TK4N(W48×H24mm)

Line-up

Upgrade

High function/High performance PID control

▣ Features

Be sure that (★) marks are for upgraded functions.

●**Upgrade functions(★)**

◎ **Convenient parameter setting (by DAQMaster)**
:**Parameter mask**
Hides unnecessary and seldom used parameters
:**User parameter group**
Groups usually used parameters to set parameters fast and conveniently

◎ **Line-up Alarm output3(heaing&cooling OUT2 Relay output model), transmission output 2 (transmission output model)**

●Super high-speed sampling cycle (10 times faster compared to existing models)
: 50ms sampling cycle and ±0.3% display-accuracy.
●Improved visibility with wide display part and high luminance LED
●High performance controlling with heating/cooling control and automatic/manual control modes
●Communication function supported: RS485 (Modbus RTU)
●Allows parameter setting and monitoring by USB port of PC
: only for using DAQMaster or USB to Serial converter(SCM-US, sold separately)
Setable parameter by PC(USB and RS485 comm.): Free download the integrated device management program(DAQMaster)
※Communication converter, sold separately
: SCM-US48I(USB/Serial converter), SCM-38I(RS-232C/RS485 converter), SCM-US48I(USB/RS485 converter)
●SSR output/Current output selectable
●SSRP output (standard/phase/cycle control selectable)
●Heater burn-out alarm (CT input) (except TK4SP)(※CT, sold separately: CSTC-E80LN, CSTC-E200LN)
●Multi SV setting fuction (Max. 4) - selectable via digital input terminals
●Mounting space saving with compact design
: downsized by approx. 38%(60mm) in depth compared to existing models
※Terminal cover, sold separately: R□A-COVER(except TK4N, TK4SP)
●Multi input / Multi range

⚠ **Please read "Caution for your safety" in operation manual before using.**

▣ User manual

●Visit our web site (www.autonics.com) to download user manual and communication manual.
●User manual describes for specifications and function, and communication manual describes for RS485 communication (Modbus RTU protocol) and parameter address map data.

▣ Integrated device management program(DAQMaster)

●DAQMaster is a integrated device management program for Autonics TK series providing GUI control for easy and convenient management of parameters and multiple device data monitoring.
●Visit our website (www.autonics.com) to download user manual and integrated device management program.

< Computer specification for using software >

Item	Recommended specification
Processor	IBM PC compatible computer with Intel Pentium III or above
Operating system	Windows 98 / NT / XP / Vista / 7
RAM	Over 256MB
Hard disk	Over 1GB of available space
VGA	Over 1024×768
Others	RS232C serial port, USB port

< DAQMaster screen >

▣ Ordering information

TK 4 S — 1 4 R R

OUT2 control output※3	Standard	N	None ※Select in case of standard control(Heating or Cooling)
	Heating & Cooling	R	Relay output
		C	Current output+SSR drive output
OUT1 control output※2	R		Relay output
	S		SSRP output
	C		Current output+SSR drive output
Power supply	4		100-240VAC 50/60Hz
Option I/O※1 (★)	N	1	Standard: Alarm output 1+CT input※4, Heating&Cooling: Alarm output 2※5
		2	Standard: Alarm output 1+Alarm output 1
		D	Standard: Alarm output 1+Digital input(DI-1, DI-2) Heating&Cooling: Digital input(DI-1, DI-2)
		R	Standard: Alarm output 1+Transmission output Heating&Cooling: Transmission output
		T	Standard: Alarm output 1+RS485 communication output Heating&Cooling: RS485 communication output
	SP	1	Alarm1 output
	S M W H L	1	Alarm1 output
		2	Alarm1+Alarm2 output
		R	Alarm1+Transmission output
		T	Alarm1+RS485 Communication output
		A	Alarm1+Alarm2+Transmission output
		B	Alarm1+Alarm2+RS485 Communication output
Size (★)	N		DIN W48×H24mm
	SP		DIN W48×H48mm(11pin plug type)※6
	S		DIN W48×H48mm(Terminal block type)
	M		DIN W72×H72mm
	W		DIN W96×H48mm
	H		DIN W48×H96mm
	L		DIN W96×H96mm
Digit	4		9999(4 digit)
Item	TK		Temperature / Process Controller

※1. In case of TK4N, TK4SP, option output may be limited due to number of terminals.
※2. In case of OUT1 control output, 'S' is able to SSR standard/cycle/phase control by SSRP voltage output as the voltage output model. 'C' is able to select one between current output or SSR drive (standard) voltage output.
※3. Select 'R' or 'C' type which has OUT2 control output to use heating&cooling control. Select 'N' type which does not have OUT2 control output to use standard control.
※4. CT input of TK4N is available only for the standard model which has alarm output1.
※5. The heating&cooling model of TK4N-1□□□ has only alarm output 2.
※6. Sockets for TK4SP (PG-11, PS-11) are sold separately.

▣ Specifications

Series		TK4N	TK4SP	TK4S	TK4M	TK4W	TK4H	TK4L
Power supply		100-240VAC 50/60Hz						
Allowable voltage range		90 to 110% of rated voltage						
Power consumption		Max. 6VA	Max. 8VA					
Display method		7 Segment(Red), Other display part(Green, Yellow, Red) LED						
Character size	PV(W×H)	4.5×7.2mm	7.0×14.0mm		9.5×20.0mm	8.5×17.0mm	7.0×14.6mm	11.0×22.0mm
	SV(W×H)	3.5×5.8mm	5.0×10.0mm		7.5×15.0mm	6.0×12.0mm	6.0×12.0mm	7.0×14.0mm
Input type	RTD	JPt100Ω, DPt100Ω, DPt50Ω, Cu100Ω, Cu50Ω, Nikel 120Ω(6types)						
	Thermocouple	K, J, E, T, L, N, U, R, S, B, C, G, PLII(13types)						
	Analog	Voltage: 0-100mV, 0-5V, 1-5V, 0-10V(4types) / Current: 0-20mA, 4-20mA(2types)						
Display accuracy ※1	RTD	At room temperature(23℃±5℃): (PV ±0.3% or ±1℃, select the bigger one) ±1digit Out of range of room temperature: (PV ±0.5% or ±2℃, select the bigger one) ±1digit In case of TK4SP series, ±1℃ will be added.						
	Thermocouple							
	Analog	At room temperature(23℃±5℃): ±0.3% F.S. ±1digit, Out of range of room temperature: ±0.5℃% F.S. ±1digit						
	CT input	±5% F.S. ±1digit						
Control output	Relay	OUT1, OUT2: 250VAC 3A 1a						
	SSR	11VDC±2V 20mA Max.						
	Current	DC4-20mA or DC0-20mA selectable(Load 500Ω Max.)						
Alarm output	Relay	AL1, AL2 Relay: 250VAC 3A 1a (TK4N AL2: 250VAC 0.5A 1a(Max.125VA), TK4SP has only AL1.)						
Sub output	Transmission	DC4-20mA (Max. Load 500Ω, Accuracy : ±0.3% F.S.)						
	Communication	RS485 communication output(Modbus RTU)						
Option input	CT	0.0-50.0A(Primary heater current value measuring range) ※CT ratio = 1000:1(except TK4SP)						
	Digital input	・Contact Input: ON-Max. 2kΩ, OFF-Min. 90kΩ ・Non-contact Input: ON-Residual votage max. 1.0V, OFF-leakage current max. 0.1mA ・Outflow current : Approx. 0.5mA ※ TK4S/M-1EA(Due to limited terminals), TK4N/H/W/L-2EA(except TK4SP)						
Control type	Heating,cooling	ON/OFF, P, PI, PD, PID control mode						
	Heating&cooling							
Hysteresis		Thermcouples / RTD : 1 to 100℃/℉(0.1 to 100.0℃/℉) variable, Analog : 1 to 100digit						
Proportional band(P)		0.1 to 999.9℃(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 and SSR drive output only)						
Manual reset value		0.0 to 100.0%						
Sampling period		50ms						
Dielectric strength		2000VAC 50/60Hz for 1min.(between power source terminal and input terminal)						
Vibration		0.75mm amplitude at frequency of 5 to 55Hz(for 1min.) in each of X, Y, Z direction for 2 hours						
Relay life cycle	Mechanical	OUT1/2: Over 5,000,000 times, AL1/2: Over 20,000,000 times(TK4H/W/L: Over 5,000,000 times)						
	Electrical	OUT1/2: Over 200,000 times, AL1/2: Over 100,000 times(TK4H/W/L: Over 200,000 times)						
Insulation resistance		Min. 100MΩ(at 500VDC megger)						
Noise resistance		Square shaped noise by noise simulator (pulse width 1μs) ±2kV R-phase, S-phase						
Memory retention		Approx. 10 years(When using non-volatile semiconductor memory type)						
Environ -ment	Ambient temperature	-10 to 50℃, storage: -20 to 60℃						
	Ambient humidity	35 to 85%RH, storage: 35 to 85%RH						
Protection		IP65(Front panel) ※TK4SP: IP50(Front panel)						
Insulation type		Double insulation or reinforced insulation (Mark: ⊡, Dielectric strength between the measuring input part and the power part : 2kV)						
Approval		CE c UL us						
Weight※2		Approx. 140g (Approx. 70g)	Approx. 130g (Approx. 85g)	Approx. 150g (Approx. 105g)	Approx. 210g (Approx. 140g)	Approx. 211g(Approx. 141g)		Approx. 294g (Approx. 198g)

※1. ◎ At room temperature(23℃±5℃)
: Thermocouple K, J, T, N, E type, below -100℃ / TC L, U, PLII, Cu50Ω, DPt50Ω : (PV ±0.3% or ±2℃, select the bigger one) ±1digit
: Thermocouple C, G type/TC R, S type, below 200℃: (PV ±0.3% or ±3℃, select the bigger one) ±1digit
: Thermocouple B type, below 400℃: There is no accuracy standards.
◎ Out of range of room temperature
: RTD CU50, DPt50: (PV ±0.5% or ±3℃, select the bigger one) ±1digit
: TC R, S, B, C, G: (PV ±0.5% or ±5℃, select the bigger one) ±1digit
: Others: Below -100℃: Within ±5℃
In case of TK4SP series, ±1℃ will be added to the degree standard.
※2. The weight is with packaging and the weight in parentheses is only unit weight.
※Environment resistance is rated at no freezing or condensation.

