








Expansion Mode

- The parameters in this mode can be used only when the “security” parameter (protect mode) is set to “0” and “1”.
- This mode contains the parameters for setting expanded functions. These parameters include parameters for setting the SP setting limiter, selecting advanced PID and ON/OFF control, and setting the program time unit, step time/rate of rise programming, time unit of ramp rate and the automatic return of display mode.
- To select this mode, press the  key for 1 second minimum. The display changes to the menu display. If you select [E_UL] using the  and  keys, and then press the  key for 1 second minimum, the controller enters the expansion mode.
- To select parameters in this mode, press the  key. To change parameter settings, use the  or  keys.
- The following table shows the parameters supported in this mode and the page where the parameter is described.

Symbol	Parameter Name	See
SL-H	Set point upper limit	below
SL-L	Set point lower limit	below
EntL	PID/ON/OFF	below
P-on	Operation at power ON	below
ESEt	End condition	below
P-no	Number of patterns	below
t-U	Program time unit	below
t-Pr	Step time/Rate of rise programming	below
PrU	Time unit of ramp rate	below
PvSt	PV start	below
rPARL	Alarm during ramp step enable	below
rUnA	Run all enable	below
ALFA	α	below
At-G	AT calculated gain	below
rEt	Automatic return of display mode	below
At-H	AT hysteresis	below
LbAb	LBA detection width	below

SL-H Set point upper limit

SL-L Set point lower limit



Function

- Limits the upper and lower limits when the SP is set. The SP can be set within the range defined by the upper and lower limit set values of the “set point upper limit” and “set point lower limit ” parameters. Note that as these parameters are reset, the SP of existing settings that are out of the range are forcibly changed to one of the upper or lower limit values.
- When the temperature input type and temperature unit have been changed, the set point upper limit and set point lower limit are forcibly changed to the upper and lower limits of the sensor.
- During temperature input, the decimal point position is dependent on the currently selected sensor, and during analog input on the results of scaling.



Comment

Parameter	Setting Range	Unit	Default
Set point upper limit	Set point lower limit +1 to scaling upper limit	EU	1300
Set point lower limit	Scaling lower limit to set point upper limit -1	EU	-200

During temperature input, the range becomes the range of use of the selected sensor instead of the range defined by the scaling upper and lower limit values.



See

- Related description
4.2 Operating Condition Restrictions
- Related parameter
“Input type” “Scaling upper limit” “Scaling lower limit” “Decimal point” (setup mode)

EntL PID/ON/OFF



Function



Comment



See

- Selects advanced PID control or ON/OFF control.

Setting Range	Default
"P _{id} " :Advance PID/ "ōōōF" :ON/OFF	P _{id}

- Related description
4.1 Selecting the Control Method/ON/OFF control
- Related parameters
"Hysteresis (heat)" "Hysteresis (cool)" (level 1 mode)
-

P-ōō

Operation at power ON



Function



Comment



See

Selects one of the following operations when the power is turned ON:

- "Continue" : Starts operations from the state that was active when the power was interrupted.
- "Reset" : Resets the controller.
- "Run" : Starts normal program operation.
- "Manual" : Sets the controller to the manual mode.

"Manual" cannot be selected when Auto/Manual key operation is protected.

Setting Range	Default
"ōō" :Continue/ "ōōō" :Reset/ "ōōō" Run/ "ōōō" :Manual	ōō

- Related description
4.6 Setting Running Conditions/Operation at power ON

ESEt

End condition



Function

- Specifies a reset state or continued control on the SP of the final step after program operation ends.
- The program end state will not change when the “number of steps” parameter setting has been changed after program operation ends. However, when control on the SP is continued, the SP of the final step is selected after the number of steps has been changed.



Comment

Setting Range	Default
“ r5t ”:Reset/ “ 5P ”:Continued control using final SP	r5t



See

- Related description
4.6 Setting Running Conditions/End condition
- Related parameter
“Number of steps” (program mode)
-

P-nā

Number of patterns



Function

- Sets the number of patterns that can be used in a program.



Comment

Setting Range	Default
1 to 4	1



See

- Related parameters
“Run all enable” (expansion mode)
“Event input assignment 1” (option mode)

t-U

Program time unit



Function

- Specifies the time unit of the following parameters:
 “Pattern elapsing time monitor”, “Step 0 to 15 time”/Soak time
 0 to 7”, “Time signal 1 ON time” “Time signal 2 ON time” “Time
 signal 1 OFF time” “Time signal 2 OFF time”



Comment

Setting Range	Default
“HH $\bar{n}\bar{n}$ ”:Hour, minute/ “ $\bar{n}\bar{n}55$ ”:Minute, second	HH $\bar{n}\bar{n}$



See

- Related parameters
 “Pattern elapsing time monitor” (level 1 mode)
 “Steps 0 to 15 time/Soak time 0 to 7” “Time signal 1 ON time”
 “Time signal 2 ON time” “Time signal 1 OFF time” “Time signal
 2 OFF time” (program mode)



t-Pr

Step time/Rate of rise programming



Function

- Specifies the program method.



