SEIKO

Sports Printer CT-2000

OPERATING MANUAL

Thank you for purchasing SEIKO SPORTS PRINTER CT-2000.
Before using your SEIKO SPORTS PRINTER, please read this manual carefully for its proper use and care.
Keep this manual handy for ready reference.

SEIKO TIME SYSTEMS INC.

CAUTION

（1）This manual may not be copied or reproduced in any form, in whole or in part, without the express written consent of SEIKO.

（2）This manual may be subject to change without prior notice.

（3）This manual has been prepared carefully to provide you with complete information for the operation of this product. For the purpose of constant improvement in this manual, your suggestions and comments on the descriptions included herein are highly appreciated.

（4）SEIKO shall not be liable for any failure of this product or direct or indirect damages resulting from such failure if such failure is caused due to abuse or misuse of the product, failure to observe instructions herein or neglect of other reasonable care, or servicing, changes, modifications or alterations performed by other than SEIKO or a servicing contractor authorized by SEIKO.

SAFETY ALERT SYMBOLS

The following symbols and terms used in this manual have the meaning as explained below. They are intended to attract special attention of the users to the descriptions attached with them so that they can use the product properly to prevent personal injuries and property damages. Before reading this manual, be sure to understand what they mean.

 WARNING	This pictorial symbol with WARNING is used to indicate a potentially hazardous situation which is likely to cause death or severe personal injury if the instructions attached with them are not followed correctly.
 CAUTION	This pictorial symbol with CAUTION is used to indicate a potentially hazardous situation which is likely to cause personal injury or property damage if the instructions under attached with them are not followed correctly.

	This pictorial symbol indicates what must NOT be done.
	This pictorial symbol indicates what must be done.

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1. SAFETY PRECAUTIONS

The following precautions must be strictly observed for the safety of yourself and your fellow workers and for the protection of property from loss and damages.

WARNING	If the Product is giving out smoke or burnt smell, or showing other abnormal symptoms, turn off the power switch and stop using it. Then, checking that no more smoke is given out, call your nearby SEIKO dealer or agent for repair service.	
	Unless you are a qualified electrician, never try to disassemble, repair or modify the Product. Unauthorized disassembly, repair or modification may cause an electric shock or fire.	
	Do not let any foreign matter such as pin and a piece of metal enter into the inside of the Product. In case this has occurred, turn off the power switch immediately, and stop using it. If the Product is used continuously without being reconditioned, an electric shock or fire may result. Call your nearby SEIKO dealer or agent for repair.	
	Never operate the Product with wet hands. An electric shock or malfunction may result.	
	Do not expose the Product to splashes of water. An electric shock, malfunction or fire may result.	
	Never use any damaged power cord or plug, or loose socket. An electric shock or fire may result.	
	Do not use or keep the Product at following places, as this may cause an electric shock, malfunction or fire: · Places under extremely high temperatures (such as those exposed to direct sunlight); · Dusty places; · Places exposed to frequent vibrations; and · Places subject to static electricity.	

CAUTION	Do not drop the Product, or hit it strongly against hard objects. A malfunction or injury may result. 
	When connecting the Product with any accessory, optional or other device, check that the connection is performed properly and securely. A malfunction or failure may result. 
	Do not twist or pull strongly the cables to connect the Product with the grip switch, or optional or other devices, or do not place any heavy object on the cables. A malfunction of the Product or break in them may result. 
	Install the dry batteries properly, checking that their (+) and (-) terminals are properly aligned. A malfunction or failure may result. 
	Do not use dry batteries of different types together. Otherwise, heat generation or electrolyte leakage of the batteries may result and cause damage to the Product. 
	Do not use old and new dry batteries together. Otherwise, heat generation or electrolyte leakage of the batteries may result and cause damage to the Product. 
	Use only dry batteries of the same make, type and size. Otherwise, heat generation or electrolyte leakage of the batteries may result and cause damage to the Product. 
	Use the dry batteries only within their specified operational temperature range. The alkaline dry batteries, in particular, should never be used in cold temperatures below the specified range. Otherwise, they may not perform as specified, and a malfunction of the Product may result. 
	If you decide not to use the Product for a long time, take out the dry batteries. Otherwise, heat generation or electrolyte leakage of the batteries may result and cause damage to the Product. 
	Please note that the AC cord (5m) enclosed with the AC adapter can be used within Japan only. 
	When an external battery is used, use 11~14 V DC battery only. A malfunction, fire or personal injury may result. 
	To feed the paper, be sure to operate the “FEED” button, and do not pull the paper forcibly. This may damage the printer. 
	Do not turn off the switch while operating the Product. Otherwise, the measurement data obtained so far will be erased, and a malfunction or failure may result. 
	Do not expose the case of the Product to solvents such as alcohol and gasoline, spray of cosmetics or the like, cleaners, adhesives, or paints. They may discolor, deteriorate or damage the case due to chemical change. 

2. INTRODUCTION

2.1 Overview

The SEIKO Sports Printer CT-2000 is a multi-purpose printer/timer that can be used for various sports events requiring timing such as track and road running races, swimming, ski and skate.

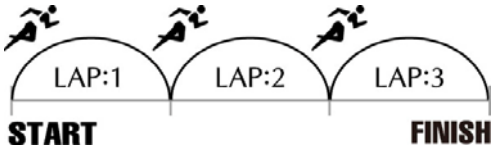
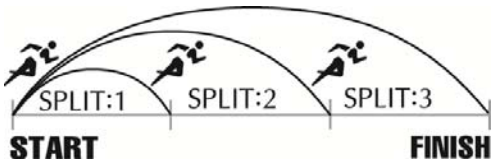
2.2 Features

- Being equipped with various measurement modes, CT-2000 can be used for timing of all types of sports events.
- Timing down to 1/1,000 of a second is possible.
  The method of calculating the fraction of a second can be selected from 10 types including rounding up, rounding down and rounding off, thus making it possible to comply with various timing rules adopted in different sports events.
- A large-sized LCD monitor is used to make it easier to check various types of information displayed on it. (20 characters x 4 lines)
- The design of the grip switch is renewed so that it better fits into your palm and provides easier switch operation.
- By using resin case, high durability has been achieved.
- If the dry batteries are installed when CT-2000 is powered by AC adapter, the power source can be quickly switched over to the batteries in case of failure of AC power supply, to ensure constant operation. *1
- Two sets of dry batteries (6 AA size cells per set) can be installed in the main body, and the power source is switched over automatically between them. By replacing the unused set of dry batteries with new ones, CT-2000 can be powered by the dry batteries continuously for a long time.*1
- Rechargeable batteries can be used in place of alkaline dry batteries.*1
- CT-2000 can also be powered by external battery (DC11V～DC14V)*1
- The Auto Measurement Mode enables the measurement during individual practices performed alone.
  - · Reaction time (start reaction time: time after the start signal until swimmer's feet have left the starting block), lap time, and split time can be measured during swimming practices.
  - · Lap time and split time can be measured during practices of speed skating, track, and other races.*2
  - · By outputting a signal to an external buzzer device, CT-2000 can control the device to generate a starting sound automatically.*2
- Even if the actual start time has differed from the scheduled time, the Time Correction Mode (inputting time difference from start time) corrects the scheduled start time set in advance in the secondary CT-2000 units, enabling them to synchronize with the master CT-2000 unit.
- The Speed Measurement Mode measures the average speed over a given section of the entire distance.*2
- By connecting a Bib No. input device with CT-2000, the measured times can be printed out together with the Bib No.*2
- CT-2000 can be connected with a personal computer via USB interface.
- Two types of time signals (RS-422) are output to the scoreboard (with or without running time data).
- A synchronization signal can be output to external devices.
- As CT-2000 is compatible with CT-1000, the grip switches, extension unit, synchronization cables, and cables to connect with scoreboard used previously with CT-1000 can also be used with CT-2000 (with the exception of a cable used to connect with a personal computer).

*1: Dry batteries, rechargeable batteries and external battery are not included with CT-2000, and they should be purchased separately if required.

*2: Optional device is required.

2.3 Lap Time and Split Time

Lap time: Time required to go a given section of the entire distance.	
Split time: Time required to go from the start to any given point of the entire distance.	

2.4 System Components

① CT-2000 main body 1 unit
② GS-51 grip switch (with 2.5 m cable) 2 units
③ AC adapter (with 5 m cable) 1 unit
④ RP-03 roll paper 1 roll
⑤ ERC-22 ribbon cassette 1 unit (preset in printer section of main body)
⑥ Operating Manual (this document)



CT-2000 Main Body



GS-51 Grip Switch



AC Adapter



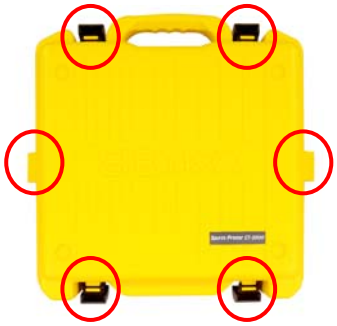
RP-03 Roll Paper



ERC-22 Ribbon Cassette

2.5 How to Open the Case

Place the case with the side attached with a sticker facing toward you, and unlock the four locks on the upper and lower sides and two locks on the side faces to open the case.



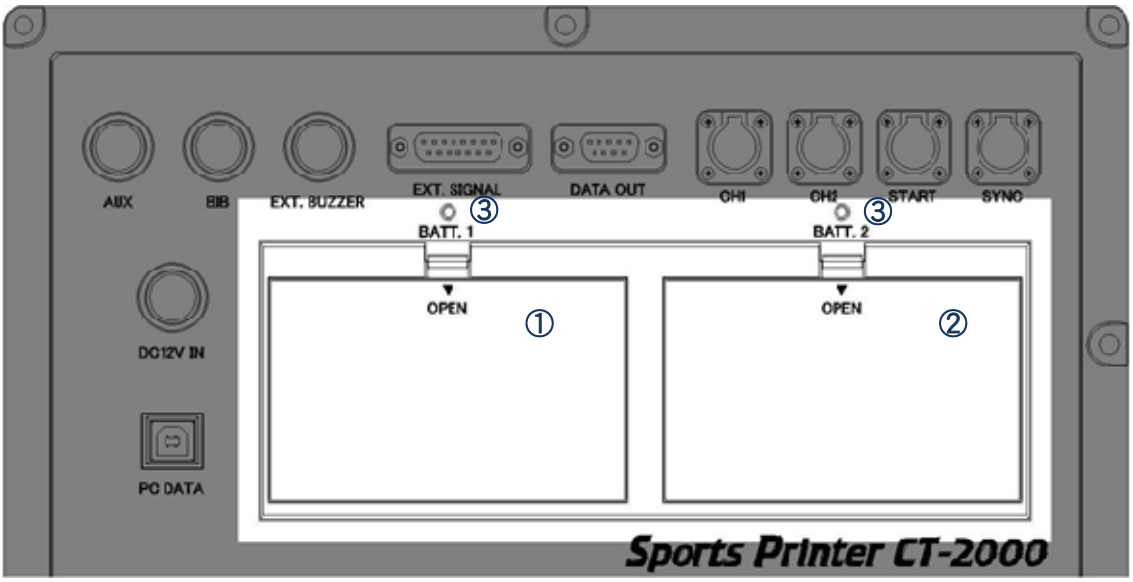
2.6 Power Supply

- CT-2000 can be supplied with the power from two sources. One is the power source connected to DC12V IN (AC adapter or external battery), and the other is either of the two sets of dry batteries.
- For external battery, use 11~14 V DC battery only.
- Rechargeable batteries can be used in place of alkaline dry batteries.
- When all types of power sources are available, the one connected to DC12V IN will be used.
- When CT-2000 is powered by the dry batteries, the LED lamp above the battery compartment of the batteries in use lights up.
- When replacing the dry batteries with new ones, be sure to replace those in the battery compartment whose LED lamp stays out.
- When the battery power of both sets of dry batteries has reduced to a low level, both sets are used at the same time.
  In that case, the LEDs of both battery compartments light up. Replace the batteries with new ones set by set.

CAUTION	
	Install the dry batteries properly, checking that their (+) and (-) terminals are properly aligned. A malfunction or failure may result.
	Do not use dry batteries of different types together. Otherwise, heat generation or electrolyte leakage of the batteries may result and cause damage to the Product.
	Do not use old and new dry batteries together. Otherwise, heat generation or electrolyte leakage of the batteries may result and cause damage to the Product.
	Use only dry batteries of the same make, type and size. Otherwise, heat generation or electrolyte leakage of the batteries may result and cause damage to the Product.
	Use the dry batteries only within their specified operational temperature range. The alkaline dry batteries, in particular, should never be used in cold temperatures below the specified range. Otherwise, they may not perform as specified, and a malfunction of the Product may result.
	If you decide not to use the Product for a long time, take out the dry batteries. Otherwise, heat generation or electrolyte leakage of the batteries may result and cause damage to the Product.
	When an external battery is used, use 11~14 V DC battery only. A malfunction, fire or personal injury may result.

3. NAMES AND FUNCTIONS OF PARTS

3.1 Battery Compartment



No.	Name	Function
①	BATT.1	Open the battery compartment cover, and install the batteries.
②	BATT.2	
③	LED	The LED of the compartment of the batteries in use lights up.

3.1.1 How to Install the Batteries

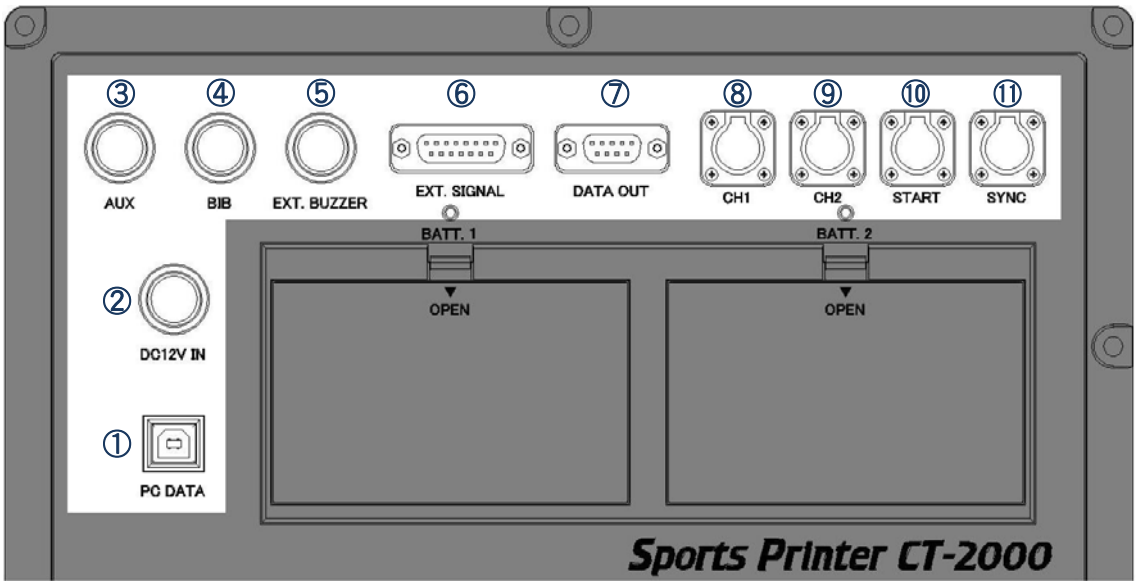
①Put your finger on the protrusion of the battery compartment cover, and pull it up to open the cover.



②Install the dry batteries while checking that their (+) an (-) terminals are properly aligned.

