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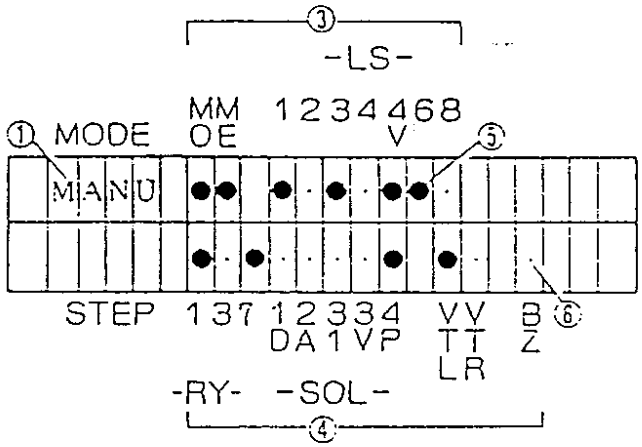
Find the *Star Automation STEC-30* at our website: *Click HERE*

5-1 Input/Output Screen

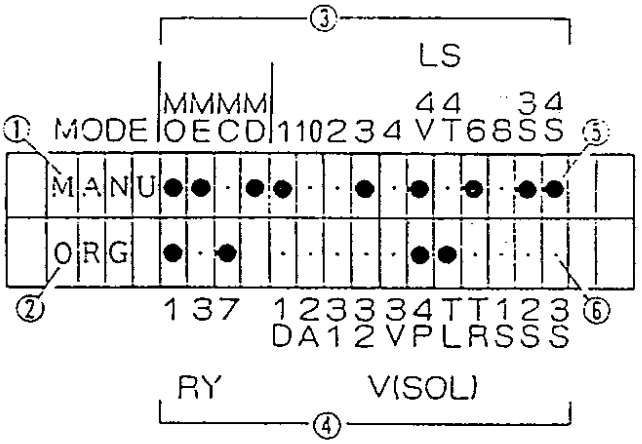
Each manual operation requires input/output signal conditions. If the machine does not operate even though the operation procedures have been carried out, input/output signals for which conditions have not been met can be found on the input/output screen.

Press the [RESET] key to display the input/output screen.

● STEC-20



● STEC-30



① MANU/AUTO..... Displays MANU when the machine is in manual operation and AUTO when in automatic operation.

② ORG..... Indicates that the home-return-operation has been completed. (Displayed only during manual operation after the chuck is opened.)

③ ..... Indicates the status of input signals.

④ ..... Indicates the status of output signals.

⑤ <●> ..... ON (Action)

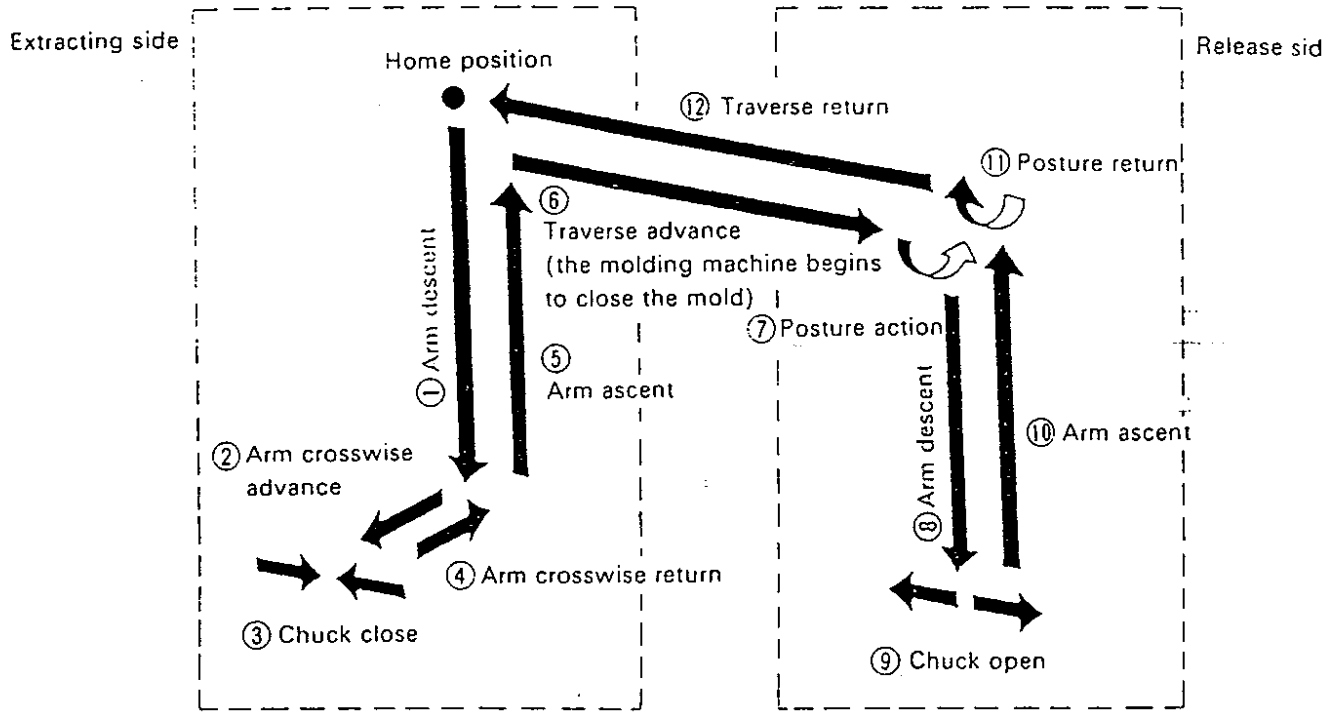
⑥ <・> ..... OFF (Stop)

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5-2 Input/Output Symbol List

Input		Code	Name	Output		Code	Name
Signals from the injection molding machine	MO	MO	Mold opening completed	Relay output signal (RY)	1	RY-1	Mold open safety circuit
	ME	ME	Ejector advance end		3	RY-3	Cycle start
	MC	MC	Mold closing completed		7	RY-7	Ejector start
	MD	MD	Safety door closed	Unloader solenoid valve output signal (SOL)	1D	V-1D	Arm descent
Unloader limit switch LS	1	LS-1	Extracting side		2A	V-2A	Arm crosswise advance
	10	LS-10	Midway traverse		31	V-31	Chuck open
	2	LS-2	Release side		32	V-32	Sprue chuck open
	3	LS-3	Arm ascent end		3V	V-3V	Suction off
	4	LS-4	Product confirmation		4P	V-4P	Posture action
	4V	LS-4V	Suction confirmation				
	4T	LS-4V	Multiple cavity product confirmation		VTL TL	VTL	Traversing to extracting side
	6	LS-6	Arm crosswise return end		VTR TR	VTR	Traversing to release side
	8	LS-8	Posture return end		1S	V-1S	Runner side descent
	3S	LS-3S	(R) Ascent end		2S	V-2S	Runner side crosswise advance
	4S	LS-4S	Runner detection		3S	V-3S	Runner side chuck open
Mode	MANU	MANUAL	Manual mode		BZ	BZ	Buzzer
	AUTO	AUTO	Automatic mode				
	STEP	STEP	Step No.				

