DEICY

PC Card Recorder

DR-600/DR-300
Instruction Manual

Revision 1.00

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DR-600_DR-300_InstructionManual_E

Thank you for purchasing the DR-600/300 PC Card Recorder.
The DR-600/300 is a ruggedized/compact size/multi-channel data recorder using (ATA) PC memory card for recording media.
The DR-600/300 can also be used as the data acquisition frontend by using the standard accessory DR600CTL control program.
This instruction manual covers operations of the main unit mainly by the front panel buttons and the display.
For the operating instructions of the DR600CTL program, please refer the separate DR600CTL instruction manual.

Revision History

Issuance Date	Revision	Description
March 20th, 2008	1.00	First revision

IMPORTANT SAFETY INSTRUCTIONS

CAUTION:

- Read all of these Instructions.
- Save these Instructions for later use.
- Follow all Warnings and Instructions marked on the product.

1) Read Instructions - All the safety and operating instructions should be read before the product is operated.

2) Retain Instructions - The safety and operating instructions should be retained for future reference.

3) Heed Warnings - All warnings on the product and in the operating instructions should be adhered to.

4) Follow instructions - All operating and use instructions should be followed.

5) Cleaning - Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

6) Attachments - Use only manufacturer-approved attachments. The use of non-approved attachments may cause hazards.

7) Water and Moisture - Do not use this product near water - for example, near a bath tub, wash bowl, kitchen sink, or laundry tub; in a wet basement; or near a swimming pool; and the like.

8) Accessories - Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious personal injury and/or serious damage to the product. Any mounting of the product should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.

9) Ventilation - Slots and openings in the cabinet are provided for ventilation, to ensure reliable operation of the product, and to protect it from overheating. These openings must not be blocked or covered. Keep the openings clear from such items as; a bed, sofa, rug, or other similar obstacles. This product should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.

10) Power Sources - This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your product dealer or local power company. For products intended to operate from battery power or other sources, refer to the operating instructions.

11) Grounding or Polarization - This product may be equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug still fails to fit, contact your electrician to replace your outlet which may be obsolete. Do not defeat the safety purpose of the polarized plug.

12) Power-Cord Protection - Power-supply cords should be routed so that they are not likely to be walked on, pinched, pulled, or otherwise strained by items placed upon or against them. Pay particular attention to the cord ends where the plugs exit the product and where they enter the wall outlet or power supply.

13) Lightning - For added protection during a lightning storm or prolonged periods of unuse, unplug it from the wall outlet. This will prevent possible damage to the product due to lightning strikes or power-line surges.

14) Overloading - Do not overload wall outlets, extension cords, or integral convenience receptacles as this can result in the risk of fire or electric shock.

15) Object and Liquid Entry - Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.

16) Servicing - Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

17) Damage Requiring Service - If damaged, unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

a) If the power-supply cord or plug is damaged.

b) If liquid has been spilled onto, or objects have fallen into the product.

c) If the product has been exposed to rain or water.

d) If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions. An improper adjustment of other controls may result in further damage and will often require extensive work by a qualified technician to restore the product to its normal operation.

e) If the product has been dropped or damaged in any way.

f) If the product exhibits a distinct change in performance.

18) Replacement Parts - When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.

19) Safety Check - Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper and safe operating condition.

20) Heat - The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.

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1. Overview and Hardware Specifications

Overview of the DR-600 and DR-300 PC memory card recorder and their hardware specifications will be explained.

1.1. Overview

The DR-600/300 is developed for multi-channel recording with various kinds of the slot type amplifier modules built-in.
It can be operated at the on-line mode with the Windows PC via 100BASE-TX Ethernet or at a standalone mode.
The operating voltage is from 11 V DC to 30 V DC. The right weight (approximately 5.6 kg with 8 amplifier modules) and the compact size (A4 size foot-print) are other features. The recorder is designed for on-vehicle testing applications.

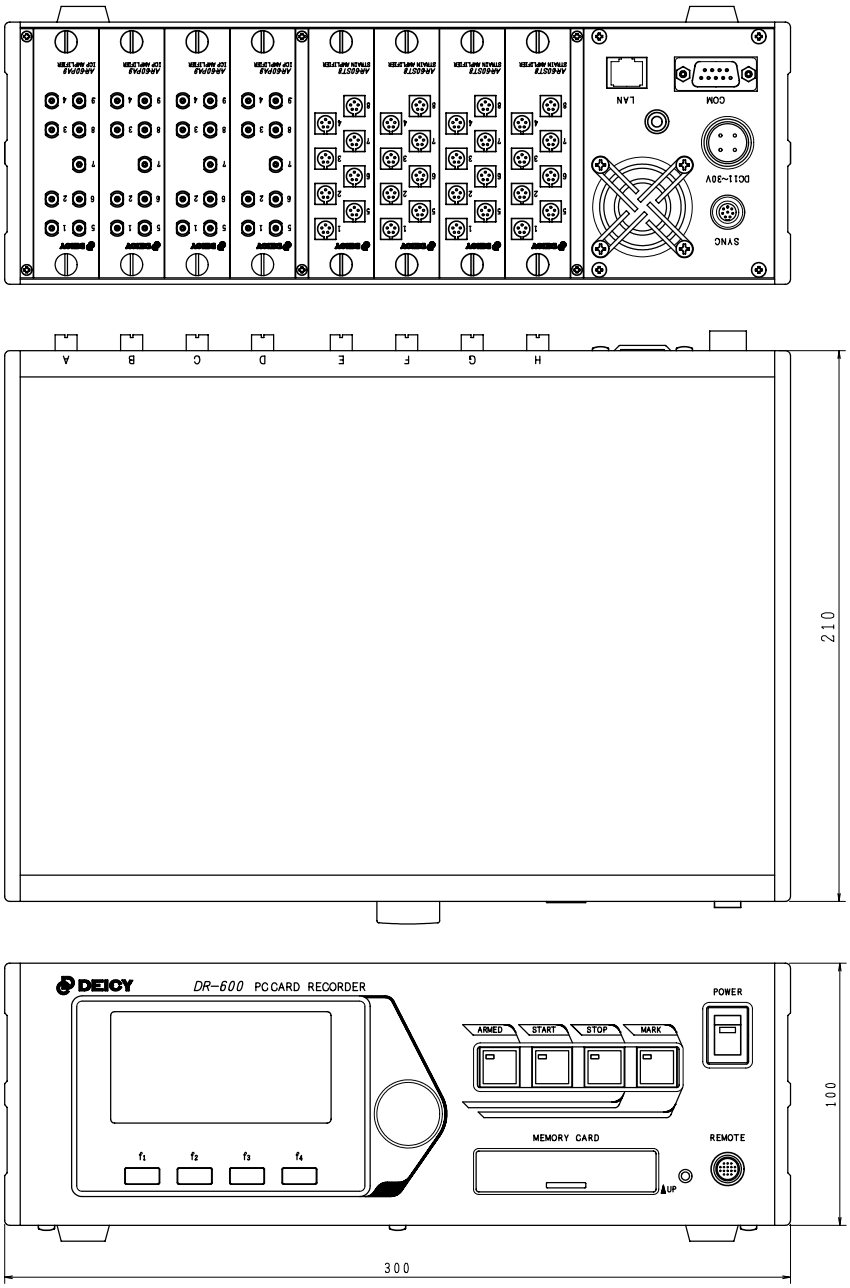
DR-600: 8 slot type, PC card slot, Ruggedized model
DR-300: 4 slot type, PC card slot, Ruggedized model
FE-300: 4 slot type, No card slot, Bench top model (not ruggedized, the model information is not coved by this manual)