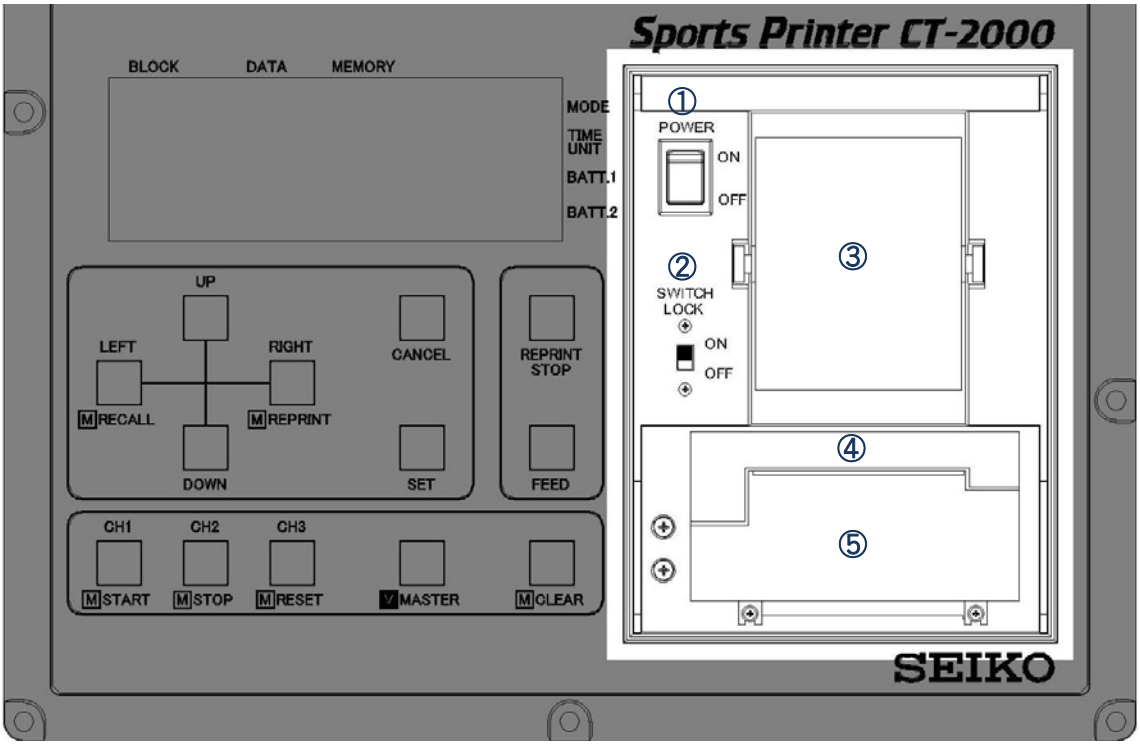


3.2 Connector Section



No.	Name	Function
①	PC DATA	Connect with a personal computer using a USB cable. * For details, refer to【6.9 PC DATA (Output of Data to Personal Computer)】on P. 50.
②	DC12V IN	Connect AC adapter included with CT-2000 or an external battery. After connection, be sure to fix the cable securely in the same manner as you would turn the screw.
③	AUX	It is an unused connector (for extending functionality).
④	BIB	Connect Bib No. input device. After connection, be sure to fix the cable securely in the same manner as you would turn the screw.
⑤	EXT.BUZZER	Connect external buzzer device. After connection, be sure to fix the cable securely in the same manner as you would turn the screw.
⑥	EXT.SIGNAL	Connect input extension unit. The number of input channels can be increased to a maximum of 10. After connection, be sure to fix the cable using the lock screw.
⑦	DATA OUT	Two types of time signals (RS-422) are output to the scoreboard. After connection, be sure to fix the cable using the lock screw.
⑧	CH1	By connecting a grip switch, etc., CH1 signal can be input. Mate the protrusions of the plug and receptacle connectors with each other, and push in the plug until it clicks fixed.
⑨	CH2	By connecting a grip switch, etc., CH2 signal can be input. Mate the protrusions of the plug and receptacle connectors with each other, and push in the plug until it clicks fixed.
⑩	START	An external start signal can be input. Mate the protrusions of the plug and receptacle connectors with each other, and push in the plug until it clicks fixed.
⑪	SYNC	Use the connector to synchronize other units of CT-2000. For details, refer to【6.8 SYNC (Synchronization)】on P. 48.

3.3 Printer Section



No.	Name	Function
①	POWER switch	It turns on the power of CT-2000 main body.
②	LOCK switch	It prevents mistaken operation of the operation buttons. By sliding it to “ON” position, all the buttons except “FEED” button are disabled. * For details, refer to【6.7 LOCK Switch】on P. 47.
③	Roll paper	It is a roll paper for use with the printer. Be sure to use the one for exclusive use with CT-2000. It is recommended that a new roll paper be installed when CT-2000 is used for timing in a competition.
④	Ribbon cassette	It is an ink ribbon cassette for use with the printer. Be sure to use the one for exclusive use with CT-2000. It is recommended that a new ribbon cassette be installed when CT-2000 is used for timing in a competition.
⑤	Printer	It prints out the measurement data during and after measurement.

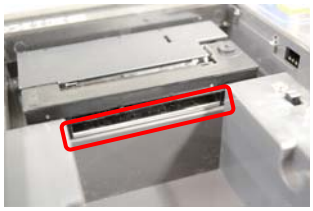
* The above parts are all located inside the printer cover.

3.3.1 How to Install a Roll Paper

①Open the printer cover, turn on the POWER switch, and take out the paper holder.



②Insert the edge of the paper into the paper inlet of the printer.





③Press FEED to feed the paper until the edge of the roll paper comes out from the outlet.



CAUTION	To feed the paper, be sure to operate the “FEED” button, and do not pull the paper forcibly. This may damage the printer.

④Insert the paper holder into the roll paper.



⑤Set the roll paper in position in the printer, and close the printer cover.



3.3.2 How to Replace the Ribbon Cassette

* When the roll paper has been installed inside the printer, take it out temporarily before replacing the ribbon cassette.

①Open the printer cover and then ribbon cassette cover.



②Push the “PUSH” portion of the ribbon cassette to remove it.



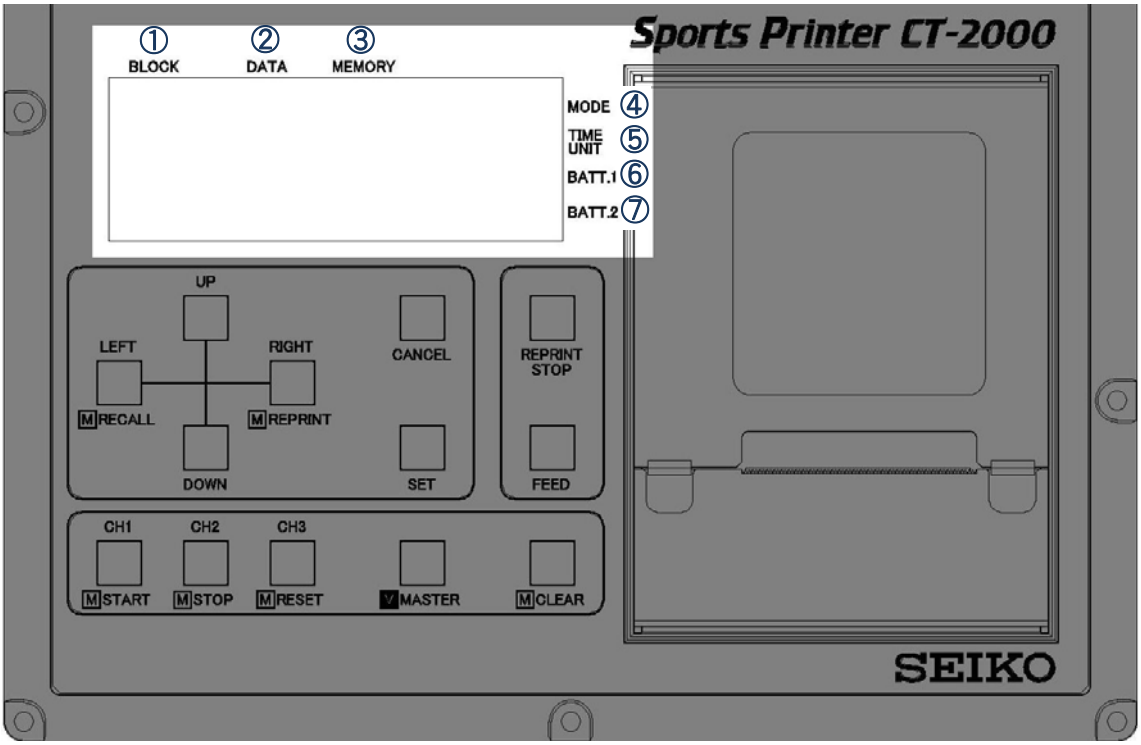
③Push in the new ribbon cassette until it clicks in position.



④Rotate the ribbon feed roller in the direction of the arrow with a finger to remove the slack of the ribbon.



3.4 Monitor Section



No.	Name	Function
①	BLOCK	Block No. (up to 100) of the displayed memory block is indicated.
②	DATA	Data No. within the displayed block is indicated.
③	MEMORY	During measurement, the total number of data stored in memory is indicated. During recall, the number of data stored in the selected block is indicated.
④	MODE	Measurement Mode No. is indicated.
⑤	TIME UNIT	The measurement unit is indicated.
⑥	BATT.1	Remaining power of each set of dry batteries is indicated.
⑦	BATT.2	

3.4.1 Memory

- CT-2000 can store up to 3,000 measurement data in its memory.
- The measurement data is stored block by block, and up to 100 blocks can be stored.
- The data stored in memory can be recalled for display on the monitor section and for reprinting by the printer as many times as necessary, before it is erased or the POWER switch is turned off.
- When the number of data stored in memory reaches 3,000, new measurement will be printed out but will not be stored in memory for later recall.
  When the bib No. input device is connected to CT-2000, new measurement will be neither printed out nor stored in memory.

* For the method of clearing data in memory, refer to【6.6 How to Clear Data in Memory】on P. 46.

3.4.2 Memory Block

- The measurement data obtained from the start of the timer until it is stopped and reset is stored in memory as one block of data.
- The block No. is assigned to each block automatically, and the data can be recalled and reprinted by designating the corresponding block No.
- Up to 100 blocks can be stored in memory, and the block No. is assigned from “1” in the order of measurement.
- When the block No. reaches 100, new measurement data will not be stored in memory.
- If the timer is started but no measurement is made until it is stopped and reset, no data is stored in memory, and the block No. will not be incremented.

(Example)

Total number of data in memory	1・・・100	101・・・300	301・・・500	・・・	・・・3,000 (the last data in memory)
Block No.	1	2	3	・・・	100 (the last block in memory)

3.4.3 Measurement Mode

- Eight types of measurement modes are available.
- The number of the measurement mode currently in use is indicated on the monitor section.

Measurement Mode No.	Measurement Mode
1	Counting Mode
2	Parallel Counting Mode
3	Parallel Lap/Split Time Measurement Mode
4	Parallel Delayed Start Mode
5	Time Correction Mode (inputting time difference from start time)
6	Auto Measurement-1 Mode
7	Auto Measurement-2 Mode
8	Speed Measurement Mode

* For details, refer to【5. MEASUREMENT MODE】on P. 22.

3.4.4 TIME UNIT

- 10 types of measurement increments are available.
- The time unit No. of the measurement unit currently in use is indicated on the monitor section.
- The measurement data is stored in memory and printed out using the selected measurement unit.

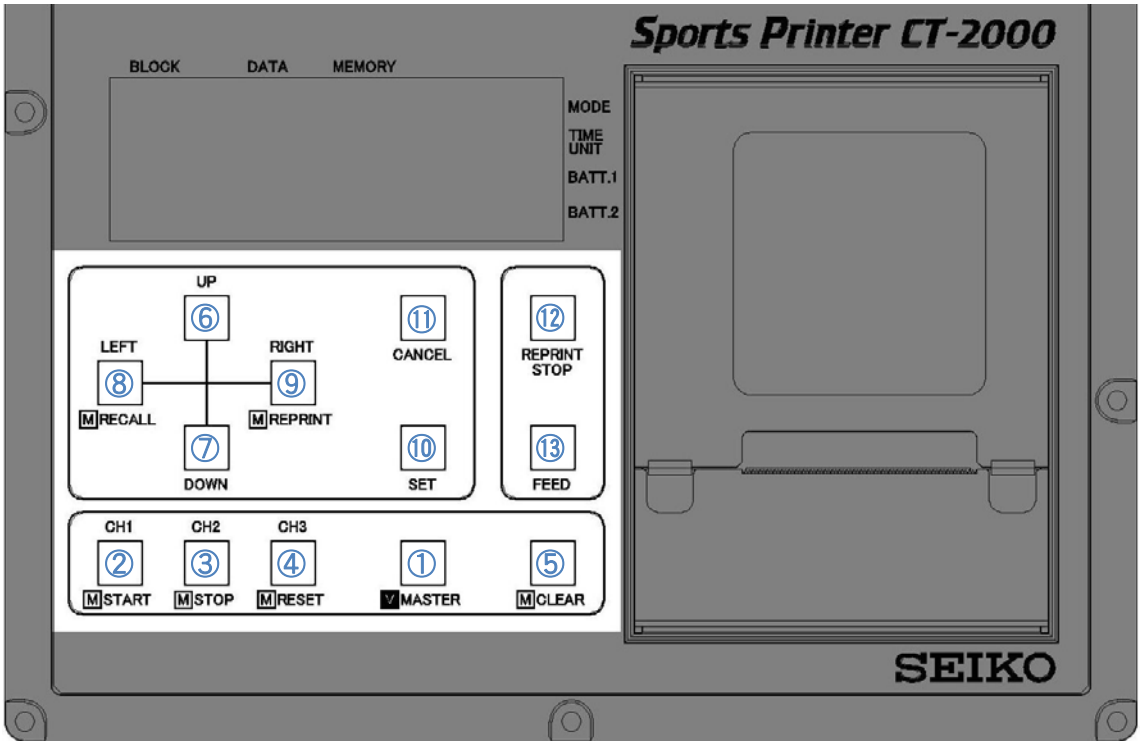
Time Unit No.		Measurement unit of stored/printed data	Method of calculating fraction of a second
0	1/1000s	1/1,000 second	—
1	1/100s (discarding)	1/100 second	1/1000 sec. digit is discarded. (1/1,000 sec. digit is rounded down.)
2	1/100s (raising)		1/1000 sec. digit is discarded, and 1/100 sec. digit is raised by one. (1/1,000 sec. digit is rounded up.)
3	1/100s (rounding off)		1/1,000 sec. digit is rounded off.
4	1/10s (discarding)	1/10 second	1/100 sec. and lower digits are discarded. (1/100 sec. digit is rounded down.)
5	1/10s (raising)		1/100 sec. and lower digits are discarded, and 1/10 sec. digit is raised by one. (1/100 sec. digit is rounded up.)
6	1/10s (rounding off)		1/100 sec. digit is rounded off.
7	1s (discarding)	1 second	1/10 sec. and lower digits are discarded. (1/10 sec. digit is rounded down.)
8	1s (raising)		1/10 sec. and lower digits are discarded, and 1 sec. digit is raised by one. (1/10 sec. digit is rounded up.)
9	1s (rounding off)		1/10 sec. digit is rounded off.

3.4.5 BATT.1, BATT.2 (Remaining Power)

- The remaining power of the dry battery sets BATT. 1 BATT. 2 is indicated.

Indication on monitor	Remaining Battery Power
H	The batteries have sufficient power.
M	The batteries near to their end.
L	Replace the batteries with new ones.
x	The battery power has depleted completely, or no battery is installed.

