

USERGUIDE

# KG-101 Controller Series

## HIM Series Robot



### **WARNING - Reliance on this Manual Could Result in Severe Bodily Injury or Death!**

This manual is out-of-date and is provided only for its technical information, data and capacities. Portions of this manual detailing procedures or precautions in the operation, inspection, maintenance and repair of the product forming the subject matter of this manual may be inadequate, inaccurate, and/or incomplete and cannot be used, followed, or relied upon. Contact Conair at [info@conairgroup.com](mailto:info@conairgroup.com) or 1-800-654-6661 for more current information, warnings, and materials about more recent product manuals containing warnings, information, precautions, and procedures that may be more adequate than those contained in this out-of-date manual.

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## 1. FEATURES

The KG-101 controller controls the HIM series robot with its sequence control system which is applicable for complicated special robot motion. It is available to control the robot operation just besides the robot by using a handy console.

- MODE SELECTION ..... Selection of [ROBOT OFF] , [AUTO MODE] and [PGM·MAN] by a key switch.
- EMERGENCY STOP ..... Cut off the all output by pressing EMERGENCY STOP switch.
- MANUAL OPERATION ..... Individual manual operation of Main arm, Strip, traverse and wrist flip motion are available.
- RETURN TO HOME..... Possible to RETURN TO HOME position by [RETURN TO HOME] key.
- STEP motion ..... Stepping motion is available by [STEP] key.
- SETTING ..... MODE setting and TIMER setting are done with digital display.

The following display is available on the LCD ( Liquid crystal display with back light ) which has 40 letters and 2 lines.

- PROGRAM NUMBER ..... Max. 16 programs can be stored
- MODE setting ..... Setting of operation mode
- TIMER setting ..... Digital display and setting of timer value
- X AXIS POSITION ..... Digital display and setting of X axis stop position
- PALLETIZING ..... Setting of stop pitch and number ( Multi-row placing ) of stops
- INPUT/OUTPUT display ... Monitoring of I/O status ( Robot I/O and interface with press )

POSITION ON X AXIS ..... Display of the present position  
on the traverse beam

ALARM indication ..... Diagnosis of handling problem

ERROR message ..... Error messages of robot problem

COUNTER ..... Cycle counter of robot operation  
and take out cycle

## 2. CAUTION ON HANDLING KG-101 CONTROLLER

Make sure the followings before operate the robot with KG-101 controller.

- a) Press the keys on control panel by finger. Do not press the keys by sharp shaped tool such as screw driver in order to protect keys from being damaged.
- b) Make sure that the circuit breaker is OFF when connect and disconnect the cables of KG-101 controller.
- c) Check if the wiring (interface between the press and robot) is correct after installation of robot. The miss wiring might cause the miss operation or damage the controller or robot.
- d) Keep the controller in the proper position. Especially, high temperature and/or vibration will cause the problem.

### 3. STANDARD SPECIFICATION

#### a) Conditions

|                           | Specification                  |
|---------------------------|--------------------------------|
| Power supply              | AC 200V 50/60 Hz Three phase   |
| Allowable voltage         | AC 170V ~ AC 246V              |
| Allowable frequency range | 47 Hz ~ 440 Hz                 |
| Voltage resistance        | AC 1500V / 1 min.              |
| Insulation resistance     | Over 1500M $\Omega$ at DC 500V |
| Power consumption         | 25 Watt Max.                   |
| Temperature range         | 0° C ~ + 50° C                 |
| Preservation temp.        | - 10° C ~ + 65° C              |
| Humidity range            | 40% ~ 80% RH, No dew           |
| Circumstance              | No corrosion gas and dust      |

#### b) Control

|                    | Specification                    |
|--------------------|----------------------------------|
| Control system     | Stored program system            |
| Programming system | ROM fixed sequence program       |
| Program capacity   | 2000 steps Max.                  |
| Scan speed         | 10 msec. ~ 20 msec.( 1 scan )    |
| Program protection | Pass word                        |
| Battery life time  | 3 years(+5° ~+35° ) Lithium bat. |

c) Input/Output

|                   | Specification                  |
|-------------------|--------------------------------|
| Input             | DC 24V 10 mA (Open collector)  |
| Transistor output | DC 24V 200 mA (Open collector) |
| Relay output      | AC 250V, DC 30V 5A             |
| Insulation        | Photo-coupler                  |

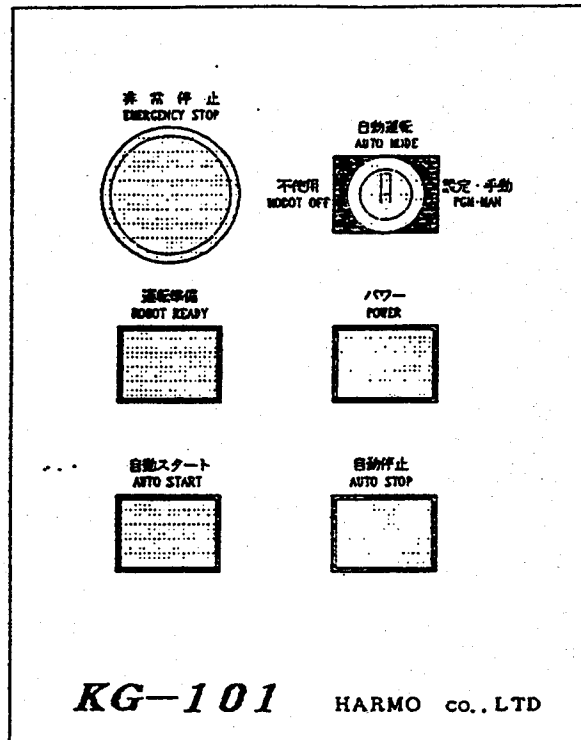
d) Power supply for control circuit

|                      | Specification                  |
|----------------------|--------------------------------|
| Power supply         | AC 200V 50/60 Hz Single phase  |
| Allowable voltage    | AC 170V ~ AC 264V              |
| Power consumption    | Less 0.9 A                     |
| Voltage resistance   | AC 2KV / 1 min. (Cut off 20mA) |
| Temperature range    | 0°C ~ + 50°C                   |
| Humidity range       | 25% ~ 85% RH, No dew           |
| Over load protection | Over 105% of rated consumption |
| Safety standard      | UL1012, CSA EB1402             |

e) Inverter

|                         | Specification  |
|-------------------------|--|
| Power supply            | AC 200V 50/60 Hz Three phase                               |
| Allowable voltage range | AC 180V ~ AC 220V ( 50 Hz )<br>AC 180V ~ AC 253V ( 60 Hz ) |
| Power capacity          | 1.5KVA (0.4kw), 2.5KVA (0.75kw)                            |
| Temperature range       | - 10°C ~ + 50°C  |
| Humidity range          | 90% RH, No dew   |
| Protection              | Over current, Over load,<br>External thermal protection    |

## 4. CONTROL BOX



### (1) SWITCH PANEL ON THE BOX

#### [KEY SWITCH]

- a) ROBOT OFF .. For the operation of only the press ( without the robot ).
- b) AUTO MODE .. For the auto operation of the robot.
- c) PGM-MAN ( Program and manual )  
.. For the setting of the MODE, TIMER, and STOP POSITION, and for MANUAL operation.

#### [EMERGENCY STOP]

The robot stops immediately when this switch is pressed.

#### [POWER]

The switch enable the drive circuit live.



KEYS ON HANDY CONSOLE

a) MODE SETTING KEY

| No. | Key    | Function   |
|-----|--------|--|
| 1   | PGM    | Store or revise of the program                       |
| 2   | MODE   | MODE setting and indication                          |
| 3   | TIMER  | TIMER setting and indication                         |
| 4   | COUNT  | Counter for pick up and robot cycle                  |
| 5   | I/O    | I/O status monitor, Position on beam                 |
| 6   | X AXIS | Position setting on traverse beam and indication     |
| 7   | PALLET | Setting of palletizing & indication                  |
| 8   | Y AXIS | Strip fwd/bwd end position adjustment                |
| 9   | HELP   | Display change of MODEs, TIMERs and present position |
| 10  | PAGE Δ | Display previous page ( Scroll up )                  |
| 11  | PAGE ∇ | Display next page ( Scroll down )                    |
| 12  | ITEM ← | Move the cursor to the left                          |
| 13  | ITEM → | Move the cursor to the right                         |
| 14  | UP     | Increase timer value                                 |
| 15  | DOWN   | Decrease timer value                                 |
| 16  | 0.1S   | Set timer value in 0.1 sec. unit                     |
| 17  | .01S   | Set timer value in 0.01 sec. unit                    |
| 18  | SET    | Set program number                                   |
| 19  | CLEAR  | Clear timer value and error message                  |

b) MANUAL OPERATION KEY

| No. | Key            | Function                                  |
|-----|----------------|---|
| 1   | MANUAL         | Manual operation with green LED lights    |
| 2   | ARM UP         | Arm ascent                                |
| 3   | ARM DOWN       | Arm descent                               |
| 4   | STRIP FWD      | Strip forward                             |
| 5   | STRIP BWD      | Strip backward                            |
| 6   | TRAV OUT       | Traverse out                              |
| 7   | TRAV IN        | Traverse in                               |
| 8   | WRIST VERT     | Wrist flip vertical                       |
| 9   | WRIST HORIZ    | Wrist flip horizontal                     |
| 10  | GRIP ON        | Grip, vacuum ON                           |
| 11  | GRIP OFF       | Grip, vacuum OFF                          |
| 12  | RETURN TO HOME | Make the robot to be in the home position |
| 13  | STEP           | Stepping motion                           |

c) MOTOR ROTATION KEY

| No. | Key        | Function  |
|-----|------------|---|
| 1   | FWD        | Normal rotation of the traverse motor                       |
| 2   | BWD        | Reverse rotation of the traverse motor                      |
| 3   | MAIN F-END | Adjust main arm forward end position                        |
| 4   | MAIN B-END | Adjust main arm backward end position                       |
| 5   | SUB F-END  | Adjust sub arm forward end position                         |
| 6   | SUB B-END  | Adjust sub arm backward end position                        |
| 7   | JOG FAST   | Jog operation on the traverse beam<br>Fast speed ( 60mm/s ) |
| 8   | JOG SLOW   | Jog operation on the traverse beam<br>Slow speed ( 20mm/s ) |

d) OTHERS

| No. | Key            | Function   |
|-----|----------------|--|
| 1   | EMERGENCY STOP | Robot stops immediately  |
| 2   | CONTRAST ADJ.  | Display contrast adjustment<br>(Can be done at left side of console) |

## 5. TURN THE POWER ON

- a) After checking the correct interface with press, turn the circuit breaker in the controller ON.
- b) After turning the power ON, the controller will have an Initial check (self diagnosis) and display the message as below.

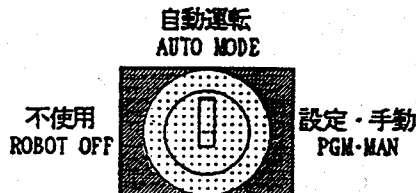
ROBOT CONTROLLER KG-101 VER X.X  
----- (C) COPYRIGHT HARMO 1991

Note) VER x.x indicates the ROM version

- c) Operation mode indication is shown after initial check ( 2 seconds later ) on the LCD display.

## 6. OPERATION MODE

The selection of following three modes is available by the key switch. High reliability and safety are obtained by not only the program stored in ROM IC but also external hardware circuit.



- a) ROBOT OFF mode

When the key switch is set to [OFF], the following message is shown on the LCD. Under this mode, the interlock signals for the press are released and press operation is available without robot.

===== ROBOT OFF MODE =====  
INTERLOCK RELEASED & POWER OFF

Note) If the robot is not at home position the interlock for the press is effective.

b) AUTO mode

When the key switch is set to [AUTO], the following message will appear on the LCD and the robot AUTO operation is available.

```
===== ROBOT AUTO MODE =====  
[ROBOT READY] --> [AUTO START]
```

See page 22 for auto operation.

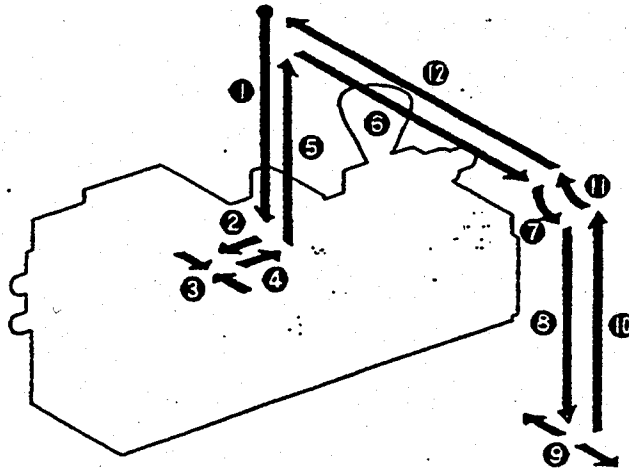
c) PGM·MAN ( Program and manual ) mode

When the key switch is set to [PGM], the following message will appear on the LCD. The each setting ( Program #, Modes, Timer value, Positions on the beam etc. ) and manual operation by pressing MANUAL key are available.

```
===== ROBOT PGM·MAN MODE =====  
MANUAL,MODE SET,TIMER SET,TEACHING
```

See page 19 for manual operation.

## 7. BASIC MOTION SEQUENCE



- |                            |                           |
|----------------------------|---------------------------|
| 1. Arm descent             | 7. Wrist flip horizontal  |
| 2. Approach to the molding | 8. Arm second descent     |
| 3. Grip the molding        | 9. Release the molding    |
| 4. Strip backward          | 10. Arm second ascent     |
| 5. Arm ascent              | 11. Wrist return vertical |
| 6. Traverse outward        | 12. Traverse inward       |

The above motion sequence is obtained by the following mode setting.

