

KPN Series

Features

- Super high-speed sampling cycle
(10 times faster compared to existing models)
: 50 ms sampling cycle and $\pm 0.3\%$ display accuracy
- Improved visibility with wide display and high luminance LED
- Easy check control output MV with Bar graph
- High performance control with heating/cooling control and automatic/manual control modes
- PC parameter setting
(via USB and RS485 communication)
: Integrated device management program (DAQMaster) supported
 - ※ Communication converter, sold separately:
SCM-WF48 (Wi-Fi to RS485, USB converter)
SCM-US48I (USB to RS485 converter),
SCM-38I (RS232C to RS485 converter),
SCM-US (USB to Serial converter),
- Selectable SSR output or current output
- Heater disconnection alarm (CT input) function
 - ※ CT, sold separately: CSTC-E80LN, CSTC-E200LN
- Multi-SV (up to 4) setting (selectable by digital input terminal)
- Space saving with compact design: downsized by 38% depth-based (panel rear length: 60 mm)
- Terminal cover, sold separately: R□A-COVER
- Multi-input/Multi-range



Please read "Caution for your safety" in operation manual before using this unit.

Manual

- For more information and instructions, refer to the user manual and the user manual for communication. Visit our web site (www.autonics.com) to download the manuals.
- The user manual includes product specifications, functions, and operations.
- The user manual for communication includes information about Modbus RTU protocol, and Modbus mapping table.

Integrated device management program(DAQMaster)

DAQMaster is the integrated device management program to set parameters and manage monitoring data and user group, parameter mask which are the dedicated function of KPN.

Visit our website (www.autonics.com) to download user manual and integrated device management program.

< Computer specification for using software >

Item	Minimum requirements
System	IBM PC compatible computer with Intel Pentium III or above
Operating system	Microsoft Windows 98/NT/XP/Vista/7
Memory	256MB or more
Hard disk	More than 1GB of free hard disk space
VGA	1024×768 or higher resolution display
Others	RS-232 serial port(9-pin), USB port

< DAQMaster screen >



High Performance & Accuracy Process Controller

Ordering information

KPN5

5

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0

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0

0

0

Power supply

Option input/output

Option communication output

Control output*1

The number of control outputs

Size

Item

0	100-240 VAC 50/60 Hz	
0	None	
3	Transmission output + Remote SV	
0	None	
2	RS485	
1 output type	0	Relay, Current, SSR drive voltage selection output
2 output type	1	OUT1: Current, SSR drive voltage selection output OUT2: Current, SSR drive voltage selection output
	3	OUT1: Current, SSR drive voltage selection output OUT2: Relay output
	7	OUT1: Relay output OUT2: Current, SSR drive voltage selection output
	9	OUT1: Relay output OUT2: Relay output
	0	1 output type (Heating or Cooling type)
	1	2 output type (Heating&Cooling type)
3	DIN W48×H96 mm	
5	DIN W96×H96 mm	
KPN5	Temperature / Process Controller	

※ 1: The 1 output type is heating or cooling output type and the 2 output type is heating & cooling output type.

The 1 output type is able to use only one output among relay, current, SSR drive voltage outputs.

OUT1 of the 2 output type is fixed as heating output and OUT2 of the 2 output type is fixed as cooling output.

If you select the SSR drive voltage or current output model, you can select the appropriate control output.

A. Recorder

B. Indicator

C. Converter

D. Controller

E. Thyristor unit

F. Pressure transmitter

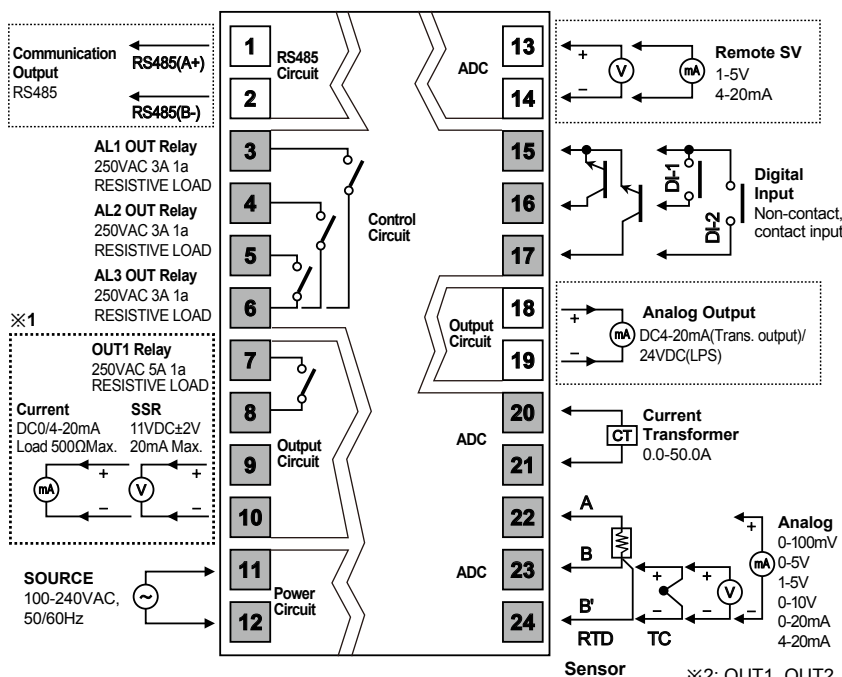
G. Temp. transmitter

H. Accessories

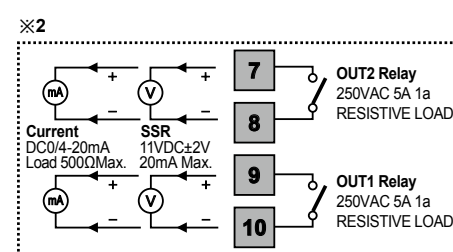
Connections

KPN

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© KPN5□1□



※ 1: Set relay output [REL], current [CUR], or SSR drive voltage output [SSV] at OUT1 control output [OUT1] in parameter 3 group.

※ Standard model has shaded terminals only.
□ is option specification.

※ 2: OUT1, OUT2

Model	OUT1 control output	OUT2 control output
KPN5□11	Current, SSR drive voltage selection output	Current, SSR drive voltage selection output
KPN5□13	Current, SSR drive voltage selection output	Relay output
KPN5□17	Relay output	Current, SSR drive voltage selection output
KPN5□19	Relay output	Relay output

KPN Series

Specifications

Series		KPN53□□	KPN55□□
Power supply		100-240 VAC 50/60 Hz	
Allowable voltage range		90 to 110% of rated voltage	
Power consumption		Max. 15 VA	
Display method		7Segment(red, green), control Bar graph: red, green	
Character size	PV(W×H)	7.0×14.6 mm	11.0×22.0 mm
	SV(W×H)	6.0×12.0 mm	6.0×12.0 mm
Input type	RTD	JPT100Ω, DPT100Ω, DPT50Ω, Cu100Ω, Cu50Ω, Nikel120Ω(6 types)	
	TC	K, J, E, T, L, N, U, R, S, B, C, G, PLII(13 types)	
	Analog	· Voltage: 0-100 mV, 0-5 V, 1-5 V, 0-10 V(4 types) · Current: 0-20 mA, 4-20 mA(2 types)	
Display accuracy	RTD	· At room temperature (23±5 °C): (PV ±0.3% or ±1 °C, select the higher one) ±1digit ※1	
	TC	· Out of room temperature range: (PV ±0.5% or ±2 °C, select the higher one) ±1digit	
	Analog	At room temperature (23±5 °C): ±0.3% F.S.±1digit, Out of room temperature range: ±0.5% F.S.±1digit	
	CT input	±5% F.S.±1digit	
Control output	Relay	OUT1, OUT2 : 250 VAC 5 A 1 a	
	SSR	Max. 11 VDC±2 V 20 mA	
	Current	0-20 mA or 4-20 mA selectable (max. load 500 Ω)	
Alarm output	Relay	AL1, AL2, AL3 Relay contact capacity 250 VAC 3 A 1 a	
Option output	Transmission	4-20 mA (Load max. 600 Ω, output accuracy: ±0.3% F.S.±1digit)	
	Communication	RS485 communication output (Modbus RTU method)	
Option input	CT	0.0-50.0 A(primary heater current value measuring range) ※CT ratio is 1/1000	
	Remote SV	1-5 VDC or 4-20 mA(current input: using external resistance 250 Ω)	
	Digital input	· Contact input: Max. 2 kΩ in ON, Min. 90 kΩ in ON · Non-contact input: Residual voltage max. 1.0 V in ON, leakage current max. 0.1 mA in OFF	
Control type	Heating, Cooling	ON/OFF control, P, PI, PD, PID control	
	Heating&Cooling		
Hysteresis		· Thermocouple/RTD: 1 to 100 °C/°F(0.1 to 100.0 °C/°F) variable · Analog: 1 to 100 digit	
Proportional band (P)		0.1 to 999.9 °C(0.1 to 999.9%)	
Integral time(I)		0 to 9999 sec.	
Derivative time (D)		0 to 9999 sec.	
Control period(T)		0.1 to 120.0 sec.(relay output, SSR drive voltage output only)	
Manual reset value		0.0 to 100.0%	
Sampling period		50 ms	
Dielectric strength		2000 VAC 50/60 Hz for 1 min. (between input terminal and power source terminal)	
Vibration		0.75 mm amplitude at frequency of 5 to 55 Hz (for 1 min.) in each X, Y, Z direction for 2 hours	
Relay life cycle	Mechanical	Over 10,000,000 operations	
	Electrical	Over 100,000 operations (250 VAC 3 A resistance load)	
Insulation resistance		Over 100 MΩ at 500 VDC megger)	
Noise resistance		Square shaped noise by noise simulator (pulse width 1μs) ±2 kV R-phase, S-phase	
Memory retention		Approx. 10 years (when using non-volatile semiconductor memory type)	
Environ-ment	Ambient tempera-ture	-10 to 50 °C, storage: -20 to 60 °C	
	Ambient humidity	35 to 85%RH, storage: 35 to 85%RH	
Protection		IP65(front part)	
Insulation type		Double insulation or reinforced insulation (mark: □, dielectric strength between the measuring input part and the power part: 1kV)	
Unit weight		Approx. 160 g	Approx. 220 g

※1. ◎ At room temperature (23 °C±5 °C)

- TC K, J, T, N, E type, below -100 °C / L, U, PLII, RTD Cu50, DPt50: (PV ±0.3% or ±2 °C, select the higher one) ±1digit
- TC C, G and R, S type, below 200 °C: (PV ±0.3% or ±3 °C, select the higher one) ±1digit
- TC B type, below 400 °C, there is no accuracy standards.