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8-1 Operation Method

1. Check the operation of the unloader manually. (See the section 7. Manual Operations.)

2. Return the unloader to the home position in manual operation. (See the section 7-2 Setting Method for Returning to the Home Position.)

3. Press the [RESET] key.

4. Press the [AUTO] key to set the machine in automatic mode.

5. Press the [START] key to start automatic operations.

6. To stop the machine, press the [MANU] key.
   Stop the carriage unit somewhere not likely to cause trouble. (In general, stop the carriage un with the vertical arm raised on the release side.)

* Automatic operations can only be started from the home position.
* The mode cannot be switched during automatic operation.
* If the unloader stops because of an abnormality during automatic operation, refer to the section 11. Alarm Function.

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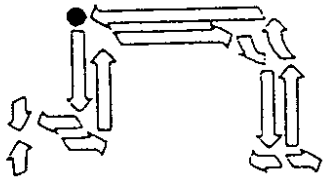
8-2 Input/Output Signal Conditions for Automatic Operations

● : ON
・ : OFF
—①→ : Operation number
: When ejector linked mode (MDE) is selected
··→ : Timer operation

1. Check that unloader is at the home position.

Unloader	LS-1, LS-3, LS-6, LS-8, LS-3S	●
	LS-4, LS-4V, LS-4T, LS-4S	・

→ RESET → AUTO → START



2. Automatic start standby

Unloader	LS-1, LS-3, LS-6, LS-8, LS-3S	●
	LS-4, LS-4V, LS-4T, LS-4S	・

→

Unloader	V-31, V-32, V-3V, V-3S	●
	V-2A, V-2S	・

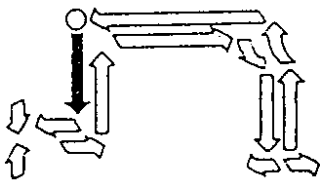
3. Home position —①→ Vertical cylinder descends.

IMM	M0, MD	●

→

V-1D, V-1S	●
V-3V	・

→ T1 ● ----



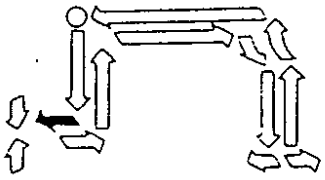
4. Vertical cylinder descends. —②→ Crosswise cylinder advances.

IMM	M0	●
Unloader	LS-1, LS-8	●
	T1	UP

→

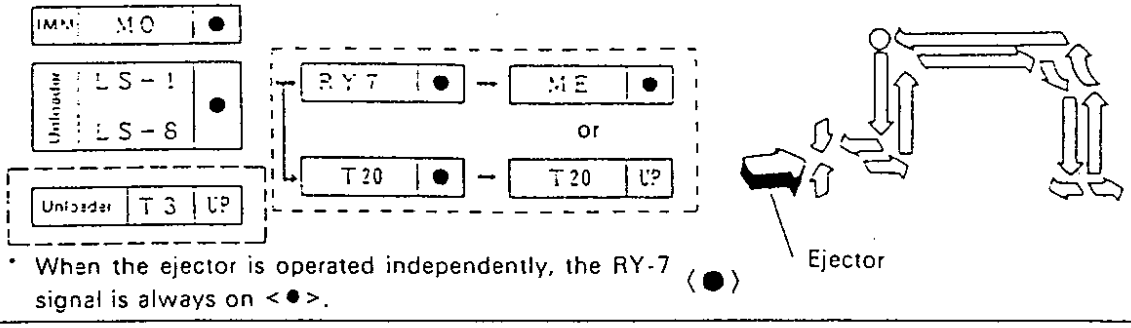
V-2A, V-2S	●

→ T2 ● ----
T3 ● ----



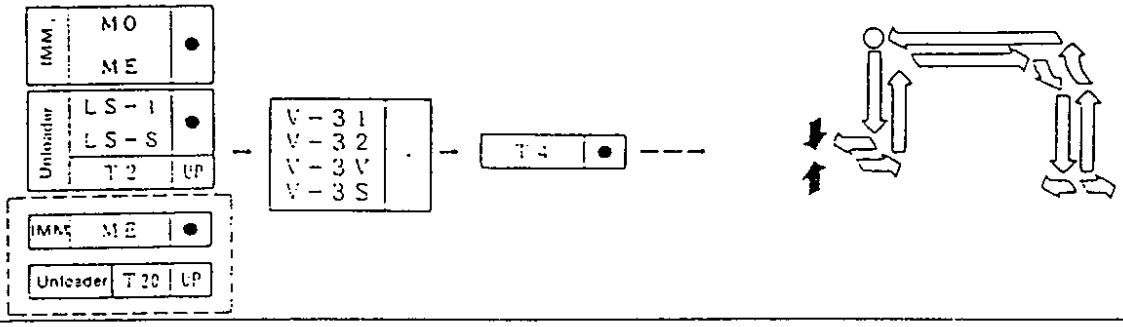
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5. Crosswise cylinder advances. ⟶ Ejector start signal (RY-7)

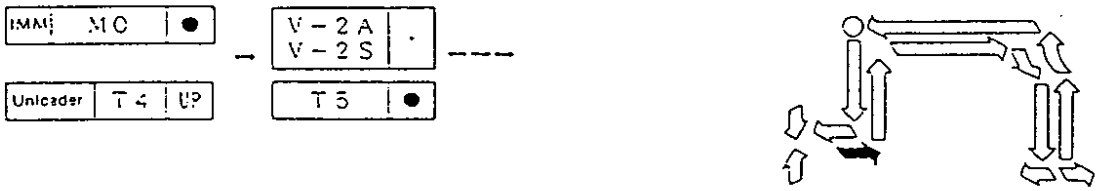


* When the ejector is operated independently, the RY-7 signal is always on <●>. (●)

6. Crosswise cylinder advances. —③→ Chuck cylinder closes.



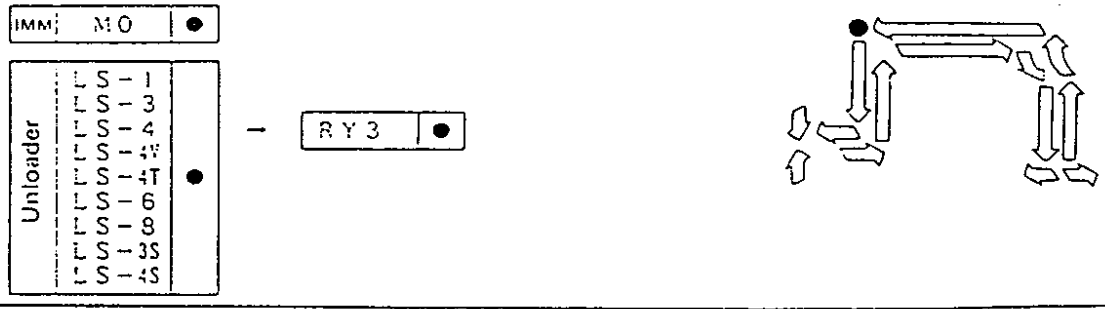
7. Chuck cylinder closes. —④→ Crosswise cylinder returns.



