: 1A @ 240VAC • NOU: 0.15A @ 240VAC or VDC • NCU: 0.2A @ 135VAC or VDC
Off State Leakage	<10 micro Amps
Response Time	Adjustable 0.2 to 15 Seconds
Setpoint Range	Jumper Selectable: 1.5–12A, 12–55A, 50–200A
Hysteresis	5% (constant)
Overload	• 1.5–12A Range: 600A max. • 12–55A Range: 800A max. • 50–200A Range: 1,200A max.
Isolation Voltage	5,000VAC (tested)
Frequency Range	50–100Hz
Case	UL94 V0 Flammability Rated
Environmental	5 to 122°F (-15 to 50°C) 0–95%RH, non-condensing
Listings	UL 508 Industrial Control Equipment (USA & Canada), CE pending.

Ordering Information

Sample Model Number: ASX-NOAC-SP
Current Switch w/adjustable time delay, N.O. 1.0A @ 240VAC output, jumper selectable input ranges, split-core enclosure.

ASX - (1) - (2)

(1) Output Type

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

(2) Case Style

FT	Solid-core
SP	Split-core

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MADE IN USA

ASXP SERIES
Current Operated Switches

ASXP Series Current Operated Switches are powered versions of our popular current switches with integral time delay. A fixed two-second delay upon trip minimizes nuisance alarms during start-up and operation in motor or heater status applications. After startup a second 0–15 second delay can be set. For use with 24VAC/DC or 120VAC supplies, this high performance product offers OEM-caliber accuracy, precision tolerances, low hysteresis and low (non-sinusoidal) frequency operation. Available with status LED and solid-core enclosure as standard.

Applications

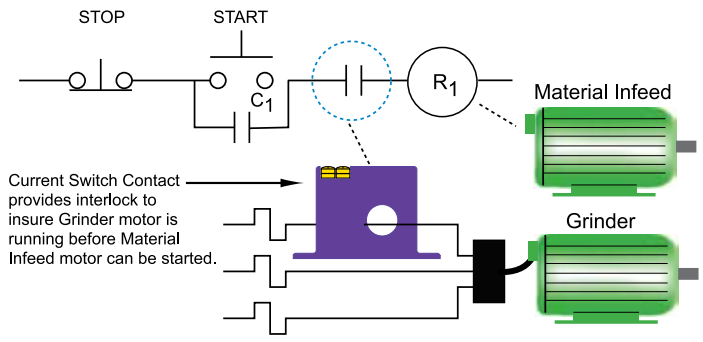
Motor Protection

- 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 relays.

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 0-15 second delay can be added.

Safety Interlocks



Features

Fixed Start-up/Delay Timer

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

Choice of N.O./N.C. Electro-mechanical Relay Output

- Contact rating of 10A @ 240VAC 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 24VAC/DC or 120VAC/DC supply models.
- LED provides indication of trip point contact status.
- Setpoint adjustable from 1–50A.

Industrial Grade Performance

- 0.5% accuracy, precise time delay setpoint, constant hysteresis, linear response and low frequency capability.

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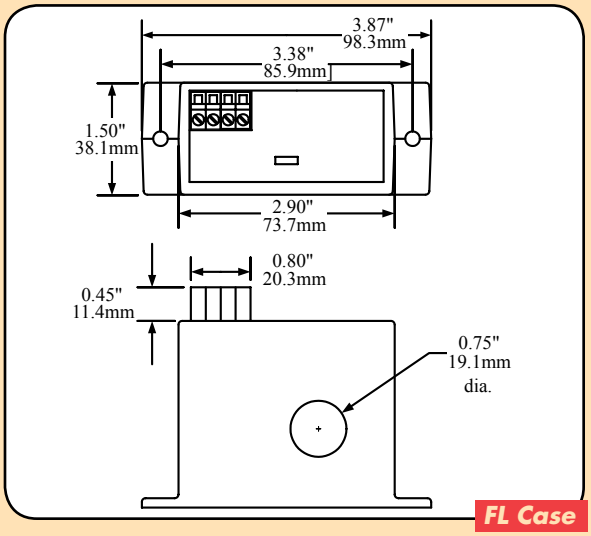
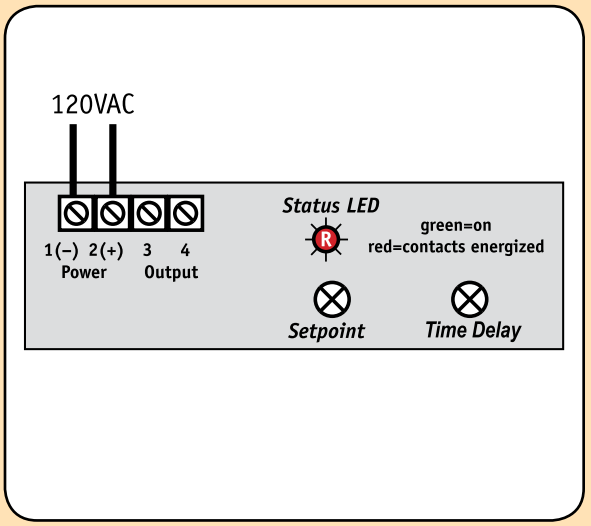
Dimensions



FL Case

Connections



Specifications

Power Supply	24VAC/DC or 120VAC/VDC, (+/- 10%), 2VA max
Output	Electromechanical SPST Relay, Auto Reset
Output Rating	10A @ 240VAC
Trip Point Range	● ASXP1: 1–20A ● ASXP2: 20–50A
Time Delay	2.0 sec (fixed on startup) 0-15 sec (adjustable after startup)
Max Inrush Current	500A (5 second duration)
Hysteresis	5% (constant)
Isolation Voltage	1,250 VAC (monitored)
Frequency Range	6–100Hz
Sensing Aperture	0.75" (19.1mm) dia.
Case	UL94 V0 Flammability Rated
Environmental	-4 to 122°F (-20 to 50°C) 0–95%RH, non-condensing

Ordering Information

Sample Model Number: ASXP1-NOR-120-FL
AC current switch, fixed 2 sec. delay, N.O. 10A @ 240VAC output, 120VAC/VDC supply, solid-core enclosure.

	(1)		(2)		(3)		(4)
ASXP		-		-	120	-	FL

(1) Input Range

1	1–20A
2	20–50A

(2) Output Type

NOR	N.O. SPST 10A @ 240VAC
NCR	N.C. SPST 10A @ 240VAC

(3) Power Supply

24U	24VAC/DC
120	120VAC/DC

(4) Case Style

FL	Solid-core

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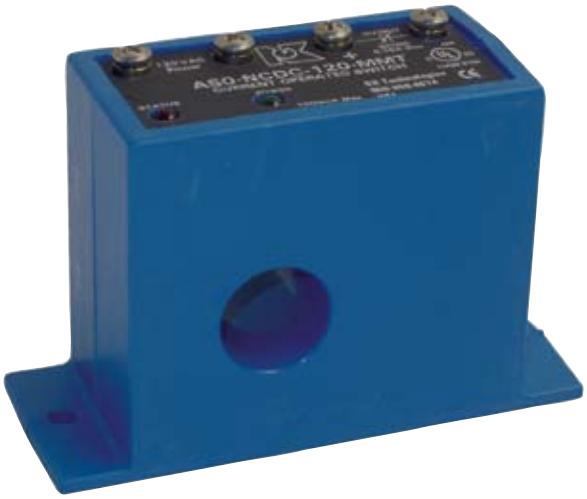


MADE IN USA

AS0 Series Low-current Sensors are specialized current operated switches that combine an ultra-sensitive current transformer and signal conditioning electronics into a single package for sensing AC current from 3–350mA. Useful for signal or lamp status monitoring, detecting minute fault currents or fan proving, the AS0 Series features solid-state outputs and jumper-selectable ranges, which make it a versatile choice for low-current status indication applications.

AS0 SERIES
Current Operated Switches

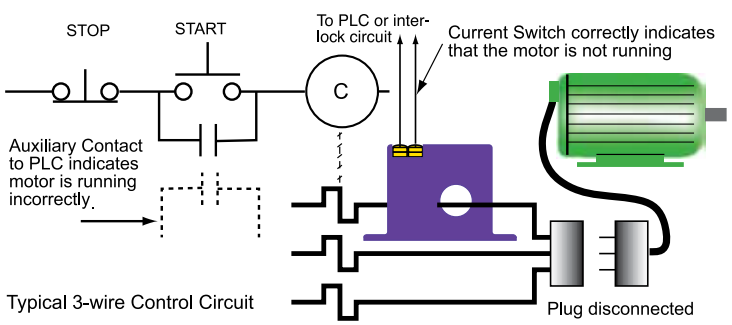
Applications

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-proving on a crucial cooling fan.

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

Status Alarming



Features

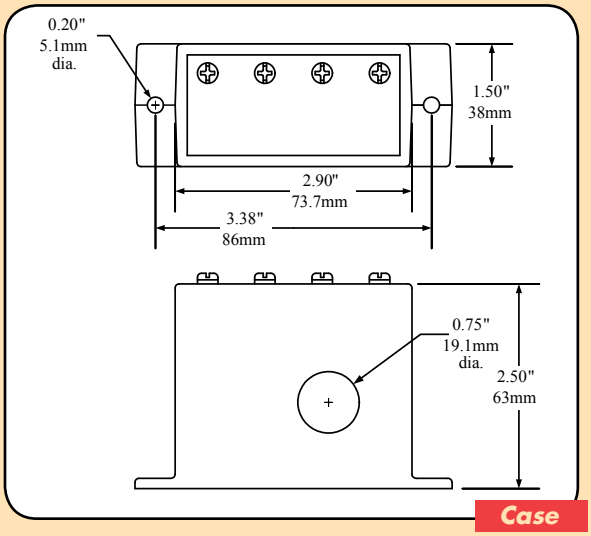
Wide Range of Output Options
- Dependable, solid state switch N.O. or N.C. contacts rated at 240VAC or 30VDC.
- Compatible with most automation controllers.

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 3mA to 350mA, speeding installation and allowing for tailored applications.

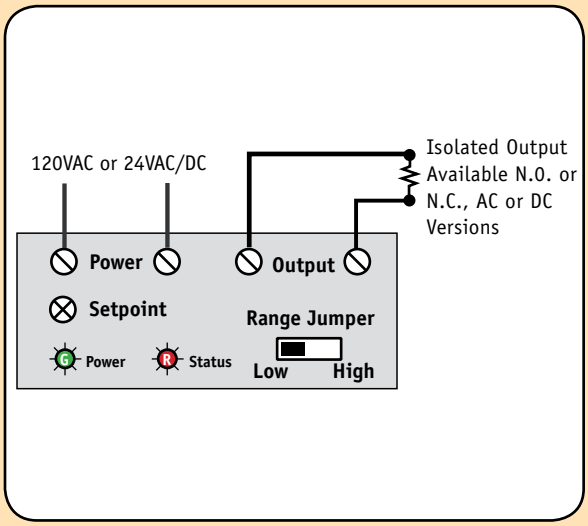
UL, CUL and CE Approval
- Accepted worldwide.

Dimensions



Case

Connections



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

Specifications

Power Supply	Operates from +/-20% of nominal voltages
Nominal Voltages	120VAC (50–400Hz) or 24VAC/DC
Power Consumption	2.5 Watts
Output Rating	• AC Version: 1A @ 240VAC • DC Version: 0.15A @ 30VDC
Response Time	• 150 ms @ 5% above setpoint • 100 ms @ 50% above setpoint
Setpoint Range	• Low Range: 3–15mA Field Adjustable • High Range: 15–350mA Field Adjustable
Maximum Input	10A
Isolation Voltage	600VAC (Monitored Circuit)
Frequency Range	50–400Hz (Monitored Circuit)
Case	UL94 V0 Flammability Rated
Environmental	-58 to 122°F (-20 to 50°C) 0–95%RH, non-condensing
Listings	UL Listed, CSA Approved, CE Certified

Ordering Information

Sample Model Number: AS0-NODC-120
Ultra low current sensor, normally open solid state DC output and 120VAC power supply.

AS0 - (1) [ ][ ][ ][ ] - (2) [ ][ ][ ]

(1) Output Type

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

(2) Power Supply

24U	24VAC/DC
120	120VAC

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MADE IN USA

DS3 Series Current Operated 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 400Hz. Available in a solid-core case with choice of relay or a universal solid-state output.

DS3 SERIES
Current Operated Switches

Applications

Welders and Platers
- Instant indication of equipment status.

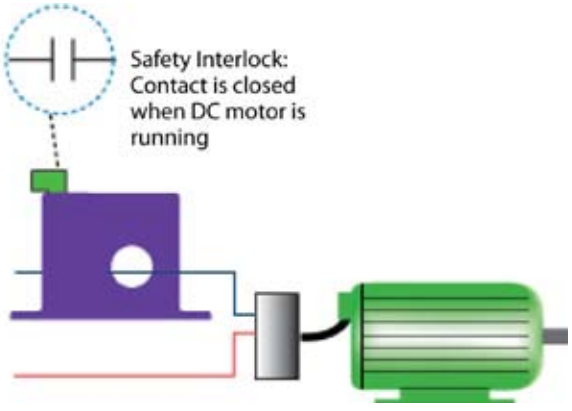
Large Drive Motors
- Provides enhanced field loss protection.

Power Supplies
- Signals over-current before equipment fails.

Machine Operation
- Instant status of motors, lamps and other loads.

Telecom Sites
- Monitors battery output.

Failure Detection



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.