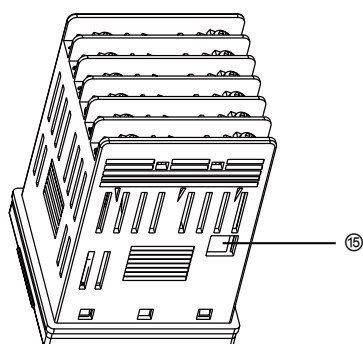
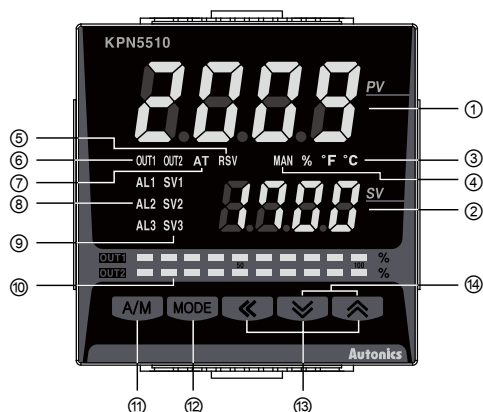
◎ Out of room temperature range

- RTD Cu50, DPt50: (PV 0.5% or ±3 °C, select the higher one) ±1digit
- RTD R, S, B, C, G: (PV ±0.5% or ±10 °C, select the higher one) ±1digit
- Other sensors: Below -100 °C, within ±5 °C

※ Environment resistance is rated at no freezing or condensation.

High Performance & Accuracy Process Controller

Part descriptions



- ① Measured value(PV) display part
 - RUN mode: Displays currently measured value (PV).
 - Set mode: Displays the parameters.
 - ② Set value (SV) display part
 - RUN mode: Displays the set value (SV).
 - Set mode: Displays the set value of the parameter.
 - ③ Unit(°C/°F/%) indicator: Displays the unit set at display unit [dUnit] in parameter 3 group.
 - ④ Manual control indicator : Turns ON during manual controlling.
 - ⑤ Remote SV control indicator : Turns ON during remote SV controlling.
 - ⑥ Control output (OUT1, OUT2) indicator: Turns ON when the control output is ON.

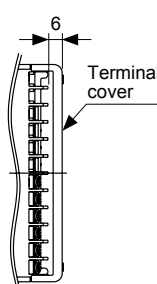
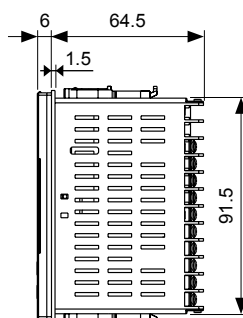
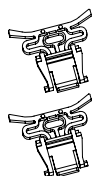
※Using current output, in case that for manual control MV is 0.0%, the control output indicator turns OFF but the other cases it turns ON always. In case that for auto control MV is over 3.0%, it turns ON and the MV is below 2.0%, it turns OFF.
 - ⑦ Auto tuning indicator: Flashes by 1 sec. when executing auto tuning.
 - ⑧ Alarm output (AL1, AL2, AL3) indicator: Turns ON when the alarm output is ON.
 - ⑨ Multi SV indicator: The SV 1 to 3 indicator turns ON when using multi SV function.
 - ⑩ Bar graph for control output: Displays control output MV as bar graph. KPN5□00 as 1 output type has one bar graph (OUT1), and the KPN5□1□ as 2 output type has two bar graphs (OUT1, OUT2).
 - ⑪ **A/M** key: Used when switching auto control to manual control.
 - ⑫ **MODE** key: Used when entering parameter setting group, returning to RUN mode, moving parameter, saving the set value.
 - ⑬ **←**, **→**, **↕** key: Used when entering the set value changing mode and moving or changing up/down digit.
 - ⑭ Digital input key : When pressing the **↕** + **↕** keys for 3 sec. at the same time, it operates the function (RUN/STOP, alarm clear, auto-tuning) set at digital input key [dI - P] in parameter 5 group.
 - ⑮ PC loader port: It is the PC loader port for serial communication to set and monitor parameters by PC. Use this port for connection SCM-US (USB to serial converter).
- ※ Display part is different by options.

A. Recorder
B. Indicator
C. Converter
D. Controller
E. Thyristor unit
F. Pressure transmitter
G. Temp. transmitter
H. Accessories

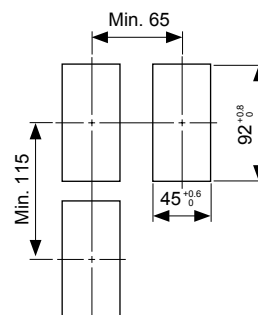
Dimensions

◎ KPN53□□

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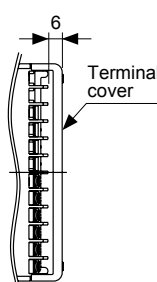
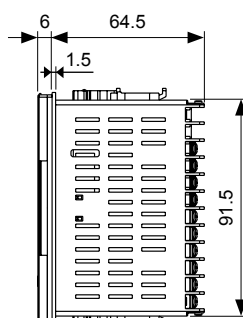
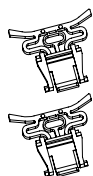


● Panel cut-out (unit:mm)

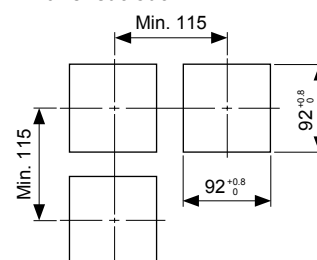


◎ KPN55□□

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● Panel cut-out

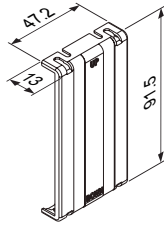


KPN Series

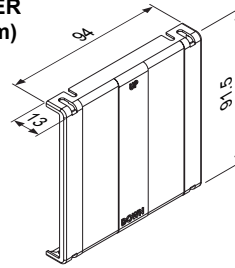
Dimensions

◎ Terminal cover (sold separately)

- RHA-COVER
(48×96 mm)



- RLA-COVER
(96×96 mm)



(unit:mm)

Sold separately

◎ Communication converter

- SCM-WF48 (available soon)
(Wi-Fi to RS485/USB communication converter)



- SCM-US48I
(USB to RS485 converter)



- SCM-38I
(RS232C to RS485 converter)

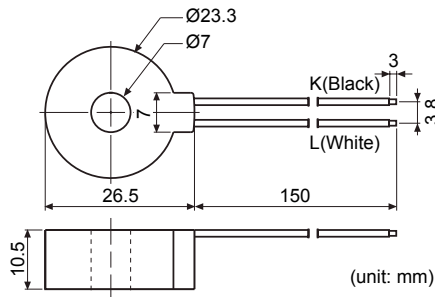


- SCM-US
(USB to Serial converter)

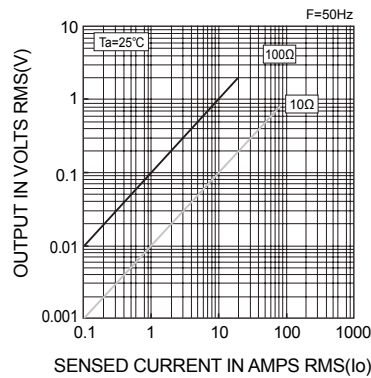


◎ Current transformer(CT)

- CSTC-E80LN

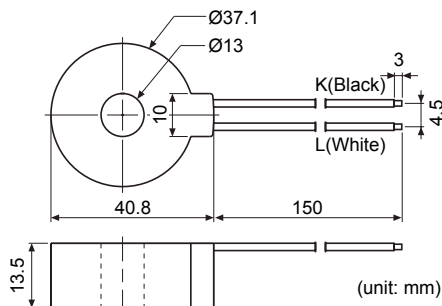


(unit: mm)

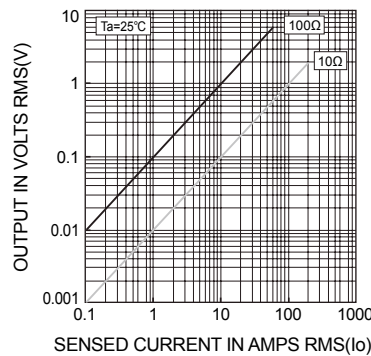


- Max. load current: 80A(50/60Hz)
- ※Max. load current for KPN Series is 50A.
- Current ratio: 1/1000
- Wire wound resistance: 31Ω±10%

- CSTC-E200LN



(unit: mm)



- Max. load current: 200A(50/60Hz)
- ※Max. load current for KPN Series is 50A.
- Current ratio: 1/1000
- Wire wound resistance: 20Ω±10%

※Do not supply primary current in case that CT output is open. High voltage will be generated in CT output.

※The current for above two CTs is 50A same but inner hole sizes are different. Please use this for your environment.

