



# KILOVAC KCS03 Current-Sensing High-Voltage Contactor

600 A/28 VDC – 600 VDC Bi-Directional Power Switching in a Rugged, Compact Package with Integrated Current Sensor and Current Trip Function

# KILOVAC KCS03 Current-Sensing High-Voltage Contactor

Compact Package with Integrated Current Sensor and Current Trip Function



The new KILOVAC Current Sensing [KCS] Contactors from TE Connectivity (TE) eliminate the need for a discrete current sensor, saving the customer money, weight and space. The sensor function also has a programmable trip feature, allowing for immediate, delayed or disabled trip.

## Rugged Reliability

In addition to the integrated current sensing feature, KSC03 contactors are rugged and hermetically sealed, making them suitable for a variety of applications in harsh, corrosive and explosive environments. Even after long periods of non-operation, the contacts are impervious to oxidation and contamination.

## Versatile and Efficient

The KCS03 contactor is extremely small and lightweight. It features bidirectional switching and an integrated dual-coil electronic economizer with coil suppression, and can be mounted in any orientation. Main contacts are not polarity sensitive, and the KSC03 is EMC compliant with no radiated coil emissions.

## Specifications

### MAIN CONTACTS

- **Contact Arrangement:** SPST-NO (Form X)
- **Voltage Rating, Switching:** 600 VDC max.
- **Current Rating, Continuous:**  $\pm 600$  A
- **Current Rating, Short Term:**  $\pm 1200$  A / 30 sec
- **Contact Resistance, Main Contacts:** 0.2 m $\Omega$  max. at rated current
- **Hot-Switching Performance, Resistive Load**
  - 1 A / 600 VDC: 1,000,000 cycles
  - 100 A / 28 VDC: 100,000 cycles
  - 100 A / 400 VDC: 25,000 cycles
  - 100 A / 600 VDC: 20,000 cycles
  - 1000 A / 28 VDC: 100 cycles
  - 1000 A / 400 VDC: 10 cycles
  - 1000 A / 600 VDC: 5 cycles
- **Maximum Pulse Through Closed Contacts:** 3000 A (half cycle, 60 Hz)
- **Dielectric Withstanding Voltage:**
  - Between Open Contacts: 2800 V<sub>rms</sub>
  - Contacts to Coil: 2800 V<sub>rms</sub> / 4000 VDC
- **Insulation Resistance (Terminal to Terminal; Terminals to Coil):**
  - Beginning of Life 100 M $\Omega$  min. @ 500 VDC
  - End of Life 50 M $\Omega$  min. @ 500 VDC

### INTEGRATED CURRENT SENSOR

- Saves space by eliminating the need for external sensor
- Simplifies design
- Flexible configuration for application needs

### HERMETICALLY SEALED

- Suitable for application in harsh, explosive, and corrosive environments
- No oxidation or contamination of contacts, including long periods of non-operation

### SPACE AND WEIGHT SAVINGS

- Extremely small size
- Lightweight contactor: 500 grams

### VERSATILE

- Bidirectional switching
- Main contacts not polarity sensitive
- Not position sensitive: mounts in any orientation

### EFFICIENT

- Integrated dual-coil electronic economizer with coil suppression
- EMC compliant: no radiated coil emissions

### APPLICATIONS

- Energy Storage/Battery Storage
- Power Distribution
- Power Motion Control
- High-Voltage DC Converter Systems
- Alternative Energy
- Military and Commercial Electric Vehicles
- Test Equipment

## TE Components . . . TE Technology . . . TE Know-how . . .

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## AUXILIARY CONTACTS

- **Auxiliary Contacts Contact Arrangement:** SPST-NO (Form A)
- **Auxiliary Contact Rating:** 1 A/ 30VDC, 3 A/125 Vac
- **Switching Life at Max. Rating:** 100,000 cycles min.
- **Minimum Load:** 5 VDC/5 mA

