

**DC SPECIFICATIONS**

CONDITIONS: 1 PLC or 5 PLC.

For <1PLC, add appropriate "ppm of range" adder from "RMS Noise" table.  
Includes rear panel Analog Backplane connector and transducer conversion. Refer to DC Notes for additional card uncertainties.

Accuracy: +/- (ppm of reading + ppm of range)  
(ppm = parts per million) (e.g., 10ppm = 0.001%)

Function	Range <sup>1</sup>	Resolution	Test Current or Burden Voltage	Input Resistance or Open Ckt. Voltage <sup>2</sup>	24 Hour <sup>3</sup> 23°C ± 1°	90 Day 23°C ± 5°	1 Year 23°C ± 5°	Temperature Coefficient 0° -18°C & 28° - 50°C
Voltage <sup>4</sup>	100.00000 mV <sup>19</sup>	0.01µV		>10G Ω or 10M Ω ± 1%	10 + 9	25 + 9	30 + 9	(1 + 5)/ °C
	1.0000000 V <sup>19</sup>	0.1µV		>10G Ω or 10M Ω ± 1%	7 + 2	25 + 2	30 + 2	(1 + 1)/ °C
	10.000000 V	1µV		>10G Ω or 10M Ω ± 1%	7 + 2	20 + 2	25 + 2	(1 + 1)/ °C
	100.00000 V	10µV		10M Ω ± 1%	15 + 6	35 + 6	40 + 6	(5 + 1)/ °C
	300.00000 V	100µV		10M Ω ± 1%	20 + 6	35 + 6	40 + 6	(5 + 1)/ °C
Resistance <sup>4, 5, 6, 7</sup>	1.0000000 Ω	0.1µΩ	10mA	8.2V	15 + 80	40 + 80	60 + 80	(8 + 1)/ °C
	10.000000 Ω	1µΩ	10mA	8.2V	15 + 9	40 + 9	60 + 9	(8 + 1)/ °C
	100.00000 Ω	10µΩ	1mA	13.9V	15 + 9	45 + 9	65 + 9	(8 + 1)/ °C
	1.0000000 kΩ	100µΩ	1mA	13.9V	20 + 4	45 + 4	65 + 4	(8 + 1)/ °C
	10.000000 kΩ	1m Ω	100µA	9.1V	15 + 4	40 + 4	60 + 4	(8 + 1)/ °C
	100.00000 kΩ	10m Ω	10µA	14.7V	20 + 4	45 + 5	65 + 5	(8 + 1)/ °C
	1.0000000 MΩ	100m Ω	10µA	14.7V	25 + 4	50 + 5	70 + 5	(8 + 1)/ °C
	10.000000 MΩ	1 Ω	0.64µA // 10MΩ	6.4V	150 + 6	200 + 10	400 + 10	(70 + 1)/ °C
Dry Circuit Resistance <sup>6, 8</sup>	1.0000000 Ω	1µΩ	10mA	27mV	25 + 80	50 + 80	70 + 80	(8 + 1)/ °C
	10.000000 Ω	10µΩ	1mA	20mV	25 + 80	50 + 80	70 + 80	(8 + 1)/ °C
	100.00000 Ω	100µΩ	100µA	20mV	25 + 80	90 + 80	140 + 80	(8 + 1)/ °C
	1.0000000 kΩ	1mΩ	10µA	20mV	25 + 80	180 + 80	400 + 80	(8 + 1)/ °C
	2.0000000 kΩ	10m Ω	5µA	20mV	25 + 80	320 + 80	800 + 80	(8 + 1)/ °C
Continuity (2W)	1.000 kΩ	100mΩ	1mA	13.9V	40 + 100	100 + 100	100 + 100	(8 + 1)/ °C
Current <sup>9</sup>	10.000000 µA	1pA	<61mV		40 + 50	300 + 50	500 + 50	(35 + 9)/ °C
	100.00000 µA	10pA	<105mV		50 + 9	300 + 30	500 + 30	(50 + 5)/ °C
	1.0000000 mA	100pA	<130mV		50 + 9	300 + 30	500 + 30	(50 + 5)/ °C
	10.000000 mA	1nA	<150mV		50 + 9	300 + 30	500 + 30	(50 + 5)/ °C
	100.00000 mA	10nA	<0.4V		50 + 9	300 + 30	500 + 30	(50 + 5)/ °C
	1.0000000 A	100nA	<0.6V		200 + 60	500 + 60	800 + 60	(50 + 10)/ °C
	3.0000000 A	1µA	<1.8V		1000 + 75	1200 + 75	1200 + 75	(50 + 10)/ °C

**Temperature**

(Displayed in °C, °F, or K. Exclusive of probes errors.)  
Thermocouples (Accuracy based on ITS-90.)

