



Compact Production Control Indicator

SD-4

Instruction Manual V1.70

Please use this Instruction manual correctly on reading well.
Please keep it carefully to be able to read immediately, when required.

FCC for United States of America

NOTE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

IC for CANADA

This class A digital apparatus compliance with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

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Chapter 1 Before Use

1-1 Introduction

This operation manual contains necessary information for using the product, such as general description, installation, and operation of the product.

Read the manual carefully before using the product. Also, keep it at a safe place for ready reference at anytime.

1-2 Accessories

Mounting fittings: 1 set


Nameplate stickers (Japanese): 1 set

Fixture for wire fixing: 1 piece


1-3 Safety precautions (Be sure to read)

The description here highlights the precautionary matters which must be strictly observed in order to prevent physical harm to the user or other persons and damage to the property.


- The following pictorial symbols are used to classify and explain the criticality levels of harms or damages that may result from using the product in an improper way while ignoring the instructions.


	Caution	The Caution indication means that “failure to observe the instructions may result in human injury, or physical damage alone.”
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- For handling this machine:



<ul style="list-style-type: none"> ● This machine is a wireless communication device composed of precision parts. Do not overhaul/remodel. It may cause an accident or a machine trouble. 	 Prohibited
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- For working/storage environment:

<ul style="list-style-type: none"> ● To minimize the possibility of trouble, characteristic degradation, fire, or electrical shock, avoid using or storing the product in the following locations: <ul style="list-style-type: none"> • Locations subject to direct sunlight. • Locations where liquids, foreign objects, corrosive gas, or flammable gas may enter the product. • Locations exposed to high humidity, oily smoke, dust, sand, or the like. • Locations with less stability such as the top surface of an unsteady table or an inclined surface. 	 Prohibited
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	Warning	The Warning indication means that “failure to observe the instructions may result in death or serious injury.”
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- For handling this machine:

<ul style="list-style-type: none"> ● Do not use this product for such applications as require an extremely high level of reliability relating to human life. 	 Prohibited
<ul style="list-style-type: none"> ● Do not use this product in locations where there is uncertainty about the coverage of radio waves. 	 Prohibited



■ For handling the power supply:

Always observe the following precautions to prevent the power cord from being heated, damaged, or ignited.

● Do not bring the power cord close to fire nor put it into fire. The power cord may be broken or ignited, resulting in an accident.	 Prohibited
● Use the AC adapter and the main body only with the specified power voltage to protect them against damage or fire accidents.	 Prohibited
● Do not use the main body in a wettable atmosphere. It may cause accidents or troubles such as heating, igniting, and electrical shock.	 Prohibited
● Do not touch the main body, the power cord, or the plug outlet with wet hands. It may lead to accidents such as electrical shock.	 Prohibited
● Do not damage the power cord. A short circuit or heating may result, causing fire or electrical shock.	 Prohibited
● Do not use the power plug with dust adhered on it. A short circuit or heating may result, causing fire or electrical shock.	 Prohibited
● Do not give a strong impact onto the power cord. It may cause an accident or a machine trouble.	 Prohibited
● Do not use the power cord if you find out deformation etc. in it. It may cause an accident or a machine trouble.	 Prohibited
● Do not charge the main body in locations where flammable gas could be generated. It may result in igniting or a fire accident.	 Prohibited
● Never overhaul the main body. It may cause an accident or a machine trouble.	 Prohibited

■ When something erroneous has occurred during use:

Since it may cause fire, electrical shock, or the like, remove the power plug from the plug outlet and ask the outlet store or us for repair.

● When smoke or abnormal odors come out, immediately remove the power plug from the plug outlet and ask the outlet store or us for repair.	 Attention
● Do not use the power cord if it is damaged. Using the damaged power cord may result in fire or electric shock.	 Prohibited

1-4 General description

This machine is a compact type indicator unit that displays the constantly changing production quantity on the shop floor. It helps you grasp the ongoing status of production at a glance and also contributes greatly to the rationalization of production such as analysis of manufacturing processes and improvement of workers' self-control.

With a built-in microprocessor, the machine allows you to set or change the six types of basic data: Tact, Target, Actual, Advancement, Clock, and Working hour.

As for a production quantity, the machine counts up the signals from limit switches etc., calculates the advancement based on the tact and working hours, and displays each of the data. The machine also features a number of functions, which include the "Clear time function" for automatically clearing the Plan, Actual, and Advancement when a preset time is reached, and the "Stop function" for temporarily suspending the Plan calculation even during working hours.

- ▼ Low in price.
- ▼ Compact, lightweight, and space-saving.
- ▼ Bright & easy-to-see 1-inch red color 7-segment LED display.
- ▼ Equipped with a built-in microprocessor and a timer.
- ▼ Offers a range of display variations and allows you to change display types by keyboard operation.
- ▼ Includes the stop function.
- ▼ Includes the data backup function, which allows data to be maintained even at a power failure.
- ▼ Can select between use and no use of the Working hour.
When the Working hour is not used, a switchover is made between the operating and stopped status in response to ON/OFF of external contact inputs.

1-5 Specifications

Items	Specifications
Input	Non-voltage contact input x 2: <ul style="list-style-type: none"> • Actual count x 1 • Stop input x 1
Display	4-digit x 3-line Single-sided High-luminance 7-segment LED Character height: 25.4mm
	Operating status monitor LED x 1: <ul style="list-style-type: none"> • LED colors: 2 (red/green) Power LED x 1 *1
Switch	Power switch x 1
Operating power voltage	DC12V (input voltage range: DC11 - 15V) / 0.8A or more
Operating power supply	DC jack Applicable plug: $\phi 2.1$ (I.D.) x $\phi 5.5$ (O.D.) mm Center negative
Power consumption	200mA (at DC12V)
Working environment	Temperature: 0-50°C Humidity: 80% or less (no condensation)
Dimensions	240(W) x 165(H) x 32(D) mm (projections excluded)
Weight	1.5kg
Clock backup	Approx. 5 years Coin type lithium battery (CR2032)

<Operating specifications>

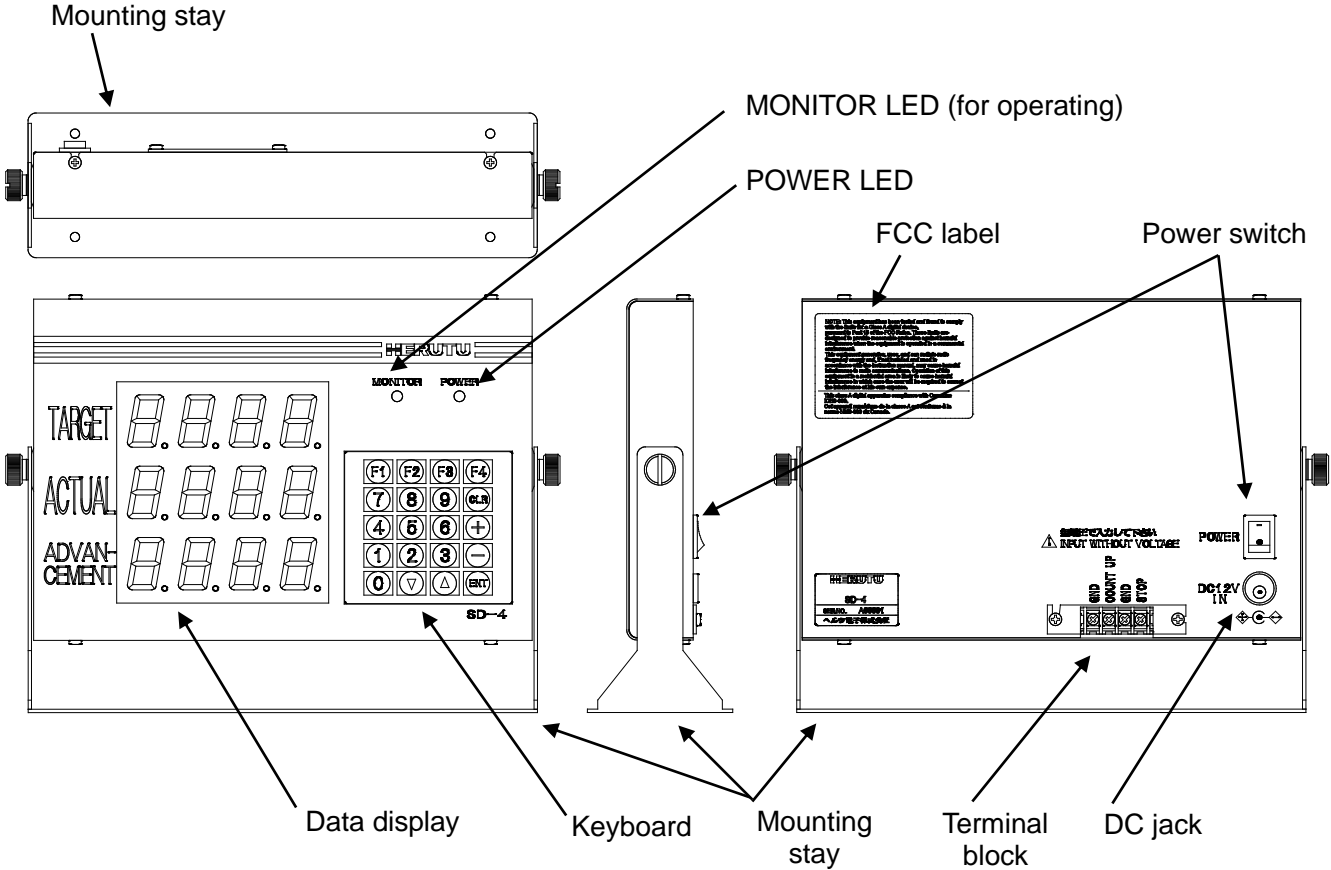
Items	Specifications
Labor hour	Max 23 hours 59 minutes/day *2
Working hour	For 20 working hours (periods)/day *2
Working hour pattern	6 patterns *2
Tact	0.1-9999.9 seconds
Target	0-9999
Plan	0-9999
Actual	0-9999
Advancement	-999 - +999
Accomplishment rate	0-999
Clear time	3 times/day
cumulative operating time limitation	Cumulative operating time for no use of Working hour: Max 1 month