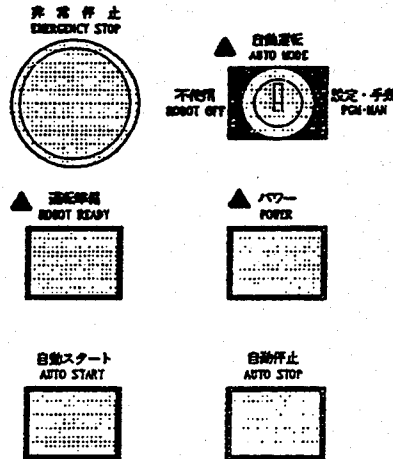
M01: Pick up arm select ..... a: MAIN  
M03: Part grip select ..... b: WITH LS  
M05: Part release position .... a: 2ND. DESC  
M06: Main sprue grip select ... a: OFF  
M09: Wrist flip position ..... a: OUTWARD

## 8. INITIAL SETTING

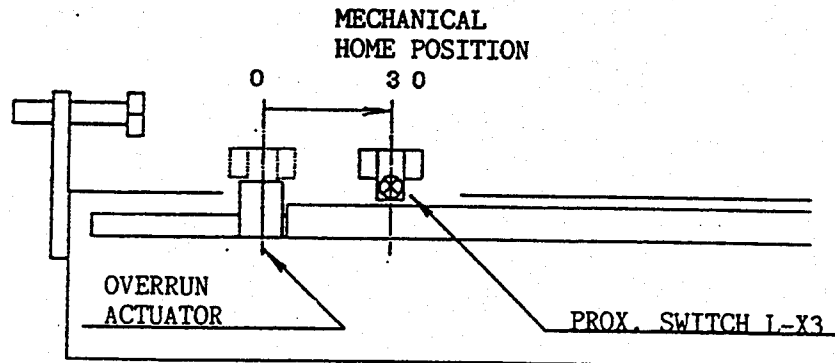
Initial setting of positions on traverse beam is needed when installed and change the program number.

### (1) MECHANICAL HOME POSITION

Set mechanical home position first.



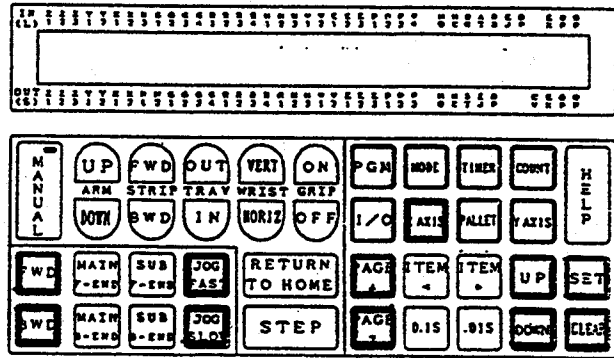
- Turn the key switch to [PGM-MAN].
- Press [POWER] and confirm the white lamp lights.
- Press [ROBOT READY], then yellow lamp blinks and start to run. When the prox. switch L-X3 goes ON by overrun actuator, it stops and back approx. 20 to 30mm. The LCD indicates [TEACHING ERROR] at this moment, and the lamps of [POWER] and [ROBOT READY] goes OFF.



- d) The following message is shown , then, Press [CLEAR] to reset the error.

E91 : < NO TEACHING ( POSITION ) DATA  
 --> SET THE POSITION BY TEACHING

(2) TAKE OUT POSITION ( HOME POSITION )

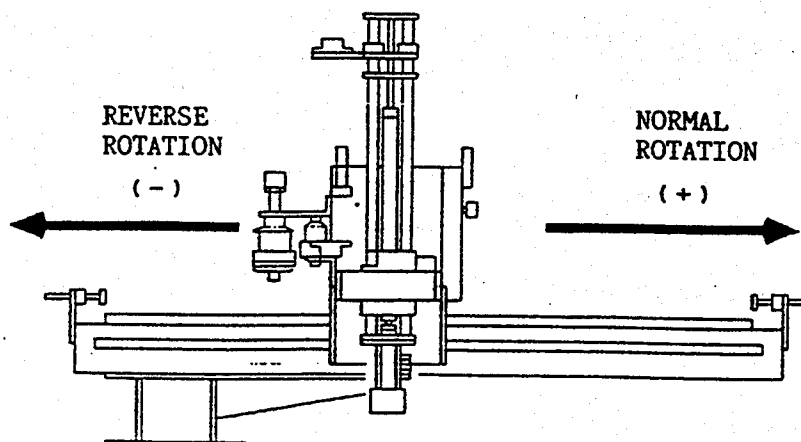


- a) Press [POWER], then, white lamp and yellow [ROBOT READY] lamp light if mechanical home position is correctly set.
- b) Press [X AXIS]. The LCD indicates the message.

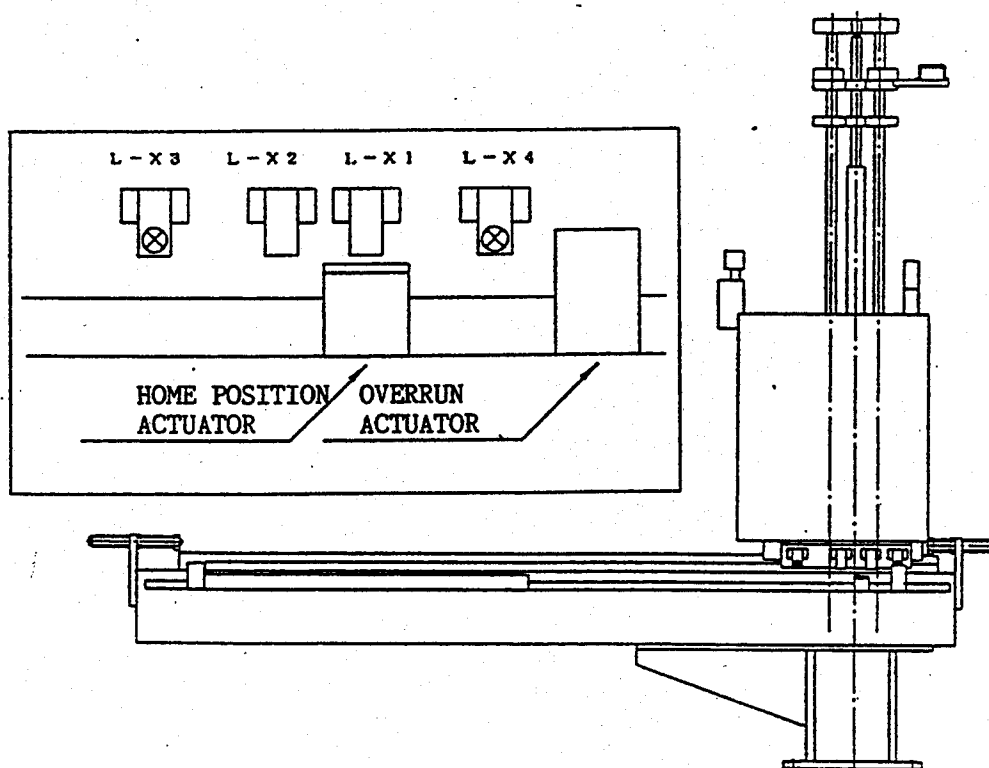
< PART TAKE OUT > < SPEED > | < X AXIS >  
 P1 = \*\*\*\*(MM) V1 = | 0(MM)

The value of < X axis > means the present position.

- c) Press [FWD] or [BWD] and [JOG FAST] or [JOG SLOW] together so the robot start to run. If release the finger from the key, it stops immediately.



- d) Stop the traverse motion when HOME POSITION switch L-X1 goes ON.



Note) If the following message is shown on the LCD, make the main circuit breaker OFF and take the procedure from POWER ON.

E90 : < THIS POSITION IS OUT OF RANGE >  
 --> SET NEW POSITION IN NC AREA

- e) Press [SET] and confirm that the value P1 is changed to 0mm.

< PART TAKE-OUT > < SPEED > | < X AXIS >  
 P1 = 0(MM) V1 = 1 | 0(MM)

Note) If the position without L-X1 ON, teaching error is shown.

-- FIRST DESCENT SAFETY (L-X1) IS OFF --

- f) When change the HOME POSITION, move the actuator for L-X1 and move the robot by JOG operation so that the L-X1 switch goes ON. Then press [SET].

Note) If error message E90 is indicated, press [CLEAR]- and -[X AXIS] and operate by JOG key according to the error message.

(3) OTHER POSITION SETTING ( PART RELEASE POSITION )

- a) Press [X AXIS] and [PAGE ▲], [PAGE ▼], and select the following indication.

```
< PART RELEASE > < SPEED > | < X AXIS >
P2 = ****(MM) V2 = 1 | 0(MM)
```

- b) Move the kick frame to part release position by jog operation.

```
< PART RELEASE > < SPEED > | < X AXIS >
P2 = ****(MM) V2 = 1 | 1200(MM)
```

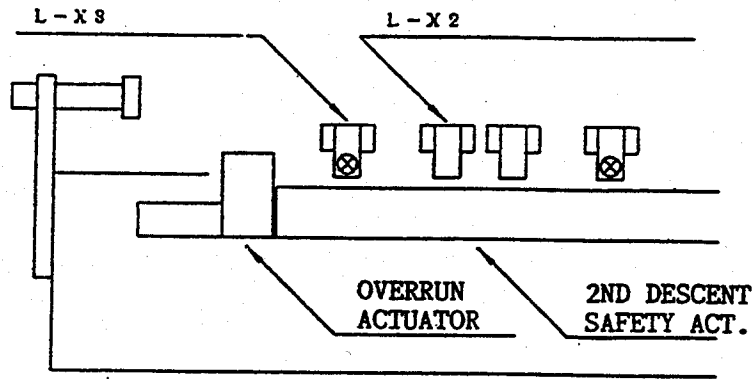
- c) Press [SET] and confirm that the value of P2 is changed.

```
< PART RELEASE > < SPEED > | < X AXIS >
P2 = 1200(MM) V2 = 1 | 1200(MM)
```

- d) Set SPRUE RELEASE POSITION and WAITING NIPPER POSITION in a same manner.

Note) The position setting except TAKE OUT POSITION should be done under the condition of L-X2 ON. If L-X2 is OFF, below error message is shown.

```
-- SECOND DESCENT SAFETY(L1-X2) IS OFF--
```



**CAUTION !! Do not move the actuator for overrun and second descent safety.**

---

(4) SPEED CONTROL

- a) Press [X AXIS] and [PAGE Δ],[PAGE ▽] to select the mode that the speed change is needed.

|                   |           |  |            |
|-------------------|-----------|--|------------|
| < PART TAKE OUT > | < SPEED > |  | < X AXIS > |
| P1 = 0(MM)        | V1 = 1    |  | 0(MM)      |

- b) Press [UP], [DOWN] to change the speed setting value. It can be set from 1 ( slow ) to 8 ( fast ).

|                   |           |  |            |
|-------------------|-----------|--|------------|
| < PART TAKE OUT > | < SPEED > |  | < X AXIS > |
| P1 = 0(MM)        | V1 = 8    |  | 0(MM)      |

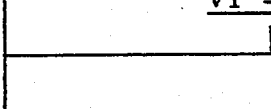
The set value is stored in the controller.

- c) Set other speed in a same manner if needed.

Note: The speed setting value is effective for the speed to reach each set position.

ex)

|                   |           |  |            |
|-------------------|-----------|--|------------|
| < PART TAKE OUT > | < SPEED > |  | < X AXIS > |
|                   | V1 = 8    |  |            |



Return to home position at speed 8.

By the above settings, the basic motion is available.

## 9. MANUAL OPERATION

MANUAL operation, STEP operation and HOME RETURN operation can be done under MANUAL OPERATION MODE. The manual operation outside the mold area is available even if the mold open complete signal is OFF.

### (1) MANUAL OPERATION

- a) Turn the key switch to [PGM·MAN] and the following indication is shown.

```

===== ROBOT PGM·MAN MODE =====
MANUAL,MODE SET,TIMER SET,TEACHING
    
```

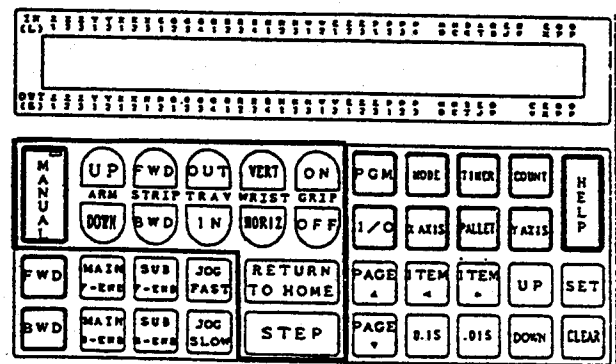
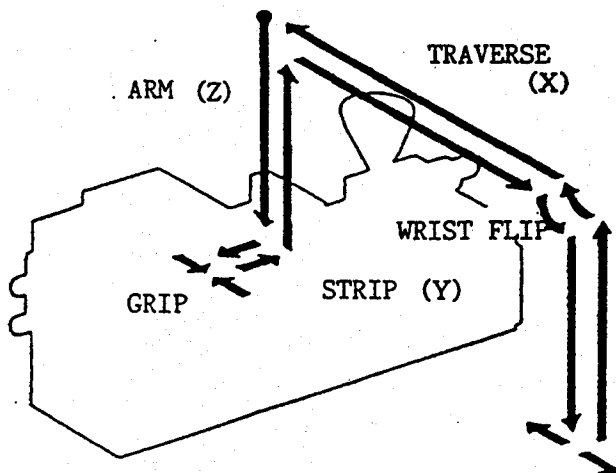
- b) Press [MANUAL] and green LED lights, The indication is as below.

```

----- MANUAL OPERATION MODE NO.1 -----
[ARM,CSR] [X AXIS] [WRIST] [GRIP]
    
```

- c) Press each manual key and operate manually.