Type	Range	Resolution	90 Day / 1 Year 23°C ± 5°		90 Day / 1 Year 23°C ± 5°		Temperature Coefficient 0° - 18°C & 28° - 50°C
			Simulated Reference Junction	3720, 3721, or 3724 Cards	Range	3720, 3721, or 3724 Cards	
J	-150 to +760 °C	0.001°C	0.2°C	1.0°C	-200 to -150 °C	1.5°C	0.03°C/°C
K	-150 to +1372°C	0.001°C	0.2°C	1.0°C	-200 to -150°C	1.5°C	0.03°C/°C
N	-100 to +1300 °C	0.001°C	0.2°C	1.0°C	-200 to -100 °C	1.5°C	0.03°C/°C
T	-100 to +400°C	0.001°C	0.2°C	1.0°C	-200 to -100°C	1.5°C	0.03°C/°C
E	-150 to +1000°C	0.001°C	0.2°C	1.0°C	-200 to -150°C	1.5°C	0.03°C/°C
R	+400 to +1768°C	0.1°C	0.6°C	1.8°C	0 to +400°C	2.3°C	0.03°C/°C
S	+400 to +1768°C	0.1°C	0.6°C	1.8°C	0 to +400°C	2.3°C	0.03°C/°C
B	+1100 to +1820°C	0.1°C	0.6°C	1.8°C	+350 to +1100°C	2.8°C	0.03°C/°C

**4-Wire RTD or 3-Wire RTD:** (100Ω platinum [PT100], D100, F100, PT385, PT3916, or USER 0Ω to 10kΩ. Selectable Offset compensation On or Off).  
For 3-Wire RTD, dmm.connect=dmm.CONNECT\_FOUR\_WIRE, ≤ 0.1Ω lead resistance mis-matching in Input HI and LO. Add 0.25°C/ 0.1Ω of lead resistance mis-match.

4-Wire RTD	-200 to +630°C	0.01°C	0.06°C		0.003°C/°C
3-Wire RTD	-200 to +630°C	0.01°C	0.75°C		0.003°C/°C

**Thermistor:**(2.2kΩ, 5kΩ, and 10kΩ). Not recommend with Model 3724 card. See Model 3724 manual for "Measurement Considerations".

	-80 to +150°C	0.01°C	0.08°C		0.002°C/°C
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DC Specifications.

