JANOME ELECTRO PRESS

JP-104	JP-204	JP-504	JP-1004
JP-1504	JP-3004	JP-5004	
JPH-104	JPH-204	JPH-504	JPH-1004
JPH-1504	JPH-3004	JPH-5004	
JPU-104	JPU-204	JPU-504	JPU-1004
JPU-1504	JPU-3004	JPU-5004	JPU-8004

Operation Manual

<Operation>

Thank you for purchasing the Electro Press.

***Read this manual thoroughly in order to properly use this machine.**
Be sure to read "For Your Safety" before you use the machine. It will protect you from possible dangers during operation.
***After having read this manual, keep it in a handy place so that you or the operator can refer to it whenever necessary.**

JANOME

FOR YOUR SAFETY

Safety Precautions

The precautions stated in this manual are provided for the customer to make the best use of this product safely, and to provide preventive measures against injury to the customer or damage to property.

• • • • • Be sure to follow the instructions • • • • •

Various symbols are used in this manual. Please read the following explanations to understand what each symbol stands for.

● Symbols indicating the Degree of Damage or Danger

The following symbols indicate the degree of damage or danger which may be incurred if you neglect the safety notes.

Warnings	These "Warnings" indicate the possibility of death or serious injury.
Cautions	These "Cautions" indicate the possibility of accidental injury or damage to property.

● Symbols indicating the type of Danger and Preventive Measures

The following symbols indicate the type of safety measure that should be taken.

	Indicates the type of safety measure that should be taken.
	Take care. (General caution)
	Indicates prohibition.
	Never do this. (general prohibition)
	Do not disassemble, modify or repair.
	Do not touch. (contact prohibition)
	Indicates necessity
	Be sure to follow instructions.
	Be sure to unplug the power supply from wall outlet.
	Be sure to check grounding.

FOR YOUR SAFETY

⚠ Warnings

Do not leave the unit plugged in (power cord and connectors) when it is not in use for long periods of time. Dust can cause fire.
Be sure to shut off the power supply before removing the power cord.

Regularly replace the built-in battery (optional) in the body or control box. It is preferable to replace it every 3 years.
Failure to do so may cause malfunction or defect.

Keep the emergency stop switch within reach of an operator while teaching and running the machine.
Failure to do so is dangerous because the machine cannot be stopped quickly and safely.

Regularly check that the I/O-S circuits and emergency stop switch work properly.
Failure to do so is dangerous because the machine cannot be stopped quickly and safely.

Check the mounting screws regularly so that they are always firmly tightened.
Loose screws may cause injury or damage.

Power the unit only with the rated voltage.
Excessive voltage can cause fire or malfunction of the unit.

Do not sprinkle water or oil on the unit, control box, or its cable.
Contact with water can cause electric shock, fire, or malfunction of the unit.
IP Protection Rating is IP40.

A person entering the machine's operation area may be injured.
Put up a "No Entry" or "No Operating" warning sign in a clearly visible position near the machine.

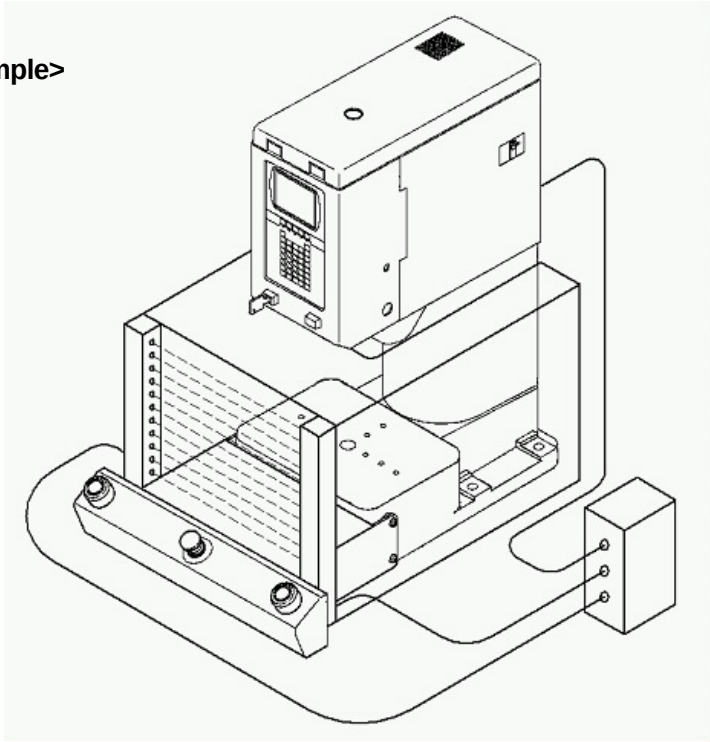
FOR YOUR SAFETY

INSTALLATION

⚠ Warnings

Install an interlock as a safeguard that triggers an emergency stop when it is activated using the I/O-S connector included in the package.

<Example>



Use protective wear (helmet, protective gloves, protective glasses and protective footwear) when installing the machine.

Place the machine in a well-ventilated area for the health and safety of the operator.

Place the machine on a suitable flat surface that can support its weight and do not cover the cooling fan vent on the top of a stand-alone and head type.
An insufficient or unstable area can cause the machine to fall, overturn, breakdown or overheat.

FOR YOUR SAFETY

⚠ Warnings

Confirm that the unit is properly grounded.
Power supply earth should be connected complying with Type D grounding. (under 100 Ω of resistance.)
Insufficient grounding can cause electric shock, fire or malfunction.

Plug the power cord into the wall outlet firmly.
Incomplete insertion into the wall outlet heats the plug and can cause fire.
Check that the plug is not covered with dust.
Be sure to shut off the power supply before connecting the power cord

Do not attempt to disassemble or modify the machine.
Disassembly or modification may cause electric shock, fire or malfunction.

Be sure to use within the voltage range indicated on the unit.
Failure to do so may cause electric shock or fire.

Do not use the unit near inflammable or corrosive gas.
If leaked gas accumulates around the unit, it can cause fire.
IP Protection Rating is IP40.

Turn off the unit before inserting and removing cables.
Failure to do so may result in electric shock, fire, or malfunction of the unit.
IP Protection Rating is “IP40.”

Use the machine in an environment between 0 to 40 degrees centigrade with a humidity of 20 to 95 percent without condensation.
Use outside tease conditions may result in malfunction.
IP Protection Rating is “IP40.”

Keep the emergency stop switch within reach of an operator while teaching and running the machine.
Failure to do so may cause danger since the machine cannot be stopped immediately and safely.

FOR YOUR SAFETY

⚠ Warnings

	**Use the machine in an environment where no electric noise is present.**
	**Attach an eyebolt and use a crane or other equipment to transport the machine.** Failure to do so may result in malfunction or defect.
	**Do not bump or jar the machine while it is being transported or installed.** This can cause defects.
	**Use the machine in an environment where it is not exposed to direct sunlight.** Direct sunlight may cause malfunction or defect.
	**Be sure to confirm that jigs such as the electric screwdriver unit, etc. are properly connected.** Failure to do so may result in injury or defect.
	**Be sure to check the wiring to the main unit.** Improper wiring may cause malfunction or defect.
	**Be sure to shut off the power supply before plugging the power cord.**
	Place the control box on a flat surface more than 80 cm above the floor so that it is easier to operate it.
	The installation mount should be steel. **For the stand-alone type, it should be able to support the machine's weight. For the head and unit types, it is able to support the machine's weight and pressing capacity.**
	**Use the machine in an environment that is not dusty or damp.** Dust and dampness may cause failure or malfunction.