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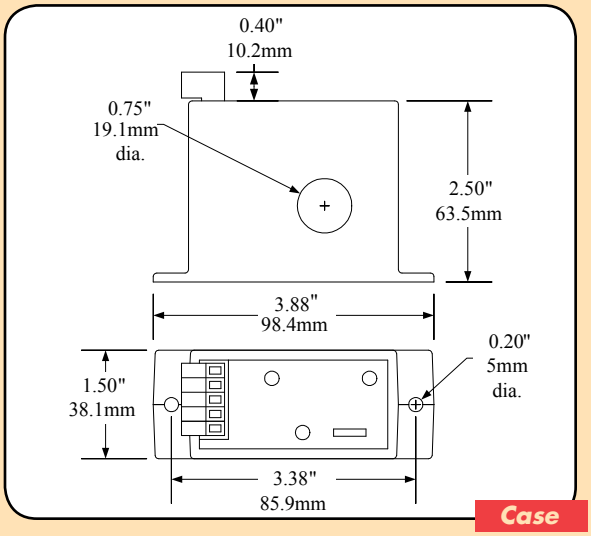
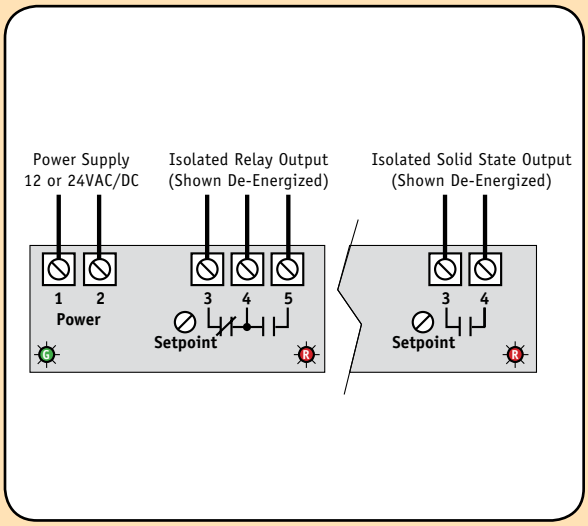
Dimensions



Case

Connections



Notes:

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

Specifications

Output	Isolated Dry Contact
Output Rating	• Solid State: 0.15A @ 240VAC or VDC (N.O. Only) • Relays: 5.0A @ 240VAC, 5.0A @ 30VDC (SPDT)
Off State Leakage	<10µA
Response Time	• 100ms (10% above setpoint) • 20ms (100% above setpoint)
Setpoint Range	• 4–20, 10–50 and 20–100A (DC) jumper selectable (derate by $\sqrt{2}$ for AC)
Hysteresis	5% of Setpoint
Isolation Voltage	3kV
Frequency Range	DC to 400Hz
Sensing Aperture	0.75" (19.1mm) dia.
Case	UL94 V0 Flammability Rated
Environmental	• -4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing • -40 to 140°F (-40 to 60°C) (Solid state output only)
Listings	UL 508 Industrial Control Equipment (USA & Canada), CE

Ordering Information

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

(1) (2) (3)
DS □ - □□□ - □□□

(1) Setpoint Range

3	4–20, 10–50 and 20–100A, Jumper Selectable
C	Custom (consult factory)

(2) Output Type

SDT	SPDT Relay (Form C)
NOU	Solid State N.O. AC/DC

(3) Power Supply

24U	+24VAC/DC
12U	+12VAC/DC

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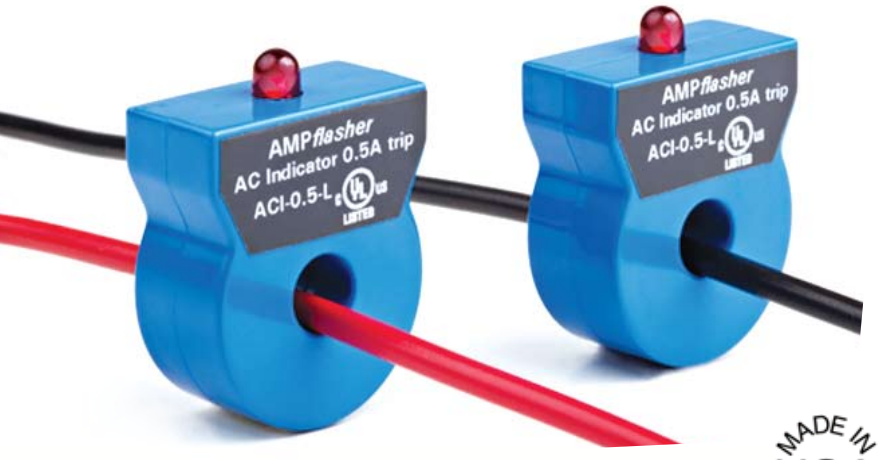


MADE IN USA

AMP*Flasher*™ ACI SERIES

AC Current Indicators

The **AMP*Flasher*™ 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, AMP*Flasher*™ current indicators are a cost-effective way to detect live conductors and see current flow to fans, heaters, pumps, lighting or other powered devices.

Specifications

Output/Indication	LED (flashing, red), Standard
Indicating Range	0.5A–100A
LED On/Relay Trip Point	<500mA (factory set)
Dimensions	• Overall: 1.125"W x 0.56"D x 1.5"H • Aperture: 0.32"ID
Case	UL94 V0 Flammability Rated
Mounting	Slides directly onto monitored conductor
Environmental	-58 to 122°F (-50 to 50°C) 0–95% RH, non-condensing
Frequency Response	50–400 HZ
Listings/Certifications	UL 508 Listed; RoHS Compliant

Features

Low Sensitivity Turn-On Point

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

High Visibilty Flashing LED

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

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.

Ordering Information

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

ACI -	(1) 0 . 5	-	(2) L

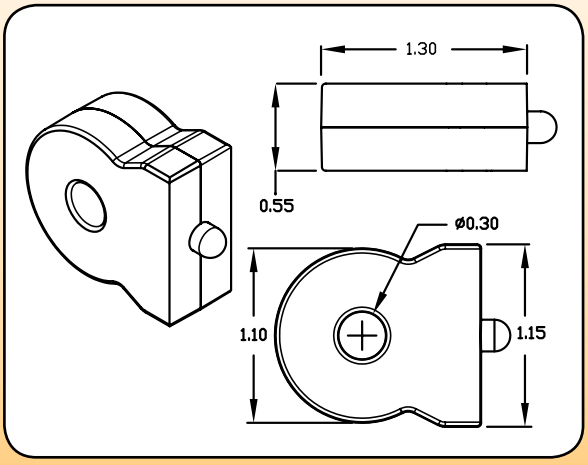
(1) Sensitivity Level

0.5	500 mA

(2) Indication/Output

L	LED (flashing, red)

Dimensions



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MADE IN USA

AT SERIES
Current Transducers

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

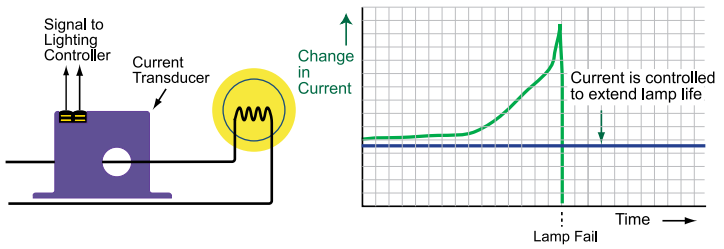
Applications

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



Features

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

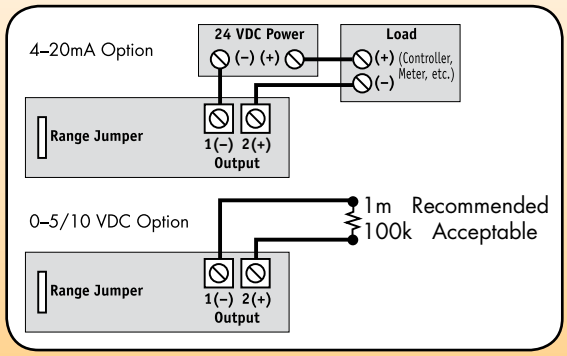
Average Responding
- "Average Responding" algorithm gives an RMS output on pure sine waves. Perfect for constant speed (linear) loads.

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.

Connections



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

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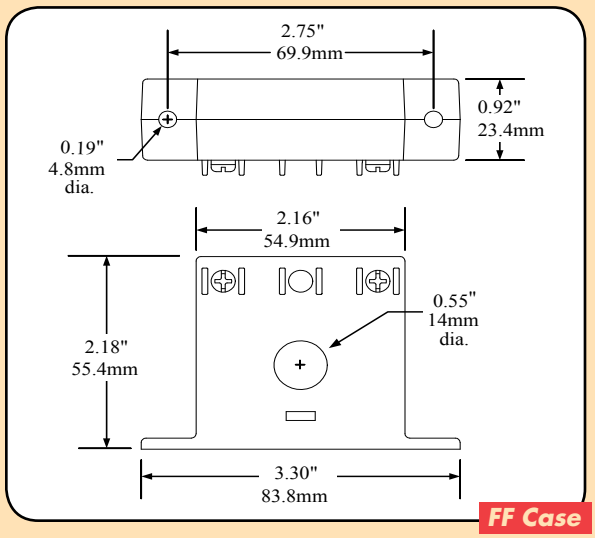
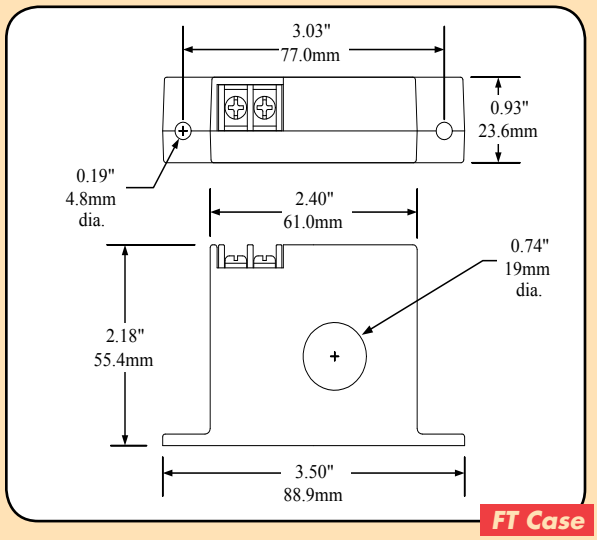
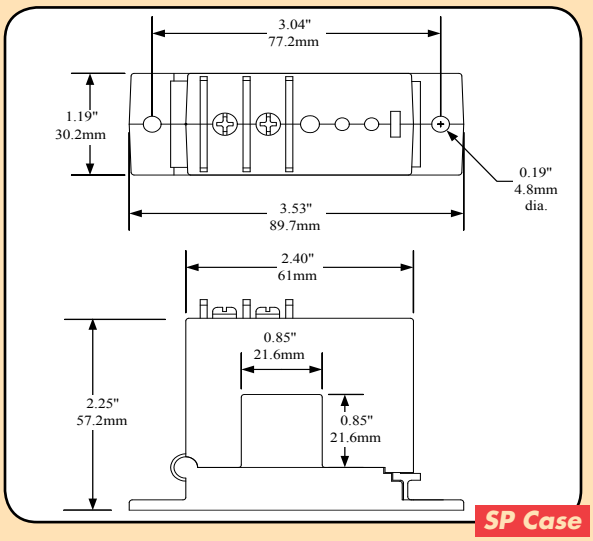
Dimensions



FF Case



FT Case



SP Case

Specifications

	-005 Model	-010 Model	-420 Model
Output Signal	0–5VDC	0–10VDC	4–20mA
Output Limit	8.2VDC	15VDC	32mA
Accuracy	1.0% FS		
Response Time (10–90% step change)	100 ms		300 ms
Frequency Range	50–60Hz		20–100Hz*
Other Frequencies	Special calibration available for any frequency from 10–400Hz*		
Power Supply	Self-powered		12–40VDC, Loop-powered
Loading	1m min. for rated accuracy 100K add 1.3% error		See power requirements on page 48
Isolation Voltage	UL listed to 1,270VAC (tested to 5KV)		
Input Ranges	Field selectable ranges from 0–200A; custom ranges available; consult factory.		
Sensing Aperture	• -FF Case: 0.55" (14mm) dia. • -FT Case: 0.74" (19mm) dia. • -SP Case: 0.85" (21.6mm) sq.		
Case	UL94 V0 Flammability Rated		
Environmental	• -4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing		
Listings	UL 508 Industrial Control Equipment (USA & Canada), CE		

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

Ordering Information

Sample Model Number: AT1-005-000-SP

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

AT (1) - (2) - (3) - (4)

(1) Full Scale Range

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

(3) Power Supply

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

(2) Output Signal

420	4–20mA
005	0–5VDC
010	0–10VDC

(4) Case Style

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

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MADE IN USA

ATR SERIES
Current Transducers

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

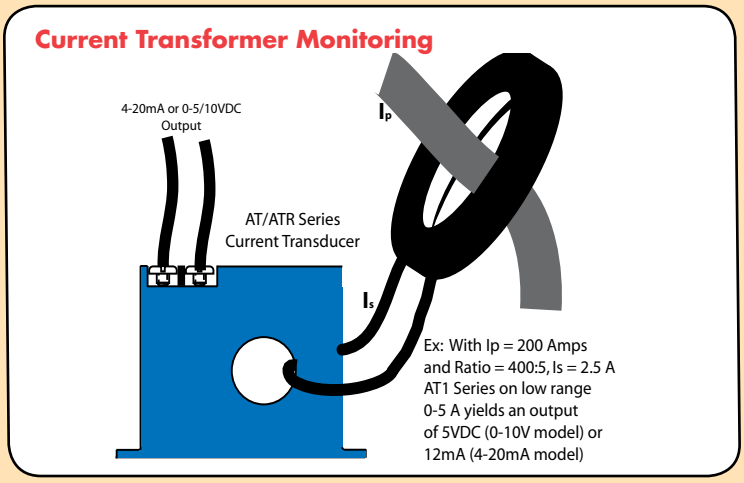
Applications

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.

Current Transformer Monitoring



Features

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

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.

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***.