8. Crosswise cylinder returns. —⑤→ Vertical cylinder ascends.

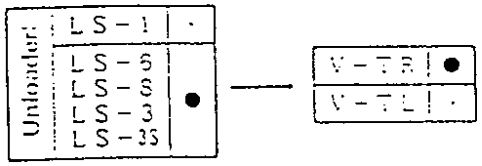


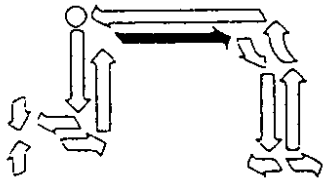
9. Vertical cylinder ascends. ⟶ Cycle starts (RY-3).



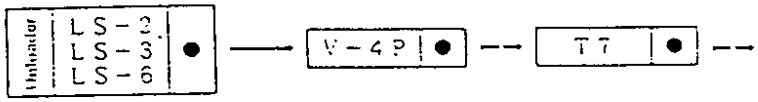
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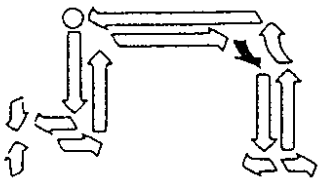
10. Extracting side —⑥→ Traverse advance to release side.



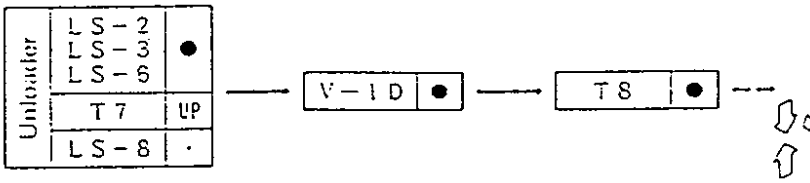


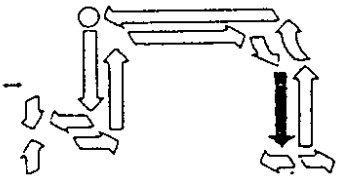
11. Release side —⑦→ Posture cylinder activated.



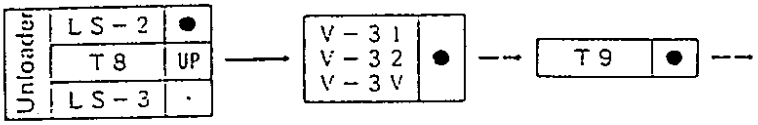


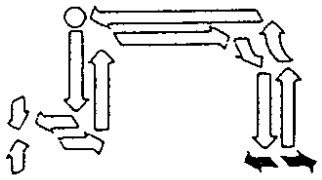
12. Posture cylinder activated. —⑧→ Vertical cylinder descends.



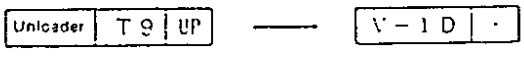


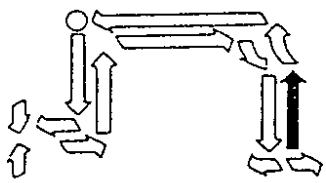
13. Vertical cylinder descends. —⑨→ Chuck cylinder opens.





14. Chuck cylinder opens. —⑩→ Vertical cylinder ascends.

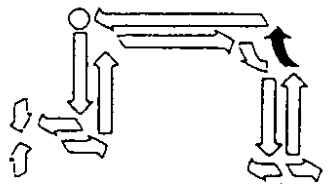




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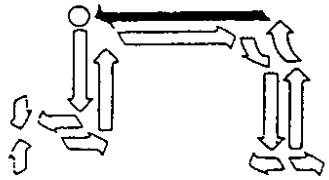
15. Vertical cylinder ascends. —⇅→ Posture cylinder returns.

Unloader	LS – 3	●	⟶	V – 4 P	·



16. Release side —⇄→ Traverse return to the extracting side.

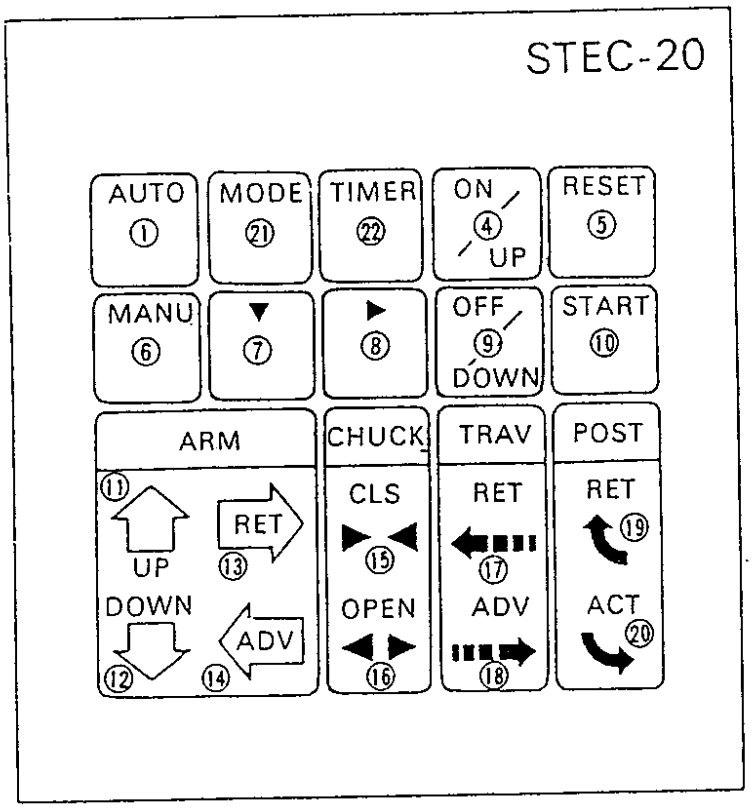
Unloader	LS – 2 LS – 3 LS – 3S LS – 6 LS – 8	●	⟶	V – T L	●
				V – T R	·
	LS – 4 LS – 4V LS – 4T LS – 4S	·			



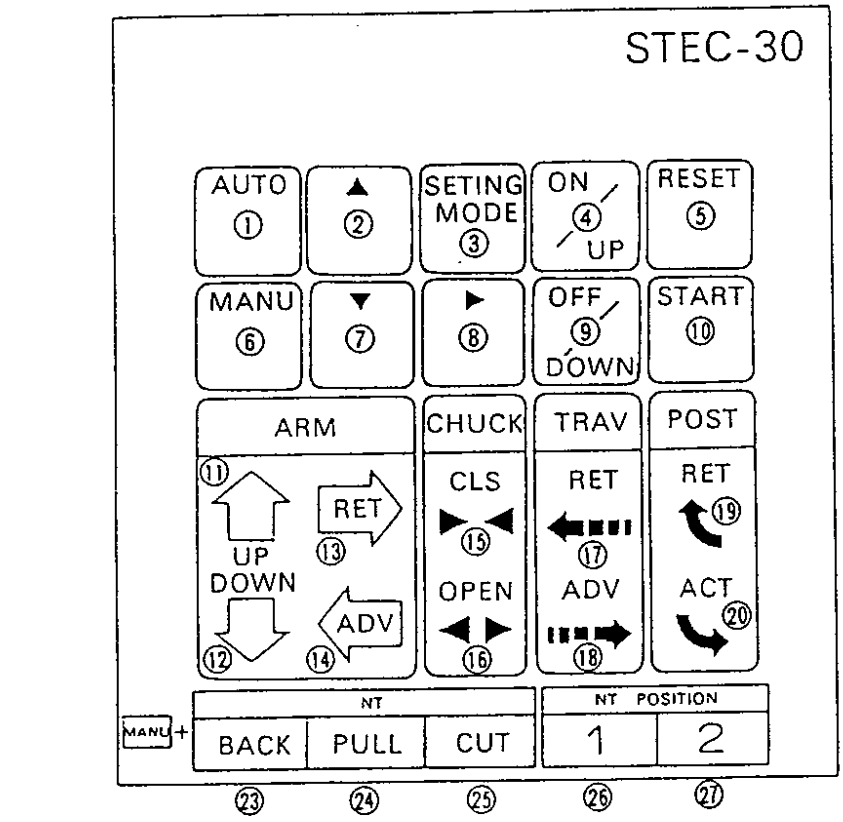
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2-2 Manual Operation Keys