▣ Connections

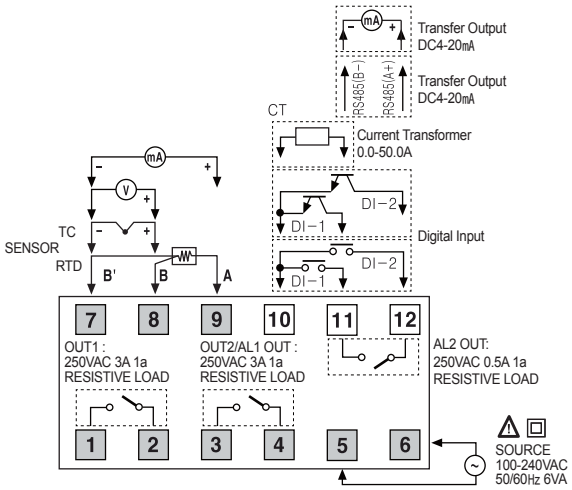
※Please check the polarity when connecting temperature sensor or analog input.

※Standard model has shaded terminals only.

(★)Operation mode of heating&cooling OUT2 relay output model is heating or cooling, OUT2 is available as alarm output 3(except TK4N Series).

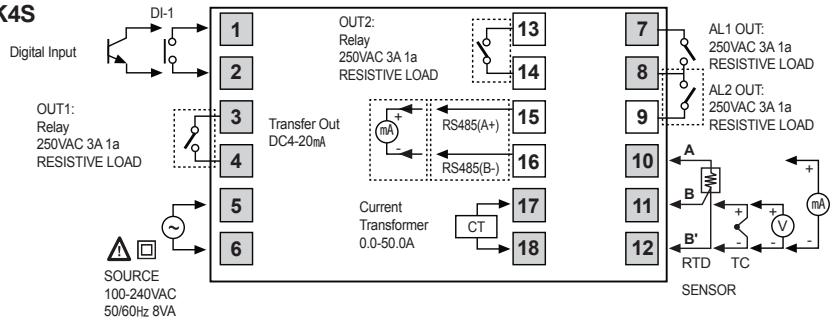
(★)Operation mode of heating&cooling OUT2 current output model is heating or cooling, OUT2 is available as transmission output 2.

●TK4N Line-up



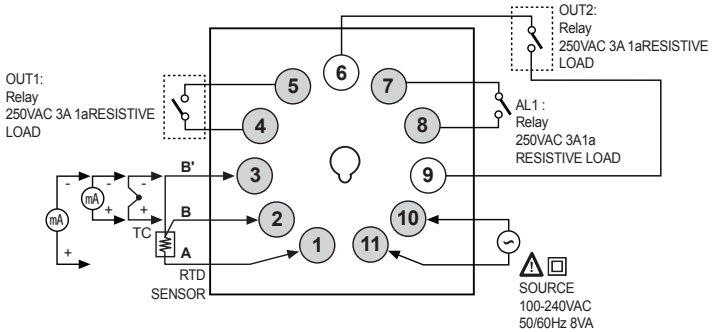
	SSR	Current
OUT1	3 4 (+ V -) 11VDC±2V 20mA Max.	3 4 (+ mA -) DC0/4-20mA Load 500Ω Max.
OUT2	1 2 (+ V -) 11VDC±2V 20mA Max.	1 1 (+ mA -) DC0/4-20mA Load 500Ω Max.

●TK4S



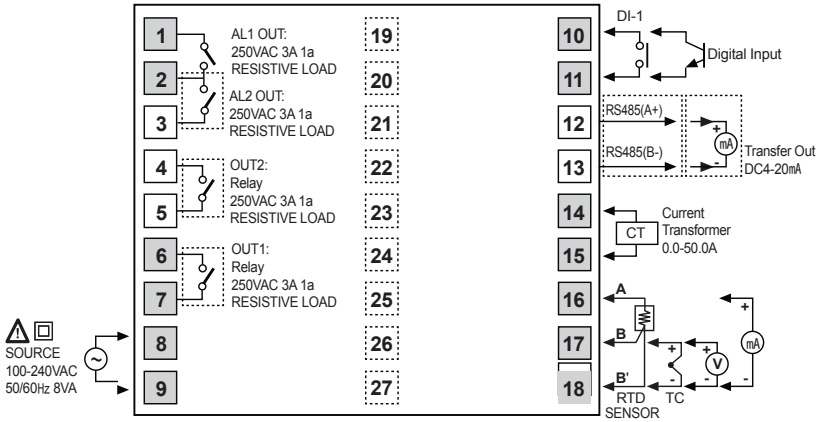
	SSR	Current
OUT1	3 4 (+ V -) 11VDC±2V 20mA Max.	3 4 (+ mA -) DC0/4-20mA Load 500Ω Max.
OUT2	13 14 (+ V -) 11VDC±2V 20mA Max.	13 14 (+ mA -) DC0/4-20mA Load 500Ω Max.

●TK4SP



	SSR	Current
OUT1	5 4 (+ V -) 11VDC±2V 20mA Max.	5 4 (+ mA -) DC0/4-20mA Load 500ΩMax.
OUT2	9 6 (+ V -) 11VDC±2V 20mA Max.	9 6 (+ mA -) DC0/4-20mA Load 500ΩMax.

●TK4M

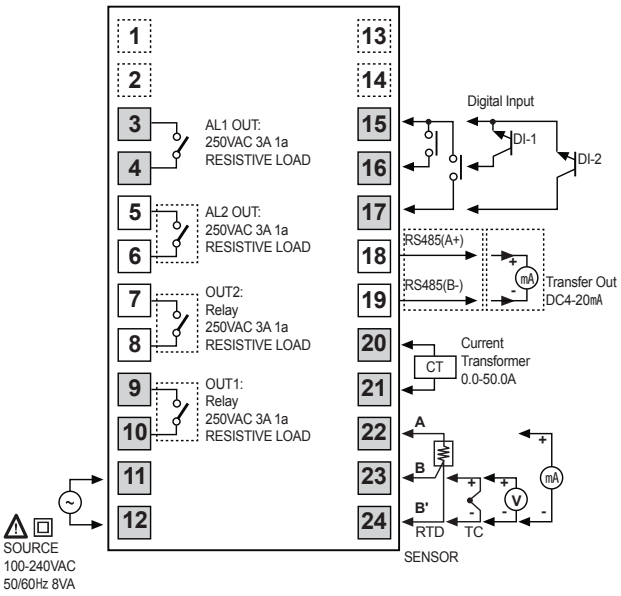


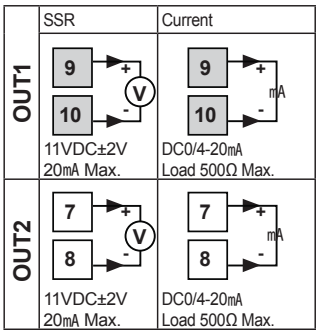
	SSR	Current
OUT1	6 7 (+ V -) 11VDC±2V 20mA Max.	6 7 (+ mA -) DC0/4-20mA Load 500Ω Max.
OUT2	4 5 (+ V -) 11VDC±2V 20mA Max.	4 5 (+ mA -) DC0/4-20mA Load 500Ω Max.

▣ Connections

※Please check the polarity when connecting temperature sensor or analog input.