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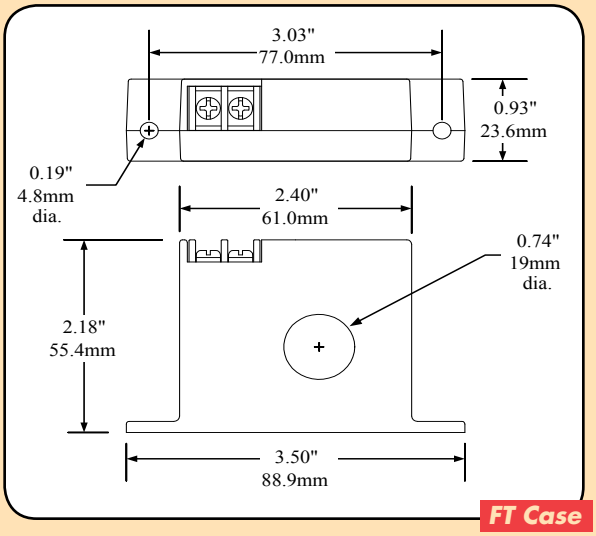
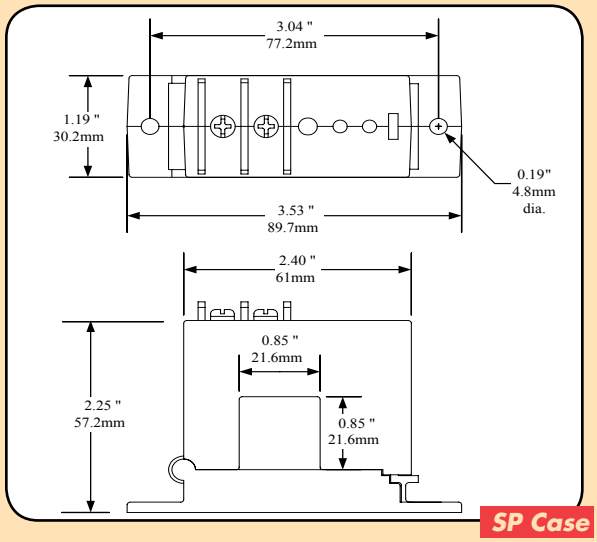
Dimensions

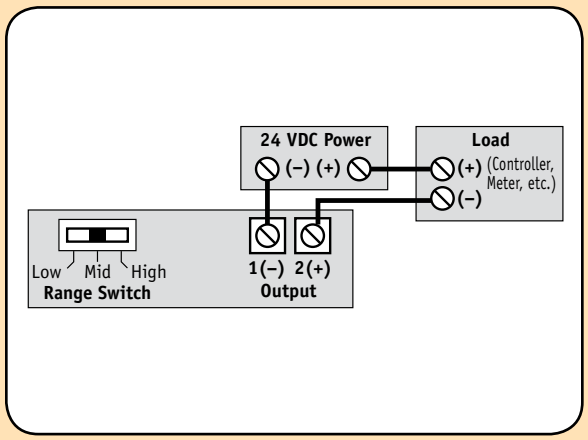


FT Case



SP Case

Connections



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

Specifications

Output Signal	4–20mA, Loop-powered, True RMS
Output Limit	23mA
Accuracy	1.0% FS
Response Time	600 ms (to 90% step change)
Frequency Range	10–400Hz
Power Supply	24VDC Nominal, 40VDC Maximum
Isolation Voltage	UL listed to 1,270VAC (tested to 5KV)
Input Ranges	Field selectable ranges from 0–200A; custom ranges available; consult factory.
Sensing Aperture	• -FT Case: 0.74" (19mm) dia. • -SP Case: 0.85" (21.6mm) sq.
Case	UL94 V0 Flammability Rated
Environmental	-4 to 122°F (-20 to 50°C) 0–95% RH, non-condensing
Listings	UL 508 Industrial Control Equipment (USA & Canada), CE

Ordering Information

Sample Model Number: ATR1-420-24L-SP
True RMS AC current transducer, 10/20/50A ranges, 4–20mA output, 24VDC loop-powered in a split-core case.

	(1)		(2)			(3)			(4)	
ATR		-	4	2	0	-	2	4	L	-		

(1) Full Scale Range

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

(2) Output Signal

420	4–20mA

(3) Power Supply

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

(4) Case Style

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

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MADE IN USA

AT/ATR 3 & 4 SERIES
Current Transducers

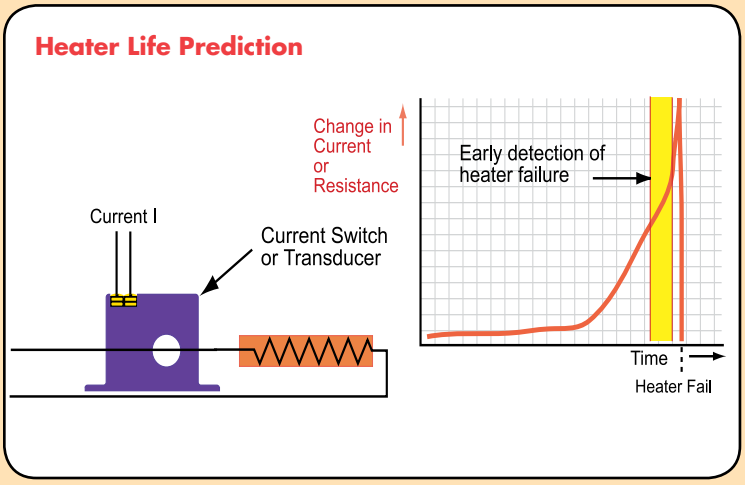
AT/ATR 3 & 4 Series Current Transducers combine a current transformer and a signal conditioner into a single package for applications from 200A to 2000A. The AT version is Average Responding for use on linear (sinusoidal) loads. The ATR version is True RMS for use on distorted waveforms found in VFD or SCR ouputs. Available in a solid-core case.

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.



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."***

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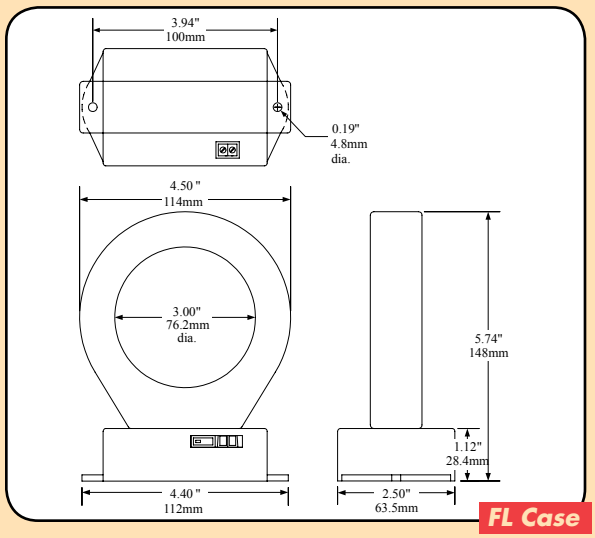
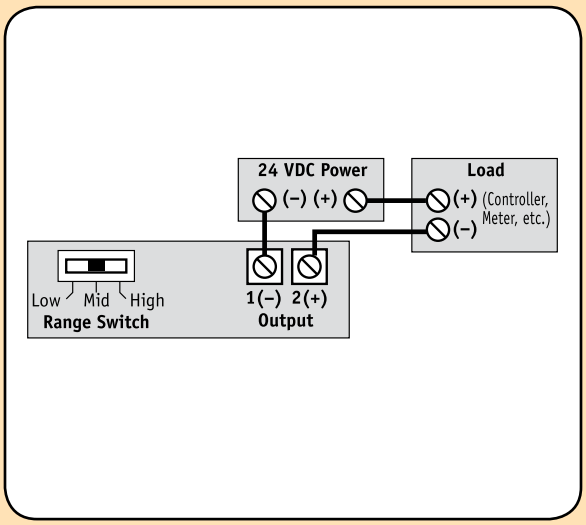
Dimensions



FL Case

Connections



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

Specifications

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

Ordering Information

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

	(1)	(2)	(3)		(4)		(5)	
AT			4	2 0	2	4 L	F	L

(1) Measurement

R	True RMS
	Average Responding (Blank)

(2) Full Scale Range

3	375, 500, 750A
4	1000, 1333, 2000A

(3) Output Signal

420	4–20mA

(4) Power Supply

24L	24VDC Loop-powered

(5) Case Style

FL	Solid-core

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

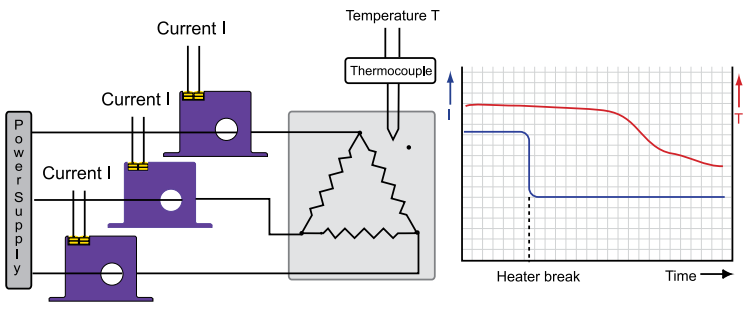
ATP SERIES
Current Transducers

Applications

Commercial and Industrial Motor Control Centers

- 120VAC 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 24VDC power supply or AC rectifiers within the control panel; saves space, material and labor associated with power supplies.

Heater Failure Detection



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.

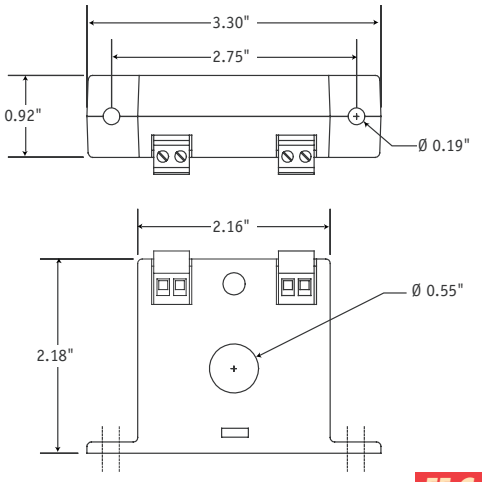
Jumper Selectable Input Ranges

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

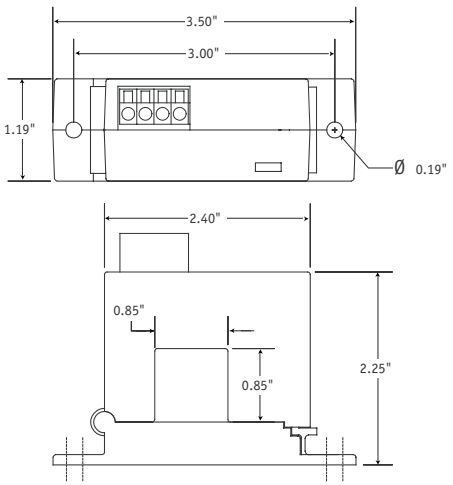
Isolation Output

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

Dimensions

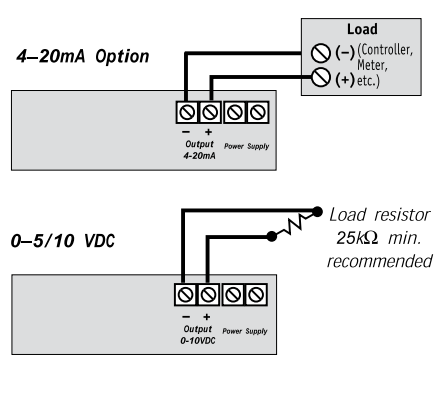


FF Case



SP Case

Connections



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

Specifications

	-005 Model	-010 Model	-420 Model
Output Signal	0–5VDC	0–10VDC	4–20mA
Output Limit	112% (5.6V)	112% (11.2V)	112% (22.4mA)
Loading	25K min.: VDC Models 500 max.: 4–20mA Models		
Response Time	100ms (10–90% step change)		
Frequency Range	40–100 Hz standard. Special calibration for frequencies 100–400Hz, consult factory.		
Accuracy	• Solid-core: <0.5% • Split-core: 1%		
Power Supply	120VAC or 24VAC/VDC, 2VA max		
Isolation Voltage	UL listed to 1,270VAC (tested to 5KV)		
Input Ranges	0–200A Jumper-selectable		
Sensing Aperture	• -FF Case: 0.55" (14mm) dia. • -SP Case: 0.85" (21.6mm) sq.		
Case	UL94 V0 Flammability Rated		
Environmental	5 to 122°F (-15 to 50°C) 0–95% RH, non-condensing		

Ordering Information

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

ATP (1) - (2) - (3) - (4)

(1) Full Scale Range

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

(2) Output Signal

005	0–5VDC
010	0–10VDC
420	4–20mA

(3) Power Supply

120	120VAC (-FF only)
24U	24VAC/DC with isolated output

(4) Case Style

FF	Solid-core
SP	Split-core

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ATP/ATPR 3 & 4 Series Powered High-Current Transducers are large-format solid-core transducers designed for high current applications from 200A to 2000A. Powered by 120VAC or 24VAC/VDC, these products take advantage of available power supplies and eliminate the need for costly control power transformers. Options include average responding and True RMS versions, 0–5/10VDC or 4–20mA analog outputs and switch-selectable input ranges.

ATP/ATPR 3 & 4 SERIES
Current Transducers

Applications

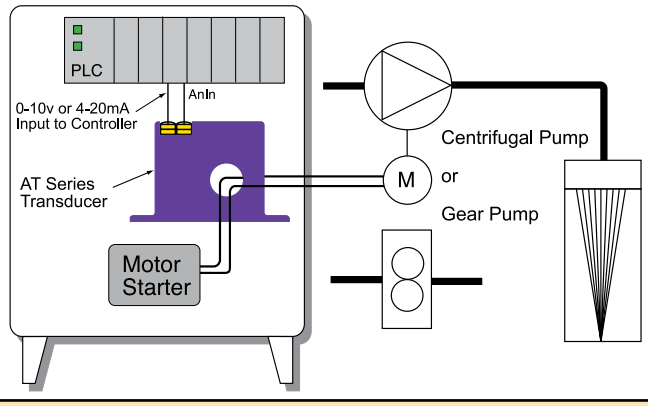
Commercial and Industrial MCC's
- Fits conveniently in motor control centers, senses current on industrial motors and provides analog inputs back to PLC or controller.

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. 120VAC or 24VAC/VDC 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.

Centrifugal Pump Monitoring



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).