1.2. Hardware Specifications

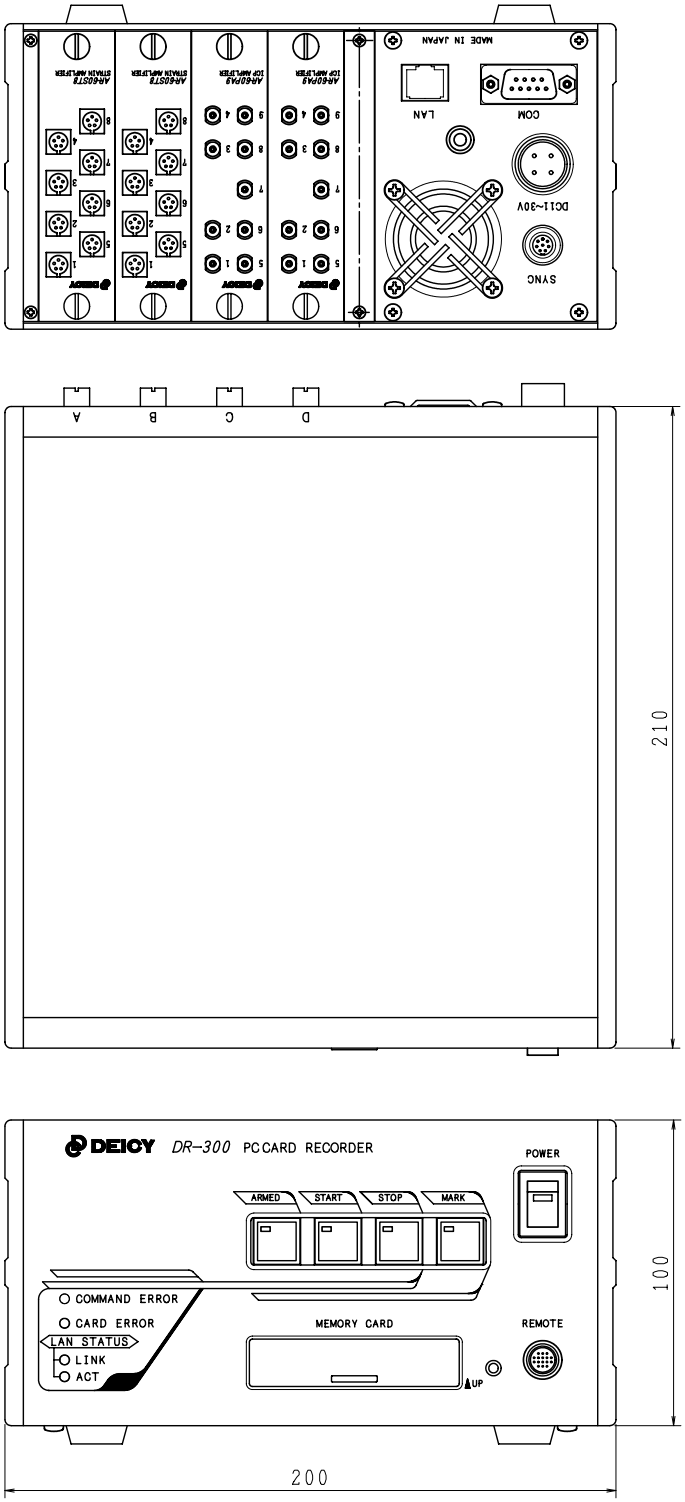
1.2.1. DR-600/300 Main Unit

Item	Description
Numbers of Slots	DR-600: 8 DR-300: 4 (For AR-60 series amplifier modules)
Maximum Data Translation Rate	100BASE-TX Ethernet 1.28 MB/sec, PC memory card only: 1.1 MB/sec, 100BASE-TX and PC memory card parallel: 600 kB/sec each. They are the maximum rates and their actual rates can be lowered depending on the network environment and types of the PC memory card to be used.
Sampling Frequency (Each amplifier module has its maximum frequency response.)	Series 1: 1, 2, 5, 10, 20, 50, 100, 200, 500, 1k, 2k, 5k, 10k, 20k, 50k, 100k, 200 kHz Series 2: 12.8, 25.6, 51.2, 128, 256, 512, 1.28k, 2.56k, 5.12k, 12.8k, 25.6k, 51.2k, 128k, 256 kHz. Series 3: 30, 300, 3 kHz
External Sampling	Applicable (need an external device, only for a single DR-600/300 use)
Applicable Recording Media	PC Card Type II memory card, or CompactFlash™ (with a card adapter) Recommended CF card (as of December 2007): SanDisk Extreme III
Recording Modes	Manual, Pretrigger, Post trigger, Level trigger start, External trigger start (at the DR600CTL program with an external device)
Front Panel Operations	For recordings: ARMED, START, STOP, MARK (DR-600/DR-300) For settings: Buttons and Rotary knob (DR-600 only)
Display (DR-600 only)	Vacuum Fluorescent Display (VFD), Characters, Barmeter/Level % monitors.
Voice Memo/Mark Function	Pressing a press-talk switch (CONT) or VOX recording at an optional DM-1599A microphone connecting to the RC-60V remote control unit creates voice recording files on the PC card recording. Voice memo: Voice recording while recording standby (ARMED) state. Voice mark: Voice recording while recording (ACQ) state, the voice recording files are treated as Mark points at the waveform viewer program.
Recording Data Files	Text base header file (*.hdr) and Binary format data file (*.dat) Voice memo/mark file (*.wav)
Interface	100BASE-TX Ethernet
Power Supply and Consumption	11 to 30 V DC, DR-600 Approximately 60 W (at 64 channels strain measurement)
External Dimensions	DR-600: 300W x 100H x 210D mm (excluding protruding parts)
Mass	DR-600: 5.6 kg (at 64 channels strain measurement configuration)
Operating Temperature Range	- 10 to 60 degree C (without condensing)
Vibration Proof Characteristics	10G, 30 to 200 Hz
Standard Accessories	CK-112 DC power cable 2 m RC-60V remote control unit with 2 m cable PL-U4610 DR600CTL control program PL-U4101C1 PcWaveForm waveform viewer program PL-U4112 PcWaveCal calibration program)

DR-600 External Dimensions



DR-300 External Dimensions

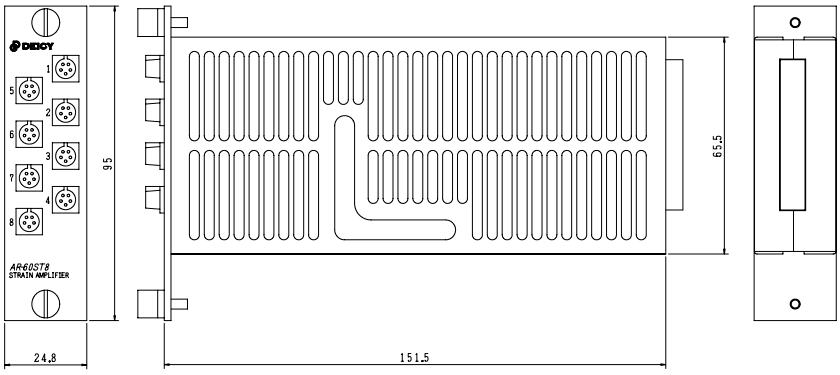


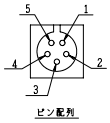
1.2.2. AR-60ST8 8ch Strain/DC Input Amplifier Module

The AR-60ST8 is an 8-channel input amplifier module switchable between strain and DC inputs by channel.