*1: The term "orange" used in the following refers to the color produced by simultaneous emission of red and green LED's.

*2: Specifications for use of the Working hour.

1-6 Exterior features

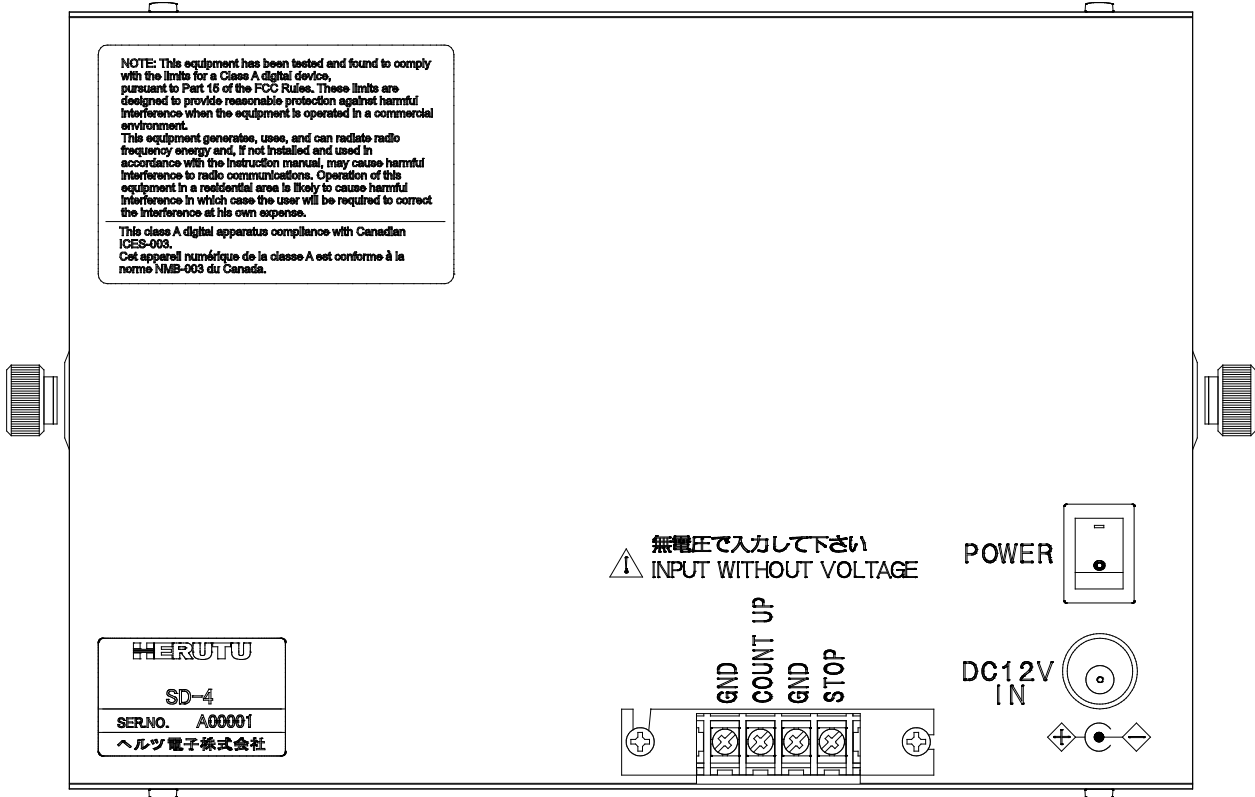
1-6-1 Main body



Items	Descriptions
POWER LED	Illuminates at power on.
MONITOR LED (LED for operating)	LED for checking the operating status. Illuminates in "red"/"green"/"orange" depending on the operating status.
Keyboard	Keyboard for operations.
Data display	4-digit x 3-line 7-segment LED display.
Power switch	Power-on/off switch.
Terminal block	Input terminal block for the Actual count/stop.
DC jack	DC12V input Applicable plug: $\phi 2.1$ (I.D.) x $\phi 5.5$ (O.D.) mm, center negative
Mounting stay	Dedicated stay for installation.
FCC label	FCC Note for a Class A digital device or peripheral

1-6-2 Terminal block

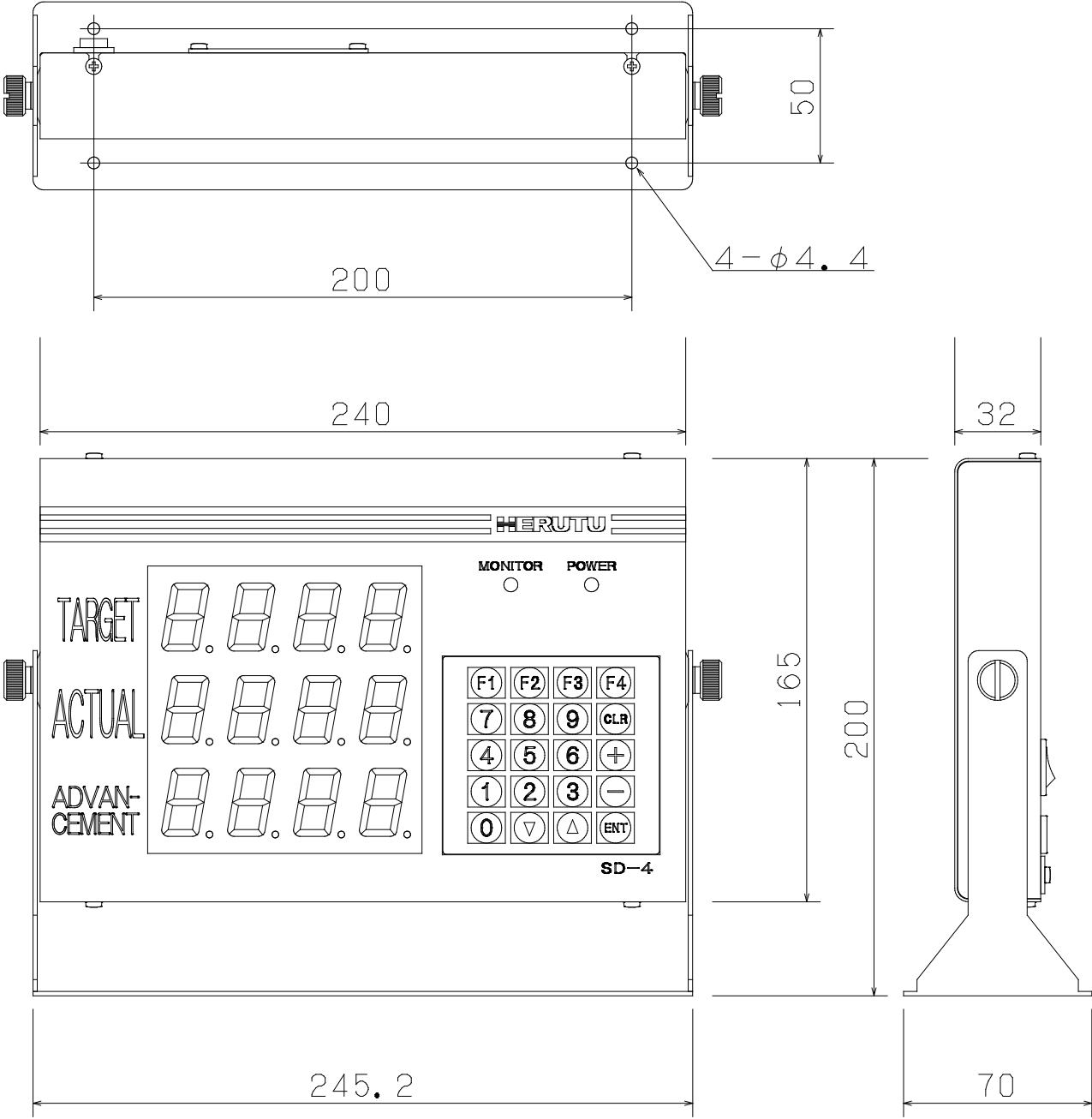
The terminal block is located on the back of the main body. The functions of individual terminals are shown below.



