



50 MHz Arbitrary Waveform Generator
The LXI interface makes easier for the test system!

Function Generator

FGA5050

- FGA5050
- **FGA5050GC** (with GPIB)

The FGA5050 is a function generator that equips with the arbitrary waveform function. In addition to Sine waveform, Square waveform, Ramp waveform of those custom waveform generation function, the FGA5050 offers to realize high precision waveform with 1 μ Hz of resolution and 50MHz of wideband frequency. The FGA5050 can be used in wide application such as "Voltage variation test for Automotive Electronic Components", "ECU false signal source", "Charge-Discharge test for the rechargeable battery", "Ripple super-impose test" and it can be used as the trigger signal for the various type of test system.

Further more, three types of interface, LAN / USB / GPIB* are equipped with the FGA5050 as standard feature, it applies for automated test along with manual operation.

- Wide band frequency
 Sine waveform: 1μHz to 50MHz, Square waveform: 1μHz to 25MHz
- Sine waveform, Square waveform, Ramp waveform, Triangle waveform, Pulse waveform, Noise waveform, DC, Arbitrary waveform output
- Waveform Editor Application Software "WAVEPATT" is included as standard
- Various modulation types AM, FM, PM, FSK, PWM, Frequency sweep, Burst, External Modulation Input
- 16 bits / up to 50MHz pattern out
- 14 bits / 256k-point, 125MSs/s
- 10MHz clock in and out
- Trigger Input and Trigger output (TTL compatible)
- Interface: LAN / USB / GPIB*standard

*Only available in Model FGA5050GC

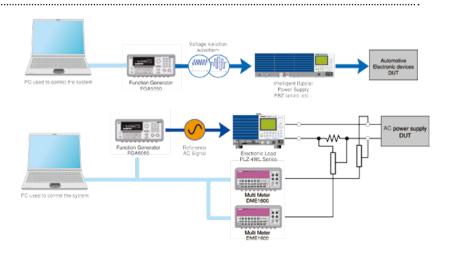
Application

Voltage variation test for Automotive Electronic devices

The system combined with the FGA5050 and the Bipolar power supply, it can be used as the "Signal Source" for the "Voltage variation test of the automotive electronic components" complied to the ISO standard and other manufacturer's standard.

Measurement of the output impedance of the power supply

The system combined with the FGA5050, electronic load, and multi-meter, it can be used as the "Reference AC Signal" for the "Impedance measurement of power supply output".