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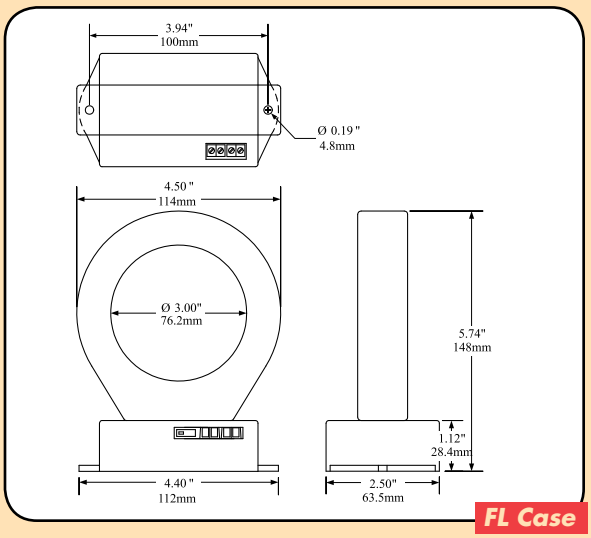
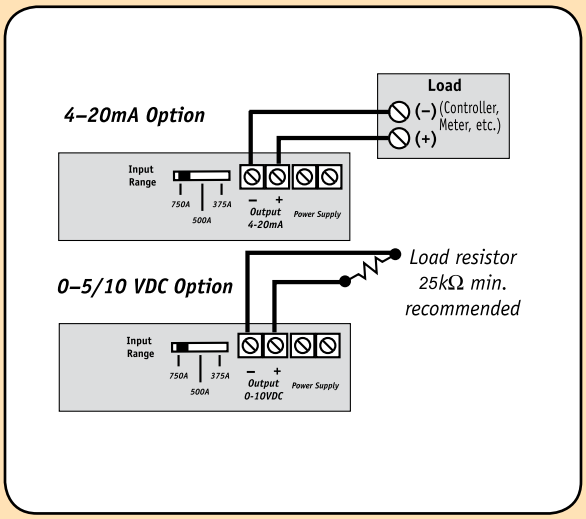
Dimensions



FL Case

Connections



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

Specifications

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

Ordering Information

Sample Model Number: ATPR3-420-120-FL
True RMS AC current transducer, 24VDC, powered with a 4–20mA output, 375/500/750A ranges in a fixed core case.

ATP (1) (2) - (3) - (4) - (5) F L

(1) Measurement

R	True RMS
	Average Responding (Blank)

(5) Case Style

FL	Solid-core

(2) Full Scale Range

3	375–750A
4	1000–2000A

(3) Output Signal

005	0–5VDC
010	0–10VDC
420	4–20mA

(4) Power Supply

24U	24VAC/DC
120	120VAC

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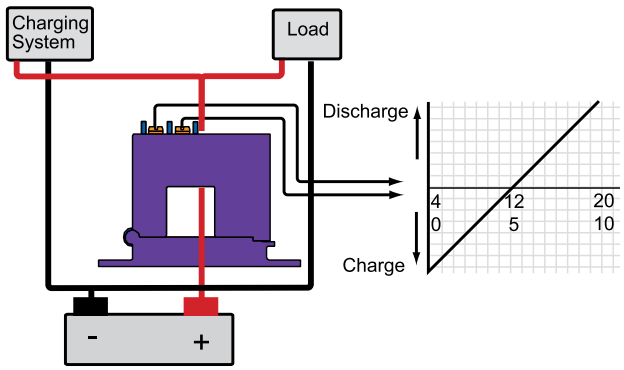
MADE IN USA

DT SERIES
Current Transducers

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

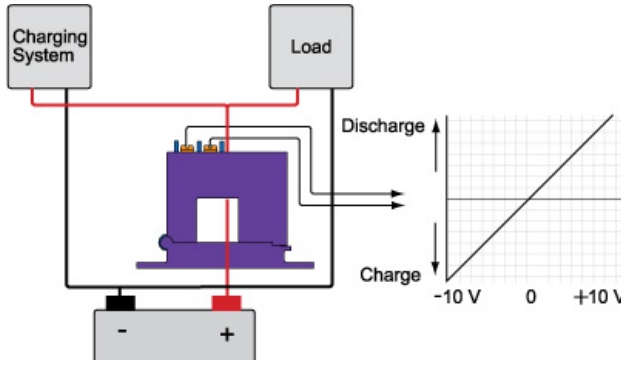
DT Bidirectional Output models produce a +10 VDC signal with current through the aperture in one direction, and -10 VDC with current passing in the reverse direction. Split-core enclosures only.

Battery Charging System - Bipolar Output



NOTE: See page 51 for DT Series bipolar and unipolar output graphs.

Battery Charging System - Bidirectional Output



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.

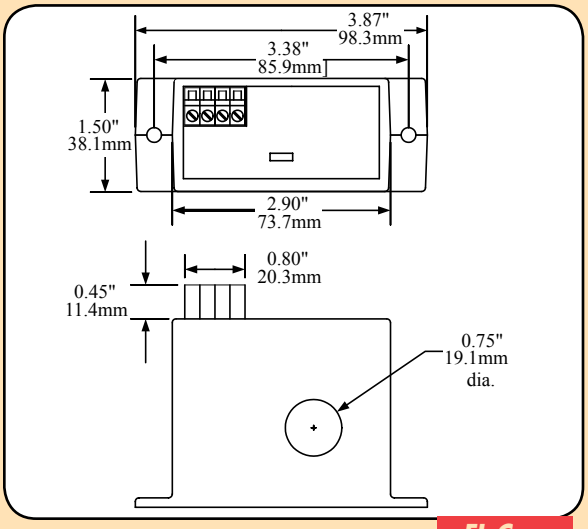
Applications

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

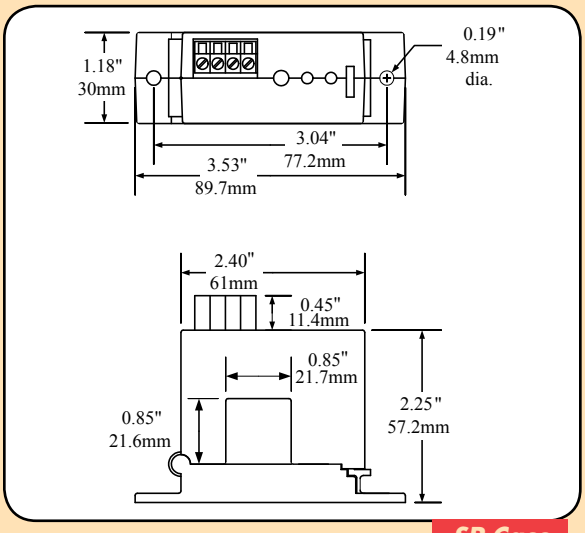
Transportation
- Measures traction power or auxiliary loads.

Electric Heating Elements
- Monitors heater loads.
- Faster response than temperature sensors.

Dimensions



FL Case



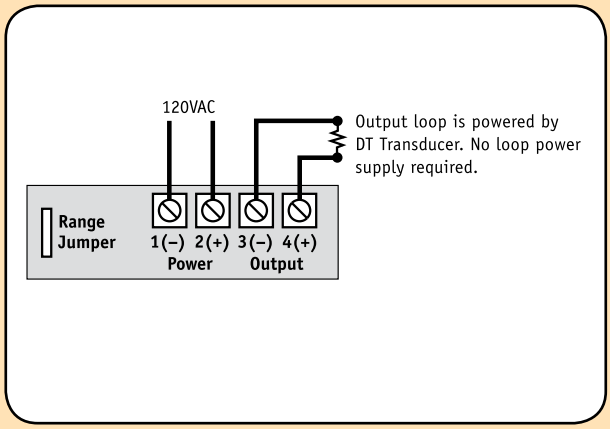
SP Case

Specifications

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

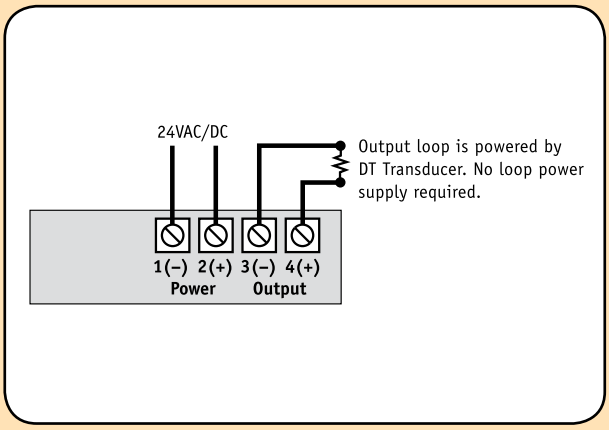
Connections

DT Series Unipolar and Bipolar Output Models



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

DT Series Bidirectional Output Models



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

Ordering Information

DT Series Unipolar and Bipolar Output Models

Sample Model Number: DT2-420-24U-U-SP
Split-core DC current transducer, 0–100/150/200A range, 24VAC/DC powered, 4–20mA unipolar output.

DT (1) - (2) - (3) - (4) - (5)

(1) Full Scale Range

0	5, 10, 20A*
1	50, 75, 100A
2	100, 150, 200A
3	150, 225, 300A
4	200, 300, 400A
C	Custom Range

*DT0 Models FL case only.
**120VAC power supply FL case only.

(2) Output Signal

020	0–20mA
420	4–20mA
003	0–3VDC
005	0–5VDC
010	10VDC

(3) Power Supply

24U	+24VAC/DC
120	120VAC**

(4) Output Polarity

U	Unipolar
BP	Bipolar

(5) Case Style

FL	Solid-core
SP	Split-core

DT Series Bidirectional Output Models

Sample Model Number: DT2-010-24U-BD-SP
Split-core DC current transducer, 0–100/150/200A range, 24VAC/DC powered, +/-10 VDC bidirectional output.

DT (1) - (2) - (3) - (4) - (5)

(1) Full Scale Range

1	100A
2	200A
3	300A
4	400A
C	Custom Range

(2) Output Signal

010	10VDC

(3) Power Supply

24U	+24VAC/DC

(4) Output Polarity

BD	Bidirectional

(5) Case Style

SP	Split-core

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MADE IN USA

AG SERIES
Ground Fault (Earth Leakage) Sensors

AG Series Ground Fault Sensors 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.

"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 sensors monitor this field and trip alarm contacts when the leakage rises above setpoint.

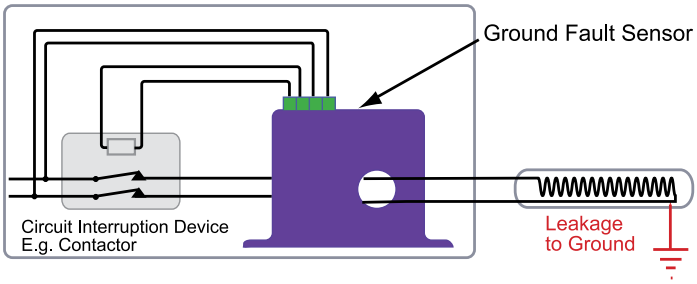
Applications

Personnel Protection (typically 5mA)
- 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 10mA or 30mA)
- For applications where personal protection is not the primary concern, higher setpoint capability helps eliminate nuiscance 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



Features

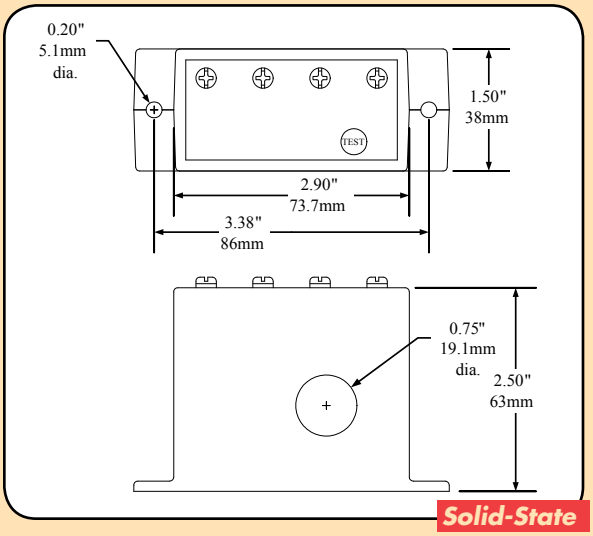
Broad Range of Options to Match Application Needs
- N.O./N.C. solid-state switch or mechanical relay outputs.
- Normally energized or normally de-energized contacts.
- Noise Immunity option for use in EMI/RFI sensitive environments.

Setpoint Options Maximize Ease-of-Use
- Field selectable 5mA, 10mA or 30mA setpoints on the AG3 "Tri-set" model makes user adjustments fast, sure and convenient.
- Single factory calibrated setpoints available form 5mA to 950mA.

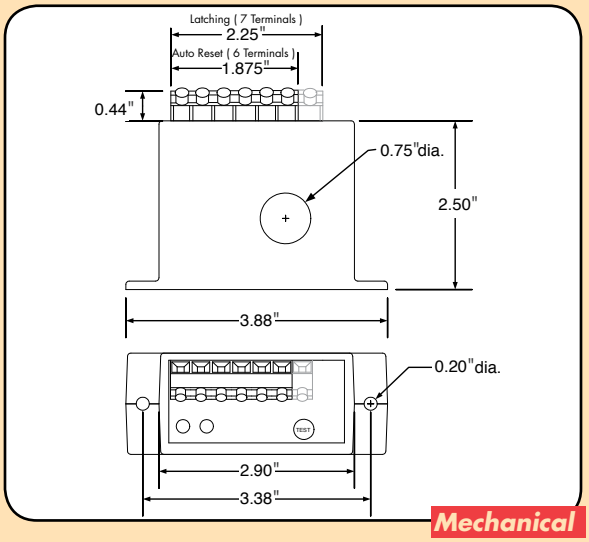
Compatible with Standard Equipment
- Applicable on single- and three-phase systems.
- Ideal for use with shunt trip breakers.
- Magnetically isolated from monitored circuit and control power.

Agency Approved
- UL, CE approved.