[ARM UP/DOWN] [STRIP FWD/BWD] [TRAVERSE OUT/IN]  
 [WRIST VERTICAL/HORIZONTAL] [GRIP ON/OFF]



- d) For the manual operation of optional motion, press [HELP] and the indication is as below.

----- MANUAL OPERATION MODE NO.2 -----  
[OPT.1] [OPT.2] [OPT.3] [ROTAT] [NIPP]

The assignment of each key is as follows.

OPT. 1 ..... ARM UP/DOWN  
OPT. 2 ..... STRIP FWD/BWD  
OPT. 3 ..... TRAVERSE OUT/IN  
ROTATE ..... WRIST VERT/HORIZ  
NIPPER ..... GRIP ON/OFF

- e) Press [MANUAL] key to change to the previous indication.

(2) RETURN TO HOME

The robot should be at home position when start AUTO OPERATION or STEP OPERATION.

If the following message appeared, press [CLEAR] to reset ALARM. And proceed the HOME RETURN OPERATION.

A02 : < AUTO ( STEP ) FAILURE ! >  
--> PERFORM RETURN TO HOME

This operation is needed after setting of mode or stop positions.

- a) Turn the key switch to [PGM·MAN].
- b) Press [MANUAL].
- c) Press [RETURN TO HOME], then the robot returns automatically to home position according to the programmed sequence.
- d) When returned to home position, the indication is shown.

<< RETURNED TO HOME POSITION >>

### (3) STEP OPERATION

When check the preset robot sequence, make use of this function. The robot can be operated under the same condition ( sequence and timing ) with AUTO operation.

- a) Turn the key switch to [PGM·MAN].
- b) Press [MANUAL] key.
- c) Confirm that the robot is at home position. If not, proceed [RETURN TO HOME].
- d) Press [STEP] and the robot steps one by one.
- e) If press [STEP] continuously, the robot perform with the same condition of AUTO operation.

Note) If press the manual key during STEP operation, STEP operation is reset. Operate manually or proceed [RETURN TO HOME].

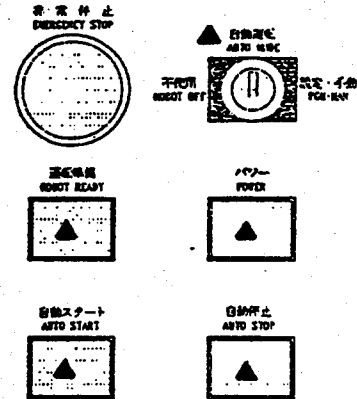
## 10. AUTO OPERATION

- a) Turn the key switch to [AUTO] and the LCD shows as below.

```

===== ROBOT AUTO MODE =====
[ROBOT READY] --> [AUTO START]
  
```

- b) Press [POWER], then white lamp lights.
- c) Press [ROBOT READY], then yellow lamp blinks and mechanical home position initial setting and return to home sequences is performed.
- d) When [ROBOT READY] sequence is finished, the indication is shown as below.



```

<< RETURNED TO HOME POSITION >>
  
```

Note) If yellow lamp of [ROBOT READY] lights when press [POWER], proceed [RETURN TO HOME] manually.

- e) Check if the press is in AUTO MODE, and then press [AUTO START]. The robot starts AUTO operation.
- f) If the part verification is ON after take out motion, the controller issue the safety interlock release and mold closing start signal to the press. The robot starts to traverse out.
- g) If the part verification is OFF, the following indication is shown on the LCD and green lamp blinks.

```

A05 : < ROBOT PICK UP FAILURE >
--> PRESS [START] AFTER CHECK MOLDS
  
```

- h) Press [START] key after make sure that nothing is remained in the mold area. The robot and press continue to next sequence.
- i) After returned to home position, the robot waits for the next mold open complete signal.
- j) To stop the AUTO OPERATION, press [AUTO STOP], then the lamp blinks and indicate the following message. When returned to home position, the AUTO OPERATION stops.

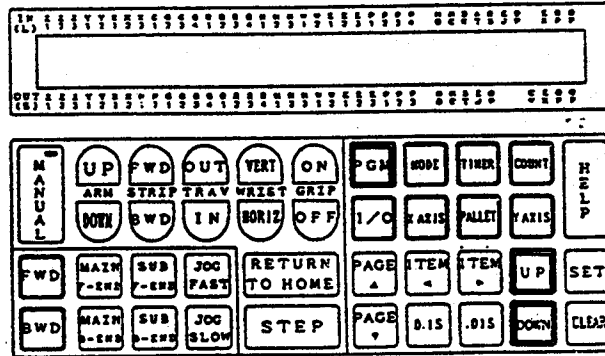
///// AUTO OPERATION STOP /////  
ROBOT STOPS AT END OF CYCLE

Note) To start AUTO OPERATION is available only when the robot is at home position.

- k) If needed to stop the robot immediately, then the key switch to [OFF] or [PGM·MAN], or press EMERGENCY STOP button.
- l) Mode setting during AUTO operation is not available, but timer setting can be done. Refer to the instruction "TIMER SETTING".

## 11. PROGRAM NUMBER

When set up the robot or operate robot by preset program, this function which has maximum 16 programs storage is very useful to save preparation time.



- a) Turn the key switch to [PGM-MAN].
- b) Press [PGM], then the following message is shown on the LCD.

```

----- PROGRAM NUMBER CHANGE -----
PRESENT NO.   0 : NEW (CHANGE) NO.  0
    
```

- c) Press [UP],[DOWN] key and select the program number.

```

----- PROGRAM NUMBER CHANGE -----
PRESENT NO.   0 : NEW (CHANGE) NO. 15
    
```

- d) Press [SET] key and the message is shown on the LCD and data is changed 2 seconds later.

```

CHANGED TO PROGRAM [ NO. 15 ]
    
```

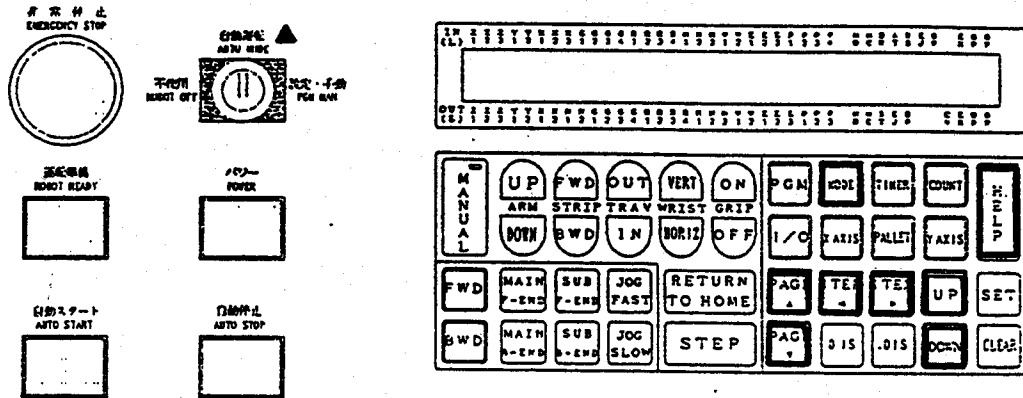
- e) After change the program number, set stop positions on the traverse beam, Modes and timer value.

## 12. MODE SETTING

Set modes according to the following procedure.

Note) Mode setting is not available under AUTO OPERATION mode.

### (1) MODE SETTING



- a) Turn the key switch to [PGM·MAN].
- b) Press [MODE] key.

M01 : < PICK UP ARM SELECT >  
 ̣.MAIN(Z) b.SUB(H) c.MAIN+SUB

- c) Select the page to change the mode by [PAGE Δ]/[PAGE ▽] key,

M02 : < ARM MOTION (L/U) SELECT >  
 ̣.STD(L) b.DIRECT

- d) Move the cursor by [ITEM ←]/[ITEM →] key.

M02 : < ARM MOTION (L/U) SELECT >  
 a.STD(L) ̣.DIRECT

- e) Set data is stored in the memory.
- f) Set other modes in the same manner.

(2) MODE SETTING LIST

Preset modes M01 to M08 or M09 to M16 can be seen on the LCD. And the mode setting is available on the same page.

a) Tune the key switch to [PGM·MAN].

b) Press [MODE] key.

|   |
|---|
| M01 : < PICK UP ARM SELECT ><br>■.MAIN(Z) b.SUB(H) c.MAIN+SUB |
|---|

c) Press [HELP] key. The indication is changed as below.

|                                   |
|-----------------------------------|
| [M01] M02 M03 M04 M05 M06 M07 M08 |
| (a) (a) (a) (a) (a) (a) (a) (a)   |

d) Change the page by [PAGE Δ]/[PAGE ▽] key,

|                                   |
|-----------------------------------|
| [M09] M10 M11 M12 M13 M14 M15 M16 |
| (a) (a) (a) (a) (a) (a) (a) (a)   |

e) Select mode by [ITEM ←]/[ITEM →] key.

|                                   |
|-----------------------------------|
| M09 [M10] M11 M12 M13 M14 M15 M16 |
| (a) (a) (a) (a) (a) (a) (a) (a)   |

f) Select function in each mode by [UP]/[DOWN] key.

|                                   |
|-----------------------------------|
| M09 [M10] M11 M12 M13 M14 M15 M16 |
| (a) (b) (a) (a) (a) (a) (a) (a)   |

g) Press [HELP] key to change to the previous indication.

(3) MODE SELECTION

M01: PICK UP ARM

M01 : < PICK UP ARM SELECT >  
a.MAIN(Z) b.SUB(H) c.MAIN+SUB

- a. Take out molding by main arm.
- b. Take out sprue/runner by sub arm.
- c. Take out molding and sprue/runner from 3 plate molds.

M02: ARM MOTION

M02 : < ARM MOTION (L/U) SELECT >  
a.STD(L) b.DIRECT

- a. Arm approaches to molding after detection of arm down end position.
- b. Arm starts strip forward motion by timer set even if the arm is on the way down.

M03: PART GRIP

M03 : < PART GRIP (G1) SELECT >  
a.OFF b.WITH LS c.W/O LS

- a. Grip circuit not in use.
- b. Use grip circuit with part verification switch.
- c. Use grip circuit without part verification.

M04: VACUUM

M04 : < VACUUM (G2) SELECT >  
a.OFF b.WITH LS c.W/O LS

- a. Vacuum circuit not in use.
- b. Use vacuum circuit with vacuum differential switch.
- c. Use vacuum circuit without verification.

M05: PART RELEASE POSITION

M05 : < PART RELEASE (G1,G2) POSITION >  
a.2ND DESC b.ON WAY c.IN MOLD

- a. Release the molding at arm second descent end.
- b. Release the molding at traverse end without second descent.
- c. Release the molding in the mold area after strip backward motion.

M06: MAIN SPRUE GRIP

M06 : < MAIN SPRUE GRIP (G3) SELECT >  
a.OFF b.WITH LS c.W/O LS

- a. Main arm sprue grip circuit not in use.
- b. Use main sprue grip circuit with sprue verification switch.
- c. Use main sprue grip circuit without verification switch.

M07: SPRUE RELEASE TIMING

M07 : < SPRUE RELEASE (G3,G4) TIMING >  
a.BEFORE b.AFTER c.IN MOLD

- a. Release sprue before releasing the molding.
- b. Release sprue after releasing the molding.
- c. Release sprue after strip backward motion in the mold area.

M08: EJECTOR INTERLOCK RELEASE

M08 : < EJECTOR INTERLOCK RELEASE >  
a.RELEASE b.DESC c.GRIP d.SYNCHRO

- a. Eject interlock is released when the mold open complete signal goes ON. ( No interlocking )
- b. Eject interlock is released when the timer that start counting at the same time of arm descent elapses.
- c. Eject interlock is released when the timer that start counting at the same time of grip elapses.

- d. Eject interlock is released when the arm reaches strip forward end position, and the end of arm tooling grips the molding when the ejector forward end signal goes ON.

M09: WRIST FLIP POSITION

M09 : < WRIST FLIP (VER/HOR) POSITION >  
a.OUTWARD b.IN END c.OFF

- a. Wrist flip motion is done in the area of second descent safety zone.
- b. Wrist flip motion is done at above mold.
- c. Without wrist flip motion.

M10: NIPPER CUT

M10 : < NIPPER CUT (N1,N2) SELECT >  
a.OFF b.ON EOAT c.ON EXT.

- a. Nipper circuit not in use.
- b. Nipper actuates at molding release position.
- c. For external nipper station equipped in the area of second descent safety zone.

M11: REJECT PART RELEASE

M11 : < REJECT PART RELEASE SELECT >  
a.OFF b.SPRUE c.IN MOLD

- a. Reject part signal from the press is not effective.
- b. Release molding at sprue releasing position when the reject signal from the press is ON.
- c. Release the molding in the mold area when the signal is ON.

M12: ROBOT HOME POSITION

M12 : < ROBOT HOME (START) POSITION >  
a.IN END b.ON BEAM

- a. Robot waits for mold open at traverse inward end position. ( Above mold )
- b. Robot waits at preset position on the beam, and start when the mold open complete signal goes ON.

M13: WRIST ROTATION HOME POSITION (OPTION)

M13 : < WRIST ROTATION HOME POSITION >  
a.OFF            b.ROTATE    c.RETURN

- a. Wrist rotate function not in use.
- b. Wait for mold open with wrist rotate horizontal position.
- c. Wait for mold open with wrist rotate vertical position.