3.5 Operation Section



No.	Name	Function
①	M MASTER	Pressing it alone will not work. It works when being pressed simultaneously with another button.
②	M START	By pressing this button while keeping “MASTER” pressed, the timer starts.
	CH1	Press this button alone to input CH1 signal.
③	M STOP	By pressing this button while keeping “MASTER” pressed, the timer stops.
	CH2	Press this button alone to input CH2 signal.
④	M RESET	By pressing this button while keeping “MASTER” pressed, the timer is reset.
	CH3	Press this button alone to input CH3 signal.
⑤	M CLEAR	By pressing this button while keeping “MASTER” pressed, the display to clear data in memory appears. * For details, refer to【6.6 How to Clear Data in Memory】on P. 46.
⑥	UP	By pressing this button while keeping “MASTER” pressed in the Time Correction Mode, the time difference from the scheduled start time can be input. * For details, refer to【5.5 Time Correction Mode (Measurement Mode No. 5】on P. 30.
		Use this button to set items. (Increasing or advancing the value)
⑦	DOWN	Use this button to set items. (Decreasing or moving back the value)

No.	Name	Function
⑧	M RECALL	By pressing this button while keeping “MASTER” pressed, the mode changes to “Recall”. * For details, refer to【6.4 Memory Recall】on P. 44.
	LEFT	When setting items, press this button to move the cursor to left.
⑨	M REPRINT	By pressing this button while keeping “MASTER” pressed, the mode changes to “Reprint”. * For details, refer to【6.5 Reprinting Data in Memory】on P. 45.
	RIGHT	When setting items, press this button to move the cursor to right.
⑩	SET	When setting items, press this button to register the setting you have made.
⑪	CANCEL	By pressing this button while keeping “MASTER” pressed, the display to select measurement mode appears. * For details, refer to【4. SETTING PROCEDURE】on P. 17.
		When setting items, press this button to cancel the setting you have made.
⑫	REPRINT STOP	Press this button to stop printout while reprinting data. * For details, refer to【6.5 Reprinting Data in Memory】on P. 45.
⑬	FEED	Press this button to fee the paper.

* By sliding LOCK switch to “ON” position, all the buttons except “FEED” are disabled.
For details, refer to【6.7 LOCK Switch】on P. 47.

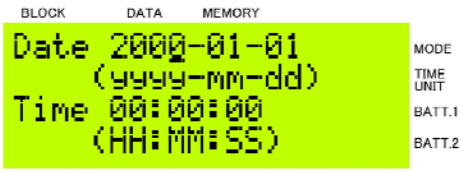
4. SETTING PROCEDURE

4.1 Time/Calendar Setting

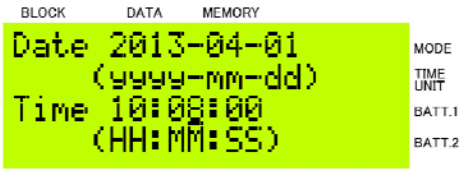
① Turn on “POWER” switch. The initial display appears.



② The time/calendar setting display is shown.



③ Set the year, month, date, hour, minute and second digits.



Press UP or DOWN to set the time/calendar digits.

Press RIGHT or LEFT to move the cursor to the digits to be adjusted.

(M REPRINT / M RECALL)

Press SET to register the setting you have made.

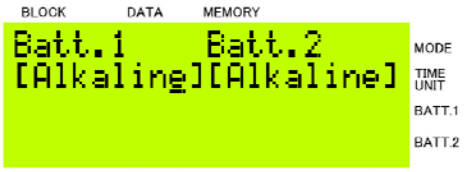
The registered time/calendar setting is retained inside CT-2000.

* When “POWER” switch is turned on, the time/calendar you registered previously is shown. Set the time/calendar newly each time you turn on the power.
* To change the setting you have registered, be sure to turn off “POWER” switch, and then, turn it on again to follow the procedure above.

4.2 Dry Battery Setting

① The dry battery setting display is shown.

After the time/calendar is registered, the display changes over to the dry battery setting display automatically.



② Set the type of dry batteries to be used.

The battery type can be selected from alkaline dry battery [Alkaline] and nickel-metal hydride rechargeable battery [Ni-MH].



Press UP or DOWN to select the battery type.

Press RIGHT (M REPRINT) or LEFT (M RECALL) to move the cursor to select the battery type.

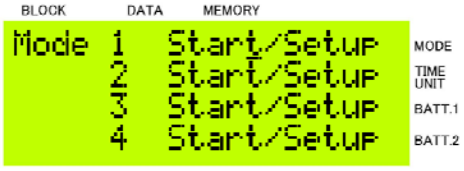
Press SET to register the setting you have made.

The registered dry battery setting is retained inside CT-2000.

* Even when only the AC adapter is used, be sure to make the dry battery setting above. In that case, select [Alkaline] or [Ni-MH] as desired.

③ To change the dry battery setting:

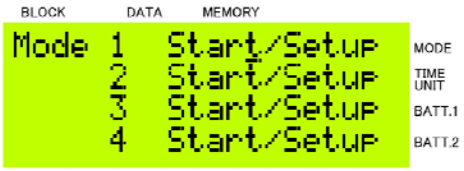
Press CANCEL while the measurement mode setting display is shown. The dry battery setting display will appear.



4.3 Measurement Mode Setting

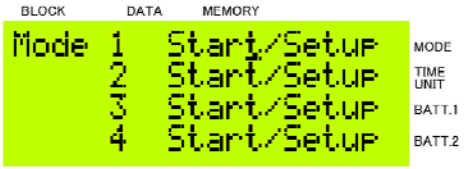
① The measurement mode selection display is shown.

After the dry battery setting is registered, the display changes over to the measurement mode selection display automatically.

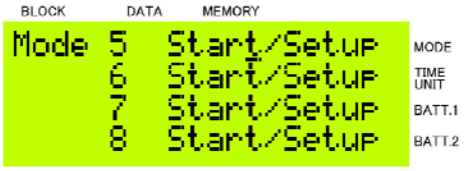


② Move the cursor to select the desired measurement mode.

Press UP , DOWN , RIGHT M REPRINT or LEFT M RECALL to move the cursor to [Setup] of the measurement mode you wish to use.



Press SET to register the setting you have made.



③ Set the items available for the selected measurement mode.

Press UP or DOWN to set the item.

Press RIGHT M REPRINT or LEFT M RECALL to move the cursor.

Press SET to register the setting you have made, and the next setting item appears.

Press CANCEL to return to the previous setting item.

After the setting of all the available setting items is completed, the display returns to the measurement mode selection display.

4.3.1 List of Setting Items Available for Each Measurement Mode

The setting items marked with "✓" are available for the respective measurement modes.

The registered settings are retained inside CT-2000.

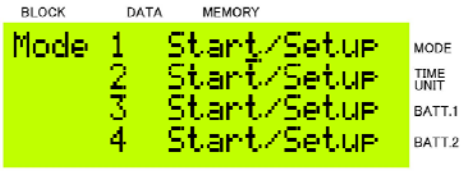
No.	Setting item	Measurement Mode No.								Setting value	Remarks
		1	2	3	4	5	6	7	8		
1	Measurement unit [Time Unit]	✓	✓	✓	✓	✓	✓	✓		0 ～ 9	Refer to P. 14.
2	Baud rate of data output [Baud Rate]	✓	✓	✓	✓	✓	✓	✓		9600 bps / 19200 bps	
3	Count up/down from set time [Direction of Count]	✓	✓	✓						Up / Down	
4	Auto countup after countdown to "0" [Auto Countup after 0]	✓	✓	✓						On / Off	Settable when [Down] is selected in No.3.
5	Interval of sync signal output [Sync Signal Output]	✓	✓	✓	✓					Per Minute / Per Second	"Per Minute" is built-in in No.5.
6	Buzzer when CH signal is input [CH Signal Beep]	✓	✓	✓	✓	✓	✓	✓	✓	On / Off	
7	Data output to printer [Printing]	✓	✓	✓	✓	✓	✓	✓	✓	Enable / Disable	
8	Space between print lines [Line Space]	✓	✓	✓	✓	✓	✓	✓	✓	Normal / Wider	
9	Use of bib No. input device [Bib No. Input Device]	✓			✓	✓				On / Off	
10	Display on scoreboard during countdown [Countdown Display]					✓				Enable / Disable	For master CT-2000 only
11	Resting time of interval training [Interval Duration]						✓	✓		0M10S ～ 59M59S	
12	Use of starting cue [Starting Cue]						✓	✓		On / Off	
13	The number of laps covered [Number of Laps]							✓		1 ～ 99	
14	Use of sound to signal final lap [Final Lap Signal]							✓		On / Off	
15	Type of time data output to scoreboard [Display of Data]			✓			✓	✓		Split / Lap	Data displayed on scoreboard
16	Speed measurement unit [Speed Unit]								✓	km/h / mph / m/s	
17	The number of PBUs set [Number of PBUs]								✓	1 ～ 10	
18	Distance between PBUs [PBU-PBU Distance]								✓	1.0 ～ 100.0m	Set for each pair of PBUs set in No.17.
19	Normal speed range (km/h) [Normal Range of km/h]								✓	1 ～ 1000km/h	Effective if [km/h] is selected in No.16.
20	Normal speed range (mph) [Normal Range of mph]								✓	1 ～ 600mph	Effective if [mph] is selected in No.16.
21	Normal speed range (m/s) [Normal Range of m/s]								✓	1 ～ 250m/s	Effective if [m/s] is selected in No.16.
22	Use of measurement timeout [Measurement Timeout]								✓	On / Off	

* When the normal speed range has been set, the printout has a marking if the measured speed is outside the specified range.

4.4 How to Start Each Measurement Mode

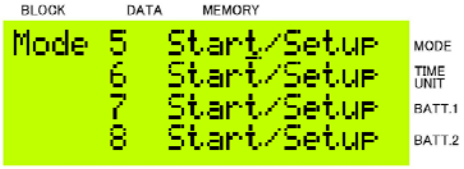
① Move the cursor in the measurement mode selection display.

Press UP , DOWN , RIGHT M REPRINT or LEFT M RECALL to



move the cursor to [Start] of the measurement mode you wish to use.

Press SET to register the setting you have made.



② To change the measurement mode:

Check that the timer of each measurement mode is stopped, and press CANCEL while keeping M MASTER pressed. The measurement mode selection display will appear.

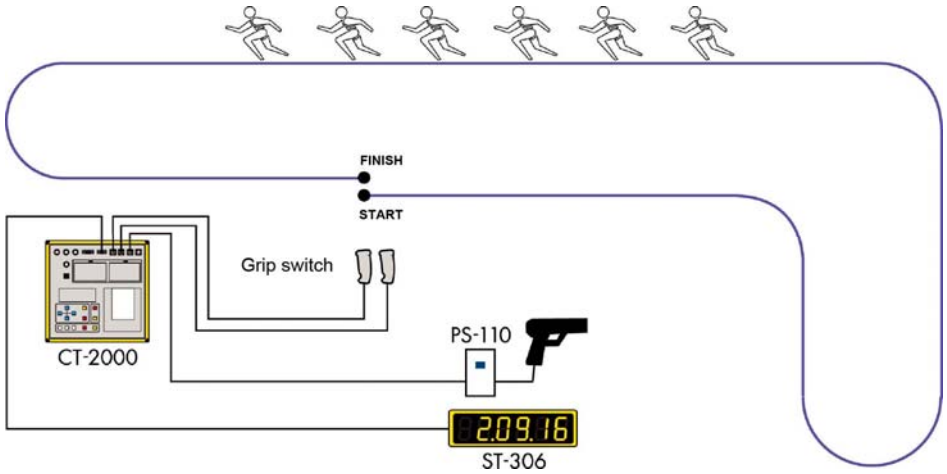
5. MEASUREMENT MODE

5.1 Counting Mode (Measurement Mode No. 1)

5.1.1 Features

- This measurement mode is suitable for such sports events as track races, marathon, cycle road races, and Nordic ski races.
- Order of arrival and split time are printed out each time a measurement is made from the start to the finish.
- Order of arrival is printed out from 0001 to 9999, but the measurement can be continued after the arrival of the 9,999th racer with the order of arrival being counted from 0000 (9999 → 0000 → 0001 → 0002). When a bib No. input device is used, however, the order of arrival is printed out up to 3000.
- Order of arrival is printed out from 0001 in order of signal input irrespective of the channel through which the signal is input. It is possible, therefore, for one timekeeper to have two grip switches, one in each hand, and input signals arbitrarily from either of them.
- By using an input extension unit, up to 10 CH signals can be input.*
- By using a bib No. input device, the measurement times and the corresponding bib No. can be printed out together.*
- Running time (time elapsed from the start) and split time measured can be displayed on the scoreboard (ST-306, etc.).*

* Input extension unit, bib No. input device and scoreboard are available as options.



5.1.2 Operating Method

①Start the timer.

Input a start signal from an external device, or

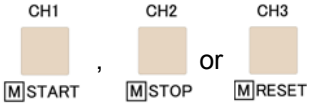
press while keeping  pressed

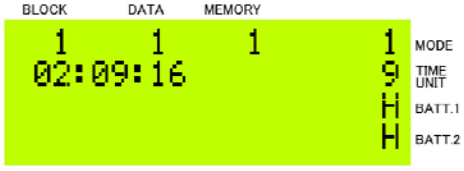
to start the timer.



②Measure the time.

Input a CH signal from a grip switch, or press

 , or to measure the time.



③Stop the timer.

Press CH2 (M STOP) while keeping (M MASTER) pressed to stop the timer.

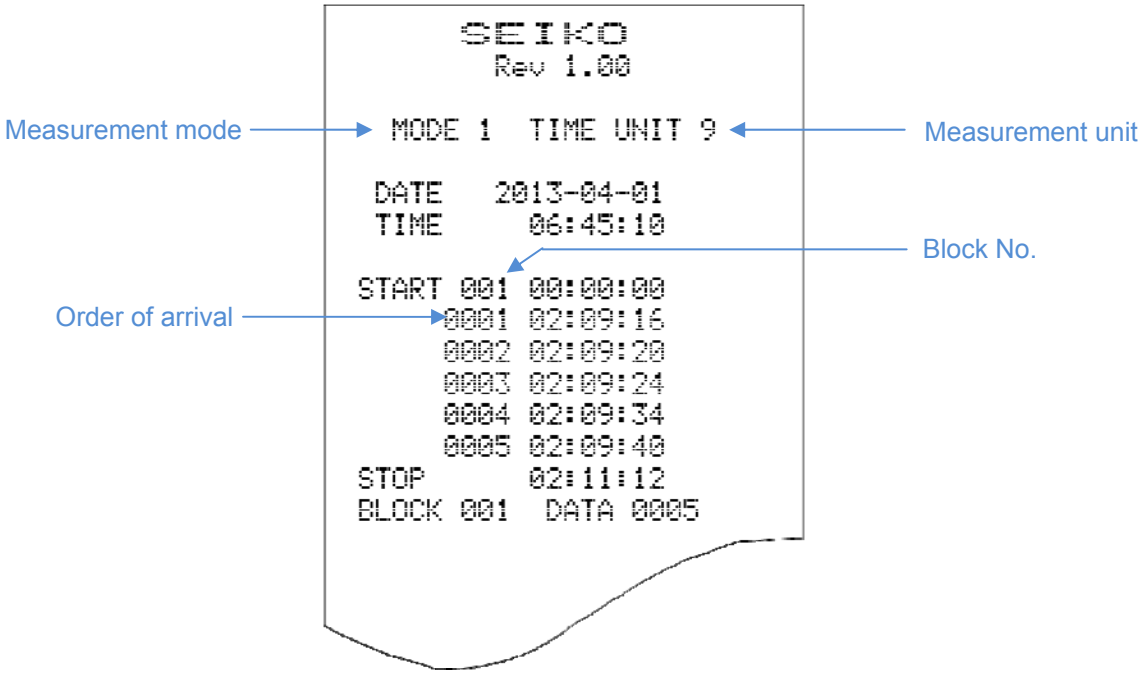
Before the timer is reset, stop and reset of the timer can be repeated as many times as necessary with the measurement data being stored in the same block No.

④Reset the timer.

Press CH3 (M RESET) while keeping (M MASTER) pressed to stop the timer.

When the timer is reset, the display returns to the one shown in Step ① above, and the block No. is incremented by one.