**1PLC and 5PLC RMS Noise are included in DC Specifications.**

DC Speeds vs. RMS Noise				RMS Noise <sup>16</sup> PPM of Range					Measurements into Buffer <sup>13</sup>		Measurement to PC <sup>13</sup>		
Single Channel, 60Hz (50Hz) Operation				RMS Noise calculator Add 2.5 x "RMS Noise" to "ppm of range" (e.g. 10V @ 0.006plc) "ppm of range" = 2.5 x 7.0ppm + 2ppm					(Rdg/s)		(ms / Rdg) AzeroOff		
Function	NPLC	Aperture (ms)	Digits	100mV	1V	10V	100V	300V	Azero On	Azero Off	Enet	GPIB	USB
DCV	5 <sup>14</sup>	83.3 (100)	7-½	1.0	0.07	0.05	0.7	0.2	9.5 (8)	12 (10)	86.3 (104)	86.1 (102.8)	86.3 (103.1)
	1 <sup>14</sup>	16.7 (20)	7-½	0.9	0.12	0.1	0.8	0.35	42 (33)	59.8 (49.5)	19.4 (22.7)	19.5 (22.8)	19.9 (23.2)
	0.2 <sup>12,14</sup>	3.33 (4.0)	6-½	2.5	0.32	0.3	2.5	1.0	50 (40)	60 (50)	19.4 (22.7)	19.5 (22.8)	19.9 (23.2)
	0.2 <sup>14</sup>	3.33 (4.0)	6-½	3.5	1.7	0.7	3.5	1.5	120 (100)	295 (235)	7.6 (8.3)	6.2 (6.8)	6.4 (7.0)
	0.06 <sup>15</sup>	1.0 (1.2)	5-½	12	3.0	1.5	8.0	3.5	205 (165)	935 (750)	1.40 (1.80)	1.50 (1.80)	1.60 (2.30)
	0.006 <sup>15</sup>	0.100 (0.120)	4-½	55	15	7.0	70	35	218 (215)	6,200 (5,500)	0.55 (0.57)	0.65 (0.67)	0.75 (0.77)
	0.0005 <sup>15</sup>	0.0083 (0.001)	3-½	325	95	95	900	410	270 (270)	14,600 (14,250)	0.50 (0.5)	0.60 (0.60)	0.70 (0.70)
					10-100Ω	1KΩ	10KΩ						
2WΩ (≤10kΩ)	5 <sup>14</sup>	83.3 (100)	7-½	2.0	0.5	0.4	—	—	9.5 (8)	12 (10)	87.0 (105)	86.1 (103)	86.5 (104)
	1 <sup>14</sup>	16.7 (20)	7-½	3.5	0.8	0.6	—	—	42 (33)	59.8 (49.5)	21.0 (24.3)	19.5 (22.8)	19.9 (23.2)
	0.2 <sup>12,14</sup>	3.33 (4.0)	6-½	6.5	1.7	1.5	—	—	50 (40)	60 (50)	21.0 (24.3)	19.5 (22.8)	19.9 (23.2)
	0.2 <sup>14</sup>	3.33 (4.0)	6-½	8.0	4.5	5.5	—	—	120 (100)	295 (235)	7.6 (8.3)	6.2 (6.8)	6.4 (7.0)
	0.06 <sup>15</sup>	1.0 (1.2)	5-½	15	6	6.5	—	—	205 (165)	935 (750)	1.40 (1.80)	1.50 (1.80)	1.60 (2.30)
	0.006 <sup>15</sup>	0.100 (0.120)	4-½	60	15	15	—	—	218 (215)	6,200 (5,500)	0.55 (0.57)	0.65 (0.67)	0.75 (0.77)
	0.0005 <sup>15</sup>	0.0083 (0.001)	3-½	190	190	190	—	—	270 (270)	14,100 (13,700)	0.50 (0.5)	0.60 (0.60)	0.70 (0.70)
					10μA	100μA	1mA-100mA	1A	3A				
DCI	5 <sup>14</sup>	83.3 (100)	7-½	3.5	1.6	1.6	2.9	2.0	9.5 (8)	12 (10)	88 (103)	86.1 (102.8)	86.3 (103.1)
	1 <sup>14</sup>	16.7 (20)	6-½	3.5	1.1	1.1	2.2	1.8	42 (33)	59.8 (49.5)	21.0 (22.7)	19.5 (22.8)	19.8 (23.1)
	0.2 <sup>12,14</sup>	3.33 (4.0)	5-½	50	5.0	3.0	4.0	8.0	50 (40)	60 (50)	19.4 (22.7)	19.5 (22.8)	19.8 (23.1)
	0.2 <sup>14</sup>	3.33 (4.0)	4-½	100	35	12	4.0	8.0	120 (100)	295 (235)	7.6 (8.3)	6.2 (6.8)	6.4 (7.0)
	0.06 <sup>15</sup>	1.0 (1.2)	4-½	350	35	20	8.0	20	205 (165)	935 (750)	1.40 (1.80)	1.50 (1.80)	1.60 (2.30)
	0.006 <sup>15</sup>	0.100 (0.120)	4-½	400	200	40	50	100	218 (215)	6,200 (5,500)	0.55 (0.57)	0.65 (0.67)	0.75 (0.77)
	0.0005 <sup>15</sup>	0.0083 (0.001)	3-½	2500	450	250	325	750	270 (270)	14,100 (13,700)	0.50 (0.5)	0.60 (0.60)	0.70 (0.70)
					1Ω	10-100Ω	1KΩ	10KΩ					
4WΩ	5 <sup>14</sup>	83.3 (100)	7-½	5.5	0.8	0.5	0.5	—	5 (4)	5.9 (4.7)	173 (206)	173 (206)	173 (206)
	1 <sup>14</sup>	16.7 (20)	7-½	15	1.4	0.5	0.7	—	23.5 (18.5)	29 (23)	39 (46)	39 (46)	39 (46)
	0.2 <sup>12,14</sup>	3.33 (4.0)	5-½	100	30	10	50	—	26.5 (21)	30 (24)	39 (46)	39 (46)	39 (46)
	0.2 <sup>14</sup>	3.33 (4.0)	5-½	300	50	10	63	—	80 (60)	120 (95)	12.3 (14.5)	11.3 (13.3)	11.7 (13.7)
	0.06 <sup>15</sup>	1.0 (1.2)	4-½	500	50	15	70	—	140 (110)	285 (225)	6.2 (7.2)	6.3 (7.3)	6.5 (7.6)
	0.006 <sup>15</sup>	0.100 (0.120)	4-½	750	75	30	100	—	200 (195)	580 (565)	4.2 (4.4)	4.3 (4.5)	4.6 (4.8)
	0.0005 <sup>15</sup>	0.0083 (0.001)	3-½	3500	450	250	250	—	210 (205)	650 (645)	4.2 (4.4)	4.3 (4.5)	4.6 (4.8)
					1Ω	10-100Ω	1KΩ	10KΩ					
4WΩ OCOMP	5 <sup>14</sup>	83.3 (100)	7-½	5.5	0.8	0.5	0.5	—	2.5 (2.0)	2.9 (2.3)	343 (427)	341 (425)	342 (426)
	1 <sup>14</sup>	16.7 (20)	7-½	16	1.5	0.7	1.5	—	12.7 (10)	14 (11.2)	77 (95)	74 (92)	75 (93)
	0.2 <sup>12,14</sup>	3.33 (4.0)	6-½	45	4.5	2.1	3.5	—	14 (11.2)	15 (12)	70 (86.5)	70 (86.5)	70 (86.5)
	0.2 <sup>14</sup>	3.33 (4.0)	5-½	500	50	13	30	—	46.5 (37)	56 (44)	22.7 (25)	20.5 (23)	21.1 (24)
	0.0005 <sup>15</sup>	0.0083 (0.001)	3-½	4500	650	400	400	—	129 (125)	215 (210)	6.7 (6.7)	6.8 (6.8)	7 (7)
				1-10Ω	100Ω	1KΩ	2KΩ						
Dry-CktΩ OCOMP	5 <sup>14</sup>	83.3 (100)	6-½	8.0	10	10	8.0	—	2.5 (2.0)	2.9 (2.3)	347 (430)	345 (428)	346 (429)
	1 <sup>14</sup>	16.7 (20)	5-½	17	22	25	28	—	12 (9.5)	13 (10)	80 (99)	77 (95)	78 (97)
	0.2 <sup>12,14</sup>	3.33 (4.0)	4-½	50	50	50	50	—	14 (11.2)	15 (12)	70 (86.5)	70 (86.5)	70 (86.5)
	0.2 <sup>14</sup>	3.33 (4.0)	3-½	500	1000	1000	1500	—	35 (30)	45 (36)	27 (33)	25 (31)	26 (32)
	0.0005 <sup>15</sup>	0.0083 (0.001)	2-½	8500	8500	8500	8500	—	84 (84)	115 (110)	10.7 (10.7)	10.7 (10.7)	11 (11)