Dimensions



Solid-State



Mechanical

Specifications

Setpoint Range	Factory calibrated models (specify when ordering): • AG1: 5–100mA (005–100) • AG2: 80–950mA (080–950)	
	TR3 "Tri-set" models (field jumper select): • AG3: 5, 10, or 30mA	
	Solid-state Output Models	**Mechanical Output Models**
Output	Isolated Dry Contact	Mechanical Relay
Output Rating	• Solid-state AC Switch 1A @ 240VAC • Solid-state DC Switch 0.15A @ 30VDC	• Auto Reset: SPDT Relay 1A @ 125VAC, 2A @ 30VDC • Latching: SPST Relay 1A @ 125VAC, 2A @ 30VDC
Off State Leakage	• <10 micro Amps (N.O.) • <2.5mA (N.C.)	None
Response Time	• 200ms @ 5% above trip point • 60ms @ 50% above trip point • 15ms @ 500% above trip point	
Isolation Voltage	5,000 VAC (tested)	
Frequency Range	50–400 Hz (monitored circuit)	
Noise Immunity Option	N/A	• EMI/RFI Shielding • Power supply noise filtering
Power Supply	• 120VAC (55–110% of nominal voltage) • 24VAC/VDC (+/- 20%) • Green LED = Power On indication	
Loading	2VA Max.	
Case	UL94 V0 Flammability Rated	
Environmental	-4 to 122°F (-20 to 50°C), 0–95% RH, non-condensing	
Listings	UL 1053, Class 1 Recognized, CE	

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Solid-state Outputs

Mechanical Outputs

MADE IN USA

AG SERIES
Ground Fault (Earth Leakage) Sensors

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.

AG Series with Solid-state Outputs offer the benefit of reliable, long-lasting solid-state switches. Sold-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 enclosures 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 adjustable setpoint or with a "Tri-set" option, which provides three factory-set, field adjustable setpoints. A noise immunity option is available for applications in harsh EMI/RFI environments.

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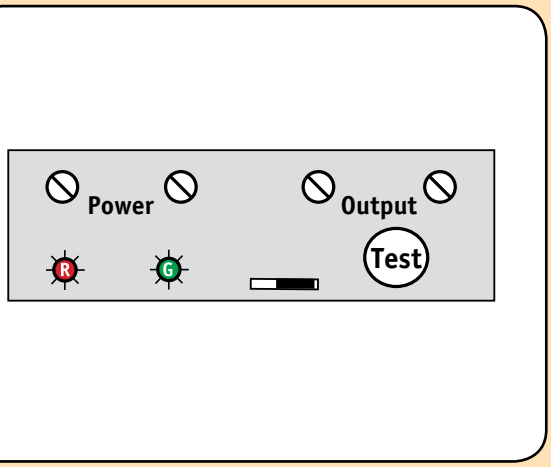
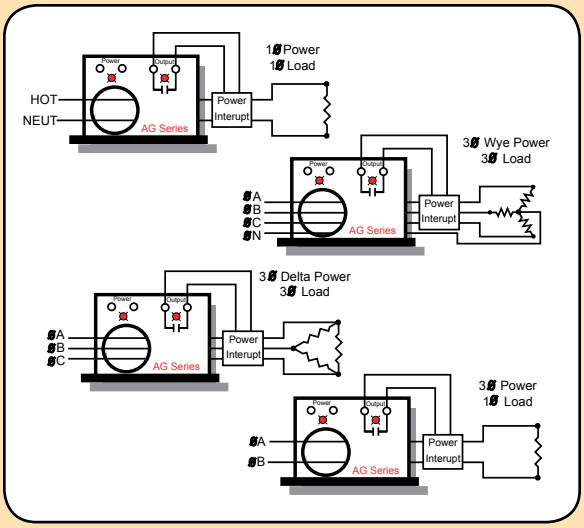
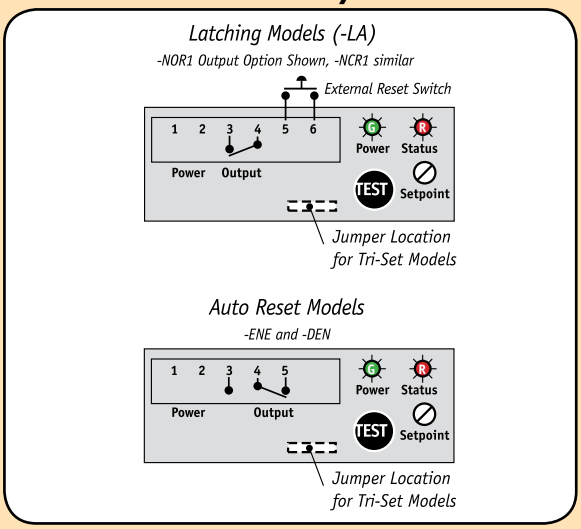
Connections

AG Series Solid-State Sensor





AG Series Mechanical Relay



Ordering Information

Solid-state Output Models

Sample Model Number: AG1-NOAC-120-FS-005

Ground fault sensor with normally open solid-state contact output, 120VAC power supply, 5mA trip point, fail safe version.

AG (1) - (2) - (3) - (4) - (5)

(1) Setpoint Range

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

*Not UL recognized in any configuration.

(2) Output Type

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

(3) Power Supply

120	120VAC
24U*	24VAC/VDC

*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 sensor with normally open SPST latching relay output, 120VAC power supply and 5mA trip point.

AG (1) - (2) - (3) - (4) - (5) - (6)

(1) Setpoint Range

1	5–100mA factory set
2	80–950mA factory set
3	5/10/30mA 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	120VAC
24U	24VAC/VDC

(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)

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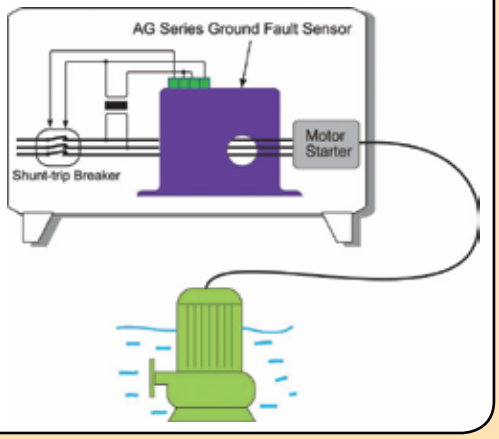
AGL Series, new from NK Technologies, is a large aperture ground fault sensor that offers one of the largest aperture diameters in the industry while maintaining a compact overall profile. Intended for sensing earth leakage in applications up to 400A, the AGL Series offers a choice of N.O. or N.C. latching relays or an SPDT Form C relay with auto-reset. Enclosure features integral DIN-rail mounting as standard and optional noise immunity coatings for applications in harsh EMI/RFI environments.

AGL SERIES
Large Aperture Ground Fault Sensors

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

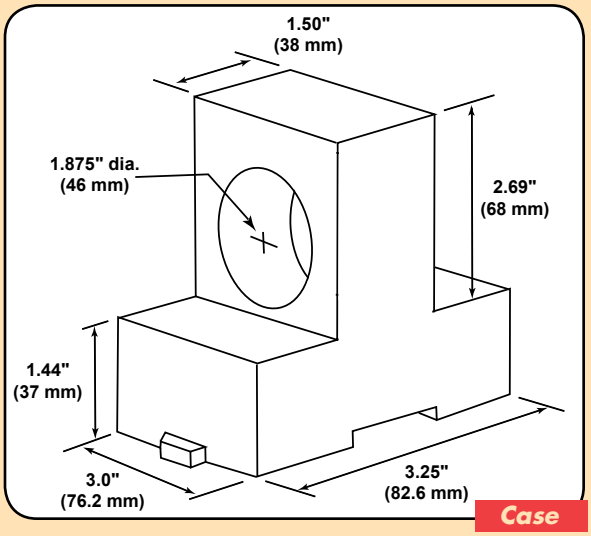


Features

- **Integral DIN-rail Mount with Spring Loaded Mounting Clips***
- **Setpoint Options Include Factory Adjustable Setpoint from 5mA –100mA or "TR3 Tri-Set" Models with Field-selectable 5/10/30mA 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 15ms to 200ms**
- **Integral "Push-to-test" Button with LED Indication of Contact Status**

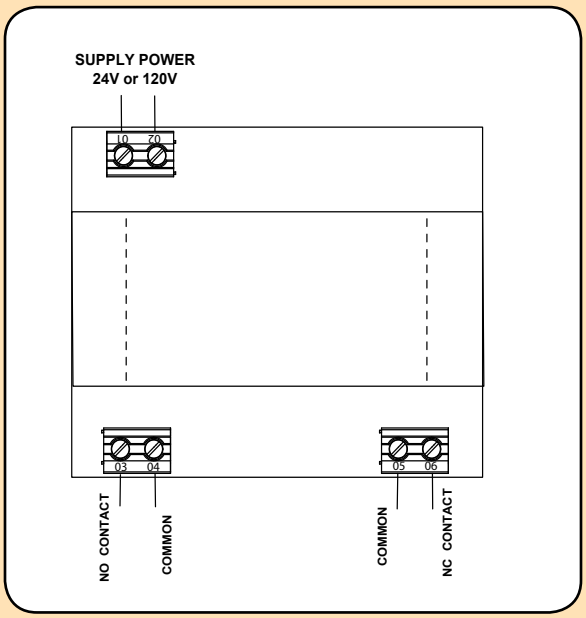
*See DIN Rail accessories datasheet for information on the kit.

Dimensions



Case

Connections



Specifications

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

Ordering Information*

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

AGL (1) - (2) - (3) - (4) - (5) - (6)

(1) Setpoint Range

1	5–100mA factory set
2	80–950mA factory set
3	5/10/30mA 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	120VAC
24U	24VAC/VDC

(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)

*Contact factory for specific model availablility.

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MADE IN USA

APN & APO Series Power Transducers feature the patented Autophase™ technology, which helps to correct common wiring errors ranging from CT reversal to phase mismatch.

Analog 4–20mA or 0–5/10VDC (proportional to kW) and pulse kWH outputs are available as standard options; Modbus or RS232 outputs are optional in either configuration.

APN & APO SERIES
Power Monitors

Applications

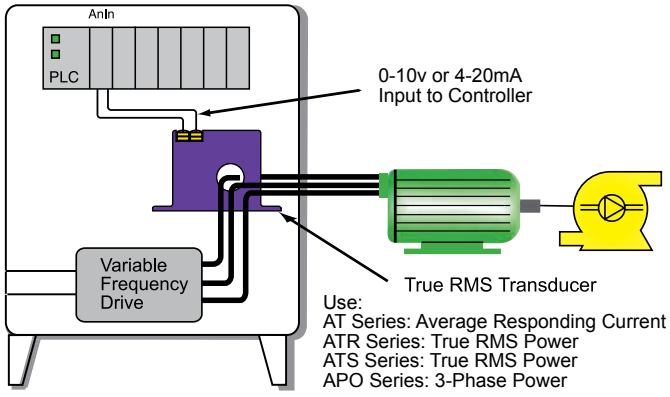
Cost Allocation
- Measure and display power, both demand (KW) and consumption (KWH).

Improve Plant Performance
- Measure and correct low power factor.
- Measure and stop erratic machine operation and overheats; extending equipment life.

Machine Control
- KW monitoring provides a good picture of machine tool operation.

Generator Performance
- A cost-effective way to monitor power output from backup generators, ensuring "information age" standard.

Pump Load Monitoring



Features

Meter Grade Digital Accuracy
- Provides for reliable measurement.

Patented AutoPhase™ Technology
- Senses and automatically corrects for errors in CT orientation or mismatches between voltage inputs and CTs, identifying the reversed CTs and mismatched phases.

Compatible with a Wide Variety of CTs
- APO/APN Series KWH meters accept inputs from traditional existing 5A CTs or from ProteCT™ 0.333V output CTs which improve safety and eliminate the need for costly shorting blocks.

Available in Quick-mount NEMA-rated Enclosures
- Installation is simple and efficient.

Networked Options
- MODBUS option allows for direct network connection without the need for expensive system interfaces.

Agency Approved.
- UL and CUL listed.

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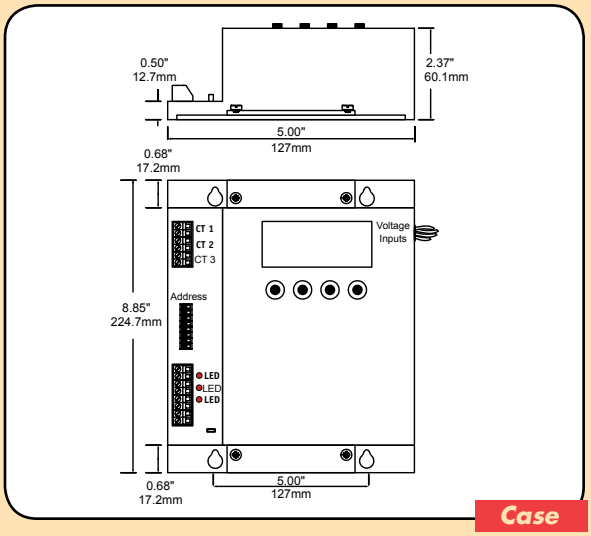
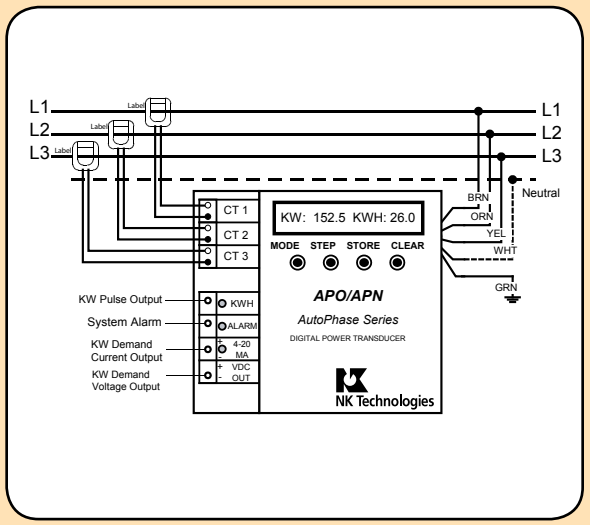
Dimensions



Case

Connections



Specifications

Power Supply	None—Self-powered
Accuracy	0.5% FS, True RMS Power +/- 0.5Hz
Voltage Range	120–600VAC, Auto Range Select, Up to 12KV with optional Potential Transformers
Amperage Range	● 5–1500A with ProteCT™ CTs ● 50–3000A with Current Output (5A) CTs
Isolation Voltage	3700VAC
Built-in Fuse Rating	600VAC, 0.5A (no external fuses required)
LCD Display	Two line, 16 character
Connections	● Voltage 12" leads, #18 AWG, pre-tinned ● Current Input: Captive screw terminal for 14–22 AWG wire ● Outputs: Captive screw terminal for 14–22 AWG wire* or 3-pin connector**
Modbus Set**	RTU Version, RS485 addressable, 9600 Baud; optional RS232
Analog Outputs*	● KW: Choice of two; 4–20mA and 0–5 or 0–10VDC ● Alarm Contact: N.O. solid state contact, 0.1A @ 30VAC/VDC (from 75–95% under voltage) ● KWH: Solid-state contact, 0.1A @ 30VAC/VDC; Range 0.01, 0.1, 1.0 or 10KWH per pulse
Listings	CE, UL Listed (Measuring and Testing Equipment)

Ordering Information

Sample Model Number: APN-MOD-5A-MX-LM

AC power transducer with Modbus RTU output, module for mounting inside a panel or switchgear with an LCD display.

