

Measuring Instruments Selection Guide 2008/2009

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<http://www.adcmt.com>

Digital Multimeters

7351A/7351E/7351E+03



5½-digit

5½-digit DMM that realizes general-purpose applications, low price and high throughput

- Realizes 5½-digit DMM with a price of 4½-digit
- Highest throughput in the class
FAST: 140 readings/sec. (Max. display of 19999)
MED: 40 readings/sec. (Max. display of 199999)
- High measurement accuracy of 110ppm (2VDC range)
- Wide range of current measurement
Three ranges: 200mA, 2000mA, 10A

7451A



5½-digit 

High-performance and low-cost DMM optimum for average measurement

- Fast sampling rate: 5,000 times/sec.
- Variable integration time: 100μs to 10s
- Two-channel input for DC voltage measurement
- High-resolution DC current measurement: 10nA resolution
- Data memory: up to 10,000 data
- Full array of trigger functions

7461A



6½-digit 

High-performance and low-cost DMM with fast sampling rate

- Fast sampling rate: 20,000 readings/sec.
- Variable integration time: 10μs to 10s
- Two-channel input for DC voltage measurement
- High-resolution DC current measurement: 1nA resolution
- Data memory: up to 10,000 data
- Full array of trigger functions

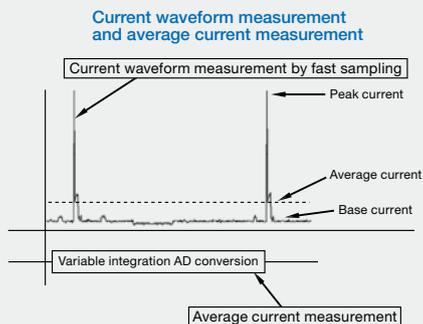
	7351A	7351E	7351E+03	7451A	7461A
Maximum display		199999		319999	1199999
Sampling rate (readings/sec.)		140max		5,000max	20,000max
Variable integration		—		✓	✓
DC voltage		1μV to 1000V		1μV to 1000V	100nV to 1000V
Accuracy (typical value)		0.011 %/year		0.01 %/year	0.0035 %/year
DC current		1μA to 10A		10nA to 3A	1nA to 3A
Resistance		1mΩ to 200MΩ		100μΩ to 300MΩ	100μΩ to 100MΩ
Four-wire resistance		—		✓	✓
AC voltage (True RMS)		1μV to 700V		1μV to 700V	100nV to 700V
AC voltage frequency range		20Hz to 100kHz		20Hz to 300kHz	20Hz to 300kHz
AC current (True RMS)		1μA to 10A		10nA to 3A	1nA to 3A
Calculation functions		✓		✓	✓
Rear input		—		✓	✓
Interface	USB, GPIB	USB	USB, RS232	USB, GPIB	USB, GPIB
Comparator output	—	—	✓	✓	✓
External trigger input	✓	—	✓	✓	✓
Dimensions (W)x(H)x(D)mm	212×88×340				
Weight (kg)	3.4 or less				

Application

Stand-by current measurement for a mobile phone

With the stand-by current of mobile phones, the peak current flows at a certain interval while standing by, and the constant current flows at other times.

The 7461A and the 7451A are capable of current waveform measurement including the peak current measurement with the fast measurement at the maximum rate of 20,000 and 5,000 samplings per second, respectively. These models are also capable of accurate average current measurement, by using variable integration time of up to 10 seconds.

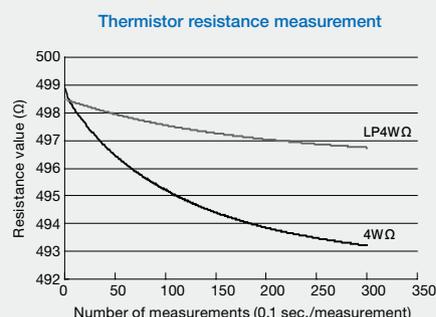


Application

Resistance measurement of thermistor by low-power resistance measurement

The 7461A and the 7451A are equipped with the low-power resistance measurement function as a standard. This enables measurement with reduced effect from self-heating, even with thermistor and other thermosensitive elements.

When a thermistor is measured with the LP4WΩ function that utilizes the measurement function, the current for measurement would be 100μA, which is 1/10 the normal value 4WΩ. Therefore, measurement would be possible with small change in resistance.