5.1.3 Example Printout

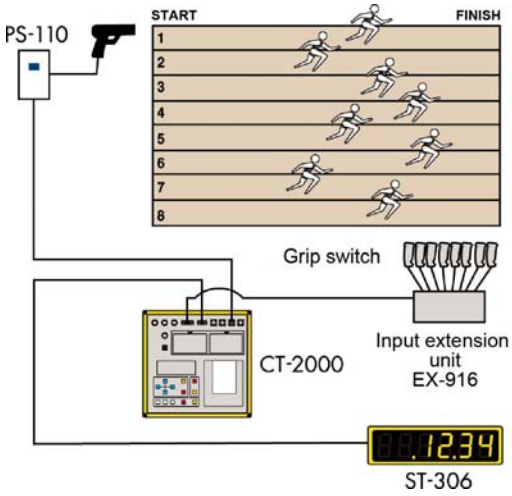


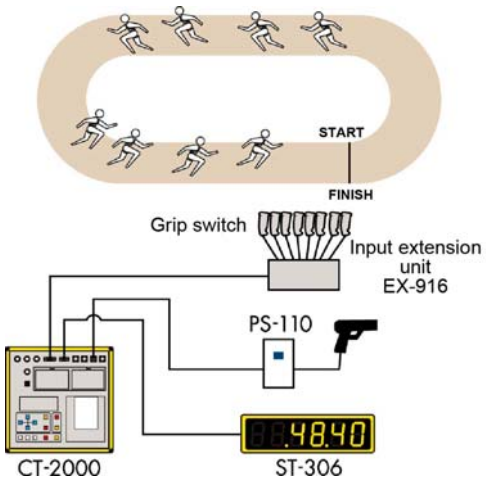
5.2 Parallel Counting Mode (Measurement Mode No. 2)

5.2.1 Features

- This measurement mode is suitable for such sports events as track races, marathon, swimming, cycle road races, speed skating, and boat and canoe races.
- Split time can be measured lane by lane (or racer by racer).
- Lane No. (that is, CH No.), number of laps, and split time are printed out.
- By using an input extension unit, up to 10 CH signals can be input.*
- Running time (time elapsed from the start) and split time measured can be displayed on the scoreboard (ST-306, etc.).*

* Input extension unit and scoreboard are available as options.





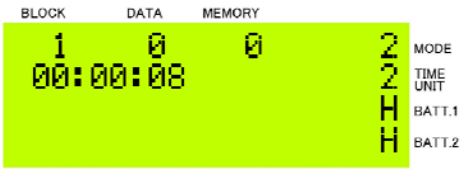
5.2.2 Operating Method

①Start the timer

Input a start signal from an external device, or

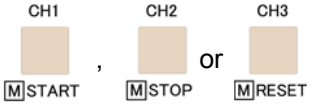
press while keeping  pressed

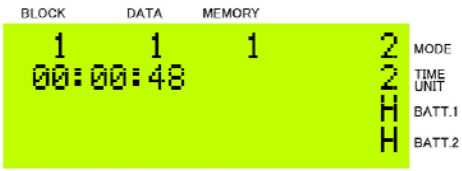
to start the timer.



②Measure the time.

Input a CH signal from a grip switch, or press

 to measure the time.



③Stop the timer.

Press  while keeping  pressed to stop the timer.

Before the timer is reset, stop and reset of the timer can be repeated as many times as necessary with the measurement data being stored in the same block No.

④Reset the timer.

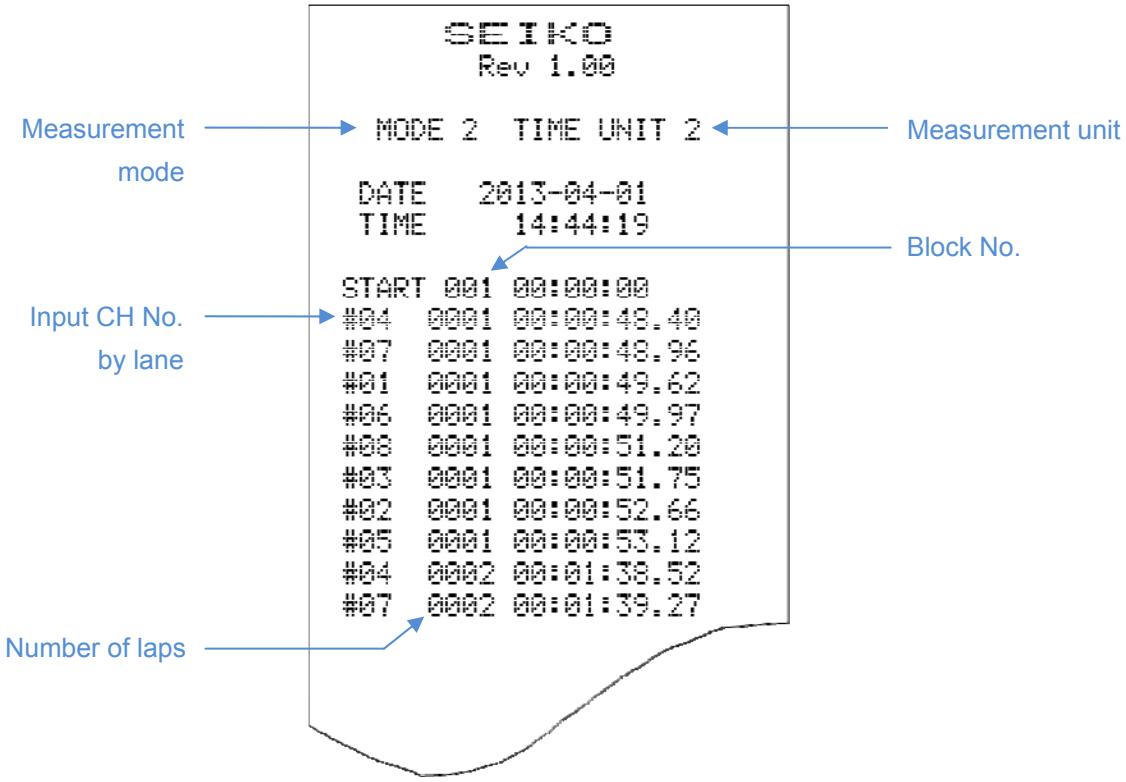
Press 

while keeping 

pressed to stop the timer.

When the timer is reset, the display returns to the one shown in Step ① above, and the block No. is incremented by one.

5.2.3 Example Printout

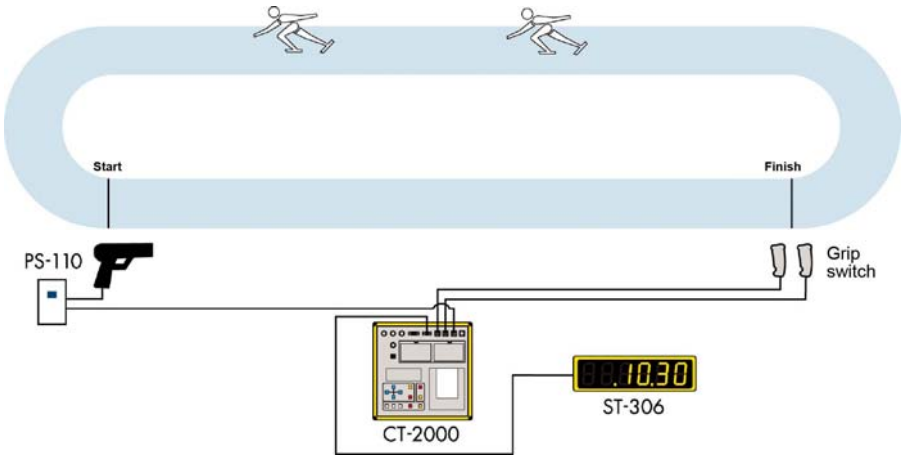


5.3 Parallel Lap/Split Time Measurement Mode (Measurement Mode No. 3)

5.3.1 Features

- This measurement mode is suitable for such sports events as track races, swimming, cycle road races, speed skating and motor sports.
- Lap times and split times can be measured lane by lane (or racer by racer).
- Lane No. (that is, CH No.), number of laps, lap time and split time are printed out.
- By using an input extension unit, up to 10 CH signals can be input.*
- Running time (time elapsed from the start) and lap or split time measured can be displayed on the scoreboard (ST-306, etc.).*

* Input extension unit and scoreboard are available as options



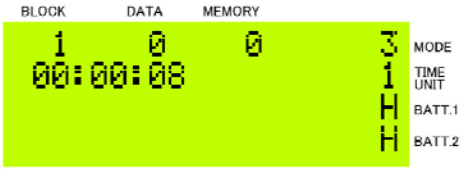
5.3.2 Operating Method

①Start the timer.

Input a start signal from an external device, or

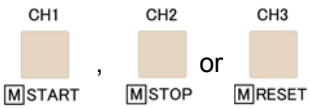
press  while keeping  pressed

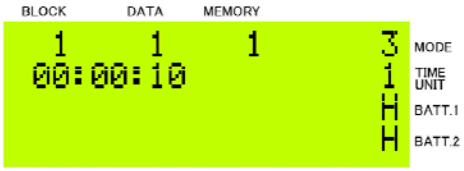
to start the timer.



②Measure the time.

Input a CH signal from a grip switch, or press

 to measure the time.



③Stop the timer.

Press  while keeping  pressed to stop the timer.

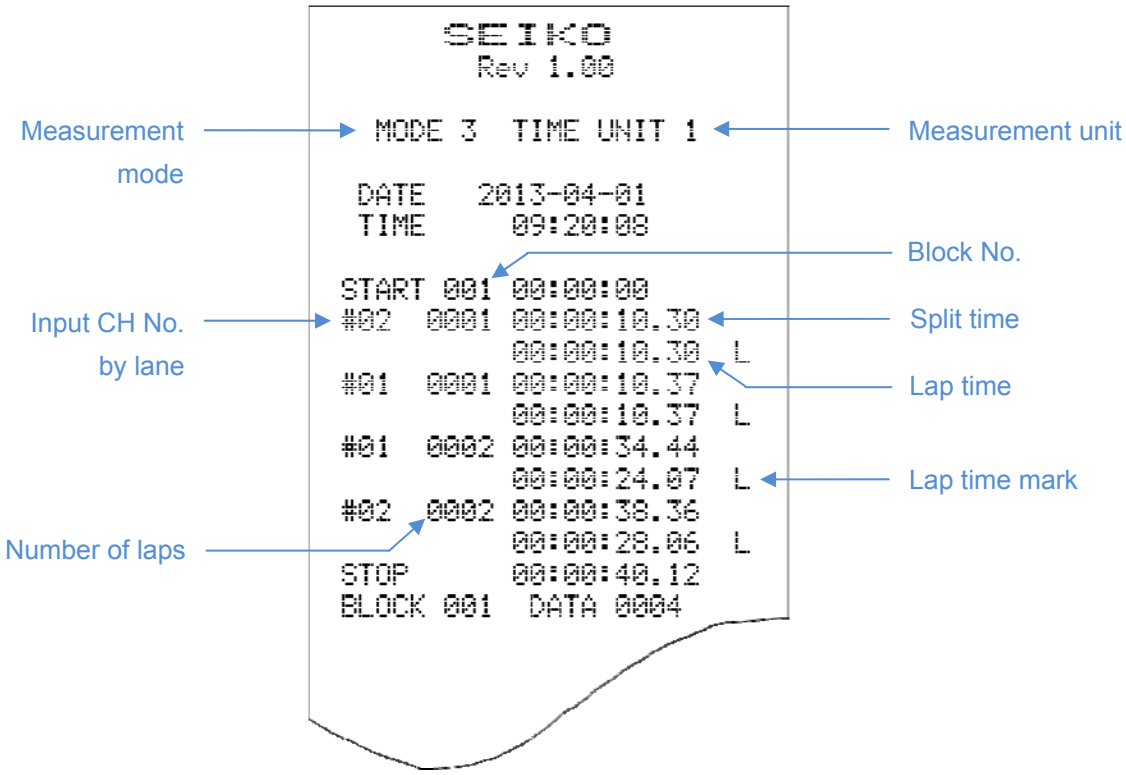
Before the timer is reset, stop and reset of the timer can be repeated as many times as necessary with the measurement data being stored in the same block No.

④Reset the timer.

Press CH3 M RESET while keeping M MASTER pressed to stop the timer.

When the timer is reset, the display returns to the one shown in Step ①above, and the block No. is incremented by one.

5.3.3 Example Printout

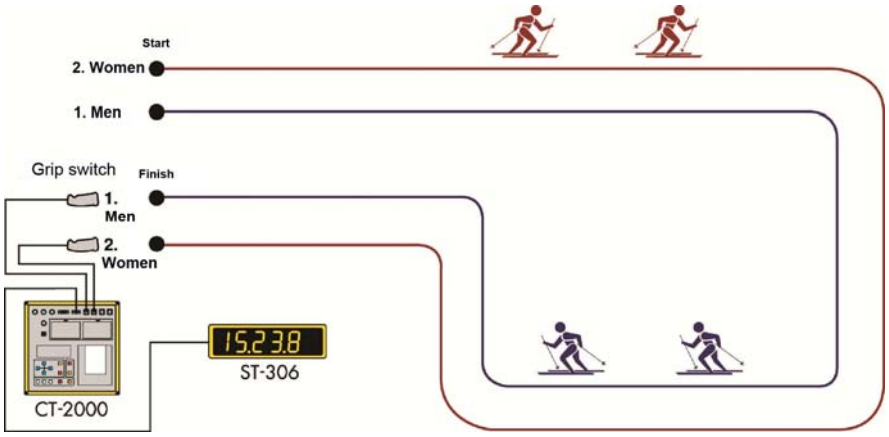


5.4 Parallel Delayed Start Mode (Measurement Mode No. 4)

5.4.1 Features

- This measurement mode is suitable for such sports events as marathon and Nordic ski races.
- Time measurement of each racer can be made in a race where not all the racers start at the same time but they start at different times at certain intervals.
- Different time measurements can be made according to the start times.
- The timer is started by inputting, at the start time, a CH signal corresponding to the group No. (CH No.) .
  The start time is recorded group by group (CH by CH). (No start signal is input.)
- Group No., finish time (current time at the finish line), order of arrival and split time are printed out as classified by the start time.
- By using an input extension unit, up to 10 CH signals can be input.*
- By using a bib No. input device, the measurement times and the corresponding bib No. can be printed out together.*
- Running time (time elapsed from the start) and split time measured can be displayed on the scoreboard (ST-306, etc.).*

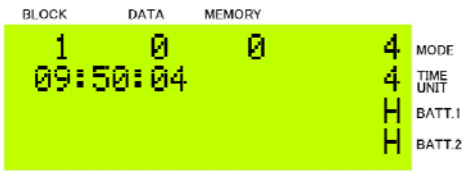
  * Input extension unit, bib No. input device and scoreboard are available as options.



5.4.2 Operating Method

①The timer counts on the basis of the current time.

As the Parallel Delayed Start Mode is started, the timer starts counting on the basis of the current time.



②Input a CH signal that corresponds to the group No. to start the measurement.

Input a CH signal from a grip switch corresponding to the group No., or press



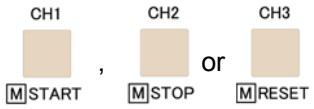


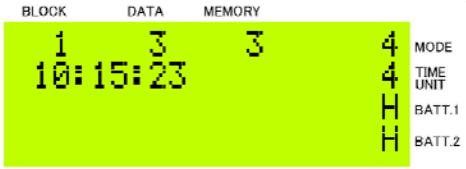
, or to start the measurement.

* Do not start the measurement by inputting an external start signal, or pressing [START] while keeping [MASTER] pressed.

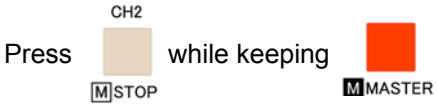
③ Measure the time.

Input a CH signal from a grip switch, or press

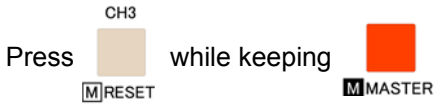




④ Stop the timer.