	(1)		(2)				(3)		(4)		(5)	
AP		-				-			-		-	

(1) AP Type

O	Non-networkable Power Transducer
N	Networkable Power Transducer

(2) Output Type

KWKH	KW (4–20mA & 0–10VDC) & KWH Pulse*
MOD	Modbus RTU**
R232	RS232**

*APO type only **APN type only

(3) CT Input

5A	5 Amp CTs (Ratio:5)
PC	ProtectCT low voltage output CTs

(4) Case Style

MX	Module (Aluminum)
MN	Module in NEMA 1 enclosure
M4	Module in NEMA 4 enclosure

(5) Display

LM	LCD on Module
LC	LCD on enclosure (MN case ONLY)
LR	LCD shipped loose, remote mount by others

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MADE IN USA

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 180A and nominal voltages up to 480VAC.

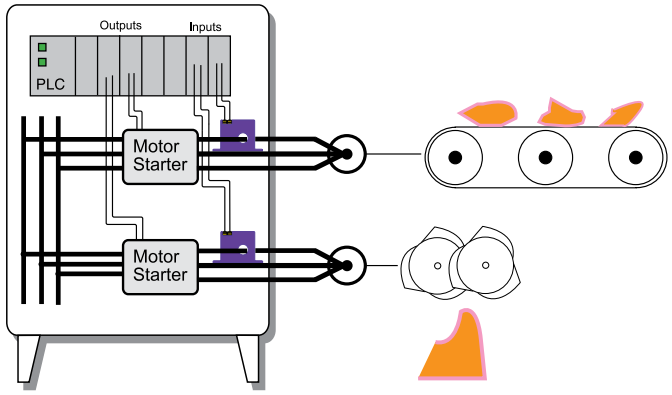
Applications

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.

Crusher/Grinder/Shredder Motor Interlocks



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 24VDC loop-powered supply allows for quick and easy two-wire installation.

Field Adjustable Setpoint Ranges
- Jumper-selectable input range allows users to tailor input to the application for more precise control.

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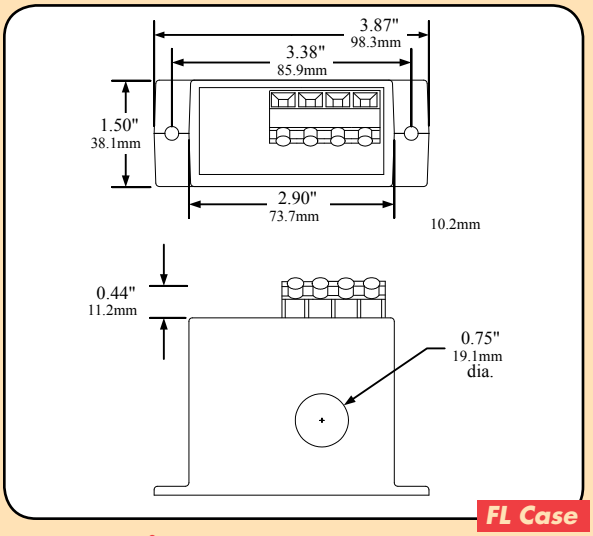
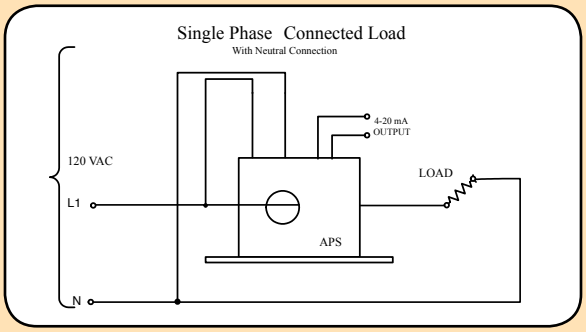
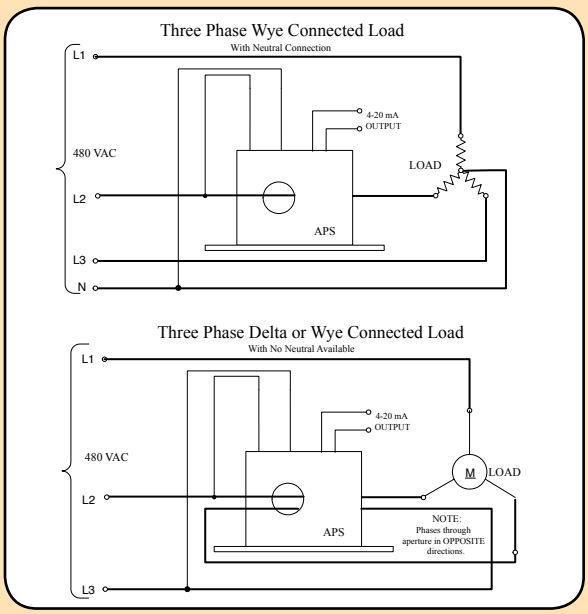
Dimensions



FL Case

Connections





Wiring Notes For Three Phase Delta loads

1. Connect two phases to the Potential Transformer (PT).
2. Bring one of the PT connected phases through the sensor aperture.
3. Bring the other phase through the sensor aperture in the opposite direction.

Specifications

Power Supply	24VDC Nominal Loop Powered (40VDC Max.)
Output	4–20mA Proportional to max kW; 25mA Limit
Input Range(s)	120, 240 or 480VAC Nominal, +/- 25%
Potential Transformer	Pre-wired to APS, 18 AWG 28", flange mounting
Response Time	100 ms (to 90% of step change)
Accuracy	1% FS
Indication	Power on LED
Max Inrush Current	300% Full Scale Range (6 sec. duration)
Max. Power Output	0.2 KW to 110 KW; 1/4 HP @ 120VAC to 150 HP @ 480VAC
Frequency Range	50–60 Hz
Case	UL94 V0 Flammability Rated
Environmental	-4 to 122°F (-20 to 50°C), 0–95% RH non-condensing

Ordering Information

Sample Model Number: APS4-420-24L-10.0
Single phase watt transducer, 10 kW range, 480VAC input, may be wired with two opposite current wire passes, 4–20mA output, loop powered.

	(1)		(2)		(3)		(4)
APS	4	-	420	-	24L	-	10.0

(1) Input Voltage

1	120 VAC
2	240 VAC
4	480 VAC

(2) Output Signal

420	4–20mA

(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
2.0	2.0 KW
3.0	3.0 KW
4.0	4.0 KW
5.0	5.0 KW
6.0	6.0 KW
7.0	7.0 KW
9.0	9.0 KW
10.0	10 KW
12.0	12 KW
15.0	15 KW
18.0	18 KW
20.0	20 KW
23.0	23 KW
30.0	30 KW
35.0	35 KW
45.0	45 KW
50.0	50 KW
55.0	55 KW
65.0	65 KW
75.0	75 KW
80.0	80 KW
100	100 KW

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MADE IN USA

APT SERIES
Power Transducers

APT Series power transducers sense true, "active" power and are a cost-effective way to measure kW on 1ϕ or 3ϕ applications up to 600VAC. Powered by 24V or 120V supply, the APT provides a fully isolated 4–20mA proportional output making it compatible with most supervisory controllers, panel meters and data loggers. Housed in a compact, DIN-compatible enclosure, the APT accepts standard 5A or 0–333mV current transformer inputs. Optional accessories include transceivers for wireless communication.

Specifications

Power Supply	24VAC (+/- 10%), 2VA max
Output	0–5VDC, 0–10VDC or 4–20mA
Accuracy	0.5% Full Scale (True RMS KW)
Voltage Range	120–600VAC
Frequency Range	6–400Hz
Amperage Range	• 5A–4,000A w/standard 5A secondary CTs • 5A–1,500A w/ProteCT™ 333mV CTs
Indication	Power on LED
Mounting	DIN-rail Compatible
Pwr Consumption	<2.0VA
Isolated Voltage	1250VAC
EMC	EN50081-1, EN61000-6-2
Case	UL94 V0 Flammability Rated
Environmental	-4 to 122°F (-20 to 50°C), 0–95% RH non-condensing
Connections	CTs (3), Voltage Inputs (3), Output (two-wire) Wireless Mesh Network Transceiver (optional)

Ordering Information

Sample Model Number: APT-48T-5A-120-010

APT - (1) [ ][ ][ ] - (2) [ ][ ] - (3) [ ][ ][ ] - (4) [ ][ ][ ]

(1) Voltage

12T	120V Three Phase
24T	240V Three Phase
48T	480V Three Phase

(2) CT Inputs

5A	XXX:5 5A Secondary
MV	XXX:333mV Secondary

(3) Supply Voltage

024	24VAC
120	120VAC

(4) Full Scale Output

005	0–5VDC
010	0–10VDC
420	4–20mA

Features

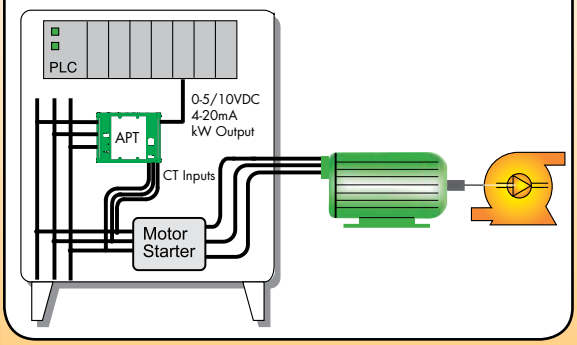
- **4–20mA Proportional Output to kW; Compatible with PLC and Datalogging Equipment**
- **Accepts 5A Secondary CTs or 0–333mV ProteCT™ CTs**
- **DIN-rail Compatible Package; Finger-safe Terminals***

Applications

True, Active Power Monitoring

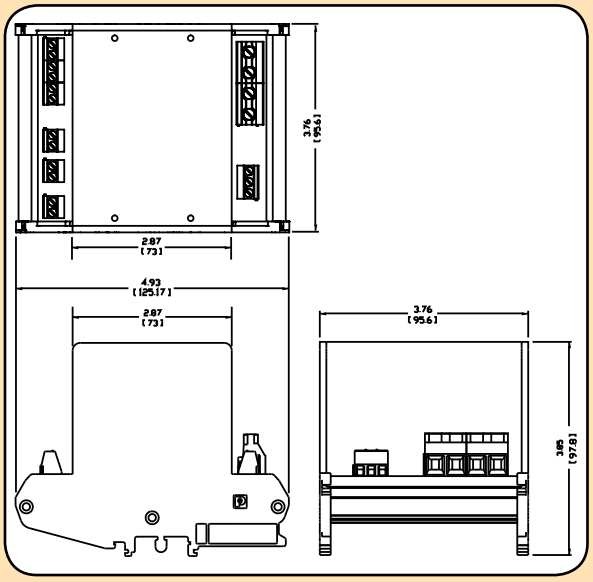
- Measure motor power consumption when current alone provides insufficient resolution (e.g. voltage or PF variation).
- Monitor machine tool finishing operations such as deburring.
- Sense brush entanglements in carwash systems.
- Detect dry run or blockages on pumping systems.
- Monitor SCR fired electrical heaters.
- Monitor general power usage and tripping of electrical loads.

Pump Motor KW Monitoring

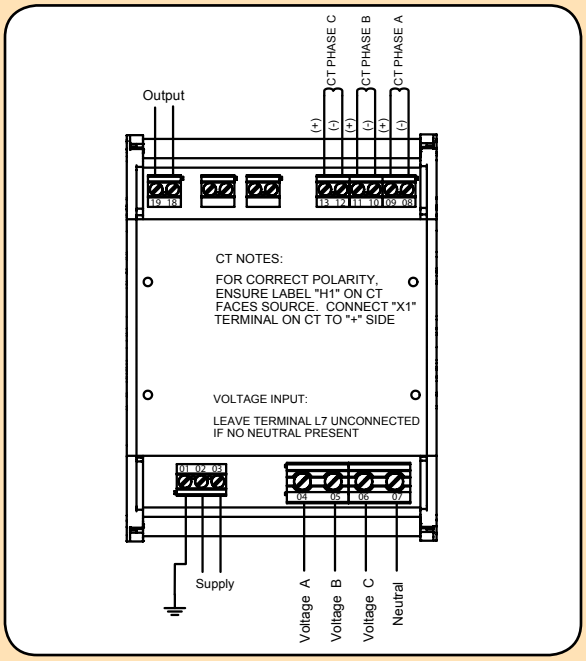


*See accessories datasheet for DIN Rail accessory kit information.