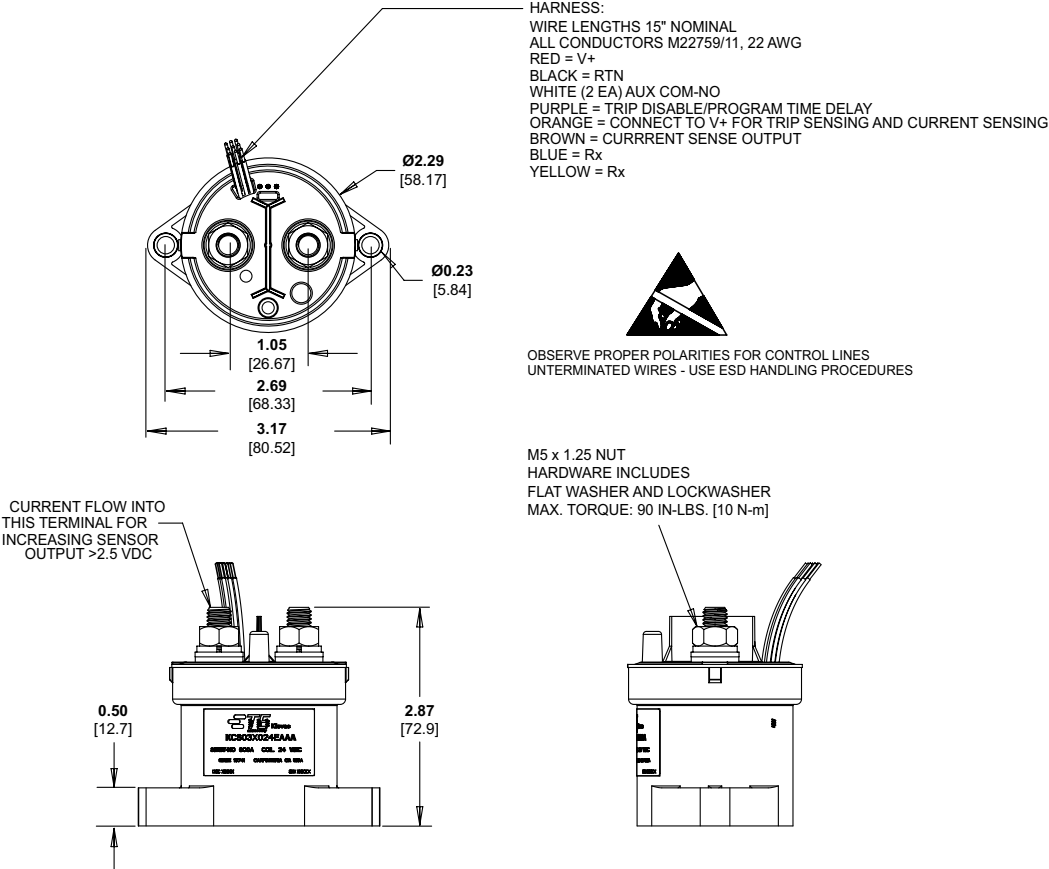
## MECHANICAL/ENVIRONMENTAL

- **Mechanical Life:** 1,000,000 cycles
- **Shock:** 11 ms 1/2 sine (operating), 20 g peak
- **Sine Vibration:** 20 g peak (operating), 55-2000 Hz
- **Operating Temperature Range:** -40 to +105 °C
- **RoHS Compliant**
- **Weight, Nominal:** 500 grams
- **Hermetically Sealed:** Safe for harsh/corrosive environments
- **Nonoxidizing:** No contact oxidation over periods of nonuse
- **Mounting:** Not position-sensitive
- **Noise Emission (at 100 mm distance):** 70 dBA

## Coil Data

At 20°C (Internal Two-Coil Economizer)

	12 V Coil	24/28 V Coil
<b>Coil Voltage Range</b>	9-14 VDC	18-28 VDC
<b>Nominal Pickup Current</b>	4.5 A	4.5 A
<b>Nominal Holding Current</b>	0.26 A	0.23 A
<b>Pickup Voltage</b>	≥9 VDC	≥16 VDC
<b>Dropout Voltage</b>	≤3.5 VDC	≤10 VDC
<b>Pickup Pulse (max)</b>	50 ms	50 ms
<b>Coil Resistance ±5%</b>	2.0 Ω Pickup/45 Ω Hold	5.7 Ω Pickup/120 Ω Hold
<b>Coil Holding Power</b>	3.2 W	5.5 W
<b>Main Contacts:</b>		
Operate Time (max)	20 ms	20 ms
Operate Bounce (max)	3 ms	3 ms
Release Time	5 ms	5 ms
<b>Current Sensing</b>		
<b>Sensing Range (5% accurate -40°C to +105°C)</b>	±50 - 630 A	±50 - 630 A
<b>Null Output @ I = 0</b>	2.5 (±0.04) VDC	2.5 (±0.04) VDC
<b>Output Voltage vs. Current (VDC)</b>	$V(I) = \pm I (.0034) + 2.50$	
<b>Current Trip Point vs. Setpoint Resistance</b>	See Pages 5 and 6	
<b>Hysteresis (-40°C to + 105°C)</b>	1% of Full Scale Output	