Comment

Setting Range	Default
“t $\bar{t}\bar{n}\bar{E}$ ”:Set time/ “Pr”:Rate of rise programming	t $\bar{t}\bar{n}\bar{E}$



See

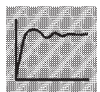
- Related description
 3.5 Setting Patterns
 4.3 Ramp Rise Rate Setup Program
- Related parameter
 “Step 0 to 15 SP/Target SP 0 to 7” “Ramp rate 0 to 7” “Step 0 to
 15 time/Soak time 0 to 7” (program mode)

Pr-U

Time unit of ramp rate

Conditions of Use

Rate of rise programming must be set.



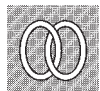
Function

- Specifies the unit time of “rate of rise 0 to 7.”



Comment

Setting Range	Default
“ \dot{H} ” : Minute/ “ H ” : Hour	\dot{H}



See

- Related parameter
“Ramp rate 0 to 7” (program mode)

PVSt**PV start**

Conditions of Use

The set time must be set.



Function

Specifies either of the following current SP at the start of program operation:

- PV : Process value at start of program operation (PV start)
- SP : SP of step 0 (normal program operation)

When “PV” is selected, program operation is started from the position where the current SP first matches the PV at the start of program operation. If the SP does not match the PV, program operation is started from the beginning of the program.



Comment

Setting Range	Default
“ PV ”: PV/“ SP ”:SP	SP



See

● Related description

4.6 Setting Running Conditions/Starting the program run/PV start

-PAL**Alarm during ramp step enable**

Function

- To enable alarms during the ramp step, set to [ON]. To disable alarm, set to [OFF].



Comment

Setting Range	Default
“ ON ”: / “ OFF ”	ON



Run all enable

Conditions of Use

The “number of patterns” parameter must be set to a value greater than “1”.



Function

- To successively execute the program of all patterns from pattern 0, set to [ON].
- Patterns whose “pattern execution count” parameter (level 1 mode) is set to “0” are skipped.

Setting Range	Default
“ 00 ” : / “ 0FF ”	0FF

ALFA α

Conditions of Use

The control must be advanced PID control.



Function

- Normally, use the default value.
- Sets advanced PID-control parameter α .



Comment

Setting Range	Unit	Default
0.00 to 1.00	None	0.65

AT-C AT calculated gain

Conditions of Use

The control must be advanced PID control.



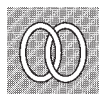
Function

- Normally, use the default value.
- Sets the gain when adjusting the PID parameters by auto-tuning.
- To give priority to response, decrease the set value of this parameter. To give priority to stability, increase the set value of this parameter.



Comment

Setting Range	Unit	Default
0.1 to 10.0	None	1.0

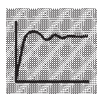


See

- Related parameter
“AT Execute/Cancel” (level 1 mode)
“PID/ON/OFF” (expansion mode)
-

AT

Automatic return of display mode



Function

- If you do not operate any of the controller keys for the time set in this parameter when in levels 0 to 2 and program modes, the display automatically returns to the PV/Present SP display.
- When this parameter is set to “0”, this function is disabled. (That is, the display does not automatically return to the PV/Present SP display.)
- This parameter is disabled while the menu display is displayed.



Comment

Setting Range	Unit	Default
0 to 99	Second	0

AT-H

AT hysteresis

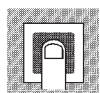
Conditions of Use

The control must be advanced PID control.



Function

- Normally, use the factory setting.
- The levels of limit cycle operations during AT execution are given hysteresis at event ON/OFF switching. This parameter sets this hysteresis width.



Comment

Setting Range	Unit	Default
0.1 to 9.9	%FS	0.2



LBA detection width

Conditions of Use

The LBA (Loop Break Alarm) function must be assigned as an output.



Function

- This parameter can be used when LBA is assigned as an output.
- When the change width of the manipulated variable is below the width set in this parameter, the controller regards this as detection of an LBA.



Comment

Setting Range	Unit	Default
0.0 to 999.9	%FS	0.2