FOR YOUR SAFETY

WORKING ENVIRONMENT

⚠ Warnings

When you lubricate or inspect the unit, unplug the power cord from the outlet.
Failure to do so may result in electric shock or injury.
Be sure to shut off the power supply before removing the power cord.

During operation, always have the emergency stop switch within the operator's reach.
For the operator's safety, the emergency stop switch is necessary to make a quick and safe stop in an emergency.

Always be aware of the machine's movement, even in the teaching mode.
Special attention will protect the operator from injury.

FOR YOUR SAFETY

DURING OPERATION

⚠ Warnings

When starting the machine, check that **no object will interfere with the machine's operation.**

Under no circumstances should you go inside the working area or place your hands or head inside the working area while the machine is operating.

If anything unusual (e.g. a burning smell) occurs, stop operation and unplug the cable immediately. Contact your dealer or the office listed on the last page of this manual.
Continuous use without repair can cause electric shock, fire, or breakdown of the unit.

During teaching, tests, and actual operation, always have the Emergency stop switch within the operator's reach.
For the operator's safety, the emergency stop switch is necessary to make a quick and safe stop in an emergency.

PREFACE

The operation manual for the JANOME Electro Press consists of the following volumes.
“For Your Safety” is also provided so that the customer can make the best use of this product safely. This section includes preventive measures that can be taken against injury to the customer or damage to property. Please be sure to read “For Your Safety” before using this product.

Setup	This volume explains how to set up the Electro Press. * For those who have received training in Electro Press safety and installation.
Maintenance	This volume explains Electro Press maintenance. * For those who have received training in Electro Press safety and installation.
Teaching and Operation	This volume lists part names and data structure as well as providing the basic knowledge necessary to operate the Electro Press.
Operation	This volume explains how to operate the Electro Press.
Specifications	This volume provides comprehensive specifications, including mechanical and electrical requirements.

Note: The product specifications in these volumes may differ from those of the machine you have received due to a product upgrade.

Please be sure to follow the instructions described in these volumes. Proper use of the robot will ensure continued functionality and high performance.
These volumes are based on the standard application. Menu items may vary depending on the model.

Be sure to shut off the power supply before plugging in the power cord.

BE SURE TO MAKE A PROPER GROUNDING WHEN YOU INSTALL THE MACHINE.

Be sure to save data whenever it is added or modified. **Otherwise, changes will not be saved if the power to the robot is cut off.**

CONTENTS

1. CHECKING BEFORE ACTIVATION

Check the following items before you register data or operate the machine.

■ Obstacles

Check that there are no obstacles in or around the Electro Press working area.

■ Emergency Stop Function

Check that the I/O-S circuit (Interlock) and emergency stop switch work properly.
Without this check you may not be able to stop the machine quickly and safely.
The Electro Press will stop running if the interlock comes ON or you press the emergency stop switch.

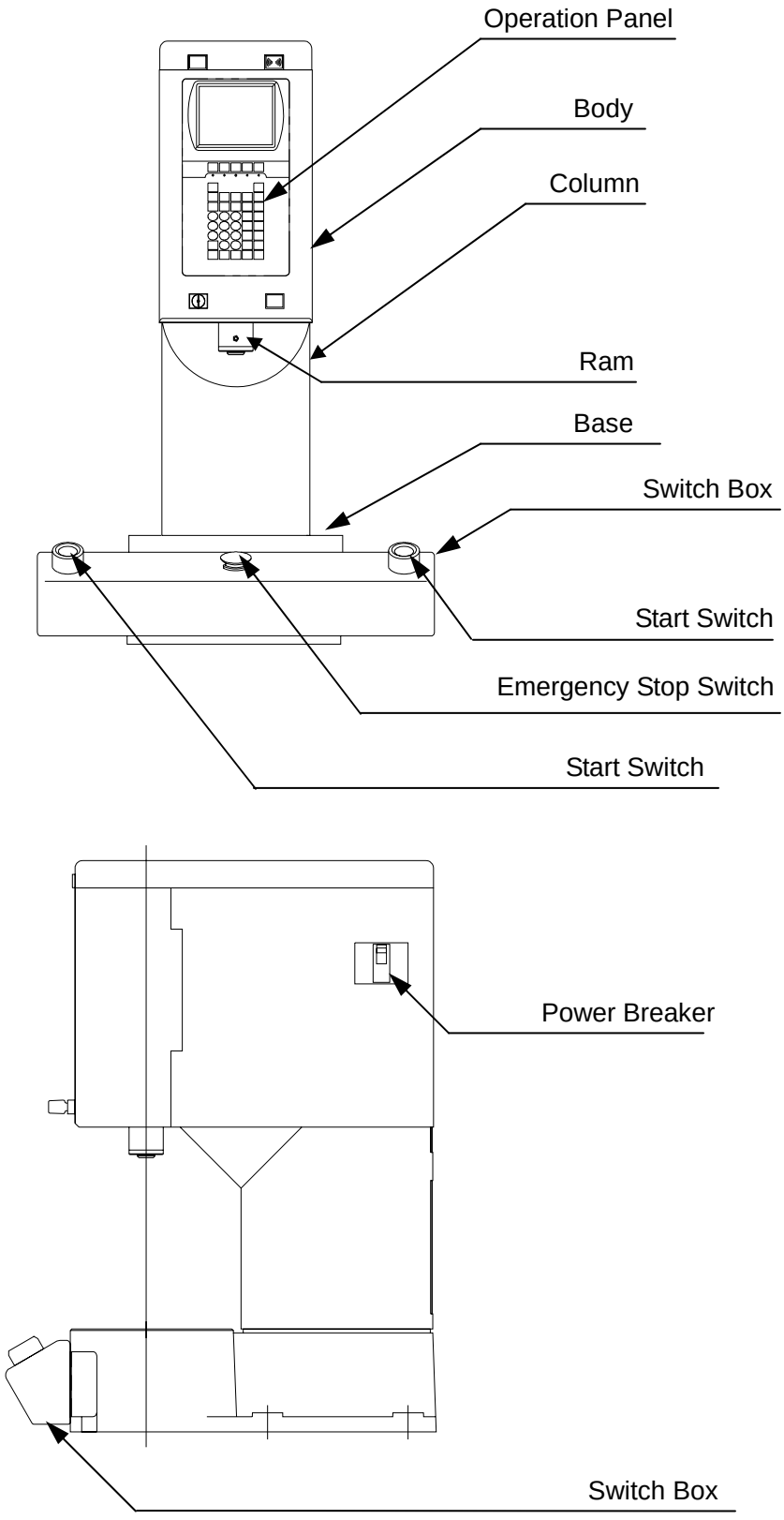
<How to release the emergency stop switch>

Turn the pressed in emergency stop switch in a clockwise direction to release the emergency stop.