1 PLC and 5 PLC Noise are included in RTD Specifications.										
RTD Speeds vs. Noise				Add °C to Reading <sup>16</sup>		Measurements into Buffer <sup>13</sup>		Measurement to PC <sup>13</sup>		
Single Channel, 60Hz (50Hz) Operation						(Rdg/s)		(ms / Rdg) AzeroOff		
Function	NPLC	Aperture (ms)	Digits	4-Wire	3-Wire	Azero On	Azero Off	Enet	GPIB	USB
OCOMP OFF	5 <sup>14</sup>	83.3 (100)	7-½	0	0	5 (4)	5.9 (4.7)	173 (206)	173 (206)	173 (206)
	1 <sup>14</sup>	16.7 (20)	7-½	0	0	23.5 (18.5)	29 (23)	39 (46)	39 (46)	39 (46)
	0.2 <sup>12,14</sup>	3.33 (4.0)	5-½	0.01	0.01	26.5 (21)	30 (24)	39 (46)	39 (46)	39 (46)
	0.2 <sup>14</sup>	3.33 (4.0)	5-½	0.18	0.18	80 (60)	120 (95)	12.3 (14.5)	11.3 (13.3)	11.7 (13.7)
	0.06 <sup>15</sup>	1.0 (1.2)	4-½	0.24	0.24	140 (110)	285 (225)	6.2 (7.2)	6.3 (7.3)	6.5 (7.6)
OCOMP ON	5 <sup>14</sup>	83.3 (100)	7-½	0	0	2.5 (2.0)	2.9 (2.3)	343 (427)	341 (425)	342 (426)
	1 <sup>14</sup>	16.7 (20)	7-½	0	0	12.7(10)	14 (11.2)	77 (95)	74 (92)	75 (93)
	0.2 <sup>12,14</sup>	3.33 (4.0)	6-½	0.02	0.02	14 (11.2)	15 (12)	70 (86.5)	70 (86.5)	70 (86.5)
	0.2 <sup>14</sup>	3.33 (4.0)	5-½	0.38	0.38	46.0 (37)	56 (44)	22.7 (25)	20.5 (23)	21.1 (24)
	0.0005 <sup>15</sup>	0.0083 (0.001)	3-½	4.67	4.67	128 (125)	215 (210)	6.7 (6.7)	6.8 (6.8)	7 (7)

**System Performance <sup>13, 14</sup>**

3-1/2 Digit Mode, azero off, and nPLC=0.0005. Time includes function change from either DCV or 2WΩ to listed function.

Function	Function Change (msec)	Range Change (msec)	Auto-range (msec)
DCV or 2WΩ (<10KΩ)	10	10	10
4WΩ (<10k)	20	20	20
DCI	10	10	10
Frequency or Period <sup>17</sup>	110	10	—
ACV or ACI <sup>17</sup>	20	85	300

Buffer Transfer Speed	Enet	GPIB	USB
Average for 1000 readings	2450/s	2000/s	1800/s
Average for 1000 readings with timestamp	2300/s	1800/s	1600/s

Card	Command	Single Command Execution time (ms)		
		Enet	GPIB	USB
3720, 3721, 3722, 3730	channel.close (ch_list) or channel.open (ch_list)	5.7	5.8	6.1
3723, 3724, 3731, 3732 <sup>18</sup>	channel.close (ch_list) or channel.open (ch_list)	2.3	2.4	2.7
3740	channel.close (ch_list 1-28) or channel.open (ch_list 1-28)	10.7	10.8	11.1
	channel.close (ch_list 29-32) or channel.open (ch_list 29-32)	22.7	22.8	23.1

AC Speeds				Measurements into Buffer <sup>13</sup>			Measurement to PC <sup>13</sup>		
Single Channel, 60Hz (50Hz) Operation				(Rdg/s)			(ms / Rdg)		
Function	Detector Bandwidth	NPLC	Aperture (ms)	Digits	Azero On	Azero Off	Enet	GPIB	USB
ACI / ACV	3	n/a	n/a	6-½	0.45 (0.45)	n/a	2150 (2150)	2150 (2150)	2150 (2150)
	30	n/a	n/a	6-½	2.5 (2.5)	n/a	400 (400)	400 (400)	400 (400)
	300	1.0 <sup>14</sup>	16.67 (20)	6-½	42 (33)	59.5 (50)	19.4 (22.7)	19.5 (22.8)	19.8 (23.1)
	300	0.2 <sup>14</sup>	3.33 (4.0)	6-½	120 (100)	295 (235)	7.6 (8.3)	6.2 (6.8)	6.4 (7.0)
	300	0.06 <sup>15</sup>	1.0 (1.2)	5-½	170 (165)	935 (750)	1.40 (1.80)	1.50 (1.80)	1.60 (2.30)
	300	0.006 <sup>15</sup>	0.100 (0.120)	4-½	218 (215)	6,200 (5,500)	0.55 (0.57)	0.65 (0.67)	0.75 (0.77)
300	0.0005 <sup>15</sup>	0.0083 (0.001)	3-½	218 (215)	14,600 (14,250)	0.50 (0.5)	0.60 (0.60)	0.70 (0.70)	
Frequency / Period	n/a		10 → 273	n/a	2x input period + Gate time	n/a	2x input period + Gate time + 2.7ms	2x input period + Gate time + 2.8ms	2x input period + Gate time + 3.1ms

DC Notes

**DC Measurement Characteristics**

**DC Volts:**

**A-D LINEARITY:** 1.0 ppm of reading + 2.0 ppm of range.

**INPUT IMPEDANCE:**

**100mV – 10V Ranges:** Selectable >10GΩ// <400pF or 10MΩ ±1%.

**100V – 300V ranges:** 10MΩ ±1%.

**Input Bias Current:** <50pA at 23°C with dmm.autozero=dmm.OFF or dmm.inputdivider=dmm.ON.

**Common Mode Current:** <500nA peak-to-peak for ≤1MHz.

**Autozero OFF Error:** For DCV ±1°C and ≤10minutes,

Add ±(8ppm of reading + 5μV).