Terminal	Input	Function
GND	-----	Common GND
COUNT UP	Input	Actual count input. (Actual + 1 per signal input)
GND	-----	Common GND
STOP	Input	Input terminal for stop/operating. (Stop input terminal)

* For each input terminal, connect a non-voltage contact.

1-7 Dimensional drawing



1-8 Installation

1-8-1 Installation procedure

- (1) Mount the mounting stay to the installation area with wood screws or small screws. Mount the main body onto the mounting stay with ornamental screws loosely tightened.
 - * In the case the mounting stay is attached to the main body, remove the two ornamental screws from both sides and detach the mounting fittings.
- (2) To the Actual count (UP terminal) on the input terminal block, connect the non-voltage contact for counting up the input signals from relays, micro switches, limit switches, etc. Also, establish a connection to each of the other input terminals as needed.
- (3) Determine the angle at which the display panel (data display and LED's) is easy to see and operate, and then fix the main body by fully tightening the ornamental screws on both sides.
- (4) Insert an applicable plug firmly into the DC jack and supply the power of DC12V/0.8A or more. (Applicable plug: $\phi 2.1$ (I.D.) x $\phi 5.5$ (O.D.) mm with center negative)

The main body has a build-in microprocessor, which means there is a possibility that the data may collapse due to power fluctuation or flicker. Take power supply from a location free from power fluctuation or flicker.

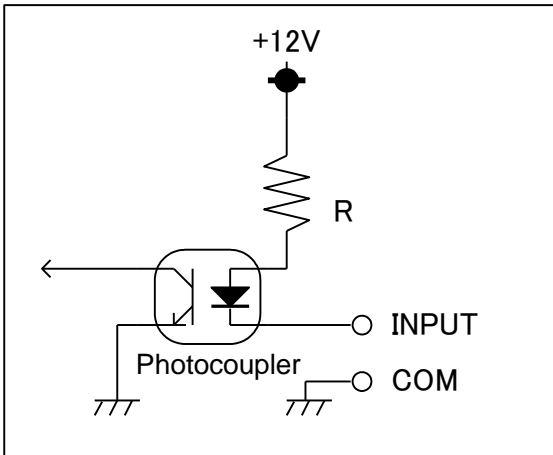
For the non-voltage contacts to be connected to the input terminal block, use the ones with less chattering that can steadily turn on/off the voltage/current of 12V/10mA.

1-8-2 Input terminal block

For the input signals to be connected to the terminal block, use the ones with less chattering that can steadily turn on/off the voltage/current of 12V/10mA. Keep a time interval of at least 50msec between input signals. Also, keep 50msec or more from when one input signal is turned off till another input signal is turned on.

<Input circuit>

Non-voltage contact input circuit (rating: DC12V/10mA)



Chapter 2 How to Use

2-1 Function settings

Before using the machine, you need to make settings for the following items. Read the description carefully and make suitable settings for your intended application.

■ Setting an operation type

Select an item shown on the display of the machine to set a desired operation type.

For an operation type, you may make a choice from among the seven patterns in all by a combination of “Target,” “Actual,” “Advancement,” “Accomplishment rate,” “Plan,” and “Tact.”

■ Setting use or no use of the Working hour

When the Working hour is used, the machine calculates the planned quantity based on the registered data of working hours.

When the Working hour is not used, the machine calculates the planned quantity based on ON/OFF of external input signals.

■ Setting the stop input logic

Set “Positive” or “Negative” for the logic of a stop input signal.

The resulting operation (operating/stop) differs depending on whether the Working hour is set to be used or not used.

Setting		Terminal input	
Working hours	Stop input logic	ON	OFF
Used	Negative	Stop	Operating
	Positive	Operating	Stop
Not used	Negative	Operating	Stop
	Positive	Stop	Operating

■ Setting use or no use of the function which the planned quantity stop at Target.

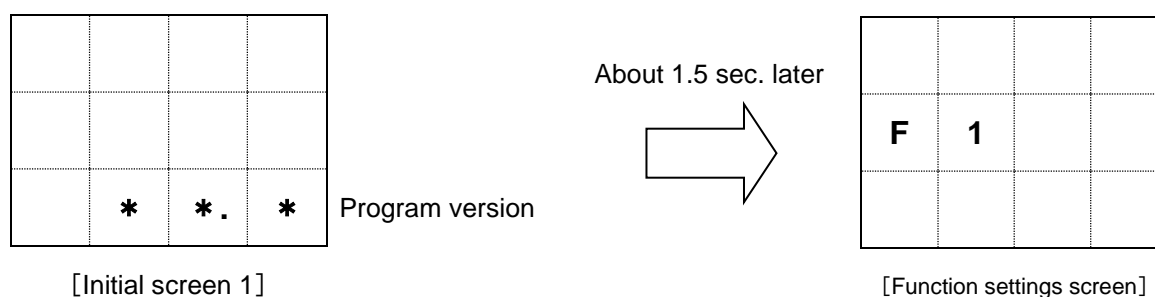
Setting use or no use of the function which the planned quantity calculation stop, when the planned quantity reached target.

When choosing the operation type which includes target of display “Plan“, “Advancement“ and “Accomplishment rate“ can’t be set any more.

(The case of setting “1”)

How to call up the function settings screen

Turn on the power switch while pressing the [F1] key. The [Function settings screen] appears after the [Initial screen 1] is displayed for about 1.5 seconds.



On the [function settings screen] shown above, select the following sub commands to make your settings.

Sub command	Description	Setting
1	Sets an operation type.	Select from seven patterns.
2	Sets use/no use of the Working hour.	0: Not used 1: Used
3	Sets the stop input logic.	0: Negative logic 1: Positive logic
4	Setting use or no use of the function which the planned quantity stop at Target.	0: Not used 1: Used

* Default values

The factory settings are as follows:

Operation type: → 123 (Target/Actual/Advancement)

Use/no use of Working hour: → Used

Stop input logic: → Negative logic

Use or no use of the function

which the planned quantity stop at Target → Not used

2-1-1 Setting an operation type

The machine is so designed that a setting can be made from among seven operation types. When using the machine with any operation type other than the type 123 (Target/Actual/Advancement), affix the attached command sticker onto the case.

Display items	[1] Target:	The target production quantity of the day (fixed value).
	[2] Actual:	The production quantity up to the present time.
	[3] Advancement:	The degree of advancement relative to the planned production quantity at the present time.
	[4] Accomplishment rate:	The rate of accomplishment to the planned production quantity at the present time.
	[5] Plan:	The planned production quantity at the present time (changes over time).
	[6] Tact:	The time required for production per product (shown in seconds).