7352A / 7352E



5½-digit TWIN

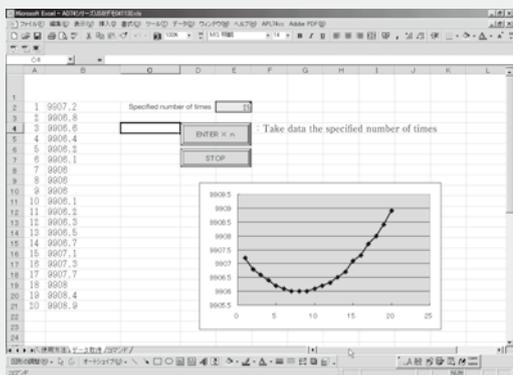
5½-digit DMM with built-in twin AD converter that enables two-channel synchronous measurement

- Completely independent two-input, twin-AD converter that creates the new measurement environment
- Double the conventional throughput with synchronous Ach and Bch measurement
- 5½-digit dynamic range for both Ach and Bch
- Wider current measurement range, capable of voltage-temperature parallel measurement
Ach: 10pA-2A Bch: 100µA-10A

	7352A/7352E	
	Ach	Bch
Maximum display	199999	199999
Sampling rate (times/sec.)	140max	140max
DC voltage	1µV to 1000V	1µV to 200V
Accuracy (typical value)	0.01%/year	
DC current	10pA to 2A	100µA to 10A
Resistance	1mΩ to 200MΩ	—
AC voltage (True RMS)	1µV to 700V	—
AC voltage Frequency range	20Hz to 100kHz	—
AC current (True RMS)	1nA to 2A	100µA to 10A
Calculation functions	✓	✓
Rear input temperature	K(CA): -50°C to 1370°C T(CC): -50°C to 400°C	
Interface	7352A: USB, GPIB, RS232C 7352E: USB	
External trigger input	7352A: ✓ 7352E: —	
Dimensions (W)x(H)x(D)mm	212×88×340	
Weight (kg)	3.7 or less	

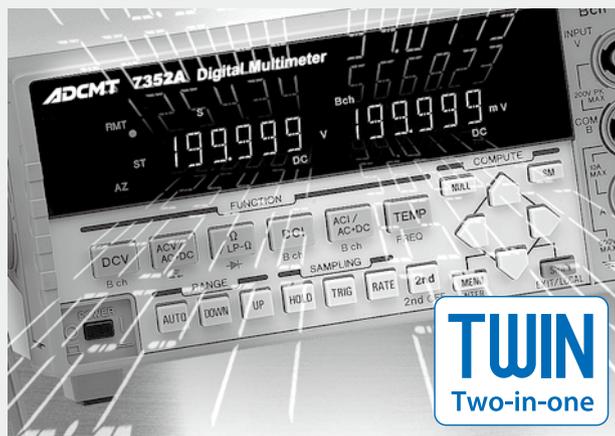
Application USB interface as a standard

Data transfer would be possible easily using the standard USB interface for PC. (USB1.1-compliant) Free software for taking in the measurement data onto Excel sheet is available from our website.



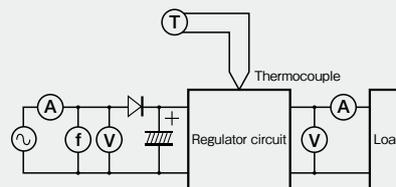
Data collection software of USB

New applications made possible by Twin DMM 7352A/7352E



Application Testing of power unit

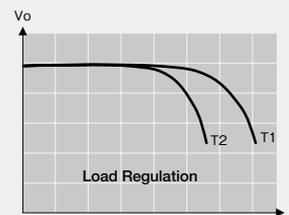
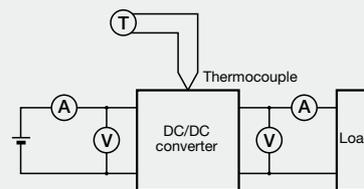
As for the 7352A/7352E, the Ach, Bch and TEMP are completely independent of each other. With two independent AD converters, switching measurement and functional change are unnecessary. Thus, measurement of high throughput would be possible without being affected by effects from between the channels.



Application Evaluation of DC/DC converter

The 7352A/7352E with two inputs where the channels are completely isolated may evaluate the input and output properties, load variability characteristics and rise in temperatures of a DC/DC converter.