M14: OPTION 1

M14 : < OPTION 1 SELECT >  
a.OFF            b.IN USE

- a. Optional function 1 not in use.
- b. Optional function 1 in use.

M15: OPTION 2

M15 : < OPTION 2 SELECT >  
a.OFF            b.IN USE

- a. Optional function 2 not in use.
- b. Optional function 2 in use.

M16: OPTION 3

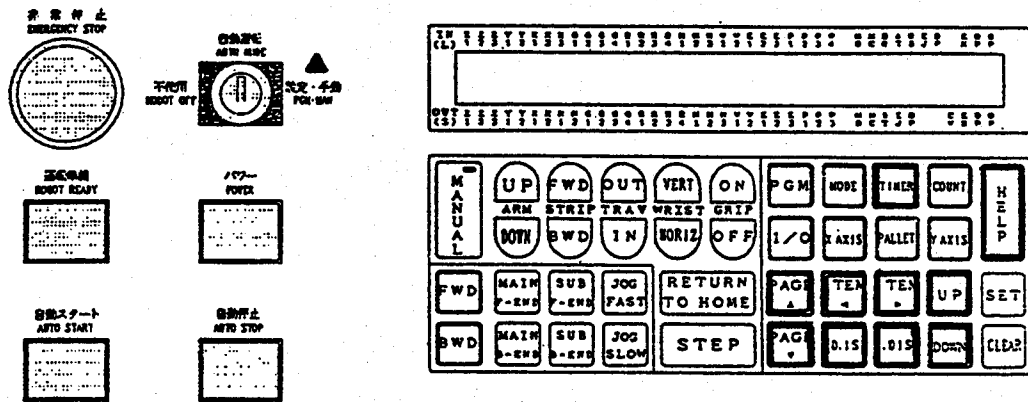
M16 : < OPTION 3 SELECT >  
a.OFF            b.IN USE

- a. Optional function 3 not in use.
- b. Optional function 3 in use.

### 13. TIMER SETTING

Set timer value in order to have secure take out motion and minimize the take out time.  
 Timer setting range is from 0.00sec. to 9.99sec..  
 Timer setting is available not only under manual mode but also during auto operation.

#### (1) SETTING



a) Turn the key switch to [PGM·MAN].

b) Press [TIMER] key.

T01 : < FIRST DESCENT (Z2) DELAY >  
 TIMER VALUE = .00 (SEC.)

c) Select timer T01 through T16 by [PAGE Δ]/[PAGE ∇] key,

T02 : < STRIP FORWARD (Y2) DELAY >  
 TIMER VALUE = .00 (SEC.)

d) Select time unit by [.1S]/[.01S] key.

T02 : < STRIP FORWARD (Y2) DELAY >  
 TIMER VALUE = .00 (SEC.)

- e) Set timer value which the cursor blinks by [UP]/[DOWN] key.

|  |
|--|
| T02 : < STRIP FORWARD (Y2) DELAY ><br>TIMER VALUE = .0 <u>1</u> (SEC.) |
|--|

- f) Set data is stored in the memory.  
g) Set other timer value in the same manner.

(2) TIMER SETTING LIST

Preset timer value T01 to T08, T09 to T16 and T17 to T24 can be seen on the LCD. And the timer setting is available on the same page.

- a) Turn the key switch to [PGM-MAN].  
b) Press [TIMER] key.

|  |
|--|
| T01 : < FIRST DESCENT (Z2) DELAY ><br>TIMER VALUE = . <u>00</u> (SEC.) |
|--|

- c) Press [HELP] key. The indication is changed as below.

|             |     |     |     |     |     |     |     |
|-------------|-----|-----|-----|-----|-----|-----|-----|
| [T01]       | T02 | T03 | T04 | T05 | T06 | T07 | T08 |
| . <u>00</u> | .00 | .00 | .00 | .00 | .00 | .00 | .00 |

- d) Change the page by [PAGE Δ]/[PAGE ▽] key,

|             |     |     |     |     |     |     |     |
|-------------|-----|-----|-----|-----|-----|-----|-----|
| [T09]       | T10 | T11 | T12 | T13 | T14 | T15 | T16 |
| . <u>00</u> | .00 | .00 | .00 | .00 | .00 | .00 | .00 |

- e) Select timer by [ITEM ←]/[ITEM →] key.

|     |             |     |     |     |     |     |     |
|-----|-------------|-----|-----|-----|-----|-----|-----|
| T09 | [T10]       | T11 | T12 | T13 | T14 | T15 | T16 |
| .00 | . <u>00</u> | .00 | .00 | .00 | .00 | .00 | .00 |

- f) Select time unit by [.1S]/[.01S] key.

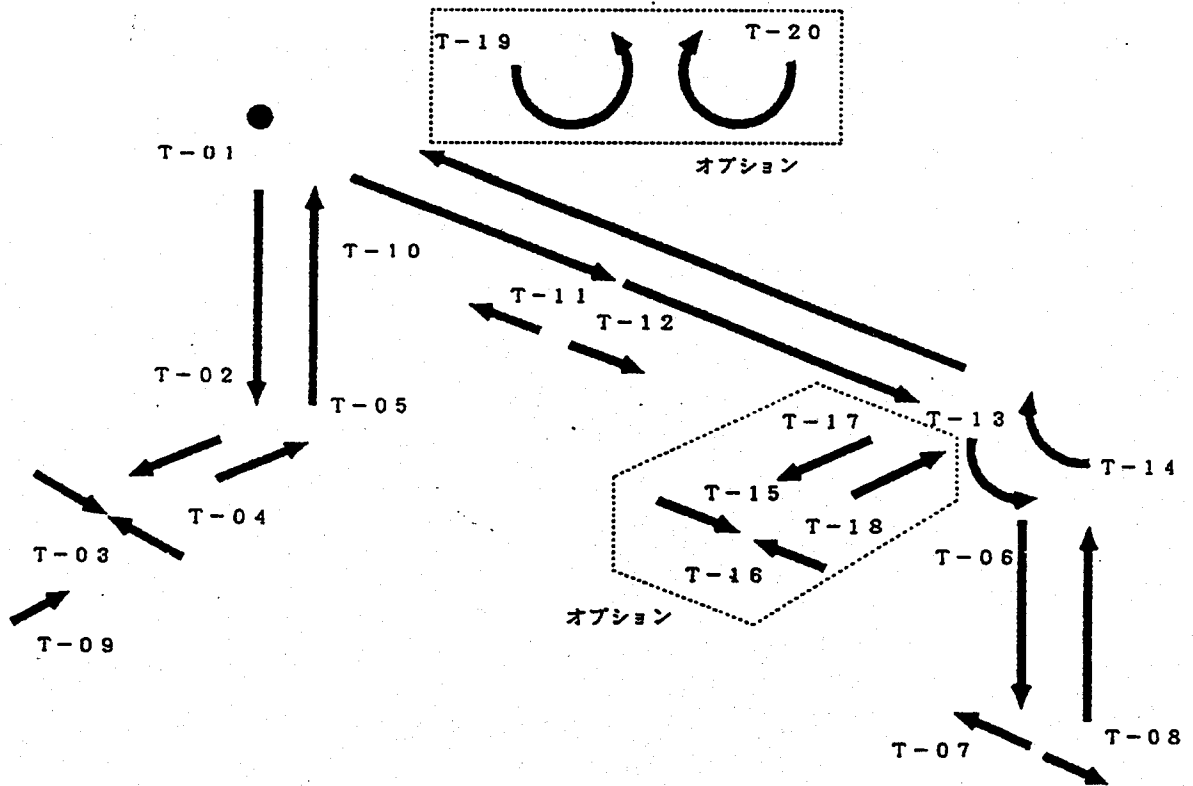
|     |             |     |     |     |     |     |     |
|-----|-------------|-----|-----|-----|-----|-----|-----|
| T09 | [T10]       | T11 | T12 | T13 | T14 | T15 | T16 |
| .00 | .0 <u>0</u> | .00 | .00 | .00 | .00 | .00 | .00 |

- g) Set timer value which the cursor blinks by [UP]/[DOWN] key.

|     |       |     |     |     |     |     |     |
|-----|-------|-----|-----|-----|-----|-----|-----|
| T09 | [T10] | T11 | T12 | T13 | T14 | T15 | T16 |
| .00 | .01   | .00 | .00 | .00 | .00 | .00 | .00 |

- h) Set data is stored in the memory.  
 i) Set other timer value in the same manner.  
 j) Press [HELP] key to change to the previous indication.

(3) TIMERS



- T01 : < FIRST DESCENT (Z2) DELAY >  
 TIMER VALUE = (SEC.)
- T02 : < STRIP FORWARD (Y2) DELAY >  
 TIMER VALUE = (SEC.)
- T03 : < PART (SPRUE) GRIP DELAY >  
 TIMER VALUE = (SEC.)
- T04 : < STRIP BACKWARD (Y1) DELAY >  
 TIMER VALUE = (SEC.)
- T05 : < FIRST ASCENT (Z1) DELAY >  
 TIMER VALUE = (SEC.)
- T06 : < SECOND DESCENT (Z2) DELAY >  
 TIMER VALUE = (SEC.)
- T07 : < PART RELEASE (G1,G2) DELAY >  
 TIMER VALUE = (SEC.)
- T08 : < PART REL. TIME / ASCENT DELAY >  
 TIMER VALUE = (SEC.)
- T09 : < EJECTOR FORWARD DELAY >  
 TIMER VALUE = (SEC.)
- T10 : < PART VERIFICATION DELAY >  
 TIMER VALUE = (SEC.)
- T11 : < SPRUE RELEASE (G3,G4) DELAY >  
 TIMER VALUE = (SEC.)
- T12 : < SPRUE REL. TIME / TRAV. DELAY >  
 TIMER VALUE = (SEC.)
- T13 : < WRIST HORIZONTAL (R2) DELAY >  
 TIMER VALUE = (SEC.)

T14 : < WRIST VERTICAL (R1) DELAY >  
 TIMER VALUE = (SEC.)

T15 : < NIPPER CUT (N1,N2) DELAY >  
 TIMER VALUE = (SEC.)

T16 : < NIPPER CUT (N1) TIME >  
 TIMER VALUE = (SEC.)

T17 : < NIPPER APPROACH (Y2) DELAY >  
 TIMER VALUE = (SEC.)

T18 : < NIPPER BACKWARD (Y1) DELAY >  
 TIMER VALUE = (SEC.)

OPTION TIMER

T19 : < WRIST ROTATION (R4) DELAY >  
 TIMER VALUE = (SEC.)

T20 : < WRIST RETURN (R3) DELAY >  
 TIMER VALUE = (SEC.)

T21 : < OPTION TIMER 1 >  
 TIMER VALUE = (SEC.)

T22 : < OPTION TIMER 2 >  
 TIMER VALUE = (SEC.)

T23 : < OPTION TIMER 3 >  
 TIMER VALUE = (SEC.)

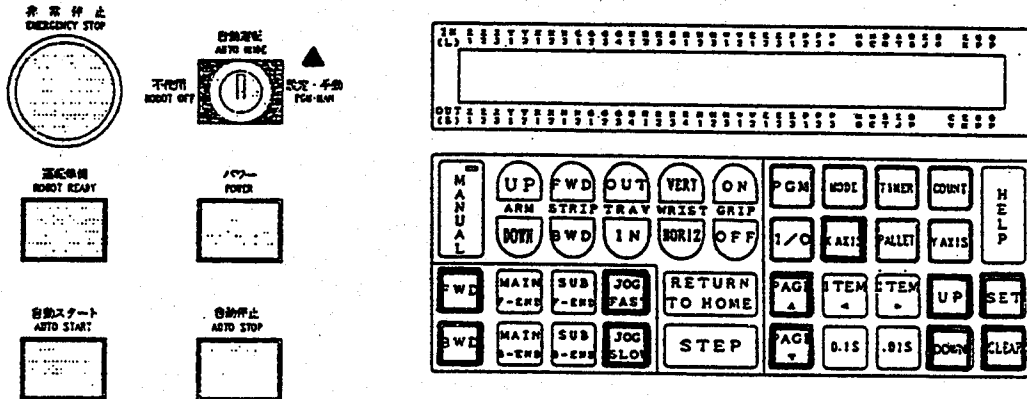
T24 : < OPTION TIMER 4 >  
 TIMER VALUE = (SEC.)

## 14. POSITION SETTING ON TRAVERSE BEAM

When set up the robot or change the stop position such as take out position and part release position, move the robot to the proper position by JOG operation. It is very easy to set or change the positions.

Note) When change the mold and program number, set the take out position first.

### (1) SETTING



- Turn the key switch to [PGM·MAN].
- Press [X AXIS] key, then, the following message is shown on the LCD. The controller is under setting mode of STOP POSITION, TRAVERSE SPEED and JOG OPERATION MODE.

```
< PART TAKE OUT > < SPEED > | < X AXIS >
P1 =      0(MM)    V1 = 1 | 1300(MM)
```

Note) The value of < X AXIS > is showing present position.

- In case of setting after set up the robot, refer to "INITIAL SETTING".

- d) After reach the take out position, press [SET] key. Then, the present position is changed to 0mm.

|                   |           |  |            |
|-------------------|-----------|--|------------|
| < PART TAKE OUT > | < SPEED > |  | < X AXIS > |
| P1 = 0(MM)        | V1 = 1    |  | 0(MM)      |

Note) If the present position is not changed, check if the prox. switch (L-X1) is ON. If not, adjust the position of actuator for L-X1.

