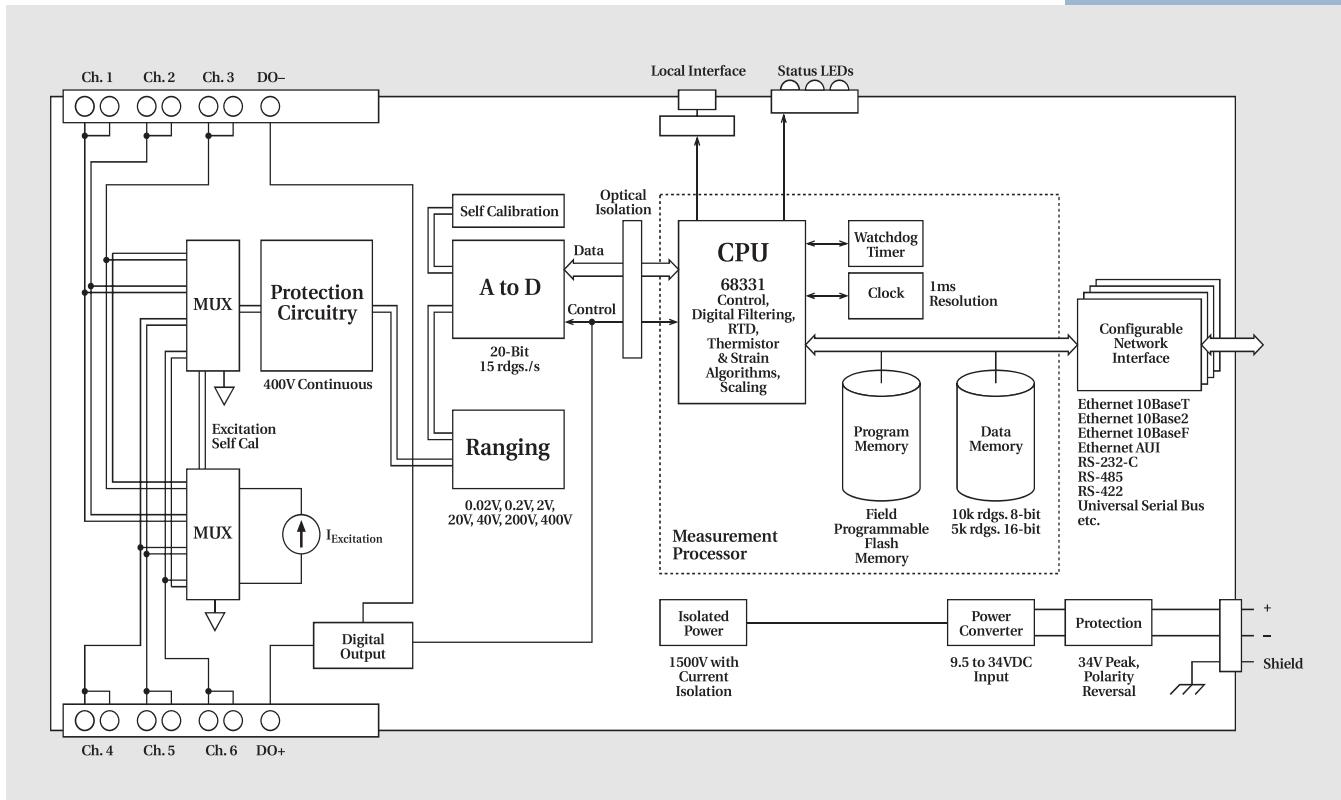


# Isolated Precision DC Volts and Ohms



## Configuration

Very little instrument configuration is required. After the appropriate type of instruments for a particular measurement is determined, the communications interface, power supply and mounting scheme must be selected. Interfaces are all factory installed and configured to order. For the power supply, determine the total system load needed in watts, then select the appropriate unit or provide another source of power (9.5–34 VDC).

## Installation

The form factors of conventional instruments and system components normally dictate the physical and electrical characteristics of a

system. Long analog wiring runs or racks of equipment in the field are often required. SmartLink Instruments impose no such restrictions. It's possible to put network nodes at measurement sites and still get instrument-grade readings. Instruments can mount on a DIN rail, screw to a panel, be placed in a wiring tray, or be located virtually anywhere a source of power (9.5–34 VDC) and a network connection can be found. This permits a wide range of system configurations that can easily be rearranged to suit changing needs. Because of their small size, instruments can often be placed in junction boxes or within electrical panels if environmental protection is required. Environmentally hardened enclosures are also available.