Dimensions



Connections



APT Output Values

Voltage	CT Ratio	Full Scale kW (20mA)
480	5:5	4.16
480	100	83.14
480	200	166.28
480	400	332.55
480	600	498.83
480	800	665.11
480	1000	831.38
480	1200	997.66
480	1500	1247.08
480	1600	1330.22
480	2000	1662.77
380	5:5	32.91
380	100	65.82
380	200	131.64
380	400	263.27
380	600	394.91
380	800	526.54
380	1000	658.18
380	1200	789.82
380	1500	987.27
380	1600	1053.09
380	2000	1316.36
240	5:5	2.08
240	100	41.57
240	200	83.19
240	400	166.28
240	600	249.42
240	800	332.55
240	1000	415.69
240	1200	498.83
240	1500	623.54
240	1600	665.11
240	2000	831.38
208	5:5	1.81
208	100	36.03
208	200	72.05
208	400	144.11
208	600	216.16
208	800	288.21
208	1000	360.27
208	1200	432.32
208	1500	540.40
208	1600	576.43
208	2000	720.53
120	5:5	1.04
120	100	20.79
120	200	41.57
120	400	83.14
120	600	124.71
120	800	166.28
120	1000	207.85
120	1200	249.42
120	1500	311.77
120	1600	332.55
120	2000	415.69

APMR SERIES
Power Transducers

APMR Series power monitoring relays are intended for sensing true, active power and measuring KW on 1Φ or 3Φ applications. Applicable on nominal circuits of 120, 240, 480, and 600VAC, the APMR offers multiple relay outputs adjustable to trip when desired power thresholds are reached. As an added benefit, a fully isolated 4–20mA output proportional to sensed KW is standard. All trip points and associated time delays are individually adjustable and each has its own status LED. Applicable on variable frequency systems, the APMR comes in a compact, DIN-compatible enclosure and is an ideal choice for applications requiring power sensing and reporting.

Specifications

Power Supply	24VAC/VDC, 120VAC, 208VAC or 240VAC
Output	• Relays (2): 5A @ 240VAC; 5A @ 24VDC • Analog: 4–20mA Proportional to max. kW; 25mA Max
Input CTs	Standard 0–5A or 0–333mV CTs
Sensed Voltages	120, 208, 230, 480, or 600VAC
Response Time	<200 ms (to 90% value)
Delay Timers	• Inrush: 2 sec. (factory set) • Individual: 0–25 sec. adjustable
Setpoint Adjust	0–100% of Full Load kW
Setpoint Accuracy	+/- 2%
Power Consumption	<5VA
Frequency Range	30Hz–400Hz
EMC	EN50081-1, EN61000-6-2
Case	UL94 V0 Flammability Rated
Environmental	-4 to 122°F (-20 to 50°C), 0–95% RH non-condensing

Features

- **Dual Output Relays for Switching Loads Once Power Trip Points Are Reached**
- **Accepts 5A Secondary CTs or 0–333mV ProteCT™ CTs**
- **4–20mA Proportional Output to KW for Compatibility with PLC and Datalogging Equipment**
- **DIN-rail Compatible Package; Finger-safe Terminals***
- **Built-in Adjustable Time Delays**

*See DIN Rail accessories datasheet for information on the kit.

Ordering Information

Sample Model Number: APMR-12T-5A-120-FL

APMR - (1) [ ][ ][ ] - (2) [ ][ ] - (3) [ ][ ][ ] - (4) [F][L]

(1) Monitoring Voltage

12T	120V Three-phase
24T	240V Three-phase
48T	480V Three-phase

(2) CT Input

5A	XXX:5A Secondary
MV	XXX:333 mV Secondary

(3) Supply Voltage

24U	24VAC
120	120VAC

(4) Case

FL	DIN-rail Mount Enclosure

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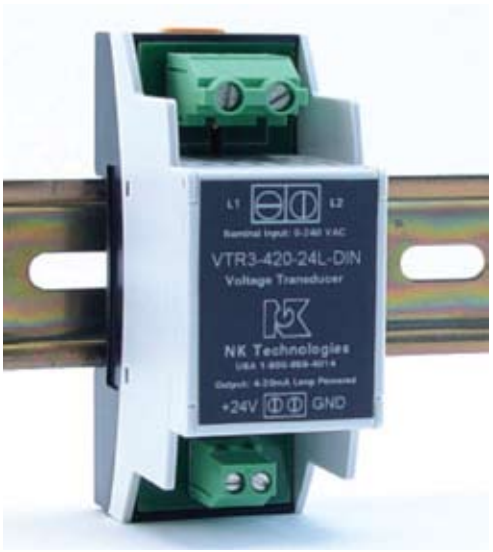


MADE IN USA

VTR SERIES
Voltage Transducers

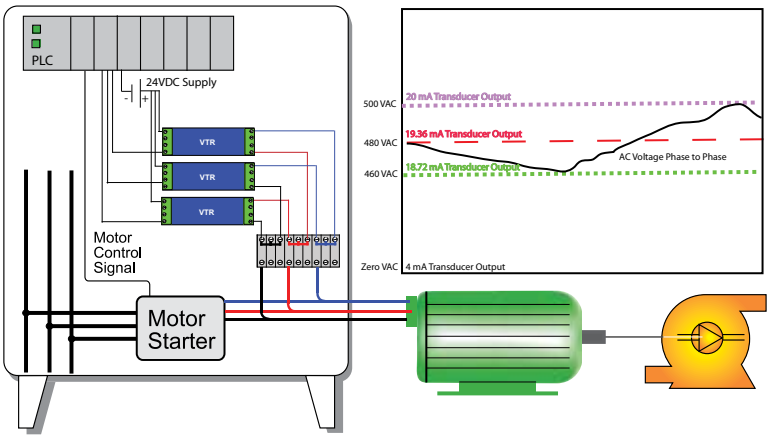
VTR Series is a high-performance True RMS transducer for sensing voltage in single- and three-phase installations. Applicable on nominal circuits of 120V, 240V and 480V, VTR Series voltage transducers provide a fully isolated, 4-20mA output proportional to rated nominal voltage in both sinusoidal and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

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



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 4-20mA 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 Enclosure*

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

*See DIN Rail accessories datasheet for information on the kit.

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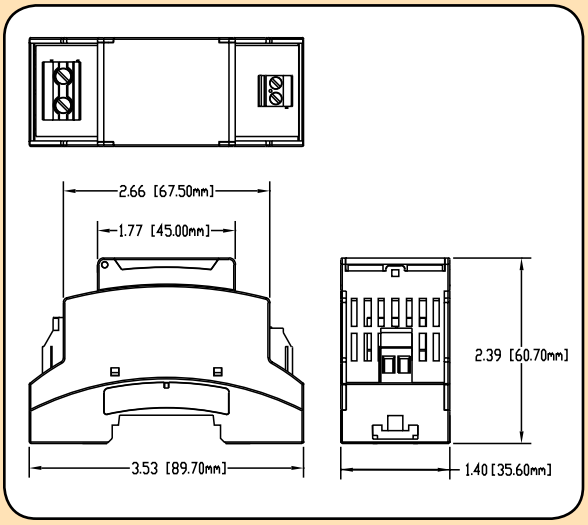
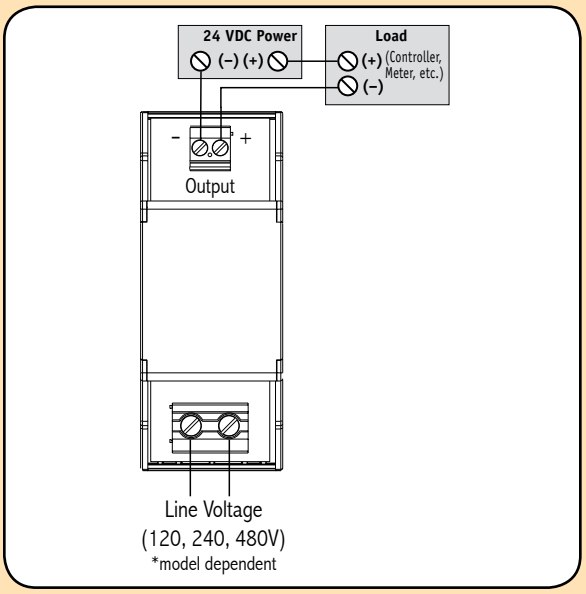
Dimensions



Connections



Specifications

Power Supply	24VDC Loop-powered
Input	120V, 150V, 240V, 480V, 500V
Input Over-range	+15% of nominal range
Output	4–20mA Proportional; capped at 24mA max.
Response Time	250 ms (to 90% value)
Accuracy	<1%
Linearity	<0.5%
Loading	<500 ohms
Isolation Voltage	2500VAC
Frequency Range	40Hz–5KHZ
Operating Temp.	-30°C to 60°C
Mounting	DIN-rail compatible
Case	UL94 V0 Flammability Rated; noncorrosive thermoplastic
Environmental	14 to 122°F (-10 to 50°C), 0–95% RH non-condensing
EMC/Immunity	EN50081-1, EN50082-2
Ripple	<1% (peak to peak)
Listings	UL/CUL and CE Pending

Ordering Information

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

	(1)		(2)		(3)		(4)
VTR		-	4 2 0	-	2 4 L	-	D I N

(1) Nominal Range

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

(2) Output Type

420	4–20 mA

(3) Supply Voltage

24L	24V Loop powered

(4) Mounting

DIN	DIN-rail compatible

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MADE IN USA

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 333mV output secondary. Available in split-core packaging as standard.

Specifications

Power Required	None—Self-powered
Accuracy	0.5% FS, +/- 2% CTP
Output	0–0.333V
Phase Angle	<1 degree., 2 degrees @ 50% Range
Response Time	<1 ms
Isolation Voltage	600VAC
Max. Primary Voltage	5000VAC (insulated conductor)
Max Inrush Current	300% Full Scale Range (6 sec. duration)
Environmental	-0 to 122°F (-18 to 50°C), 0-95% RH non-condensing

Ordering Information

NKP-075 0.85"(22mm) Window	
Model	Input Range
NKP-075-005SP	0–5 Amps
NKP-075-015SP	0–15 Amps
NKP-075-030SP	0–30 Amps
NKP-075-050SP	0–50 Amps
NKP-075-070SP	0–70 Amps
NKP-075-101SP	0–100 Amps
NKP-075-151SP	0–150 Amps

CTP-125 1.25"(31.75mm) Window	
Model	Input Range
CTP-125-101	0–100 Amps
CTP-125-151	0–150 Amps
CTP-125-201	0–200 Amps
CTP-125-251	0–250 Amps
CTP-125-301	0–300 Amps
CTP-125-401	0–400 Amps
CTP-125-601	0–600 Amps

CTP-200 2.0"(50.8mm) Window	
Model	Input Range
CTP-200-601	0–600 Amps
CTP-200-801	0–800 Amps
CTP-200-102	0–1000 Amps
CTP-200-122	0–1200 Amps
CTP-200-152	0–1500 Amps

Features

0.333V Output Secondary
- Unique low voltage output allows safe opening of transformer secondary, protecting installers from shock hazards found on traditional 5A CTs.

Eliminates Need for "Shorting Blocks"

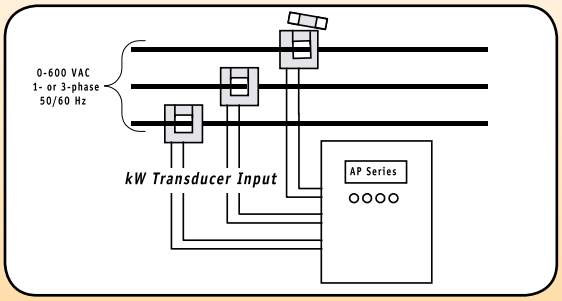
Standard Split-core Enclosure Design
- Snap close package speeds installation and eases retrofits for existing jobs.
- Eliminates need to power down or disconnect system to install CT, maximizing up time.

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"

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.

Connections



Dimensions

Dim.	NKP-075-xxx	CTP-125-xxx	CTP-200-xxx
Width	2.25" (57.2mm)	3.25"(82.55mm)	4.75" (120.65mm)
Length	2.40" (61.0mm)	3.35"(85.09mm)	5.00"(122.5mm)
Thick	1.18"(30.0mm)	1.00"(25.4mm)	1.20"(30.48mm)

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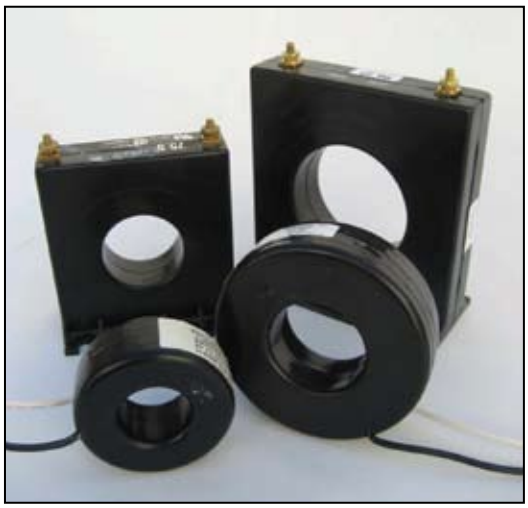

Current Transformers
5Amp Secondary

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

Features

- **Solid-core Enclosures; Choice of Round Package with Flying Leads or Integral Feet for Panel Mount with Terminals**
- **Optional Split-core Enclosures for Easy Installation Without Disconnecting Wiring**
- **Aperture Diameters From 1 1/8" to 3 1/4"**
- **Agency Approved**

Applications

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

Specifications

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

Dimensions

Series	Aperture Size
2	1.13" (28.7 mm)
5	1.56" (39.6 mm)
7	2.50" (63.5 mm)
8	3.25" (82.6 mm)
1SP	0.84"x 2.00"
3SP	2.19"x 3.25"
5SP	2.88"x 4.25"
7SP	2.88"x 6.25"

Ordering Information

Solid-core CTs: Sample Model Number: 2RL-501-NK

(1) [ ] (2) [ ][ ][ ] - (3) [ ][ ][ ] - NK

(1) Series

2, 5, 7, or 8

(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) [ ][ ][ ] - (2) [ ][ ][ ][ ] - [0][0] - (3) [ ][ ][ ] - NK

(1) Series

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

(2) CT Ratio

XXXX	See Ranges/VA Burdens

(3) Lead Type

T	Screw Terminals
L24	24" Lead Wires
L36	36" Lead Wires
L48	48" Lead Wires

Ranges/VA Burdens

		Solid-core Series				Split-core Series			
Model	CT Ratio:5	2	5	7	8	1SP	3SP	5SP	7SP
500	50	1.0	0.75	0.5					
750	75	2.0	1.25	1.0					
101	100	2.5	2.25	2.0		1.0			
151	150	4.0	5.0	2.5					
201	200	5.0	5.0	5.0	5.0	1.5	1.0		
251	250	7.5	12.5	5.0	7.5				
301	300	10.0	12.5	5.0	15.0	2.0	1.0		
401	400		12.5	12.5	25.0	5.0	2.0		
501	500		25.0	15.0	35.0		3.0	2.0	
601	600		25.0	25.0	50.0		5.0	3.0	
801	800		30.0	35.0	60.0			10.0	5.0
102	1000		35.0	35.0	75.0		20.0	15.0	10.0
122	1200		40.0	40.0	75.0			25.0	15.0
152	1500			50.0	90.0			35.0	20.0
162	1600			50:0	100.0				
202	2000				120.0			50.0	40.0
252	2500				50.0				50.0
302	3000								50.0

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MADE IN USA

PBR PowerBASE™ Series are industrial-grade relays in a specially designed package. 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.