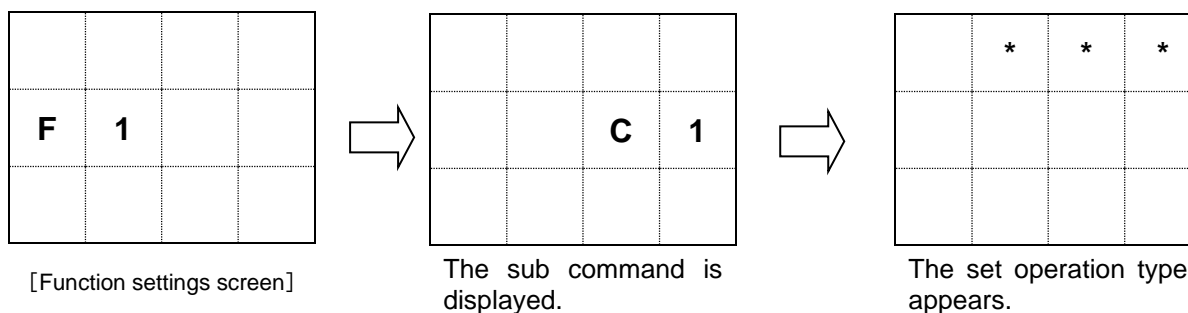
Operation type	Description
*123	Target/Actual/Advancement
523	Plan/Actual/Advancement
124	Target/Actual/Accomplishment rate
524	Plan/Actual/Accomplishment rate
152	Target/Plan/Actual
126	Target/Actual/Tact
526	Plan/Actual/Tact

* Default values

<How to set>

(1) On the function settings screen, press the [1] key on the keyboard.

The currently set operation type appears after the sub command "C1" is displayed for 0.75 seconds.



- (2) Input the operation type of your choice with a 3-digit number. For example, to set the type 523, input [5][2][3]. The resulting display is as follows:

	5	2	3

- (3) Press the [ENT] key to set the operation type you input. If you have inadvertently press a wrong type No., press the [CLR] key and re-input the correct data.

***** Error *****

If you have input any number other than the type Nos. and pressed the [ENT] key, then an error will result. In this case, the display blinks the following screen and automatically returns to the re-input status without changing the preset type.

1	0		0

The operation type you set appears on the last three digits of the top line on the [Initial screen 2] (see page 17).

2-1-2 Setting use or no use of the Working hour

This machine is so designed that use or no use of the Working hour can be set.

Note that the resulting operation differs depending on whether the Working hour is set to be used or not used.

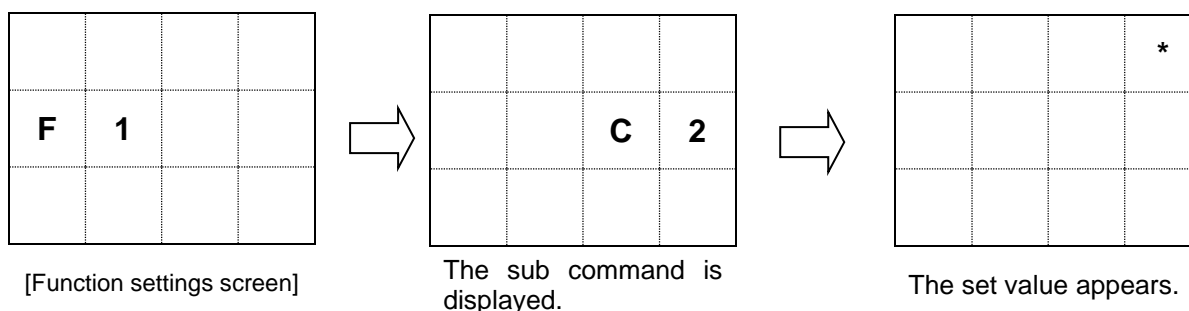
Setting	Set value	Description
Working hour: Not used	0	[5] (Register working hour) and [6] (Select working hour pattern) are disabled. The Plan calculation is carried out based on the status of external input signals. No recalculation function is available.
*Working hour: Used	1	[5] (Register working hour) and [6] (Select working hour pattern) are enabled. The Plan calculation is carried out based on the registered data of working hours.

*Default values

<How to set>

- (1) When on the function settings screen, press the [2] key on the keyboard.

The currently set value appears after the sub command "C2" is displayed for 0.75 seconds.



- (2) As the value you want to set, input either [0] (Not used) or [1] (Used).

<e.g.> To set the Working hour to be used, input [1]. The resulting display is as follows:

			1

- (3) Press the [ENT] key to set the change you input. If you have inadvertently input a wrong data, press the [CLR] key and re-input the correct data.

2-1-3 Setting the stop input logic

The machine is so designed that the logic of a stop input signal can be set to either “Negative logic” or “Positive logic.” Note that the resulting operation differs depending on whether the Working hour is set to be used or not used.

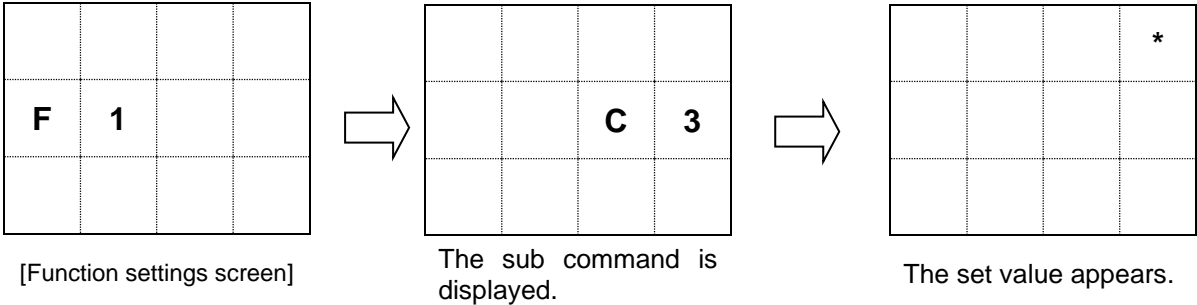
Setting	Set value	Description
Negative logic	*0	See the table below.
Positive logic	1	See the table below.

* Default values

Setting		Terminal input	
Working hour	Stop input logic	ON	OFF
Used	Negative	Stop	Operating
	Positive	Operating	Stop
Not used	Negative	Operating	Stop
	Positive	Stop	Operating

<How to set>

- (1) When on the function settings screen, press the [3] key on the keyboard.
The currently set value appears after the sub command “C3” is displayed for 0.75 seconds.



- (2) As the value you want to set, input either [0] (Negative logic) or [1] (Positive logic).
<e.g.> To set the stop input logic to Negative logic, input [0]. The resulting display is as follows:

			0

- (3) Press the [ENT] key to set the value you input. If you have inadvertently set a wrong data, press the [CLR] key and re-input the correct data.

2-1-4. Setting use or no use of the function which plan stop at Target.

Setting use or no use of the function which the planned quantity calculation stop when plan reached target. It can use that choosing the type which includes target of display.

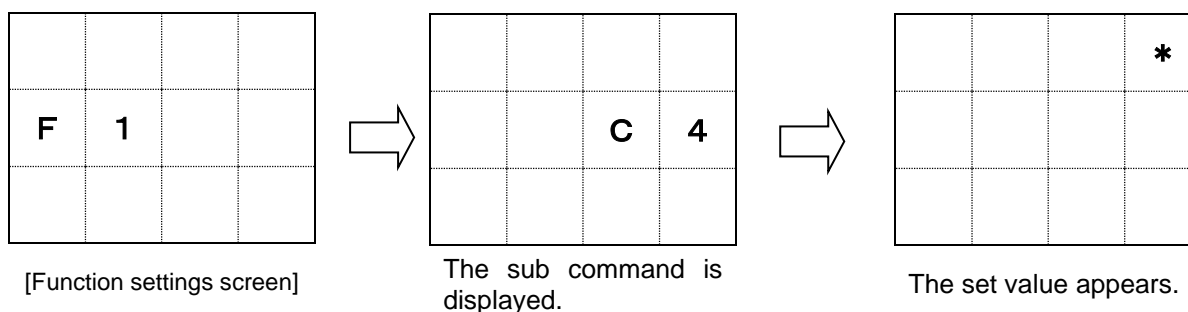
Setting	Set value	Description
Plan=Not stop at target	※0	Plan=Plan doesn't stop when plan reached target. Plan>Plan indication is possible.
Plan=stop at target	1	Plan=Plan stops when plan reached target. Plan>Plan indication is not possible.

※Default values.

<How to set>

①When on the function settings screen, press the [4] key on the keyboard.

The currently set value appears after the sub command "C4" is displayed for 0.75 seconds.



②As the value you want to set, input either [0] (Not used) or [1] (Used).