### SMARTLINK™ ORDERING INFORMATION

#### Isolated Precision DC Volts & Ohms

##### Single Channel Instruments

KNM-DCV41-RS232-C

Single-Channel RS-232-C

KNM-DCV41-RS422-C

Single-Channel RS-422

KNM-DCV41-RS485-C

Single-Channel RS-485

KNM-DCV41-EthrT-C

Single-Channel Ethernet

10BaseT

KNM-DCV41-Ethr2-C

Single-Channel Ethernet

10Base2

KNM-DCV41-EthrA-C

Single-Channel Ethernet AUI

KNM-DCV41-EthrF-C

Single-Channel Ethernet

10BaseF

##### Multi-Channel Instruments

KNM-DCV42-RS232-C

Multi-Channel RS-232-C

KNM-DCV42-RS422-C

Multi-Channel RS-422

KNM-DCV42-RS485-C

Multi-Channel RS-485

KNM-DCV42-EthrT-C

Multi-Channel Ethernet

10BaseT

KNM-DCV42-Ethr2-C

Multi-Channel Ethernet

10Base2

KNM-DCV42-EthrA-C

Multi-Channel Ethernet AUI

KNM-DCV42-EthrF-C

Multi-Channel Ethernet

10BaseF

# KNM-DCV41

# KNM-DCV42

1. Accuracy specifications include the effects of non-linearity, hysteresis and non-repeatability over  $T_{CAL} \pm 30^\circ C$  range for 5 years.  $T_{CAL} = 23^\circ \pm 3^\circ C$ .
2. Accuracy specifications include the effects of non-linearity, hysteresis and non-repeatability over  $T_{CAL} \pm 1^\circ C$  range for 24 hours.  $T_{CAL} = 23^\circ \pm 3^\circ C$ .
3. Specifications for horizontal mounting in still air. Add  $\pm 0.3^\circ C$  uncertainty for other mounting, or recalibrate to eliminate uncertainty.
4. All accuracies include instrument errors such as A/D errors, reference junction errors and conformity errors. Sensor errors cannot be predicted and therefore are not included.
5. 24-hr. specifications for 4-wire offset compensation (OC) off, 14 reading avg. 5-year specs for 4-wire O.C. on, 8 reading avg.
6. Specifications for 26 reading avg.
7. Specifications for 8 reading avg.
8. 5 year thermocouple specs apply for measurements from  $-100^\circ C$  to  $+100^\circ C$ . For measurements outside this range, see adjoining stability table.

## SMARTLINK™ ORDERING INFORMATION

### Options

KNM-CALDATA-DCV41/42  
Calibration Data

### Accessories

KNM-MMI-100  
Multimeter Interface  
KNM-MMI-120  
Enhanced Multimeter Interface  
KNM-MMI-KIT  
Multimeter Interface Kit  
KNM-PS-MOD-40-AC  
40 Watt, 90-264 VAC Power Supply  
KNM-PS-WALL-9-ACUS  
9 Watt, 120 VAC Power Supply  
KNM-PS-WALL-9-ACEU  
9 Watt, 240 VAC Power Supply  
KNM-PS-MOD-9-DC12  
9 Watt, 8-15 VDC Power Supply  
PS-CONN01  
KNM-Power Supply Connector  
KNM-DINMT  
DIN Mounting Assembly  
KNM-SCWMT  
Screw-In Panel Mount  
KNM-VELMT  
Velcro® Mount  
KNM-DCI-KIT  
Resistor Kit for measuring current

