

MR13 Series Digital Controller

Program Function Instruction Manual

Thank you for purchasing the Shimaden M13 series controller.

Please check that the delivered product is the correct item you ordered. Please do not begin operating this product until you have read this instruction manual thoroughly and you understand its contents.



"Notice"

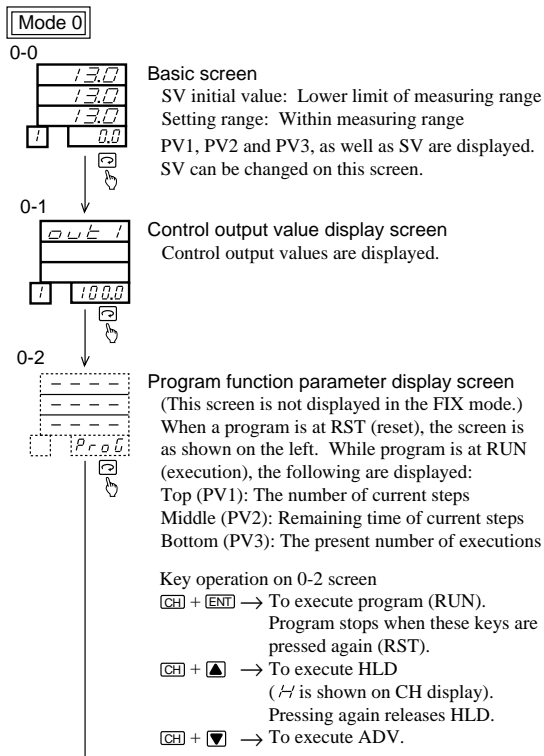
Please ensure that this instruction manual is given to the final user of this instrument.

Preface

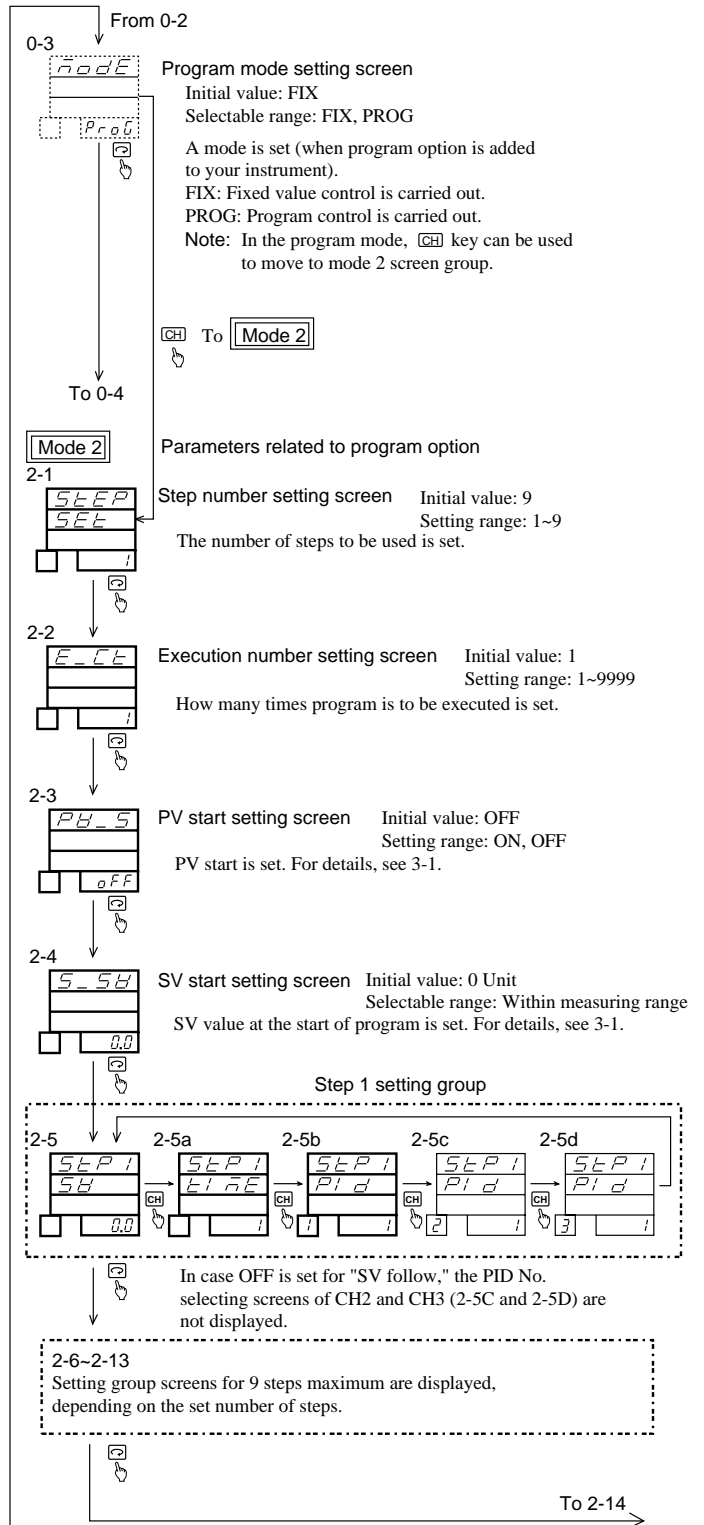
This instruction manual describes the program function, an optional function of the M13 series digital controller. Concerning the specifications, matters to be attended to during usage and a description of other functions, please refer to the separate instruction manual.