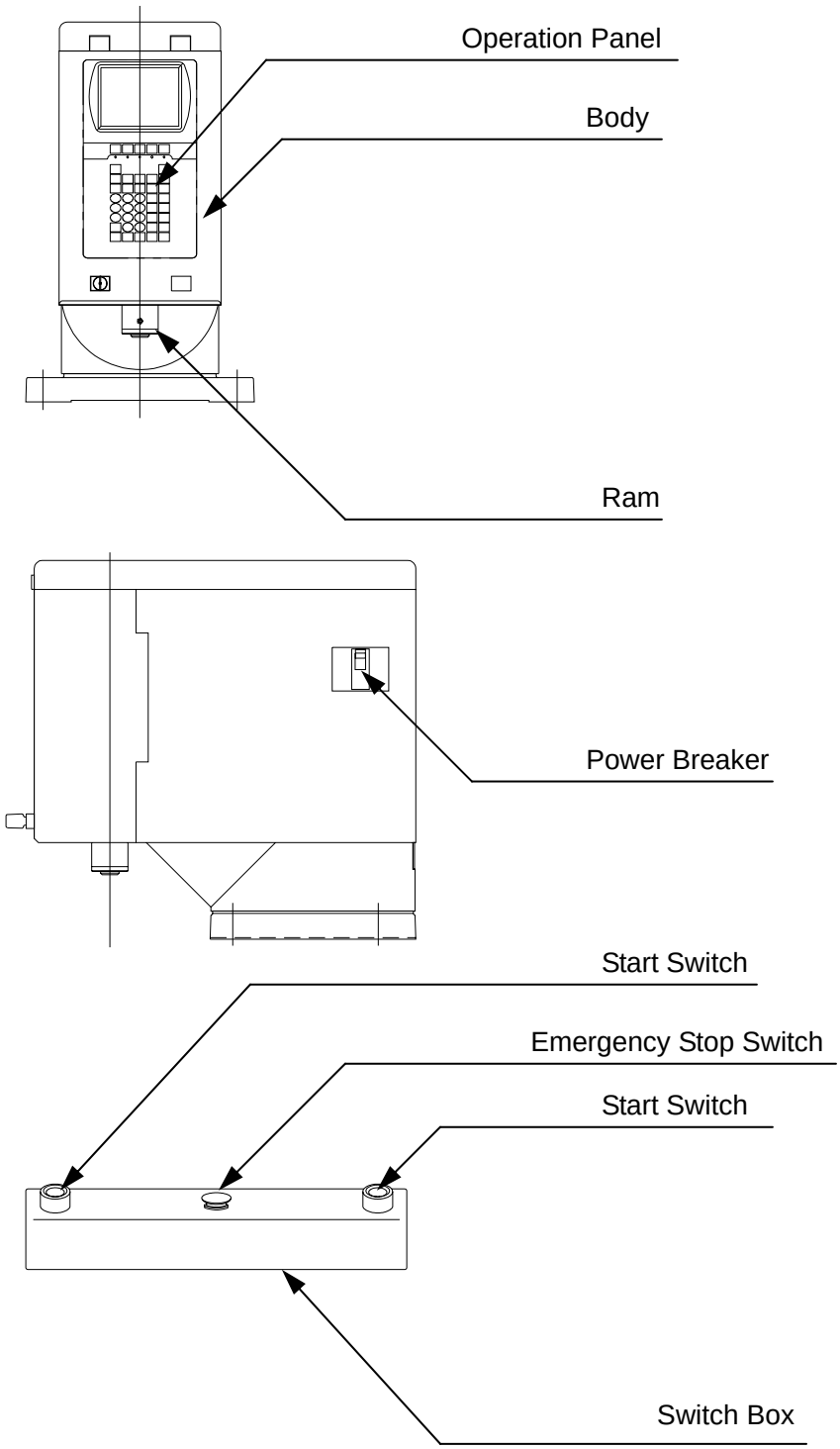
2. PARTS NAMES

2-1 Parts Names

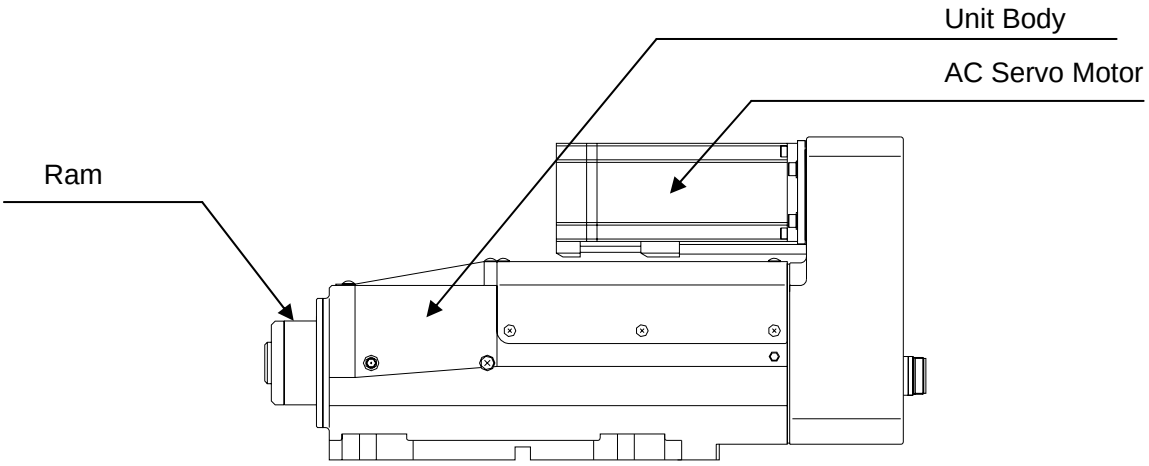
2-1-1 Stand-Alone Type

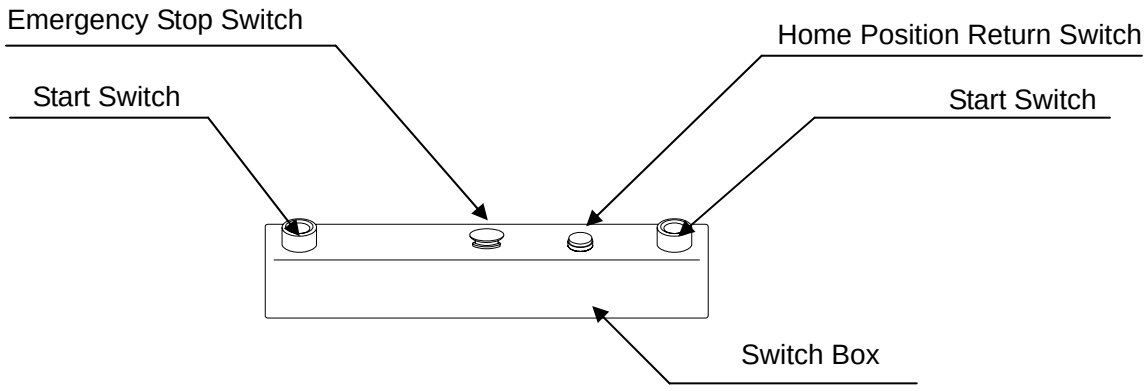