# Isolated Precision DC Volts and Ohms

ACCURACY & RESOLUTION <sup>4</sup>				
FUNCTION	RANGE	5 YEAR ACCURACY <sup>1</sup>	24 HR. ACCURACY <sup>2</sup>	RESOLUTION
<b>DC VOLTS<sup>6</sup></b>	20 mV	$\pm 0.11\% + 20\text{ }\mu\text{V}$	$\pm 0.005\% + 2.5\text{ }\mu\text{V}$	$\pm 100\text{ nV}$
	200 mV	$\pm 0.099\% + 80\text{ }\mu\text{V}$	$\pm 0.003\% + 5\text{ }\mu\text{V}$	$\pm 1\text{ }\mu\text{V}$
	2 V	$\pm 0.099\% + 80\text{ }\mu\text{V}$	$\pm 0.0028\% + 27\text{ }\mu\text{V}$	$\pm 10\text{ }\mu\text{V}$
	20 V	$\pm 0.12\% + 8\text{ mV}$	$\pm 0.0031\% + 400\text{ }\mu\text{V}$	$\pm 100\text{ }\mu\text{V}$
	200 V	$\pm 0.13\% + 10\text{ mV}$	$\pm 0.004\% + 5\text{ mV}$	$\pm 1\text{ mV}$
	400 V	$\pm 0.13\% + 20\text{ mV}$	$\pm 0.004\% + 20\text{ mV}$	$\pm 10\text{ mV}$
<b>DC AMPS (when used with Model DCI-KIT)</b>				
	20 mA	$\pm 0.12\% + 8\text{ }\mu\text{A}$	$\pm 0.011\% + 0.5\text{ }\mu\text{A}$	$\pm 0.1\text{ }\mu\text{A}$
	200 mA	$\pm 0.11\% + 80\text{ }\mu\text{A}$	$\pm 0.014\% + 5\text{ }\mu\text{A}$	$\pm 1\text{ }\mu\text{A}$
<b>RESISTANCE</b>	200 $\Omega$ (4-Wire) <sup>5</sup>	$\pm 0.04\% + 7\text{ m}\Omega$	$\pm 0.0026\% + 5\text{ m}\Omega$	$\pm 1\text{ m}\Omega$
	2 k $\Omega$ (4-Wire) <sup>5</sup>	$\pm 0.035\% + 40\text{ m}\Omega$	$\pm 0.0026\% + 40\text{ m}\Omega$	$\pm 10\text{ m}\Omega$
	20 k $\Omega$ (4-Wire) <sup>5</sup>	$\pm 0.047\% + 0.7\text{ }\Omega$	$\pm 0.0034\% + 500\text{ m}\Omega$	$\pm 100\text{ m}\Omega$
	200 k $\Omega$ (4-Wire) <sup>5</sup>	$\pm 0.057\% + 3\text{ }\Omega$	$\pm 0.0042\% + 3\text{ }\Omega$	$\pm 1\text{ }\Omega$
	2 M $\Omega$ (2-Wire) <sup>7</sup>	$\pm 1.03\% + 320\text{ }\Omega$	$\pm 0.035\% + 85\text{ }\Omega$	$\pm 10\text{ }\Omega$
	20 M $\Omega$ (2-Wire) <sup>7</sup>	$\pm 2.54\% + 2\text{ k}\Omega$	$\pm 0.08\% + 500\text{ }\Omega$	$\pm 100\text{ }\Omega$
<b>RTDS – 4-WIRE<sup>5</sup> (100<math>\Omega</math> type 385 or 390)</b>	200°C to + 70°C	$\pm 0.13^\circ C$	$\pm 0.019^\circ C$	$\pm 0.001^\circ C$
	+70°C to + 200°C	$\pm 0.20^\circ C$	$\pm 0.025^\circ C$	$\pm 0.001^\circ C$
	+200°C to + 800°C	$\pm 0.58^\circ C$	$\pm 0.18^\circ C$	$\pm 0.001^\circ C$
	<b>THERMISTORS – 4-WIRE<sup>5</sup> (100<math>\Omega</math> to 1M<math>\Omega</math>)</b>			
	-80°C to + 10°C	$\pm 0.64^\circ C$	$\pm 0.02^\circ C$	$\pm 0.0125^\circ C$
	+10°C to + 70°C	$\pm 0.46^\circ C$	$\pm 0.013^\circ C$	$\pm 0.0125^\circ C$
<b>THERMOCOUPLES<sup>3,8</sup></b>	+70°C to + 250°C	$\pm 0.064^\circ C$	$\pm 0.03^\circ C$	$\pm 0.0125^\circ C$
	Type J	-200°C to + 760°C	$\pm 1.85^\circ C$	$\pm 0.4^\circ C$
	Type K	-200°C to + 1350°C	$\pm 1.7^\circ C$	$\pm 0.4^\circ C$
	Type R	+250°C to + 1767°C	$\pm 3.6^\circ C$	$\pm 0.6^\circ C$
	Type E	-200°C to + 1000°C	$\pm 1.7^\circ C$	$\pm 0.4^\circ C$
	Type S	+200°C to + 1760°C	$\pm 3.4^\circ C$	$\pm 0.6^\circ C$
<b>THERMOCOUPLES<sup>3,8</sup></b>	Type T	-200°C to + 400°C	$\pm 1.7^\circ C$	$\pm 0.4^\circ C$
	Type N	-200°C to + 1300°C	$\pm 1.7^\circ C$	$\pm 0.4^\circ C$
	Type B	+250°C to + 1820°C	$\pm 3.0^\circ C$	$\pm 1.0^\circ C$
	Measurement Accuracy = [(measured value $\times$ % accuracy) / 100] + offset. e.g., 24 hour, 1k $\Omega$ accuracy = [(1000 $\times$ 0.0026%) / 100] + 40m $\Omega$ = 66m $\Omega$ .			
	If running at higher speeds, add noise @ max. speed from chart below. To adjust for intermediate temperature range or time, add values below to 24 hour accuracy.			