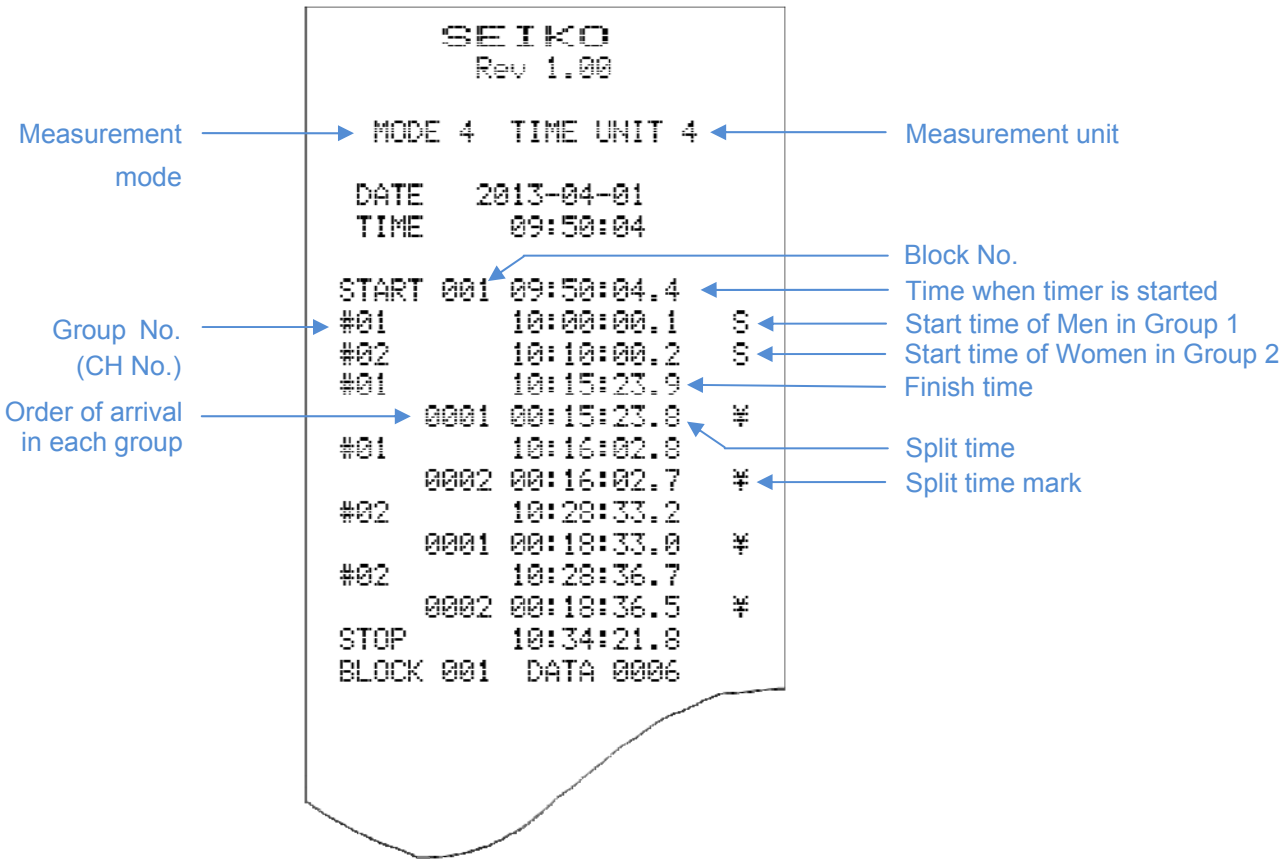


⑤ Reset the timer.



When the timer is reset, the display returns to the one shown in Step ① above, and the block No. is incremented by one.

5.4.3 Example Printout

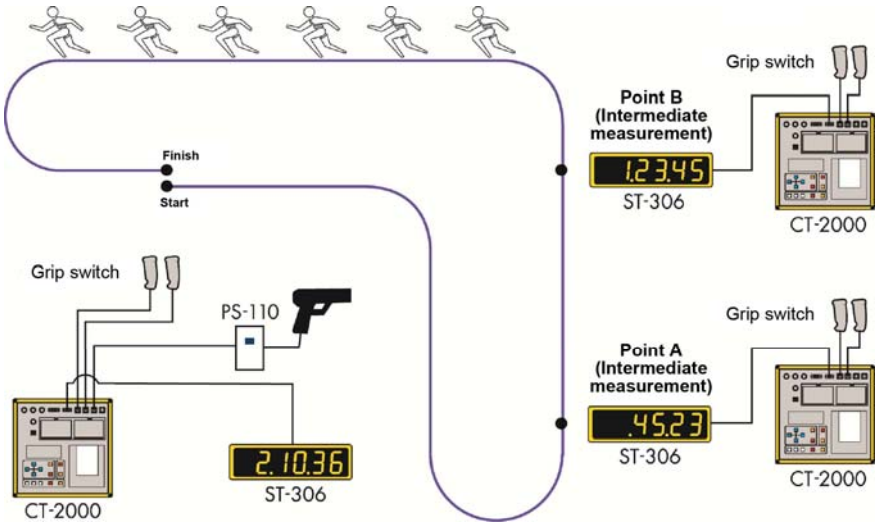


5.5 Time Correction Mode (Measurement Mode No. 5)

5.5.1 Features

- This measurement mode is designed to measure the times at intermediate points on the course in such sports events as marathon and Nordic ski races.
- The CT-2000 placed at the start point (Master) and the other units of CT-2000 placed at some intermediate measurement points (Secondary) can be synchronized.
- Scheduled start time can be set in advance.
- It is possible to input the time difference between the scheduled and actual start times into the Secondary units of CT-2000.
- Order of arrival and split time can be printed out.
- By using a bib No. input device, the measurement times and the corresponding bib No. can be printed out together.*
- By using an input extension unit, up to 10 CH signals can be input.*
- Running time (time elapsed from the start) and split time measured can be displayed on the scoreboard (ST-306, etc.).*

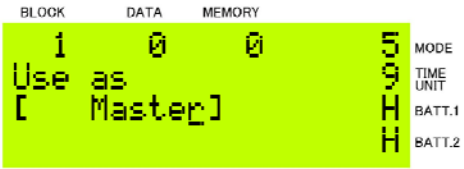
  * Bib No. input device, input extension unit and scoreboard are available as options.



5.5.2 Operating Method (Master Unit)

①Designate the CT-2000 unit as Master.

Press UP or DOWN to select [Master], and press SET to register the setting.



②Synchronize the Secondary CT-2000 units with the Master.

Connect the Secondary units with the Master using the sync cables, and synchronize the Secondary units with the Master. After checking that synchronization has been achieved disconnect the sync cables.

* The sync signal is output to all units of CT-2000 when the minute digits of the current time is incremented irrespective of whether they are designated as [Master] or [secondary].

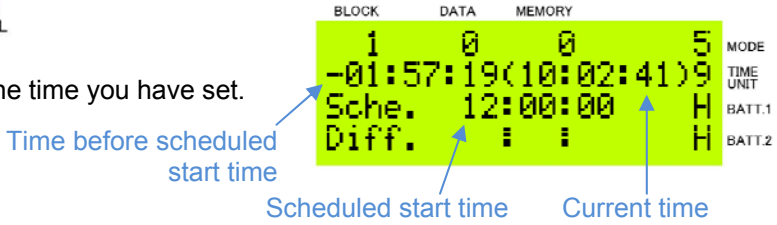
③Set the scheduled start time.

Press UP or DOWN to set the time digits.

Press RIGHT (M REPRINT) or LEFT (M RECALL) to move the cursor.

Press SET to register the time you have set.





④Input a start signal.

Input a start signal from an external device, or press CH1 (M START) while keeping M MASTER pressed.

* Start signal can be input starting from 30 seconds before the scheduled start time. If a start signal is input before that, [TEST] is printed out to indicate that the timer is ready for the input of a start signal.
* By disabling [Countdown display], countdown of time before start will not be displayed on the scoreboard. For the setting procedure, refer to【4.3 Measurement Mode Setting】on P. 19.

⑤The difference between the scheduled and actual start times is calculated.

The difference between the time when the start signal is input and the scheduled start time (“Diff.”) is calculated and displayed.



* If the actual start time is earlier or later than the scheduled start time, “-” or “+” is attached before the time difference, respectively.

⑥Measure the time.

Input a CH signal from a grip switch, or press CH1 (M START), CH2 (M STOP) or CH3 (M RESET) to measure the time.



* Time measurement cannot be made before the start signal has been input.

⑦ Stop the timer.

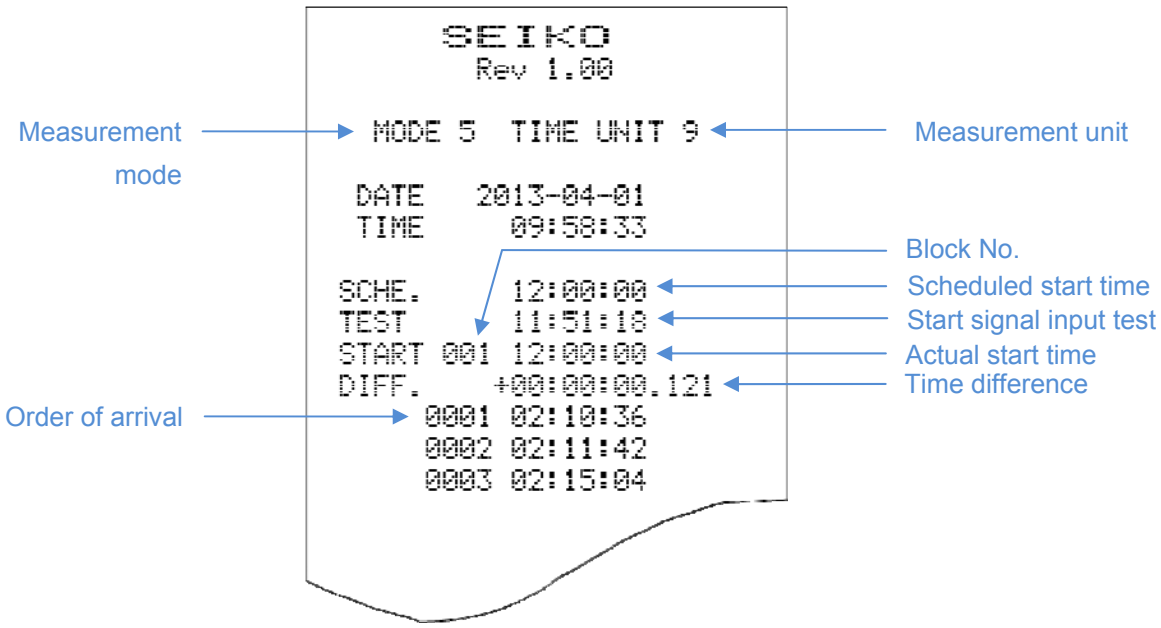
Press CH2 (M STOP) while keeping M MASTER pressed to stop the timer.

⑧ Reset the timer.

Press CH3 (M RESET) while keeping M MASTER pressed to stop the timer.

When the timer is reset, the display returns to the one shown in Step ① above, and the block No. is incremented by one.

5.5.3 Example Printout (Master Unit)



5.5.4 Operating Method (Secondary Unit)

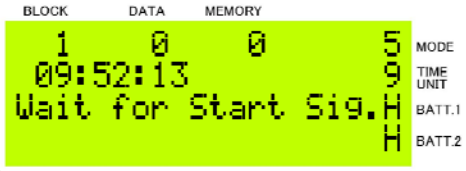
①Designate the CT-2000 unit as Secondary unit.

Press UP or DOWN to select [Secondary], and press SET to register the setting.

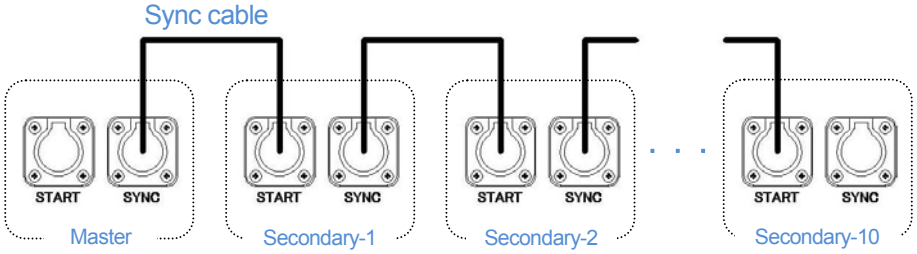


②Synchronize Secondary units with Master. The current time displayed will be corrected.

Connect the sync cables with [START] connectors, and synchronize the Secondary units with Master.



* Up to 10 Secondary units can be synchronized with each output of a sync signal.



A sync signal is output every minute from Master, and the time of Secondary unit that has received it is corrected during a minute between the 30th second of a minute and the 29th second of the next.

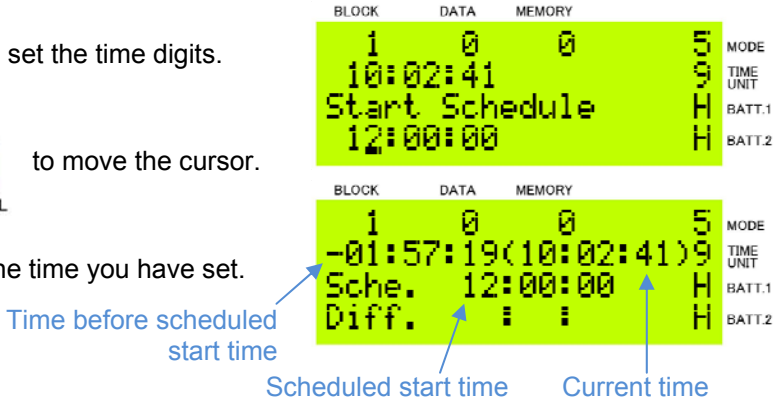


③ Set the scheduled start time.

Press UP or DOWN to set the time digits.

Press RIGHT (M REPRINT) or LEFT (M RECALL) to move the cursor.

Press SET to register the time you have set.



④Input the difference between the scheduled and actual start time.

Input the time difference ("Diff.") calculated in Master.

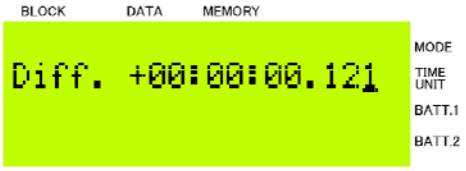
Press UP while keeping M MASTER pressed.



The display to input the time difference will appear.

Press UP or DOWN to set the time digits.

Press RIGHT (M REPRINT) or LEFT (M RECALL) to move the cursor.



Press SET to register the time difference you have set.

⑤ Measure the time.

Input a CH signal from a grip switch, or press CH1 (M START), CH2 (M STOP) or CH3 (M RESET) to measure the time.



* Time measurement cannot be made before the scheduled start time.

⑥ Stop the timer.

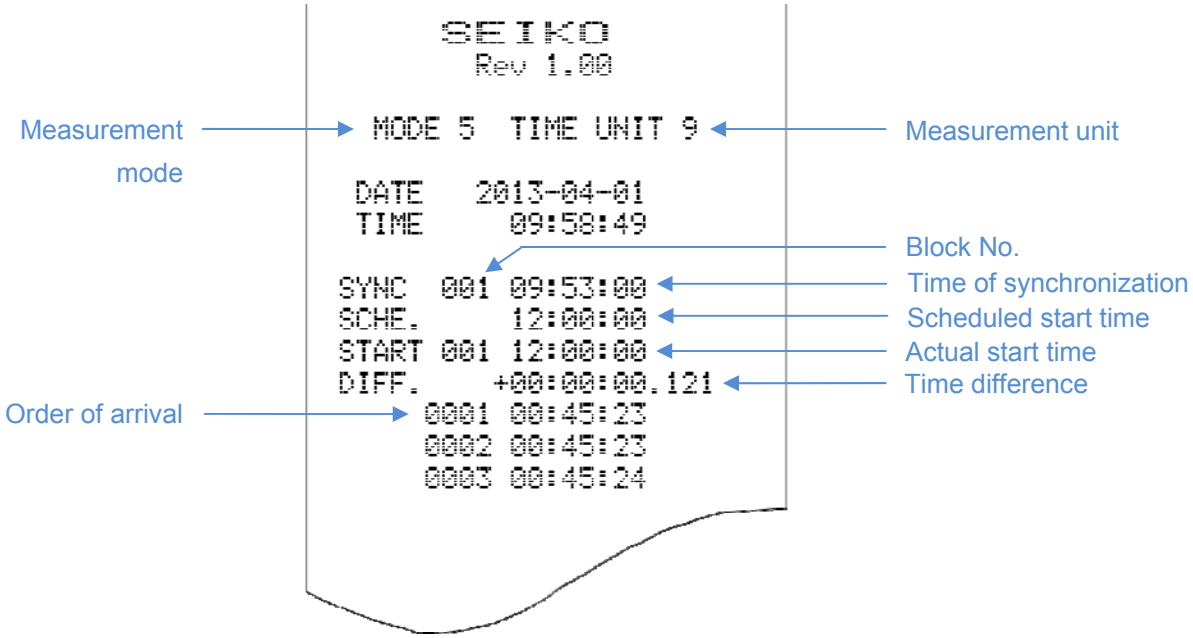
Press CH2 (M STOP) while keeping M MASTER pressed to stop the timer.