Item	Description
Numbers of Chanels	8
Connecter	Binder719 5pin Female
Connecter Pin Assignment (See below.)	Strain input mode 1: BV + (Bridge voltage: +2 V supply terminal) 2: V IN + (Strain signal non-reverse input) 3: SHIELD (Shield terminal) 4: V IN – (Strain signal reverse input) 5: BV – (Bridge voltage: 0V supply terminal) DC input mode 1: NC (No connection) 2: IN + (Unbalanced voltage input +) 3: COM (Unbalanced voltage input COM) 4: NC (No connection) 5: NC (No connection)
Applicable Gage	120 to 1 kohm
Input Impedance	1 Mohm or more (at differential input mode)
Bridge Voltage	2 V DC
Balanced Method	Auto-balance, within +/- 700 % of input range
Input Range	+/- 1000, 2000, 5000, 10000, 20000 uST ± 0.5, 1, 2, 5, 10 V
Low Pass Filter	20, 50, 100, 200, 500, 1k, 2k, Pass -48 dB/Oct Butterworth (Switched capacitor filter) Channel independent, command controls
Non Linearity	+/- 0.2 % FS
Frequency Response	0 to 10 kHz -3 dB
Stability	+/- 2 uST (30 minutes after power On)
ADC	16-bit successive comparison method ADC x 8, Simultaneous sampling of ADC in each channel.
Output Data Format	2-byte signed integer, 25000 = Range 100%
Level Trigger Start	Set ABSOLUTE value at each channel in 2 % increments, trigger detection by Or logic condition.
Setting Parameter Back Up	Yes, save into non volatilized area.
Power Supply and Consumption	Received from DR-600 main unit, approximately 5 W
External Dimensions	24.8W x 95H x 151.5D mm (excluding protruding parts)
Mass	0.23 kg
Operating Temperature Range	- 10 to 60 degree C (non condensing)
Vibration Proof Characteristics	10G, 30 to 200 Hz

External Dimensions





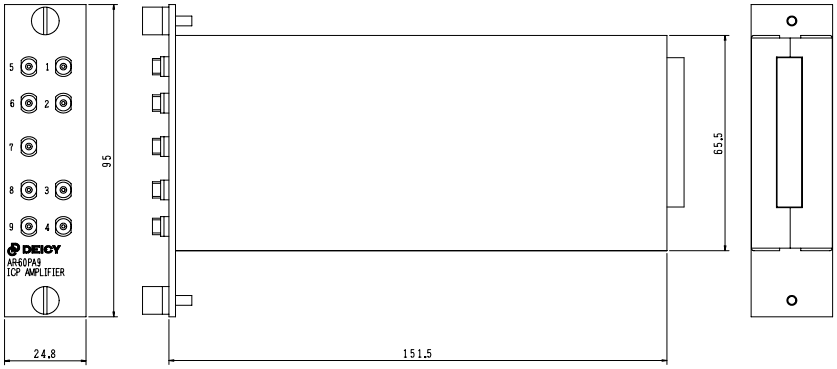
Pin outs

1.2.3. AR-60PA9A/AR-60PA9AL 9ch IEPE Input Amplifier Module

The AR-60PA9A and AR-60PA9AL are 9-channel input modules directly to connect IEPE(Integrated Electronics Piezo Electric) type sensors.

Item	Description
Numbers of Channels	9
Connecter	10-32 UNF Microdot x 9
Input Impedance	100 kohm, Unbalanced voltage input
Sensor Power Supply	Constant current 4 mA, 24V
Input Range	± 50m, 100m, 200m, 500m, 1, 2, 5, 10 V
Low Pass Filter	200, 500, 1k, Pass -24 dB/Oct Butterworth Channel independent, command controls
Non Linearity	+/- 0.2 % FS
Frequency Response	1.5 Hz to 20 k Hz -3 dB Another model for the lowest range from 0.5 Hz (-3dB) is also available (AR-60PA9AL) when ordering
Stability	+/- 5 uV/degree C (30 minutes after power On)
ADC	16-bit successive comparison method ADC x 8, Simultaneous sampling of ADC in each channel.
Output Data Format	2-byte signed integer, 25000 = Range 100%
Level Trigger Start	Set ABSOLUTE value at each channel in 2 % increments, trigger detection by Or logic condition.
Setting Parameter Back Up	Yes, save into non volatilized area.
Power Supply and Consumption	Received from DR-600 main unit, approximately 5 W
External Dimensions	24.8W x 95H x 151.5D mm (excluding protruding parts)
Mass	0.23 kg
Operating Temperature Range	- 10 to 60 degree C (non condensing)
Vibration Proof Characteristics	10G, 30 to 200 Hz

External Dimensions



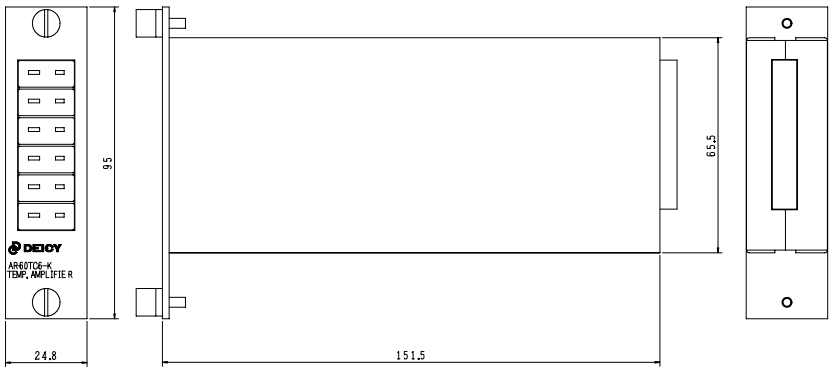
1.2.4. AR-60TC6 6ch Thermocouple Input Amplifier Module

AR-60TC6-K

The AR-60TC6-K is a 6-channel input amplifier module directly to connect K type thermocouples.

Item	Description
Numbers of Channels	6
Connecter	Omega GIM-K2 type
Input Method	Flying capacitor, between-channel isolation
Maximum Isolation Voltage	200 V DC
Applicable Thermocouple	K type
Burnout Detection	Applicable
Input Range	30 to 200 degree C, - 30 to 500 degree C, - 30 to 1000 degree C Channel independent, command controls
Accuracy	+/- 0.2 % FS of each input range or +/- 1 degree C
Clod Conjunction Compensation	+/- 1 degree C or less at - 10 to 60 degree C
Linearizer	CPU compensation by an internal linearization table, compensation error +/- 1 degree C or less
Frequency Response	0 to 10 Hz -3 dB
Cold Conjunction Compensation Accuracy	+/- 0.1 % or less (30 minutes after power On)
ADC	16-bit successive comparison method ADC x 1
Output Data Format	2-byte signed integer, 25000 = Range 100%
Level Trigger Start	Set ABSOLUTE value at each channel in 2 % increments, trigger detection by Or logic condition.
Setting Parameter Back Up	Yes, save into non volatilized area.
Power Supply and Consumption	Received from DR-600 main unit, approximately 2 VA
External Dimensions	24.8W x 95H x 151.5D mm (excluding protruding parts)
Mass	0.23 kg
Operating Temperature Range	- 10 to 60 degree C (non condensing)
Vibration Proof Characteristics	10G, 30 to 200 Hz

External Dimensions



AR-60TC6-T

The AR-60TC6-T is a 6-channel input amplifier module directly to connect T type thermocouples.