FUNCTION/ RANGE	INPUT <sup>2</sup> IMPEDANCE	EXCITATION CURRENT <sup>2,4</sup> O.C. OFF	O.C. ON	MAX. V	INTEGRAL LINEARITY Typical	CONFORMITY ERROR <sup>2</sup>
<b>DC VOLTS</b>	20 mV	>1 G $\Omega$			20ppm	
	200 mV	>1 G $\Omega$			20ppm	
	2 V	>1 G $\Omega$			20ppm	
	20 V	>10M $\Omega$			20ppm	
	200 V	>10M $\Omega$			20ppm	
	400 V	>10M $\Omega$			20ppm	
<b>RESISTANCE</b>	200 $\Omega$	>1G $\Omega$	1 mA	500 $\mu\text{A}$	6 V	20ppm
	2 k $\Omega$	>1G $\Omega$	1 mA	500 $\mu\text{A}$	6 V	20ppm
	20 k $\Omega$	>1G $\Omega$	11 $\mu\text{A}$	5.6 $\mu\text{A}$	6 V	20ppm
	200 k $\Omega$	>1G $\Omega$	11 $\mu\text{A}$	5.6 $\mu\text{A}$	6 V	20ppm
	2M $\Omega$	>1G $\Omega$	0.25 $\mu\text{A}$ -0.208 $\mu\text{A}$	—	6 V	20ppm
	20M $\Omega$	>1G $\Omega$	0.25 $\mu\text{A}$ -0.083 $\mu\text{A}$	—	6 V	20ppm
<b>RTDS – 4-WIRE (100<math>\Omega</math> type 385 or 390)</b>	200°C to 250°C	see below	see above		$\pm 0.005^\circ C$	$\pm 0.2^\circ C$
	<b>THERMISTORS (100<math>\Omega</math> to 1M<math>\Omega</math>)</b>					
	-80°C to 250°C	>1G $\Omega$	see above	2.6V	$\pm 0.002^\circ C$	$\pm 0.2^\circ C$
	<b>THERMOCOUPLES</b>					
	>1G $\Omega$	see above			$\pm 0.01^\circ C$	$\pm 0.2^\circ C$

1. This uncertainty already included in 5 year accuracy spec.
2. Typical.
3. Maximum conformity error of algorithm to standard sensor characteristics.
4. Lower effective sensor currents can be realized when scanning multiple channels on DCV32.