High Performance & Accuracy Process Controller

Input type and range

Input type	Dot	Parameter	Input range (°C)	Input range (°F)
Thermocouple	K(CA)	1	ℓℓℓ1	-200 to 1350
		0.1	ℓℓℓ2	-199.9 to 999.9
	J(IC)	1	ℓℓℓ1	-200 to 800
		0.1	ℓℓℓ2	-199.9 to 800.0
	E(CR)	1	ℓℓℓ1	-200 to 800
		0.1	ℓℓℓ2	-199.9 to 800.0
	T(CC)	1	ℓℓℓ1	-200 to 400
		0.1	ℓℓℓ2	-199.9 to 400.0
	B(PR)	1	ℓℓ-b	0 to 1800
	R(PR)	1	ℓℓ-r	0 to 1750
	S(PR)	1	ℓℓ-S	0 to 1750
	N(NN)	1	ℓℓ-n	-200 to 1300
	C(TT)*1	1	ℓℓ-ℓ	0 to 2300
	G(TT)*2	1	ℓℓ-G	0 to 2300
	L(IC)	1	ℓℓℓ1	-200 to 900
		0.1	ℓℓℓ2	-199.9 to 900.0
	U(CC)	1	ℓℓℓ1	-200 to 400
		0.1	ℓℓℓ2	-199.9 to 400.0
RTD	Platinel II	1	ℓℓ-P	0 to 1390
	Cu50Ω	0.1	ℓℓ50	-199.9 to 200.0
	Cu100Ω	0.1	ℓℓ10	-199.9 to 200.0
	JPt100Ω	1	ℓℓℓ1	-200 to 650
		0.1	ℓℓℓ2	-199.9 to 650.0
	DPt50Ω	0.1	ℓℓℓ5	-199.9 to 650.0
	DPt100Ω	1	ℓℓℓ1	-200 to 650
		0.1	ℓℓℓ2	-199.9 to 650.0
	Nickel120Ω	1	ℓℓ12	-80 to 200
Analog	0-10 V		ℓℓ-ℓ1	-1999 to 9999 (display range depends on the decimal point position)
	0-5 V		ℓℓ-ℓ2	
	1-5 V		ℓℓ-ℓ3	
	0-100 mV		ℓℓℓℓ1	
	0-20 mA		ℓℓℓℓ1	
	4-20 mA		ℓℓℓℓ2	

※ 1: C(TT) : Same as existing W5(TT) type sensor.

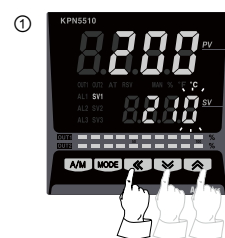
※ 2: G(TT) : Same as existing W(TT) type sensor.

SV settings

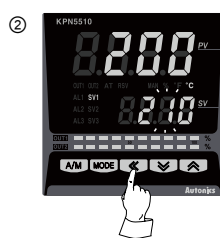
You can set the temperature to control with the , , keys.

Set range is within SV low-limit value [ℓ - 5ℓ] to SV high-limit value [ℓℓ - 5ℓ].

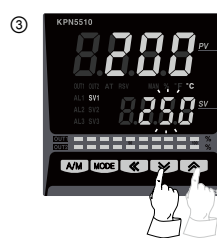
※ Ex) In case of changing set temperature from 210 °C to 250 °C



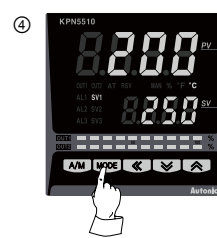
Press any key among the , , in RUN mode to enter into SV setting mode. Last digit (10⁰ digit) on SV display part flashes.



Press the key to move digit. (10⁰→10¹→10²→10³→10⁰)

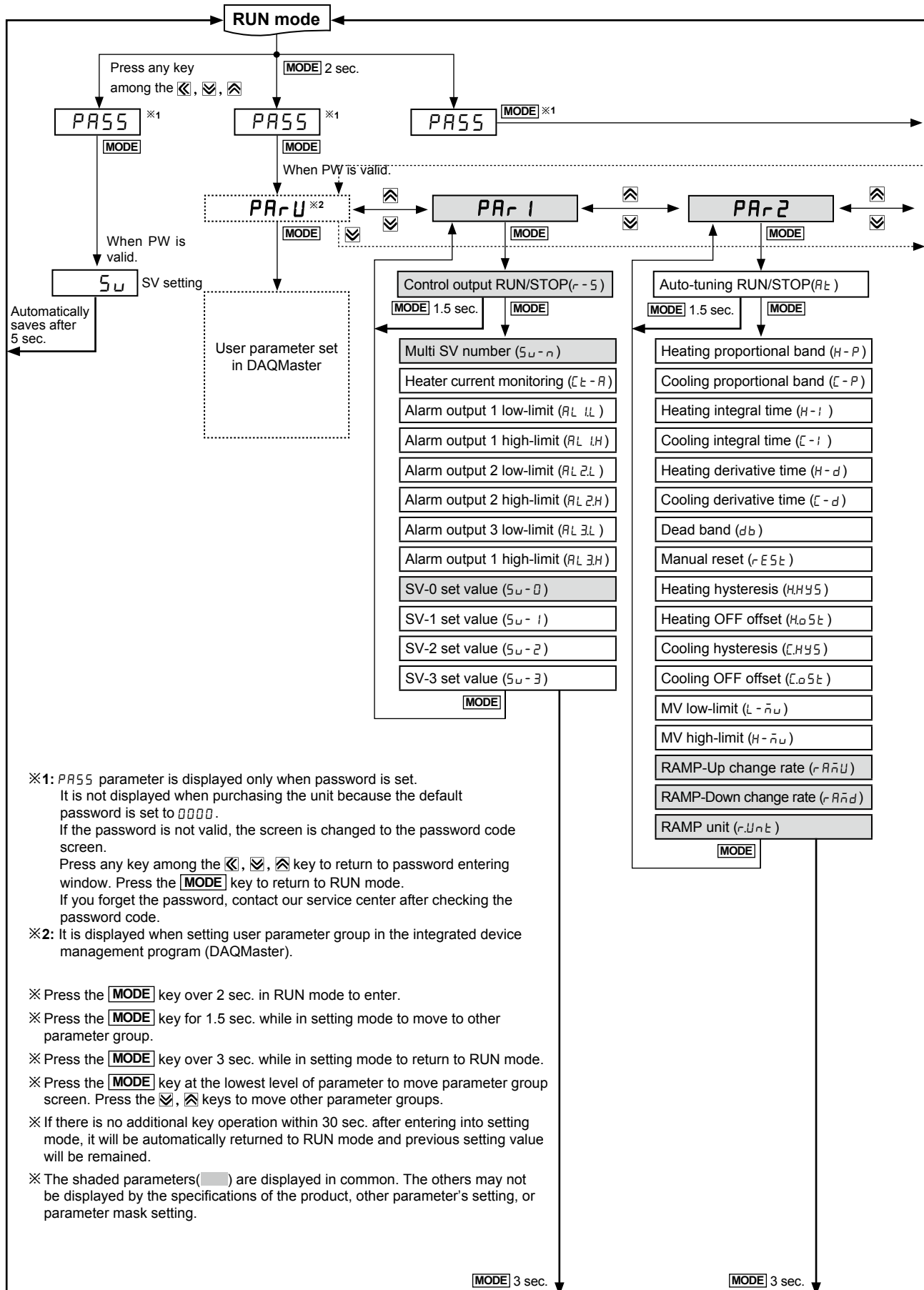


Press the or key to raise or lower the setting value. (1 → 5)

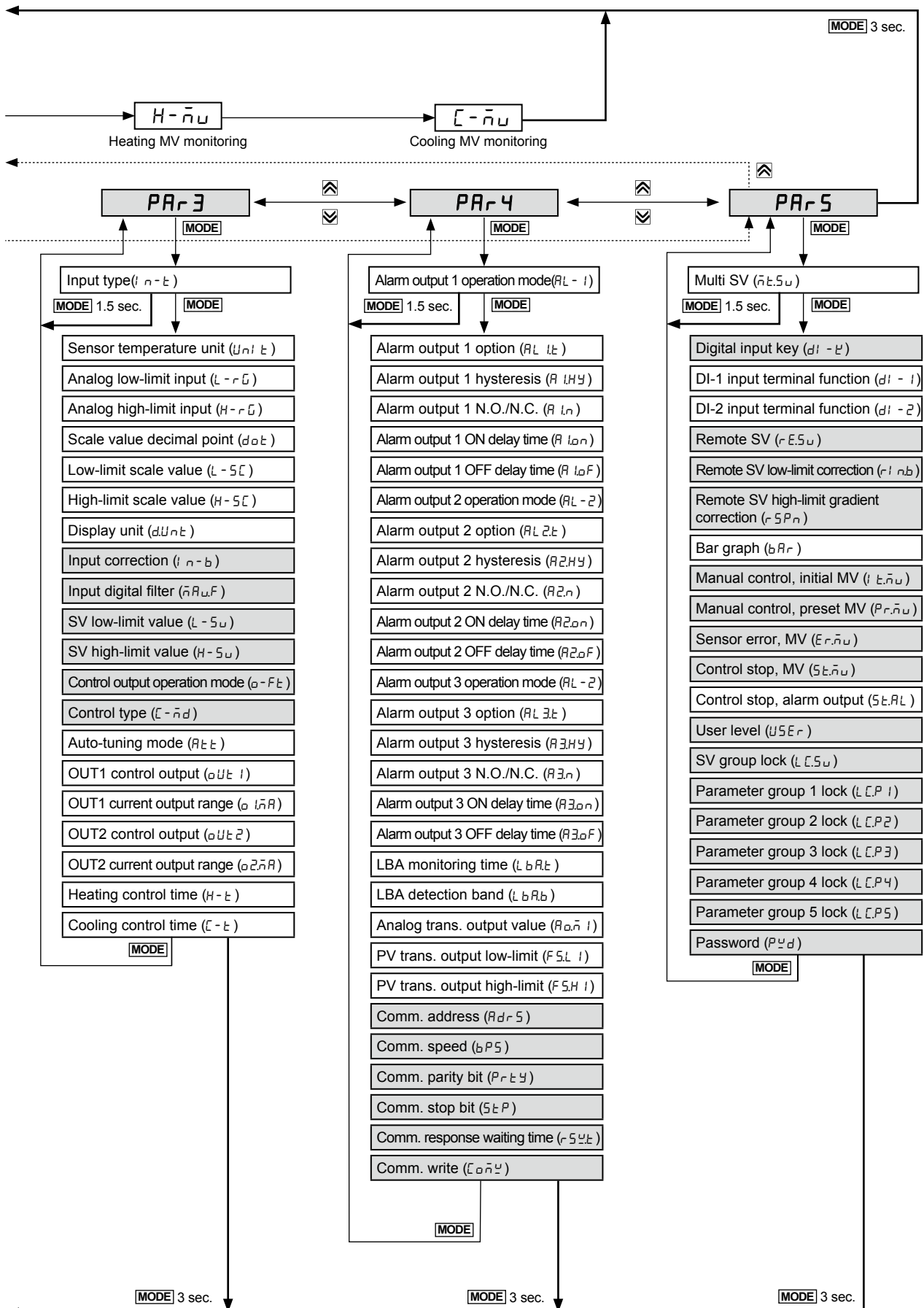


Press the **MODE** key to save the setting value. If there is no additional key operations in 3 sec., the changed SV is automatically saved.