Item	Description
Numbers of Channels	6
Connecter	Omega GIM-T2 type
Input Method	Flying capacitor, between-channel isolation
Maximum Isolation Voltage	200 V DC
Applicable Thermocouple	T type
Burnout Detection	Applicable
Input Range	30 to 100 degree C, - 30 to 200 degree C, - 30 to 300 degree C Channel independent, command controls
Accuracy	+/- 0.2 % FS of each input range or +/- 1 degree C
Clod Conjunction Compensation	+/- 1 degree C or less at - 10 to 60 degree C
Linearizer	CPU compensation by an internal linearization table, compensation error +/- 1 degree C or less
Frequency Response	0 to 10 Hz -3 dB
Cold Conjunction Compensation Accuracy	+/- 0.1 % or less (30 minutes after power On)
ADC	16-bit successive comparison method ADC x 1
Output Data Format	2-byte signed integer, 25000 = Range 100%
Level Trigger Start	Set ABSOLUTE value at each channel in 2 % increments, trigger detection by Or logic condition.
Setting Parameter Back Up	Yes, save into non volatilized area.
Power Supply and Consumption	Received from DR-600 main unit, approximately 2 VA
External Dimensions	24.8W x 95H x 151.5D mm (excluding protruding parts)
Mass	0.23 kg
Operating Temperature Range	- 10 to 60 degree C (non condensing)
Vibration Proof Characteristics	10G, 30 to 200 Hz

AR-60TC6-J

The AR-60TC6-J is a 6-channel input amplifier module directly to connect J type thermocouples.

Item	Description
Numbers of Channels	6
Connecter	Omega GIM-J2 type
Input Method	Flying capacitor, between-channel isolation
Maximum Isolation Voltage	200 V DC
Applicable Thermocouple	J type
Burnout Detection	Applicable
Input Range	30 to 100 degree C, - 30 to 200 degree C, - 30 to 500 degree C Channel independent, command controls
Accuracy	+/- 0.2 % FS of each input range or +/- 1 degree C
Clod Conjunction Compensation	+/- 1 degree C or less at - 10 to 60 degree C
Linearizer	CPU compensation by an internal linearization table, compensation error +/- 1 degree C or less
Frequency Response	0 to 10 Hz -3 dB
Cold Conjunction Compensation Accuracy	+/- 0.1 % or less (30 minutes after power On)
ADC	16-bit successive comparison method ADC x 1
Output Data Format	2-byte signed integer, 25000 = Range 100%
Level Trigger Start	Set ABSOLUTE value at each channel in 2 % increments, trigger detection by Or logic condition.
Setting Parameter Back Up	Yes, save into non volatilized area.
Power Supply and Consumption	Received from DR-600 main unit, approximately 2 VA
External Dimensions	24.8W x 95H x 151.5D mm (excluding protruding parts)
Mass	0.23 kg
Operating Temperature Range	- 10 to 60 degree C (non condensing)
Vibration Proof Characteristics	10G, 30 to 200 Hz

AR-60TC6-E

The AR-60TC6-E is a 6-channel input amplifier module directly to connect E type thermocouples.

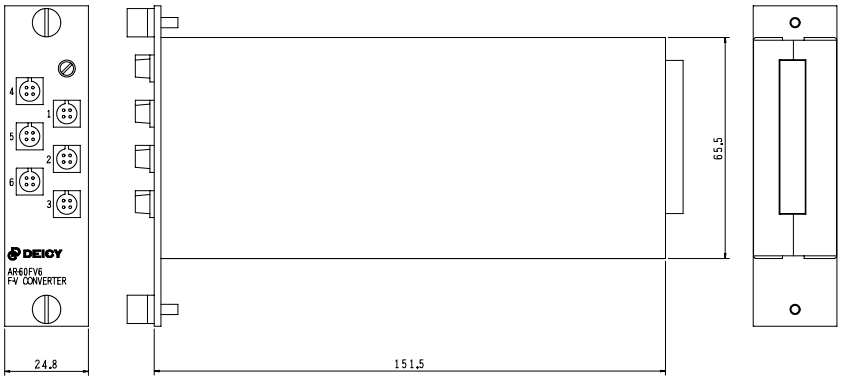
Item	Description
Numbers of Channels	6
Connecter	Omega GIM-E2 type
Input Method	Flying capacitor, between-channel isolation
Maximum Isolation Voltage	200 V DC
Applicable Thermocouple	E type
Burnout Detection	Applicable
Input Range	30 to 100 degree C, - 30 to 500 degree C, - 30 to 1000 degree C Channel independent, command controls
Accuracy	+/- 0.2 % FS of each input range or +/- 1 degree C
Clod Conjunction Compensation	+/- 1 degree C or less at - 10 to 60 degree C
Linearizer	CPU compensation by an internal linearization table, compensation error +/- 1 degree C or less
Frequency Response	0 to 10 Hz -3 dB
Cold Conjunction Compensation Accuracy	+/- 0.1 % or less (30 minutes after power On)
ADC	16-bit successive comparison method ADC x 1
Output Data Format	2-byte signed integer, 25000 = Range 100%
Level Trigger Start	Set ABSOLUTE value at each channel in 2 % increments, trigger detection by Or logic condition.
Setting Parameter Back Up	Yes, save into non volatilized area.
Power Supply and Consumption	Received from DR-600 main unit, approximately 2 VA
External Dimensions	24.8W x 95H x 151.5D mm (excluding protruding parts)
Mass	0.23 kg
Operating Temperature Range	- 10 to 60 degree C (non condensing)
Vibration Proof Characteristics	10G, 30 to 200 Hz

1.2.5. AR-60FV6 /AR-60FV6L 6ch FV/Pulse Count Input Amplifier Module

The AR-60FV6 and AR-60FV6L are amplifier modules equipped with Frequency to Voltage conversion and counting pulses.

Item	Description
Numbers of Channels	6 (FV and Pulse count mixture)
Connecter	Binder719 4pin Female
Connecter Pin Assignment (See below.)	1: GND 2: +5 V 3: Input signal + 4: +12 V
Input Mode	Ch1: Dedicate for FV, TTL/Electromagnetic coupler, threshold adjustable with 15-turn trimmer. Applicable electromagnetic coupler: DEICY ER-01 Ch2: Dedicate for FV, TTL/AC (AC threshold +/- 50 mV) Ch3 to Ch6: FV or Counter switchable - FV mode, TTL/AC (AC threshold +/- 50 mV) - Counter mode, 16bit counter/32bit counter (Ch3-4, Ch5-6 to be used for 32bit counter.
Input Pulse Specification	Ch1: Detect pulse width of 20 micro sec or more pulse and duty of 200 micro sec or more as a valid signal. Ch2 to Ch6: Detect pulse width of 200 micro sec or more at 500 Hz rage, 20 micro sec or more at 5 kHz range, and 2 micro sec or more at 50 kHz range as a valid signal.
Input Impedance	10 kΩ
Maximum Input Voltage	+/- 40 V or less
Sensor Power Supply	+5 V max. 30 mA, +12 V max. 100 mA, total max. 100 mA
FV Method	Cycle measurement between input pulse signals
FV Range	Ch1: 0.1 to 500 Hz, 0.5 to 5 kHz (Low pass filter at 800 Hz) Ch2 to Ch6: 0.1 to 500 Hz, 0.5 to 5 kHz, 1 to 50 kHz Another model for FV range change to 1 to 10 kHz at Ch2 to Ch6 from 1 to 50 kHz is available at ordering. (AR-60FV6L)
Maximum Counting Frequency	50 kHz
Pre-scaler	1 to 255 command controls
Accuracy	0.05% or less at 50 kHz range, 0.02% or less at other ranges. (At pre-scaler set to 1)
Conversion at No Pulse Detected.	0 Hz at lowest frequency of the input range. Exponential compensation after 4 cycle temporary termination of input pulses within the input range.
Response Speed	Maximum sampling frequency of each range or 5 kHz (only 1ch On, this number will be reduced in case measurement channels are increased.)
Smoothing	Simple moving average from 1 to 100, command controls
Output Data Format	2-byte signed integer, 25000 = Range 100%
Level Trigger Start	Set ABSOLUTE value at each channel in 2 % increments, trigger detection by Or logic condition.
Setting Parameter Back Up	Yes, save into non volatilized area.
Power Supply and Consumption	Received from DR-600 main unit, approximately 3 VA
External Dimensions	24.8W x 95H x 151.5D mm (excluding protruding parts)
Mass	0.23 kg
Operating Temperature Range	- 10 to 60 degree C (non condensing)
Vibration Proof Characteristics	10G, 30 to 200 Hz