Five types of measurements are possible, namely the input voltage and current with Ach, output voltage and current with Bch and temperature with rear input.



DC Voltage / Current Sources / Monitors

6240A



Cost-effective source/monitor, capable of 5½-digit measurement and 4A pulse generation

- Source measurement range
Voltage: 0 to ±15V; current: up to ±4A (1A with DC)
- Measurement at 5 1/2-digit and resolution of 10µV/10nA
- Source/sink possible at ±4A at intervals of up to 20ms
- Pulse measurement with the minimum pulse width of 500µs

6241A/6242



High performance source/monitor capable of pulse generation and measurement with the minimum pulse width of 50µs

- Wide range of generation and measurement functions
Voltage: 0 to ±32V; current: 0 to ±500mA (6241A)
Voltage: 0 to ±6V; current: 0 to ±5A (6242)
- High source/measurement resolution
Source: 10µV/1nA Measurement: 1µV/100pA
- Two-slope linear sweep function
- GPIB/USB interfaces as a standard

	6240A	6241A	6242
Number of digits for generation		4½-digit	
Output method		Bipolar	
Maximum output (high)	Voltage	±15V/1A	±32V/0.5A
	Current	100µV	10µV
Minimum resolution (low)	Voltage	±4A/10V(DC: ±1A/15V)	±0.5A/32V
	Current	100nA	1nA
Number of digits for measurement		5½-digit	
Basic accuracy (typical range)	0.025%		0.02%
Minimum measurement resolution	Voltage	10µV	1µV
	Current	10nA	100pA
Maximum measurement range of resistance/ minimum resolution	7.5MΩ/2µΩ	1.6GΩ/2µΩ	304MΩ/0.2µΩ
Pulse application/ measurement		✓	
Minimum pulse width	500µs		50µs
Interface	GPIB		USB/GPIB

DC Voltage / Current Sources / Calibrators

6144



Programmable DC voltage/ current source optimum for evaluation of precision circuits and components and calibration of equipment

- Up to 32V/160mA of voltage/ current output
- High resolution of 1µV/100nA steps
- 160-step memory
- High accuracy of 0.03% (voltage) and 0.035% (current)
- Low noise that enhances measurement reliability: 3mV_{p-p}
- All-digit continuous variable sweep function for greater measurement applicability

6161



**Highly sensitive and accurate working standard
DC voltage: 10nV to 1200V
DC current: 1nA to 120mA**

- High resolution of up to 10nV/1nA
- High accuracy guaranteed: ±5ppm/ day, ±25ppm/ 90days
- High output of ±1200V, ±120mA
- 100-step memory
- OPT01 enables the maximum compliance voltage in the 1mA and 10mA range to be changed from ±120V to ±1200V

	6144	6161
Number of digits	4½-digit	6½-digit
Maximum output (high)	Voltage	±32V/160mA
	Current	1µV
Minimum resolution (low)	Voltage	±160mA/28V
	Current	100nA
Accuracy (typical range)	Voltage	0.03%
	Current	0.035%
Settling time	50ms	1s
Output noise (typical range)	3mVp-p	3mVp-p
Interface	GPIB / BCD-parallel	GPIB / BCD-parallel

6243/6244



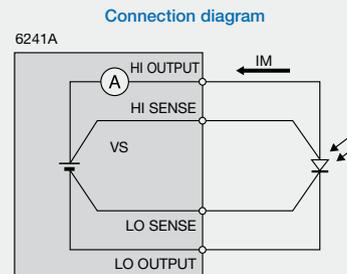
Source/monitor optimum for evaluating electronic circuits (components), with flexible generation and measurement

- Wide range of generation and measurement
Voltage: 0 to $\pm 110V$; current: 0 to $\pm 2A$ (6243)
Voltage: 0 to $\pm 20V$; current: 0 to $\pm 10A$ (6244)
- Measurement at 5 1/2-digit and resolution of $1\mu V/100pA$ (6243) and $1\mu V/1nA$ (6244)
- Pulse measurement with the minimum pulse width of 1ms