Parameter groups



High Performance & Accuracy Process Controller

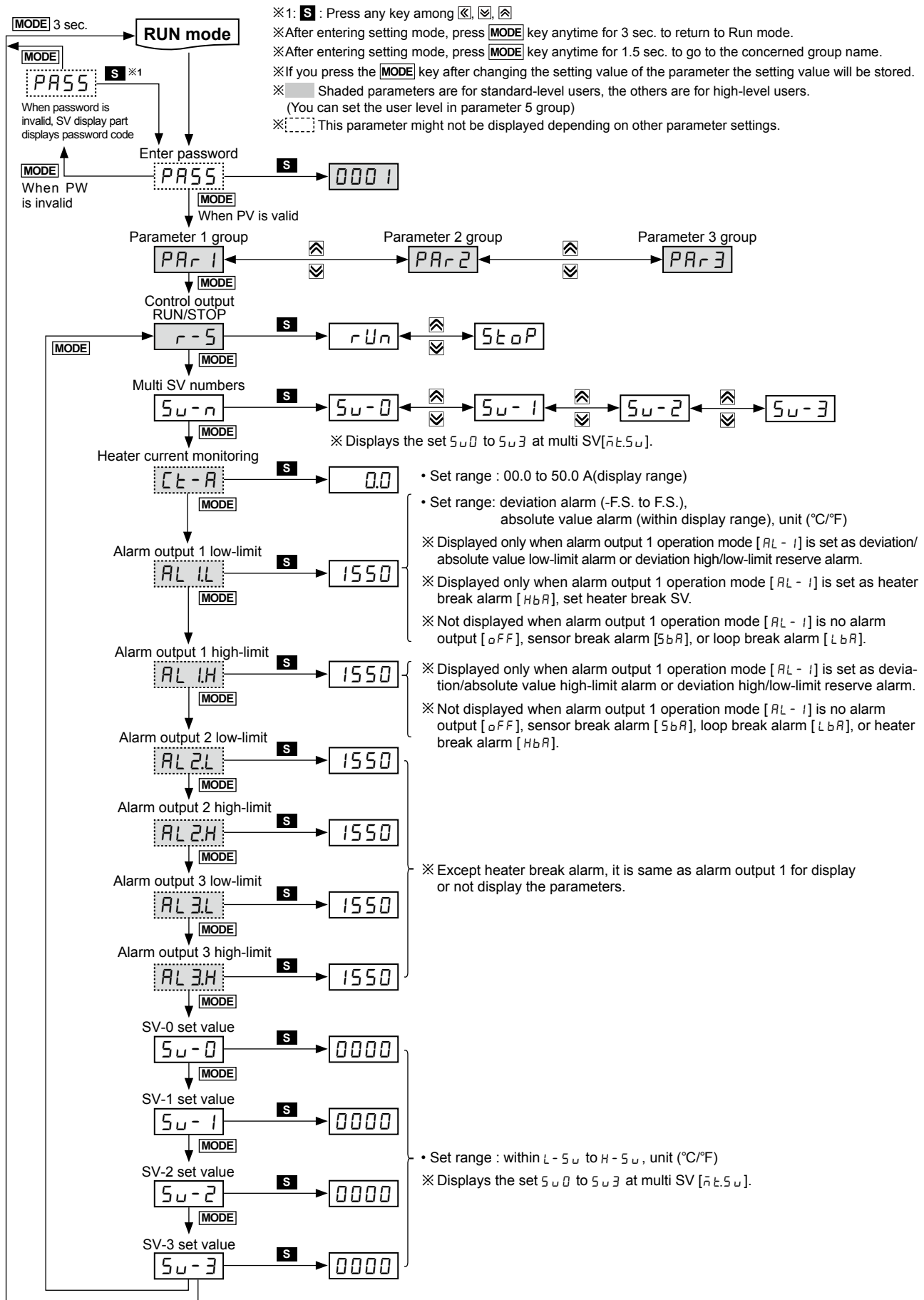


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KPN

KPN Series

Parameter 1 group



High Performance & Accuracy Process Controller

Parameter 2 group

※1: **S** : Press any key among $\leftarrow$, $\rightarrow$, $\uparrow$, $\downarrow$

※After entering setting mode, press **MODE** key anytime for 3 sec. to return to Run mode.

※After entering setting mode, press **MODE** key anytime for 1.5 sec. to go to the concerned group name.

※If you press the **MODE** key after changing the setting value of the parameter the setting value will be stored.

※ Shaded parameters are for standard-level users, the others are for high-level users.

(You can set the user level in parameter 5 group)

※ $\leftarrow$ This parameter might not be displayed depending on other parameter settings.