**Input Protection:** 300V all ranges.

**Common Mode Voltage:** 300V DC or 300Vrms (425V peak for AC waveforms) between any terminal and chassis.

**Resistance:**

**MAX 4WΩ LEAD RESISTANCE:** 5Ω per lead for 1Ω range, 10% of range per lead for 10Ω → 1kΩ ranges; 1kΩ per lead for all other ranges.

**For Dry Ckt**

**MAX 4WΩ LEAD RESISTANCE:** 0.5Ω per lead for 1Ω range; 10% of range per lead for 10Ω → 100Ω ranges; 50Ω per lead for 1kΩ → 2kΩ range.

**INPUT IMPEDANCE:**

**1Ω – 10Ω Ranges:** 99kΩ ±1% // <1μF.

**100Ω – 2KΩ Ranges:** 10MΩ ±1% // <0.015μF.

**OFFSET COMPENSATION:** Selectable on 4WΩ 1Ω → 10kΩ ranges.

**OPEN LEAD DETECTOR:** Selectable per channel. 1.5uA, ±20% sink current per DMM SHI and SLO lead. Default on.

**CONTINUITY THRESHOLD:** Adjustable 1 to 1000Ω.

**Autozero OFF Error:** For 2WΩ ±1°C and ≤10minutes,

Add ±(8ppm of reading + 0.5mΩ for 10Ω and 5mΩ for all other ranges).

**INPUT PROTECTION:** 300V all ranges.

**DC Current:**

**Autozero OFF Error:** For ±1°C and ≤10minutes,

Add ±(8ppm of reading + range error). Refer to table below.

Range	3A	1A	100mA	10mA	1mA	100μA	10μA
Shunt Resistance guaranteed by design	0.05Ω	0.05Ω	1Ω	10Ω	100Ω	1kΩ	6kΩ
Burden Voltage	<1.75V	<0.55V	<0.4V	<150mV	<130mV	<105mV	<61mV
Burden Voltage with 3721 card	<2.35V	<1.15V	<0.4V	<150mV	<130mV	<105mV	<61mV
Autozero OFF "of range" error	100μA	100μA	5μA	0.5μA	50nA	5nA	0.85nA
For each additional amp after ±1.5A input, add the following to ppm of range.	—	120	60	60	60	60	95

**INPUT PROTECTION:** 3A, 250V fuse.

**Thermocouples:**

**CONVERSION:** ITS-90.

**REFERENCE JUNCTION:** Internal, External, or Simulated (Fixed).

**OPEN LEAD DETECTOR:** Selectable per channel. Open >1.15k ±50Ω. Default on.

**COMMON MODE ISOLATION:** 300V DC or 300Vrms (425V peak for AC waveforms), >10GΩ and <350pF any terminal to chassis.

End dc

**DC Notes**

- 2.0% overrange on DC functions except 1% on 300V and 3.33% on 3A.
- ±5% (Measured with 10MΩ input Resistance DMM, >10GΩ DMM on 10MΩ and 100MΩ ranges). Refer to table for other 2W/4W configurations. For Dry Circuit, +20%, <1mV with dmm.offsetcompensation=ON for 100Ω → 2kΩ ranges.

Range	2W	Ocomp Off		Ocomp On	
		4W	4W - Kelvin	4W	4W - Kelvin
1, 10Ω	8.2V	8.2V	8.2V	12.1V	12.1V
100, 1kΩ	13.9V	14.1V	13.9V	15.0V	12.7V
10kΩ	9.1V	9.1V	9.1V	0.0V	0.0V
100k, 1MΩ	12.7V	14.7V	12.7V	—	—
10M, 100MΩ	6.4V	6.4V	6.4V	—	—

- Relative to calibration accuracy.
- Add the following additional uncertainty with -ST Accessory:

Cards	"ppm of range"			"ppm of reading + ppm of range"			
	100mV	1V	10V	100kΩ	1MΩ	10MΩ	100MΩ
3720, 3721, 3722, and 3730	45	4.5	-	8 + 5	8 + 0.5	-	-
3723	60	6.0	-	8 + 6	8 + 0.5	-	-
3724	45	4.5	-	8 + 5	80 + 0.5	250 + 1	5000 + 1
3731	800	80	8	8 + 80	40 + 8	0 + 25	0 + 15
3732 (Quad 4x28)	200	20	2	8 + 20	40 + 2	0 + 7	0 + 4

- Specifications are for 4-wire Ω, 1Ω → 1kΩ with offset compensation on. For the Model 3700 plug-in cards, LSYNC and offset compensation on. 1Ω range is 4-wire only. The Model 3724 card, 1kΩ → 100MΩ and 3731 card, 100Ω → 100MΩ ranges only.

For 2-wire Ω specifications, add the following to "ppm of range" uncertainty:

DMM Connect Relays	Rel Enable	Rear Panel Connector or 3700 Card	3724 Card	3731 Card
CONNECT_ALL	ON	100mΩ	500mΩ	900mΩ
CONNECT_ALL	OFF	1.5Ω	64Ω	2.3Ω
CONNECT_TWO_WIRE	ON	700mΩ	1.2Ω	1.5Ω
CONNECT_TWO_WIRE	OFF	1.5Ω	64Ω	2.3Ω

- Test current with dmm.offsetcompensation=OFF, (± 5%).
- Add the following to "ppm of reading" uncertainty when using 3700 plug in cards in Operating Environment ≥50%RH.