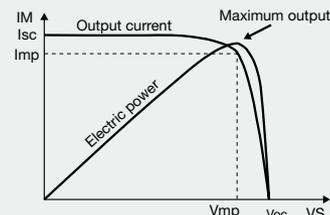
		6243	6244
Number of digits for generation		4½-digit	
Output method		Bipolar	
Maximum output (high) Minimum resolution (low)	Voltage	$\pm 110V/0.5A$	$\pm 20V/4A$
	Current	$10\mu V$	$10\mu V$
Minimum resolution (low)	Voltage	$\pm 2A/32V$	$\pm 10A/7V$
	Current	$1nA$	$10nA$
Number of digits for measurement		5½-digit	
Basic accuracy (typical range)		0.03%	
Minimum measurement resolution	Voltage	$1\mu V$	$1\mu V$
	Current	$100pA$	$1nA$
Pulse application/ measurement		✓	
Minimum pulse width		1ms	
External interface		GPIB	

Application Evaluation of solar cells

The conversion efficiency of solar cells is affected by duration of bias application. Therefore, measurement by pulse application would be effective for obtaining the true conversion efficiency. Using the pulse sweep function of the 6241A/6242, the I-V curve can be measured at high speed. Furthermore by varying the pulse width, the changes in characteristics caused by the duration of application can be measured easily. Also, the two-slope linear sweep that enables the step width to be switched during measurement enables measurement in small steps from the vicinity of V_{mp} to V_{oc}



Light I-V characteristics

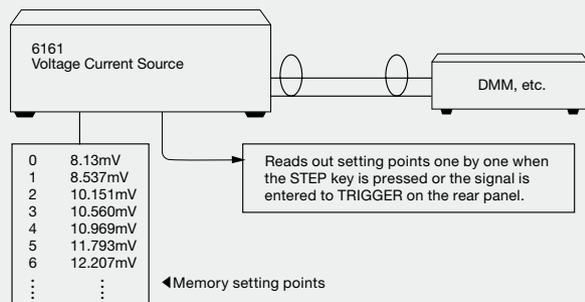


Isc: Short-circuit current
Voc: Open-circuit voltage
Imp: Current at the peak power point
Vmp: Voltage at the peak power point

Application Calibration of DMMs and other meters and adjustment of elements and devices

Calibration of DMMs and other meters and adjustment of elements and devices

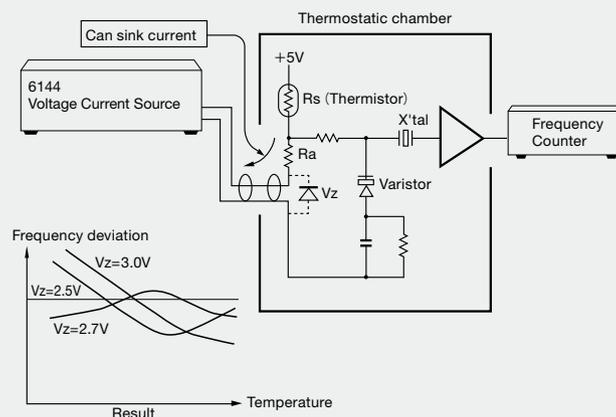
Calibration/adjustment points that are manually set to the memory of the 6161 or the generation conditions such as voltage that are programmed in the built-in memory are sent to DMM with setting generation intervals (step time). When calibrating a measuring instrument, the next step can be taken at the end of every calibration by the remote controller.



Application Evaluation of X'tal oscillation circuit

Evaluation of X'tal oscillation circuit

The 6144 capable of current sink can evaluate circuits as a reference voltage source to replace a Zener diode. The following diagram shows an application to measure the oscillation frequency temperature characteristics of X'tal and determine the optimum conditions.



Optical Power Meters

These are most suitable optical power meters for R&D and production of LDs, optical pickups, and drivers for optical discs.

You may choose from the three types of mainframes and nine sensors, to suit your needs.