KNM-DCV41

KNM-DCV42

## Isolated Precision DC Volts and Ohms

STABILITY <sup>1,2</sup>		TEMPERATURE COEFFICIENT <sup>1,2</sup>						TIME STABILITY <sup>1,2</sup>				NOISE <sup>3</sup>	
FUNCTION/ RANGE	±1°C	±5°C	±10°C	±30°C	90 DAYS	1 YEAR	2 YEARS	5 YEARS	@ MAX. SPEED	RMS	PK-PK		
<b>DC VOLTS</b>													
20 mV	±0.0%	±0.013%+ 0.5 μV	±0.026%+ 1 μV	±0.074%+ 3 μV	±0.0080%	±0.014%	±0.020%	±0.033%	±0.22 μV	±21 μV	±21 μV		
200 mV	±0.0%	±0.011%+ 1 μV	±0.022%+ 6 μV	±0.070%+ 30 μV	±0.0037%	±0.01 %	±0.017%	±0.028%	±2.2 μV	±11 μV	±11 μV		
2 V	±0.0%	±0.01 %+ 0	±0.022%+ 0	±0.068%+ 53 μV	±0.003 %	±0.009%	±0.016%	±0.027%	±19 μV	±95 μV	±95 μV		
20 V	±0.0%	±0.011%+ 0.1 mV	±0.023%+ 0.6 mV	±0.077%+ 7.6 mV	±0.0054%	±0.012%	±0.021%	±0.035%	±220 μV	±1100 μV	±1100 μV		
200 V	±0.0%	±0.012%+ 0.1 mV	±0.024%+ 0.6 mV	±0.079%+ 7.6 mV	±0.0057%	±0.014%	±0.021%	±0.035%	±220 μV	±1100 μV	±1100 μV		
400 V	±0.0%	±0.012%+ 0	±0.024%+ 1 mV	±0.079%+ 7 mV	±0.0060%	±0.014%	±0.021%	±0.035%	±1 mV	±5 mV	±5 mV		
<b>RESISTANCE</b>													
4-wire 200 Ω (O.C. On)	±0.0%+2mΩ	±0.0023%+ 2mΩ	±0.0055%+ 2mΩ	±0.02 %+ 2mΩ	±0.0029%	±0.0062%	±0.012 %	±0.017%	±5 mΩ	±25 mΩ	±25 mΩ		
(O.C. Off)	±0.0%	±0.0023%+ 2mΩ	±0.0055%+ 12mΩ	±0.02 %+ 135mΩ	±0.0029%	±0.0062%	±0.012 %	±0.017%	±3.4 mΩ	±17 mΩ	±17 mΩ		
2 kΩ (O.C. On)	±0.0%	±0.002 %+ 0	±0.0051%+ 0	±0.018%+ 0	±0.0021%	±0.005 %	±0.01 %	±0.014%	±48 mΩ	±240 mΩ	±240 mΩ		
(O.C. Off)	±0.0%	±0.002 %+ 2mΩ	±0.0051%+ 12mΩ	±0.018%+ 135mΩ	±0.0021%	±0.005 %	±0.01 %	±0.014%	±32 mΩ	±160 mΩ	±160 mΩ		
20 kΩ (O.C. On)	±0.0%+200mΩ	±0.0015%+ 200mΩ	±0.0064 %+ 200mΩ	±0.029%+ 200mΩ	±0.0021%	±0.005 %	±0.01 %	±0.014%	±0.44 Ω	±2.2 Ω	±2.2 Ω		
(O.C. Off)	±0.0%	±0.0015%+ 0.1 Ω	±0.0064%+ 0.7 Ω	±0.029%+ 9 Ω	±0.0021%	±0.005 %	±0.01 %	±0.014%	±0.3 Ω	±1.5 Ω	±1.5 Ω		
200 kΩ (O.C. On)	±0.0%	±0.0032%+ 0	±0.0078%+ 0	±0.039%+ 0	±0.0028%	±0.0051 %	±0.014 %	±0.014%	±3.2 Ω	±16 Ω	±16 Ω		
(O.C. Off)	±0.0%	±0.0032%+ 0.1 Ω	±0.0078%+ 0.7 Ω	±0.039%+ 9 Ω	±0.0028%	±0.0051 %	±0.014 %	±0.014%	±2.2 Ω	±11 Ω	±11 Ω		
2-wire 2MΩ	±0.0%	±0.036 %+ 5 Ω	±0.15%+ 15 Ω	±0.91 %+ 235	±0.015 %	±0.028 %	±0.049 %	±0.086%	±140 Ω	±700 Ω	±700 Ω		
20MΩ	±0.0%	±0.074 %+ 0	±0.31%+ 100 Ω	±2.38 %+ 1.5 kΩ	±0.013 %	±0.026 %	±0.047 %	±0.084%	±1.2 kΩ	±6 kΩ	±6 kΩ		
200MΩ	±0.0%	±0.45 %+ 0	±2.21%+ 7 kΩ	±16.9 %+ 111 kΩ	±0.01 %	±0.02 %	±0.04 %	±0.07 %	±16 kΩ	±80 kΩ	±80 kΩ		
2-wire (All Ranges)	±1.8 Ω	±9.5 Ω	±19 Ω	±56 Ω									
<b>RTDS - 4-WIRE<sup>4</sup> (100Ω type 385 or 390)</b>													
-200°C to +70°C	±0.005°C	±0.012°C	±0.023°C	±0.07°C	±0.015°C	±0.027°C	±0.045°C	±0.06°C	±0.012°C	±0.06°C	±0.06°C		
+ 70°C to 200°C	±0.004°C	±0.016°C	±0.032°C	±0.1 °C	±0.022°C	±0.035°C	±0.06 °C	±0.09°C	±0.012°C	±0.06°C	±0.06°C		
+ 200°C to 800°C	±0.0°C	±0.031°C	±0.074°C	±0.26°C	±0.04 °C	±0.075°C	±0.16 °C	±0.20°C	±0.11 °C	±0.55°C	±0.55°C		