Card	10kΩ	100kΩ	1MΩ	10MΩ	100MΩ
3720, 3721, 3724, 3730, 3731, 3732 (Quad 4x28) with MTC D-Shell connector	1ppm	10 ppm	0.01%	0.1%	1%
3720, 3721, 3724, 3730, 3731, 3732 (Quad 4x28) with -ST screw terminal module	10ppm	100 ppm	0.1%	1%	10%
3722 and 3723	10ppm	100 ppm	0.1%	1%	10%

3700 plug in cards Operating Environment: Specified for 0°C to 50°C, ≤70%RH at 35°C.

- Dry-Ckt Ω is 4-wire only. Specifications with offset compensation and LSYNC on.

Card	Ranges
3720, 3721, and 3730	1Ω → 2kΩ
3722, 3723, and 3732	10Ω → 2kΩ
3724	1kΩ → 2kΩ
3731	100Ω → 2kΩ

- Includes Analog Backplane 15-pin rear panel connector. For 3721, refer to DC Current table for additional uncertainties.

- For LSYNC On, line frequency +/-0.1 %.

	nPLC	5	1	≤0.2	≤0.01
L <sub>SYNC</sub> On	NMRR	110 dB	90dB	45dB	—
L <sub>SYNC</sub> Off	NMRR	60dB, ±2dB	60dB, ±2dB	—	—

- For 1kohm unbalance in LO lead. AC CMRR is 70dB.

nPLC	5	1	0.2 <sup>12</sup>	≤0.2
CMRR	140 dB	140dB	120dB	80dB

- For LSYNC On.

- Reading rates are for 60Hz (50Hz) operation using factory defaults operating conditions dmm.reset("all"), Autorange off, dmm.autodelay=dmm.OFF, dmm.opendetector=dmm.OFF, format.data=format.SREAL. Rates listed below.

Function	Range
DCV	10V
2WΩ or 4WΩ	1KΩ
DCI	1mA
Dry-Ckt Ω	10Ω
Dry-Ckt Ω, Offset Comp OFF	2KΩ, 60 rdg/s max
Dry-Ckt Ω, Offset Comp ON	2KΩ, 29.5 rdg/s max
ACI	1mA
ACV	1V
T/C	Use DCV rates
Thermistor	Use 2WΩ rates

Speeds are typical and include measurement and data transfer out the Enet, GPIB or USB.

- DMM configured for single reading, dmm.measurecount=1 and print(dmm.measure()). May require additional settling delays for full accuracy depending on measurement configuration.
- DMM configured for multi-sample readings and single buffer transfer, dmm.measurecount=1000, buf=dmm.makebuffer(1000), dmm.measure(buf), and printbuffer(1, 1000, buf).
- dmm.autozero=dmm.ON. RMS Noise using low thermal short for DCV, 2WΩ, 4WΩ, and Dry-Ckt Ω. For DCI, dmm.connect=dmm.CONNECT\_NONE or 0. For RTD, Noise using low thermal 190Ω precision resistor. Includes Model 3721 card accuracies. RMS Noise values are typical.
- For DCV or 2W to Frequency or Period, dmm.nplc=0.2 and dmm.aperture=0.01 sec. For ACI or ACV, dmm.detectorbandwidth=300. For ACI or ACV with dmm.autodelay=dmm.ON, best speed is 65ms.
- Speeds are within same Mux bank. Add an additional 8msec when changing banks or slots.
- When properly zeroed using REL function.

**AC**

Function	Range <sup>1</sup>	Resolution	Calibration Cycle	Accuracy: ± (% of reading + % of range) 23°C ± 5°					
				3 Hz – 5Hz	5Hz – 10Hz	10Hz – 20kHz	20kHz – 50kHz	50kHz – 100kHz	100kHz – 300kHz
Voltage <sup>2</sup>	100.0000mV	0.1µV	90 Day	1.0 + 0.03	0.30 + 0.03	0.05 + 0.03	0.11 + 0.05	0.6 + 0.08	4.0 + 0.5
	1.000000V	1µV	(100mV – 100V)						
	10.00000V	10µV	1 Year	1.0 + 0.03	0.30 + 0.03	0.06 + 0.03	0.12 + 0.05	0.6 + 0.08	4.0 + 0.5
	100.0000V	100µV	(100mV – 100V)						
	300.0000V	1mV	90 Day	1.0 + 0.05	0.30 + 0.05	0.05 + 0.05	0.11 + 0.08	0.6 + 0.11	4.0 + 0.8
	3.000000V	1mV	1 Year	1.0 + 0.05	0.30 + 0.05	0.06 + 0.05	0.12 + 0.08	0.6 + 0.11	4.0 + 0.8
			Temp. Coeff. /°C <sup>3</sup> (all ranges)	0.010 + 0.003	0.030 + 0.003	0.005 + 0.003	0.006 + 0.005	0.01 + 0.006	0.03 + 0.01
Current <sup>2</sup>	1.000000mA <sup>7</sup>	1nA		3 Hz – 5Hz	5 Hz – 10Hz	10Hz – 2kHz	2kHz – 5kHz	5kHz – 10kHz	
	10.00000mA	10nA		1.0 + 0.04	0.30 + 0.04	0.08 + 0.03	0.09 + 0.03	0.09 + 0.03	
	100.0000mA	100nA	90 Day / 1 Year	1.0 + 0.04	0.30 + 0.04	0.08 + 0.03	0.09 + 0.03	0.09 + 0.03	
	1.000000A	1µA		1.0 + 0.04	0.30 + 0.04	0.20 + 0.04	0.88 + 0.04	2.0 + 0.04	
	3.000000A	10µA		1.0 + 0.05	0.30 + 0.05	0.20 + 0.05	0.88 + 0.05	2.0 + 0.05	
				Temp. Coeff. /°C <sup>3</sup> (all ranges)	0.10 + 0.004	0.030 + 0.004	0.005 + 0.003	0.006 + 0.005	0.006 + 0.005
Frequency <sup>4</sup> and Period	100.0000mV	0.333 ppm		Accuracy: ±(ppm of reading + offset ppm)					
	to	3.33 ppm	90 Day / 1 Year	(3Hz – 500kHz)	(3Hz – 500kHz)	(333ms – 2µs)			
	300.0000V	33.3 ppm	(all ranges)	80 + 0.333	80 + 0.333	(0.25s gate)			
				80 + 3.33	80 + 3.33	(100ms gate)			
				80 + 33.3	80 + 33.3	(10ms gate)			