8230E



- Low-priced general-purpose sensors and high power sensors are available
- USB interface

8230



- Wide lineup of sensors are available for each application
- Automated system may be configured easily with USB

8250A



- A desk-top type; equipped with GPIB and USB
- Wide lineup of sensors are available for each application

Optical Sensors

Applicability table for the nine product types of sensors, from low-priced general-purpose ones to those compatible with high power and blu-ray, to suit your needs

			Wavelength/ calibrated wavelength (nm)	Photoreception power/ area	8250A	8230	8230E
General-purpose sensor	Thin type	82311	390 to 1100/780	1nW to 50mW/9.5□	✓	✓	✓
	(Option: OPT8230E+11)				—	—	✓
High power sensor	Cylindrical	82321	390 to 1100/780	1nW to 50mW/8.5φ	✓	✓	✓
	Thin type	82313	390 to 1100/650	10nW to 200mW/8.5φ	✓	✓	✓
Blue-violet sensor	Cylindrical	82323	390 to 1100/650	10nW to 200mW/8.5φ	✓	✓	✓
	Thin type	82312	390 to 450/405	10nW to 100mW/10□	✓	✓	N/A
Three-wavelength sensor	Cylindrical	82322	390 to 450/405	10nW to 100mW/8.5φ	✓	✓	
	Thin type	82314A	390 to 900/405	10nW to 100mW/10□	✓	✓	
	Thin-type large-area	82314W	390 to 900/405	10nW to 100mW/18□	✓	✓	
	Cylindrical	82324A	390 to 900/405	10nW to 100mW/8.5φ	✓	✓	

* In addition to the calibrated wavelength indicated, calibration with additional wavelengths (405, 650, 780nm) is possible as an option.

* The wavelength sensitivity of the 82311 and the 82321 is corrected by using the typical values. Correction by measurement is possible with the 82311 as an option. However, this is not possible with the OPT8230E+11.

Optical Spectrum Analyzer

8341

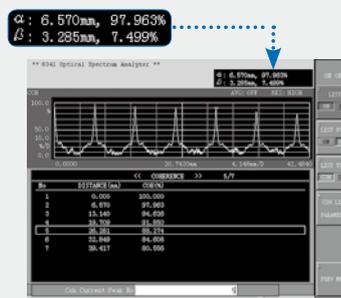


For high-speed and high-accuracy wavelength measurement of LDs for optical discs

- Method: Fourier spectroscopy with Michelson interferometer
- Wavelength range: 350 to 1000nm
Wavelength accuracy: $\pm 0.05\text{nm}$ (standard), $\pm 0.01\text{nm}$ (option)
Wavelength resolution: 0.05nm (standard), 0.01nm (option)
Optical input: FC-type connector, GI fiber, sensitivity: -55dBm
- Coherence analysis length: 10.3mm (standard), 41.4mm (option)
Resolution: 0.001mm
- Throughput: 2sec. or less (standard), 0.5sec.
- Interface: GPIB, USB, Ethernet
- Dimensions and weight: $424(\text{W}) \times 132(\text{H}) \times 500(\text{D}) \text{mm}$, 16kg or less

Application Coherence measurement of LD for DVD

One of the evaluation items of laser diode for DVD is coherence measurement, in which the ratio between the peak and second peak of interference output is obtained. The 8341 makes the measurement possible at easy one-key operation. Only the data on coherence calculation results may be displayed during spectrum analysis.



Coherence analysis example

Digital Electrometers

8240



For evaluation and testing of semiconductor and electronic components
Low-cost type with GPIB interface

- Wide current measurement range: 10fA to 20mA
- High input impedance of voltage measurement: $10^{15}\Omega$ or more
- High-speed voltage measurement with driving guard

8340A



High-speed and highly accurate measurement for 10^{-14}A , $3 \times 10^{16}\Omega$
Maximum voltage source of +1000V

- Current measurement: 10fA to 19.999mA
- Resistance measurement: 10Ω to $3 \times 10^{16}\Omega$
- High-speed charge and discharge are possible
- High-speed measurement: 100 readings/sec.
- Voltage source: 0 to +1000.0V
- Floating measurement is possible for 1100VDC

		8240	8340A
Number of digits		4½-digit	
Measurement function	Voltage	✓	N/A
	Current	✓	✓
	Resistance	N/A	✓
	Electrical Charge	N/A	N/A
Voltage/Current measurement resolution		$10\mu\text{V}/10\text{fA}$	$\sim/10\text{fA}$
Resistance measurement	Measurement range	—	10Ω to $3 \times 10^{16}\Omega$
Voltage source	Range/maximum current	—	+2.5mV to +1000V/±10mA
Interface	GPIB/single-wire signal	✓	✓
	Handler	N/A	✓
	D/A output/ analog output	N/A / ✓	✓ / N/A