●TK4H / TK4W / TK4L





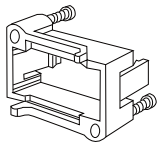
※Digital input is not electrically insulated from internal circuits, so it should be insulated when connecting other circuits. (Photocoupler, Relay, Indenpendent switch)

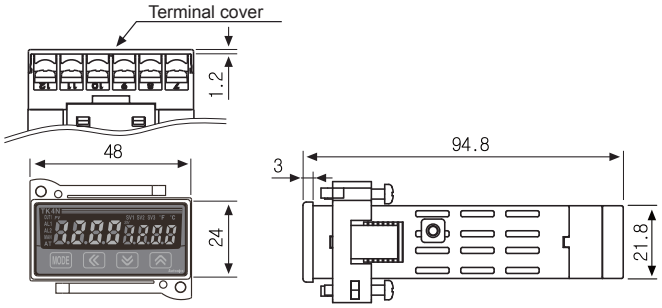
▣ Dimensions

●TK4N Line-up

(unit: mm)

●Bracket





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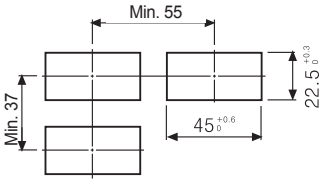

●TK4S

(unit: mm)

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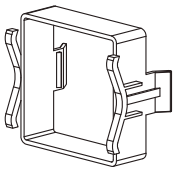

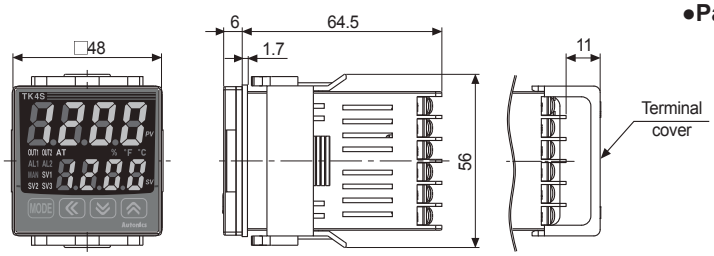

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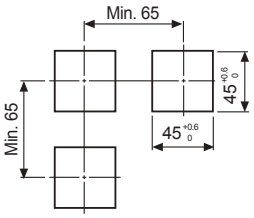

●TK4SP

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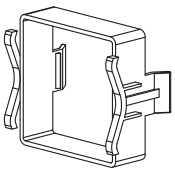

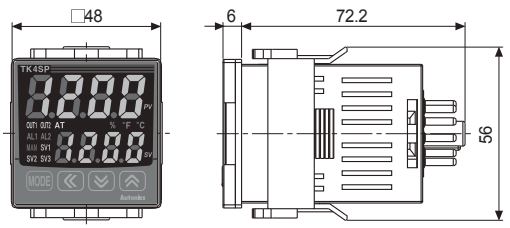

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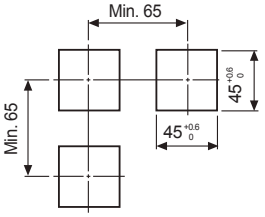

▣ Dimensions

●TK4M

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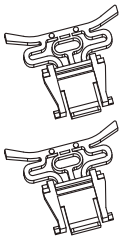

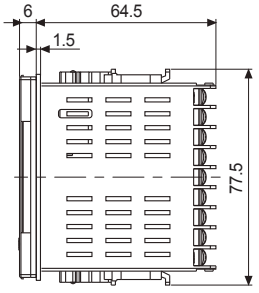

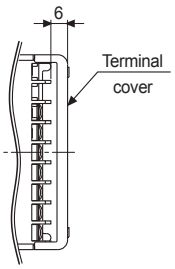

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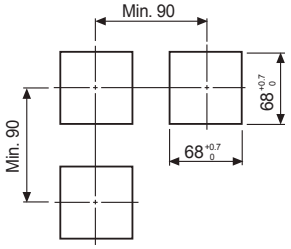

●TK4H

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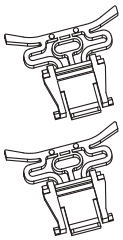

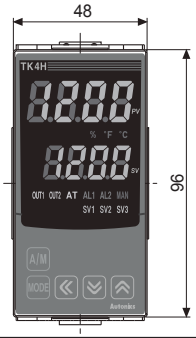

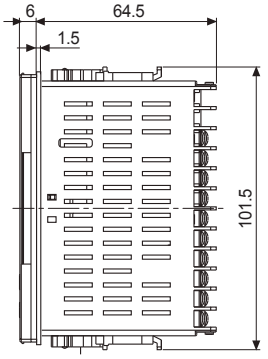

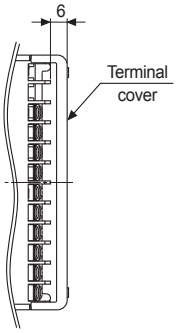

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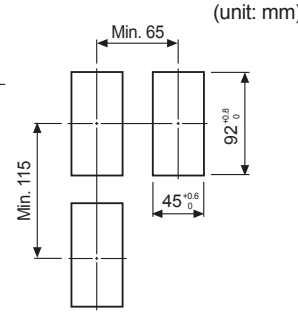

●TK4W

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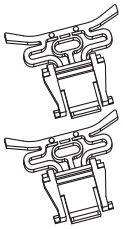

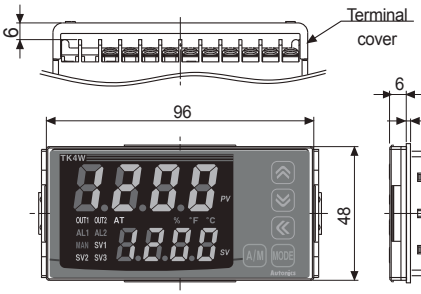

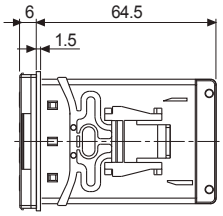

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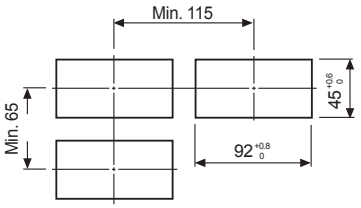
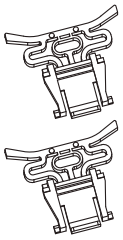
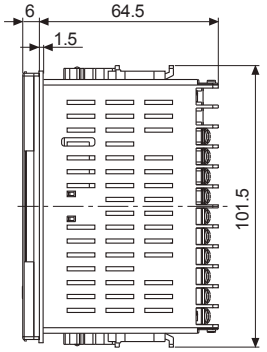
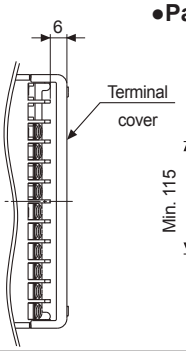


●TK4L

●Bracket

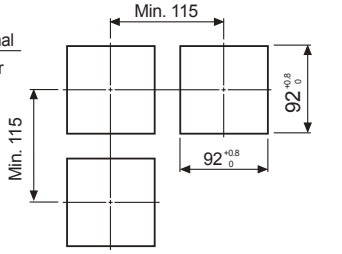






●Panel cut-out

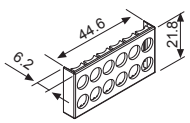
(unit: mm)



●Terminal cover(sold separately)

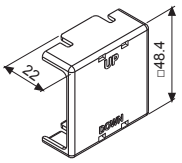
●TK4N-Cover (48×24mm)

Line-up

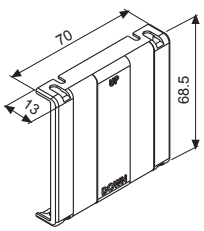


※ TK4N cover is provided as an accessory.

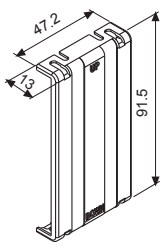
●RSA-Cover (48×48mm)



●RMA-Cover (72×72mm)

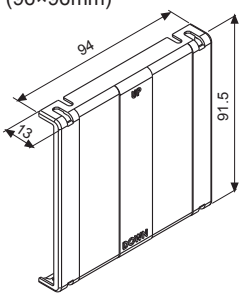


●RHA-Cover (48×96mm, 96×48mm)



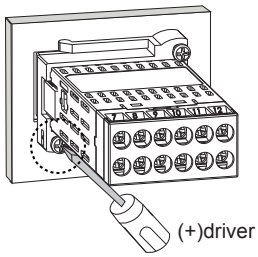
●RLA-Cover (96×96mm)

(unit:mm)



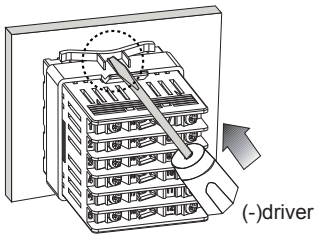
▣ Product mounting

●TK4N(48×24mm) series Line-up



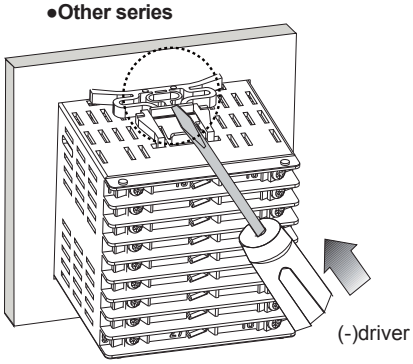
※ Insert the unit into a panel, fasten the bolt with a (+) driver.

●TK4S/SP(48×48mm) series



※ Insert the unit into a panel, fasten the bracket by pushing with tools with a (-) driver.