To set the Plan calculation stopped when the plan reached target to be used, input [1].

The resulting display is as follows:

			1

③Press the [ENT] key to set the change you input. If you have inadvertently input a wrong data, press the [CLR] key and re-input the correct data.

※When choosing the operation type which includes target of display 「Plan」 「Advancement」 「Accomplishment rate」 can't be set any more.
(The case of setting "1")

2-2 Basic operations

To operate this machine, you need to make a number of settings. In order to ensure normal operation of the machine, make the settings in accordance with the description below.

Key	Command	Function	Target type
[0]	Tact	Sets or changes the tact.	ALL
[1]	Target	Sets or changes the target production quantity.	1**
	Plan	Sets or changes the planned production quantity.	5**
[2]	Actual	Sets or changes the production actual.	*2*
	Plan	Sets or changes the planned production quantity.	152
[3]	Advancement	Sets or changes the advancement.	**3
	Accomplishment rate	Sets or changes the accomplishment rate.	**4
	Actual	Sets or changes the production actual.	152
[4]	Clock	Sets or changes the internal clock.	ALL
[5]	Working hour	Sets or changes the working hours.	ALL *1
[6]	Working hour pattern	Sets or changes the working hour pattern.	ALL *1
[7]	Clear time	Sets or changes the clear time.	ALL
[▲]	Actual UP	Increments the Actual by one count.	ALL
[▼]	Actual DOWN	Decrements the Actual by one count.	ALL
[CLR]	Clear	Clears the Actual.	ALL
[+]	Screen switch	Switches between standard screen and initial screen 2.	ALL
[F4]	Turn on/off	Turns on/off the Plan calculation.	ALL

*1: Disabled when the Working hour is not used.

2-2-1 Initial screens

The initial screen 1 is the first screen you see after powering on the machine (see below). After displayed for 1.5 seconds, the initial screen 1 switches over to the initial screen 2 where the working hour pattern, operation type, and time are displayed. Alternatively, if it is within working hours, the initial screen 1 switches over to the standard screen after displayed for 1.5 seconds. Even when it is not within working hours, the initial screen 1 also switches over to the standard screen provided the Actual input is present.

		1.	0

Program version

[Initial screen 1]

↓ 1.5 seconds later

1.	1	2	3
	8.	3	1.
		5	9

Working hour pattern + Operation type *1
hours./minutes.
seconds

[Initial screen 2]

Switches to the standard screen when it is within working hours or Actual input is present even when it is not within working hours.

↓

1	2	3	4
		3	0
			3

Target quantity
Production actual
Advancement

[Standard screen]

When on the standard screen, you can switch to the initial screen 2 by pressing the [+] key. Press the [+] key again to return to the standard screen.

*1: When the Working hour is set to be not used, the Working hour pattern is disabled, causing the following display to result:

.	1	2	3
	8.	3	1.
		5	9

Operation type
hours./minutes.
seconds

[Initial screen 2]

2-2-2 Setting the Internal clock

Set the machine’s internal clock by using the [4] key on the keyboard.

(1) Press the [4] key. The resulting display is as follows:

	4		

The command No. is displayed for about 0.75 seconds.

↓

*	*	*	*
		*	*

The currently set time (hours./minutes)

The currently set time (seconds)

(2) Input the desired time in the 24-hour format in the order of hours, minutes, and seconds.

<e.g.> To set 8:05:00 A.M., input the keys [8][0][5][0][0].

	8.	0	5
		0	0

The value input

(3) Press the [ENT] key, and the time you input will be set for the internal clock. If you have inadvertently set a wrong data, you may press the [CLR] key to return to the status of (1). Alternatively, you may overwrite it with the correct 6-digit data right after your input.

***** Error *****

If the time you input is illogical, the display returns to the time input screen in (1) after blinking the following screen:

4			4

If the digits of the value you input for the clock time are less than required, the display returns to the time input screen in (1) after blinking the following screen:

4			5

The machine has a built-in crystal clock. The clock is accurate enough to withstand normal use. However, because the oscillation frequency of the crystal could vary with temperature, the clock may suffer slight deviation due to changes in the working environment, temperature, or the like.

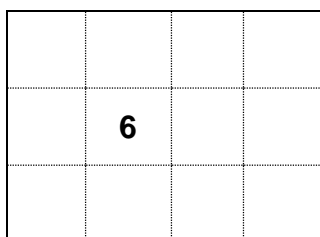
2-2-3 Setting the Working hour pattern

Set the working hour pattern of your choice. This machine has six patterns of working hours.

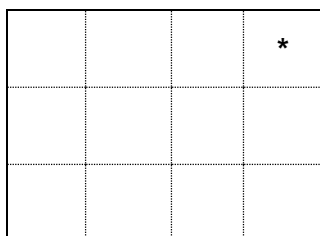
At start of work or when setting working hours, you have to set which pattern will be used.

Note that this setting is unavailable when the "Working hour: Not used" is set in function settings.

(1) Press the [6] key. The resulting display is as follows:



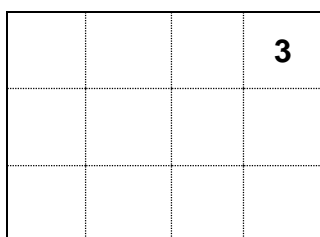
The command No. is displayed for about 0.75 seconds.



The currently set pattern

(2) As the pattern No. you want to set, input a value in the range of 1 to 6.

<e.g.> To set the pattern 3, press the [3] key.



The value input

(3) Press the [ENT] key, and the value you input will be set as the working hour pattern. If you have inadvertently set a wrong data, you may press the [CLR] key to return to the status of (1). Alternatively, you may overwrite it with the correct data right after your input.

The set pattern No. appears on the last digit of the top line on the initial screen 2.

2-2-4 Setting the Working hour

Set the working hours of your choice. The machine calculates the planned production quantity at the present based on the set working hours and tact to compute the advancement relative to the production actual.

Since the machine is designed to have up to six types of working hours, determine which working pattern No. of working hours will be set with the command [6], before proceeding to set the working hours.

Note that this setting is unavailable when the “Working hour: Not used” is set in function settings.

Suppose you have the following working hours in mind:

Start—8:00—	10:00.....	10:10—	12:00.....	13:00—	15:00.....	15:15—	17:30.....
Working	Rest	Working	Rest	Working	Rest	Working	Rest
17:45—	19:50.....	20:00—	22:00.....	23:00—	1:00.....	1:15—	3:30—End
Working	Rest	Working	Rest	Working	Rest	Working	Working

(1) Press the [5] key. The resulting display is as follows:

	5		

The command No. is displayed for about 0.75 seconds.



*	*	*	*
		0	0

The currently set time (hours./minutes)

The number of times (00)

* The number of times represents the current input position (00-40) and corresponds to “No. of times” in “Working Hours Worksheet” on the last page of this manual.

(2) Set 8:00. Press the keys [8][0][0].

	8.	0	0
		0	0

The value input

If you have inadvertently set a wrong data, you may either press the [CLR] key and redo inputting or just overwrite it with the correct 4-digit data. (In this case, [0][8][0][0])

(3) When you have input the data properly, press the [ENT] key. The display switches to the input status ready for the subsequent time to be set.

*	*.	*	*
		0	1

The currently set time

(4) Next, to set 10:00, press the keys [1][0][0][0].

1	0.	0	0
		0	1

The value input

(5) When you have input the data properly, press the [ENT] key. The display switches to the input status ready for the subsequent time to be set.

*	*.	*	*
		0	2

The currently set time (hours./minutes)

(6) Next, to set 10:10, press the keys [1][0][1][0]. When you have input the data properly, press the [ENT] key.

*	*.	*	*
		0	3

The currently set time (hours./minutes)

(7) In the same manner, continue to input [3][3][0] and [ENT].

(8) As the last step, press the keys [0] and [ENT] to set the working hours and end the command.

* If you press the [ENT] key without inputting any data, the command will end without changing the preset time.

(The data you've set before that will be left.)

* With the Working hour command, you switch to the next working hour setting by pressing the [+] key and return to the previous working hour setting by pressing the [-] key.

For 0:00 A.M., set 24:00.
For 0:01 A.M., set 00:01.

Since the machine has the unit of 24 hours for use of the Working hour, you may not set working hours such that the end of working hours comes after the start of working hours. The maximum time you can set is 23:59.
<e.g.> You may not set working hours such that they begin at 8:00 a.m. and end at 8.00 a.m. on the next day.