A. Recorder

B. Indicator

C. Converter

D. Controller

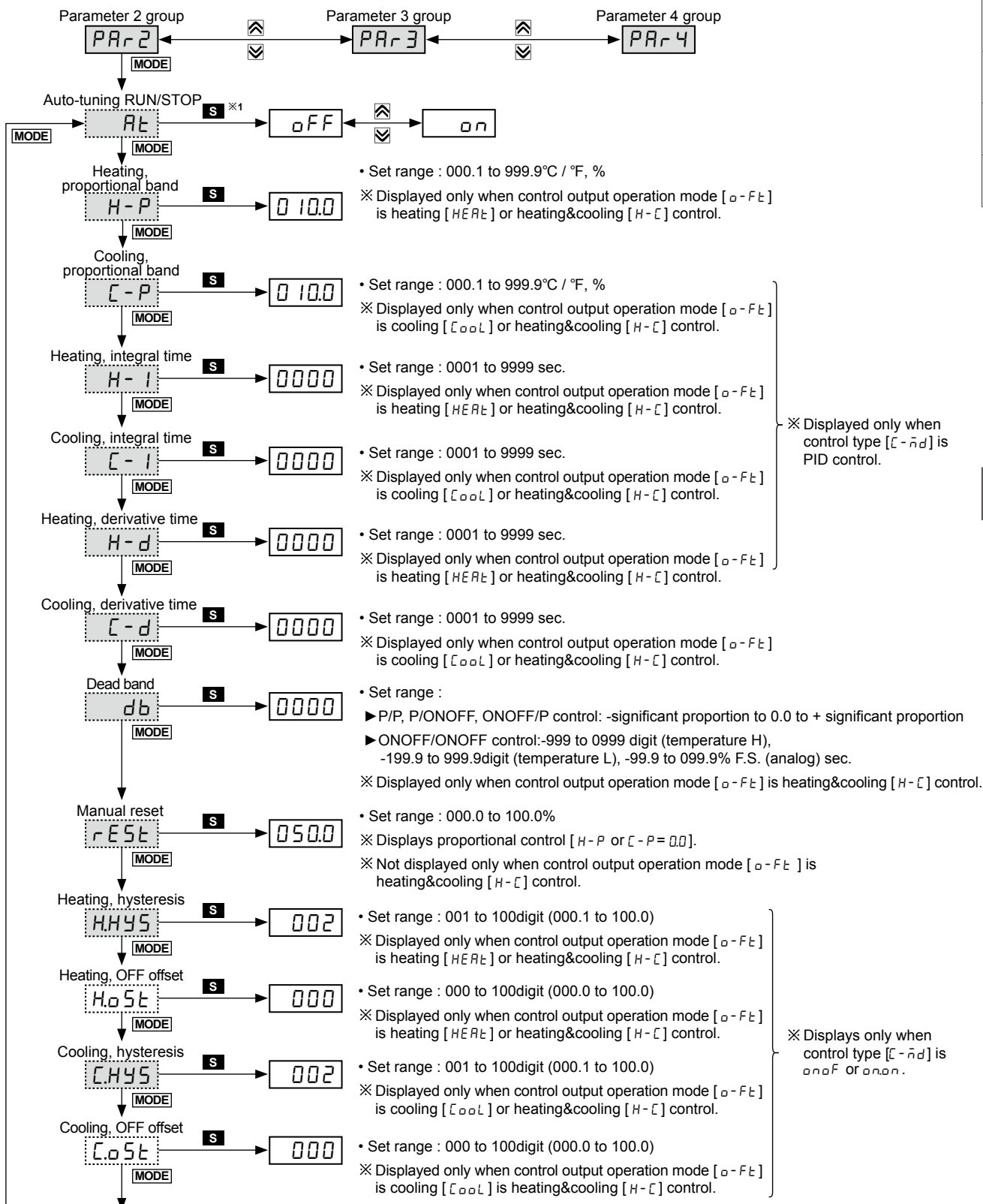
E. Thyristor unit

F. Pressure transmitter

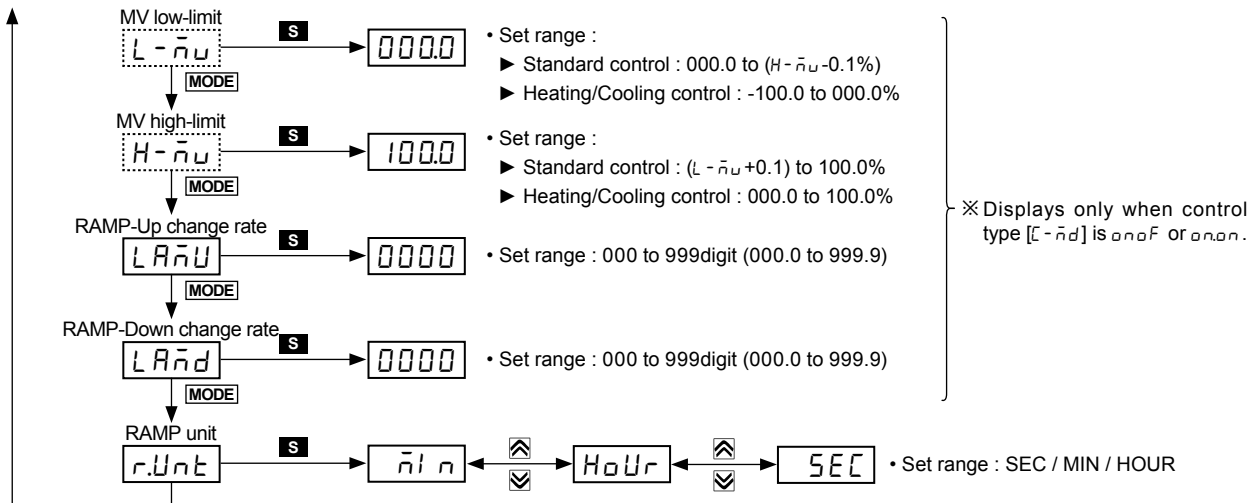
G. Temp. transmitter

H. Accessories

KPN

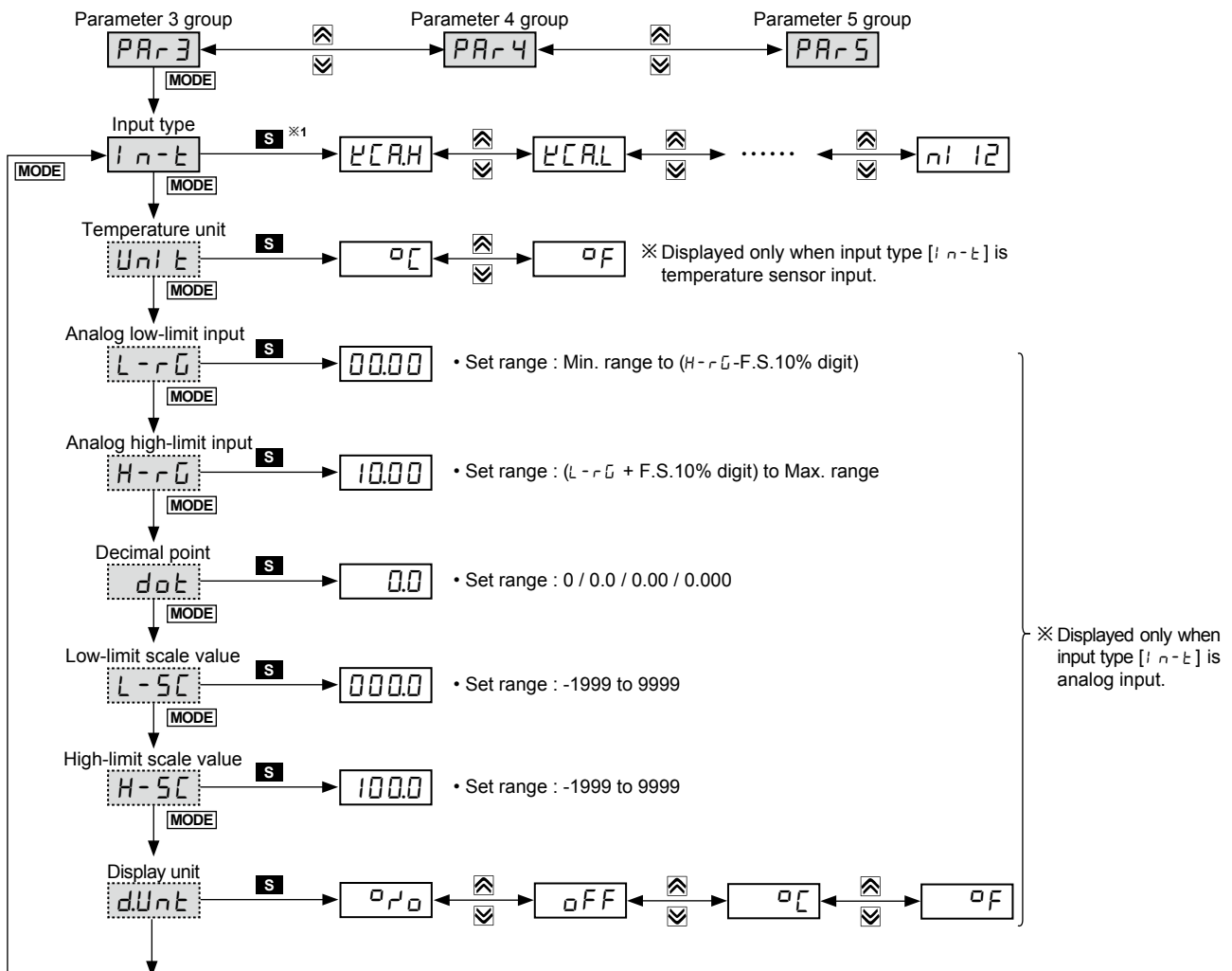


KPN Series

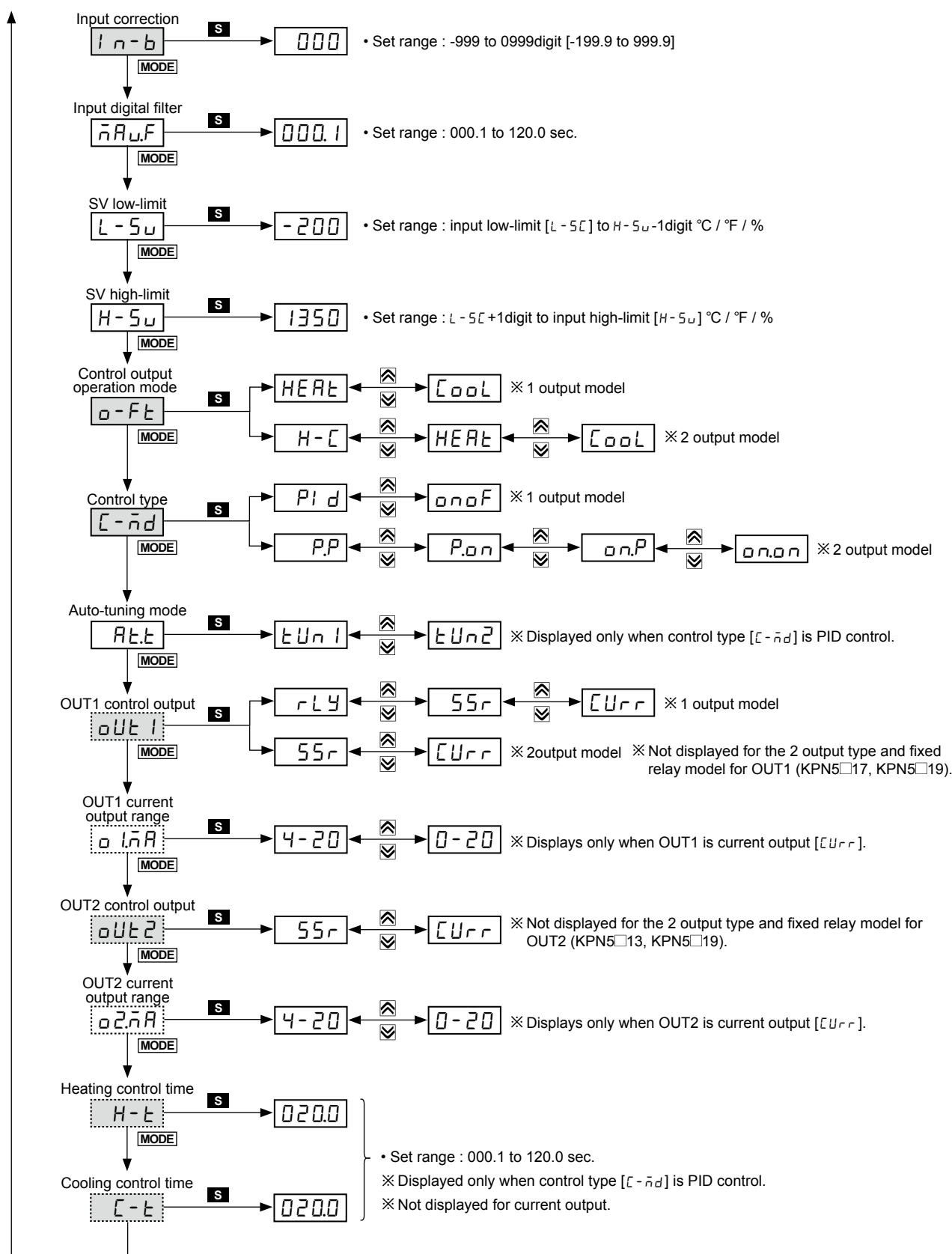


Parameter 3 group

- ※1: **S** : Press any key among $\leftarrow$, $\rightarrow$, $\uparrow$, $\downarrow$
- ※After entering setting mode, press **MODE** key anytime for 3 sec. to return to Run mode.
- ※After entering setting mode, press **MODE** key anytime for 1.5 sec. to go to the concerned group name.
- ※If you press the **MODE** key after changing the setting value of the parameter the setting value will be stored.
- ※ $\square$ Shaded parameters are for standard-level users, the others are for high-level users.
(You can set the user level in parameter 5 group)
- ※ $\square$ This parameter might not be displayed depending on other parameter settings.



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Parameter 4 group

※1: **S** : Press any key among , , 

※After entering setting mode, press **MODE** key anytime for 3 sec. to return to Run mode.