●Other series



▣ Sold separately

●Communocation convertor

[SCM-38I(RS232C/RS485 converter)]

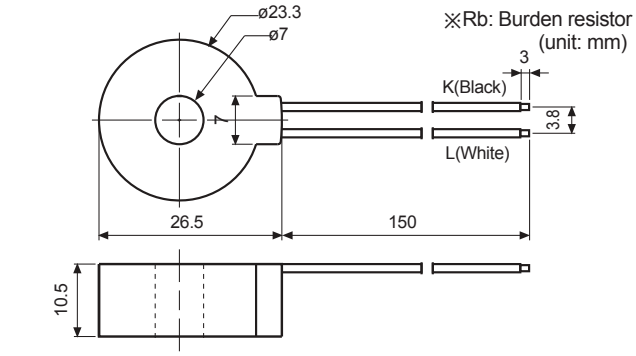
[SCM-US48I(USB/RS485 converter)]

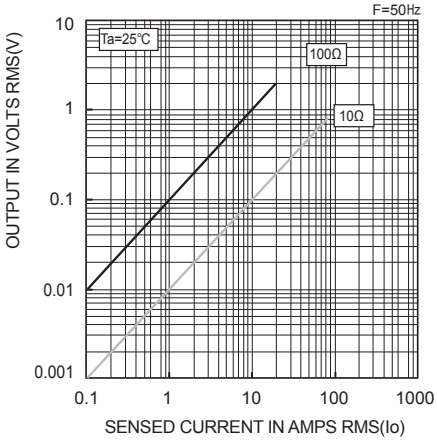
[SCM-US (USB/Serial converter)]

●Current transformer(CT)

[CSTC-E80LN]

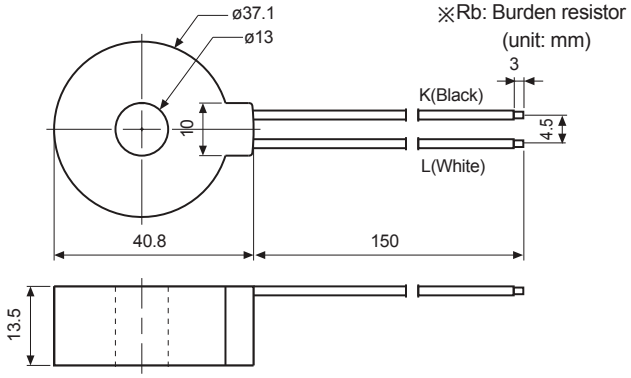
Current measuring range	100mA to 80A (Rb=10Ω)	Current ratio	1000:1
Wire wounded resistance	31Ω±10%	Accuracy	2.0 grade (5A to 80A)%

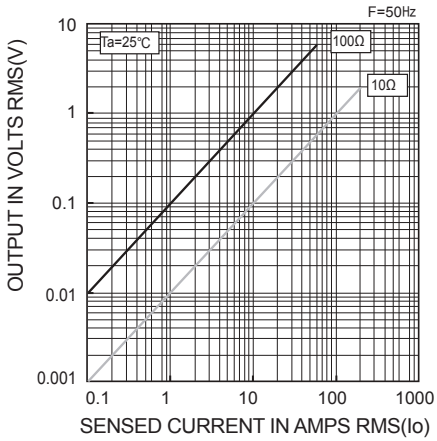




[CSTC-E200LN]

Current measuring range	100mA~200A (Rb=10Ω)	Current ratio	1000:1
Wire wounded resistance	20Ω±10%	Accuracy	2.0 grade (5A to 200A)

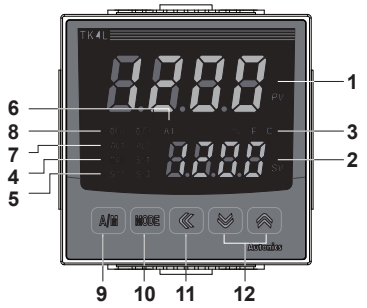




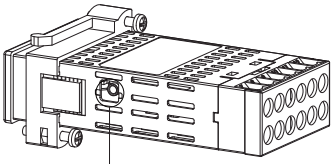
※Do not supply primary current in case that CT output is open. High voltage will be generated in CT output.

▣ Parts description

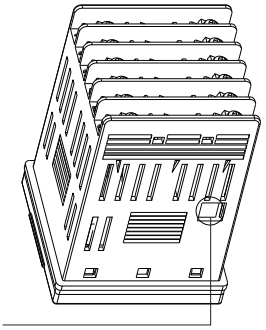
※ The input selection switch (TC, RTD/mV, V, mA) switch disappears.
Select input type [Inㅌ] in parameter 3 group.



TK4N Series Line-up



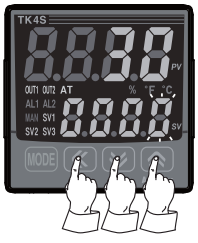
Other series

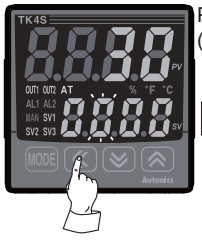


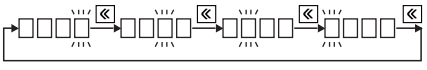
1. Measured value(PV) display part : RUN mode: It displays currently measured value (PV).
Setting mode: It displays the parameter.
2. Set value (SV) display part : RUN mode: It displays the set value (SV).
Setting mode: It displays the set value of the parameter.
3. Unit(℃ / ℉ / %) Indicator : It displays the unit set at display unit [Unㅌ] in parameter 3 group.
4. Manual control indicator : It turns ON during manual controlling.
5. Multi SV Indicator : One of SV1 to 3 lamp will be ON in case of selecting multi SV function.
6. Auto tuning indicator : It flashes by 1 sec. when executing auto tuning.
7. Alarm output (AL1, AL2) indicator : It turns ON when the alarm output is ON.
8. Control output (OUT1, OUT2) indicator : It turns ON when the control output is ON.
※During cycle/phase controlling in SSRP output type, when MV is over 5.0%, it turns ON.
※To use current ouput, when MV is 0.0% in manual control, it turns OFF. Otherwise, it always turns ON.
When MV is over 3.0% in auto control, it turns ON and when MV is below 2.0%, it turns OFF.
9. A/M **key :** It is used when switching auto control to manual control.
※TK4N/S/SP do not have A/M key. MODE key operates switching simultaneously.
10. MODE **key :** It is used when entering parameter setting group, returning to RUN mode, moving parameter, saving the set value.
11. ≪, ≫, ∧ **key :** It is used when entering the set value changing mode and moving or changing up/down digit.
12. Digital input key : When pressing ≫ + ∧ keys for 3 sec. at the same time, it operates the function(RUN/STOP, alarm clear, auto tuning) set at digital input key [dI-ㅌ] in parameter 5 group.
13. PC loader port : It is the PC loader port for serial communication to set parameter and monitoring by DAQMaster installed in PC. Use this for connecting SCM-US(USB to Serial converter, sold separately).

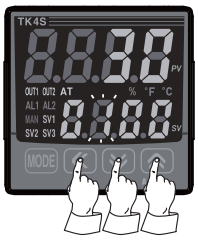
▣ Flow chart for SV setting

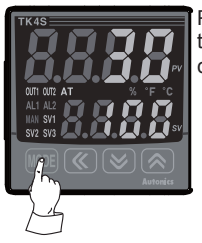
You can set the temperature to control with MODE, ≪, ≫, ∧ keys.
Set range is within SV low-limit value [L-SU] to SV high-limit value [H-SU].
Ex) In case of changing set temperature from 210ºC to 250ºC

1 
Press any key among ≪, ≫, ∧ in RUN mode to enter into SV setting mode. Last DIGIT(100 DIGIT) on SV display part will be flashing.

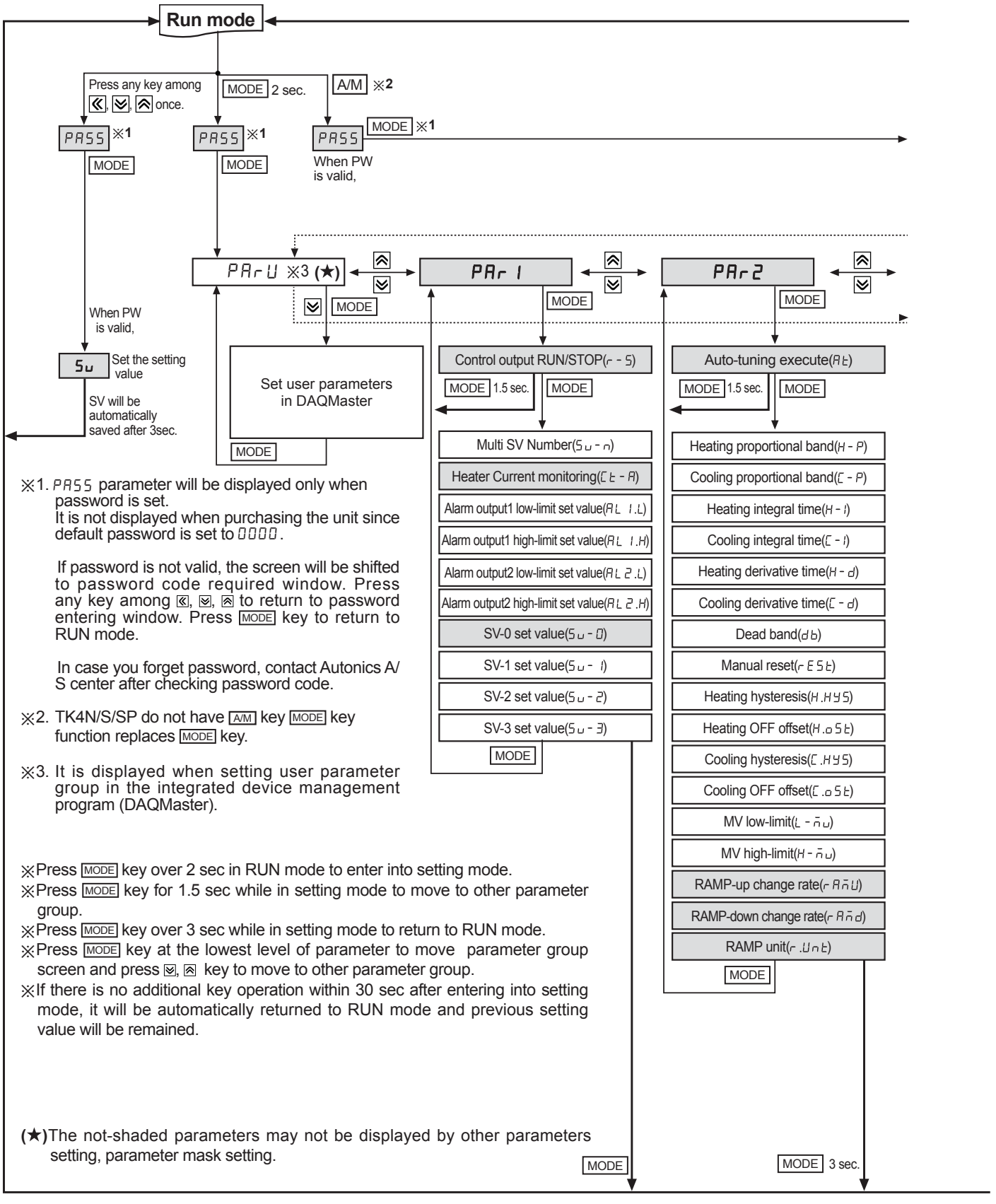
2 
Press ≪ key to move DIGIT.
($10^0 \rightarrow 10^1 \rightarrow 10^2 \rightarrow 10^3 \rightarrow 10^0$)



3 
Set the number 0↔1↔2↔3↔4↔5↔6↔7↔8↔9↔0 for each digit with key and set the SV using ≫, ∧, ≪, ≫, ∧ keys.

4 
Press MODE key to save the setting value. If there is no additional key operations in 3 sec., changed SV will be automatically saved.