External Dimensions



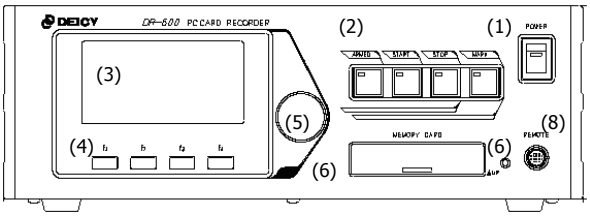
Pin Outs

2. Names and Functions of Main Unit

Each part name and its function of the DR-600 main unit will be explained.

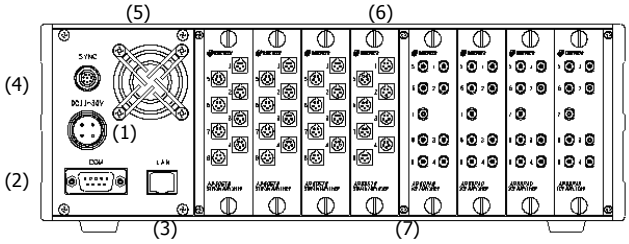
2.1. Names and Functions of Main Unit

Front Panel



No.	Name	Function
(1)	Power Switch	Turn On and Off the power of the DR-600. Power LED is on the switch.
(2)	Control Buttons	Buttons to control recordings, ARMED, START, STOP, MARK (Details are explained later.)
(3)	VFD (Display)	Vacuum Fluorescent Display. Use to display and set the recording conditions and to monitor the input signal while armed state and recording state. (Maximum 8 channels selected)
(4)	Function Keys	Functional keys. Correspondent function at each VFD content is displayed on the top of the key at the VFD, such as Entry, Return, or Cancel.
(5)	Rotary Knob	Move the cursor on the VFD to select an setting item.
(6)	Card Slot	Slid up the rid to open the slot. Insert a PC memory card for recording.
(7)	Card Status LED	Card access status are shown, Green on the card inside, Red on the system accessing to the card.
(8)	Remote Connector	Connect the remote control unit RC-60V.

Rear Panel



No.	Name	Function
(1)	DC Power Connector	Apply the main power source to the unit, 11 to 30 V DC.
(2)	COM Connector	Not used.
(3)	LAN Connector	100BASE-TX Ethernet connector to connect to the PC or network.
(4)	Sync Connector	Use to synchronization recordings, connect the synchronization recording cable CK-111.
(5)	Fan	For cooling the system, exhausting. Do not cover the outlet.
(6)	Slot	Insert the input modules to built up the system.
(7)	Dust Filter	Locating the bottom of the unit. To prevent the dust gets in the system, also in-taking air for cooling.

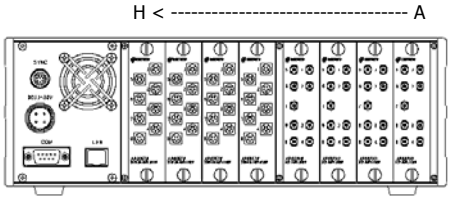
3. Basic Operations

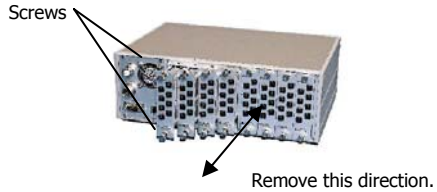
This section covers basic operations from mounting/dismounting the signal conditioning (input) modules, turning power On and Off, and connecting to the PC.

3.1. Mounting and Dismounting Input Modules

Use a small Philips (-) screw driver to mount or dismount the input modules from the DR-600.
Mount the input module straightly into an empty slot of the DR-600 rear panel and tighten the screws on the top and bottom of the input module with the screw driver to fix it to the DR-600.
The slot numbers are assigned from the right to the left at the rear panel view as follows:

Slot A for Slot No. 1
Slot B for Slot No. 2
Slot C for Slot No. 3
Slot D for Slot No. 4
Slot E for Slot No. 5
Slot F for Slot No. 6
Slot G for Slot No. 7
Slot H for Slot No. 8





If any slot remains empty, please use the BP-60 blank panel to prevent dusts are getting into the inside of the unit.

3.2. Cable Connections

If you use the remote control unit RC-60V for off-line measurements, connect it to the REMOTE connecter before turning On the power. Connect all the input cables to the input modules before turning On the power.

3.3. Turning Power On and Off

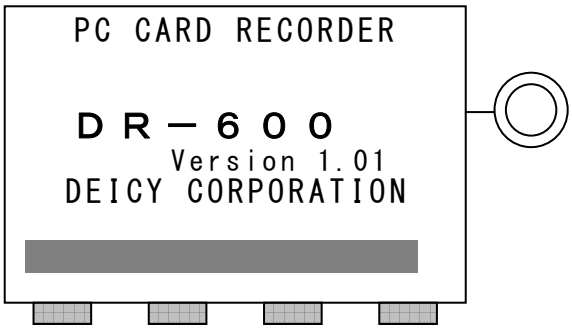
Turning power On

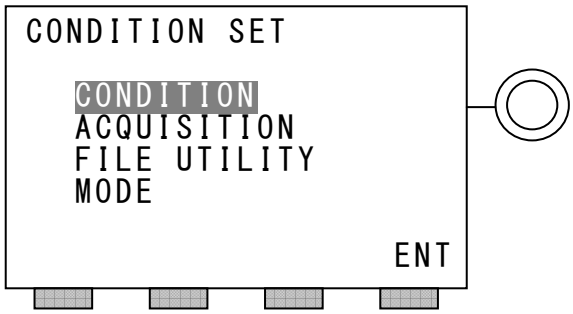
(1) Connect the DC power cable to the DR-600, another edge of the cable to a car battery or DC power supply. Or use the PW-600 AC adapter for AC source

(2) Connect the remote control unit RC-60V if you use. Or connect LAN cable for online operation.

(3) Press the POWER Switch of the unit. Turning the Green LED On of the Power Switch indicates the power has been applied.

(4) All LEDs on the Control Buttons turn On once and disappear. **Wait until the STOP LED on the STOP button turns On green.** At this timing, the progress bar below the "DR-600" characters on the VFD disappears and the main menu is shown. This boot process takes approximately 20 to 30 seconds.