<b>THERMISTORS - 4-WIRE<sup>4</sup> (100Ω to 30kΩ)</b>													
-80°C to +10°C	±0.0°C	±0.01 °C	±0.043°C	±0.33 °C	±0.005°C	±0.0051°C	±0.01 °C	±0.016°C	±0.014°C	±0.07°C	±0.07°C		
+10°C to +70°C	±0.0°C	±0.005°C	±0.007°C	±0.015°C	±0.006°C	±0.007 °C	±0.008 °C	±0.01 °C	±0.006°C	±0.03°C	±0.03°C		
+70°C to +190°C	±0.0°C	±0.008°C	±0.009°C	±0.012°C	±0.008°C	±0.01 °C	±0.012 °C	±0.015°C	±0.014°C	±0.07°C	±0.07°C		
+190°C to +250°C	±0.0°C	±0.012°C	±0.015°C	±0.025°C	±0.012°C	±0.014 °C	±0.0185°C	±0.022°C	±0.018°C	±0.09°C	±0.09°C		
(100kΩ to 1MΩ)													
-80°C to +250°C	±0.0°C	±0.013°C	±0.055°C	±0.44°C	±0.0073°C	±0.0062°C	±0.011°C	±0.019°C	±0.016°C	±0.08°C	±0.08°C		
<b>THERMOCOUPLES</b>													
Type J (-210°C to +760°C)													
-100°C to +100°C	±0.0 °C	±0.0 °C	±0.27 °C	±1.0 °C	±0.06 °C	±0.14 °C	±0.20 °C	±0.25 °C	±0.008 °C	±0.04 °C	±0.04 °C		
-200°C to +760°C	±0.0 °C	±0.05 °C	±0.36 °C	±1.1 °C	±0.09 °C	±0.18 °C	±0.26 °C	±0.35 °C	±0.03 °C	±0.13 °C	±0.13 °C		
Type K (-270°C to +1372°C)													
-200°C to -100°C	±0.0 °C	±0.06 °C	±0.29 °C	±1.1 °C	±0.07 °C	±0.14 °C	±0.2 °C	±0.27 °C	±0.012 °C	±0.06 °C	±0.06 °C		
-100°C to +100°C	±0.0 °C	±0.06 °C	±0.26 °C	±1.0 °C	±0.06 °C	±0.13 °C	±0.19 °C	±0.25 °C	±0.006 °C	±0.03 °C	±0.03 °C		
-200°C to +1350°C	±0.0 °C	±0.22 °C	±0.63 °C	±1.9 °C	±0.16 °C	±0.29 °C	±0.43 °C	±0.67 °C	±0.035 °C	±0.17 °C	±0.17 °C		
Type R (0°C to +1760°C)													
+250°C to +1767°C	±0.0 °C	±0.28 °C	±0.78 °C	±2.3 °C	±0.17 °C	±0.29 °C	±0.44 °C	±0.68 °C	±0.11 °C	±0.56 °C	±0.56 °C		
Type E (-270°C to +1000°C)													
-200°C to -100°C	±0.0 °C	±0.0 °C	±0.29 °C	±1.1 °C	±0.07 °C	±0.15 °C	±0.21 °C	±0.28 °C	±0.008 °C	±0.04 °C	±0.04 °C		
-200°C to +1000°C	±0.0 °C	±0.09 °C	±0.44 °C	±1.4 °C	±0.12 °C	±0.22 °C	±0.31 °C	±0.46 °C	±0.02 °C	±0.1 °C	±0.1 °C		
Type S (0°C to +1760°C)													
+200°C to +1767°C	±0.0 °C	±0.28 °C	±0.65 °C	±2.1 °C	±0.17 °C	±0.30 °C	±0.45 °C	±0.71 °C	±0.02 °C	±0.1 °C	±0.1 °C		
Type T (-270°C to +390°C)													
-100°C to +100°C	±0.0 °C	±0.0 °C	±0.26 °C	±1.0 °C	±0.06 °C	±0.13 °C	±0.19 °C	±0.24 °C	±0.006 °C	±0.03 °C	±0.03 °C		
-200°C to +390°C	±0.0 °C	±0.06 °C	±0.31 °C	±1.1 °C	±0.07 °C	±0.15 °C	±0.21 °C	±0.29 °C	±0.020 °C	±0.12 °C	±0.12 °C		
Type N (-200°C to +400°C)													
-200°C to -100°C	±0.0 °C	±0.1 °C	±0.29 °C	±1.2 °C	±0.06 °C	±0.12 °C	±0.18 °C	±0.26 °C	±0.014 °C	±0.07 °C	±0.07 °C		
-100°C to +100°C	±0.0 °C	±0.0 °C	±0.25 °C	±1.0 °C	±0.06 °C	±0.12 °C	±0.17 °C	±0.23 °C	±0.006 °C	±0.03 °C	±0.03 °C		
-200°C to +1300°C	±0.0 °C	±0.2 °C	±0.56 °C	±1.7 °C	±0.14 °C	±0.25 °C	±0.37 °C	±0.57 °C	±0.04 °C	±0.18 °C	±0.18 °C		
Type B (+250°C to +1820°C)													
+200°C to +1767°C	±0.0 °C	±0.1 °C	±0.3 °C	±1.5 °C	±0.1 °C	±0.2 °C	±0.25 °C	±0.5 °C	±0.16 °C	±0.8 °C	±0.8 °C		