■ STEC-20



■ STEC-30



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● Message operation keys

① [AUTO] ..... Sets the unloader in the automatic operation mode.

② [▲] ..... Switches the display to the previous screen. (STEC-30)

③ [SETING MODE] ..... Pressing this key one time displays the mode screen and pressing twice displays the timer screen. (STEC-30)

④ [ON/UP] ..... Switches the mode on or increments the setting.

⑤ [RESET] ..... Resets alarm and error screens. Resets the manual operation mode and LCD screen lamps when the unloader is set in the automatic operation mode.

⑥ [MANU] ..... Sets the unloader in the manual operation mode.

⑦ [▼] ..... Switches the display to the next screen.

⑧ [▶] ..... Moves the cursor right.

⑨ [OFF/DOWN] ..... Switches the mode off or decrements the setting.

⑩ [START] ..... Starts operation in the automatic operation mode.

㉑ [MODE] ..... Displays the mode screen. (STEC-20)

㉒ [TIMER] ..... Displays the timer screen. (STEC-20)

● Manual operation keys

• ARM

⑪ [UP] ..... Moves the vertical arm up.

⑫ [DOWN] ..... Moves the vertical arm down.

⑬ [RET] ..... Returns the vertical arm.

⑭ [ADV] ..... Advances the vertical arm.

• CHUCK

⑮ [CLS] ..... Closes the chuck.

⑯ [OPEN] ..... Opens the chuck.

• TRAV

⑰ [RET] ..... Moves the carriage unit towards the extracting side.

⑱ [ADV] ..... Moves the carriage unit towards the release side.

• POST

⑲ [RET] ..... Returns the posture.

⑳ [ACT] ..... Activates the posture.

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2. NAME OF PARTS

● Optional manual operation keys (not provided for the standard type)

• GATE CUT

㉓ [BACK] ..... Pressing this key and the [MANU] key simultaneously returns the NT gate nipper.

㉔ [PULL] ..... Pressing this key and the [MANU] key simultaneously pulls the NT gate nipper.

㉕ [CUT] ..... Pressing this key and the [MANU] key simultaneously operates cutting with the NT gate nipper.

• NT POS

㉖ [1] ..... Pressing this key and the [MANU] key simultaneously moves the NT gate cutter to Position 1.

㉗ [2] ..... Pressing this key and the [MANU] key simultaneously moves the NT gate cutter to Position 2.

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6. SETTING THE MODE

This section explains how to set the operation mode for the unloader.
Before setting the mode, make sure that you understand what each mode does. This is described in section 6-3 Mode Description.

* Mode settings cannot be changed when the machine is operated automatically or the arm has not been raised completely.

6-1 Setting Method

1. Press the [MANU] key to set the machine in the manual operation mode.
2. Display the mode setting screen.
   - For the STEC-20, press the [MODE] key.
   - For the STEC-30, press the [SETING MODE] key.

   * The cursor will be displayed at ①. (See the section 6-2 Mode Setting Screens.)
3. Use the keys described below to set the mode. (See the section 6-2 Mode Setting Screens.) Move the cursor to the desired mode, then turn it ON or OFF.

   [UP/ON] ..... Pressing this key turns ON the mode where the cursor is, and displays a <●>.

   [DOWN/OFF] ..... Pressing this key turns OFF the mode where the cursor is, and displays a <•>.

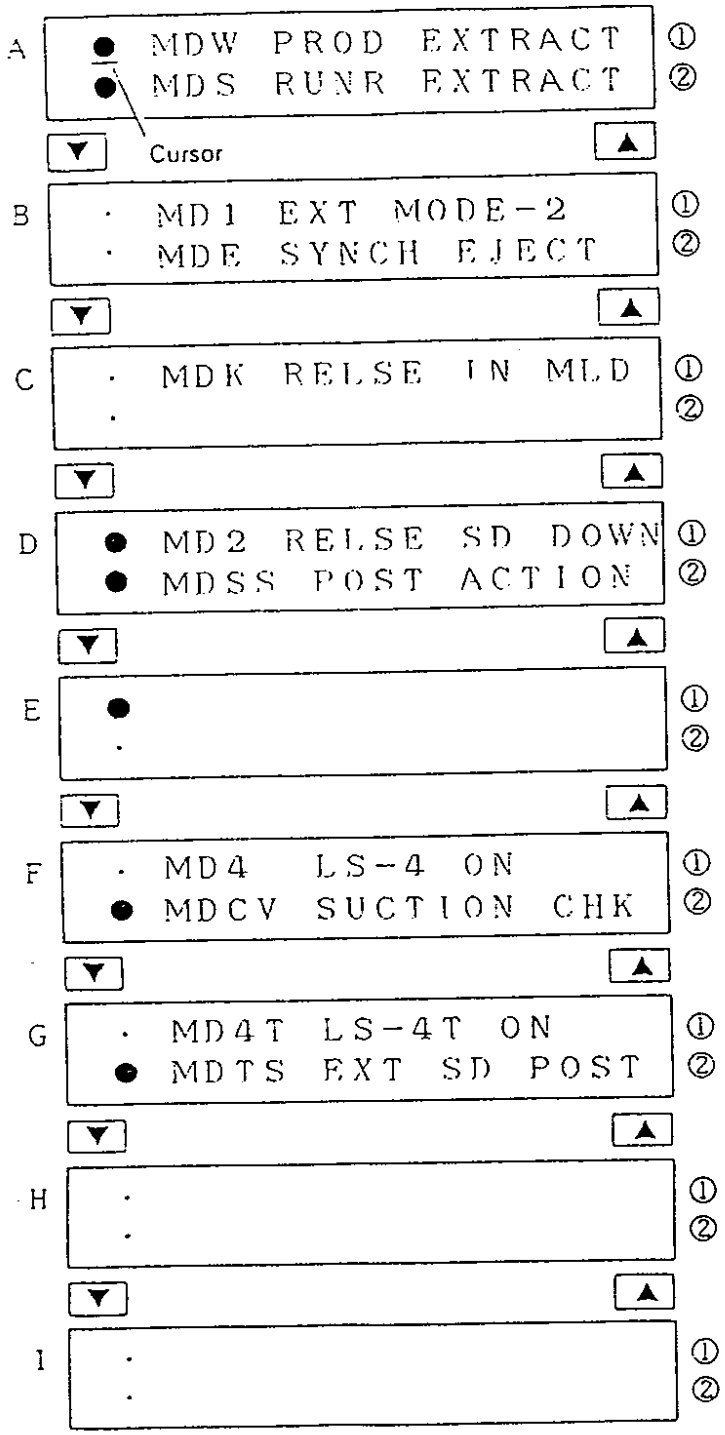
   [▶] ..... Pressing this key moves the cursor one step through the sequence ①→②→①.