▣ Parameter group



※1. PASS parameter will be displayed only when password is set.
It is not displayed when purchasing the unit since default password is set to 0000.

If password is not valid, the screen will be shifted to password code required window. Press any key among ≪, ≫, ≪ to return to password entering window. Press MODE key to return to RUN mode.

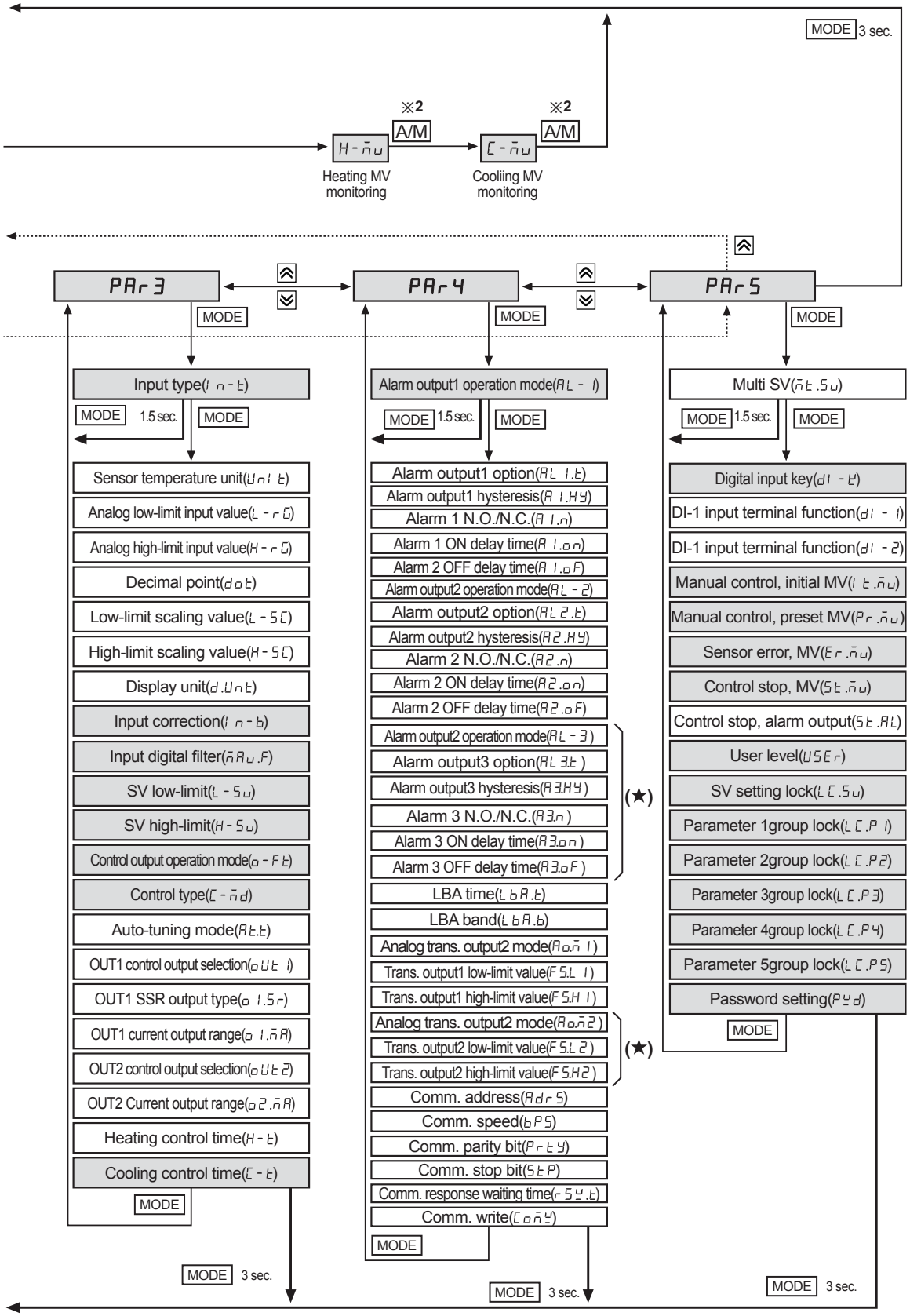
In case you forget password, contact Autonics A/S center after checking password code.

※2. TK4N/S/SP do not have A/M key MODE key function replaces MODE key.

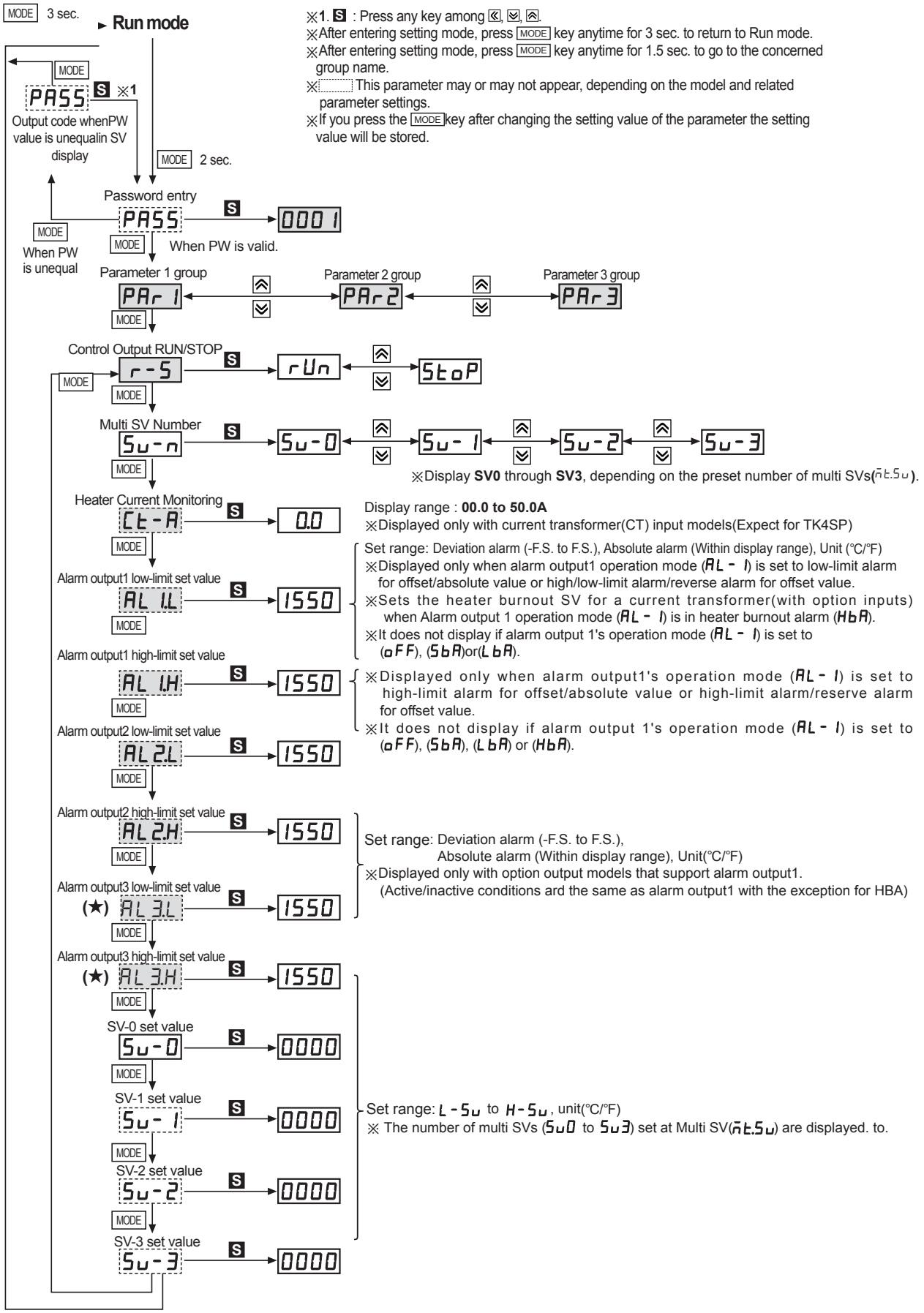
※3. It is displayed when setting user parameter group in the integrated device management program (DAQMaster).