After setting the end time of the last working hour (period), be sure to set [0]. Note that [0] may not be set if the number of set times is an odd number.

A single set of working hours is for 20 working hours (periods), which are equivalent to 40 set times.

- Applied operation: Using the above-shown case, change the start time of working from 13:00 to 12:45.

(1) Press the [5] key.

	8.	0	0
		0	0

(2) Press the [+] key 5 times.

1	5.	0	0
		0	5

(3) Since you've gone too far by one, press the [-] key once.

1	3.	0	0
		0	4

(4) Press the keys [1][2][4][0].

1	2.	4	0
		0	4

(5) Since you've made an error, press the [CLR] key.

1	3.	0	0
		0	4

(6) Press the keys [1][2][4][5].

1	2.	4	5
		0	4

(7) Press the [ENT] key.

1	5.	0	0
		0	5

(8) Now you have changed 13:00 to 12:45. To end the command, just press the [ENT] key.

After setting the end of the last working hour (period), be sure to set [0]. Unless [0] is set, the machine does not recognize the end time of working hours and thus fails to operate normally.

* * * For error message * * *

- (1) If the data you input is illogical, the display returns to the input screen after displaying the following screen:

5			5

- (2) When the input of [0] is in the position for the end time of working hours, the display returns to the input screen after displaying the following screen:

5			6

- (3) If the working hour settings are out of sequence in terms of time, the display returns to the standard screen after displaying the following screen. Select the command [5] once again and recheck the working hours.

5			9

* If nothing is left done about the errors in (2) and (3), the machine fails to operate normally (in Advancement calculation etc.); as a result, you see the error screen blinking for 3 seconds each time you switch on the machine.

2-2-5 Setting the Tact

Set tact in seconds (time required for production per product).

(1) Press the [0] key. The resulting display is as follows:

	0		

The command No. is displayed for about 0.75 seconds.



*	*	*	*.
			*

The currently set tact (integral part)

The currently set tact (decimal part)

(2) Input tact in seconds within 5 digits (9999.9).

<e.g.> To set 45.5 seconds, input [4][5][5].

		4	5.
			5

The value input (integral part)

The value input (decimal part)

(3) If you press the [ENT] key after this, the value you input will be set as the tact. If you have inadvertently set a wrong data, press the [CLR] key and re-input the correct data.

Tact can be changed at any time (even during working).

If tact is 0, the Plan calculation will be stopped.

2-2-6 Setting the Target

Set the planned production quantity of a day (fixed value).

For the types 1** and 612, press the keys [1] and [2] respectively to set the target quantity.

(1) Press the [1] key. The resulting display is as follows (for the type 1**).

	1		

The command No. is displayed for about 0.75 seconds.



*	*	*	*

The currently set data

(2) Input a target quantity.

<e.g.> For 1230, input [1][2][3][0].

1	2	3	0

The value input

(3) If you press the [ENT] key after this, the value you input will be set as the target quantity. If you have inadvertently set a wrong data, press the [CLR] key and re-input the correct data.

2-2-7 Setting the Plan

Set a planned quantity, except there normally is no need to make this setting. It is simply intended to preset a correct planned quantity in case there may occur an error in the planned quantity for some reason or other.

For the types 5** and *5*, press the [1] and [2] keys respectively to set the planned quantity.

(1) Press the [1] key. The resulting display is as follows (for the type 5**):

	1		

The command No. is displayed for about 0.75 seconds.



*	*	*	*

The currently set data

(2) Input a planned quantity.

<e.g.> For 1800, input [1][8][0][0].

1	8	0	0

The value input

(3) If you press the [ENT] key after this, the value you input will be set as the planned quantity. If you have inadvertently set a wrong data, press the [CLR] key and re-input the correct data.

If the Plan is changed, the Advancement and Accomplishment rate will be automatically changed based on the Actual.

When choosing the operation type which includes target of display 「Plan」 「Advancement」 「Accomplishment rate」 can't be set any more. (The case of setting "1")

2-2-8 Setting the Actual

Set the quantity of production actual, except there normally is no need to make this setting. It is simply intended to preset the correct quantity of production actual in case there may occur an error in the production actual for some reason or other.

For the types *2* and **2, press the [2] and [3] keys respectively to set the quantity of production actual.

(1) Press the [2] key. The resulting display is as follows (for the type *2*):

	2		

The command No. is displayed for about 0.75 seconds.



*	*	*	*

The currently set data

(2) Input the quantity of production actual.

<e.g.> For 1253, input [1][2][5][3].

1	2	5	3

The value input

(3) If you press the [ENT] key after this, the value you input will be set as the quantity of production actual. If you have inadvertently set a wrong data, press the [CLR] key and re-input the correct data.

If the Actual is changed, the Advancement and Accomplishment rate will be automatically changed based on the Plan.

Small changes to the Actual can also be made by using the [▲]/[▼] key.

2-2-9 Setting the Advancement

Set a degree of advancement, except there normally is no need to make this setting. It is simply intended to preset a correct degree of advancement in case there may occur an error in the advancement for some reason or other.

For the type **3, press the [3] key to set the advancement.

(1) Press the [3] key. The resulting display is as follows:

	3		

The command No. is displayed for about 0.75 seconds.



*	*	*	*

The currently set data

(2) For advancement, input a value with either a plus (+) or minus sign (-). First input either the [+] key or the [-] key, and then input a value with the numeric keys.

<e.g.> For advancement of +13 (e.g.), input [+][1][3].

		1	3

The value input (plus sign (+) is hidden)

(3) If you press the [ENT] key after this, the value you input will be set as the advancement. If you have inadvertently set a wrong data, press the [CLR] key and re-input the correct data.

When choosing the operation type which includes target of display 「Plan」 「Advancement」 「Accomplishment rate」 can't be set any more. (The case of setting "1")

***** Error *****

For the Advancement, you may not set any positive (+) value larger than the value for the Actual. This is because any positive advancement larger than the production actual is logically incorrect. If a positive advancement larger than the production actual is input, the display switches to the following screen and the command ends without setting the Advancement.

3			1

2-2-10 Setting the Accomplishment rate

Set an accomplishment rate, except there normally is no need to make this setting. It is only intended to preset a correct accomplishment rate in case there may occur an error in the accomplishment rate for some reason or other.

For the type **4, press the [3] key to set the accomplishment rate.

(1) Press the [3] key. The resulting display is as follows:

	3		

The command No. is displayed for about 0.75 seconds.



*	*	*	*

The currently set data

(2) Input an accomplishment rate in the range of 0 to 999.
<e.g.> For an accomplishment rate of 93%, input [9][3].

		9	3

The value input (plus sign (+) is hidden)

(3) If you press the [ENT] key after this, the value you input will be set as the accomplishment rate. If you have inadvertently set a wrong data, press the [CLR] key and re-input the correct data.

Method for calculation of an accomplishment rate:
 Accomplishment rate (%) = Actual/Plan × 100 (Decimal places are cut off.)
 If the accomplishment rate is more than 999% or cannot be calculated (e.g. for the planned quantity: 0), "999" is displayed for the Accomplishment rate.

If the Accomplishment rate is changed, the current planned quantity will be automatically changed based on the Actual. However, when an illogical accomplishment rate (e.g. an accomplishment rate of 0 for a large quantity of production actual or an accomplishment rate for a planned quantity of more than 9999) is input, none of the subsequent data will be assured. Thus, you should not change the Accomplishment rate unless there is a compelling reason.

2-2-11 Setting the Clear time

Set the time to clear data. The Clear time function is a preset arrangement for executing the clear operation ([CLR]) automatically when a preset time is reached. Up to three clear times can be set.

(1) Press the [7] key. The resulting display is as follows:

	7		

The command No. is displayed for about 0.75 seconds.



*	*	*	*
		0	1

The currently set data

The number of clear times

(2) For clear time, input a value in the 24-hour format in the order of hours and minutes. <e.g.> For 1:85 A.M., input [8][0][5].

	8	0	5
		0	1

The value input

(3) Press the [ENT] key to set the first clear time, and the display will return to the input ready status for the second clear time.

If you have inadvertently set a wrong data, press the [CLR] key and re-input the correct data.

*	*	*	*
		0	2

The currently set data

The 2nd clear time

By repeating the same procedure, you can set up to three clear times. If you press the [ENT] key without inputting anything, then the command will end. You may use the [+]/[-] key to move between the clear times you input.