   [▼] ..... Pressing this key switches to the next screen in the following sequence: A→B→C→D→E→F→G→H→I→A.

   [▲] ..... Pressing this key switches to the next screen in the following sequence: A→I→H→G→F→E→D→C→B→A.

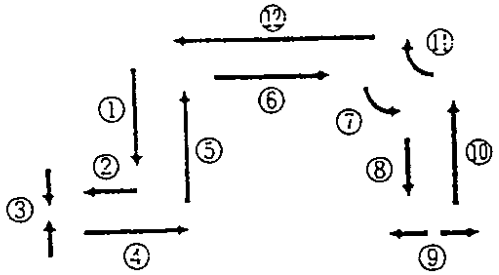
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6-2 Mode Setting Screens



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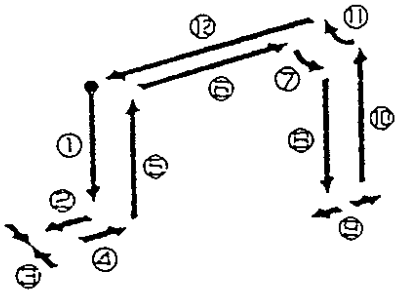
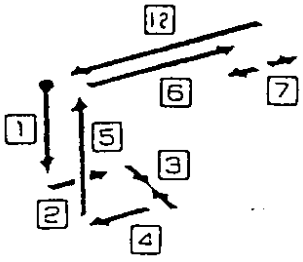
6-3 Mode Description

Product side extraction	Runner side extraction (S type)	Others
	① Descent ② Crosswise advance ③ Runner chuck closing ④ Crosswise return ⑤ Ascent ⑥ Traverse advance ⑦ Runner chuck closing ⑧ Traverse return	⚠1 Nipper pull ON ⚠2 Nipper cut ⚠3 Nipper pull OFF ⚠4 Nipper position advance ⚠5 Nipper position return ⚠6 Sprue chuck opening

① Descent
② Crosswise advance
③ Chuck closing
④ Crosswise return
⑤ Ascent
⑥ Traverse advance
⑦ Posture action
⑧ Descent
⑨ Chuck opening
⑩ Ascent
⑪ Posture return
⑫ Traverse return

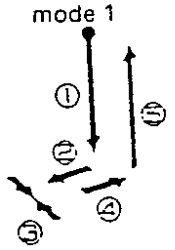
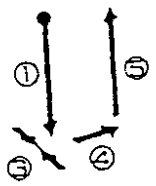
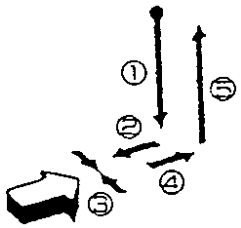
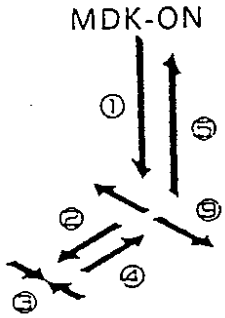
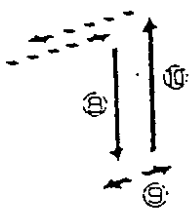
- ✻ On the extracting side:
  Crosswise advance means to move toward the product and runner.
  Crosswise return means to extract the product and runner.

✻ ( ) indicates options.

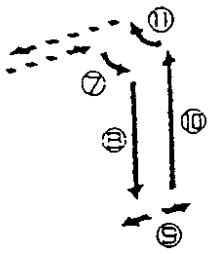
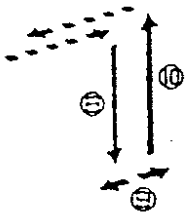
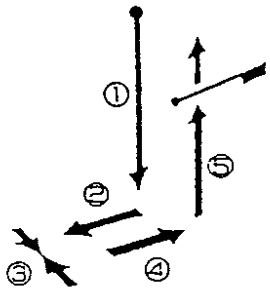
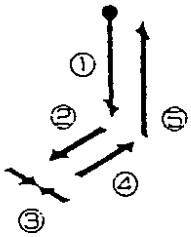
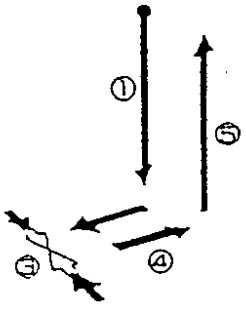
Symbol	Mode	Name	Explanation	Motion pattern
MDW	PROD EXTRACT	Product side extraction	Turn on this mode when extracting products with the arm on the product side.	MDW-ON 
MDS	RUNR EXTRACT	Runner side extraction	Turn on this mode when extracting runner with the arm on the runner side. (The runner side can be operated alone.) *Only for CYS type (STEC-30)	MDS-ON 

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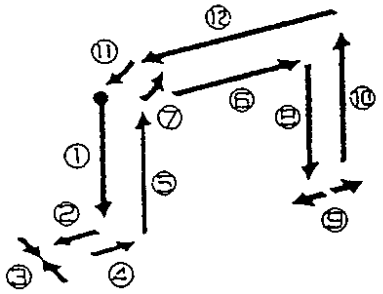
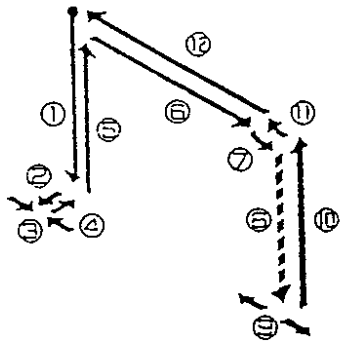
6. SETTING THE MODE

Symbol	Mode	Name	Explanation	Motion pattern	
MD1	EXT MODE 2	Extraction mode 2	Turning on this mode enables selection of motion pattern for the unloader's chuck plate to move up to the product extracting position.	MD1-OFF Extraction mode 1 	MD1-ON Extraction mode 2 
MDE	SYNCH EJECT	Ejector link	When the product is released easily because it is thin, switching on this mode links the operations of the unloader to those of the molding machine to assure proper chucking.	MDE-ON Ejector linked operation • Interlocks with the ejector only when in the automatic mode. The safety confirmation signal is available.	MDE-OFF Ejector solo operation • Does not interlock with the ejector (and the ejector start signal RY-7 stays on at all times).
				• RY-7 and T20 come on with T3 (ejector pushing start signal) up. The chuck closes with T20 up or when the ejector advance end (ME) comes on. 	
MDK	RELSE IN MLD	Release in mold	When this mode is on, the product is released within the mold after it is extracted from the mold. * When using this mode, use a product detection device to avoid any accidents because the unloader does not confirm the product.	MDK-ON 	
MD2	RELSE SD DWN	Release side descent	This mode determines the product release position for the release side.	MD2-ON 	MD2-OFF 