Specifications

	acteristic				
Waveform	Standard waveforms	Sine, Square, Ramp,	Triangle, Pulse, Noise	, DC	
	Built-in arbitrary waveforms	Exponential Rise and	Fall、Negative ramp、	Sin(x)/x cardiac	
	Frequency	1 μHz to 50 MHz			
	Amplitude	< 100 kHz	0.1 dB		
	Flatness *1 *2	< 5 MHz	0.15 dB		
	(Relative to 1 kHz)	< 20 MHz	0.3 dB		
	(Helative to 1 KHZ)	< 50 MHz 0.5 dB			
		DC to 20 kHz	< 1 Vpp	-70 dBc	
		DC 10 20 KHZ	≥ 1 Vpp	-70 dBc	
		20 kHz to 100 kHz	< 1 Vpp	-65 dBc	
			≥ 1 Vpp	-60 dBc	
Sine	Harmonic	400 111-1-4 1411-	< 1 Vpp	-50 dBc	
Sine	distortion *2 *3	100 kHz to 1 MHz	≥ 1 Vpp	-45 dBc	
		1 MHz to 20 MHz	< 1 Vpp	-40 dBc	
		I MHZ to 20 MHZ	≥ 1 Vpp	-35 dBc	
		20 MHz to 50 MHz	< 1 Vpp	-35 dBc	
		20 WII 12 (0 30 WII 12	≥ 1 Vpp	-30 dBc	
	Total Harmonic distortion	DC to 20 kHz	< 0.5 Vpp	≤ 0.06 %	
	Spurious *2 *4	DC to 1 MHz		-70 dBc	
	(non-harmonic)	1 MHz to 50 MHz		-70 dBc+6 db/ octave	
	Phase Noise (10 kHz Offset)	≥1 MHz	≥ 0.1 Vpp	-115 dBc/Hz typical	
	Frequency	1 μHz to 25 MHz			
	Rise / Fall time	< 10 ns			
	Overshoot	< 2 %			
Square		< 10 MHz	20 % ~ 80 %		
	Variable Duty Cycle	< 25 MHz	40 % ~ 60 %		
	Asymmetry	1%of period +5 ns (@			
		≥ 0.1 Vpp			
	Jitter (RMS)	≥ 1 MHz	200 ps		
	Frequency	1 μHz to 200 kHz			
Ramp,	Linearity	< 0.1 % of peak output			
Triangle	Symmetry 0.0 % to 100.0 %				
	Frequency	500 μ Hz to 10 MHz			
		20 ns minimum			
	Pulse width	10 ns res. (period ≤ 10 s)			
Pulse	Variable Edge Time	< 10 ns to 100 ns			
	Overshoot	< 2 %			
		2 0.1 Vpp 2 50 kHz 200 ps			
	Jitter (RMS)				
Noise	Bandwidth	20 MHz typical			
	Frequency	1 μHz to 10 MHz			
	Length	2 K to 256 K			
	Resolution	14 bits (including sign)			
	Sample Rate	125 M Sa/s			
Arbitrary	Min Rise / Fall time	30 ns typical			
,	Linearity	< 0.1 % of peak output			
	Setting Time	< 250 ns to 0.5 % of final value			
	Jitter (RMS)	< 250 ns to 0.5 % of final value 6 ns+300 ppm			
	Non-voltage Memory	4 Waveforms * 256 K points			
Cammar Oh					
Common Charac		1			
	Resolution	1 μHz 10 mVpp to 10 Vpp in 50 Ω			
			50 Ω		
	Resolution Range	10 mVpp to 10 Vpp in		ted)	
Frequency			No Load (open-circuit	ted)	
Frequency	Range	10 mVpp to 10 Vpp in 20 mVpp to 20 Vpp in ± 1 % of setting ± 1	No Load (open-circuit	ted)	
Frequency	Range Accuracy *2 *5 (at 1 kHz)	10 mVpp to 10 Vpp in 20 mVpp to 20 Vpp in	No Load (open-circuit	ted)	
Frequency Amplitude	Range Accuracy *2 *5 (at 1 kHz) Units Resolution	10 mVpp to 10 Vpp in 20 mVpp to 20 Vpp in \pm 1 % of setting \pm 1 Vpp、Vrms、dBm	No Load (open-circuit	ted)	
Frequency	Range Accuracy *2 *5 (at 1 kHz) Units	$\begin{array}{l} 10 \text{ mVpp to } 10 \text{ Vpp in} \\ 20 \text{ mVpp to } 20 \text{ Vpp in} \\ \pm 1 \% \text{ of setting } \pm 1 \\ \text{Vpp. Vrms. dBm} \\ 4 \text{ digits} \\ \pm 5 \text{ V in } 50 \Omega \end{array}$	No Load (open-circuit mVpp	ted)	
Frequency	Range Accuracy *2 *5 (at 1 kHz) Units Resolution Range	10 mVpp to 10 Vpp in 20 mVpp to 20 Vpp in ± 1 % of setting ± 1 Vpp、Vrms、dBm 4 digits	No Load (open-circuit mVpp pen-circuited)		
