

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 ¹	Resolution	Test Current or Burden Voltage	Input Resistance or Open Ckt. Voltage ²	24 Hour ³ 23°C ± 1°	90 Day 23°C ± 5°	1 Year 23°C ± 5°	Temperature Coefficient 0° -18°C & 28° - 50°C
Voltage ⁴	100.00000 mV ¹⁹	0.01µV		>10G Ω or 10M Ω ± 1%	10 + 9	25 + 9	30 + 9	(1 + 5)/°C
	1.0000000 V ¹⁹	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 ^{4, 5, 6, 7}	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
100.00000 MΩ	10 Ω	0.64µA // 10MΩ	6.4V	800 + 30	2000 + 30	2000 + 30	(385 + 1)/°C	
Dry Circuit Resistance ^{6, 8}	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) ⁹	1.000 kΩ	100mΩ	1mA	13.9V	40 + 100	100 + 100	100 + 100	(8 + 1)/°C
Current ⁹	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	3720, 3721, or 3724 Cards	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 ¹⁶ PPM of Range					Measurements into Buffer ¹³		Measurement to PC ¹³		
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 ¹⁴	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 ¹⁴	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 ^{12,14}	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 ¹⁴	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 ¹⁵	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 ¹⁵	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 ¹⁵	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 ¹⁴	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 ¹⁴	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 ^{12,14}	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 ¹⁴	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 ¹⁵	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 ¹⁵	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 ¹⁵	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 ¹⁴	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 ¹⁴	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 ^{12,14}	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 ¹⁴	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 ¹⁵	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 ¹⁵	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 ¹⁵	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 ¹⁴	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 ¹⁴	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 ^{12,14}	3.33 (4.0)	5-½	100	30	10	50	—	26.5 (21)	30 (24)	39 (46)	39 (46)	39 (46)
	0.2 ¹⁴	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 ¹⁵	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 ¹⁵	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 ¹⁵	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 ¹⁴	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 ¹⁴	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 ^{12,14}	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 ¹⁴	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 ¹⁵	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 ¹⁴	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 ¹⁴	16.7 (20)	5-½	17	22	25	28	—	12 (9.5)	13 (10)	80 (99)	77 (95)	78 (97)
	0.2 ^{12,14}	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 ¹⁴	3.33 (4.0)	3-½	500	1000	1000	1500	—	35 (30)	45 (36)	27 (33)	25 (31)	26 (32)
	0.0005 ¹⁵	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 ¹⁶		Measurements into Buffer ¹³		Measurement to PC ¹³		
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 ¹⁴	83.3 (100)	7-½	0	0	5 (4)	5.9 (4.7)	173 (206)	173 (206)	173 (206)
	1 ¹⁴	16.7 (20)	7-½	0	0	23.5 (18.5)	29 (23)	39 (46)	39 (46)	39 (46)
	0.2 ^{12,14}	3.33 (4.0)	5-½	0.01	0.01	26.5 (21)	30 (24)	39 (46)	39 (46)	39 (46)
	0.2 ¹⁴	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 ¹⁵	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 ¹⁴	83.3 (100)	7-½	0	0	2.5 (2.0)	2.9 (2.3)	343 (427)	341 (425)	342 (426)
	1 ¹⁴	16.7 (20)	7-½	0	0	12.7(10)	14 (11.2)	77 (95)	74 (92)	75 (93)
	0.2 ^{12,14}	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 ¹⁴	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 ¹⁵	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 ^{13, 14}

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 ¹⁷	110	10	—
ACV or ACI ¹⁷	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 ¹⁸	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 ¹³			Measurement to PC ¹³		
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 ¹⁴	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 ¹⁴	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 ¹⁵	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 ¹⁵	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 ¹⁵	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

- 20 % 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 _{SYNC} On	NMRR	110 dB	90dB	45dB	—
L _{SYNC} Off	NMRR	60dB, ±2dB	60dB, ±2dB	—	—

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

nPLC	5	1	0.2 ¹²	≤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 ¹	Resolution	Calibration Cycle	Accuracy: ± (% of reading + % of range)					
				3 Hz – 5Hz	5Hz – 10Hz	10Hz – 20kHz	20kHz – 50kHz	50kHz – 100kHz	100kHz – 300kHz
Voltage ²	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
	300.0000V	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 ³ (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
				3 Hz – 5Hz	5 Hz – 10Hz	10Hz – 2kHz	2kHz – 5kHz	5kHz – 10kHz	
Current ²	1.000000mA ⁷	1nA		1.0 + 0.04	0.30 + 0.04	0.08 + 0.03	0.09 + 0.03	0.09 + 0.03	
	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 ³ (all ranges)	0.10 + 0.004	0.030 + 0.004	0.005 + 0.003	0.006 + 0.005	0.006 + 0.005
			Accuracy:	±(ppm of reading (3Hz – 500kHz) + offset ppm)					
Frequency ⁴ and Period	100.0000mV	0.333 ppm		80 + 0.333	80 + 0.333	(333ms – 2µs)			
	to	3.33 ppm	90 Day / 1 Year	80 + 3.33	80 + 3.33	(100ms gate)			
	300.0000V	33.3 ppm	(all ranges)	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 ⁵			
		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 LO 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 CMRR⁶: 70dB

VOLT * HERTZ PRODUCT: ≤8 × 10⁷ Volt*Hz (guaranteed by design), ≤2.1 × 10⁷ Volt*Hz verified. Input frequency verified for ≤3x10⁵ Hz.

GENERAL SPECIFICATIONS

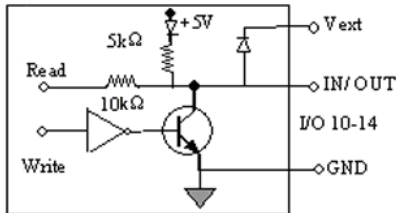
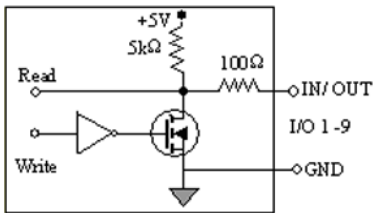
EXPANSION SLOTS: 6
POWER LINE: Universal, 100V to 240V.
LINE FREQUENCY: 50Hz and 60Hz, automatically sensed at power-up.
POWER CONSUMPTION: 28VA with DMM and display, up to 140VA with (6) 3700 cards.
OPERATING ENVIRONMENT: Specified for 0°C to 50°C, ≤80%RH at 35°C, altitude up to 2000 meters
STORAGE 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
Rack Mounted	89mm (3.5 in.)	483mm (19 in.)	457mm (18 in.)
Bench Configuration (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
Isink, max	5mA	250mA	—
Isorce, max	960µa	980µa	—
Absolute VIN	5.25V → -0.25V	5.25V → -0.25V	5V → 33V
V_{IH} min	2.2V	2.2V	—
V_{IL} max	0.7V	0.7V	—
V_{OL} max at 5mA Isink	0.7V	0.7V	—
V_{OL} max at Isink max	—	2.3V	—
V_{O_H} min, 0.4mA sour	2.7V	2.4V	—
Min V_{IN} pulse	2µs	10µs	—
Min V_O pulse	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.
 GPIB: 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.