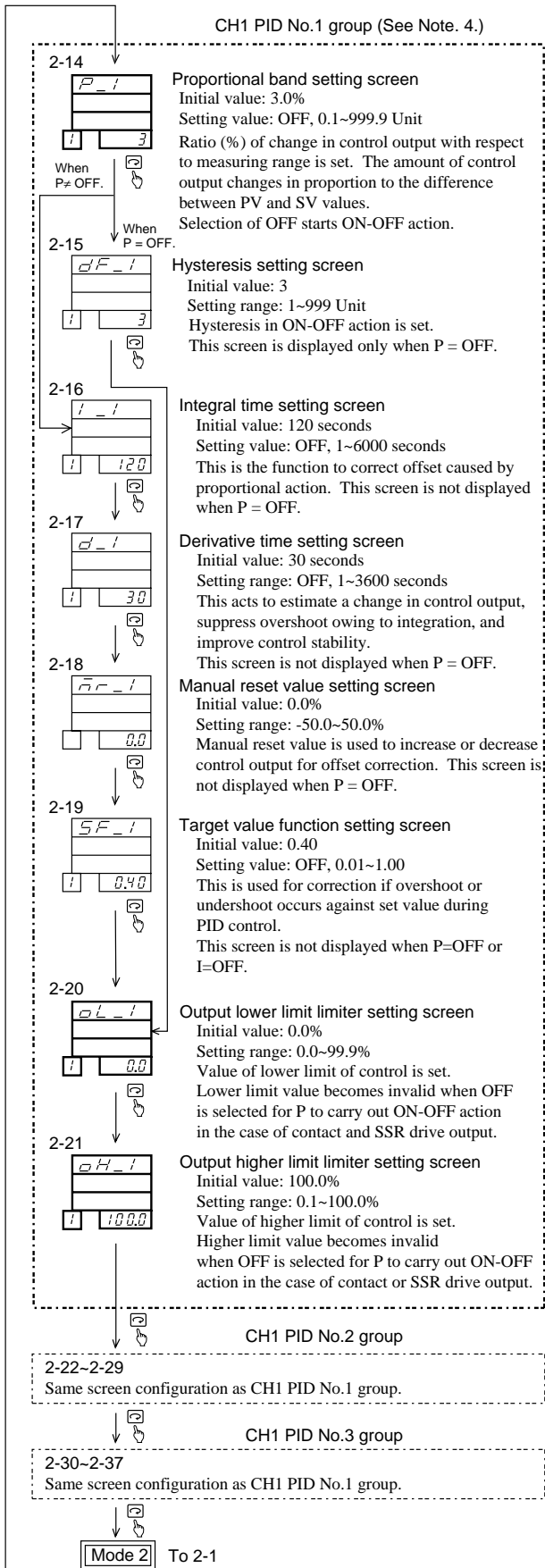
Contents	page
1. Description of screens and key sequence related to program option	1 ~ 2
2. Supplementary description of mode 0 screen group	3
2-1. 0-2 program function parameter display screen	3
2-2. Execution of program	3
2-3. HLD action	3
2-4. ADV action	3
2-5. AT in program control	3
2-6. PID action in program control	3
3. Supplementary description of mode 2 screen group	3
3-1. 2-3 PV start setting screen	3
4. Table for program pattern setting	4