Frequency	Range Accuracy *2 *5 (at 1 kHz) Units Resolution Range Accuracy *2 *5(at 1 kHz)	10 mVpp to 10 Vpp in 20 mVpp to 20 Vpp in \pm 1 % of setting \pm 1 Vpp. Vrms. dBm 4 digits \pm 5 V in 50 Ω \pm 10 V in No Load (o) \pm 2% of offset setting	No Load (open-circuit mVpp pen-circuited)		
Frequency	Range Accuracy *2 *5 (at 1 kHz) Units Resolution Range	10 mVpp to 10 Vpp in 20 mVpp to 20 Vpp in \pm 1% of setting \pm 1 Vpp. Vrms. dBm 4 digits \pm 5 V in 50 Ω \pm 10 Vin No Load (o) \pm 2% of offset setting 4 digits	No Load (open-circuit mVpp pen-circuited)		
Amplitude DC Offset	Range Accuracy *2 *5 (at 1 kHz) Units Resolution Range Accuracy *2 *5(at 1 kHz) Resolution	10 mVpp to 10 Vpp in 20 mVpp to 20 Vpp in \pm 1 % of setting \pm 1 Vpp. Vrms. dBm 4 digits \pm 5 V in 50 Ω \pm 10 V in No Load (o) \pm 2% of offset setting	No Load (open-circuiimVpp pen-circuited) ± 0.5 % of amplitude		
Amplitude DC Offset	Range Accuracy *2 *5 (at 1 kHz) Units Resolution Range Accuracy *2 *5(at 1 kHz) Resolution Impedance Isolation	10 mVpp to 10 Vpp in 20 mVpp to 20 Vpp in \pm 1 % of setting \pm 1 Vpp, Vrms, dBm 4 digits \pm 5 V in 50 Ω \pm 10 V in No Load (o) \pm 2% of offset setting 4 digits 50 Ω Vppical 42 Vpeak maximum to	No Load (open-circuit mVpp pen-circuited) ± 0.5 % of amplitude	e setting	
Amplitude DC Offset Main Output	Range Accuracy *2 *5 (at 1 kHz) Units Resolution Range Accuracy *2 *5(at 1 kHz) Resolution Impedance Isolation Protection	$\begin{array}{l} 10 \text{ mVpp to } 10 \text{ Vpp in} \\ 20 \text{ mVpp to } 20 \text{ Vpp in} \\ \pm 1 \% \text{ of setting } \pm 1 \\ \text{Vpp. Vrms. } \text{ dBm} \\ 4 \text{ digits} \\ \pm 5 \text{ V in } 50 \Omega \\ \pm 10 \text{ V in No Load (o)} \\ \pm 2\% \text{ of offset setting} \\ 4 \text{ digits} \\ 50 \Omega \text{ typical} \\ 42 \text{ Vpeak maximum to} \\ 5\text{ Not-circuit protection} \end{array}$	No Load (open-circuit mVpp pen-circuited) ± 0.5 % of amplitude	e setting	
Amplitude DC Offset Main Output	Range Accuracy *2 *5 (at 1 kHz) Units Resolution Range Accuracy *2 *5(at 1 kHz) Resolution Impedance Isolation	10 mVpp to 10 Vpp in 20 mVpp to 20 mVpp to 20 Vpp in \pm 1 % of setting \pm 1 Vpp. Vrms, dBm 4 digits \pm 5 V in 50 Ω \pm 10 Vin No Load (or \pm 2% of offset setting 4 digits 50 Ω typical 42 Vpeak maximum to Short-circuit protectior \pm 10 ppm in 90 days	No Load (open-circuit mVpp pen-circuited) ± 0.5 % of amplitude	e setting	
Amplitude DC Offset Main Output	Range Accuracy *2 *5 (at 1 kHz) Units Resolution Range Accuracy *2 *5(at 1 kHz) Resolution Impedance Isolation Protection Accuracy *5	10 mVpp to 10 Vpp in 20 mVpp to 20 Vpp to 20 Vpp. Vrms, dBm 4 digits ± 5 V in 50 Ω ± 10 V in No Load (ot ± 2% of offset setting 4 digits 50 Ω Vppical 42 Vpeak maximum to Short-circuit protection ± 10 pp in 90 days ± 20 ppm in 1 years	No Load (open-circuit mVpp pen-circuited) ± 0.5 % of amplitude	e setting	