- e) Select page by [PAGE Δ]/[PAGE ▽] key,

|                  |           |  |            |
|------------------|-----------|--|------------|
| < PART RELEASE > | < SPEED > |  | < X AXIS > |
| P2 = 1300(MM)    | V2 = 1    |  | 0(MM)      |

- f) Move the kick frame to stop position by [FWD]/[BWD] and [JOG FAST]/[JOG SLOW] key.

|                  |           |  |            |
|------------------|-----------|--|------------|
| < PART RELEASE > | < SPEED > |  | < X AXIS > |
| P2 = 1300(MM)    | V2 = 1    |  | 1000(MM)   |

- g) After reach stop position, press [SET] key. The P2 is changed to present position.

|                  |           |  |            |
|------------------|-----------|--|------------|
| < PART RELEASE > | < SPEED > |  | < X AXIS > |
| P2 = 1000(MM)    | V2 = 1    |  | 1000(MM)   |

Note) If the value is not changed, check if the prox. switch (L-X2) is ON.

**CAUTION !! DO NOT MOVE THE ACTUATOR FOR L-X2.**

- h) Set traverse speed ( 1:Slow through 8:fast ) by [UP]/[DOWN] key.

|                  |           |  |            |
|------------------|-----------|--|------------|
| < PART RELEASE > | < SPEED > |  | < X AXIS > |
| P2 = 1000(MM)    | V2 = 8    |  | 1000(MM)   |

Note) 1. The speed setting value is effective for the speed to reach each set position.  
2. If the distance between stops is too short, the speed is slower than set speed.  
3. To press [SET] key is not required for speed setting.

- i) Set the other speed in the same manner.
- j) In case that select < b. ON BEAM > in [ M12 : ROBOT HOME (START) POSITION ], the following message is shown. Proceed the above 6. through 8..

|                   |           |        |            |
|-------------------|-----------|--------|------------|
| < ROBOT WAITING > | < SPEED > |        | < X AXIS > |
| P5 =              | 0(MM)     | V5 = 1 | 0(MM)      |

(2) STOP POSITIONS

P1

|                   |           |      |            |
|-------------------|-----------|------|------------|
| < PART TAKE OUT > | < SPEED > |      | < X AXIS > |
| P1 =              | 0(MM)     | V1 = | 0(MM)      |

Note) L-X1 should be ON.

P2

|                  |           |        |            |
|------------------|-----------|--------|------------|
| < PART RELEASE > | < SPEED > |        | < X AXIS > |
| P2 =             | 0(MM)     | V2 = 1 | 0(MM)      |

Note) L-X2 should be ON.

P3

|                   |           |        |            |
|-------------------|-----------|--------|------------|
| < SPRUE RELEASE > | < SPEED > |        | < X AXIS > |
| P3 =              | 0(MM)     | V3 = 1 | 0(MM)      |

Note) L-X2 should be ON.

P4

|                    |           |        |            |
|--------------------|-----------|--------|------------|
| < NIPPER STATION > | < SPEED > |        | < X AXIS > |
| P4 =               | 0(MM)     | V4 = 1 | 0(MM)      |

Note) L-X2 should be ON.

P5

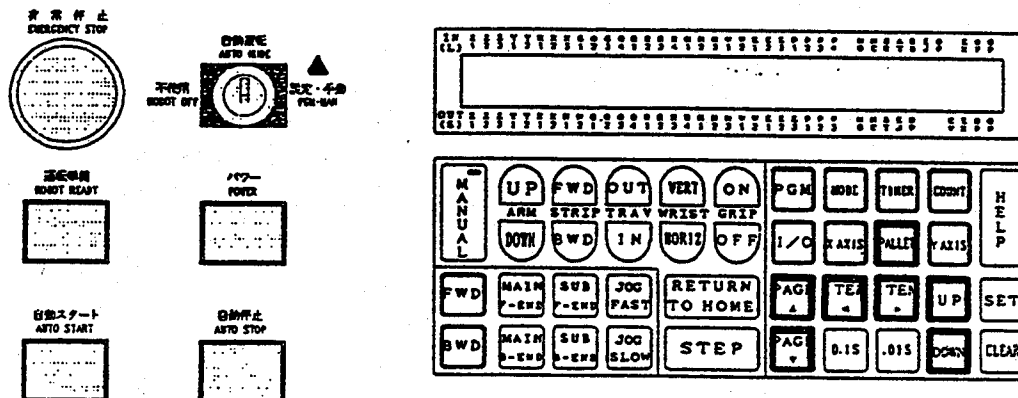
|                   |           |        |            |
|-------------------|-----------|--------|------------|
| < ROBOT WAITING > | < SPEED > |        | < X AXIS > |
| P5 =              | 0(MM)     | V5 = 1 | 0(MM)      |

- Note) 1. Set MODE M12.  
2. L-X1 or L-X2 should be ON.

## 15. MULTI-ROW PLACING ON THE TRAVERSE BEAM

In case using conveyor or stocker, and required to place the parts in multiple rows, this function is utilized. The number of stops and pitch in between parts can be set.

### (1) SETTING



- Turn the key switch to [PGM-MAN].
- Press [PALLET] key, then the following message is shown.

```
-- PALLETIZING / MULTI PLACING DATA --
  数.STOPS = 0,   数.PITCH = 0(MM)
```

- Move cursor to which should be set by [ITEM ←]/ [ITEM →] key.

```
-- PALLETIZING / MULTI PLACING DATA --
  a.STOPS = 0,   数.PITCH = 0(MM)
```

d) Set proper value by [UP]/[DOWN] key.

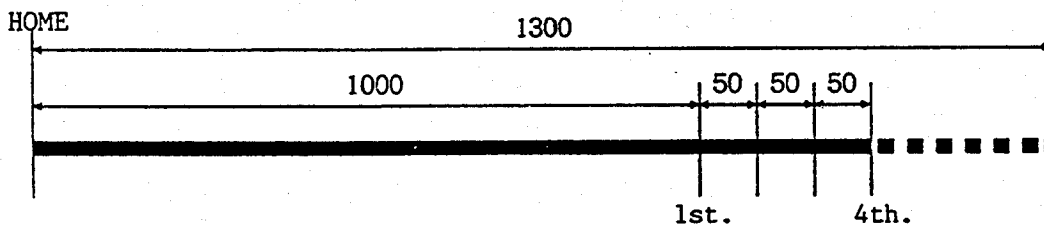
-- PALLETIZING / MULTI PLACING DATA --  
a.STOPS = , PITCH = 50(MM)

Note) Max. 20 row placing is available, but if the set distance between home position and the end position of multi row placing is over the traverse stroke, the set data is not effective.

## (2) SETTING EXAMPLE

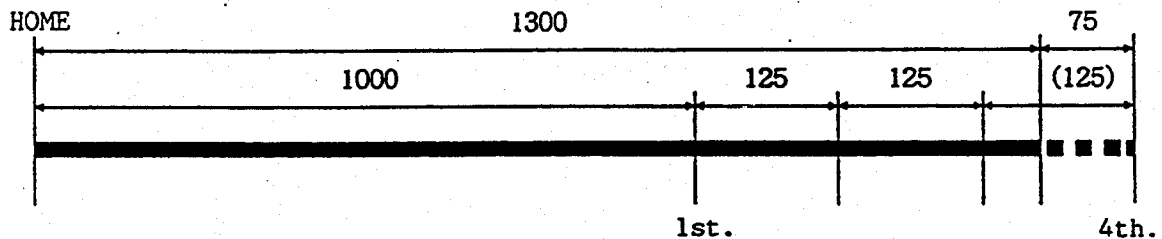
### a) CORRECT SETTING

Max. stroke : 1300mm  
First release position : 1000mm  
Pitch : 50mm  
Stops : 4



### 2. WRONG SETTING

Max. stroke : 1300mm  
First release position : 1000mm  
Pitch : 125mm  
Stops : 4

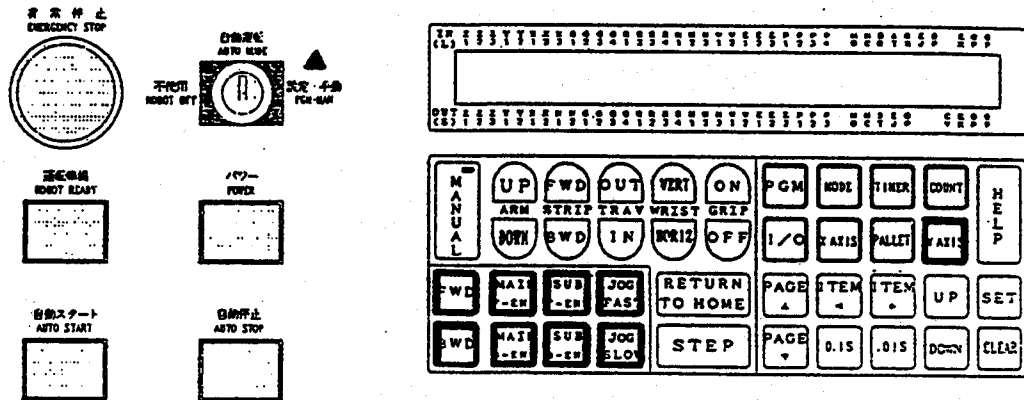


In such case, change first release position to home position side by 75mm. Then, 50mm pitch and 4 stops setting is effective.

## 16. MECHANICAL STRIP STROKE ADJUSTMENT (OPTION)

Adjustment of strip forward/backward position can be done on the HANDY console.

### (1) SETTING



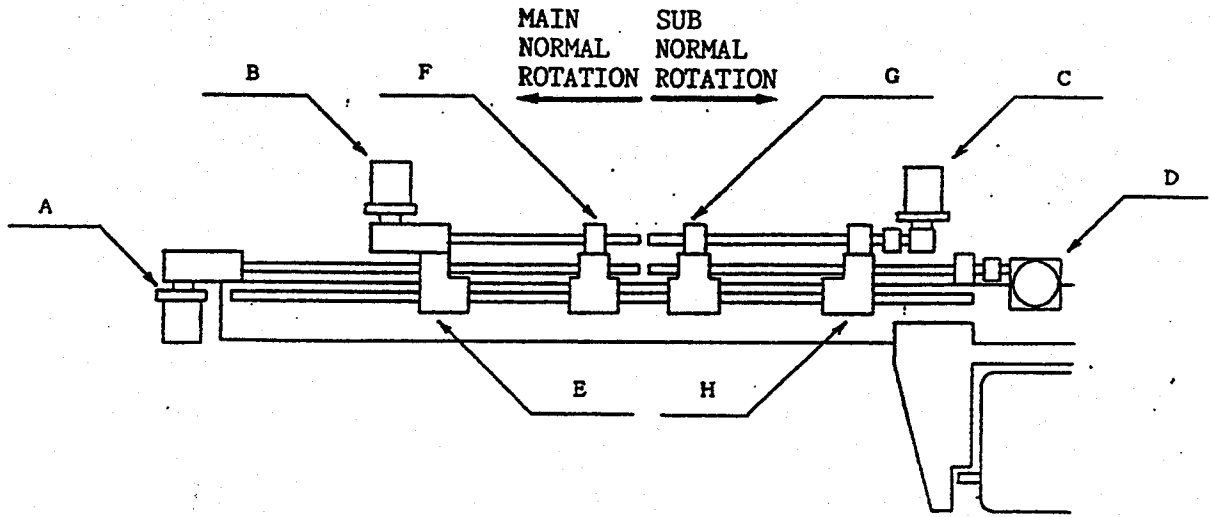
- a) Turn the key switch to [PGM-MAN].
- b) Press [Y AXIS] key, then the following message is shown.

```

=== Y AXIS (W AXIS) ADJUSTMENT MODE ==
PRESS [FWD]OR[BWD] & [F-FWD]OR[B-END]
    
```

- c) Adjust forward and backward end position by [FWD]/[BWD] and [MAIN F-END]/[MAIN B-END]/[SUB F-END]/[SUB B-END] key.

(2) MOTORS



1. Move E (Main arm fwd. end) by Motor A.
2. Move F (Main arm bwd. end) by Motor B.
3. Move G (Sub arm fwd. end) by Motor C.
4. Move H (Sub arm bwd. end) by Motor D.

# 17. INPUT/OUTPUT STATUS

This controller has a function to check the status of INPUT/OUTPUT of the robot and interfacing with external device (press etc.) on the LCD.