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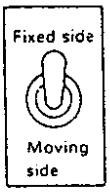
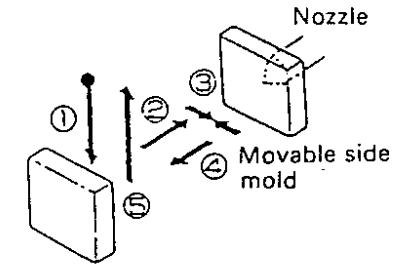
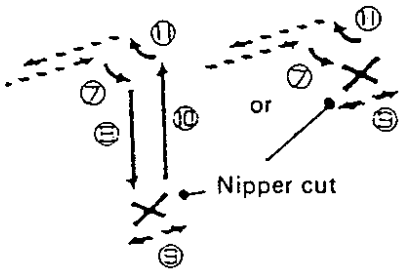
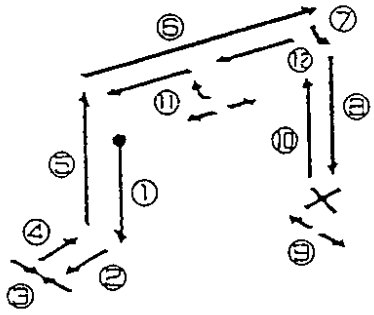
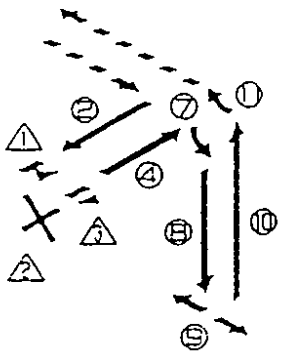
Symbol	Mode	Name	Explanation	Motion pattern
MDSS	POST ACTION	Posture action	When this mode is on, the posture (chuck plate) turns 90° at the product release position. * The 500 type turns 180°.	MDSS-ON  MDSS-OFF 
MD4	LS-4 ON	Product confir-mation	When this mode is on, confir-mation of the product starts during ascending after the pro-duct is extracted from the mold. * The limit switch should be positioned where it stays ON even when the vertical arm reaches the ascent-end.	MD4-ON 
MDCV	SUCTION CHK	Suction	When using an unloader which has the vacuum generator (op-tion), switching on this mode activates the suction circuit. * When not using the suction, always set this mode to off. If the suction confirmation limit switch (LS-4V) does not come on, then the product confir-mation limit switch (LS-4) does not come on, stopping automatic operations.	MDCV-ON 
MD4T	LS-4T ON	Multiple cavity product confir-mation	Switching on this mode makes it possible to check multiple products individually inside the chuck at the same time they are extracted from the mold.	MD4T-ON 

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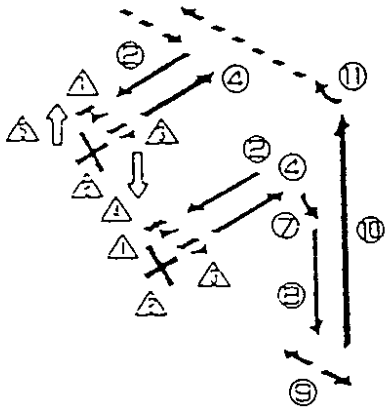
Symbol	Mode	Name	Explanation	Motion pattern
MDTS	EXT POST ACT	Extracting side posture control	When the traverse movement is obstructed by the safety door, etc. after product extraction, switching on this mode enables posture action at the ascent-end on the extraction side, making it possible to avoid the obstruction. * When the posture action mode (MDSS) is off, posture return is performed at the release side after traversing, then posture action is performed at the end of ascent and traversing is continued after releasing the product. * This mode is not displayed for the STEC-20 since the operation is fixed.	MDTS-ON 
		Slow-speed descent at release side	When this mode is used, after product extraction, the descending speed at the release side can be made slower than that at the extracting side. * This mode is not displayed in the mode setting screen.	

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6-4 Optional Modes

Symbol	Mode	Name	Explanation	Motion pattern
	FIXED SIDE MOVING SIDE 	Fixed side - Moving side extraction	If the product is at the fixed side after molding operation, the product can be extracted from the fixed side by exchanging pipes with the coupler and switching the mode switch on the machine main unit. * With the standard type, this mode is set to movable side extraction. * This mode is not displayed in the mode setting screen. * This mode is available only for the STEC-30.	Extraction on fixed side 
(MDCN)	CHK NIPPER	Nipper in chuck	Turning on this mode operates the optional air nipper if the unloader has one. * The air nipper cannot be used if the NT gate cut nipper is used. * This mode is available only for the STEC-30.	MDCN-ON 
(MDTB)	SPR PLCMT (R)	Runner midway release (traverse return)	When this mode is on, a product whose gate has been cut by the NT gate cut nipper or the nipper in chuck (option) is released on the release side, then the sprue/runner is released during the traverse return (when the LS-10 comes on). * This mode is available only for the STEC-30.	MDTB-ON 
(MDNT)	GATE NIPPER	NT gate cut	When using an unloader that has the optional NT gate cut nipper installed at the end of the traverse on the release side, turning on this mode causes the unloader to cut the side gate on the release side after extracting the product. * This mode is available only for the STEC-30. * Manual operation is not possible.	MDNT-ON 

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Symbol	Mode	Name	Explanation	Motion pattern
MDNT 2	NIPPER POSI	NT gate cut position	If this mode is selected while using the NT gate cut nipper (MDNT), a new function that enables vertical movement of the nipper will be added, making it possible for one nipper to cut side gates at two positions. * This mode is available only for the STEC-30.	MDNT2-ON 

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9. SETTING TIMERS

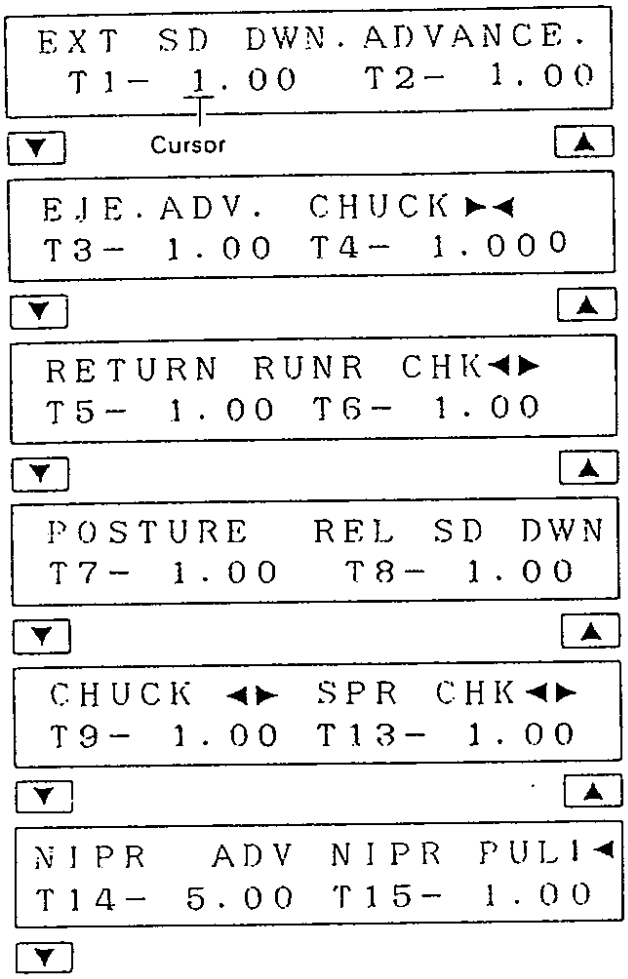
The timers are set to provide accurate chucking and efficient operations when molded products are extracted during automatic operation.