1. Description of screens and key sequence related to program option

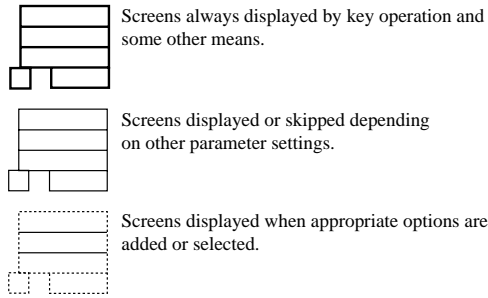


To 0-3





Note 1: The following show the types of screen frames on the respective screens:

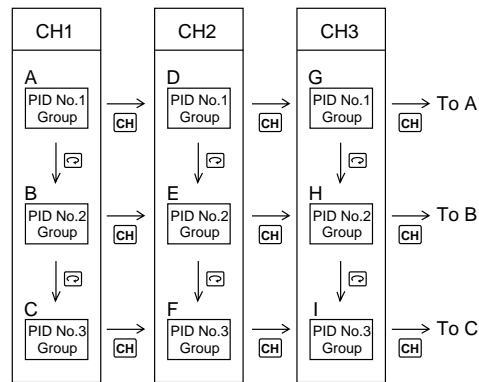


Note 2: When CH display is shaded:

The **[CH]** key can be used to change one channel to another and set parameters for each channel. On the 0-3 program mode setting screen, however, the **[CH]** key serves to move to the mode 2 screen group.

Note 3: In mode 2 screen group, pressing **[▲]** key while pressing **[◀]** key can change to a previous screen (i.e., opposite to the flow of screens as caused by pressing **[▶]** key).

Note 4: In MR13, each channel has 3 PID groups. This instruction manual gives a detailed description of the shaded portions in the following illustration. The other groups have the same screen configuration.



The M13 series program functions only in CH1.
If you want to use the program function in CH2 and CH3, SV follow should be set for them.

2. Supplementary description of mode 0 screen group

2-1.0-2 program function parameter display screen

While program is in execution (RUN), the number of steps, remaining time of current step and the number of executions are displayed. Nevertheless, these are not displayed when program is in suspension (RST).

- * While program is in suspension (RST)
 - Control output becomes 0%.
 - Event output turns OFF.
- However, in case event output is used as alarm (event types 1 ~ 6 are assigned and standby action 1 ~ 3 are set), event output turns ON only when sensor break or scaleover occurs.

2-2. Execution of program

- Program is unable to be executed in the case of scaleover of PV1.
- During execution of program, RUN lamp remains lit and the lamp goes out when program stops.
- In case time of step presently in execution is changed, the changed time becomes valid only in the next execution.
- In the following cases, program stops (RST) immediately:
 1. When measuring range, control characteristics or input scaling is changed.
 2. When scaleover occurs.
 3. When setting is changed so as to be the current execution number > the number of executions.
 4. When setting is changed at the last number of execution so as to be the step number currently in execution > the number of executions.
 - * When the current execution number is smaller than the number of executions and setting is changed to the current step number > the number of steps, the number of executions is given 1 increment and control is carried out from step 1.
 5. When program control terminates.

2-3. HLD action

- HLD action: The time of step in which HLD is input is temporarily suspended and SV value is fixed.
- HLD action is valid only when program is executed.
- ADV action is unable to be input while HLD is in action.
- While HLD is in action, "H" is shown on the channel display of the 0-2 program function parameter display screen.
- In case HLD is assigned to DI and program is executed (RUN) while DI input is ON, SV of PV start function supercedes.
Example: Hold is in action with start SV when PV start is OFF.