## Part Numbering System

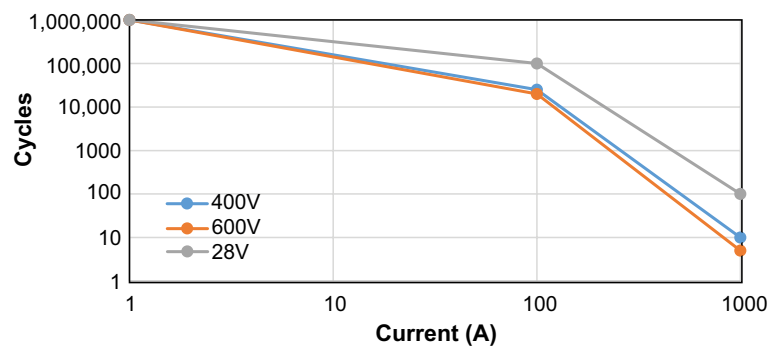
	KCS	03	X	024E	A	A	A
<b>SERIES</b>							
<b>KCS</b>	KILOVAC Current Sensing						
<b>SIZE</b>							
<b>03</b>	Size 03 (EV200 Package)						
<b>CONFIGURATION</b>							
<b>X</b>	Form X, Normally Open						
<b>COIL VOLTAGE</b>							
<b>012E</b>	12 V Coil Economized						
<b>024E</b>	24 V Coil Economized						
<b>COIL LEAD LENGTH</b>							
<b>A</b>	15 Inch Coil Leads						
<b>MOUNTING HARDWARE</b>							
<b>A</b>	M8 Male Terminals						
<b>MOUNTING STYLE</b>							
<b>A</b>	Bottom Mount						

## Part Numbers

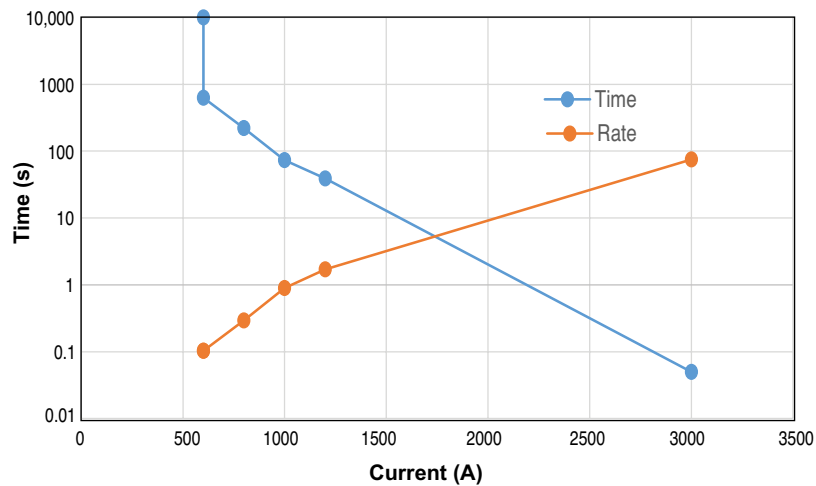
Coil Voltage	Part No.
12 VDC	KCS03X012EAAA
24 VDC	KCS03X024EAAA