***** Error *****

If the data you input is illogical, the display shows the following screen and then returns to the re-input status without changing the preset clear time.

7			7

For the clear time which is not used, set 00:00.
When any time is set, the clear operation starts when that time is reached.

For 0:00 A.M., set 24:00.
For 0:01 A.M., set 0:01.

2-2-12 Post-setting tests

- (1) If the initial screen 2 is shown on the display when you have finished the settings for Clock, Tact, Target, etc., press the [+] key to switch over to the standard screen, carry out count inputting, and check that the Actual counts up.
- (2) Next, if the present time is within working hours, press the [CLR] key, wait the display of the Advancement to be stabilized (for advancement, the planned quantity from the start of working hours till the present time is shown by a negative value), and then check that the Advancement or the Plan changes according to the set tact.
If you get the normal results of the above tests, then you can consider your data settings to be successfully complete. If you do not, redo the settings.

<Common setting error>

- The Actual and the Advancement increment in sync with each other.
 - Check the clock, the registered data of working hours, and the registered data of tact.
 - Make sure of the setting for use or no use of the Working hour, and check if the machine is in the operating status.
 - Make sure of the logic of stop input (see “2-1-3 Setting the stop input logic” on page 14).

2-3 Description of the function keys

[1] [ENT] key

The [ENT] key is used to load input data into the microprocessor.

No input data will be loaded into the microprocessor until the [ENT] key is pressed.

With this machine, data may fail to be loaded even after the [ENT] key is pressed, provided the data is logically incorrect.

[2] [CLR] key

The [CLR] key is normally used to restart the machine. Once the [CLR] key is pressed, the microprocessor restarts at the present moment after clearing the Actual and Advancement.

In the course of command input, the [CLR] key serves as the key with which to correct input data.

[3] [▼] key

Each time the [▼] key is pressed, the Actual decrements by one. Use this key when you want to make minor changes to the Actual.

[4] [▲] key

Each time the [▲] key is pressed, the Actual increments by one. Use this key when you want to make minor changes to the Actual.

[5] [+] key

Pressing the [+] key switches the display between the standard screen and the initial screen 1.

[6] [F1] key

If you turn on power with the [F1] key held pressed, the display switches over to the special command screen where various mode settings can be made. When on the function settings screen, you can perform the likes of changing operation types.

* If you turn on power with the [F2] or [F3] key held pressed, the machine will be put into the manufacturer setup mode. Take care not to inadvertently operate the machine that way. Should the machine be put into the manufacturer setup mode, just turn off power and redo the correct operation.

[7] [F4] key

Pressing the [F4] key switches between the operating and stopped status. The result depends on whether the Working hour is set to be used or not used.

<When the Working hour is used >

The [F4] key serves as the stop key. Pressing it once results in a stopped status; and pressing it again clears the stopped status (to switch over to an operating status).

< When the Working hour is not used>

The [F4] key serves as the operating key. Pressing it once gets into an operating status; and pressing it again switches over to a stopped status.

2-4 Stop function

The stop function is intended to temporarily stop the Plan calculation when in the operating status.

When the Working hour is used, the initial screen 2 or the standard screen is displayed blinking during the stoppage, allowing you to grasp the status at a glance. There are two methods of stopping as shown below.

[1] Inputting to the stop input terminal (STOP terminal)

The Plan/Advancement calculation is stopped or operated by means of signal input to the stop input terminal on the back of the main body.

The resulting operation differs depending on the stop input logic setting. To use this method, refer to the correspondence table below.

Correspondence table: Stop vs. Operating via stop input terminal

Setting		Terminal input	
Working hours	Stop input logic	ON	OFF
Used	Negative	Stop	Operating
	Positive	Operating	Stop
Not used	Negative	Operate	Stop
	Positive	Operating	Operating

* For a description of the terminal block, see “1-6-2 Terminal block” on page 6 and “1-8-2 Input terminal block” on page 8.

e.g.: For “Working hour - Used / Logic of stop input signal - Negative”:

The Plan/Advancement calculation is stopped when the process of signal input to the stop input terminal is under way. Once the signal input is cleared, the machine resumes (operates) the calculation from that moment.

[2] Pressing the [F4] key

<For Working hour - Used >

When on the initial screen 2 or the standard screen, press the [F4] key once, and the Plan/Advancement calculation will be stopped.

Pressing the [F4] key again resumes (operates) the calculation.

<For Working hour - Not used>

Pressing the [F4] key once initiates (operates) the Plan/Advancement calculation. Pressing the [F4] key once again stops the calculation.

* The machine is put into a stopped status if either the stop input terminal or the [F4] key is in the stop status.

2-5 MONITOR LED (operating status LED)

The MONITOR LED (operating status LED) shows a status in green/red/orange. The LED status corresponds to each operating status as follows:

<When the Working hour is used>

Operating status	LED status
Off working hours	Not illuminated
In working hours	Illuminated in green
Stopped	Illuminated in red
During rest break	Illuminated in orange

When the machine is stopped during a rest break, the rest break has preference over the stop, causing the LED to illuminate in orange.

<When the Working hour is not used>

Operating status	LED status
Operating	Illuminated in green
Stopped	Not illuminated

* The orange MONITOR LED is produced by a simultaneous emission of the red LED and the green LED.

2-6 Error messages

Each message takes the form of a number and is displayed blinking in the following position.

1	0		0

Command + Error No.

[Error message list]

Command	Error No.	Description
10	0	The device type input does not exist.
4	4	The data input does not have the format for time.
	5	The digits of the time data input are less than required.
5	5	The data input does not have the format for time.
	6	The input position of 0000 is incorrect.
	9	The working hours are out of sequence in terms of time.
3	1	Not allowed to set any [+] advancement larger than the Actual.
7	7	The data input does not have the format for time.

[Special error message list]

Command	Error No.	Description
99	0	Nonvolatile memory backup error
	2	Clock backup error
	3	Data check code error
	4	Data out-of-range error

Special error messages occur during power on.

When the error message of "Error No.0" occur, push "ENT" key after blinking error messages.

They do not normally take place. If any of them should frequently occur, repair is considered necessary. Please contact the outlet store through which you purchased the product or our Sales Office.

Chapter 3 Handling Information

3-1 Handling precautions

- [1] The machine maintains the displayed data after the working hours are over. Thus, you need to turn off power once or press the [CLR] key before the start of working hours.
(Unless the previous day's data is cleared, the machine will not start the Plan/Advancement calculation.)
- [2] Assume a case where the clock time is changed after the start time of working hours. If the time is put back, the machine operates erroneously, recognizing that 24 hours or more have elapsed. In this case, press the [CLR] key after you have put back the time.
For example, if the clock time is changed to 8:27 at 8:30, then the machine takes it for 8:27 on the next day.
- [3] It is imperative that the machine be switched on before the start time of working hours. If it is switched on after that, the machine fails to operate normally. For the machine takes it for recovery from a power failure because it is within working hours and recognizes 24 hours or more have elapsed. In such a case, press the [CLR] key after you have switched on the machine.
- [4] Most of the causes for abnormal operation of the machine are attributed to the Working hour setting, the Tact setting, and the above [1]/[2]/[3]. When the machine does not operate normally, try pressing the [CLR] key after re-checking if the Working hour, Tact, and Clock are normal. If the machine still does not return to normal condition, please contact us because a machine trouble is suspected.
- [5] When the data display is blinking, the stop function is working. See "2-4 Stop function" on page 36.
- [6] If the time is shifted, it is necessary to exchange the clock backup battery. It might be consumed. When you have to exchange, contact the AGENT or through which you purchased the product or our office.
- [7] If you select the operation type which includes target of display when the function which plan stop at target is selected in the function setting (the case of setting "1"), "Plan", "Advancement", "Accomplishment rate", can't be set any more.

3-2 After Service and Warranty

If something is wrong. If you should find anything wrong with the machine when using it under normal conditions, check the warranty and repair regulations and contact the outlet store through which you purchased the product or our Sales Office. The latest warranty and repair regulations can be found on our website.

[Warranty Regulation]

This regulation (hereinafter referred to as the "Regulation") is for post-shipment warranty provided by HERUTU ELECTRONICS CORPORATION (hereinafter referred to as the "Company") so that you can use the Company's product you have purchased with confidence. The Regulation does not apply to special order products (custom products). In addition, purchased products shall be subject to the relevant manufacturer's warranty regulations, and the Regulation shall not apply.