2-1-2 Head Type



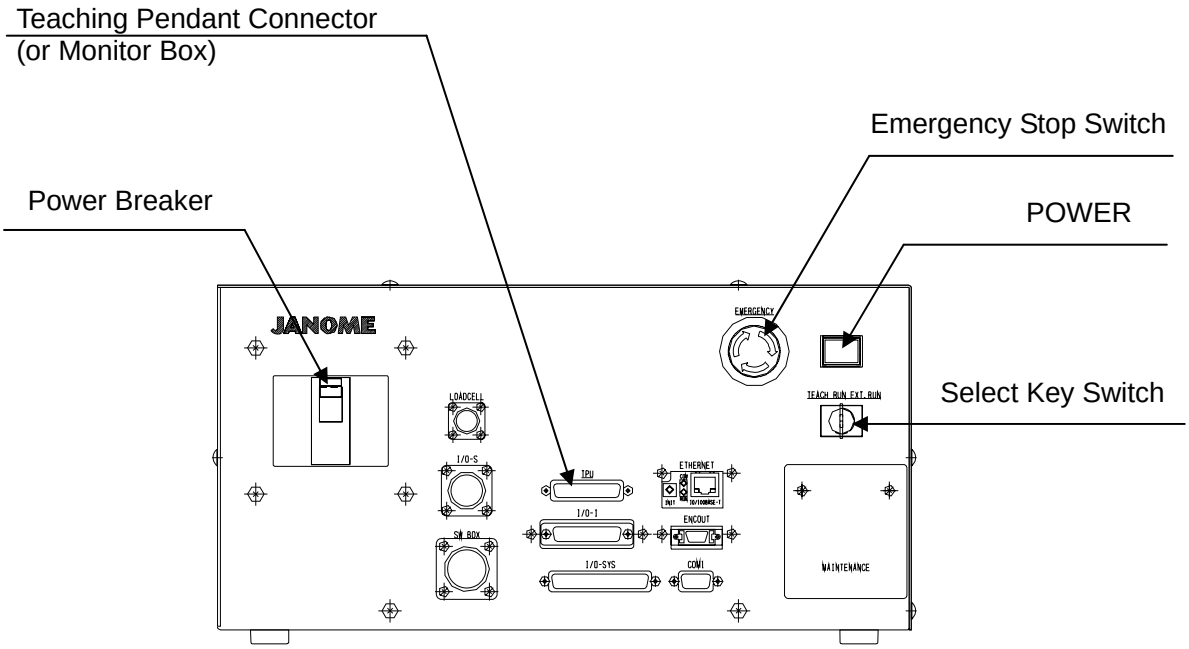
2-1-3 Unit Type



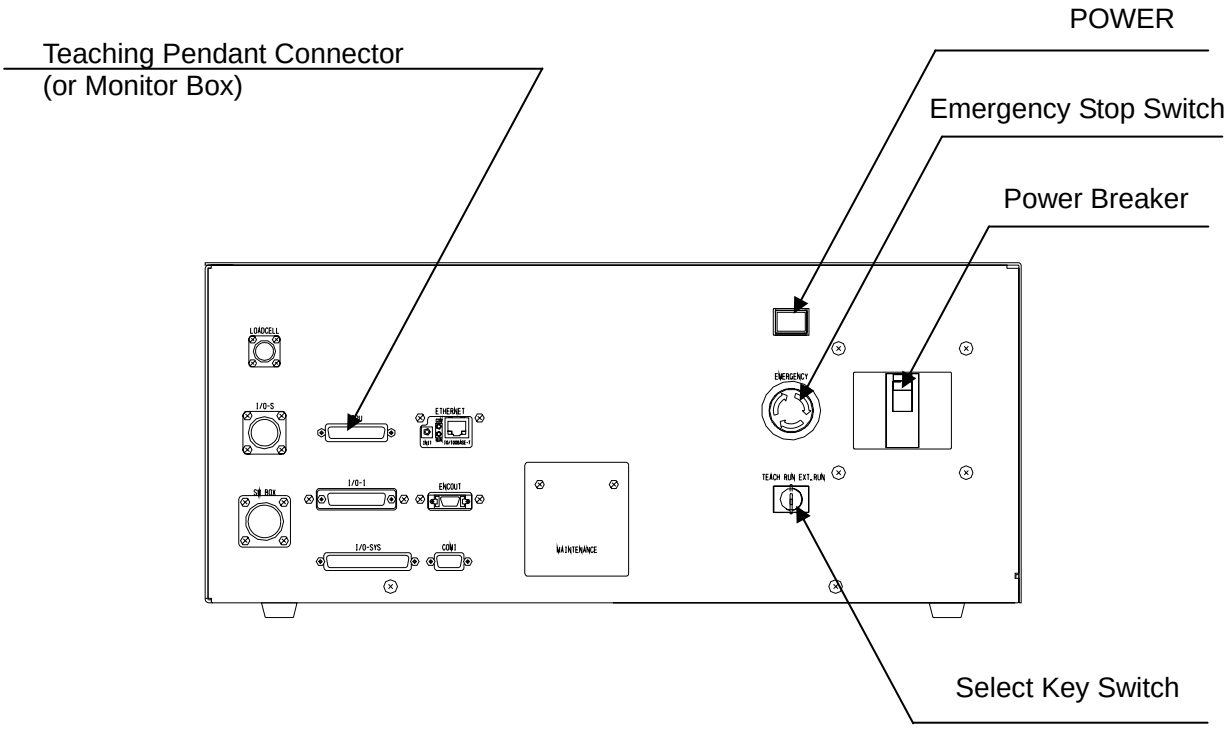


2-1-4 Control Box (Unit Type)