Amplitude DC Offset Main Output Internal Frequency External	Range Accuracy *2 *5 (at 1 kHz) Units Resolution Range Accuracy *2 *5(at 1 kHz) Resolution Insolution Insolution Protection Accuracy *5 Lock Range	$\begin{array}{l} 10 \text{ mVpp to } 10 \text{ Vpp in} \\ 20 \text{ mVpp to } 20 \text{ Vpp in} \\ \pm 1 \% \text{ of setting } \pm 1 \\ \text{Vpp. Vrms. dBm} \\ 4 \text{ digits} \\ \pm 5 \text{ V in } 50 \Omega \\ \pm 10 \text{ V in No Load (o)} \\ \pm 2\% \text{ of offset setting} \\ 4 \text{ digits} \\ 50 \Omega \text{ typical} \\ 42 \text{ Vpeak maximum to} \\ 42 \text{ Vpeak maximum to} \\ 50 \text{ or troculit protection} \\ \pm 10 \text{ ppm in 90 days} \\ \pm 20 \text{ ppm in 1 years} \\ 10 \text{ MHz} \pm 500 \text{ Hz} \\ \end{array}$	No Load (open-circuit mVpp pen-circuited) ± 0.5 % of amplitude	e setting	
Amplitude DC Offset Main Output Internal Frequency External Frequency	Range Accuracy *2 *5 (at 1 kHz) Units Resolution Range Accuracy *2 *5(at 1 kHz) Resolution Impedance Isolation Protection Accuracy *5 Lock Range Level	10 mVpp to 10 Vpp in 20 mVpp to 20 mVpp to 20 Vpp in \pm 1 % of setting \pm 1 Vpp. Vrms. dBm 4 digits \pm 5 V in 50 Ω \pm 10 V in No Load (o) \pm 2% of offset setting 4 digits 50 Ω typical 42 Vpeak maximum to Short-circuit protection \pm 10 ppm in 90 days \pm 20 ppm in 1 years 10 MHz \pm 500 Hz 100 mVpp \sim 5 Vpp	No Load (open-circulim/pp Den-circuited) ± 0.5 % of amplitude earth , Stop the output auto	e setting	
Amplitude DC Offset Main Output Internal Frequency External Frequency	Range Accuracy *2 *5 (at 1 kHz) Units Resolution Range Accuracy *2 *5(at 1 kHz) Resolution Impedance Isolation Protection Accuracy *5 Lock Range Level Impedance	10 mVpp to 10 Vpp in 20 mVpp to 20 mVpp to 20 Vpp in \pm 1 % of setting \pm 1 Vpp. Vrms, dBm 4 digits \pm 5 V in 50 Ω \pm 10 Vin No Load (or \pm 2% of offset setting 4 digits 50 Ω typical 4 Vpeak maximum to Short-circuit protection \pm 10 pm in 90 days \pm 20 ppm in 1 years 10 MHz \pm 500 Hz 100 mVpp \sim 5 Vpp 1 k Ω typical, AC coup 1 k Ω typical, AC coup	No Load (open-circulim/pp Den-circuited) ± 0.5 % of amplitude earth , Stop the output auto	e setting	
Amplitude DC Offset Main Output Internal Frequency External Frequency Input	Range Accuracy *2 *5 (at 1 kHz) Units Resolution Range Accuracy *2 *5(at 1 kHz) Resolution Insolution Resolution Insolution Protection Accuracy *5 Lock Range Level Impedance Lock Time	$\begin{array}{l} 10 \text{ mVpp to } 10 \text{ Vpp in} \\ 20 \text{ mVpp to } 20 \text{ Vpp in} \\ 12 \text{ mVpp to } 20 \text{ Vpp in} \\ 1 \text{ Vpp, Vrms. dBm} \\ 4 \text{ digits} \\ \pm 5 \text{ V in } 50 \Omega \\ \pm 10 \text{ V in No Load (o} \\ \pm 2\% \text{ of offset setting} \\ 4 \text{ digits} \\ 50 \Omega \text{ typical} \\ 42 \text{ Vpeak maximum to} \\ 42 \text{ Vpeak maximum to} \\ 500 \Omega \text{ typical} \\ 42 \text{ Vpeak maximum to} \\ 410 \text{ Vpm in 90 days} \\ 410 \text{ Vpm in 190 days} \\ 420 \text{ Vpm in 190 days} \\ 410 \text{ MHz} \pm 500 \text{ Hz} \\ 100 \text{ mVpp} \sim 5 \text{ Vpp} \\ 100 \text{ mVpp} \sim 5 \text{ Vpp} \\ 100 \text{ Lk} \Omega \text{ typical, AC coup} \\ < 2 \text{ sec} \end{array}$	No Load (open-circulim/pp Den-circuited) ± 0.5 % of amplitude earth , Stop the output auto	e setting	