9-1 Setting Method

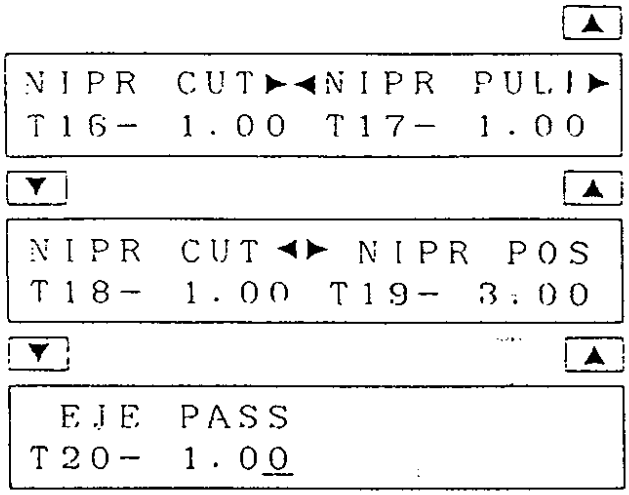
1. Display the timer setting screen.
   - For the STEC-20, press the [TIMER] key.
   - For the STEC-30, press the [SETING] key twice.
2. Pressing the [▼] key displays the next screen, and pressing the [▲] key displays the previous screen. (See section 9-2 Timer Setting Screens.)
3. Press the [►] key to move the cursor to the timer whose setting is to be changed.
4. Press the [UP/ON] or [DOWN/OFF] key to set the time.

* The runner side chuck open timing (runner release position) is adjusted at dog position for LS-10.

9-2 Timer Setting Screens



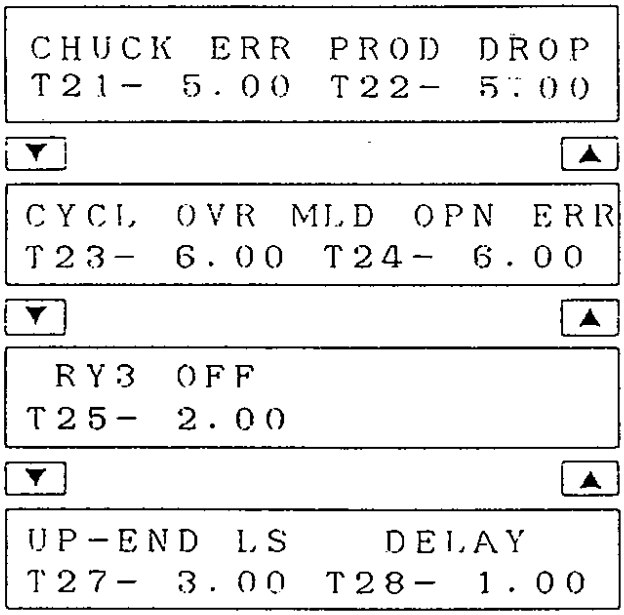
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9-3 Alarm Timers

There is normally no need to change the alarm timer settings. If you do change the setting of these timers, avoid extreme time settings.

1. Display the alarm timer screen.
   - For the STEC-20, press the [TIMER] and [▼] keys simultaneously.
   - For the STEC-30, press the [SETING] and [▼] keys simultaneously.
2. Move the cursor to the alarm timer for which you wish to change the setting.



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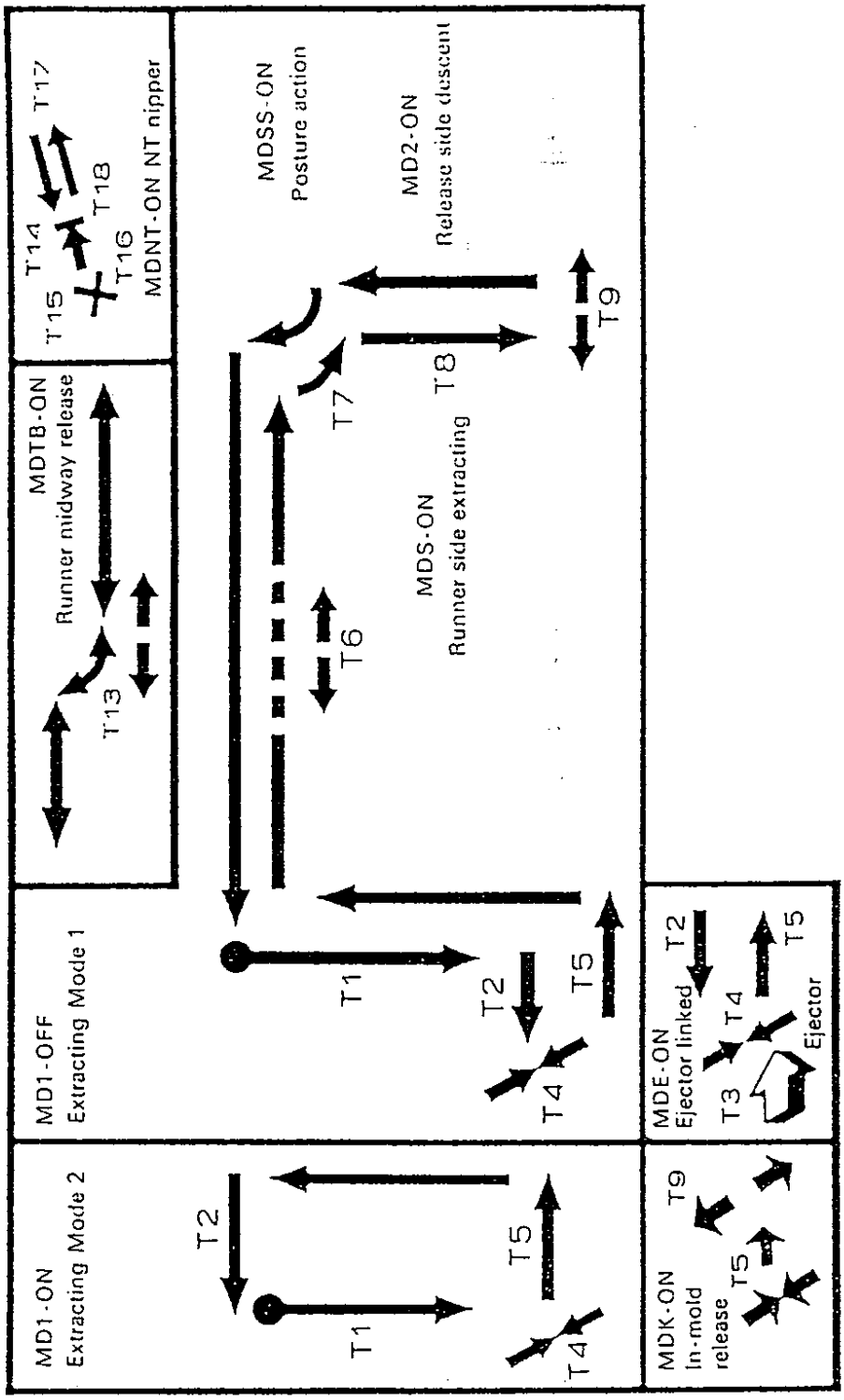
9-4 Timer Setting Times