<Control Box (Front) (JPB-104 – 1504)>

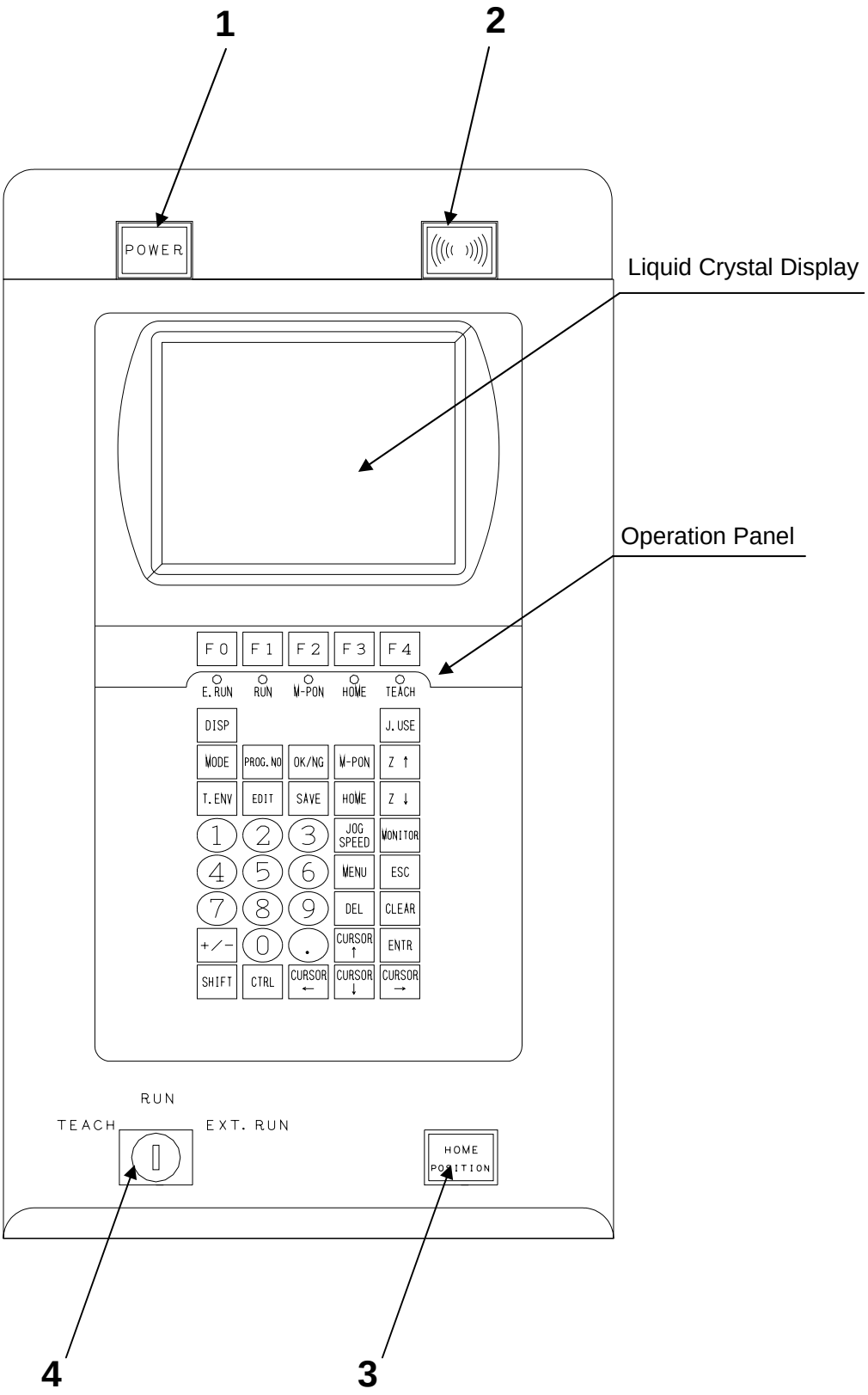


<Control Box (Front) (JPB-3004 – 8004)>



2-2 Operation Panel

2-2-1 Operation Panel (Stand-Alone/Head Type)



2-2-2 Operation Panel Functions

● **Lamp, Alarm and Switch**

1. 

[POWER]: Lights up when the power switch is turned on.
2.  [ALARM]: Sounds when an error occurs.
3. 

[HOME POSITION]: The ram returns to home position when the power is turned on.
4.  [SELECT KEY SWITCH]: The key that switches between RUN, TEACH, and EXT. RUN

● **Operation Panel Keys**

1 - 9 0	: Numeric Entry Keys. Enters numbers.
CLEAR	: Clears entered numbers.
DEL	: Deletes 1 digit.
ENTR	: Fixes entered numbers or items.
ESC	: Cancels entered items and restores previous items.
MENU	: Displays mode menu.
DISP	: Changes display to show operation results.
T.ENV	: Displays environmental setting menu such as display unit, etc.
PROG.NO	: Switches program number (enter/call.)
SAVE	: Saves teaching data.
J.USE	: Substitutes the current position as a setting value in JOG mode. Makes JOG mode effective.
JOG SPEED	: Switches the ram speed while in JOG mode.
F.0 - F.4	: Function Keys; various functions.
SHIFT	: Changes the function when pressed simultaneously with another key.
CTRL	: Changes the function when pressed simultaneously with another key.
CURSOL ↑	: Shifts the cursor (highlight) upward or to the previous page.
CURSOL ↓	: Shifts the cursor (highlight) downward or to the next page.
CURSOL←	: Shifts the cursor (highlight) to the left.
CURSOL→	: Shifts the cursor (highlight) to the right.

MODE, MONITOR, M-PON, Z ↑, Z ↓, HOME: Unused keys

● **LED**

E.RUN : Lights up when in external run mode.
RUN : Lights up when in run mode.
M-PON : Lights up when the motor power is ON.
HOME : Lights up when the ram is at the mechanical home position.
TEACH : Lights up when in teaching mode.

2-3 Monitor Box (Optional for the Unit Type)

Under development.

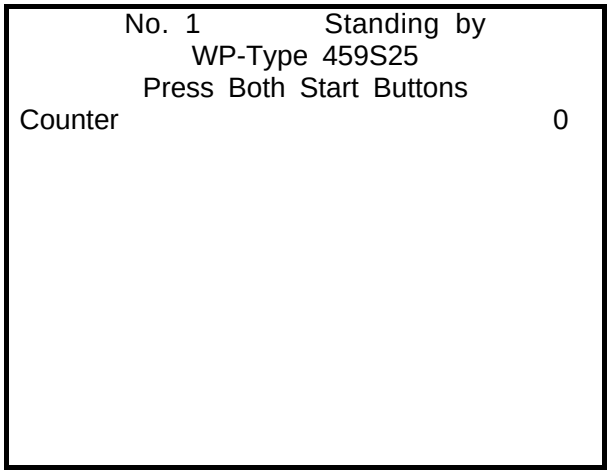
3. RUNNING

You can run the program with the start switches.

- Set the operation mode to [Run] using the select key switch.

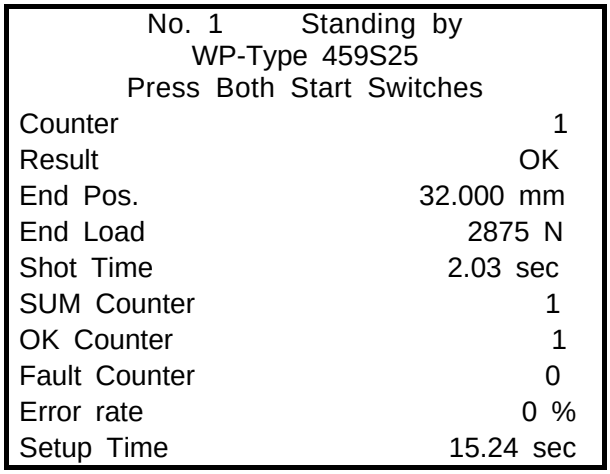
Note:
- Operate the Electro Press by using the switch box.
- If you are using the unit type, an switch box is available as an option.
  To use the switch box for the unit type, it is necessary to press [MENU] key on the teaching pendant in teaching mode and set “Switch Box” to “Valid” under “System Settings.”

- Place a workpiece beneath the ram.



- Press the two start switches on the switch box together. The ram shifts according to the registered settings. Keep pressing both start switches until the ram starts ascending.