⑨ Reset the timer.

Press CH3 / MRESET while keeping MMASTER pressed to stop the timer.

When the timer is reset, the display returns to the one shown in Step ① above, and the block No. is incremented by one.

5.5.5 Example Printout (Secondary Unit)

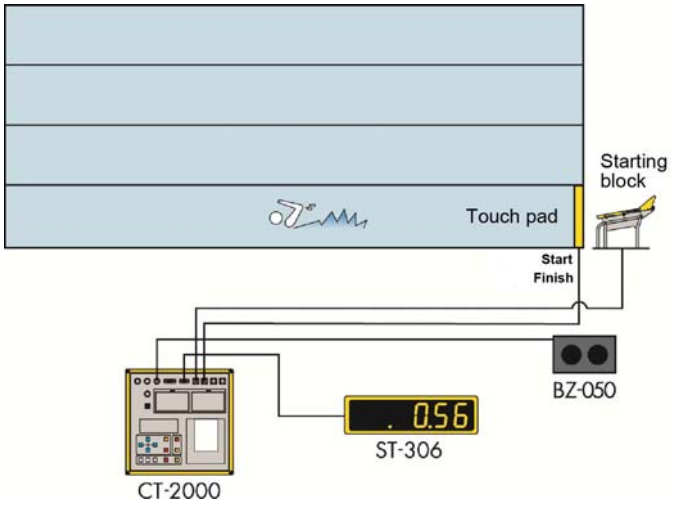


5.6 Auto Measurement-1 Mode (Measurement Mode No. 6)

5.6.1 Features

- This measurement mode is designed mainly for measurement in individual practice performed alone.
- A start sound can be generated at a random interval after a starting cue corresponding to “Take your marks.” *
- New measurement starts automatically after the interval time you have set has elapsed.
- The interval between the previous and new measurements (start interval) can be set within the range from 10 seconds up to 59 minutes and 59 seconds.
- Reaction time (time after the start sound until swimmer’s feet have left the starting block), lap time, split time are measured and printed out.*
- Connect the starting block measuring reaction time with CH1, and the touch pad measuring lap and split times with CH2.*
- Reaction time, and lap or split time can be displayed on the scoreboard (ST-306, etc.).*

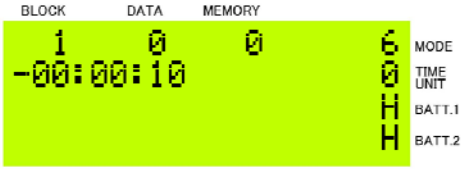
* Optional devices are required.



5.6.2 Operating Method

①Start Auto Measurement-1 Mode.

Press CH1 M START while keeping M MASTER pressed.



Auto Measurement-1 Mode starts.

②The starting cue sounds automatically.

The starting cue sounds approximately 10 seconds after the Mode starts.

* If the starting cue is turned off, it will not sound even if the Mode is started.
For the setting procedure, refer to【4.3 Measurement Mode Setting】on P. 19.

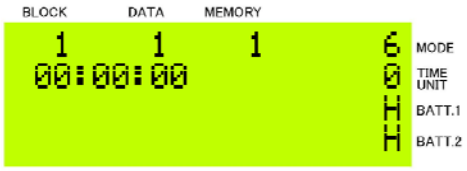
③The start sound is generated automatically.

The start sound is generated at a random interval of 3±1 seconds after the starting cue, and the timer starts automatically.



④Reaction time is calculated.

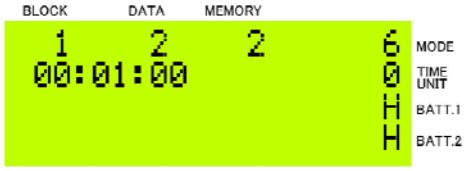
The time elapsed after the start sound until swimmer's feet have left the starting block connected to CH1 is calculated.



* For 5 seconds after the reaction time is measured, lap/split time measurement cannot be made.

⑤Lap/split times are measured.

The touch pad connected with CH2 measures lap/split times.



* For 5 seconds after a lap/split time is measured, new lap/split time measurement cannot be made.

⑥New measurement starts automatically.

New measurement starts automatically after the interval time you have set has elapsed.

* For the setting procedure, refer to【4.3 Measurement Mode Setting】on P. 19.

* New measurement starts while the previous time measurement is in progress or the touch pad did not measure any lap/split time.

⑦Stop the timer.

Press CH2 (M)STOP while keeping (M)MASTER pressed to stop the timer.

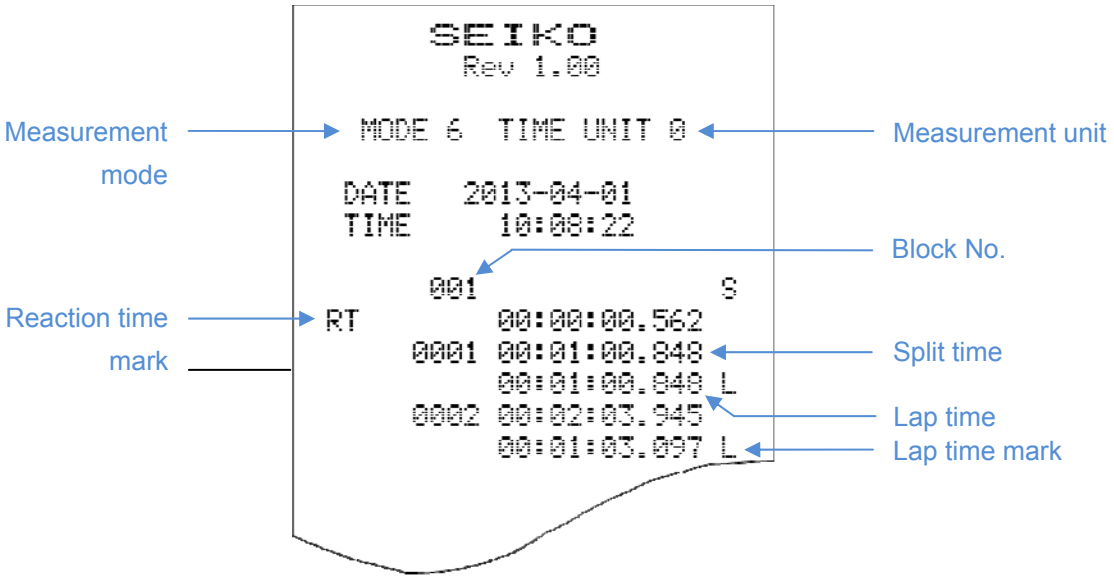
Before the timer is reset, stop and reset of the timer can be repeated as many times as necessary with the measurement data being stored in the same block No.

⑧Reset the timer:

Press CH3 (M)RESET while keeping (M)MASTER pressed to stop the timer.

When the timer is reset, the display returns to the one shown in Step ① above, and the block No. is incremented by one.

5.6.3 Example Printout

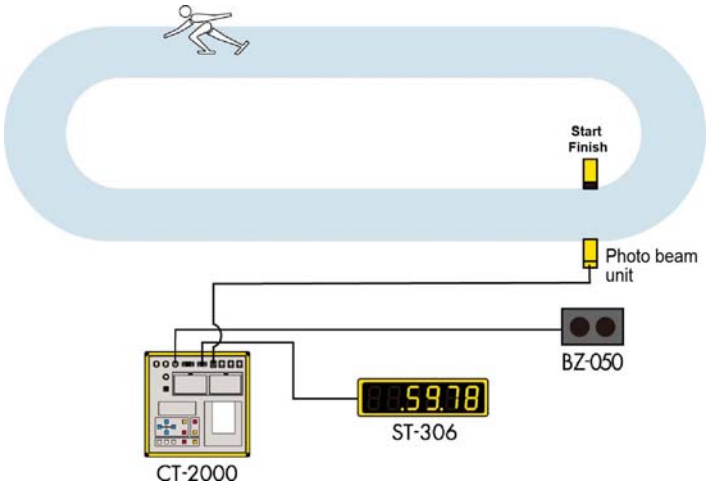


5.7 Auto Measurement-2 Mode (Measurement Mode NO. 7)

5.7.1 Features

- This measurement mode is designed for measurement in individual practice of sports events that require lap/split time measurement.
- A start sound can be generated at a random interval after a starting cue corresponding to "Take your marks." *
- New measurement starts automatically after the interval time you have set has elapsed.
- The interval between the previous and new measurements (start interval) can be set within the range from 10 seconds up to 59 minutes and 59 seconds.
- Lap time and split time are measured and printed out lap by lap.
- The number of laps can be set within the range from 1 to 99.
- Connect the photo beam unit to measure time with CH1.*
- Lap or split time can be displayed on the scoreboard (ST-306, etc.).*

* Optional devices are required.



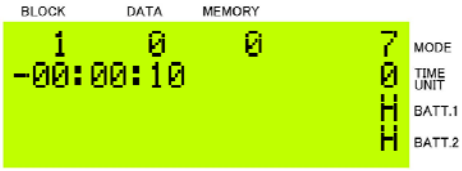
5.7.2 Operating Method

① Start Auto Measurement-2 Mode.

Press 

while keeping 

pressed.



Auto Measurement-2 Mode starts.

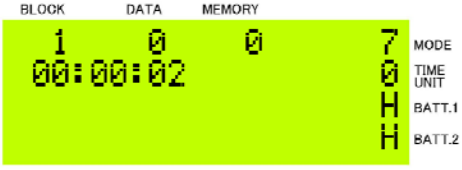
②The starting cue sounds automatically.

The starting cue sounds approximately 10 seconds after the Mode starts.

* If the starting cue is turned off, it will not sound even if the Mode is started.
For the setting procedure, refer to【4.3 Measurement Mode Setting】on P. 19.

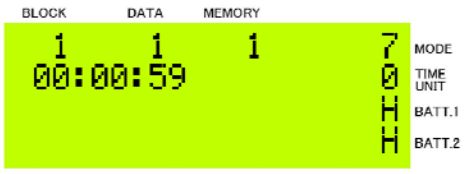
③The start sound is generated automatically.

The start sound is generated at a random interval of 3±1 seconds after the starting cue, and the timer starts automatically.



④Lap/split times are measured.

The photo beam unit connected with CH1 measures lap/split times.



* For 5 seconds after the timer starts counting and after a lap/split time is measured, new lap/split time measurement cannot be made.

⑤A sound to signal the final lap rings.

When the final lap starts, a sound to signal the final lap is generated.

* If the final lap signal is turned off, the sound will not be generated.
For the setting procedure, refer to【4.3 Measurement Mode Setting】on P. 19.

⑥New measurement starts automatically.

New measurement starts automatically after the interval time you have set has elapsed.

* For the setting procedure, refer to【4.3 Measurement Mode Setting】on P. 19.
* New measurement starts while the previous time measurement is in progress or the touch pad did not measure any lap/split time.

⑦Stop the timer.

Press 

while keeping 

pressed to stop the timer.

Before the timer is reset, stop and reset of the timer can be repeated as many times as necessary with the measurement data being stored in the same block No.

⑧Reset the timer:

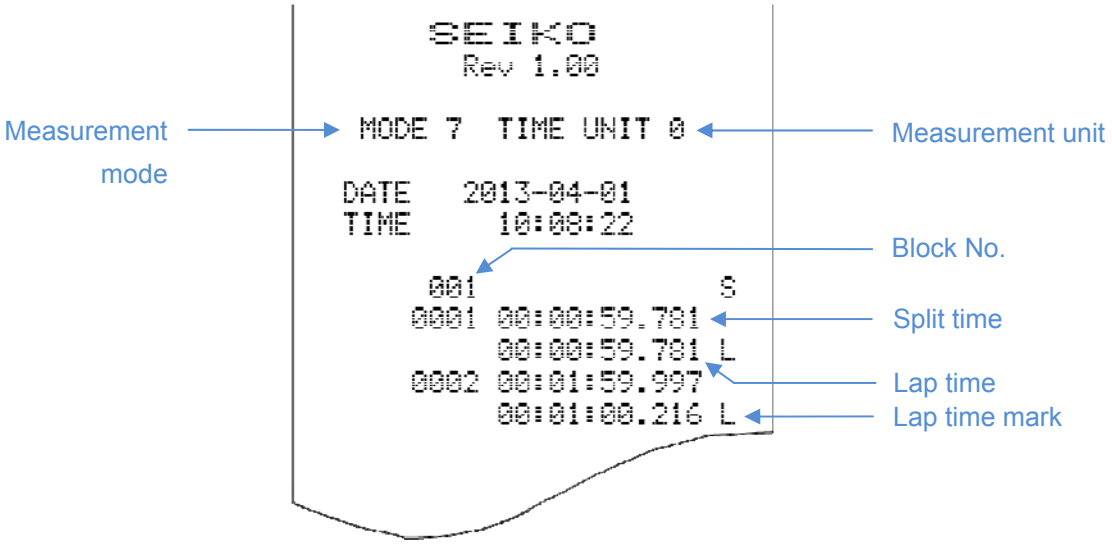
Press 

while keeping 

pressed to stop the timer.

When the timer is reset, the display returns to the one shown in Step ① above, and the block No. is incremented by one.

5.7.3 Example Printout

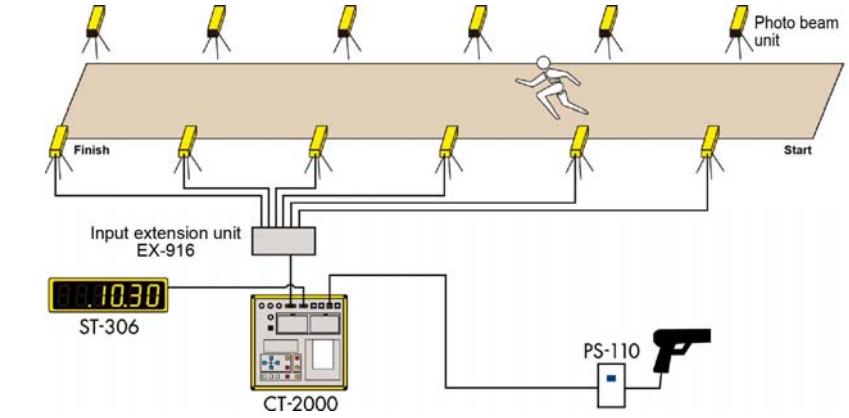


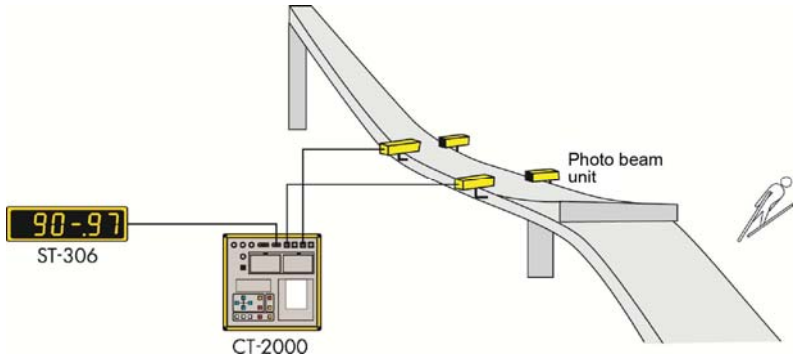
5.8 Speed Measurement Mode (Measurement Mode No. 8)

5.8.1 Features

- The average speed in a given section of the entire distance is measured.
- The distance of the measurement section can be set from 1 m to 100 m in 10-cm increments.
- Up to 10 measurement sections can be set. Connect the photo beam units placed toward the finish point with the connectors in order of [START], [CH1], [CH2] - - - [CH10].*
- The measurement unit of speed can be selected from km/h, m/s and mph (miles per hour).
- If there is no input CH signals during 3 seconds after a start signal, can be set to timeout measurement.
- The speed measured is printed out.
- The normal speed range can be set. If the speed below the lower limit ([min]) or above the upper limit ([max]) is measured, the speed measurement on the printout is marked with [S] or [F], respectively.
- The speed measured can be displayed on the scoreboard (ST-306, etc.).*

* Optional devices are required.