When the progress bar on the initial display after power On showing left is completed, the display turns to the right and the STOP LED turns On green. Now the DR-600 is ready to use.

Make sure to wait until the STOP LED on the STOP button turns On Green.

Turning power Off
(1) Press the POWER Switch of another edge above to turn Off the power of the DR-600. Turning the Green LED Off on the Power Switch indicates the power ahs been cut..

(2) All LEDs turn OFF at the power OFF state.

The DR-600 does not equip an internal back up battery either to operate or to close the recording files at the PC memory card recordings, so that an illegal power failure or shortage of the power supply cause a sudden shutdown and lost of the recording file. External back up shall be provided to avoid these unexpected situations. There is an optional internal back up module to close the recording file on the PC memory card recording.

Never turn ON and OFF the power at a short interval. The DR-600 uses a software switch controlled by the CPU. It needs several seconds to turn ON the power after turning OFF the power.

3.4. Use PC Memory Card for Offline Recording

A PC memory card or a CompactFlash™ memory card with a card adapter can be used for "off-line" recording media for the DR-600. You can use the memory card by formatting with FAT32. The format menu on the DR-600 offline setting is explained later.
Note that a single data recording file capacity shall be 2GB (1024 x 1024 kB = kilobyte) or less.
The recording file capacity can be calculated as follows:

Numbers of Channels x 2 (one data is 2 bytes) x Sampling Frequency (kHz)

Insert the memory card
Slide up the rid at CARD SLOT on the front panel to open the slot. Insert the memory card to be used and make sure the eject knob on the side of the slot stays inside, and then close the rid.

Remove the memory card
After confirming the recording stop state and the card access LED is turned ON green, slide up the rid to open the slot. Press the card eject knob to remove the PC memory card.

When the PC memory card becomes full by recording multiple files or the preset scan numbers of the recording meets, the PC memory card recording automatically stops. The pair of the header file and the data file is saved under the current directory of the PC memory card. The current directory is the one used for the previous recording otherwise specified.
Once the recording conditions are set, they are memorized to the non-volatile area of the DR-600. This information is used after power Off and power On of the DR-600. So the same directory to save the recorded data files is used after powering On.

Never remove the PC memory card from the DR-600 while recording. This operation causes to unclose the recording file and to destroy the card file system, at the result you can not read out the pre-saved data files also on the PC memory card.

3.5. Setup for On-line Connection

The DR-600 and DR-300 equip with 100BASE-TX Ethernet interface to connect to the PC.
A standard accessory DR600CTL program is used to set up the measurement conditions, to monitor, and to record the signals.
Please refer the DR600CTL program instruction manual for the network connection and its operations.

3.6. Data File Format of PC Memory Card Recording

Header file format
It is the text file being created by the data file as pair; the text file extension is HDR. The contents of the text file are followed the format of the DADiSP header file to use the keywords and the parameters.

Data file format
The data file is a binary file and it is configured by the collections of the data records. The data record is a series of the data of a single sampling scan.

For further information on the header and data files, please refer the DR600CTL instruction manual.

Engineering unit conversion for the PC memory card recording is not available at real time operation.
Create the calibration template file by using the DR600CTL program for engineering unit conversion.
When opening the PC memory card recording file at the PcWaveForm program, go to CAL menu to call the saved calibration template file to convert to the engineering units for each channel.

4. Off Line Operations

This section explains how to use the DR-600 and DR-300 at off line (no connection with the PC) mode.

You can use the DR-600 and DR-300 at off line mode; however, the ranges of the off line operations are limited on recording condition settings and you cannot set the recording conditions manually at the DR-300, so that the recording condition setting by using the DR600CTL program is recommended.

4.1. Operation States and Control Buttons

Power On State

When turning On the power to the DR-600 (Refer "3.3. Turning Power On and Off" also), the initial display is shown at the VFD. While this period, the DR-600 is initialing and loading the firmware to the system. AT this period, the memory card check is processed to see the available memory capacity for recording and the preset recording conditions are checked.

Control Buttons

There are 4 control buttons on the front panel of the DR-600 (see "2.1. Names and Functions of Main Unit"). They take you to each recording operation state as explained follows and the LEDs on their buttons show the current operation state.

Press ARMED

Pressing this button brings the DR-600 mode from the STOP state to the ARMED state. The ARMED state is recording standby state by checking the preset recording conditions and the memory card capacity. If it fails to check, the DR-600 remains at the STOP state. Pressing the STOP button at the ARMED state returns to the STOP state.

Press START

The Start button is only valid at the ARMED state and activates recordings and enters to the recording (ACQ) state.

Press STOP

Pressing the STOP button at the recording (ACQ) state stops recording. Pressing it at the ARMED state returns from the ARMED state to the STOP state.

Press MARK

The MARK button is only valid at the recording (ACQ) state. Pressing the MARK button turns the MARK LED for 1 second and records the data mark to save into the pressing data point to the header file saved into the memory card.

Overview of Operation State Sequence

Sequence	Conditions	Remarks
STOP -> ARMED	• ARMED button is pressed. • ARM command from PC is received.	Preset recording conditions must meet to the current system status.
ARMED -> ACQ	• START button is pressed. • STA command from PC is received. • Data trigger condition is met.	
ARMED -> STOP	• STOP button is pressed. • ARMSTP command from PC is received.	
ACQ -> STOP	• STOP button is pressed. • Preset recording seconds are reached. • Memory card is getting full.	

Note: ACQ = Recording state

4.2. Off Line Settings

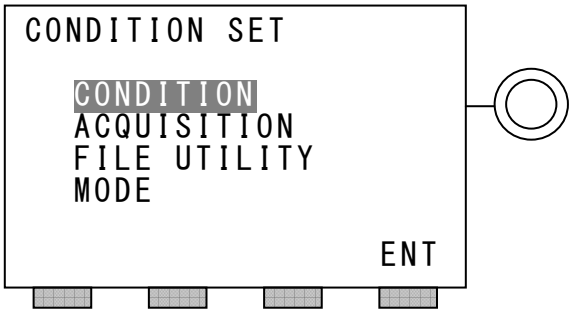
The articles of this section are only applicable for the DR-600, not for the DR-300.

4.2.1. Front Panel Operation Basics

The DR-600 equips with 128 x 64 dots (21 characters x 8 lines) VFD for showing the various information at each STOP, ARMED, ACQ state. At the STOP state, the VFD and 4 of the function keys located at the below of the VFD are used to set up the recording conditions to the DR-600. At the ARMED and ACQ states, the VFD can be used to monitor up to 8 ch of the input signals either with the bar meters or the % displays.

The rotary knob is used for scrolling the display cursor and selecting the item. Functions of the function keys are varied depending on the current display menu; the extreme right key is mainly used for the ENTER key to enter the selected values and the next extreme right key is mainly used for the CANCEL key to cancel the selected values. The extreme left key is mainly used for the RETURN key to move up the menu level.

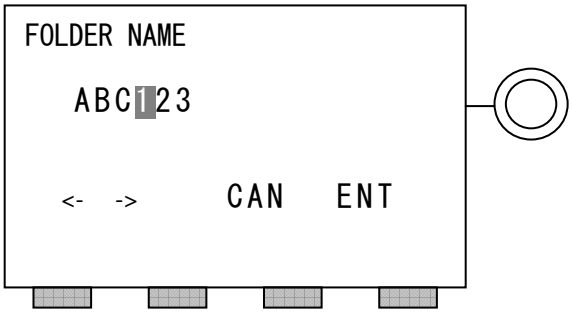
Operation Example: Selecting Items



Select the item to enter by the rotary knob and enter it by the extreme right function key ENT

The left example is the STOP state display right after the system activated after the power On. One of the line items is displayed in flashing. The flashing item is the current cursor selection position. Move the flashing cursor by using the rotary knob. Press the function key ENT to enter the selected item to the system. Then the display moves to the next menu.