Low Frequency Uncertainty	Detector bandwidth		
	3 (3Hz – 300KHz)	30 (30Hz – 300KHz)	300 (300Hz – 300KHz)
20Hz – 30Hz	0	0.3	—
30Hz – 50Hz	0	0	—
50Hz – 100Hz	0	0	4.0
100Hz – 200Hz	0	0	0.72
200Hz – 300Hz	0	0	0.18
300Hz – 500Hz	0	0	0.07
>500Hz	0	0	0

Additional Uncertainty ±(% of reading)	Detector bandwidth	Crest Factor <sup>5</sup>			
		1 - 2	2 - 3	3 - 4	4 - 5
5Hz – 10Hz	3	0.50	1.20	1.30	1.40
10Hz – 30Hz	3	0.20	0.30	0.60	0.90
30Hz – 100Hz	3 or 30	0.20	0.30	0.60	0.90
>100Hz	3 or 30	0.05	0.15	0.30	0.40
300Hz – 500Hz	300 only	0.50	1.20	1.30	1.40
≥500Hz	300 only	0.05	0.15	0.30	0.40

**AC MEASUREMENT CHARACTERISTICS**

**AC Volts**

MEASUREMENT METHOD: AC-coupled, True RMS.

INPUT IMPEDANCE: 1MΩ±2% // by <150pF.

INPUT PROTECTION: 300VDC or 300Vrms rear inputs or 37xx cards.

**AC Current**

MEASUREMENT METHOD: AC-coupled, True RMS.

Range	3A	1A	100mA	10mA	1mA
Shunt Resistance guaranteed by design	0.05Ω	0.05Ω	1.0Ω	10Ω	100Ω
Burden Voltage Rear panel	<1.75Vrms	<0.55Vrms	<0.4Vrms	<150mVrms	<125mVrms
Burden Voltage 3721card	<2.4Vrms	<1.0Vrms	<0.6Vrms	<200mVrms	<130mVrms

**AC Notes**

- 20 % overrange on AC functions except 1% on 300V and 3.33% on 3A. Default resolution is 5-½ digits; maximum useable resolution is 6-½ with 7-½ digits programmable.
- Specification are for Detector Bandwidth 3 and sinewave inputs >5% of range. Detector Bandwidth 3 and 30 are multi-sample A/D conversions. Detector bandwidth 300 is a single A/D conversion, programmable from 0.0005plc to 15plc. Default condition set to 1plc.
- Applies to 0°C - 18°C and 28°C - 50°C.
- Specified for square wave inputs. Input signal must be >10% of ACV range. If input is <20mV on the 100mV range then the frequency must be >10Hz. For sinewave inputs, frequency must be >100Hz.
- Applies for non-sinewave inputs, 5Hz → 10KHz, and DC content ≤3% of range.
- For 1kohm unbalance in L.O lead.
- For Model 3721, 1mA ACI, add 0.05% to “of reading” uncertainty from 250Hz → 10kHz.

INPUT PROTECTION: 3A, 250V fuse.

**FREQUENCY and PERIOD**

MEASUREMENT METHOD: Reciprocal Counting technique.

GATE TIME: dmm.aperture=0.273 → 0.01. Default 0.01s.

**AC General**

AC CMRR<sup>6</sup>: 70dB

VOLT \* HERTZ PRODUCT: 8 × 10<sup>7</sup> Volt\*Hz (guaranteed by design), 2.1 × 10<sup>7</sup> Volt\*Hz verified. Input frequency verified for 3x10<sup>5</sup> Hz.