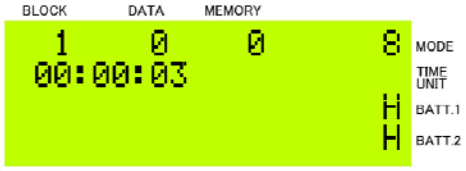




5.8.2 Operating Method

①Input START signal.

The timer starts when a signal is input from the photo beam unit that is connected with [START] connector.



②The speed is measured.

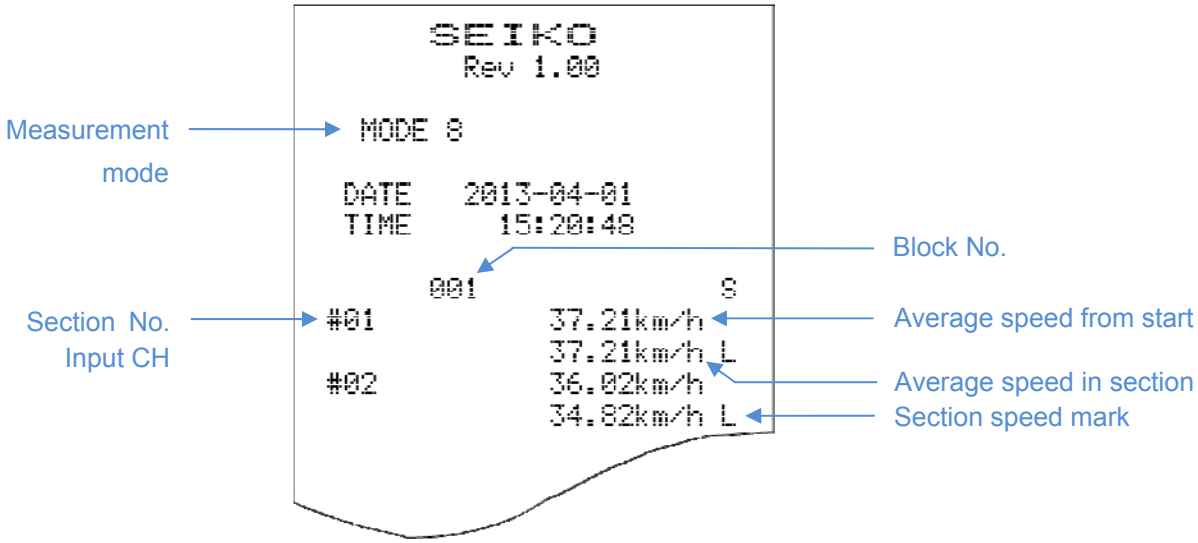
The speed is measured when a signal is input from each of the photo beam units connected with respective CH connectors.

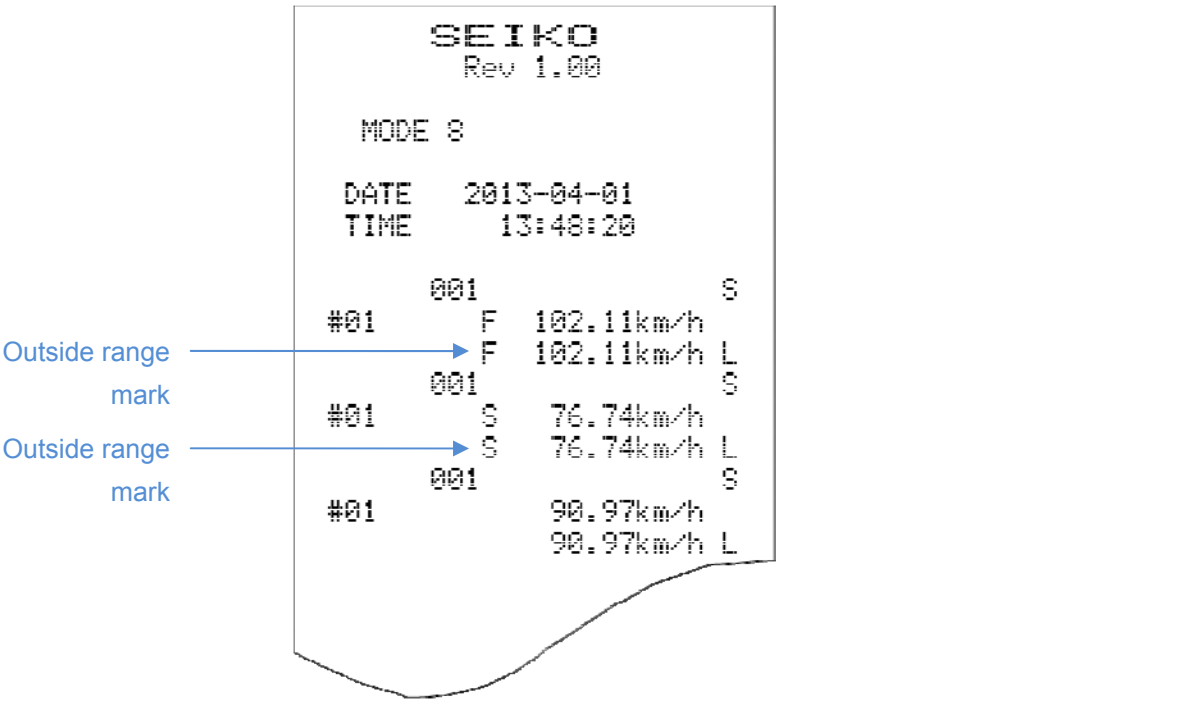


The average speeds in the distance from the start to a given section and in such section only are measured.

* If the speed below the lower limit ([min]) or above the upper limit ([max]) of the normal speed range you have set is measured, the speed measurement on the printout is marked with [S] or [F], respectively.
For the setting procedure, refer to【4.3 Measurement Mode Setting】on P. 19.

5.8.3 Example Printout





* The lower limit ([min]) and the upper limit ([max]) of the normal speed range is set to 80 km/h and 100 km/h, respectively.

6. OTHER FUNCTIONS

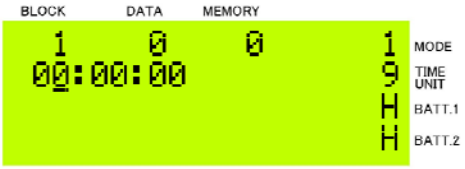
6.1 Start Time Setting

- Start time other than “0” second can be set.
- This function is available in the following measurement modes:
  - · Counting Mode (Measurement Mode No. 1)
  - · Parallel Counting Mode (Measurement Mode No. 2)
  - · Parallel Lap/Split Time Measurement Mode (Measurement Mode No. 3)

6.1.1 Operating Method

①Set the start time.

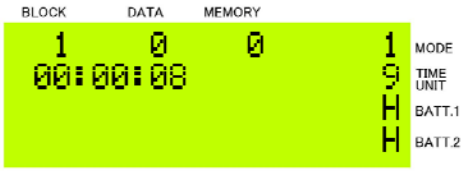
Before starting the timer, press UP or DOWN to set the time digits.



Press RIGHT (M REPRINT) or LEFT (M RECALL) to move the cursor.

②Start the timer.

Input a start signal from an external device, or press CH1 (M START) while keeping M MASTER pressed to start the timer.



* When the start time other than “0” second is set and [Down] is selected as the method of counting after the set time, the timer counts down the set time until “0” second.
For the setting procedure, refer to【4.3 Measurement Mode Setting】on P. 19.

* While the timer is counting down, time measurement cannot be made.

6.2 Resetting Order of Arrival

- While the timer is counting, the order of arrival can be reset to increment from "0001" as many times as necessary.
- This function is convenient when only one unit of CT-2000 is used to measure times at more than one points such as intermediate and finish points.
- This function is available in the following modes:
  - · Counting Mode (Measurement Mode No. 1)
  - · Parallel Counting Mode (Measurement Mode No. 2)
  - · Parallel Lap/Split Time Measurement Mode (Measurement Mode No. 3)
  - · Parallel Delayed Start Mode (Measurement Mode No. 4)
  - · Time Correction Mode (inputting time difference from start time) (Measurement Mode No. 5)

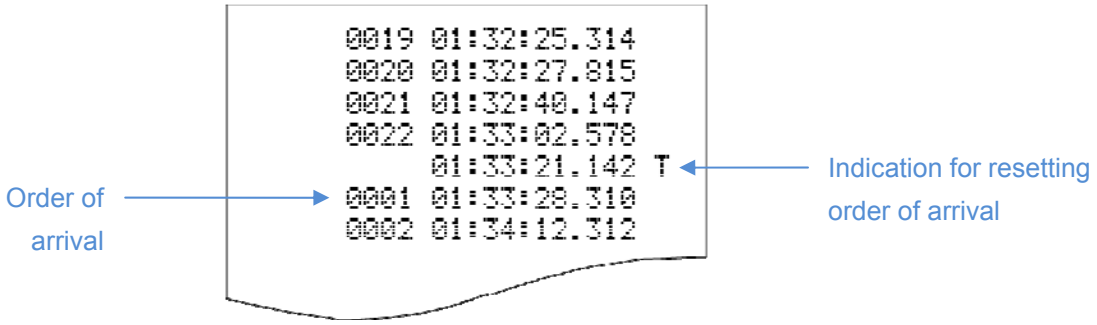
6.2.1 Operating Method

While the timer is counting, press 

while keeping 

pressed to reset the order of arrival to "0001."

6.2.2 Example Printout



6.3 Inputting Bib No.

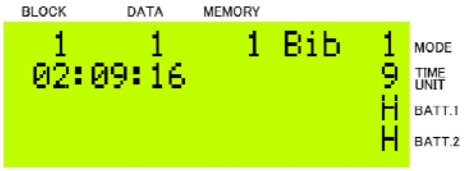
- By using a bib No. input device, measured times and bib Nos. can be printed out together.
- This function is available in the following modes:
  - · Counting Mode (Measurement Mode No. 1)
  - · Parallel Delayed Start Mode (Measurement Mode No. 4)
  - · Time Correction Mode (inputting time difference from the start time) (Measurement Mode No. 5)

* For the setting procedure, refer to【4.3 Measurement Mode Setting】on P. 19.
* Please note that, when a bib No. input device is used with CT-2000, up to 3,000 measurement data can be stored in memory or printed out.

6.3.1 Operating Method

① Measure the time.

Input a CH signal from a grip switch, or press CH1 (M START), CH2 (M STOP) or CH3 (M RESET) to measure the time.



When a time measurement is made, “Bib” is displayed.

② Input a bib No.

When the bib No. is input, the bib No. and the corresponding measurement data is printed out together.

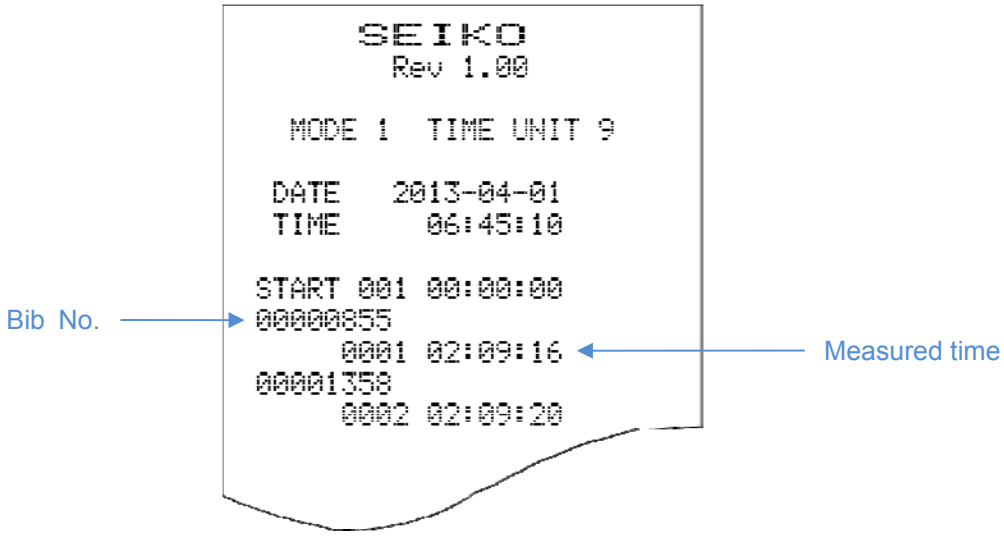
* The time measured will not be printed out until the bib No. is input.
* One bib No. can be input in advance before the time measurement is made. If more than one bib No. is input, the one input last is retained.

To skip input of bib No.:

Press CANCEL while keeping M MASTER pressed.

The measured time is printed out without bib No.

6.3.2 Example Printout



6.4 Memory Recall

● The measurement data stored in memory can be recalled and checked on the display of the monitor section.

* When no data is stored in memory, or while the timer is counting in any of the measurement modes, the memory recall function is disabled.

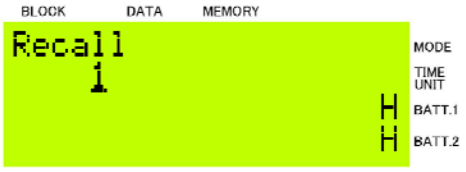
6.4.1 Operating Method

①Activate the Memory Recall Mode.

When the timer is stopped, press LEFT / M RECALL while keeping M MASTER pressed. The Memory Recall Mode will be activated.

②Select the block No. whose data you wish to recall.

Press UP or DOWN to select the block No. whose data you wish to recall.



Block No. is shown one by one in numerical order, and “All” is shown after the last block No. as follows: 1 → 2 → 3 → … → All

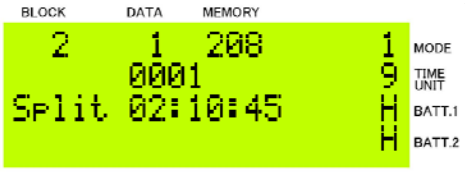
The data in the block No. you have selected can be recalled. By selecting “All”, all the measurement data in memory can be recalled.

Press SET to register the block No. you have selected.

Press CANCEL to return the display to the measurement mode.

③Recall the measurement data.

Press UP or DOWN to recall the measurement data contained in the block No. you have selected.



Press CANCEL to return to the display for selecting a block No.

6.5 Reprinting Data in Memory

● The measurement data stored in memory can be reprinted as necessary.

* When no data is stored in memory, or while the timer is counting in any of the measurement modes, the function to reprint data in memory is disabled.

6.5.1 Operating Method

①Activate the Memory Reprint Mode.

When the timer is stopped, press LEFT / M RECALL while keeping M MASTER pressed. The Memory Reprint Mode will be activated.

②Select the block No. whose data you wish to reprint.

Press UP or DOWN to select the block No. whose data you wish to reprint.



Block No. is shown one by one in numerical order, and “All” is shown after the last block No. as follows: 1 → 2 → 3 → … → All

The data in the block No. you have selected can be reprinted. By selecting “All”, all the measurement data in memory can be reprinted.

Press SET to register the block No. you have selected. The data will be reprinted.

Press CANCEL to return the display to the measurement mode.