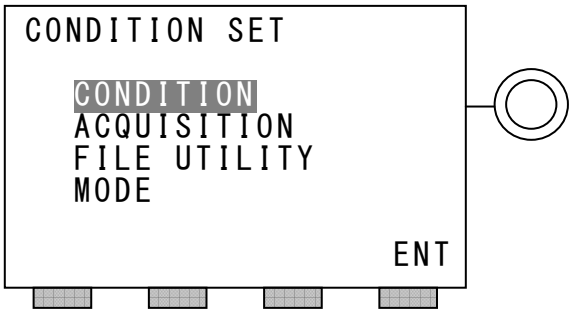
Operation Example: Entering Characters



In the process of the recording condition settings, some menu require enter the characteristics.

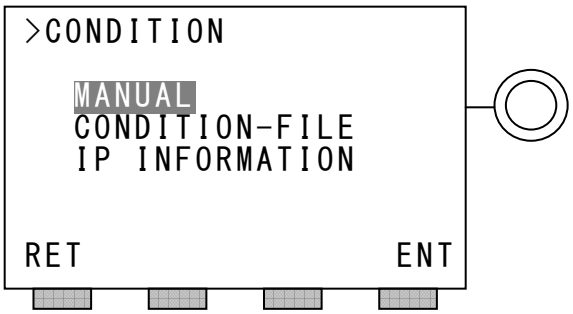
For example, [CONDITION SET] -> [FILE UTILITY] -> [FOLDER NAME] asks you to enter the characters to be used for the folder name.
The flashing cursor is located at the current entry position. To move the flashing cursor, use the function key <- or ->. Select the character to enter at the flashing cursor position by using the rotary knob (alphabet characters and numeric numbers). After completing the entry character strings, press the ENT key. Press the CAN key to cancel the entries.
Press the <- + CAN to delete a single character.

4.2.2. Setup for Input Module Recording Parameters

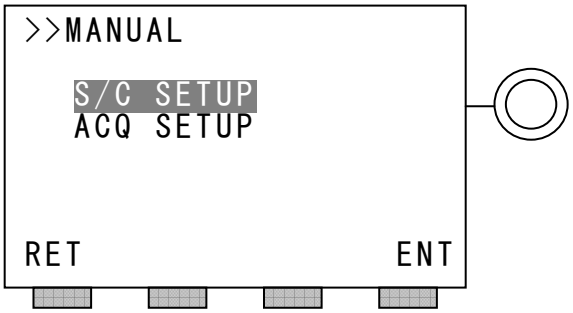


The left menu at the STOP state is displayed when the DR-600 initialization process finished (booted up).

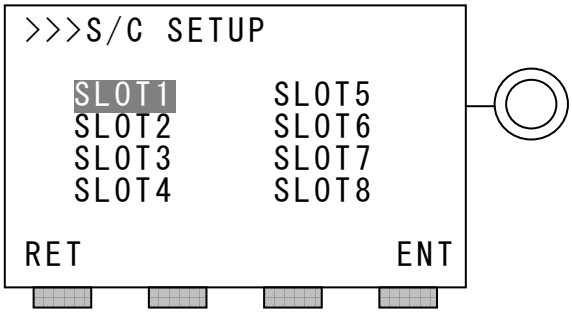
Select [CONDITION] and press the ENT key to move to the next.



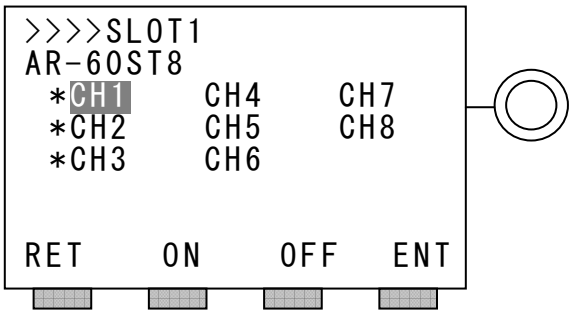
Select [MANUAL] for off line input module settings and press the ENT key.



Select [S/C SETUP] and press the ENT key.

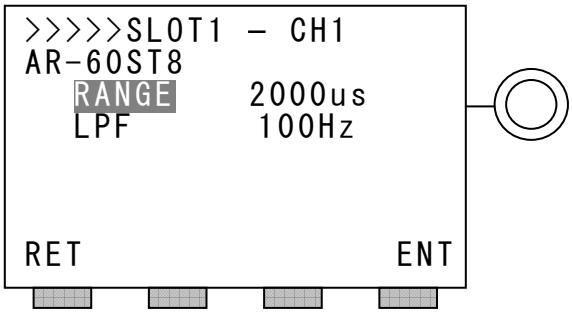


Select [SLOT] to the slot number to set up the input module inserted to the selected slot number and press the ENT key.

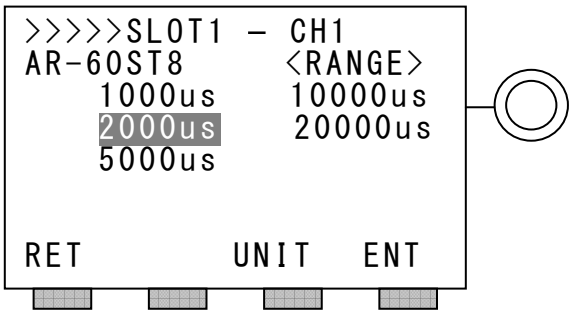


Select [CH] to the channel number to set up the channels of the selected input module and press the ENT key.
Showing numbers of the channels are depending on which input module is selected. Set recording On or Off (the function key ON or OFF) at this menu, the asterisk * indicates the channels will be recorded.

Press the ENT key to set up the further recording conditions to the flashing cursor channel.

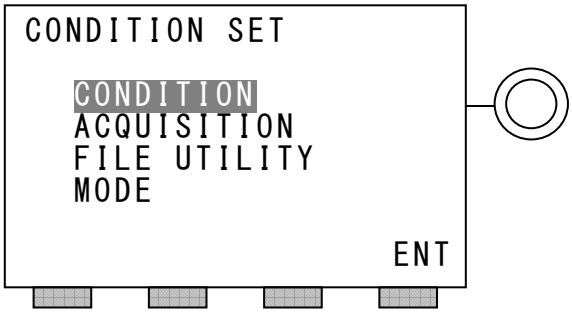


The left is an example of the AR-60ST8 input module.
In order to select the input range, locate the flashing cursor at [RANGE] and press the ENT key to the next menu.

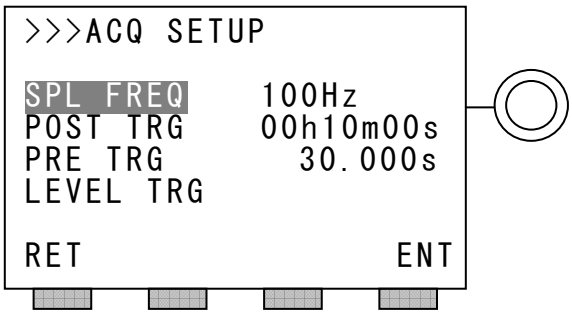


Select the input range you want to set, and press the ENT key.