Amplitude DC Offset Main Output Internal Frequency External Frequency Input External	Range Accuracy *2 *5 (at 1 kHz) Units Resolution Range Accuracy *2 *5(at 1 kHz) Resolution Impedance Isolation Protection Accuracy *5 Lock Range Level Impedance Lock Time Lock Range	$\begin{array}{l} 10 \text{ mVpp to } 10 \text{ Vpp in} \\ 20 \text{ mVpp to } 20 \text{ Vpp in} \\ \pm 1 \% \text{ of setting } \pm 1 \\ \text{Vpp. Vrms. dBm} \\ 4 \text{ digits} \\ \pm 5 \text{ V in } 50 \Omega \\ \pm 10 \text{ V in No Load (o} \\ \pm 2\% \text{ of offset setting} \\ 4 \text{ digits} \\ 50 \Omega \text{ typical} \\ 4 \text{ digits} \\ 50 \Omega \text{ typical} \\ 42 \text{ Vpeak maximum to Short-circuit protection} \\ \pm 10 \text{ ppm in 90 days} \\ \pm 20 \text{ ppm in 1 years} \\ 100 \text{ mHz} \pm 500 \text{ Hz} \\ 100 \text{ mVpp} \sim 5 \text{ Vpp} \\ 1 \text{ k} \Omega \text{ typical, AC coup} \\ < 2 \text{ sec} \\ 10 \text{ MHz} \\ \end{array}$	No Load (open-circulim/pp Den-circuited) ± 0.5 % of amplitude Dearth Stop the output auto		
Amplitude DC Offset Main Output Internal Frequency External Frequency Input External Frequency External Frequency External Frequency	Range Accuracy *2 *5 (at 1 kHz) Units Resolution Range Accuracy *2 *5(at 1 kHz) Resolution Impedance Isolation Protection Accuracy *5 Lock Range Level Impedance Lock Time Lock Range Level Lock Range Level	10 mVpp to 10 Vpp in 20 mVpp to 20 mVpp to 20 Vpp in \pm 1 % of setting \pm 1 Vpp. Vrms. dBm 4 digits \pm 5 V in 50 Ω \pm 10 V in No Load (o) \pm 2% of offset setting 4 digits 50 Ω Vppical 42 Vpeak maximum to Short-circuit protection \pm 10 ppm in 90 days \pm 20 ppm in 1 years 10 MHz \pm 500 Hz 100 mVpp \sim 5 Vpp 1 k Ω Vppical, AC coup <2 sec 10 MHz \pm 500 Hz 632 mVpp (0 dBm) to MHz 632 mXpp (0 dBm) to M	No Load (open-circulim/pp Den-circuited) ± 0.5 % of amplitude e earth , Stop the output auto	e setting	
Frequency	Range Accuracy *2 *5 (at 1 kHz) Units Resolution Range Accuracy *2 *5(at 1 kHz) Resolution Impedance Isolation Protection Accuracy *5 Lock Range Level Impedance Lock Time Lock Range	$\begin{array}{l} 10 \text{ mVpp to } 10 \text{ Vpp in} \\ 20 \text{ mVpp to } 20 \text{ Vpp in} \\ \pm 1 \% \text{ of setting } \pm 1 \\ \text{Vpp. Vrms. dBm} \\ 4 \text{ digits} \\ \pm 5 \text{ V in } 50 \Omega \\ \pm 10 \text{ V in No Load (o} \\ \pm 2\% \text{ of offset setting} \\ 4 \text{ digits} \\ 50 \Omega \text{ typical} \\ 4 \text{ digits} \\ 50 \Omega \text{ typical} \\ 42 \text{ Vpeak maximum to Short-circuit protection} \\ \pm 10 \text{ ppm in 90 days} \\ \pm 20 \text{ ppm in 1 years} \\ 100 \text{ mHz} \pm 500 \text{ Hz} \\ 100 \text{ mVpp} \sim 5 \text{ Vpp} \\ 1 \text{ k} \Omega \text{ typical, AC coup} \\ < 2 \text{ sec} \\ 10 \text{ MHz} \\ \end{array}$	No Load (open-circulim/pp Den-circuited) ± 0.5 % of amplitude e earth , Stop the output auto	e setting	