1. Maximum uncertainty for Offset Comp. ON, 8 reading filter. Typical accuracy is better.

2. This uncertainty already included in 5 Year accuracy spec.

3. Typical.

4. Specifications for O.C. on, 8 reading avg.

Accuracy = 24 hour accuracy + time stability + temperature stability + noise.

Note: Noise figure is necessary only if operating above specified averaging filter setting.

e.g., 1kΩ, 90 day, ±5°C accuracy at max. speed

=  $(1000 \times 0.0026\%) / 100 + 40m\Omega + (1000 \times 0.0021\%) / 100 + 0 + (1000 \times 0.002\%) / 100 + 0 + 48m\Omega$ =  $26m\Omega + 40m\Omega + 21m\Omega + 20m\Omega + 48m\Omega$ 

= ±155mΩ

KEITHLEY

## Isolated Precision DC Volts and Ohms

### COMMAND EXAMPLES

#### MEASURE

```
:Meas? <chan_list><<#_of_rdgs>>|Off>
:Capture? <chan_list><#_of_rdgs|All><ImmediateLevel
    <chan#><level><HILLo>><interval_usec>
    <ASCII|Binary>
```

#### FILTER

```
:Filter:Dig <chan_list> <On|Off>
:Config:Filter:Dig:MvgAvg <chan_list> <#_of_meas>
```

#### SCALING

```
:Scaling <chan_list> <On|Off>
:Config:Scaling <chan_list><<span>&|<mb>&|<table>&|<poly>>
:Config:Scaling:MB <chan_list> <m_value> <b_value>
:Config:Scaling:Span <chan_list> <zero_value> <+span>
    <-span>
:Config:Scaling:Units <chan_list> <"new_units">
```

#### LIMITS

```
:Limits <<chan_list>> |All><On|Off>
:Config:Limits <chan_list> <Lim1|Lim2><HILLo>
    <lim_value><hysteresis>
:Config:Limits:Assoc <digout Chan#> <chan_list>
    <Lim1|Lim2>
```

#### STATISTICS

```
:Stats:Max? <chan_list>
:Stats:Min? <chan_list>
```

#### CONFIG CHANS (Per Channel)

```
:Config <chan_list>DigIn <#_of_bits><ActiveHigh|ActiveLow><Diff|SE><<"chan_tag">
:Config <chan_list>DigOut <#_of_bits><ActiveHigh|ActiveLow><Initial_state><"chan_tag">
:Config <chan#>Calculated <chan#A><math_func>
    <chan#B><"chan_tag">
:Config <chan_list>Flow Xmit <fs_flow><fs_signal>
    <zero_signal><VDIFF|VSE|IDIFF><shuntohms>
    <"chan_tag">
:Config <chan_list>IDC <range><shuntohms>
    <DIFFISE><"chan_tag">
:Config <chan_list>Ohms <range><4W|SE|4WOC|SEOC>
    <"chan_tag">
:Config <chan_list>Pressure Xmit <fs_pressure>
    <fs_signal><zero_signal><VDIFF|VSE|IDIFF>
    <shuntohms><"chan_tag">
:Config <chan_list>Temp RTD <PT385|PT3916><User r0
    alpha beta delta>><range><SE|4W|4WOC|SEOC>
    <"chan_tag">
```

```
:Config <chan_list> Temp TC <tc_type><OpenTCOn|OpenTCOff><IntRJ|RefJcnTemp><"chan_tag">
```

```
:Config <chan_list>TempThrmstr <type_code><range>
    <4W|SE|4WOC|SEOC><"chan_tag">
```

```
:Config <chan_list>VDC <range><DIFFISE>
    <"chan_tag">
```

```
:Config <chan_list>Weight Xmit <fs_weight><fs_signal>
    <zero_signal><VDIFF|VSE|IDIFF><shuntohms>>
    <"chan_tag">
```

#### CONFIG UNITS

```
:Config:Units:Flow < >
:Config:Units:Force <Lb|N|Kg|Oz>
:Config:Units:Ohms <Ohms|Kohms|Mohms>
:Config:Units:Temp <DegC|DegF|K>
:Config:Units:VDC <Volts|mVolts>
:Config:Units:Weight <Lb|N|Kg|Oz>
:Config:Units:Pressure <PSI|Atm|KPa>
```

#### TIME, DATE

```
:Time <hh:mm:ss.sss>
:Date <mm/dd/yyyy>
:Time:SyncGlobal
```

#### SYSTEM

```
*Sav,*Rcl (Save & Recall)
:System:POSetup <Saved|Factory>
*Idn? (Identification)
```

#### OUTPUT

```
:Output <chan_list> <value> <step_delay>
```

#### DATAMEM

```
:DataMem? <chan_list> <All><scan_list>
:DataMem:Last?
:DataMem:Next?
```

```
:DataMem:Memsize?
```

#### CONFIG DATAMEM

```
:Config:DataMem:Scans?
:Config:DataMem:Captures?
```

```
:Config:DataMem:Mode <WrapWhenFull|StopWhenFull>
```