2-4. ADV action

- ADV action: terminates the step currently in execution and starts the next step.
- ADV action is valid while program is in execution but becomes invalid when HLD is in action.
- Once ADV action is executed, you have to wait about 2 seconds to execute ADV action again.

2-5. AT in program control

- AT is unable to be carried out while ramp is in execution in program control. AT cannot be carried out either if there is no flat portion from step 1 through step 9.
- AT lamp flashes while AT control is actually done in flat portion(s). In other portions the lamp remains lit on

standby until all AT completes.

- Occurrence of the following brings AT to a termination:
 1. Scaleover.
 2. Termination of one pattern of program (AT will terminate even if PID operation is not completed because time for one step is too short.)
 3. Completion of operation of all PID Nos.
 4. Suspension of program.

2-6. PID action in program control

In ramp portion, control is carried out in PD action even when I≠ OFF in order to reduce overshoot at the time of moving into flat portion. When SF is less than 0.10, however, control is performed in PID action.

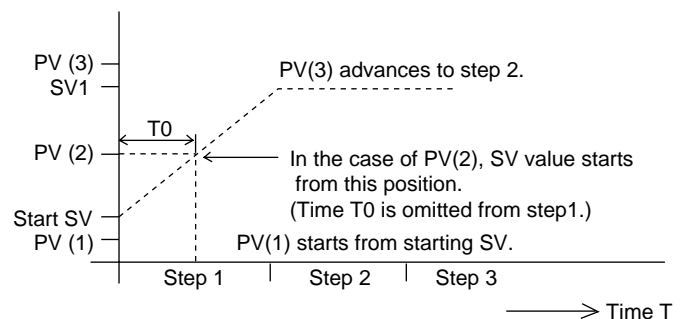
3. Supplementary description of mode 2 screen group

3-1.2-3 PV start setting screen

When the starting step of program falls on ramp control and starting SV value and PV value are widely apart from each other, action time is wasted. To get rid of such waste of time, starting SV value is set so that the step starts from it as PV start.

When PV start is OFF, step starts always from starting SV value.

The following shows the pattern when RUN is executed in program control.



4. Table for program pattern setting

100%									
90%									
80%									
70%									
60%									
50%									
40%									
30%									
20%									
10%									
0%									
Step No.	1	2	3	4	5	6	7	8	9
CH1 SV (set value)									
CH2 SV (CH1 SV + CH2 S_FL)									
CH3 SV (CH1 SV + CH3 S_FL)									
Time (minute)									
CH1 PIDNo. (1~3)									
CH2 PIDNo. (1~3)									
CH3 PIDNo. (1~3)									

STEP No. 1~9
PV start ON, OFF
Starting SV value
Number of executions
- MEMO -

	PID No. 1	PID No. 2	PID No. 3
CH1	P_1= %	P_2= %	P_3= %
	I_1= sec.	I_2= sec.	I_3= sec.
	D_1= sec.	D_2= sec.	D_3= sec.
	DF_1=	DF_2=	DF_3=
	MR_1= %	MR_2= %	MR_3= %
	SF_1=	SF_2=	SF_3=
	OL_1= %	OL_2= %	OL_3= %
	OH_1= %	OH_2= %	OH_3= %
CH2	P_1= %	P_2= %	P_3= %
	I_1= sec.	I_2= sec.	I_3= sec.
	D_1= sec.	D_2= sec.	D_3= sec.
	DF_1=	DF_2=	DF_3=
	MR_1= %	MR_2= %	MR_3= %
	SF_1=	SF_2=	SF_3=
	OL_1= %	OL_2= %	OL_3= %
	OH_1= %	OH_2= %	OH_3= %
CH3	P_1= %	P_2= %	P_3= %
	I_1= sec.	I_2= sec.	I_3= sec.
	D_1= sec.	D_2= sec.	D_3= sec.
	DF_1=	DF_2=	DF_3=
	MR_1= %	MR_2= %	MR_3= %
	SF_1=	SF_2=	SF_3=
	OL_1= %	OL_2= %	OL_3= %
	OH_1= %	OH_2= %	OH_3= %

The contents of this manual are subject to change without notice.

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