11 Add 1/10th of output amplitude and offset spec per "C" for operation outside the range of 18 "C" to 28 "C"
22 Autorange enabled
3 DC offset set to 0V
4 Spurious output at low amplitude is -75 dBm typical
5 Add 1 ppm"C average for operation outside the range of 18 "C" to 28 "C"
6 FSK uses trigger input (1MHz maximum)
7 Sine and square waveforms above 10 MHz are allowed only with an "infinite" burst count

Modulation					
Modulation Type AM, FM, PM, FSK, PWM, SWEEP and BURST					
modulation Type	Carrier	,,	Sine, Square, Ramp, Arb		
	Source		Internal / External		
АМ	Internal M	odulation	Sine, Square, Ramp, Triangle, Noise, Arb		
	Frequency	(Internal)	2 mHz to 20 kHz		
	Depth		0.0 % to 120.0 %		
	Carrier		Sine, Square, Ramp, Arb		
FM	Source		Internal / External		
	Internal Modulation		Sine, Square, Ramp, Triangle, Noise, Arb		
	Frequency (Internal)		2 mHz to 20 kHz		
	Deviation		DC to 25 MHz		
	Source		Internal / External		
РМ	Internal Modulation		Sine, Square, Ramp, Triangle, Noise, Arb		
	Frequency (Internal)		2 mHz to 20 kHz		
	Deviation		0.0 * to 360 *		
	Carrier		Pulse		
	Source Internal Madulation		Internal / External		
PWM	Internal Modulation		Sine, Square, Ramp, Triangle, Noise, Arb		
	Frequency (Internal) Deviation		2 mHz to 20 kHz		
			0 % to 100 % of pulse width		
			Sine, Square, Ramp, Arb		
FSK	Internal Modulation		Internal / External 50 % duty cycle Square		
			50 % duty cycle Square 2 mHz to 100 kHz		
External	Frequency (Internal) Voltage Range		± 5 V full scale		
Modulation	Input Resistance		± 5 V ruii scale 8.7 kΩ typical		
Input *6	Bandwidth		DC to 20 kHz		
	Waveforms		Sine, Square, Ramp, Arb		
	Туре		Linear, Log		
OWEED	Direction		Up or Down		
SWEEP	Sweep Tir	ne	1 ms to 500 s		
	Trigger Source		Internal, External or Manual		
	Marker		falling edge of sync signal (programmable frequency)		
	Waveform	s*7	Sine, Square, Ramp, Triangle, Noise, Arb		
	Туре		Internal / External		
BURST	Start / Sto	p Phase	-360 * to +360 *		
201.01	Internal Period		1 μs to 500 s		
	Gated Source		External trigger		
	Trigger Sc	ource	Internal, External or Manual		
	Level		TTL compatible		
Trigger	Slope		Rising or Falling (Selectable)		
Input	Pulse width		≥ 100 ns		
· ·	Impedano	e	≥ 10 kΩ DC coupled		
	Latency Level		< 500 ns TTL compatible into ≥ 1 kΩ		
	Pulse widt	da .			
Trigger			≥ 400 ns		
Output	Impedance Maximum rate		50 Ω typical		
	Fan-out	- 440	≤ 4 FGA5050s		
Pattern Mode Cha			341 ansosos		
- allon wode on		rimum Rate	50 MHz		
_	Output Le		TTL compatible into ≥ 2 kΩ		
Output	Output Im		110 Ω typical		
	Pattern Le		2 K to 256 K		
General					
voltage / frequenc	y range	100 Vac ~ 240	Vac (single phase) / 50 Hz/60 Hz		
Power consumption	Power consumption 80 VAmax		·		
		0 °C to 55 °C	0 ℃ to 55 ℃		
Operating Humidity range		30 %rh(0 °C, 50 °C), 40 %rh(18 °C, 23 °C, 28 °C), 80 %rh(35 °C), non condensing			
		-40 °C to 70 °C			
		Up to 2000 m			
			H X 380 D mm / 4.08 kg		
			LAN、USB、GPIB (only GC)		
Accessories		"Power cable" 1pc. (with 3P plug), "Pattern generator cable" 1pc., "USB cable" 1pc., "CD-R"*1pc., Packing list, "For Safety documents" 2pcs. (1 each for English, Japanese)			
Electromagnetic compatibility (EMC)		Conforms to the requirements of the following directive and standard. EMC Directive2004/108/EC EMC: EN6136-12006 EMI: CISPR 11:2003 Class A, IEC61000-3-2:2000 IEC61000-3-3:1994-A1:2001 EMS:IEC61000-4-2:1995-A1:1998-A2:2000, IEC61000-4-3:2002 IEC61000-4-4:2004, IEC61000-4-5:1995-A1:2000, IEC61000-4-6:1996-A1:2000			
Safety		Conforms to the	e requirements of the following directive and standard.		

*including the "Operation Manual" and "Communication Interface Manual"



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