Timer		Min.	Max.	Initial value	Remarks
T 1	EXT SD DOWN	0.00	99.99	5.00	
T 2	ADVANCE	0.00	99.99	5.00	
T 3	EJE ADV	0.00	99.99	5.00	
T 4	CHUCK ▶◀	0.00	99.99	3.00	
T 5	RETURN	0.00	99.99	5.00	
T 6	RUNR CHK ◀▶	0.00	99.99	3.00	
T 7	POSTURE	0.00	99.99	5.00	
T 8	REL SD DOWN	0.00	99.99	5.00	
T 9	CHUCK ◀▶	0.00	99.99	3.00	
T 13	SPR CHK ◀▶	0.00	99.99	3.00	
T 14	NIPR ADV	0.00	99.99	5.00	Option
T 15	NIPR PUL ▌◀	0.00	99.99	1.00	
T 16	NIPR CUT ◀▶	0.00	99.99	1.00	
T 17	NIPR PUL ▌▶	0.00	99.99	1.00	
T 18	NIPR CUT ◀▶	0.00	99.99	1.00	
T 19	NIPR POS	0.00	99.99	3.00	
T 20	EJE PASS	0.00	99.99	1.00	
T 21	CHUCK ERR	0.10	99.99	3.00	Alarm Timer
T 22	PROD DROP	0.10	99.99	3.00	
T 23	CYCL OVR	3.0	599.99	10.00	
T 24	MLD OPN ERR	10.0	599.99	30.00	
T 25	RY3 OFF	0.1	99.99	1.00	
T 27	UP END LS	0.1	99.99	1.00	
T 28	DELAY	0.00	99.99	0.50	

* The initial value is the value when the E^2 PROM data is cleared.
* Timer setting units.....1/10 second for T23 and 24, and 1/100 for other timers.

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9-5 Standard Timer Operation Diagram



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9-6 Standard Timer Operation List

Timer	Name	Function	Remarks
T1	Extracting side descent time	• Sets the time from when the arm begins to descend on the extracting side until it begins to advance.	
T2	Advance time	• Sets the time from when the arm begins to advance until the chuck closes or the arm finishes advancing completely.	
T3	Ejector advance time	• Sets the time from when the arm begins to advance until the ejector begins to advance.	Only when the ejector is linked
T4	Chuck close time	• Sets the time from when the chuck closes until the arm begins to return.	
T5	Return time	• Sets the time from when the arm begins to return until the arm begins to ascend.	
T6	Runner side chuck open time	• Sets the time from when the runner side chuck opens until the product is released.	
T7	Posture action time	• When the release side descent mode (MD2) is on, this timer sets the time from the posture action until the arm begins to descend. • When the release side descent mode (MD2) is off, this timer sets the time from the posture action until the chuck opens.	
T8	Release side descent time	• Sets the time from when the arm begins to descend on the release side until the chuck opens.	
T9	Chuck open time	• When the release side descent mode (MD2) is on, this timer sets the time from when the chuck opens until the arm begins to ascend. • When the release side descent mode (MD2) is off, this timer sets the time from when the chuck opens until traverse return begins.	
T13	Sprue chuck release time	• When the runner midway release mode (MDTB) is on, this timer sets the sprue chuck release time during traversing.	
T14	NT gate cut advance time	• Sets the time from when the NT gate cutter begins to advance until the advance is completed.	When the NT gate cut nipper (MDNT) is used
T15	NT gate cut pull operation time	• Sets the time from when the NT gate cut pull operation begins until the time the NT gate cut nipper (cutting) operation begins. *The pull operation brings the nipper cutting edge in close contact with the product.	When the NT gate cut nipper (MDNT) is used.
T16	NT gate cut nipper cutting time	• Sets the time from the NT gate cut nipper operation (cutting) until the nipper returns (and the cut signal goes off).	When the NT gate cut nipper (MDNT) is used
T17	NT gate cut pull return operation time	• Sets the time from when the NT gate cut nipper pull (off) return begins until the NT gate cutter arm begins to return.	When the NT gate cut nipper (MDNT) is used
T18	NT gate cut nipper open time	• Sets the time from when the NT gate cut nipper (cut signal off) returns until the NT gate cut pull (off) return begins.	When the NT gate cut nipper (MDNT) is used
T19	NT gate cut position move time	• Sets the time from when the NT gate cut position begins to move until the time when the NT gate cut advance begins.	When the NT gate cut nipper (MDNT) is used

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Timer	Name	Function	Remarks
T20	Ejector pass	• Timer T20 is activated when T3 runs out. *The chuck closes when the ejector reaches the ejector end (ME) or T20 runs out.	Only when the ejector is linked
T21	Chuck error time	• This is the timer for monitoring chuck errors during automatic operation. • After the product is chucked and the arm completes its ascent, if the product confirmation signal does not come on even if this timer runs out, the alarm is triggered.	
T22	Product drop abnormality	• This is the timer for monitoring the product drop during traversing in automatic operation. • After traversing begins, if the product confirmation limit switch goes off before this timer runs out, the alarm is triggered.	
T23	Cycle over	• This timer is for monitoring the automatic operation cycle of the unloader. • The timer is activated at the same time the output comes on. The alarm is triggered if no input even if this timer runs out.	
T24	Mold open abnormality	• This timer monitors the opening and closing of the mold during automatic operations. • After the product is extracted, the timer is activated at the same time when the cycle start signal (RY-3) is sent to the molding machine. If the the mold open complete signal (MO) is not received from the molding machine after the timer runs out, the alarm is triggered.	
T25	RY3 OFF	• This timer sets the duration for which the the cycle start signal (RY-3) is output to the molding machine during automatic operations. • When the ascent end (LS-3) and product confirmation (LS-4) limit switches come on after the product is extracted, the cycle start signal (RY-3) is output and the timer is activated simultaneously. RY-3 goes off when this timer runs out, the mold opening complete signal (MO) goes off or the release side traverse end (LS-2) comes on.	
T27	Upper end LS abnormality	• The timer monitors the operation of the upper end limit switch. • The timer is excited when the arm descent output (V1D) comes on. If the ascent end limit switch does not go off even if this timer runs out, all operations are stopped and the alarm is triggered.	
T28	Delay	• This sets the time until both extracting side (LS-1) and release side (LS-2) limit switches come on.	

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