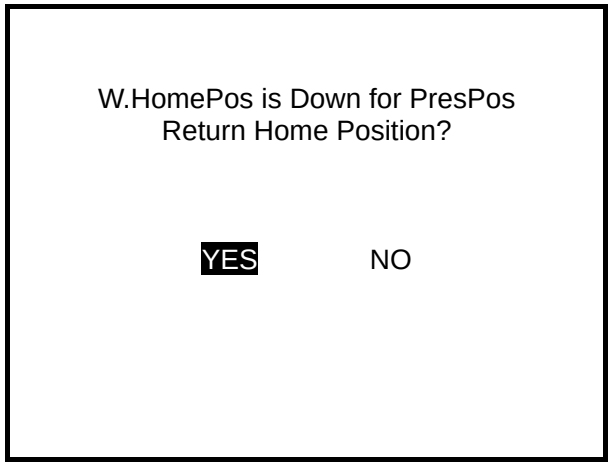
  If you release one switch while the ram is descending, the ram stops on the spot. Then, the ram returns to the work home position if you release the other switch.
  This returns a [Stop in Middle] NG and the buzzer sounds. To stop the buzzer, press either the start switches, [F·1], [F·2], or [F·3] key.
  The ram returns to the work home position and the operation result will be displayed will be displayed after releasing the start switches.



Note:
- Each time the start switch is pressed, the Electro Press performs operations and the operation results will be displayed accordingly.

[Special Program]

If a program in which the settings for the work home position are lower than the End position has been selected, the confirmation screen to the right will appear when switching to run mode or program selection.
The machine will go into standby status when [YES] or [NO] is selected.
If the [ESC] key is pressed, the confirmation screen will appear again and you can re-select [YES] or [NO.]



If [YES] is selected and an operation is started, the ram descends to the work home position after pressing. This is regarded as the one-shot end.
If [NO] is selected and an operation is started, the ram does not descend to the work home position after pressing. The end position is regarded as the one-shot end.

- This confirmation screen will not be displayed on the unit type Electro Press. This is a feature of the stand-alone and head types only. With the unit type, the ram descends to the work home position after pressing, and this is regarded as the one-shot end.

4. OPERATION RESULT

Press both start switches on the switch box at the same time, and the ram shifts according to the values that were set during teaching. If you release one of the switches, the ram stops and returns to the work home position. Keep pressing the switches until the ram starts ascending. After the ram has returned to the work home position and the start switches are released, the screen displays the work results.

The following work results are possible.

Work Result 1

1. Counter: Finished (OK) works + unfinished (NG) works
2. Sensor Result: Sensor and system error results
3. End Position: Position where ram stopped
4. End Load: Load at position where ram stopped
5. Work Time: Time required for one work cycle
6. Sum Counter: Number of works performed since shipment
   (Reset is unavailable. The test run will not be included in the number.)
7. OK Counter: Number of jobs finished successfully
8. Fault Counter: Number of jobs not finished successfully
9. Error Rate: Error rate (%) = {Fault Counter / (OK Counter + Fault Counter)} x 100
10. Preparation Time: Time expended from the end of the last operation to the next cycle

Work Result 2

1. Work Time Rate: Work time rate (%) = {Working Time÷(Preparation Time + Working Time)} x 100
2. Touching Position: Position where the load cell detected touching load
   (The ram starts pressing from the position.)
3. Touching Load: Load at which the ram changes from probing to pressing
4. Approach Time: Time required for approach
5. Sensor Value: End value in the sensor range/sensor sampling value
   If there are plural sensors, each value is displayed on the screen in order. If the data covers several pages, press the [DISP] key to display the next page.

Work Result 3

External I/O Sampling Value: Displayed sampled value via external I/O (IN16)

How to Change the Display

- Perform the operation using the start switches. After the operation is complete and the start switches are released, the work result is displayed on the screen.

There will be some work results that return a fault due to an error triggered by a sensor result, or by an error other than a sensor error. The reason for the error is displayed as sensor results of operation.

No. 1	Standing by
WP-Type 459S25	
Press Both Start Switches	
Counter	154
Result	OK
End Pos.	30.25 mm
End Load	1050 N
Shot Time	5.23 sec
SUM Counter	2568
OK Counter	150
Fault Counter	4
Error rate	2.6 %
Setup Time	15.24 sec

The following are the possible sensor result errors.

OK

Sensor Result	OK

Sensor Upper Error

S1J1 Upper Error	NG

Sensor Lower Error

S1J1 Lower Error	NG

Pressure Over	NG

This error occurs when the load exceeded the preset maximum pressure in the Constant Speed - Set Stop Position mode or during approach.

Maximum Pressure: JP/JPH/JPU-104: 1000 N
JP/JPH/JPU-204: 2000 N
JP/JPH/JPU-504: 5000 N
JP/JPH/JPU-1004: 10000 N
JP/JPH/JPU-3004: 30000 N
JP/JPH/JPU-5004: 50000 N
JPU-8004: 80000 N

Position Over	NG

This error occurs when the ram exceeded the maximum lower position.

Limit Pos'n Over	NG

This error occurs when the ram exceeded the preset "Limit Position" during pressing.

Time Over	NG

This error occurs when the time exceeded the preset maximum pressing time in the Constant Load - Set Position Stop mode.

Stop in Middle	NG

This error occurs when the two start switches are released in the middle of operation.
If the operation is started using the external I/O, the External Signal Stop error occurs instead of the Stop in Middle error.

Approach Pressure Over	NG

This error occurs when the pressure exceeded the preset “Max. Pressure AP” during approach.

Probe Limit Pos’n Over	NG

This error occurs when the ram exceeded the preset probe limit position during probing.

Ext. Stop Signal	NG

This error occurs when the ram was stopped by an external stop signal (IN2) or when the IN1 start signal was interrupted.

- Press the [DISP] key to display the Work Result 2 (including sensor values.)

  If the data covers several pages, press the [DISP] key to display the next page.

  If the screen covers several pages, press the [DISP] key on the last page to display the Work Result 3.

No. 1	Standing by
WP-Type 459S25	
Press Both Start Switches	
Time Rate	25.5 %
Touch Pos'n	1.25 mm
Touch Load	50 N
Approach Time	1.23 sec
S1J1 End Value	1260 N
S1J2 Peak	2560 N

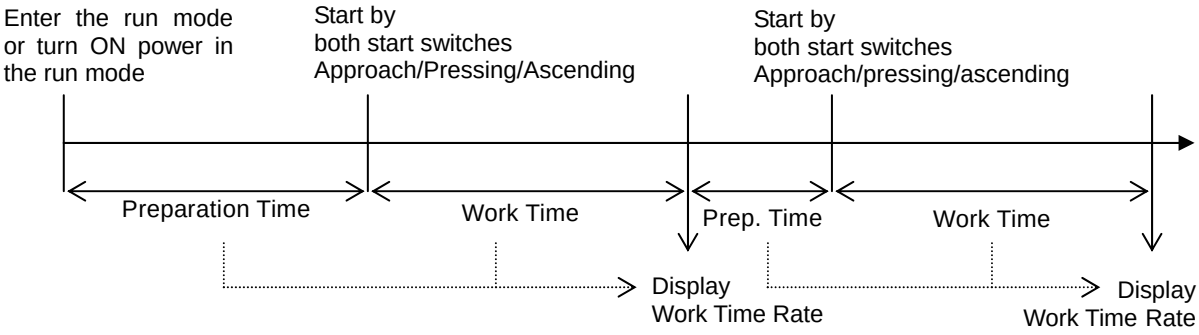
- Press the [DISP] key to display the Work Result 3 (External I/O Sampling Value.)