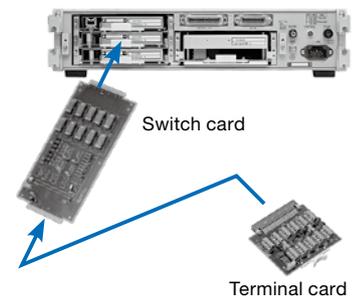
Scanner

7210



For automatic measurement systems
 $1\mu\text{V}$ low-thermal electromotive force
 0.1pA minute electric current

- Digital signal input/output functions
- 10^7 times of switching is guaranteed at 1000V/ 5mA
- Increase is possible up to five slots or less



	Card name		Number of channels	Maximum rated values at contacting point		Voltage between terminals	Number of exclusive slots	Applicable terminal card
				Voltage	Current			
Multiplexer card	72101A	General-purpose	10 channels; 3 wires/channel	100V	0.5A	200V	1	72109A/B/D/E
	72101B	General-purpose	10 channels; 4 wires/channel	40V	1A	200V		
	72101C	Long-life high-voltage	10 channels; 3 wires/channel	300V	1A	500V	2	Unified structure with switch card
	72101E	High insulation resistance		100V	200mA	200V	1	
	72101G	High voltage	10 channels; 2 wires/channel	1kV	5mA	1kV	2	
	72101H	Long-life high-voltage	20 channels; 3 wires/channel	300V	2A	500V		
72101J	Minute electric current	10 channels; 2 wires/channel	200V	1A	400V	2		
Actuator	72102A	General-purpose	10 channels; 2 wires/channel	100V	0.5A	200V	1	
	72102C	Long-life high-voltage		300V	1A	500V	2	Unified structure with switch card
	72102H	Long-life high-voltage		300V	2A	500V	2	
Matrix	72103A	General-purpose	4×4 channels; 4 wires/channel	100V	0.5A	200V	1	72109A/D/E
	72103B	General-purpose		40V	1A	200V		
	72103C	Long-life high-voltage		300V	1A	500V	2	Unified structure with switch card
Transfer	72106A	General-purpose	10 channels; transfer contact point	30V	100mA	100V	1	72109A/D/E

About ADC Corporation

ADC Corporation is a manufacturer specialized in testing and measurement that became an independent firm by management buyout from Advantest in April 2003. We have developed mother technologies to measure electric and physical quantities accurately, by combining our analog measurement technologies developed for over 50 years with digital technologies, and provided general measuring instruments that support many cutting-edge technologies.

Our mission is to pursue the essence of generic measuring instruments by developing innovative measurement technologies using accumulated analog technologies so as to contribute to the development of cutting-edge technologies continuously. In keeping with the mission, we will be growing with our customers by quick decision-making and flexible customer support.

■ Corporate Profile

Company name	ADC Corporation
House mark	ADCMT
Established on	July 1, 1971
Representative Director and President	Isamu Inaba
Capital	50 million yen
Head Office	Tokyo, Japan
Higashimatsuyama Office (R&D Center)	Saitama, Japan



▲ Higashimatsuyama Office
(R&D Center)



▲ Head Office

Sales support



■ Website

Our products are described in more detail on our website. The features, application examples and specifications are shown for each product, and downloading of brochures is also possible.

■ Software downloading

You can download sample programs for automation, USB driver, LabVIEW driver and sample programs from our website, when using our products as a part of automated systems.

Quality assurance

■ Measurement results are guaranteed

With highly accurate digital measuring instruments, even a minute discrepancy with the national standards could pose a problem. ADC Corporation has periodically maintained and managed the in-house standard equipment and periodically traced the national standards.



■ Acquired ISO9001 certificate

ADC Corporation has obtained ISO9001 quality management system certificate. Using the system, we have implemented continuous improvement activities for further enhancement of customer satisfaction.



Warranty and maintenance



■ Warranty

In order to supply highly reliable products, we prevent mixing of defective products beforehand under stringent inspection system, at the same time designing products with backup of reliability design and technical standards. The products we deliver are guaranteed for a specified period, pursuant to our in-house standards.

■ Maintenance

We have established a thorough after-sales system so that you can use your measuring instruments securely over a long period even when they failed. Furthermore, we have configured a service network in order to offer prompt services, and have strived to secure maintenance parts and hand down technologies.



ADC CORPORATION

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