※Press MODE key over 2 sec in RUN mode to enter into setting mode.
※Press MODE key for 1.5 sec while in setting mode to move to other parameter group.
※Press MODE key over 3 sec while in setting mode to return to RUN mode.
※Press MODE key at the lowest level of parameter to move parameter group screen and press ≫, ≪ key to move to other parameter group.
※If there is no additional key operation within 30 sec after entering into setting mode, it will be automatically returned to RUN mode and previous setting value will be remained.

(★) The not-shaded parameters may not be displayed by other parameters setting, parameter mask setting.

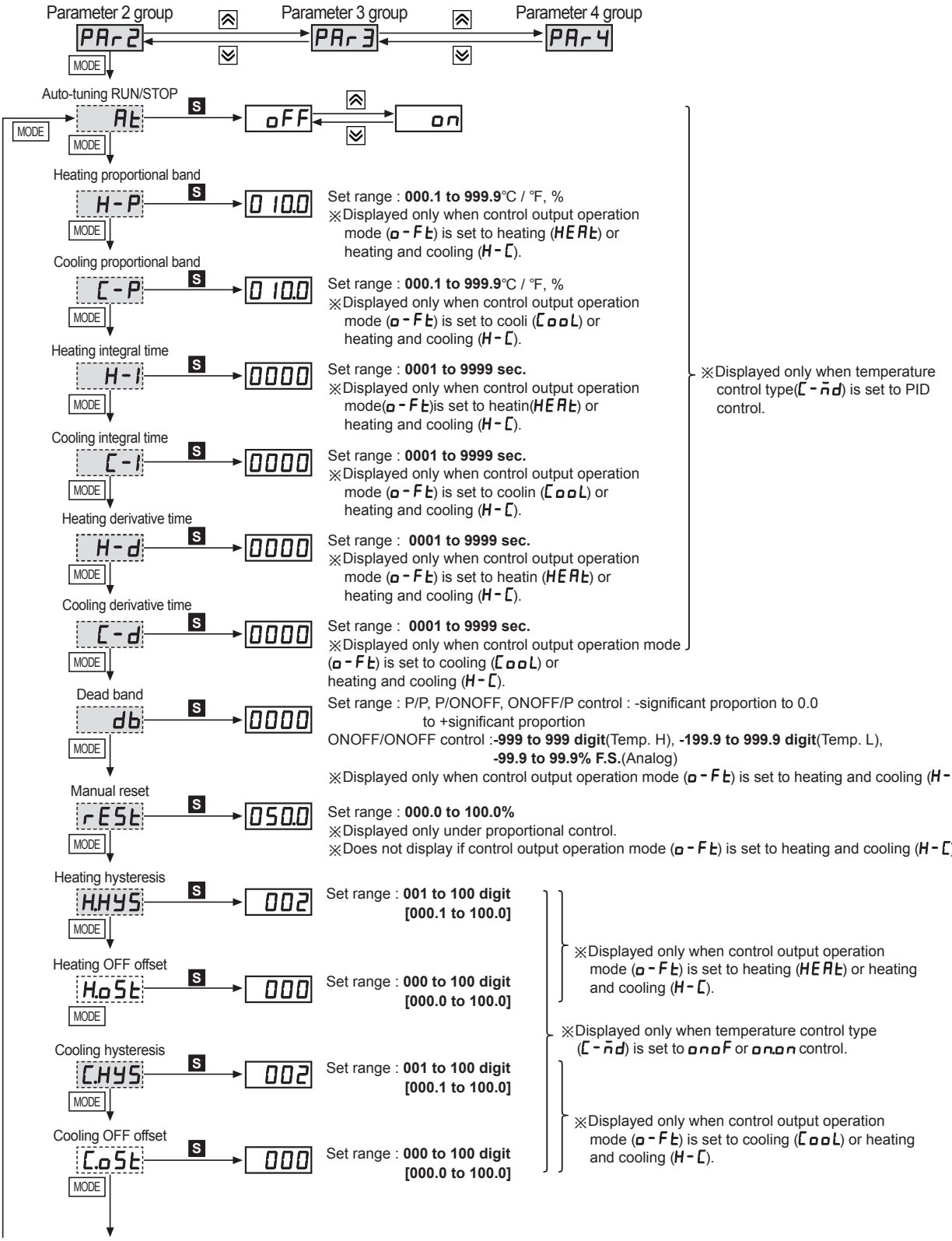

MODE 3 sec.
※2
A/M
H-ou
Heating MV monitoring
※2
A/M
C-ou
Cooliing MV monitoring
PAr3
PAr4
PAr5
MODE
Input type(in-t)
MODE 1.5 sec. MODE
Sensor temperature unit(Unit)
Analog low-limit input value(L-rG)
Analog high-limit input value(H-rG)
Decimal point(dot)
Low-limit scaling value(L-SC)
High-limit scaling value(H-SC)
Display unit(d.Unt)
Input correction(in-b)
Input digital filter(oAU.F)
SV low-limit(L-Su)
SV high-limit(H-Su)
Control output operation mode(o-Ft)
Control type(C-od)
Auto-tuning mode(AT.t)
OUT1 control output selection(oUt1)
OUT1 SSR output type(o1.Sr)
OUT1 current output range(o1.oA)
OUT2 control output selection(oUt2)
OUT2 Current output range(o2.oA)
Heating control time(H-t)
Cooling control time(C-t)
MODE
MODE 3 sec.
Alarm output1 operation mode(AL-1)
MODE 1.5 sec. MODE
Alarm output1 option(AL1.t)
Alarm output1 hysteresis(A1.HY)
Alarm 1 N.O./N.C.(A1.o)
Alarm 1 ON delay time(A1.on)
Alarm 2 OFF delay time(A1.oF)
Alarm output2 operation mode(AL-2)
Alarm output2 option(AL2.t)
Alarm output2 hysteresis(A2.HY)
Alarm 2 N.O./N.C.(A2.o)
Alarm 2 ON delay time(A2.on)
Alarm 2 OFF delay time(A2.oF)
Alarm output2 operation mode(AL-3)
Alarm output3 option(AL3.t)
Alarm output3 hysteresis(A3.HY)
Alarm 3 N.O./N.C.(A3.o)
Alarm 3 ON delay time(A3.on)
Alarm 3 OFF delay time(A3.oF)
(★)
LBA time(LbA.t)
LBA band(LbA.b)
Analog trans. output2 mode(Ao.o1)
Trans. output1 low-limit value(FS.L1)
Trans. output1 high-limit value(FS.H1)
Analog trans. output2 mode(Ao.o2)
Trans. output2 low-limit value(FS.L2)
Trans. output2 high-limit value(FS.H2)
(★)
Comm. address(Adr S)
Comm. speed(bPS)
Comm. parity bit(PrtY)
Comm. stop bit(StP)
Comm. response waiting time(rSY.t)
Comm. write(CoMY)
MODE
MODE 3 sec.
Multi SV(mt.Su)
MODE 1.5 sec. MODE
Digital input key(di-K)
DI-1 input terminal function(di-1)
DI-1 input terminal function(di-2)
Manual control, initial MV(It.ou)
Manual control, preset MV(Pr.ou)
Sensor error, MV(Er.ou)
Control stop, MV(St.ou)
Control stop, alarm output(St.AL)
User level(USEr)
SV setting lock(LC.Su)
Parameter 1group lock(LC.P1)
Parameter 2group lock(LC.P2)
Parameter 3group lock(LC.P3)
Parameter 4group lock(LC.P4)
Parameter 5group lock(LC.P5)
Password setting(PYd)
MODE
MODE 3 sec.