#### CONFIG DATA

```
:Config:Data:Fields <Read&|Units&|Chan&|Chan_Tag&|Rnum&|Time&|Date&|Limits&|Stat>
```

# KNM-DCV41

# KNM-DCV42

## Isolated Precision DC Volts and Ohms

### ANALOG AND DIGITAL FRONT ENDS

**NUMBER OF CHANNELS, DCV41:** One of any type and one digital output.

**NUMBER OF CHANNELS, DCV42:** 6 differential, 3 4-wire, or a mix of the above; one digital output.

**INPUT CONFIGURATION:** Isolated 4-wire.

**A/D CONVERSION METHOD:** 16–20 bit (effective resolution) precision sigma delta.

**COMMON MODE VOLTAGE:** 400V peak, 250V rms.

**COMMON MODE REJECTION:** >140dB @ DC, 50Hz or 60Hz (100Ω imbalance).

**NORMAL MODE REJECTION:** >60dB @ 50Hz or 60Hz.

**CHANNEL ISOLATION:** 250V rms, 800V peak.

**INSTRUMENT ISOLATION:** 1500V (between any channel and power or communications).

**INPUT IMPEDANCE:** 1GΩ (minimum).

**INPUT OVERLOAD PROTECTION:** 8kV electrostatic discharge, all pins.

**DIGITAL OUTPUT** Solid state relay, 50V max., 100Ω max. on resistance.

### NUMBER AND TYPE OF MEASUREMENTS SUPPORTED

Analog Inputs		# of Pins/Channel	# of Available Channels	
			DCV41	DCV42
Digital Input	Differential	2	1	6
<i>Flow Transmitter</i>	<i>Differential</i> <sup>1</sup>	2	1	6
<i>IDC Shunt</i>	<i>Differential</i> <sup>1</sup>	2	1	6
Ohms	4-Wire	4	1	3
<i>Pressure</i>	<i>Transmitter</i>	<i>Differential</i> <sup>1</sup>	1	6
Temperature	RTD	4-Wire	1	3
Temperature	Thermistor	4-Wire	1	3
Temperature	Thermocouple	Differential	1	3
VDC	Differential	2	1	6
<i>Weight</i>	<i>Transmitter</i>	<i>Differential</i> <sup>1</sup>	1	6
<b>Total Analog Channels</b>		1 any type	12 pins available	
<b>Digital I/O</b>				
Digital Output		1	1	1
<b>Total Digital Channels</b>			1	1
<b>Calculated Channels</b>				
<i>Calculated Measurements</i> <sup>1</sup>			1	4

<sup>1</sup>Contact factory for availability.

### MEASUREMENT PROCESSOR

**MEASUREMENT RESOLUTION:** 20 bits.

**THROUGHPUT:** 15 rdgs/sec max.

**READING MEMORY:**

	8-Bit	16-Bit	24-Bit			
Timestamp	Readings	Readings	Readings			
Resolution	Sync <sup>1</sup>	Async <sup>2</sup>	Sync <sup>1</sup>	Async <sup>2</sup>	Sync <sup>1</sup>	Async <sup>2</sup>
None	10,000	10,000	5,000	5,000	3,333	3,333
8-bit	10,000	5,000	5,000	3,333	3,333	2,500
16-bit	10,000	3,333	5,000	2,500	3,333	2,000
24-bit	10,000	2,500	5,000	2,000	3,333	1,667
32-bit	10,000	2,000	5,000	1,667	3,333	1,429

<sup>1</sup>Synchronous (interpolated timestamp).

<sup>2</sup>Asynchronous (timestamp stored with every reading).

**CONFIGURATION MEMORY:** Non-volatile flash.

**TIMING ACCURACY:** ±0.002%/month.

**TIMING RESOLUTION:** 1ms.

**TIMING SYNCHRONIZATION:** ±1ms between multiple units.

**SCALING:** mX+B, zero and span, & units designation (4 char.).

**FILTERING:** Measurement Average: 1 to 100 readings per measurement. Moving Average: 1 to 50 measurements.

**PEAK MEASUREMENTS:** Stores highest absolute values per channel.

**SPECIFIC CALCULATIONS:** Callender van Dusen (RTD), Steinhart & Hart (thermistor), microstrain.

**LIMITS:** Lim1 (HI or LO); Lim2 (HI or LO) per channel.

### GENERAL SPECIFICATIONS

**POWER SUPPLY:** 9.5 to 34 VDC, reverse polarity protected, up to 10% ripple with no degradation, maximum 34VDC.

**POWER CONSUMPTION:** 2W, 3.5W max. w/Ethernet.

**OPERATING ENVIRONMENT:** -5°C to 65°C, 0–95% RH (NC). (Specifications valid for 0–70% R.H. (NC) up to 35°C. Linearly derate 3% R.H./°C, 35°–65°C.)

**STORAGE ENVIRONMENT:** -20°C to 85°C.

**ALTITUDE:** 10,000 feet (3,050m) operating, 40,000 feet (12,200m) non-operating.

**ELECTRICAL SAFETY:** Designed to meet: IEC1010, CSA C22.2, No. 231, UL3111. For pollution degree 2, installation category 1.

**EMI EMISSIONS:** EN55022 Class B, FCC Part 15 Class A.

**EMI IMMUNITY:** EN50082-1, IEC 801-3 A.

**ELECTROSTATIC IMMUNITY:** EN50082-1, IEC 801-2 B.

**COMMON MODE FAST TRANSIENT IMMUNITY:** EN50082-1, IEC 801-4 B.

**ENVIRONMENTAL PROTECTION:** NEMA 4, IP 65 For Industrial Enclosure (-I).

**VIBRATION:** 0.25mm @ resonance for 15 min.

**WARMUP (FULL ACCURACY):** 40 minutes (maximum).

**MOUNTING:** DIN rail, screw mount, or Velcro.

**NET WEIGHT:** <0.25kg (<0.5 lb.).

**DIMENSIONS:** 17.0 cm × 3.3 cm × 2.7 cm (6.7 in. × 1.3 in. × 1.1 in.)

**WARRANTY:** 5 years.

KEITHLEY