I N    ZZZYXXXGGGRRRRHHHWEEPPPP MMDAREO EOO  
 (L)    1231212312341234123121231234 OCRTSJP XPP

|   |
|---|
| 0-00-0..000-0-0-0-00...0.... 0-00... .. |
| ..0.....000.....0..... 00..... ..       |

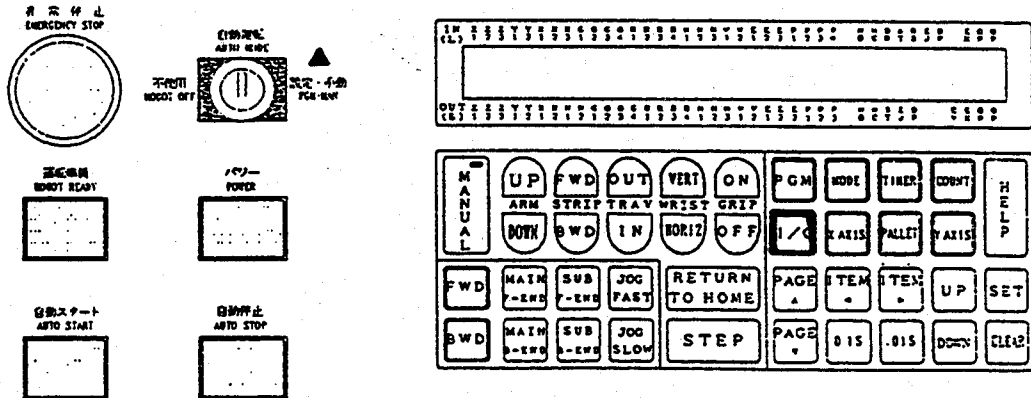
OUT    ZZZYXXNNGGRRRRHHHWEEPPPP MMSEO CEOO  
 (S)    1231212121234123412312123123 OCTJP VXPP

\* Pattern    [ 0 ] ..... ON  
                  [ . ] ..... OFF

\* Color        Red ..... Interface signal with press  
                  Black .... Interface signal with external device  
                  Green .... Interface signal with robot

## (1) DISPLAY THE I/O STATUS

1. Turn the key switch to [PGM·MAN]/[AUTO].
2. Press [I/O] key.



## (2) DESIGNATION OF I/O

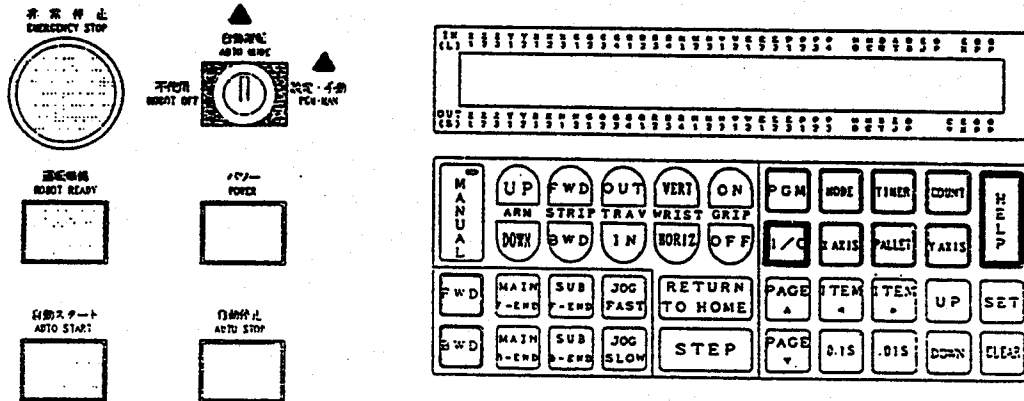
| INPUT (L) |                           | OUTPUT (S) |                           |
|-----------|---------------------------|------------|---------------------------|
| Z1        | Main arm upward end       | Z1         | Main arm ascent solenoid  |
| Z2        | Main arm downward end     | Z2         | Main arm descent solenoid |
| Z3        | Main lock cyl retract end | Z3         | Main lock cyl. solenoid   |
| Y1        | Main arm strip bwd. end   | Y1         | Main arm strip bwd. sol.  |
| Y2        | Main arm strip fwd. end   | Y2         | Main arm strip fwd. sol.  |
| X1        | Traverse 1st desc. safety | X1         |                           |
| X2        | Traverse 2nd desc. safety | X2         |                           |
| X3        | Traverse + overrun        | N1         | Nipper cut solenoid       |
| X4        | Traverse - overrun        | N2         | Nipper approach solenoid  |
| G1        | Part grip verification    | G1         | Part grip solenoid        |
| G2        | Vacuum verification       | G2         | Vacuum solenoid           |
| G3        | Main sprue verification   | G3         | Main sprue grip solenoid  |
| G4        | Sub sprue verification    | G4         | Sub sprue grip solenoid   |
| R1        | Wrist flip vertical end   | R1         | Wrist flip vertical sol.  |
| R2        | Wrist flip horizontal end | R2         | Wrist flip horizontal sol |
| R3        | Wrist rotate return end   | R3         | Wrist rotate return sol.  |
| R4        | Wrist rotate end          | R4         | Wrist rotate solenoid     |
| H1        | Sub arm upward end        | H1         | Sub arm ascent solenoid   |
| H2        | Sub arm downward end      | H2         | Sub arm descent solenoid  |
| H3        | Sub lock cyl. retract end | H3         | Sub lock cyl. solenoid    |
| W1        | Sub arm strip bwd. end    | W1         | Sub arm strip bwd. sol.   |
| W2        | Sub arm strip fwd. end    | W2         | Sub arm strip fwd. sol.   |
| E1        | Chuck slide return end.OP | E1         | Chuck slide return sol.OP |
| E2        | Chuck slide end (OPTION)  | E2         | Chuck slide sol. (OPTION) |
| E3        | Air pressure check        | E3         | (OPTION)                  |

| INPUT (L) |                           | OUTPUT (S) |                           |
|-----------|---------------------------|------------|---------------------------|
| P1        | OPTION 1 (robot)          | P1         | OPTION 1 (robot)          |
| P2        | OPTION 2 (robot)          | P2         | OPTION 2 (robot)          |
| P3        | OPTION 3 (robot)          | P3         | OPTION 3 (robot)          |
| P4        | OPTION 4 (robot)          | P4         |                           |
| MO        | Mold open complete        | MO         | Mold open interlock       |
| MC        | Mold closed end           | MC         | Mold close interlock      |
| DR        | Safety door closed        | ST         | Cycle start (Mold close)  |
| AT        | Press in AUTO             | EJ         | Ejector forward interlock |
| RS        | Part reject signal        | OP         | OPTION (for press)        |
| EJ        | Ejector forward end       | CV         | Conveyor start            |
| OP        | OPTION (from press)       | EX         | External device start     |
| EX        | External device input     | OP         | OPTION                    |
| OP        | OPTION (From ext. device) | OP         | OPTION                    |
| OP        | OPTION (From ext. device) |            |                           |

## 18. POSITION DISPLAY ( TRAVERSE BEAM )

The distance between present position and take out position can be shown on the LCD by 1mm unit.

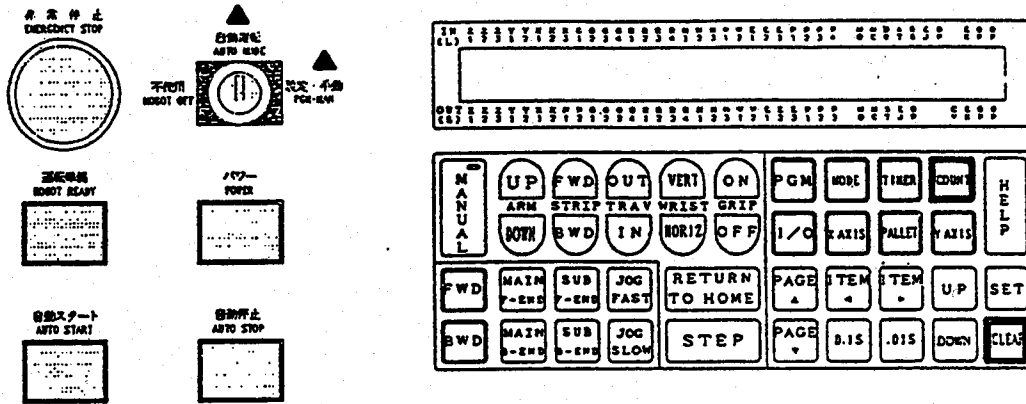
```
< PROGRAM > | < ROBOT PRESENT POSITION >
PGM = NO. 0 | X AXIS = 0(MM)
```



- Turn the key switch to [PGM·MAN] or [AUTO].
- Press [I/O] key.  
The status of Inputs and Outputs is shown on the LCD.
- Press [HELP] key.  
The present position is shown. If need to see the I/O status, press [HELP] key again.

# 19. COUNTER

The total cycle counter of the robot and take out cycle except part rejected cycle is available.  
The maximum count number is 999,999,999.



## (1) COUNTER DISPLAY

- Turn the key switch to [PGM-MAN] or [AUTO].
- Press [COUNT] key.

```

= PART TAKE OUT == | == ROBOT CYCLE ==
1234567890 (COUNT) | 1234567890 (COUNT)
    
```

## (2) CLEAR THE COUNTER

- Turn the key switch to [PGM-MAN] or [AUTO].
- Press [COUNT] key.
- Press [CLEAR] key.

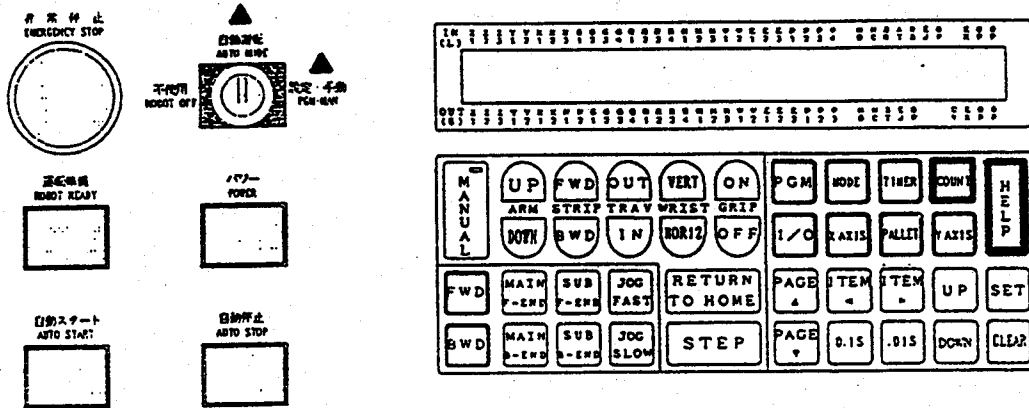
```

= PART TAKE OUT == | == ROBOT CYCLE ==
0 (COUNT) | 1234567890 (COUNT)
    
```

Note) The take out cycle counter can be cleared, but the robot cycle counter can not be cleared.

## 20. ERROR DISPLAY

It is possible to re-display the error/alarm message that appeared directly before.



- Turn the key switch to [PGM·MAN] or [AUTO].
- Press [COUNT] key. Counter display appears.
- Press [HELP] key, then, previous message appears.

## 21. ALARM

Alarm message appears and alarm sounds when missoperating or malfunction of INPUT/OUTPUT.

- a) Alarm number, alarm factor and countermeasure are shown on the LCD.

|   |
|---|
| A01 : < ROBOT POWER INEFFECTIVE ><br>--→ PRESS [POWER] SWITCH |
|---|

- b) Alarm is cleared if press [CLEAR] key or operate the robot according to the countermeasure indicated on the LCD.

c) Alarm message

A00 : < ROBOT POWER INEFFECTIVE !>  
--> PRESS [POWER] SWITCH

A01 : < ROBOT NOT READY ! >  
--> PRESS [READY] SWITCH

A02 : < AUTO (STEP) FAILURE !>  
--> PERFORM RETURN TO HOME

A03 : < AUTO START FAILURE !>  
--> SET KEY SWITCH TO [AUTO]

A04 : < PRESS IN AUTO SIGNAL IS OFF !>  
--> CHECK SIGNAL (A/S) AND CABLE

A05 : < ROBOT PICK UP FAILURE !>  
--> PRESS [START] AFTER CHECK MOLDS

A06 : < EXTERNAL DEVICE 1 FAILURE !>  
--> CHECK INTERFACE WITH EXT. DEVICE 1

A07 : < EXTERNAL DEVICE 2 FAILURE !>  
--> CHECK INTERFACE WITH EXT. DEVICE 2

A08 : < EXTERNAL DEVICE 3 FAILURE !>  
--> CHECK INTERFACE WITH EXT. DEVICE 3

A09 : < MANUAL OPERATION FAILURE ! >  
--> OPERATE MANUALLY, CHANGE MODE SET

## 22. MALFUNCTION

Malfunctions of switches, valves and motor circuit are indicated on the LCD with alarm sound.

### (1) MALFUNCTION DISPLAY

- a) The robot stops at the position that has any malfunction, and the message appears on the LCD.

|   |
|---|
| E05 : < MAIN ARM ASC. END LS ERROR ! ><br>--> CHECK SWITCH (L-Z1) AND CABLE |
|---|

- b) To clear the message and alarm sound, press [CLEAR] key.
- c) Check switches, valves or motor circuit according to the message.
- d) If the [POWER] lamp is OFF, press [POWER] key.
- e) If the [ROBOT READY] lamp is OFF, press it.
- f) Confirm the function in manual operation mode after fix the problem, then, start automatic operation.