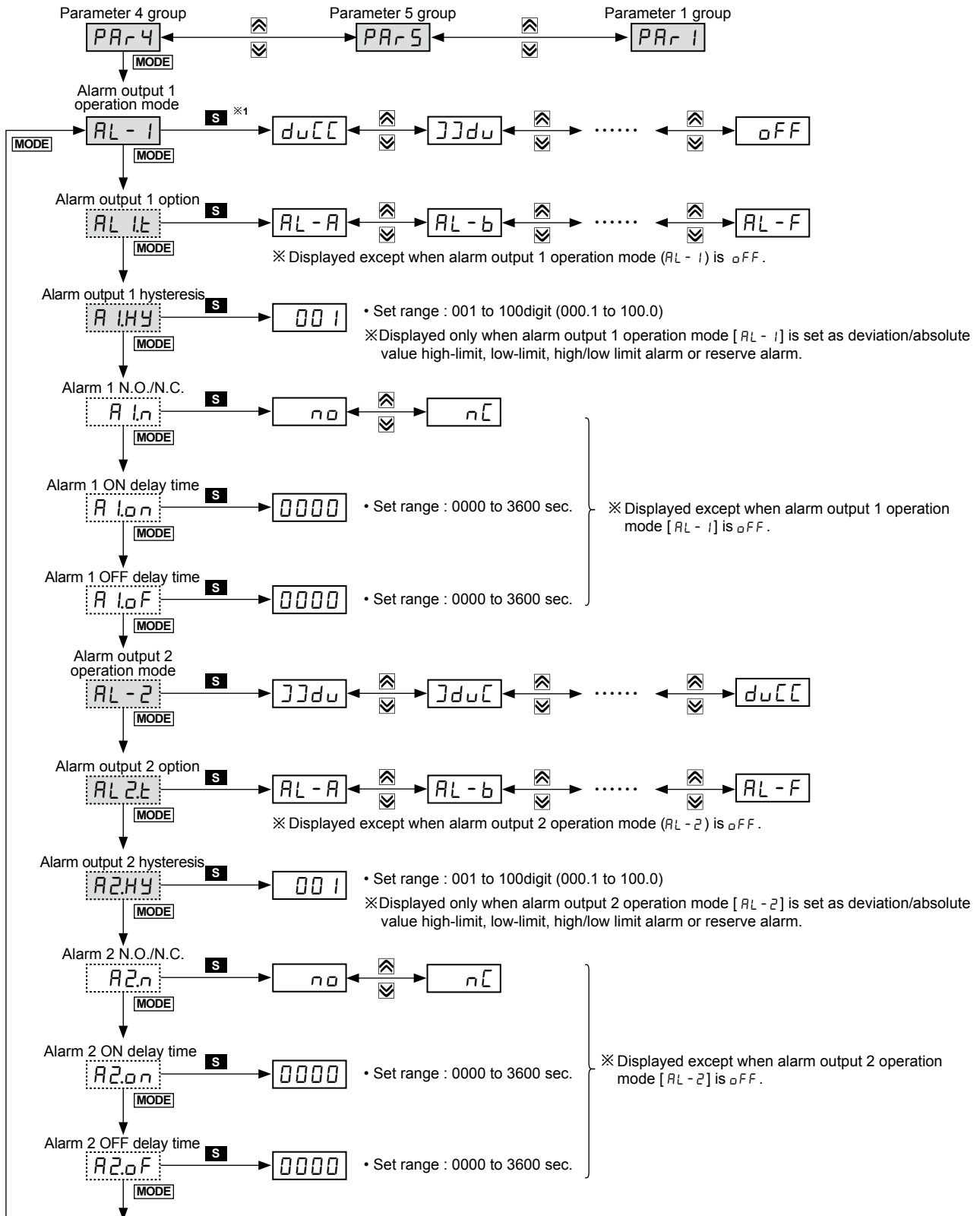
※After entering setting mode, press **MODE** key anytime for 1.5 sec. to go to the concerned group name.

※If you press the **MODE** key after changing the setting value of the parameter the setting value will be stored.

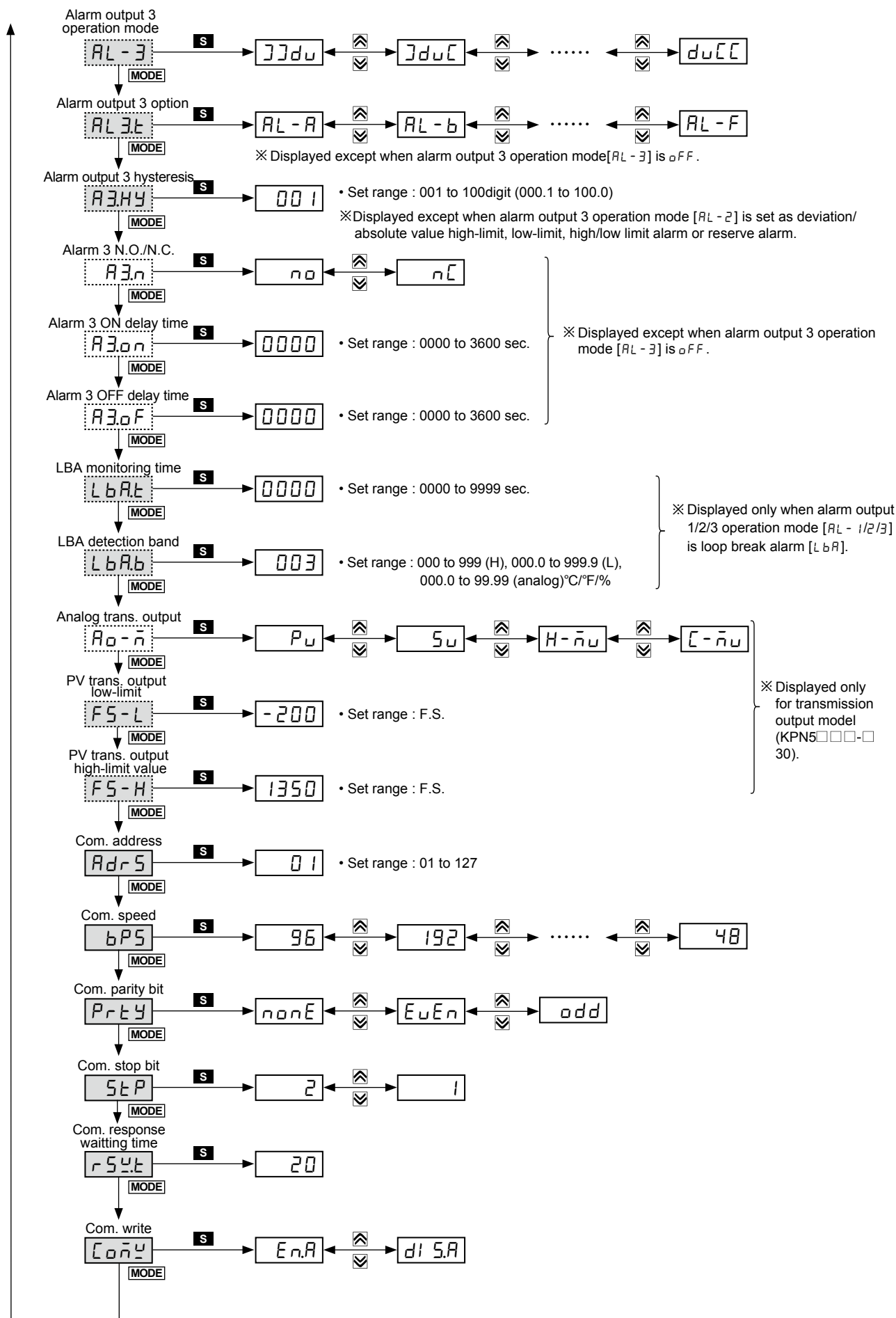
※  Shaded parameters are for standard-level users, the others are for high-level users.

(You can set the user level in parameter 5 group)

※  This parameter might not be displayed depending on other parameter settings.



High Performance & Accuracy Process Controller



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KPN

Parameter 5 group

※1: **S** : Press any key among , , 

※After entering setting mode, press **MODE** key anytime for 3 sec. to return to Run mode.

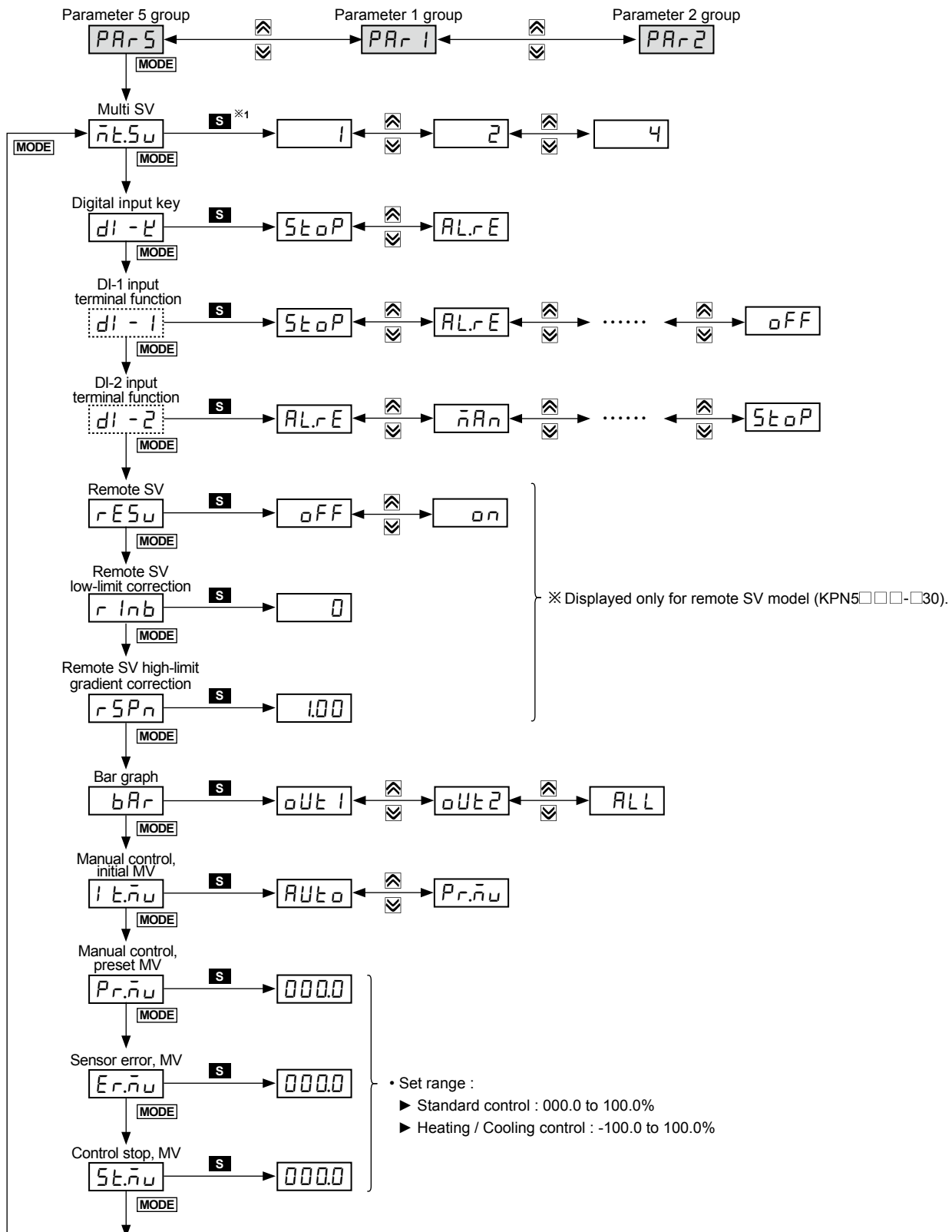
※After entering setting mode, press **MODE** key anytime for 1.5 sec. to go to the concerned group name.