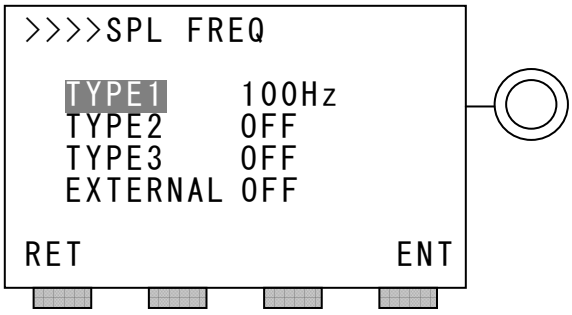
4.2.3. Setup for Sampling Frequency



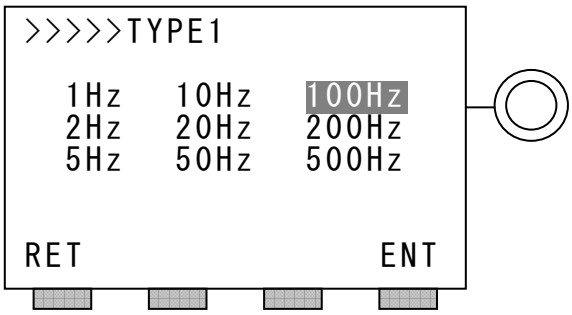
At the CONDITION SET menu, move the flashing cursor to [ACQUISITION] and press the ENT to set the sampling frequency.



Press the ENT key at [SPL FREQ] to set up the sampling frequency to be used for the recording.

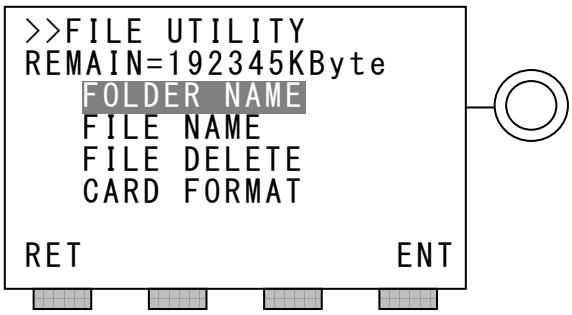


There are 3 sampling frequency series under [TYPE 1] to [TYPE 3].
Select one [TYPE] and press the ENT key to move to the next menu under the selected [TYPE].



The rotary knob will takes you the next page if the more than one page selection exists. Select one sampling frequency and press the ENT key to select.

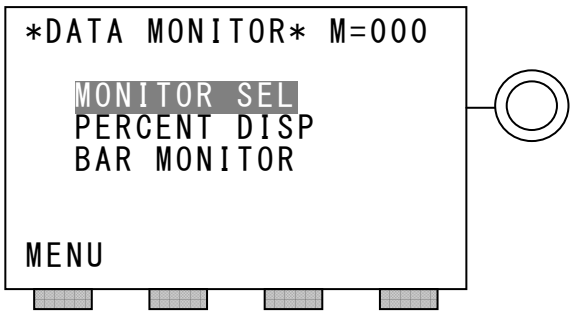
4.2.3. Setup for Sampling Frequency



Select [FILE UTILITY] at the CONDITION SET menu.
At the file utility, you can enter the folder name and the file name to be used.

4.3. Monitor Channel Setting at ARMED State

After the recording conditions are entered and the PC memory card for recording is inserted, confirm the STOP LED is turned On green to indicate the STOP state.
Press the ARMED button to move to the ARMED state, it is a recording standby state, the ARMED LED is turned On orange.



The left display will be shown at the ARMED state.

Select [MONITOR SEL] at the menu, and press the MENU key.
The [>>MONITOR SEL] menu is displayed.

Select [SLOT] which the channels you want to monitor exists and press the ENT key to select the channels.
The [>>MONITOR SEL>SLOT] is displayed. Select the channel and press the ENT key to assign the channel for monitor. Up to 8 channels can be assigned as the monitor channels.

Press the RET key to move to the upper menu.

Move the flashing cursor to [PERCENT DISP] and press the MENU to move to the % display.
Move the flashing cursor to [BAR MONITOR] and press the MENU to move to the bar monitor display.

4.4. Start and Stop PC Memory Card Recording

After the recording conditions are entered and the PC memory card for recording is inserted, confirm the STOP LED is turned On green to indicate the STOP state.
Press the ARMED button to move to the ARMED state, it is a recording standby state, the ARMED LED is turned On orange.
Then press the START button to start recording to the PC memory card, confirm the START LED is turned On red and the card access LED on the right next to the card slot turns from green to red.

Press the STOP button to stop recording. To restart the recording to create the next data files, press the ARMED button and the START button.

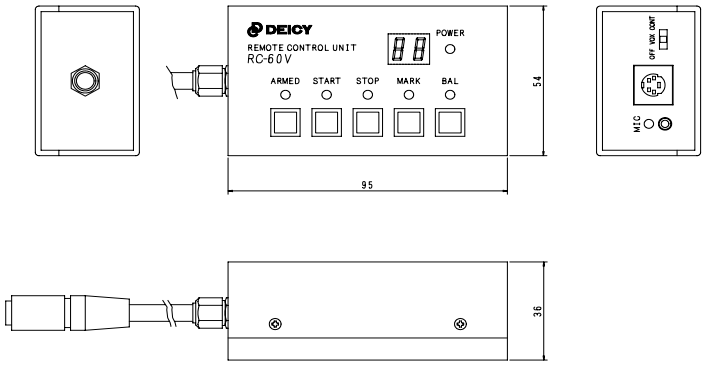
If the preset recording conditions has not met to the conditions to enable recording or no memory card is inserted, the error message will be displayed on the VFD and the DR-600 cannot enter to the ACQ (recording) state. Remove the cause to start recording.

4.5. Balance Operation

The balance operation for the AR-60ST8 strain channel(s) at the off line mode is possible.
From the [CONDITION SET] menu, select [ACQUISITION] and press the ENT key at the STOP state.
At the [>>ACQUISITION] menu, select [BALANCE] and press the ENT key.
At the [>>BALANCE] menu, <EXECUTE BALANCE SURE ?> is displayed. Press the EXEC key.
After showing <Wait Please…>, the balance result is shown.
Press the VIEW key to see the balance error channel(s).

4.6. Using Remote Control Unit

The remote control unit RC-60V provides the same recording controls with the control button operations at the front panel.
Connect the RC-60V to the REMOTE connector of the front panel and then turn On the power of the DR-600. Otherwise the RC-60V is not recognized at the DR-600. Operations of the RC-60V provide not only the recording controls, but also the memo voice recordings to the PC memory card with Windows WAV format and the voice recording while data recording is saved as a voice mark for searching and listening to at the PcWaveForm program. Use an optional microphone for voice recording. For details on how to use the recorded voice mark, see the mark function at the PcWaveForm instruction manual.



5. Miscellaneous

This section explains the maintenance of the DR-600 and DR-300.

5.1. Replace Internal Battery

The button type battery is used to back up the real time clock. This battery needs to replace periodically at approximately two years sequence. Contact us for replacing the battery.

5.2. Clean Up Filter

The DR-600 and DR-300 are in-taking cooling airs from the bottom of the unit. There is a fiber filter to prevent dusts are getting into the unit. Turn Off the power of the DR-600 and DR-300, and remove 6 screws on the filter plate and then clean up the filter to keep the filter clean.

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