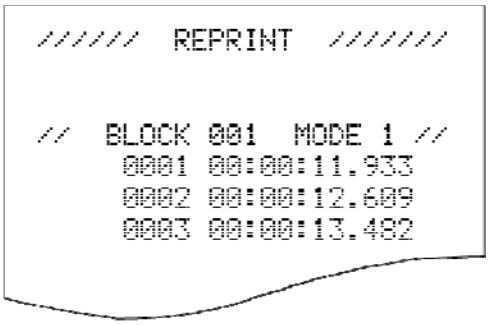
③ To stop reprinting in progress:

When reprinting of all the data in the block you have selected is completed, the display returns to the measurement mode.

To stop reprinting in progress, press REPRINT STOP .



6.5.2 Example Printout



6.6 How to Clear Data in Memory

● The measurement data stored in memory can be cleared.

> * By performing the procedure below, all the measurement data in memory is cleared.
> It is not possible to clear the data one by one or block by block.

6.6.1 Operating Method

①Activate the Memory Clear Mode.

When the timer is stopped, press 

while keeping 

pressed. The Memory Clear Mode will be activated.

To cancel the memory clear operation, press 

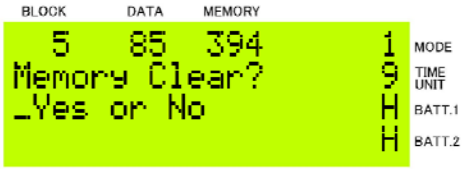
.

②Clear the data in memory.

Press 

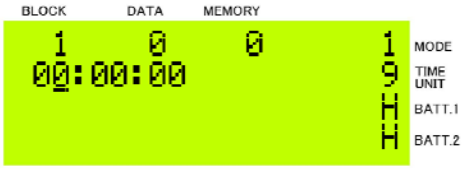
or 

to move the cursor and select [YES].



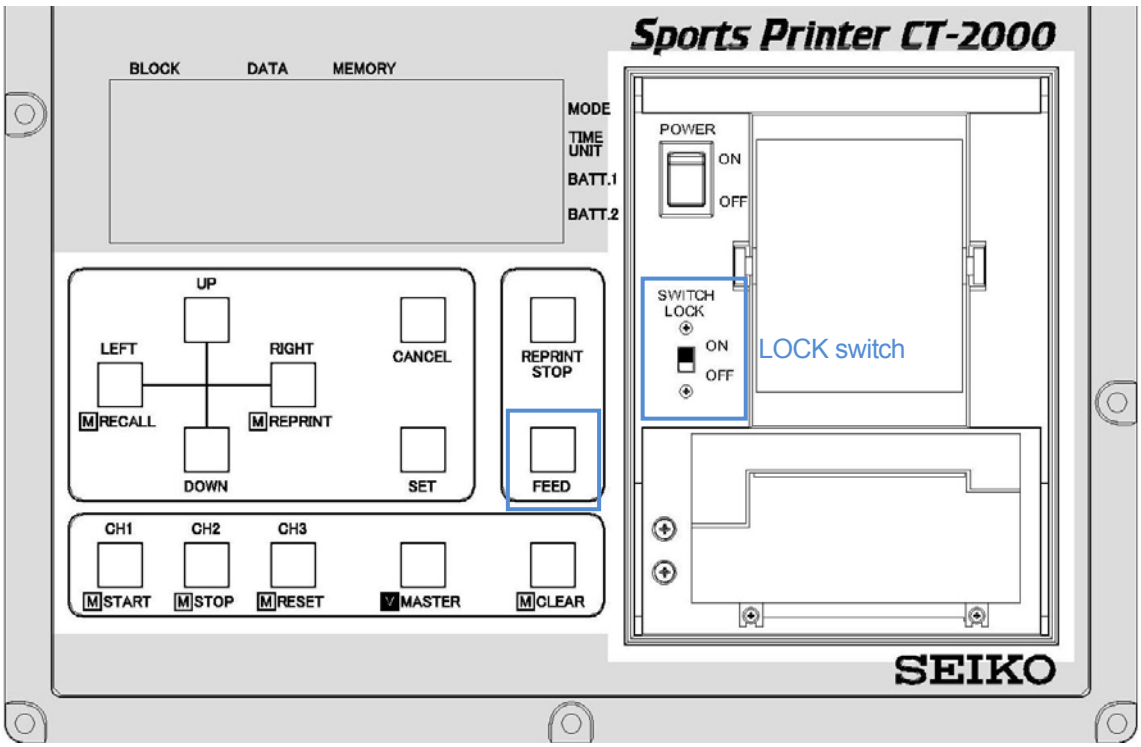
Press 

to clear the data in memory. The display returns to the measurement mode.



6.7 LOCK Switch

- This switch is intended to prevent mistaken operation of the operation buttons.
- By sliding LOCK switch located inside the printer cover to “ON” position, all the buttons except FEED button are disabled.
- While the switch is in “ON” position, START and CH signals can be input from external devices including a grip switch.
- Even while the time measurement is in progress, LOCK switch can be ON or OFF.



6.8 SYNC (Synchronization)

- By outputting a synchronization signal from SYNC connector, more than one unit of CT-2000 can be synchronized.
- Synchronization is achieved via a start signal.
- This function is available in the following measurement modes:
  - · Counting Mode (Measurement Mode No. 1)
  - · Parallel Counting Mode (Measurement Mode No. 2)
  - · Parallel Lap/Split Time Measurement Mode (Measurement Mode No. 3）
  - · Time Correction Mode (inputting time difference from the start time) (Measurement Mode No. 5）

* For the synchronization in Time Correction Mode (inputting time difference from start time), refer to【5.5 Time Correction Mode 】on P. 30.
* Up to 10 units of CT-2000 can be synchronized with each output of a sync signal.

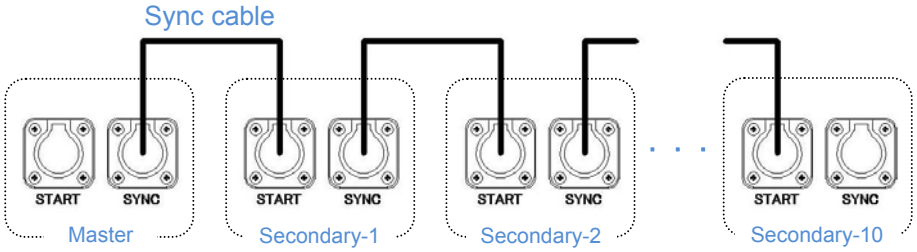
6.8.1 Method of Synchronization via Start Signal

①Set the start time.

Set the same start time on all the units of CT-2000.

②Connect all the units of CT-2000 with sync cables.

Before inputting a start signal, connect all the units of CT-2000 with sync cables as shown below.



③Input a start signal into Master unit.

The start signal input into Master unit is output from SYNC connector to synchronize all Secondary units.

6.8.2 Method of Synchronization after Start

* Select [Per minute] for the interval between each sync signal output.
  For the setting procedure, refer to【4.3 Measurement Mode Setting】on P. 19.

Ex.) To perform synchronization 5 minutes after start

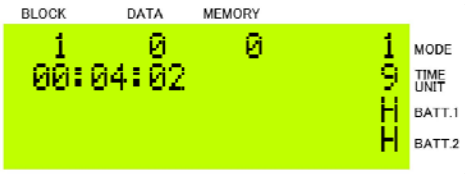
①Set the start time of Secondary units.

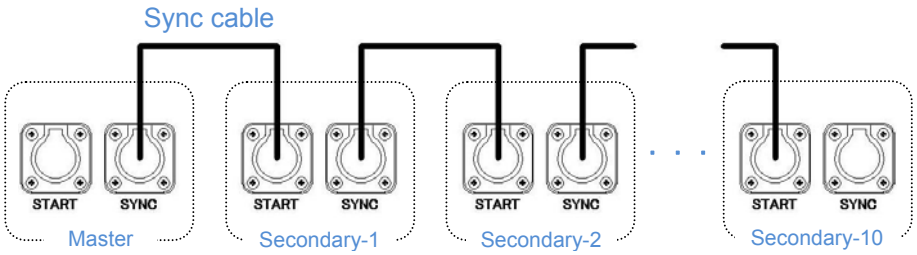
Set the start time of Secondary units to [00:05:00].



②Connect Secondary units with sync cables.

After the timer of Master unit has indicated [00:04:00], connect Secondary units with sync cables.





③A sync signal is output from Master unit.

A sync signal is output from Master unit to synchronize all Secondary units.

6.9 PC DATA (Output of Data to Personal Computer)

- By connecting a personal computer to PC DATA connector using a USB cable, the measurement data can be output to the personal computer.
- Use a cable that supports USB 2.0.
  * USB cable is an option sold separately.
- CT-2000 has a USB Type B connector.

- CT-2000 uses an FTDI USB-serial converter IC, and it is necessary to install a driver on the PC.
  Download, from the FTDI website below, Virtual COM Port Driver (VCP) that supports the OS of the PC, and check that it is installed properly on the PC.
  http://www.ftdichip.com/

- The measurement data is output to the PC when it is measured or reprinted.

6.9.1 Communication Specifications

Interface	USB
Data speed	9600bps
Data length	7 bit
Parity	Even
Stop bit	2 bit
Flow control	None

6.9.2 Data Format

No.	Data content	Value (ASCII)	Details
0	START	STX	
1	UNIT	'X'	Model code
2	MODE	'1'～'8'	Measurement mode No.
3	CODE	'R'	Reset
		'P'	Stop
		' ' (space)	Running
		'G'	Input CH signal
		'C'	Print CH data
		'N'	Print lap time (Parallel Lap/Split Time Measurement Mode)
		'S'	Print start time (Parallel Delayed Start Mode)
		'A'	Time data when CH signal is input (Parallel Delayed Start Mode)
4	CHNO	'0'～'9' or ' '	CH signal No. or number of measurements ' ' (space) when CODE is 'R' or 'P'
5		'0'～'9' or ' '	
6		'0'～'9' or ' '	
7		'0'～'9' or ' '	
8	TIME	'0'～'2'	Tens digit of hour
9		'0'～'9'	Units digit of hour
10		':'	
11		'0'～'9'	Tens digit of minute
12		'0'～'9'	Units digit of minute
13		':'	
14		'0'～'9'	Tens digit of second
15		'0'～'9'	Units digit of second
16		'.'	
17		'0'～'9' or ' '	1/10 second digit ' ' (space) depending on measurement unit setting ' ' (space) when CODE is 'C'
18		'0'～'9' or ' '	1/100 second digit ' ' (space) depending on measurement unit setting ' ' (space) when CODE is 'C'
19		'0'～'9' or ' '	1/1000 second digit ' ' (space) depending on measurement unit setting ' ' (space) when CODE is 'C'
20	DELIMITER	CR	
21	STOP	ETX	

6.9.3 Data Format (Speed)

No.	Data content	Value (ASCII)	Details
0	START	STX	
1	COMMAND	'Z'	
2	SPEED	'0'～'9' or ' '	Hundreds digit
3		'0'～'9' or ' '	Tens digit
4		'0'～'9' or ' '	Units digit
5		'-' or ' '	
6		'0'～'9' or ' '	First decimal place digit
7		'0'～'9' or ' '	Second decimal place digit
8	DELIMITER	CR	
9	STOP	ETX	

7. TROUBLESHOOTING

Problem		Possible cause	Remedy	Refer to
Problem related with power supply	CT-2000 will not start operating when POWER switch is turned ON.	AC adapter is not connected.	Connect AC adapter.	P. 7
		Dry batteries are not installed.	Install dry batteries.	P. 6
	Rechargeable dry batteries run down earlier than expected.	It is due to performance deterioration of rechargeable dry batteries.	Replace rechargeable dry batteries with new ones.	P. 6
	Remaining battery power indicator does not work properly.	Dry batteries of other than specified type are used.	Use batteries of the specified type.	P. 18
Problem related with operation	Operation buttons will not work.	LOCK switch is set at "ON" position.	Set LOCK switch to "OFF" position.	P. 47
	Timer will not start.	Respective operation buttons are not pressed while MASTER button is kept pressed.	Press respective operation buttons while MASTER button is kept pressed.	P. 15
	Timer will not stop.			
	Timer will not be reset.			
	No signal is output from connector section.	Cables are not connected properly.	Connect cables properly.	P. 7
		Other than dedicated cables are used.	Use dedicated cables only.	-
	No signal or data is output from connector section.	Cables are not connected properly.	Connect cables properly.	P. 7
		Other than dedicated cables are used.	Use dedicated cables only.	-
	Data is not displayed on ST-306 scoreboard.	ST-306 has been set wrongly.	Turn off ST-306, and make proper settings.	-
	Measurement data is not output to PC.	A cable in use does not support USB 2.0.	Use a cable that supports USB 2.0.	P. 50
		Driver is not installed on PC.	Install driver on PC.	
		Communication specifications are not set properly on PC side.	Set communication specifications properly on PC side.	
Problem related with printer	CT-2000 will not print.	A setting to disable printing is effective.	Make a setting to enable printing.	P. 20
	Time digits below decimal point (fraction of a second) are printed inappropriately.	TIME UNIT is not set properly.	Set TIME UNIT properly.	P. 14
	Measured times will not be printed out by inputting a CH signal.	"ON" is selected for setting for use of bib No. input device.	Select "OFF" for setting for use of bib No. input device.	P. 19
			Input a bib No.	P. 43
			Skip input of bib No.	
	Characters print faintly.	CT-2000 is used in low temperatures.	Warm ribbon cassette.	-
		Ribbon cassette is depleted or deteriorated.	Replace ribbon cassette with a new one.	P. 11

8. SPECIFICATIONS

Time accuracy	Accuracy of crystal oscillator: ± 1 ppm (at a temperature of 25℃)		
Maximum measurement duration	23 hours, 59 minutes, 59 seconds 999; Start time can also be set in hour, minutes and seconds up to the maximum duration.		
Measurement unit	10 types of calculation methods are available.	Method of calculation	Data and printout
		1/1000 sec. digit is retained	1/1000 sec. increments
		1/1000 sec. digit is rounded down	1/100 sec. increments
		1/1000 sec. digit is rounded up	1/100 sec. increments
		1/1000 sec. digit is rounded off	1/100 sec. increments
		1/100 sec. digit is rounded down	1/10 sec. increments
		1/100 sec. digit is rounded up	1/10 sec. increments
		1/100 sec. digit is rounded off	1/10 sec. increments
		1/10 sec. digit is rounded down	1 sec. increments
		1/10 sec. digit is rounded up	1 sec. increments
		1/10 sec. digit is rounded off	1 sec. increments
Number of input channels	From panel : 3 channels From connectors : 2 channels (up to 10 channels when extension unit is used)		
Number of data storable	Up to 3,000 data contained in up to 100 blocks		
Speed measurement	Distance of section : 1～100 m in 0.1 m increments Measurement unit : km/h, mph and m/s Measurement range : 1～1000 km/h, 1～600 mph, 1～250 m/s Number of input channels : Up to 10 channels when extension unit is used		
Monitor display	Display device : LCD Number of characters : 20 characters x 4 lines Character height : 9.2 mm		
Printer section	Printer type : Dot impact printer (5×7 dot matrix, 24 characters/line) Printing speed : 2.5 lines/ sec. Roll paper : 57.5 ± 0.5 mm (width) × 70 mm (outer diameter) or a smaller size; Plain paper type		
Power supply	1. AC 100 V～AC 240 V (used with AC adapter) 2. Built-in battery (2 sets of 6 AA size dry cells) * Rechargeable type batteries can also be used. 3. External battery (DC12V) *Do not use AC power supply at the same time.		
Battery life	Alkaline dry batter: Approximately 8 hours (at +25℃) Nickel-metal hydride rechargeable battery: Approximately 14 hours (at +25℃) * The above battery lives may be shorter if measurement/printing is performed more than once in 10 seconds.		
Temperature range	During operation	: -5℃～+40℃ (non-condensing) * 0℃～+40℃ for AC adapter	
	During storage	: -15℃～+55℃ (non-condensing)	
External appearance	Outer dimensions	440 (W) × 467 (H) × 120 (D) mm	
	Material	Resin	
Weight	Approximately 5.5kg (excluding batteries)		

If you have any question, inquiry or request for repair regarding the Sports Printer CT-2000, please contact your SEIKO dealer or agent.

SEIKO TIME SYSTEMS INC.

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