PBR Series
PowerBASE™ Relays

Specifications

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

c UL us

Ordering Information

Sample Model Number: PBR-10C-24U
PowerBASE™ Relay with 10A contacts and universal 24-volt coil.

	(1)				(2)		
PBR -	1	0	C	-			

(1) Contact Rating

10C	10A Form C

(2) Coil Voltage (see specifications)

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

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.

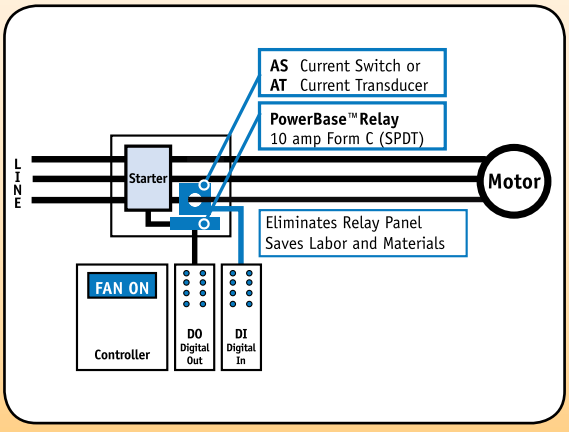
Applications

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 10A.



VTR Voltage Transducer

AGL Ground Fault Sensor

DIN RAIL Kits provide a convenient method to facilitate the mounting of the AGL, VTR, APT, and APMR Series of NK Technologies' sensors. The kits can also be used to mount other products to a panel as needed.

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

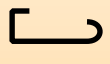
DIN Rail Kit

DIN-2 Adapter Kit

- Includes two a plastic brackets that screw on to the sensor for mounting to the DIN Rail
- Compatible with "top hat" or "G" type rail

"Top Hat" type rail.

"G" type rail.



DIN Rail Kits

Specifications

DIN RAIL Kit	
Rail Material	Rail is galvanized steel; 35mm x 7.5 mm x 175 mm
Rating	Conforms to EN50035, 50022, DIN 46277
DIN-2 Adapter Kit	
Rail Compatibility	"Top Hat" Type: 35mm x 15mm, 35mm x 7.5mm "G" Type 32mm x 15mm
Bracket Material	UL 94-V2 Rated Thermoplastic
Temp Range	-40 to 212°F (-40 to 100°C)

Ordering Information

Part Number for DIN Rail Kit: DINKIT

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

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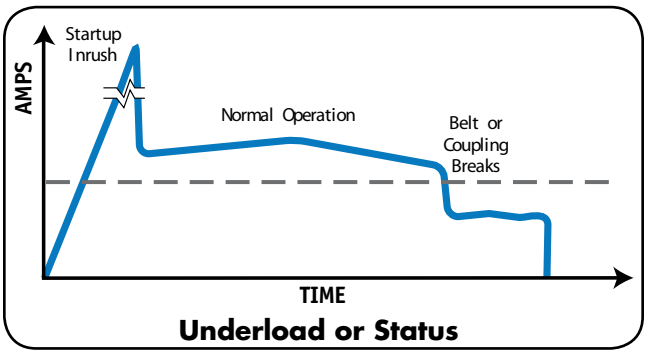
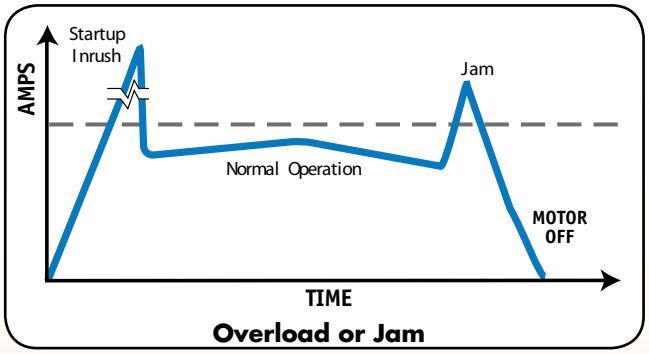
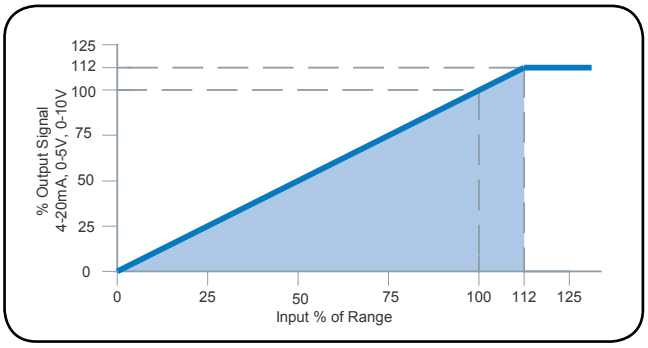
Sample Output/Power Supply Illustrations

AS1, AS3, ASX, ASXP Series

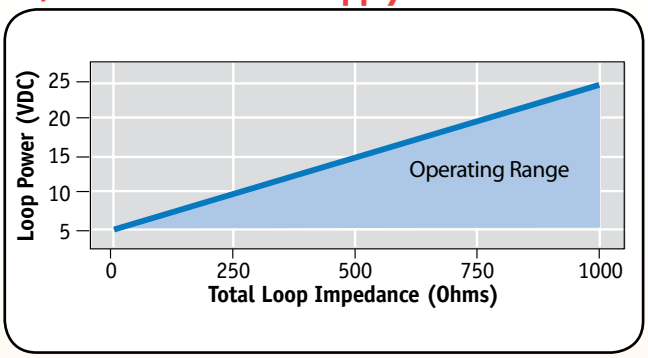




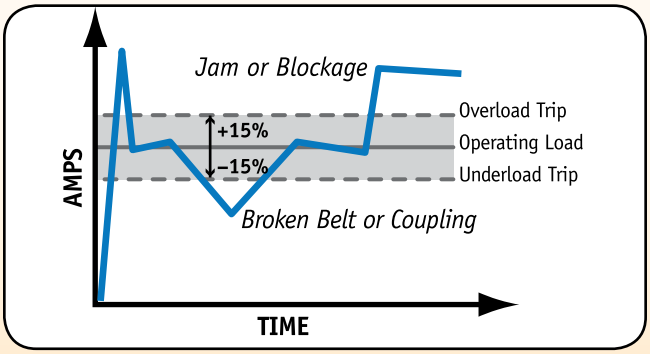
AT/ATR, ATP/ATPR Series



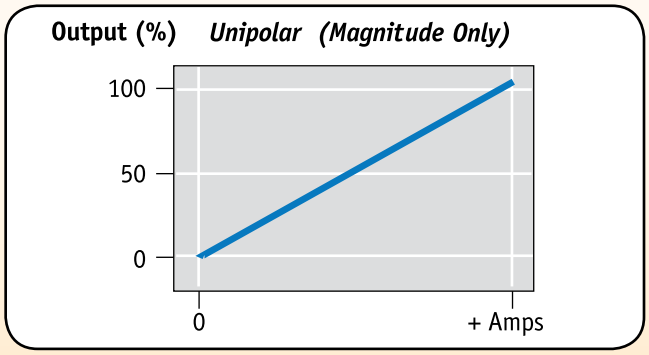
AT/ATR Series Power Supply



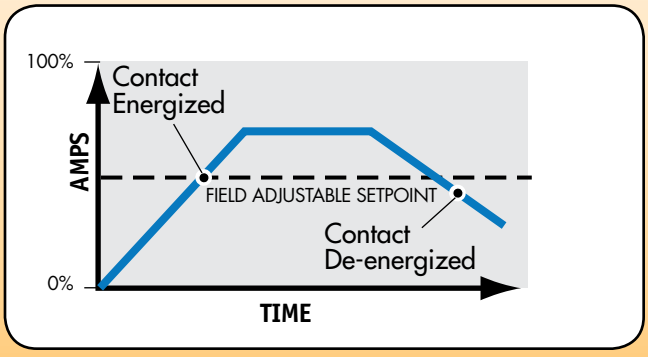
ASM Series

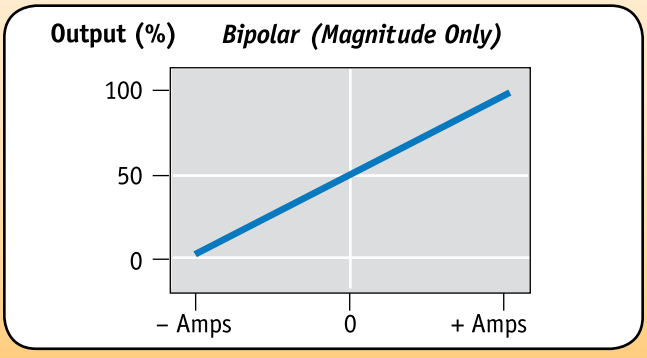


DT Series Output Polarity

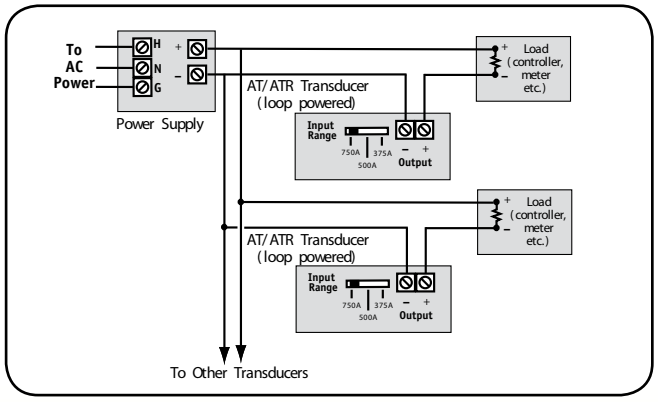


DS3 Series

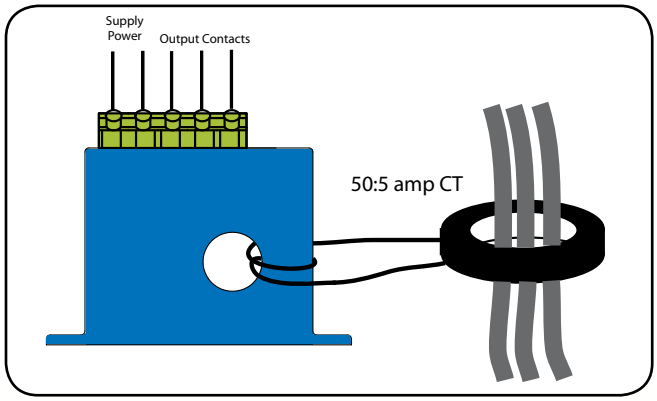




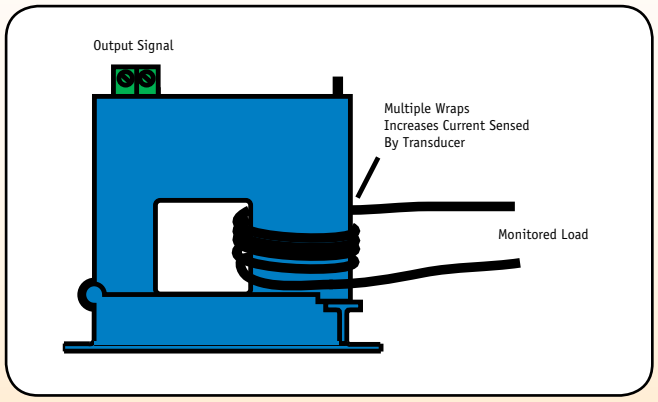
Supplemental Applications



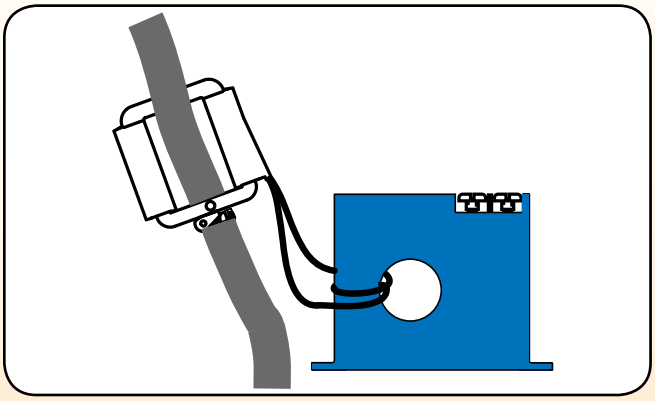
Powering Multiple Transducers From a Single Supply: For applications where multiple loop-powered (4-20mA output) transducers are installed, it may be cost-effective to power multiple transducers from one power supply as shown.



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 25mA 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 set-point, 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 1A 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 100mA signal passed through 5 times will be read as a 500mA signal and yields an output signal of 8mA 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 5A secondary of a 1200:5 split-core CT is passed through the aperture of an NK sensor with the trip point or output set accordingly.

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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.

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 it's 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 it's 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 it's 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.

RoHS CERTIFICATION OF COMPLIANCE

European Directive 2002/95/EC on the Restriction of Hazardous Substances

The European Community (EC) directive 2002/95/EC, also known as the RoHS 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 Compliant for orders placed on or after October 1, 2006.

RoHS Compliance shall be taken to mean that,

- With regard to existing designs, RoHS certified substitutions for all materials and components have been specified.
- Components used in the production of compliant parts are certified RoHS 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 compliance logo indicating their status.

Additionally, RoHS 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 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%

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

For expert technical help, or for a copy of NK Technologies' Product Guide or Application Guide contact your local Authorized Representative or Authorized Distributor.

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