※If you press the **MODE** key after changing the setting value of the parameter the setting value will be stored.

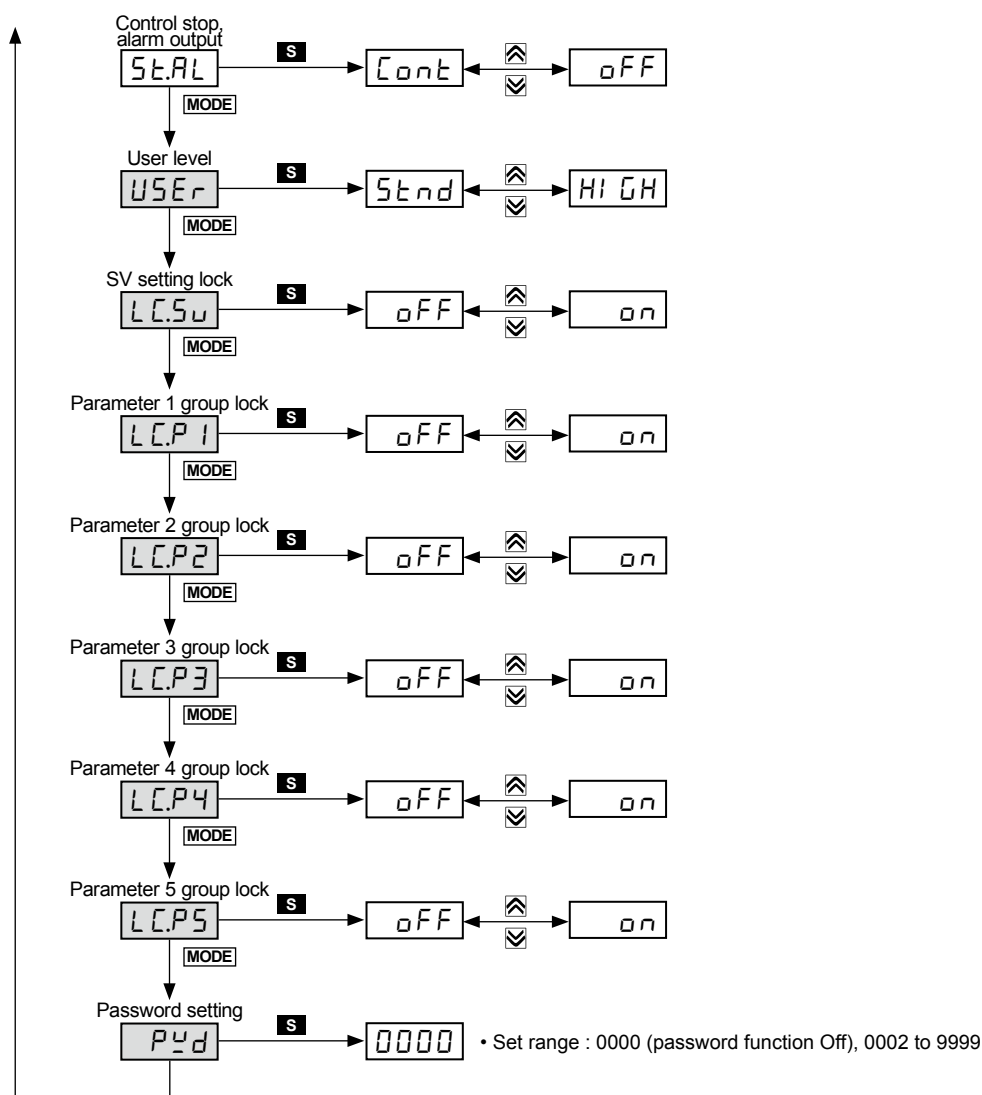
※  Shaded parameters are for standard-level users, the others are for high-level users.

(You can set the user level in parameter 5 group)

※ This parameter might not be displayed depending on other parameter settings.



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Factory default

■ SV setting [S_V]

Parameter	Default
S _V	0

■ Password input parameter

Parameter	Default
PA55	0001

■ Parameter 1 group [PA_{r1}]

Parameter	Default	Parameter	Default	Parameter	Default	Parameter	Default
r-S	rUn	AL1L	1550	AL3L	0000	S _V -2	0000
S _V -n	S _V -0	AL1H	1550	AL3H	0000	S _V -3	0000
Ct-A	00	AL2L	1550	S _V -0	0000		
AL1L	1550	AL2H	1550	S _V -1	0000		

■ Parameter 2 group [PA_{r2}]

Parameter	Default	Parameter	Default	Parameter	Default	Parameter	Default
At	oFF	H-d	0000	HoSE	000	rAñU	000
H-P	0100	C-d	0000	CHYS	002	rAñd	000
C-P	0100	db	0000	CoSE	000	rUnE	ñIn
H-1	0000	rESE	0500	L-ñu	1000		
C-1	0000	HHYS	002	H-ñu	1000		

■ Parameter 3 group [PA_{r3}]

Parameter	Default	Parameter	Default	Parameter	Default	Parameter	Default
In-E	ECRAH	H-SC	1000	o-Fe	HEAt		55r
UnitE	°C	dUnE	°F		H-C	o1ñA	4-20
L-rG	0000	In-b	0000	C-ñd	PI d	oUe2	55r
H-rG	1000	ñAUF	000.1		PP	o2ñA	4-20
dot	00	L-S _V	-200	AtE	tUn1	H-E	0200 (Relay)
L-SC	0000	H-S _V	1350	oUe1	rLY	C-E	0000 (SSR drive)

■ Parameter 4 group [PA_{r4}]

Parameter	Default	Parameter	Default	Parameter	Default	Parameter	Default	Parameter	Default
AL-1	duCC	AL-2	33du	AL-3	LbA	LbAt	0000	bPS	96
AL1E	AL-A	AL2E	AL-A	AL3E	AL-A	LbAb	002	Prty	nonE
A1HY	001	A2HY	001	A3HY	001	Aoñ	Pu	StP	2
A1n	no	A2n	no	A3n	no	FSL	-200	rSYE	20
A1on	0000	A2on	0000	A3on	0000	F5H	1350	CoñY	EnA
A1oF	0000	A2oF	0000	A3oF	0000	AdrS	01		

■ Parameter 5 group [PA_{r5}]

Parameter	Default	Parameter	Default	Parameter	Default	Parameter	Default
ñE.S _V	1	rSPn	1000	Stñu	0000	LC.P3	oFF
d1-E	StoP	bAr	oUe1	StAL	Cont	LC.P4	oFF
d1-1	oFF		ALL	USEr	Stnd	LC.P5	oFF
d1-2	oFF	1Eñu	AUto	LC.S _V	oFF	PYd	0000
rE.S _V	oFF	Prñu	0000	LC.P1	oFF		
rInb	0000	Erñu	0000	LC.P2	oFF		

※ Shaded parameters are factory defaults for the heating & cooling model.

High Performance & Accuracy Process Controller

Functions

Alarm operation

Mode	Name	Operation	Description
αFF	—	—	No alarm output
$d u \llcorner$	Deviation high-limit alarm	High deviation : Set as 10°C High deviation : Set as -10°C	If deviation between PV and SV as high-limit is higher than set value of deviation temperature, the alarm output will be ON.
$\llcorner d u$	Deviation low-limit alarm	Low deviation : Set as 10°C Low deviation : Set as -10°C	If deviation between PV and SV as low-limit is higher than set value of deviation temperature, the alarm output will be ON.
$\llcorner d u \llcorner$	Deviation high/low-limit alarm	Low deviation : Set as 10°C , High deviation : Set as 20°C	If deviation between PV and SV as high/low-limit is higher than set value of deviation temperature, the alarm output will be ON.
$\llcorner d u \llcorner$	Deviation high/low-limit reserve alarm	Low deviation : Set as 10°C , High deviation : Set as 20°C	If deviation between PV and SV as high/low-limit is higher than set value of deviation temperature, the alarm output will be OFF.
$P u \llcorner$	Absolute value high limit alarm	Absolute value alarm : Set as 90°C Absolute value alarm : Set as 110°C	If PV is higher than the absolute value, the output will be ON.
$\llcorner \llcorner P u$	Absolute value low limit alarm	Absolute value alarm : Set as 90°C Absolute value alarm : Set as 110°C	If PV is lower than the absolute value, the output will be ON.
$L b A$	Loop break alarm	—	It will be ON when it detects loop break.
$S b A$	Sensor break alarm	—	It will be ON when it detects sensor disconnection.
$H b A$	Heater break alarm	—	It will be ON when CT detects heater break.