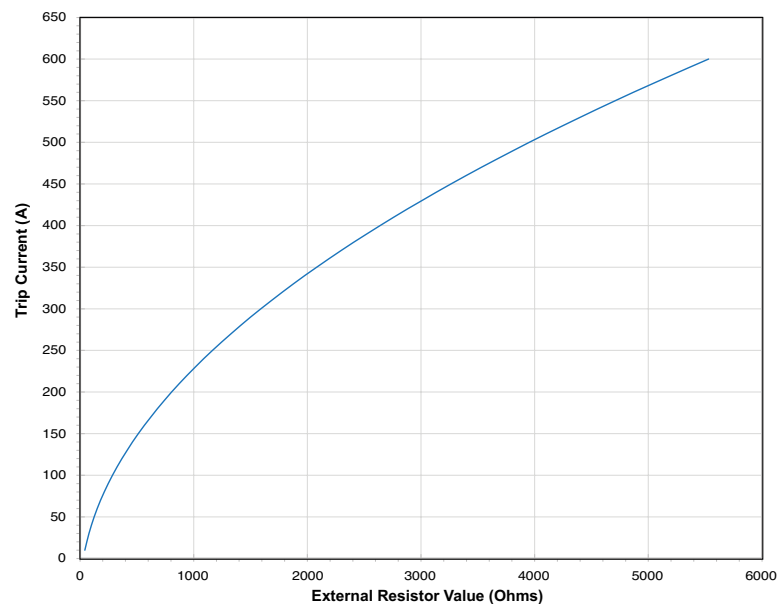
## Load Life: Resistive Load Switching



## Current Carry vs. Time



## Trip Function/Trip Delay





## Trip Setpoint Resistor (10 A to 150 A)

Connect Rx across Blue and Yellow for Trip Setpoint

Connect Purple to RTN to Disable Trip Function or Connect Purple to External Capacitor Tied to RTN to Delay Trip, 7 ms/ $\mu$ F

Connect Orange to V+ To Enable Trip and Current Sensing

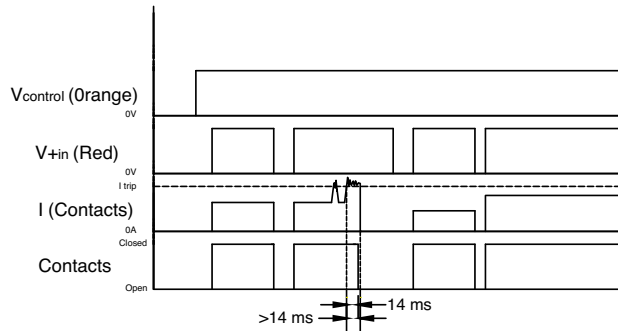
Reset Tripped Contacts by Cycling V+ Off to On