**GENERAL SPECIFICATIONS**

**EXPANSION SLOTS:** 6

**POWER LINE:** Universal, 100V to 240V.

**LINE FREQUENCY:** 50Hz and 60Hz, automatically sensed at power-up.

**POWER CONSUMPTION:** 28VA with DMM and display, up to 140VA with ( 6 ) 3700 cards.

**OPERATING ENVIRONMENT:** Specified for 0°C to 50°C, ≤80%RH at 35°C, altitude up to 2000 meters

**STORAGE ENVIRONMENT:** -40°C to 70°C.

**REAL TIME CLOCK:** Battery backed, 10-years typical life.

**WARRANTY:** 1-yr.

**EMC:** Conforms to European Union EMC Directive.

**SAFETY:** Conforms to European Union Low Voltage Directive.

**VIBRATION:** MIL-PRF-28800F Class 3, Random.

**WARM-UP:** 2-hours to rated accuracy.

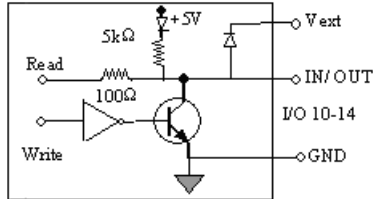
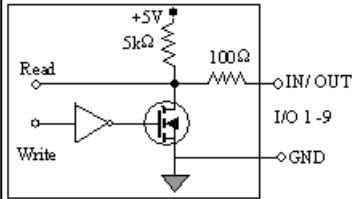
**DIMENSIONS:**

	High	Wide	Deep
<b>Rack Mounted</b>	89mm (3.5 in.)	483mm (19 in.)	457mm (18 in.)
<b>Bench Configuration</b> (includes handle and feet)	104mm (4.125 in.)	483mm (19 in.)	457mm (18 in.)

**SHIPPING WEIGHT:** 13kg (28 lbs).

**DIGITAL I/O:** 25-pin female D-shell.

	I/O 1-9	I/O 10-14	Vext
<b>I<sub>SINK</sub>, max</b>	5mA	250mA	—
<b>Absolute V<sub>IN</sub></b>	5.25V → -0.25V	5.25V → -0.25V	5V → 33V
<b>V<sub>IH</sub> min</b>	2.2V	2.2V	—
<b>V<sub>IL</sub> max</b>	0.7V	0.7V	—
<b>V<sub>OL</sub> max at 5mA I<sub>sink</sub></b>	0.7V	0.7V	—
<b>V<sub>OL</sub> max at I<sub>sink</sub> max</b>	—	2.3V	—
<b>V<sub>OH</sub> min, 0.4mA sour</b>	2.7V	2.4V	—
<b>Min V<sub>IN</sub> pulse</b>	2μs	10μs	—
<b>Min V<sub>O</sub> pulse</b>	1μs	50μs	—



**TRIGGERING AND MEMORY:**

**Window Filter Sensitivity:** 0.01%, 0.1%, 1%, 10%, or full-scale of range (none).

**Trigger Delay:** 0 to 99 hrs (10us step size)

**External Trigger Delay:** <10us.

**Memory:** Up to 650,000 time-stamped readings with web page disabled. Additional memory available with external “thumb drive”.

**Non-volatile Memory:** Single user save setup, with up to 75 DMM configurations and ≥600 Channel Patterns (dependent on name length, DMM function and configuration, and pattern image size). Additional memory available with external “thumb drive”.

**MATH FUNCTIONS:** Rel, dB, Limit Test, %, 1/x, and mX + b with user defined displayed.

**REMOTE INTERFACE:** Ethernet: RJ-45 connector, LXI Class C V1.3, 10/100BT, auto MDIX.

GPIO: IEEE-488.1 compliant. Supports IEEE-488.2 common commands and status model topology.

USB device (rear panel, type B): USB 2.0, high speed, USBTMC compliant.

USB host (front panel, type A): USB 2.0, high speed, support for thumb drives.

**LXI COMPLIANCE:** LXI Class B V1.3 with V2.0 IEEE 1588-2008 precision time protocol.

**LXI TIMING (applies to scanning) and SPECIFICATION:**

Receive LAN[0-7] event delay: n/s. Min, 800us. Typ., n/s Max.

Alarm to trigger delay: 25 us. Min., 50us. Typ., n/s Max..

Generate LAN[0-7] event: n/s. Min., 800us. Typ., n/s Max.

[ minimums are probabilistic and represent a 95% confidence factor ]

Clock accuracy: 25 ppm.

Synchronization accuracy: < 150ns. [ probabilistic and represent a 95% confidence factor ]

Timestamp accuracy: 100 us.

Timestamp resolution: 20 ns.

**LANGUAGE:** Embedded Test Script Processor (TSP) accessible from any host interface. Responds to individual Instrument Control Library (ICL) commands. Responds to high-speed test scripts comprised of ICL commands and Test Script Language (TSL) statements (e.g. branching, looping, math, etc.). Able to execute high-speed test scripts stored in memory without host intervention.

**ACCESSORIES SUPPLIED:** Product Information CD-ROM and 3m Ethernet cable.

**ACCESSORIES AVAILABLE:** 3700 Cards, 3700-MTC cables, 3706-BKPL (analog backplane extender), 3706A-3Y/5Y-EW (extended warranty)

C/3706A-3Y (Calibration / Data / ISO 17025), Software IVI/VISA drivers for VB, VC/C++, LabView, TSP Script, Script Builder, and LabWindows/CVI.

**IP CONFIGURATION:** Static, DHCP, or mDNS.

**PASSWORD PROTECTION:** 11 characters

**MINIMUM PC HARDWARE:** Intel Pentium 3, 800MHz, 512Mbyte RAM, 210Mbyte disk space or better.

**OPERATING SYSTEMS /SOFTWARE:** Windows 2000 and XP compatible, supports Web browsers with Java plug-in (requires Java plug-in 1.6 or higher). Web pages served by 3706.

Specifications are subject to change without notice.