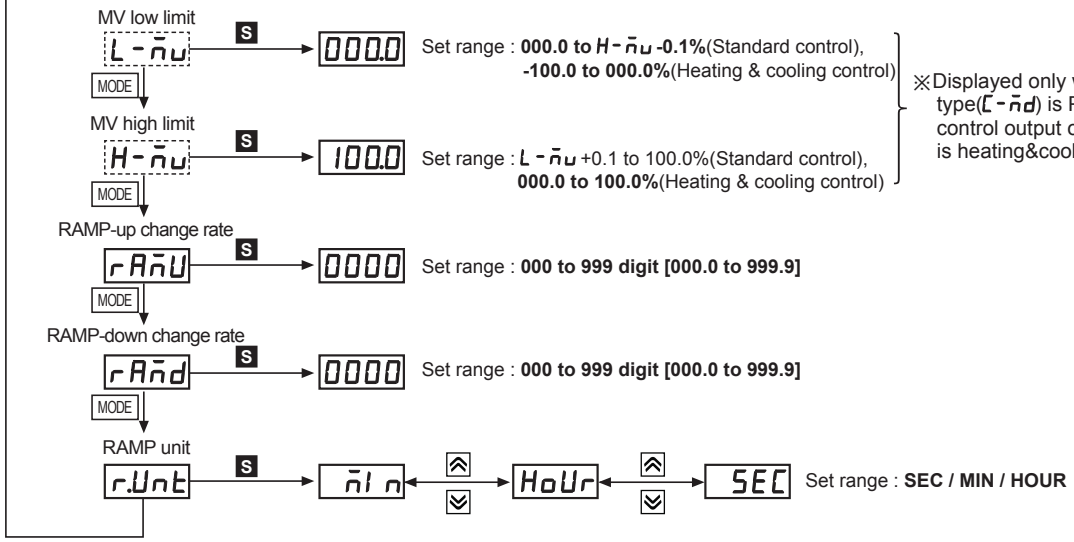
▣ Parameter 1 group



▣ Parameter 2 group

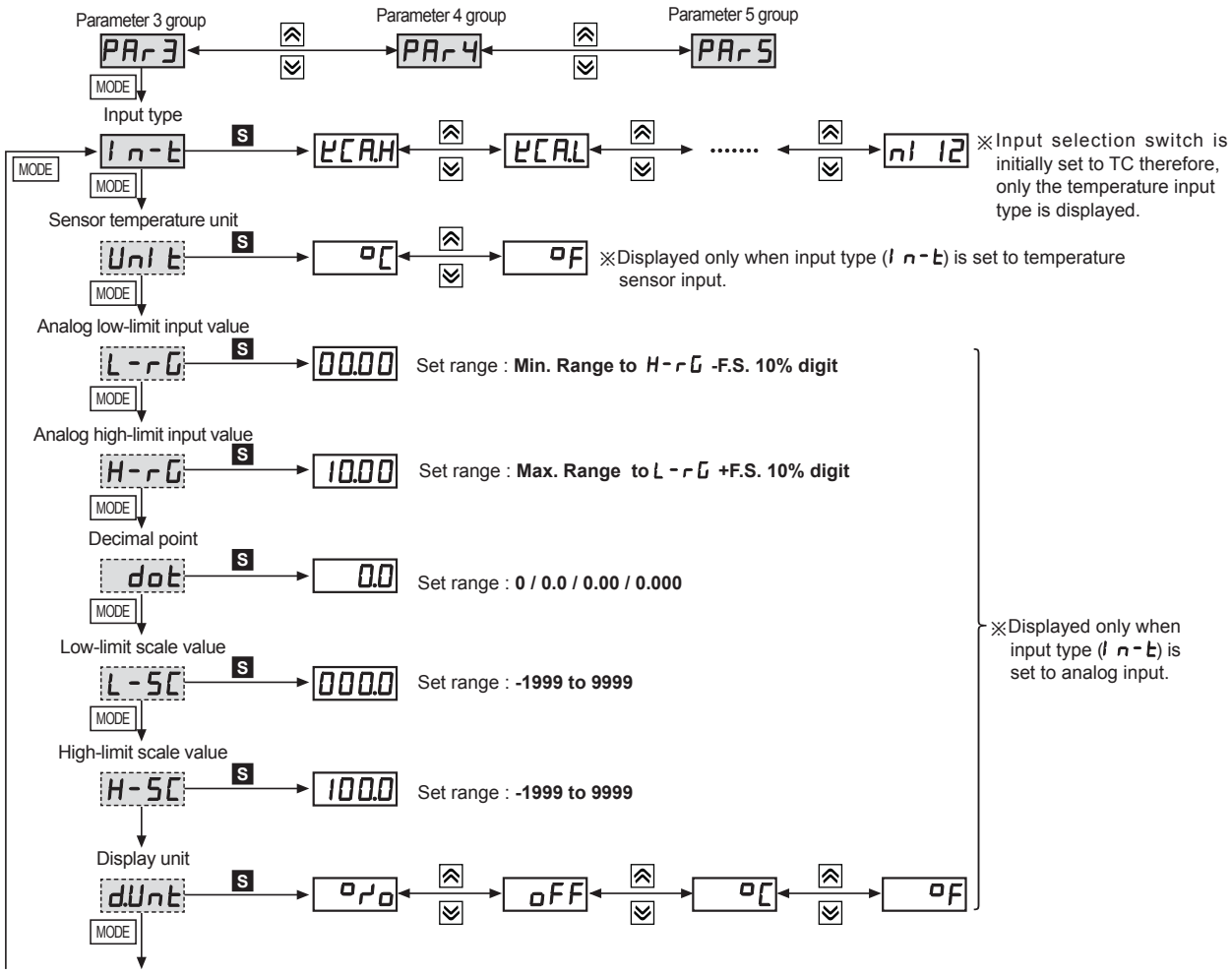
※1. S : Press any key among ≪, ≫, ≪.
※After entering setting mode, press MODE key anytime for 3 sec. to return to Run mode.
※After entering setting mode, press MODE key anytime for 1.5 sec. to go to the concerned group name.
※ This parameter may or may not appear, depending on the model and related parameter settings.
※If you press the MODE key after changing the setting value of the parameter the setting value will be stored.

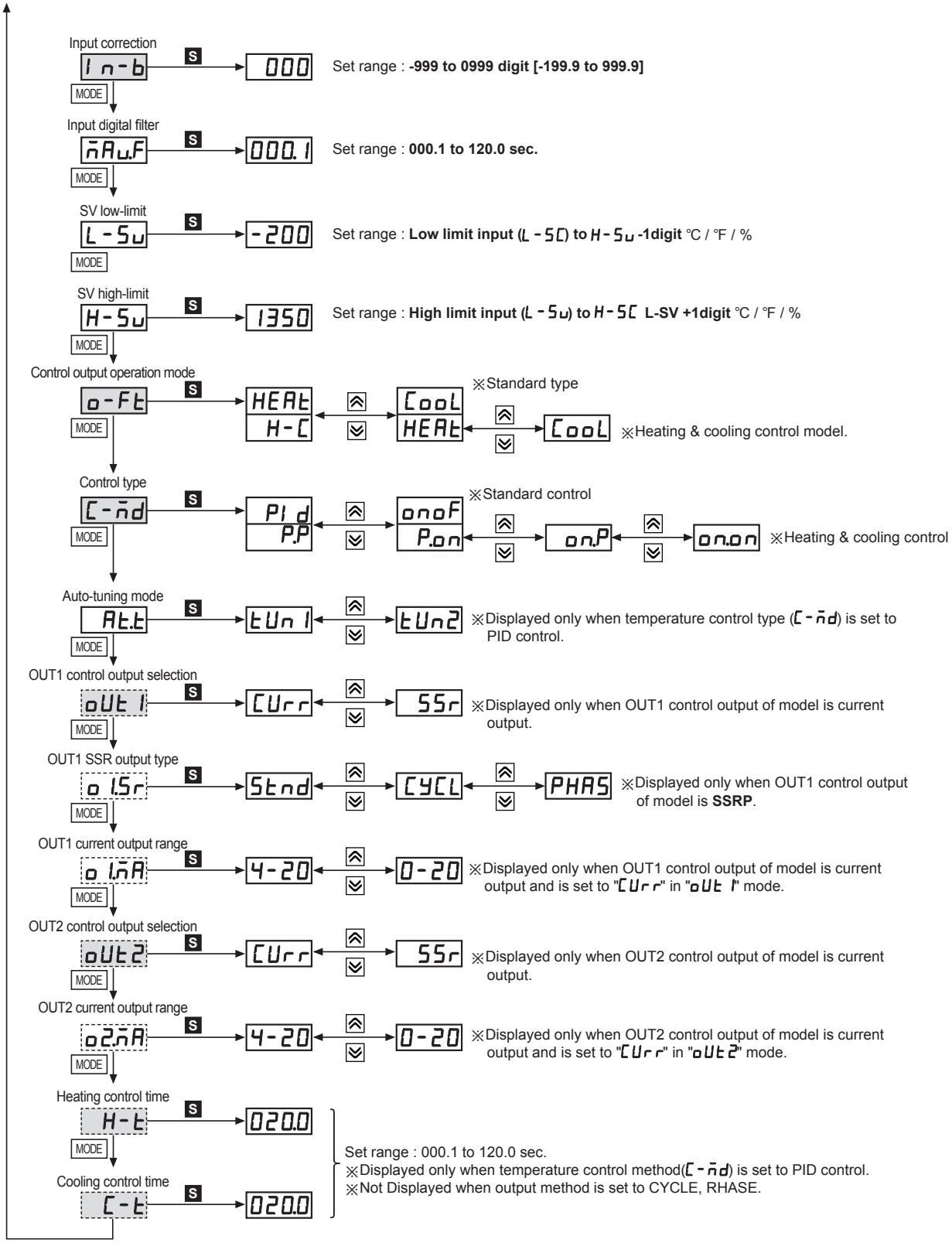




■ Parameter 3 group

※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.
※ ..... This parameter may or may not appear, depending on the model and related parameter settings.
※If you press the MODE key after changing the setting value of the parameter the setting value will be stored.





※OUT1, OUT2 output :

① In case that OUT1,OUT2 output is relay output type , oUt1, o1.Sr, o1.mA , oUt2, o2.Sr, o2.mA parameter are not displayed.

② In case that OUT1,OUT2 output is CUR + SSR output type, when OUT1,OUT2 output is set to SSR .