Intrinsic Trip Delay (Blue/Yellow Not Connected to Rx) = 14 ms

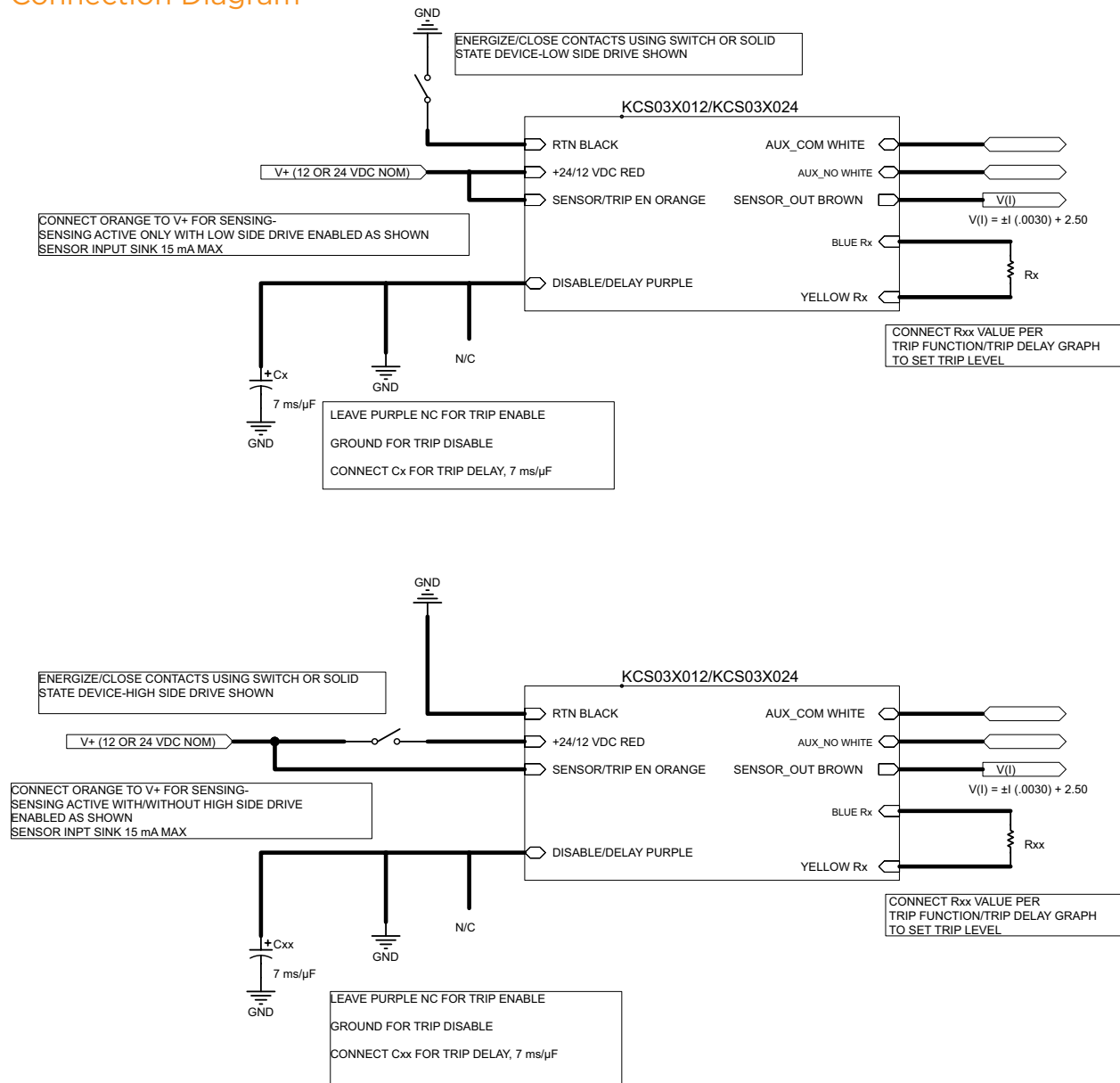
Input					Output		
Control (Orange)	V+ (Red)	RTN (Black)	Main Contact Current (A)	Trip Disable/ Time Delay (Purple)	Trip Set Rx (Blue) Trip Set Ax (Yellow)	Hall Output (V) ( White)	Main Contacts Top Post
0	Vnom	0	0	NON-ACTIVE	NON-ACTIVE	0	ON (NO TD)
0	0	0	0	NON-ACTIVE	NON-ACTIVE	0	OFF(NO TD)
1	0	0	0	OPEN	OPEN	2.5	OFF
1	Vnom	0	180 A $\pm$ 7%	OPEN	30K	4.84 (2.5 when relay trip)	RELAY TRIP OPEN AFTER 14 ms
1	0 then 1 remove and re-apply power	0	$\leq$ 167 A	OPEN	30K	2.5	ON (NO TD)
1	Vnom	0	0	GND (TRIP DISABLE)	X	2.5	ON (NO TD)
1	Vnom	0	180 A $\pm$ 7%	GND (TRIP DISABLE)	X	4.84	ON (NO TD)
1	0	0	0	GND (TRIP DISABLE)	X	2.5	OFF(NO TD)
1	Vnom	0	0	1 $\mu$ F is added between Purple and RTN	30K	2.5	ON (NO TD)
1	Vnom	0	180 A $\pm$ 7%	10 $\mu$ F is added between Purple and RTN	30K	4.84 (2.5 when relay trip)	RELAY TRIP OPEN AFTER 82 ms
1	Vnom	0	180 A $\pm$ 7%	10 $\mu$ F is added between Purple and RTN	30K	4.84 (2.5 when relay trip)	RELAY TRIP OPEN AFTER 720 ms
1	0 then Vnom remove and re-apply power	0	$\leq$ 167 A	10 $\mu$ F is added between Purple and RTN	30K	2.5	ON (NO TD)



## Timing Diagram



## Connection Diagram



## LET'S CONNECT

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