(2) MALFUNCTIONS ( ERROR MESSAGE )

E05 : < MAIN ARM ASC. END LS ERROR ! >  
--> CHECK SWITCH (L-Z1) AND CABLE

E06 : < MAIN ARM ASCENT SOL ERROR ! >  
--> CHECK SOLENOID (S-Z1) AND CABLE

E07 : < MAIN ARM DESC. END LS ERROR ! >  
--> CHECK SWITCH (L-Z2) AND CABLE

E08 : < MAIN ARM DESCENT SOL ERROR ! >  
--> CHECK SOLENOID (S-Z2) AND CABLE

E09 : < MAIN ARM FWD. END LS ERROR ! >  
--> CHECK SWITCH (L-Y2) AND CABLE

E10 : < MAIN ARM FORWARD SOL ERROR ! >  
--> CHECK SOLENOID (S-Y2) AND CABLE

E11 : < MAIN ARM BWD. END LS ERROR ! >  
--> CHECK SWITCH (L-Y1) AND CABLE

E12 : < MAIN ARM BACKWARD SOL ERROR ! >  
--> CHECK SOLENOID (S-Y1) AND CABLE

E13 : < TRAVERSE OWD. END LS ERROR ! >  
--> CHECK SWITCH (L-X2) AND CABLE

E14 : < TRAVERSE OUTWARD SOL ERROR ! >  
--> CHECK SOLENOID (S-X2) AND CABLE

E15 : < TRAVERSE IWD. END LS ERROR ! >  
--> CHECK SWITCH (L-X1) AND CABLE

E16 : < TRAVERSE INWARD SOL ERROR ! >  
--> CHECK SOLENOID (S-X1) AND CABLE

E17 : < SUB ARM ASC. END LS ERROR ! >  
--> CHECK SWITCH (L-H1) AND CABLE

E18 : < SUB ARM ASCENT SOL ERROR ! >  
--> CHECK SOLENOID (S-H1) AND CABLE

E19 : < SUB ARM DESC. END LS ERROR ! >  
--> CHECK SWITCH (L-H2) AND CABLE

E20 : < SUB ARM DESCENT SOL ERROR ! >  
--> CHECK SOLENOID (S-H2) AND CABLE

E21 : < SUB ARM FWD. END LS ERROR ! >  
--> CHECK SWITCH (L-W2) AND CABLE

E22 : < SUB ARM FORWARD SOL ERROR ! >  
--> CHECK SOLENOID (S-W2) AND CABLE

E23 : < SUB ARM BWD. END LS ERROR ! >  
--> CHECK SWITCH (L-W1) AND CABLE

E24 : < SUB ARM BACKWARD SOL ERROR ! >  
--> CHECK SOLENOID (S-W1) AND CABLE

E25 : < MAIN LOCK CYLINDER EXTENDED ! >  
--> CHECK SWITCH (L-Z3) AND CABLE

E26 : < 1ST DESC. SAFETY SIGNAL OFF ! >  
--> CHECK SWITCH (L-X1) AND CABLE

E27 : < 2ND DESC. SAFETY SIGNAL OFF ! >  
--> CHECK SWITCH (L-X2) AND CABLE

E28 : < WRIST VER. END LS ERROR ! >  
--> CHECK SWITCH (L-R1) AND CABLE

E29 : < WRIST VERTICAL SOL ERROR ! >  
--> CHECK SOLENOID (S-R1) AND CABLE

E30 : < WRIST HOR. END LS ERROR ! >  
--> CHECK SWITCH (L-R2) AND CABLE

E31 : < WRIST HORIZONTAL SOL ERROR ! >  
--> CHECK SOLENOID (S-R2) AND CABLE

E32 : < PART VERIFICATION IS ON ! >  
--> CHECK SWITCH (L-G1) AND CABLE

E33 : < PART VERIFICATION IS OFF ! >  
--> CHECK SWITCH (L-G1) AND CABLE

E34 : < VACUUM SWITCH IS OFF ! >  
--> CHECK SWITCH (L-G2) AND CABLE

E35 : < VACUUM SWITCH IS ON ! >  
--> CHECK SWITCH (L-G2) AND CABLE

E36 : < MAIN SPRUE VERIFICATION IS OFF >  
--> CHECK SWITCH (L-G3) AND CABLE

E37 : < MAIN SPRUE VERIFICATION IS ON >  
--> CHECK SWITCH (L-G3) AND CABLE

E38 : < SUB SPRUE VERIFICATION IS OFF >  
--> CHECK SWITCH (L-G4) AND CABLE

E39 : < SUB SPRUE VERIFICATION IS ON >  
--> CHECK SWITCH (L-G4) AND CABLE

E40 : < AIR PRESSURE GET DOWN ! >  
--> CHECK AND ADJUST AIR PRESSURE

E41 : < SUB LOCK CYLINDER EXTENDED ! >  
--> CHECK SWITCH (L-H3) AND CABLE

E42 : < WRIST ROTATE RET. LS ERROR ! >  
--> CHECK SWITCH (L-R3) AND CABLE

E43 : < WRIST ROTATE RET. SOL ERROR ! >  
--> CHECK SOLENOID (S-R3) AND CABLE

E44 : < WRIST ROTATE OUT LS ERROR ! >  
--> CHECK SWITCH (L-R4) AND CABLE

E45 : < WRIST ROTATE OUT SOL ERROR ! >  
--> CHECK SOLENOID (S-R4) AND CABLE

E46 : < OPTION ARM ASCENT LS ERROR ! >  
--> CHECK SWITCH (L-E1) AND CABLE

E47 : < OPTION ARM ASCENT SOL ERROR ! >  
--> CHECK SOLENOID (S-E1) AND CABLE

E48 : < OPTION ARM DESCENT LS ERROR ! >  
--> CHECK SWITCH (L-E2) AND CABLE

E49 : < OPTION ARM DESCENT SOL ERROR ! >  
--> CHECK SOLENOID (S-E2) AND CABLE

E54 : < MOLD OPEN SIGNAL ERROR ! >  
--> CHECK SIGNAL (MOC) AND CABLE

E54 : Mold open signal got off during  
arm down motion.

E55 : < MOLD OPEN SIGNAL IS OFF ! >  
--> CHECK SIGNAL (MOC) AND CABLE

E55 : When pressed main arm down,  
mold open signal was off.

E56 : < MOLD CLOSE END SIGNAL ERROR ! >  
--> CHECK SIGNAL (MCC) AND CABLE

E56 : Mold closed signal does not go off.

E57 : < MOLD CLOSE SIGNAL IS OFF ! >  
--> CHECK SIGNAL (MCC) AND CABLE

E58 : < SAFETY DOOR SIGNAL IS OFF ! >  
--> CHECK SIGNAL (SDC) AND CABLE

E59 : < PRESS IN AUTO SIGNAL IS OFF ! >  
--> CHECK SIGNAL (A/S) AND CABLE

E60 : < EJECTOR FWD END SIGNAL IS OFF >  
--> CHECK SIGNAL (EJF) AND CABLE

E62 : < ROBOT EMERGENCY STOP ! >  
-->

E63 : < MAIN ARM ASC. END LS IS OFF ! >  
--> CHECK SWITCH (L-Z1) AND CABLE

E64 : < SUB ARM ASC. END LS IS OFF ! >  
--> CHECK SWITCH (L-H1) AND CABLE

E65 : < MAIN ASC AND DESC LS BOTH ON ! >  
--> CHECK SWITCH (L-Z1,Z2) AND CABLE

E66 : < SUB ASC AND DESC LS BOTH ON ! >  
--> CHECK SWITCH (L-H1,H2) AND CABLE

E67 : < MAIN FWD AND BWD LS BOTH ON ! >  
--> CHECK SWITCH (L-Y1,Y2) AND CABLE

E68 : < SUB FWD AND BWD LS BOTH ON ! >  
--> CHECK SWITCH (L-W1,W2) AND CABLE

E69 : < WRIST VER AND HOR LS BOTH ON ! >  
--> CHECK SWITCH (L-R1,R2) AND CABLE

E70 : < ROTATE RET AND OUT LS BOTH ON >  
--> CHECK SWITCH (L-R3,R4) AND CABLE

E71 : < TRAVERSE IN AND OUT LS BOTH ON >  
--> CHECK SWITCH (L-X1,X2) AND CABLE

E72 : < OPTION ASC AND DESC LS BOTH ON >  
--> CHECK SWITCH (L-E1,E2) AND CABLE

E74 : < NC NOT COMPLETE ! (TIME OUT) >  
--> CHECK ROM VERSION (HBC,SEQ,NC,KG)

E74 : Output for traverse is ON, but do  
not run.

E75 : < NC ACCURACY ERROR >  
--> CHECK ROM VERSION (HBC,SEQ,NC,KG)

E76 : < BCD CODE ERROR > (EC=01H)  
--> CHECK NC BOARD AND NC-ROM VERSION

E76 : High speed counter board malfunction.  
Replace PCB AFB6915.

E77 : < INC/DEC DATA ERROR > (EC=02H)  
--> CHECK NC BOARD AND NC-ROM VERSION

E78 : < NC DATA ERROR 1 > (EC=03H)  
--> CHECK NC BOARD AND NC-ROM VERSION

E79 : < NC DATA ERROR 2 > (EC=04H)  
--> CHECK NC BOARD AND NC-ROM VERSION

E80 : < DIRECTION ERROR > (EC=05H)  
--> CHECK NC BOARD AND NC-ROM VERSION

E81 : < INC/DEC LINE NO DATA > (EC=06H)  
--> CHECK NC BOARD AND NC-ROM VERSION

E82 : < + END SWITCH IS ON > (EC=07H)  
--> CHECK NC BOARD AND NC-ROM VERSION

E83 : < - END SWITCH IS ON > (EC=08H)  
--> CHECK NC BOARD AND NC-ROM VERSION

E84 : < + END AREA (SLU) ERROR>(EC=09H)  
--> CHECK NC BOARD AND NC-ROM VERSION

E85 : < - END AREA (SLL) ERROR>(EC=0AH)  
--> CHECK NC BOARD AND NC-ROM VERSION

E86 : < CNT0 OVER/UNDER FLOW > (EC=0BH)  
--> CHECK NC BOARD AND NC-ROM VERSION

E87 : < CNT1 OVER/UNDER FLOW > (EC=0CH)  
--> CHECK NC BOARD AND NC-ROM VERSION

E88 : < WATCH DOG TIMER ON > (EC=80H)  
--> CHECK NC BOARD AND NC-ROM VERSION

E78 - E88 : If these message appeared,  
replacement of High speed  
counter board (PCB AFB6915)  
is needed.

E89 : < PRESENT POSITION COUNTER ERROR >  
--> CHECK NC BOARD AND NC-ROM VERSION

E90 : < THIS POSITION IS OUT OF RANGE >  
--> SET NEW POSITION IN NC AREA

E91 : < NO TEACHING (POSITION) DATA >  
--> SET THE POSITION BY TEACHING

E92 : < PRESENT POSITION COUNTER ERROR >  
--> CHECK MOTOR CABLE & ENCODER CABLE

E93 : < RAM ERROR ! ADDRESS = >  
--> CHANGE PCB-E031B IN PENDANT BOX

E94 : < BACK UP DATA (RAM) ERROR ! >  
--> BATTERY OR MISS SETTING OF DIP-SW

E95 : < MAIN CONTROLLER PROGRAM ERROR >  
--> CHECK MAIN CONTROLLER ROM(HBC,SEQ)

E96 : < NOT COMMUNICATE WITH KG-101 >  
--> CHECK COMMUNICATION CABLE

E99 : < PROGRAM TRAP ! ADDRESS = >  
--> CHANGE PCB-E031B IN PENDANT BOX

E99 : CPU board malfunction.  
Replace PCB E031.

E100: < AIR PRESSURE FAILURE ! >  
--> ADJUST AIR PRESSURE

E101: < PART VERIFICATION FAILURE ! >  
--> CHECK PART VER. (G1,G2,G3,G4)

E102: < EJECTOR FORWARD SIGNAL IS OFF >  
--> CHECK SIGNAL (EJF) AND CABLE

E103: < MOLD CLOSE SIGNAL ERROR >  
--> CHECK SIGNAL (MCC) AND CABLE

E104: < WRIST ROTATE FAILURE >  
--> CHECK (L-R3,R4),CHANGE MODE SET

E109: < STOPPED BY EMERGENCY ! >  
--> CHECK EMERGENCY SWITCH AND CABLE

E200: < KG PROGRAM ERROR > (TIMER1)  
--> CHECK TEACHING BOX AND POWER OFF

E201: < COMMUNICATION ERROR > (ASCII1)  
--> CHECK COMMUNICATE CABLE

E202: < COMMUNICATION ERROR > (ASCII2)  
--> CHECK COMMUNICATE CABLE

E203: < KG PROGRAM ERROR > (CSI0)  
--> CHECK TEACHING BOX AND POWER OFF

E204: < KG PROGRAM ERROR > (DUMMY)  
--> CHECK TEACHING BOX AND POWER OFF

E210: < MAIN CONTROLLER PROGRAM ERROR >  
-->CHECK MAIN CONTROLLER ROM (HBC,SEQ)

E211: < NOT COMMUNICATE WITH KG-101 >  
--> RECEIVE DATA (RXD) INSUFFICIENT

E212: < NOT COMMUNICATE WITH KG-101 >  
--> COMMUNICATION NOT PERMITTED (ACK)