  If the data covers several pages, press the [DISP] key to display the next page.

  If the screen covers several pages, press the [DISP] key on the last page to display the Work Result 1.

No. 1	Standing by
WP-Type 459S25	
Press Both Start Switches	
Ext IO Input Result #1	
Position	55.256 mm
Load	1525 N
Time	0.43 sec
Speed	4.8 mm/s
Ext IO Input Result #2	
Position	56.5 mm
Load	2535 N
Time	0.58 sec
Speed	4.8 mm/s

The following chart shows the relationship between the preparation time, work time and work time rate.



5. PC COMMUNICATION

It is possible to connect the electro press to a PC and transmit operation results to it.

- To use this function, it is necessary to install the software “JP Sampler” (optional.)

- Hardware Requirements
  Personal computer capable of running Windows® NT4.0/2000/XP.

  Note:
  Windows, Excel and Word are trademarks of Microsoft Corp.

- The Electro Press can receive commands from a PC when the Electro Press is:
  1. switched on and waiting for the home position return signal.
  2. on standby.
  3. in the base condition (teaching mode.)

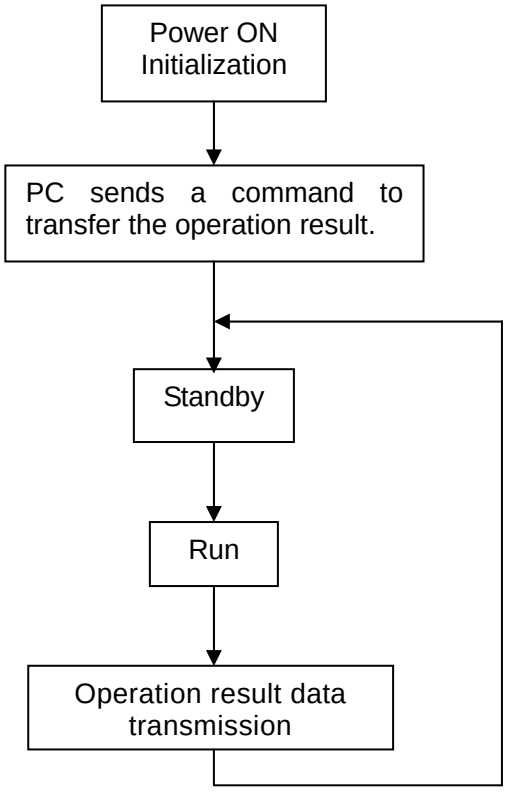
The Electro Press sends the operation results (position, load.) The data is sent to the PC from the Electro Press as the operation proceeds.

Data transmission errors are checked, and if any error is detected, the Electro Press resends the data.
The data is divided into 128 byte or 1K-byte blocks and sent to the PC in blocks. If the PC is not able to properly received the data, the Electro Press checks the results and resends the same block before sending the next block. The transmitted data includes binary files (results data) and is basically transmitted under XMODEM protocol.

R (Result Data Transfer) command is available for PCs.

● Sending Operation Results to PC

The operation results will be sent from the Electro Press to a PC if you instruct, before operation, the PC to send an R (result data transfer) command to the Electro Press. This instruction is remembered until the Electro Press is switched off or other command is sent from the PC.



The Electro Press does not start the next operation until it completes the data transmission. If this transmission takes time, operation will be delayed.

There are two kinds of result data.

1. Quality data
2. Time Series data

Which data the Electro Press transmits depends on what commands it receives from the PC.

● Transmission of Quality Data

Quality data can be transmitted repeatedly. The Electro Press sends the result of each operation to the PC, and the PC compiles the data using its application software. The Electro Press is not capable of storing and accumulating data.

At the start, or when the program number is changed, the Electro Press sends the following data for the program being executed.

1. Program number
2. Run mode
3. Sensor mode (if included)

The PC outputs the following header for the control information:

Program No. 12
S1: Const Speed - Set Stop Pos'n
J1: Sensor Load - Holding

The following specific result data will be transmitted:

1. OK Counter
2. Fault Counter
3. Sensor Result
4. End Position
5. End Load
6. Working Time
7. Prep. Time
8. Touching Pos'n
9. Touching Load
10. Sensor Value

The PC outputs the following file:

15:42:43 1/30/2005
Program No. 12
S1: Const Speed - Set Stop Pos'n
J1: Sensor Load.Position Range

Counter	Sensor	Result	End Position	End Load	Working Time	·····
[ ]	[ ]	[mm]	[kg]	[sec]	[sec]	·····
161	OK	82.345	2500	5.2	1.875	·····

Use the values calculated with the following formulas:

Counter = OK Counter + Fault Counter

Error Rate = Fault Counter / (OK Counter + Fault Counter) x 100 [%]

If there are plural sensor conditions, the plural sensor values will be transmitted. If the range covers one point (At End), the value at the point will be the sensor value. If the range covers plural points, the value of the end point will be the sensor value. If sampling (such as Peak) is designated, the sensor value will be the designated sample value. One sensor reading will result in one sensor value.

The character strings in the file will be enclosed in quotation marks (excluding numbers) and punctuated by commas.

This file can be loaded using the Microsoft Excel spreadsheets.
(Windows and Excel are registered trademarks of Microsoft Corporation.)

F: file
I: read text
N: data

● Transmission of Time Series Data

If the Electro Press is requested by the PC to send time series data, the Electro Press records position and load data within the designated sampling time (by the msec).
The Electro Press records data from the start position to the end position, but not while the ram is approaching or ascending to the work home position.
The Electro Press is able to record up to 8,000 pieces of data. For example, if the sampling time is set to 1msec, the transmission time will be 8 seconds and if the sampling time is set to 10msec, the transmission time will be 80 seconds.
The PC compiles the data and outputs the file as the follow example:

15:42:49 1/30/2005
Program No. 12
OK Counter 409
Fault Counter 31
Sum Counter 74500
Begin Time 0
Sampling Time 10
Number of data 832

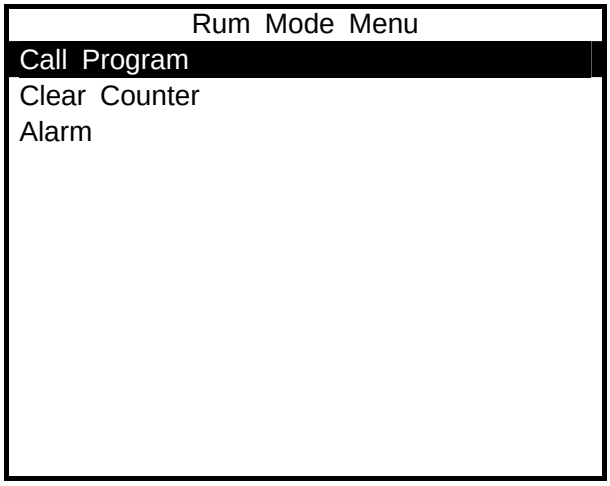
Position [mm]	Load [kg]
18.053	91
18.088	84
18.123	110
18.158	169
18.192	91
18.227	84
18.262	91
18.297	104
18.332	136
18.367	110
18.402	143
18.437	143
18.472	149
18.507	156
18.542	156
18.577	162
18.612	169
18.647	175
18.682	169
18.717	182
18.752	195
18.786	195
18.821	202
18.856	215
18.890	208
18.925	221
18.960	234
.....	...