※ H : alarm output ☐ hysteresis [$A \square H Y$]

Alarm option

Mode	Name	Description
$A L - A$	Standard alarm	If it is an alarm condition, alarm output is ON. If it is a clear alarm condition, alarm output is OFF.
$A L - b$	Alarm latch	If it is an alarm condition, alarm output is ON and maintains ON status.
$A L - \llcorner$	Standby sequence 1	First alarm condition is ignored and from second alarm condition, standard alarm operates. When power is supplied and it is an alarm condition, this first alarm condition is ignored and from the second alarm condition, standard alarm operates.
$A L - d$	Alarm latch and standby sequence 1	If it is an alarm condition, it operates both alarm latch and standby sequence. When power is supplied and it is an alarm condition, this first alarm condition is ignored and from the second alarm condition, alarm latch operates.
$A L - E$	Standby sequence 2	First alarm condition is ignored and from second alarm condition, standard alarm operates. When re-applied standby sequence and if it is alarm condition, alarm output does not turn ON. After clearing alarm condition, standard alarm operates.
$A L - F$	Alarm latch and standby sequence 2	Basic operation is same as alarm latch and standby sequence 1. If it operates not only by power ON/OFF, but also alarm setting value, or alarm option changing. When re-applied standby sequence and if it is alarm condition, alarm output does not turn ON. After clearing alarm condition, alarm latch operates.

※ Condition of re-applied standby sequence for standby sequence 1, alarm latch and standby sequence 1: Power ON

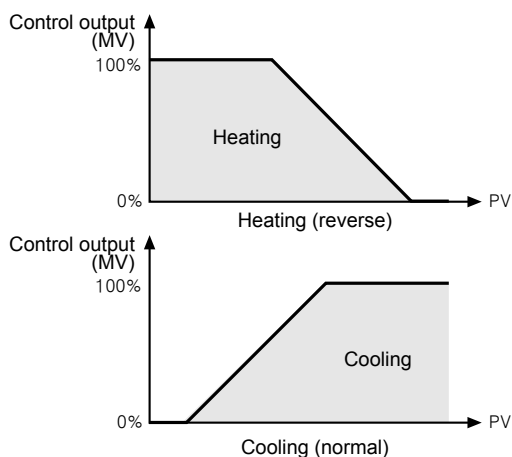
Condition of re-applied standby sequence for standby sequence 2, alarm latch and standby sequence 2: Power ON, changing set temperature, alarm temperature[$A L 1, A L 2$] or alarm operation [$A L - 1, A L - 2$], switching STOP mode to RUN mode.

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Control output mode [α -Ft]

- Control output modes for general temperature control include heating, cooling, and heating/cooling.
- Heating control (reverse operation) and cooling control (normal operation) are mutually opposing operations with inverse outputs.
- The PID time constant varies based on the controlled objects during PID control.



Group	Parameter	Set range	Default	Unit
PAR 3	α -Ft	Standard model HEAt / COOL	HEAt	—
		Heating & Cooling mode HEAt / COOL / H-C	H-C	—

Heating control [HEAt]

The output will be provided in order to supply power to the load (heater) if PV(present temperature) falls below SV(set temperature).

Cooling control [COOL]

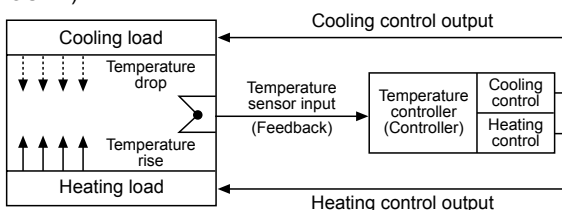
The output will be provided in order to supply power to the load (cooler) if PV(present temperature) rises above SV(set temperature)

Heating/Cooling control [H-C]

Heating and Cooling with a single temperature controller when it is difficult to control subject temperature with only heating or cooling.

Heating and cooling control mode controls the object using different PID time constants for each heating and cooling.

It is also possible to set heating and cooling control in both PID control or ON/OFF control mode. Heating/cooling output can be selected among Relay output, SSR output and current output depending on model types chosen according to your application environment. (Note that only standard SSR control is available for SSR output in OUT2.)



※ For heating and cooling control, OUT1 control output is dedicated to heating control and OUT2 control output to cooling control.

Auto-tuning [Rt]

In PID control, auto-tuning processes the control subject's thermal characteristics and thermal response rate, and then determines the necessary PID time constant. Application of the PID time constant realizes fast response and high precision temperature control.

- Auto-tuning automatically stores PID time constants upon termination. These PID time constants can then be modified by the user to suit their usage environment.
- When auto-tuning is in progress, the AT lamp located on the front of the controller flashes in 1 second intervals. When auto-tuning finishes, the AT lamp automatically goes off and the auto-tuning parameter will return to OFF.

SV	Description
α FF	Auto-tuning stops
α n	Auto-tuning starts

Group	Parameter	Set range	Default	Unit
PAR 2	Rt	α FF / α n	α FF	—

※ Manual interruption or a sensor break error when auto-tuning is in progress restores the PID time constant to the value used prior to the auto-tuning session.

※ Auto-tuning continues to run even if the temperature reading exceeds or falls below the input range.

※ When auto-tuning is in progress, parameters can only be referenced and not altered.

※ Auto-tuning is not available in manual control. (Manual Control).

Control output(OUT1/OUT2) selection [α Ut 1 / α Ut 2]

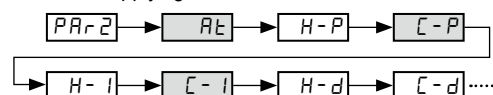
- The 1 output type (OUT1) model supports relay, current, SSR drive voltage output.
- The 2 output type (OUT1, OUT2) model supports relay fixed or current, SSR drive voltage output.

Parameter mask

This function is able to hide unnecessary parameters to user environment or less frequently used parameters in parameter setting group. You can set this in the integrated device management program (DAQMaster).

Though masked parameters are not displayed in parameter setting group, the parameter setting values are applied. For more information, refer to the DAQMaster user manual. Visit our website (www.autonics.com) to download the DAQMaster program and the user manual.

<Before applying mask>



<After applying mask>



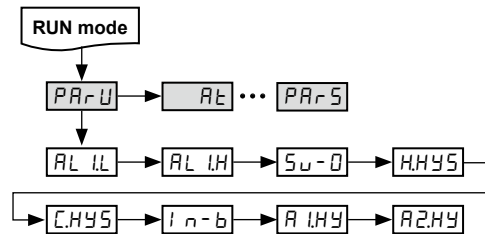
The above is masking auto tuning [Rt], cooling proportional band [C-P], cooling integral time [C-I], cooling derivative time [C-d] parameters in parameter 2 group.

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■ User parameter group [PAR-U]

This function is able to set the frequently used parameters to the user parameter group.

You can quickly and easily set par Visit our website (www.autonics.com) to download the DAQMaster program and the user manual.



The above is setting user parameter group in the DAQMaster with alarm output 1 low-limit value [AL-LL], alarm output 1 high-limit value [AL-LH], SV-0 set value [SV-0] parameters of parameter 1 group, heating hysteresis [H-HYS], cooling hysteresis [C-HYS] parameters of parameter 2 group,

input correction [I-n-b], parameter of parameter 3 group, alarm output 1 hysteresis [A-LHY], alarm output 2 hysteresis [A2-HY] parameters of parameter 4 group.

■ Bar graph

MV of control output (OUT1, OUT2) is displayed as the bar graph in real-time. According to bar graph setting [bAR-] in parameter 5 group, it displays bar graph by control output or does not display it.

OUT1 ■■■■■■ 50 100 (red LED)
OUT2 □□□□□□□□□□ (green LED)

One LED is 10% (total 10 LEDs: 100%). If control output MV is 0.1 to 10%, one LED turns ON. If MV is 90.1 to 100%, 10 LEDs turn ON.

The 1 output type (heating or cooling control) model has one OUT1 bar graph (red).

The 2 output type (heating & cooling control) model has two bar graphs; OUT1 bar graph (red), OUT2 bar graph (green). OUT1 is for heating MV and OUT2 is for cooling MV.

■ Remote SV setting

This function is to set SV by inputting analog (DC4-20 mA, 1-5 VDC) signal to no. 13 and 14 terminals. (Set that remote SV [rESV] is ON in parameter 5 group)

Input analog signal is changed to between SV low-limit value [L-SV] to SV high-limit value [H-SV].

※ When using remote SV, you cannot select SV setting by front keys and multi SV setting by digital input.

■ Parameter initialization

It initializes all parameters to factory default values. Press the front [◀][▶][⏏] keys for 5 sec. at the same time and [I-n-i-t] parameter is displayed. Select 'YES' to initialize all parameters.

If the password is set, you must enter the password. After initializing the parameters, the password parameter is also initialized.

※ ■ Refer to the KPN user manual for more functions.

Proper usage

■ Simple troubleshooting for process controller

● When the load (Heater etc) is not operated

Please check operation of the out indicator located in front panel of the unit. If the indicator does not operate, please check the parameter of all programmed mode. If the indicator is operating, please check the output (Relay, SSR drive voltage, DC4-20 mA current) after separating output line from the unit.

● When it displays oPEN during operation

This is a warning that external sensor is cut off (open). Please turn off power and check the state of sensor. If sensor is not cut off (open), disconnect sensor line from terminal block and +, - together. When you turn on power it can check room temperature.

If this unit cannot indicate room temperature, this unit itself is faulty. Please remove this unit from equipment and service or replace.

(When the input mode is thermocouple, it is available to indicate room temperature.)

● In case of indicating "Error" in display

This Error message is indicated in case of damaging inner chip program data by outer strong noise.

In this case, please send the unit to our after service center after removing the unit from system.

Noise protection is designed in this unit, but it does not stand up strong noise continuously.

If bigger noise than specified(Max. 2 kV) flows in the unit, it can be damaged.

■ Caution for using

- The connection of this unit should be separated from the power line and high voltage line in order to prevent inductive noise.
- Install a power switch or a circuit breaker to supply or cut off the power.
- Switch or circuit breaker should be installed nearby users for convenient control.
- This unit is designed for temperature controlling only. Do not apply this unit as a voltage meter or a current meter.
- In case of using RTD sensor, 3-wire type must be used. If you need to extend the line, use 3-wire with the same thickness as the line. It might cause temperature difference if the resistance of line is different.
- In case of making power line and input signal line closely, line filter for noise protection should be installed at power line and input signal line should be shielded.
- Do not use this unit near the high frequency instruments (high frequency welding machine & sewing machine, large capacity SCR controller).
- Installation environment
 - ① It shall be used indoors.
 - ② Altitude max. 2,000 m
 - ③ Pollution degree 2
 - ④ Installation category II
- It may cause malfunction if above instructions are not followed.

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