Please note that in the event that the product you purchased comes with an instruction manual that describes the Company's old repair regulation, the latest Regulation will still apply.

1. Warranty period

Unless otherwise specified, the warranty period shall be "up to thirteen months from the date of shipment of the product by the Company". During the warranty period, the Company will replace the product with a new one or repair it free of charge in accordance with the provisions of the Regulation.

In addition, if a failure occurs during the warranty period due to the Company's responsibility and the product with the failure (hereinafter referred to as the "Product") is replaced with a new one or repaired free of charge, the warranty period of the Product will be "thirteen months from the date of initial shipment of the Product, or six months from the date of shipment of the Product that has been replaced or repaired, whichever comes later".

The warranty period for paid repairs shall be in accordance with the provisions of the Company's repair regulation.

2. Warranty scope

If a failure occurs during the warranty period due to the Company's responsibility, the Company will replace the product with a new one or repair it free of charge.

Even within the warranty period, the warranty does not apply in the following cases:

- A) In the event of failure or damage caused by improper handling by the customer, such as dropping or impact during transportation or movement by the customer
- B) In case of failure due to disassembly or modification of the main unit by the customer
- C) In case of natural disasters such as fires, earthquakes, floods, and in case of failure or damage due to abnormal voltage
- D) In case of failure caused by failure of equipment other than the Company's designated equipment connected to the Product
- E) In case of failure of the Product's accessories (AC adapter, antenna, connection cable, etc.)

- F) If damage is caused by the failure of consumables or limited-life parts included in the Product:
1. Consumables: Batteries (rechargeable, batteries, dry batteries, button batteries, etc.), recording media (SD cards, etc.)
 2. Limited-life parts: Various switches (limit switches, push button switches, etc.) and various sensors
 3. Other items that are worn out or have a service life due to use
- If consumables or limited-life parts fail, we will replace or repair the parts for a fee.
- G) In case of failure caused by handling contrary to the usage and precautions described in the instruction manual of the Product
- H) If repaired, adjusted, or improved by elsewhere other than the Company
- I) If the Company is unable to reproduce the failure

3. About repair of the Product

Please note that repairing the Product requires equipment such as measuring instruments and tools, so the Company will handle it as a pick-up repair service at the Company.

4. About the shipping cost for replacement or repair of the Product

Shipping charges for sending the Product to the Company or a distributor, as well as shipping charges for sending the Product that has been replaced or repaired by the Company or the distributor to the customer, will be borne by the Company or the distributor.

5. Disclaimer

The Company is not responsible for any direct or indirect damages or monetary loss caused by failure of the Product or its use.

6. Additional notes

Please note in advance that the information of the Product described on the Company's website and in the catalogs, instruction manuals, technical materials, and other materials provided by the Company are subject to change without notice to customers.

[Repair Regulation]

This regulation (hereinafter referred to as the "Regulation") shall be applied to paid repair service (hereinafter referred to as the "Service") provided by HERUTU ELECTRONICS CORPORATION (hereinafter referred to as the "Company"). The Regulation does not apply to special order products (custom products). In addition, purchased products shall be subject to relevant manufacturer's repair regulations, and the Regulation shall not apply.

Please note that in the event that the product you purchased comes with an instruction manual that describes the Company's old repair regulation, the latest Regulation will still apply.

1. Subject of the Regulation

The Service is provided for the Company's products that are "beyond the scope of the warranty specified in the warranty regulation" and "from the sales start date to the end date of the repair period (seven years from the production end date)". However, please note that the end date of the repair implementation period may be earlier depending on the availability and procurement status of repair parts.

2. Establishment of contract

The contract shall be established when the customer approves the quotation presented by the Company and issues an order form before the end of the repair implementation period.

3. Purpose of the Service

The Company will provide the Service for the purpose of repairing the function and performance of the Company's product used by the customer if it fails beyond the scope of the warranty specified in the warranty regulation. Please note that the Service requires equipment such as measuring instruments and tools, so the Company will handle it as a pick-up repair service at the Company.

4. Usage fee for the Service

The usage fee for the Service shall be the total of the following fees:

A) Repair service fee

The repair service fee is the total amount of technical fees, parts costs, other expenses incurred, and applicable taxes associated with repairing the Company's product (hereinafter referred to as the "Product for repair") that the customer wishes to repair.

B) Shipping fee (including the cost of packaging boxes)

The Company kindly asks that customers bear the shipping costs for sending the Product for repair to the Company and for returning it from the Company. However, in the event that the Product for repair is sent by payment on delivery by the customer, the shipping cost will be included in the Service charge.

5. Warranty period and scope of the Product for repair

The warranty period for the Product for repair is "up to six months from the date of repair completion". However, please note that failures other than the repaired parts (repaired places or replaced parts) are not covered by the warranty of the Product for repair. In addition, if a failure occurs due to the Company's responsibility within the warranty period, the Company will again repair the product free of charge.

6. Handling of repair parts

- A) In order to provide the Service stably for a long time and to promote environmental protection, etc., the Company may use recycled parts or alternative parts at the time of

repair at its discretion.

- B) The Company may, at its own discretion, collect the removed parts for the purpose of recycling or analysis at the time of parts replacement through the regulation of the Service. Please note that the collected parts are the property of the Company and will be recycled, used or discarded at its discretion.

7. Estimate for the Service

The estimate for the Service is basically free of charge. However, if the Company is unable to reproduce the failure, it will not be able to carry out repairs and will not provide an estimate. If a technical investigation is required to reproduce the failure, the Company will estimate the cost of reproducing the failure.

8. Return of unrepaired product

If the Company does not estimate the cost of the Service due to reasons such as being unable to reproduce the failure, it will return the Product for repair to the customer.

In addition, if the customer does not place an order within three months from the date of creation of the quotation, or if the customer does not accept the quotation and the customer expresses an intention not to carry out the repair, the Company will assume that the customer has canceled the request for the Service, and the Company will return the Product for repair to the customer without carrying out the repair.

In addition, if a shipping fee is incurred for returning the product, it will be borne by the customer.

9. Handling of personal information

The Company will properly handle personal information such as names and addresses being provided in accordance with the privacy policy posted on the Company's website.

10. Compensation for damages

- A) The responsibility of the Company for providing the Service shall be limited to the matters and contents specified in the repair regulation, and shall not include any damages incurred by the customer due to special circumstances (including loss of profits of the customer and damages based on claims for compensation made by third parties against the customer) and damages caused by the customer being unable to use the product due to a failure or defect of the Product for repair. However, this does not apply if the damage was caused by the Company's willful misconduct or gross negligence.
- B) Even if the Company is liable to the customer for damages in connection with the regulation of the Service, the Company's liability shall not exceed the amount equivalent to the value of the Product for repair, except in cases of willful misconduct or gross negligence on the part of the Company. The value of the Product for repair shall be calculated based on the residual value after depreciation or the price of products with

equivalent performance sold in the market at the time of damage.

11. Additional notes

- A) The Company cannot restore stickers, LCD protective sheets, and coloring applied to the outer casing parts that you have attached yourself. In addition, if advertisement stickers were affixed at the time of sale, they cannot be newly prepared as repair parts when replacing the outer casing parts. After replacing the outer casing parts, the advertisement stickers will be returned without being affixed.
- B) Please note in advance that the information of the Product on the Company's website and in the catalogs, instruction manuals, technical materials, and other materials provided by the Company are subject to change without notice to customers.

Working Hours Worksheet

For setting working hours, it is useful to fill them in this worksheet before inputting.

No. of times	Time	Remarks	No. of times	Time	Remarks
00	:	Start	26	:	Start
01	:	End	27	:	End
02	:	Start	28	:	Start
03	:	End	29	:	End
04	:	Start	30	:	Start
05	:	End	31	:	End
06	:	Start	32	:	Start
07	:	End	33	:	End
08	:	Start	34	:	Start
09	:	End	35	:	End
10	:	Start	36	:	Start
11	:	End	37	:	End
12	:	Start	38	:	Start
13	:	End	39	:	End
14	:	Start	40	Only 00:00 can be set.	
15	:	End	* After setting the end of the last working hour, be sure to set 00:00. * For 0:00 A.M. set 24:00.		
16	:	Start			
17	:	End			
18	:	Start			
19	:	End			
20	:	Start			
21	:	End			
22	:	Start			
23	:	End			
24	:	Start			
25	:	End			



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