6. MENU IN RUN MODE

In the run mode, you can select from many settings to operate the Electro Press.

Menu Operation

- Press the [MENU] key in run mode.
- Press the [DISP] key on the monitor box several times. The screen will change from the operation result display to the run mode menu.



- Highlight the desired item and press the [ENTR] key.

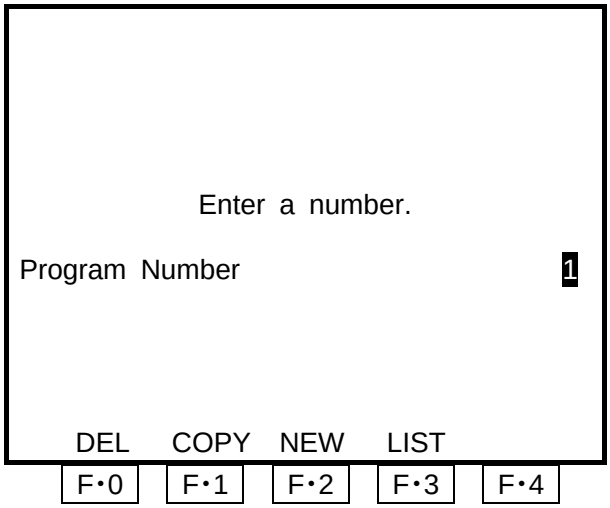
・ Press the [CURSOR ↓] key to shift the highlight downward.

・ Press the [CURSOR ↑] key to shift the highlight upward.

- To close the menu, press the [ESC] key or [SHIFT] + [ESC] keys. When you are using the monitor box, press the [DISP] key.

6-1 Call Program

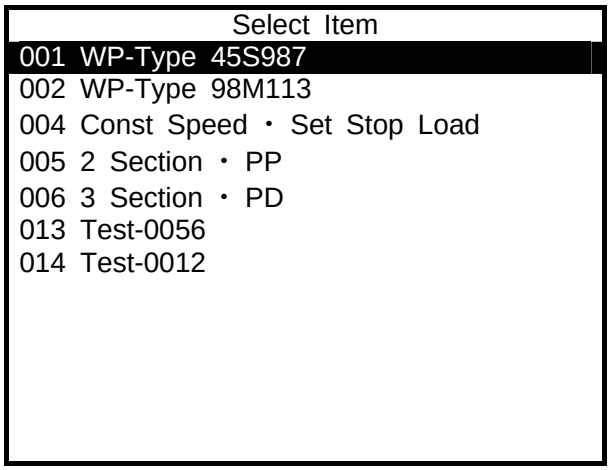
Select [Call Program] to display the screen to right.
Enter the desired program number.



It is also possible to select the desired item from the program list.
Press the [F•3] key to display the program numbers and program names.

Program numbers without teaching data will not be displayed.

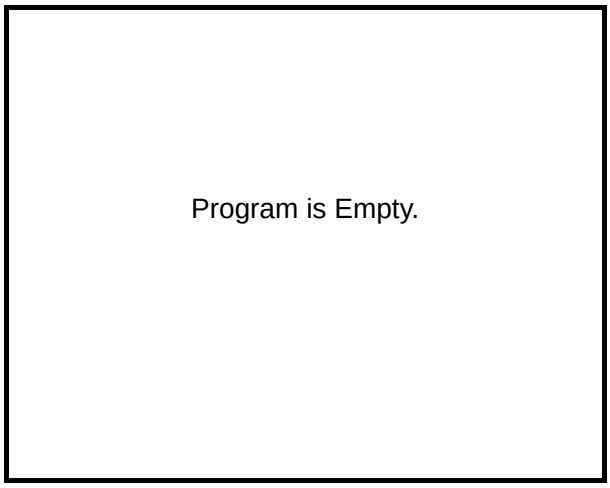
- Highlight the desired program and press the [ENTR] key.



Note:

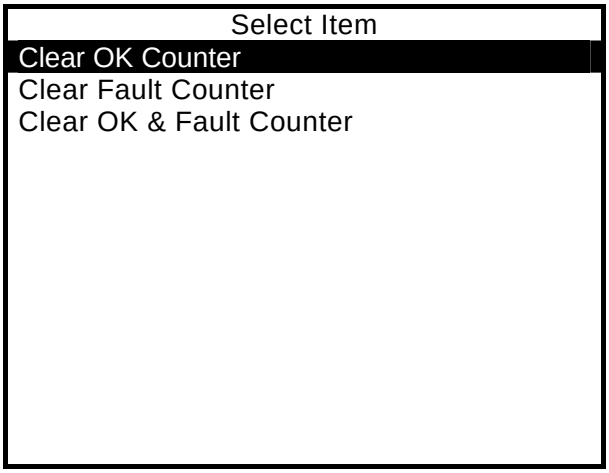
If a program number without teaching data is selected, the alarm will sound and the screen will display the message to right.

Press the [PROG. NO] key and enter a program number, or press the DIR ([F·2]) key and select a program from the list. When using the monitor box, press the [MENU] key and select [Call Program.]



6-2 Clear Counter

Select [Clear Counter], and the screen will ask you to select from [Clear OK Counter], [Clear Fault Counter] and [Clear OK & Fault Counter.]
Select the desired counter to reset it to zero, and the screen will return to the screen displayed before the [MENU] key is pressed.

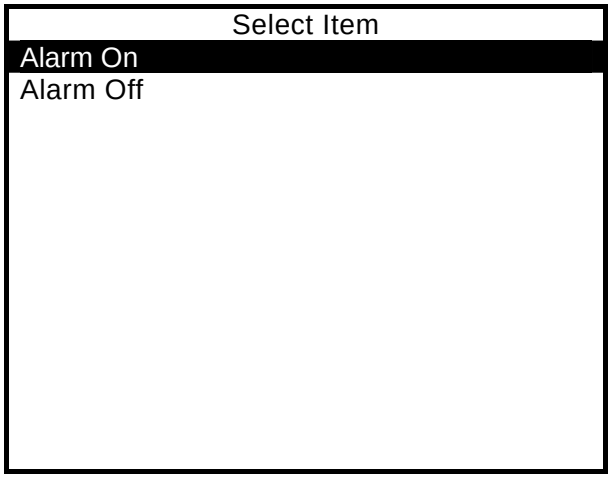


Note:
There are three different counters; OK Counter, Fault Counter, and Sum Counter. The sum counter cannot be cleared.

6-3 Alarm

Select [Alarm] to display the selection screen to right.

If you select [Alarm On], the alarm will sound when the error at end occurs.
If you select [Alarm Off], the alarm will not sound.
After setting, the screen will return to the screen displayed before the [MENU] key is pressed.



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