E213: < NOT COMMUNICATE WITH KG-101 >  
--> TRANSMIT BUFFER (TXD) NOT EMPTY

E214: < NOT COMMUNICATE WITH KG-101 >  
--> COMMUNICATION RESPONSE MALFUNCTION

E215: < NOT COMMUNICATE WITH KG-101 >  
--> RECEIVE BUFFER (RXBUF) OVERFLOW

E216: < NOT COMMUNICATE WITH KG-101 >  
-->

E217: < NOT COMMUNICATE WITH KG-101 >  
-->

E218: < NOT COMMUNICATE WITH KG-101 >  
-->

E219: < NOT COMMUNICATE WITH KG-101 >  
-->

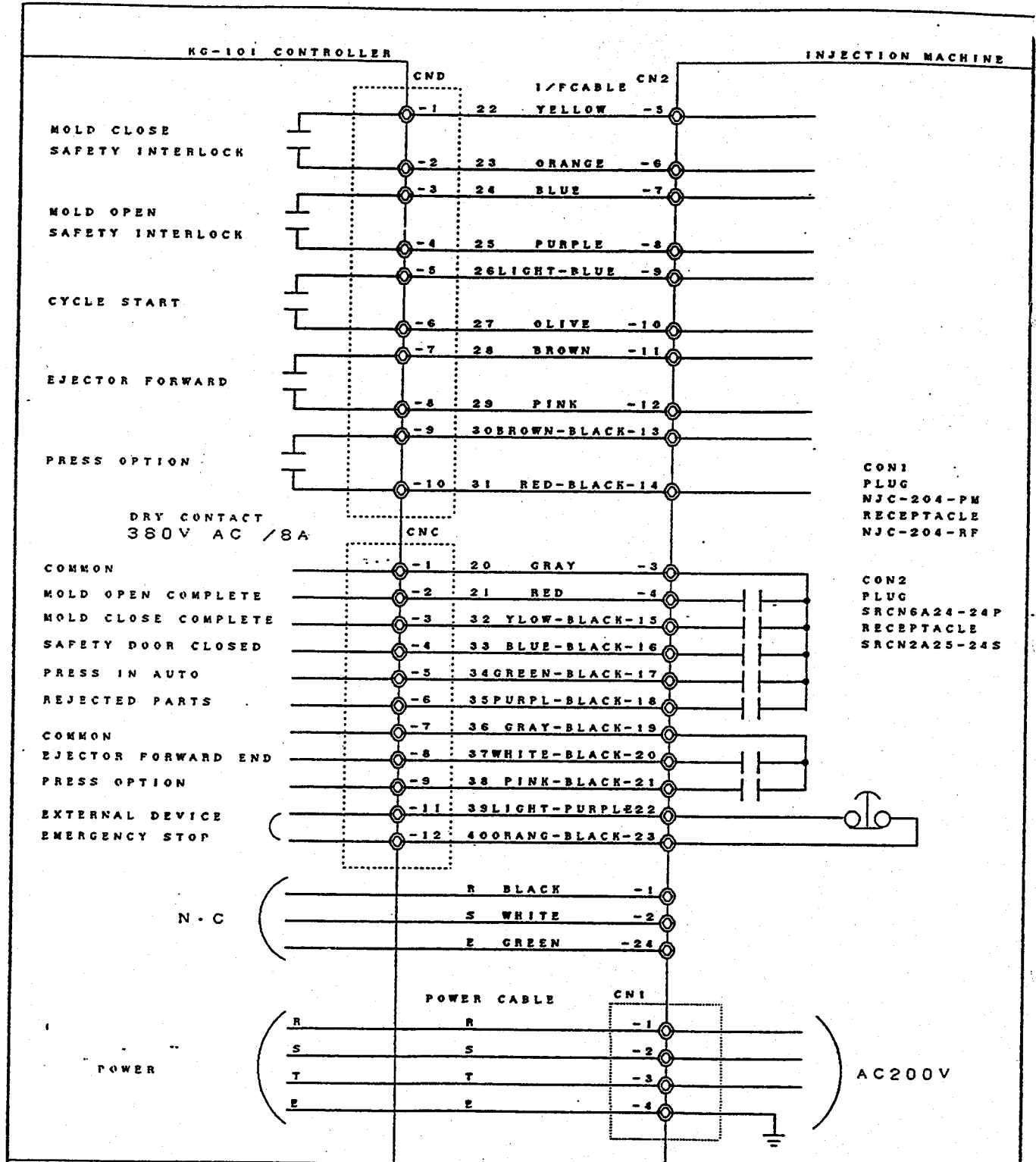
## 23. TROUBLE SHOOTING GUIDE


Refer to the following trouble shooting guide for the problem which is not shown on the LCD on KG-101 controller.

| Problem                      | Check list  | Remedy  |
|------------------------------|---|---|
| Power does not go ON         | <ol style="list-style-type: none"> <li>1 Circuit breaker ON ?</li> <li>2 Interface cable connected ?</li> <li>3 Power of press ON ?</li> </ol>                                    | <ol style="list-style-type: none"> <li>1 Turn the breaker ON</li> <li>2 Connect the cable</li> <li>3 Check the press</li> </ol>   |
| Molds do not close           | <ol style="list-style-type: none"> <li>1 Arm in the mold area?</li> <li>2 Part verification ON?</li> <li>3 Mold safety interlock</li> <li>4 Cycle start signal</li> </ol>         | <ol style="list-style-type: none"> <li>1 Move arm by [UP] key</li> <li>2 Adjust, Replace, check the wiring</li> <li>3 Check output &amp; wiring</li> <li>4 Check output &amp; wiring</li> </ol>             |
| Molds do not open            | <ol style="list-style-type: none"> <li>1 Arm in the mold area?</li> <li>2 Mold safety interlock</li> </ol>  | <ol style="list-style-type: none"> <li>1 Move arm by [UP] key</li> <li>2 Check output &amp; wiring</li> </ol>   |
| Ejector does not function    | <ol style="list-style-type: none"> <li>1 Eject forward signal</li> <li>2 Eject delay timer</li> </ol>   | <ol style="list-style-type: none"> <li>1 Check output &amp; wiring</li> <li>2 Adjust timer value</li> </ol>   |
| Auto operation not available | <ol style="list-style-type: none"> <li>1 Press in auto ?</li> <li>2 Robot home position ?</li> </ol>  | <ol style="list-style-type: none"> <li>1 Check the press</li> <li>2 Return to home by one touch key</li> </ol>  |
| No arm extension             | <ol style="list-style-type: none"> <li>1 Mold open end signal</li> <li>2 Down speed controller</li> <li>3 Down solenoid valve</li> <li>4 Air tube, seals</li> </ol>               | <ol style="list-style-type: none"> <li>1 Check relay &amp; wiring</li> <li>2 Adjust or replace h</li> <li>3 Replace the valve</li> <li>4 Replace tube, seals</li> </ol>                                     |
| No arm retraction            | <ol style="list-style-type: none"> <li>1 Up solenoid valve</li> <li>2 Air tube, seals</li> </ol>  | <ol style="list-style-type: none"> <li>1 Replace the valve</li> <li>2 Replace tube, seals</li> </ol>  |
| No strip forward             | <ol style="list-style-type: none"> <li>1 strip speed control</li> <li>2 Strip solenoid valve</li> <li>3 Air tube, seals</li> </ol>  | <ol style="list-style-type: none"> <li>1 Adjust or replace</li> <li>2 Replace the valve</li> <li>3 Replace tube or cyl.</li> </ol>  |
| No strip backward            | <ol style="list-style-type: none"> <li>1 Strip speed control</li> <li>2 Strip solenoid valve</li> <li>3 Air tube, seals</li> </ol>  | <ol style="list-style-type: none"> <li>1 Adjust or replace</li> <li>2 Replace the valve</li> <li>3 Replace tube or cyl.</li> </ol>  |
| No traverse motion           | <ol style="list-style-type: none"> <li>1 Is main arm down end?</li> <li>2 Part verification ON?</li> <li>3 Motor cable</li> <li>4 Encoder cable</li> <li>5 Motor brake</li> </ol> | <ol style="list-style-type: none"> <li>1 Move the main up</li> <li>2 Check, replace switch<br/>Check wiring</li> <li>3 Connect securely</li> <li>4 Connect securely</li> <li>5 Adjust or replace</li> </ol> |

| Problem  | Check list  | Remedy  |
|--|---|---|
| No grip  | 1 Gripper position OK ?<br>2 Air pressure correct?<br>3 Grip solenoid valve<br>4 Tube, seal in gripper<br>5 Molding stuck on mold | 1 Adjust the position<br>2 Adjust air pressure<br>3 Replace the valve<br>4 Replace tube or seal<br>5 Use release agent<br>Maintain mold |
| No vacuum                                      | 1 Mode setting correct?<br>2 Air pressure correct?<br>3 Vacuum solenoid valve<br>4 Tube<br>5 Molding stuck on mold                | 1 Set vacuum mode<br>2 Adjust air pressure<br>3 Replace the valve<br>4 Replace tube<br>5 Use release agent<br>Maintain mold             |
| No display on LCD                              | 1 Connection between control panel and power supply OK ?<br>2 Contrast adjustment<br>3 Power for control                          | 1 Connect securely and fix it<br>2 Adjust contrast<br>3 Check or replace power unit   |
| Preset data disappeared from memory or changed | 1 Battery in controller<br>2 Battery in handy box   | 1 Replace battery<br>2 Replace battery  |

## 24. INTERFACE BETWEEN THE ROBOT AND PRESS



|  |               |    |    |
|--|---------------|----|----|
| 名称   | 成形機 I/F 接続図 1 |    |    |
| 機種   | KG-101        | 図番 |    |
| 設計   | 91年 3月 11日    | 作図 | 小平 |
|  株式会社 八一七 |               |    |    |

(1) Check before wiring

1. Is the press operated correctly ?
2. Is the electrical drawing of the press corresponding to the actual wiring correctly ?
3. Is main power of the press OFF ?

(2) Wiring

- a) Connect power (200VAC 3 phase )line (R-black),(S-white), (T-red) and ground (E-green).
- b) Connect the cables (22-yellow, 23-orange) for mold close safety interlock so that it cut the mold close line of the press as shown in next page.
- c) Connect the cables (24-blue, 25-purple) for mold open safety interlock so that it cut the mold open line of the press as shown in next page.

CAUTION !! DO NOT PUT THE CABLES IN THE VALVE LINE

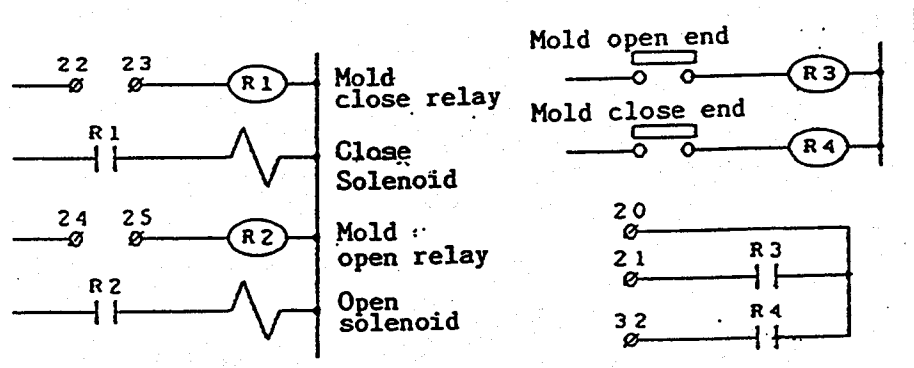
- d) Connect the cables (26-light blue, 27-olive) for cycle start into the line that permit the cycle start (mold closing) of the press such as interval timer line.
- e) Connect the cables (28-brown, 29-pink) for ejector forward permission so that it cut the ejector forward control line of the press.

CAUTION !! DO NOT PUT THE CABLES IN THE VALVE LINE

- f) Connect the cables for the following signals as shown in the drawing.

|                         |                   |
|-------------------------|-------------------|
| Mold open complete      | (21-red)          |
| Mold close complete     | (32-yellow/black) |
| Safety door closed      | (33-blue/black)   |
| Press in auto           | (34-green/black)  |
| Part reject signal      | (35-purple/black) |
| Ejector fwd. end signal | (37-white/black)  |

CAUTION !! THESE SIGNALS FROM THE PRESS SHOULD BE NORMALLY OPEN DRY CONTACTS.



Note) The circuit depends on the press.

(3) Check wiring

1. Connect the short plug to the interface connector.  
Confirm that the mold open and close function are OK.
2. Stop the mold opening in between the open end and close end position.  
Disconnect the short plug, and confirm that the mold open and close function is not available.  
If close or open, check the wiring.
3. Connect the robot controller and the press.  
Set the robot mode to [ROBOT OFF] (key switch).  
Confirm that mold open/close function is OK.
4. Check the I/O status of robot and the press by LCD.

---

Conair has made the largest investment in customer support in the plastics industry. Our service experts are available to help with any problem you might have installing and operating your equipment. Your Conair sales representative also can help analyze the nature of your problem, assuring that it did not result from misapplication or improper use.

## WE'RE HERE TO HELP

To contact Customer Service personnel, call:



## HOW TO CONTACT CUSTOMER SERVICE

**From outside the United States, call: 814-437-6861**

You can commission Conair service personnel to provide on-site service by contacting the Customer Service Department. Standard rates include an on-site hourly rate, with a one-day minimum plus expenses.

### **If you do have a problem, please complete the following checklist before calling Conair:**

- Make sure you have all model, serial and parts list numbers for your particular equipment. Service personnel will need this information to assist you.
- Make sure power is supplied to the equipment.
- Make sure that all connectors and wires within and between loading control and related components have been installed correctly.
- Check the troubleshooting guide of this manual for a solution.
- Thoroughly examine the instruction manual(s) for associated equipment, especially controls. Each manual may have its own troubleshooting guide to help you.
- Check that the equipment has been operated as described in this manual.
- Check accompanying schematic drawings for information on special considerations.

## BEFORE YOU CALL ...

*Additional manuals and prints for your Conair equipment may be ordered through the Customer Service or Parts Departments for a nominal fee.*

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## EQUIPMENT GUARANTEE

Conair guarantees the machinery and equipment on this order, for a period as defined in the quotation from date of shipment, against defects in material and workmanship under the normal use and service for which it was recommended (except for parts that are typically replaced after normal usage, such as filters, liner plates, etc.). Conair's guarantee is limited to replacing, at our option, the part or parts determined by us to be defective after examination. The customer assumes the cost of transportation of the part or parts to and from the factory.

## PERFORMANCE WARRANTY

Conair warrants that this equipment will perform at or above the ratings stated in specific quotations covering the equipment or as detailed in engineering specifications, provided the equipment is applied, installed, operated and maintained in the recommended manner as outlined in our quotation or specifications.

Should performance not meet warranted levels, Conair at its discretion will exercise one of the following options:

- Inspect the equipment and perform alterations or adjustments to satisfy performance claims. (Charges for such inspections and corrections will be waived unless failure to meet warranty is due to misapplication, improper installation, poor maintenance practices or improper operation.)
- Replace the original equipment with other Conair equipment that will meet original performance claims at no extra cost to the customer.
- Refund the invoiced cost to the customer. Credit is subject to prior notice by the customer at which time a Return Goods Authorization Number (RGA) will be issued by Conair's Service Department. Returned equipment must be well crated and in proper operating condition, including all parts. Returns must be prepaid.

Purchaser must notify Conair in writing of any claim and provide a customer receipt and other evidence that a claim is being made.

## WARRANTY LIMITATIONS

**Except for the Equipment Guarantee and Performance Warranty stated above, Conair disclaims all other warranties with respect to the equipment, express or implied, arising by operation of law, course of dealing, usage of trade or otherwise, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.**