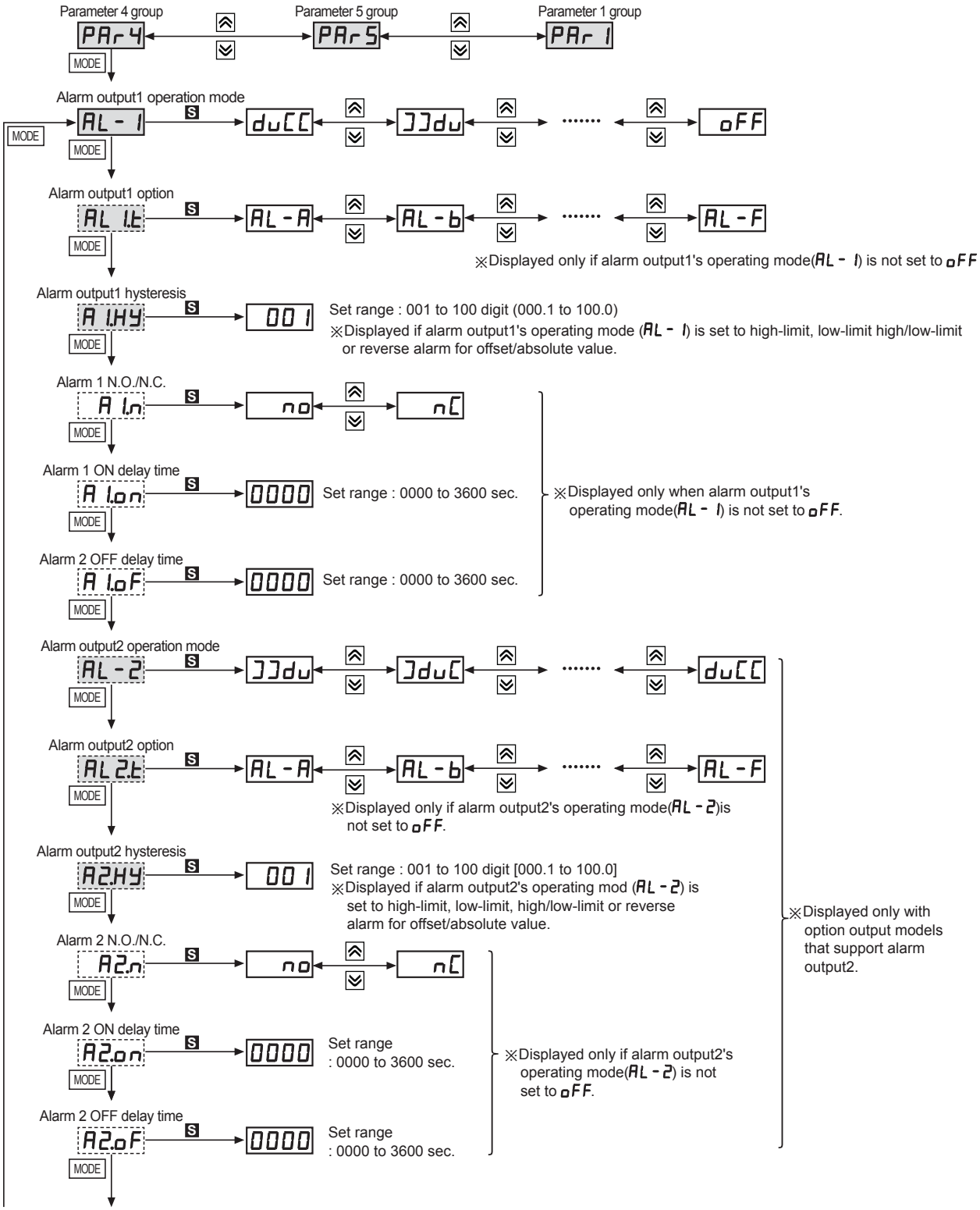
- Output method of o1.Sr, o2.Sr is held in Stnd and parameter is not displayed.

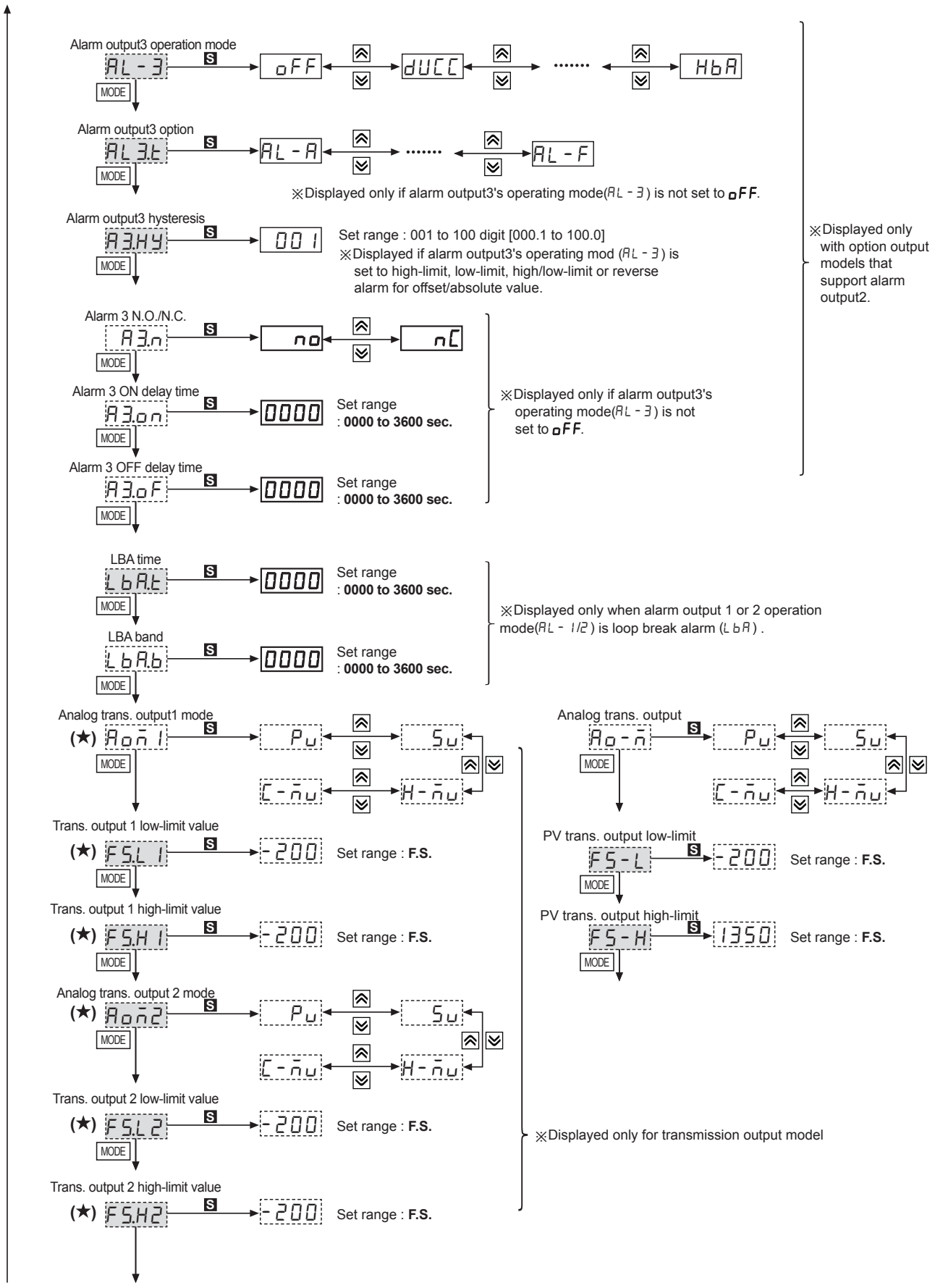
③ In case that OUT1, output is SSRP output type and OUT2 output is SUR + SSR

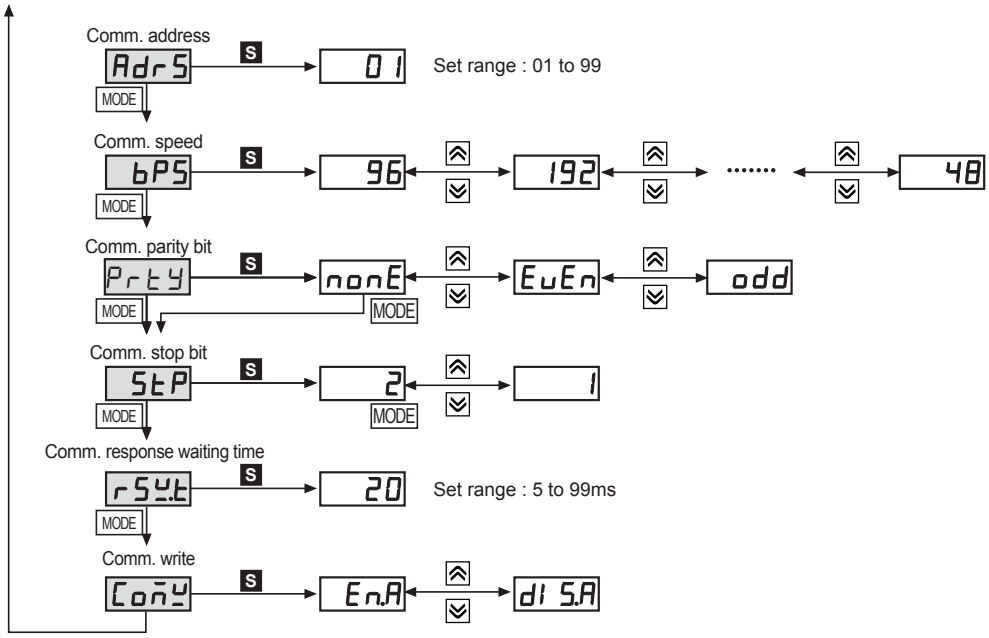
- oUt1, o1.mA are not displayed.
- o1.Sr can set to Stnd, CYCL, PHAS.
- When o2.Sr is set to SSr it is held in Stnd and parameter is not displayed.

▣ 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.
※ ..... This parameter may or may not appear, depending on the model and related parameter settings.
※If you press the MODE key after changing the setting value of the parameter the setting value will be stored.

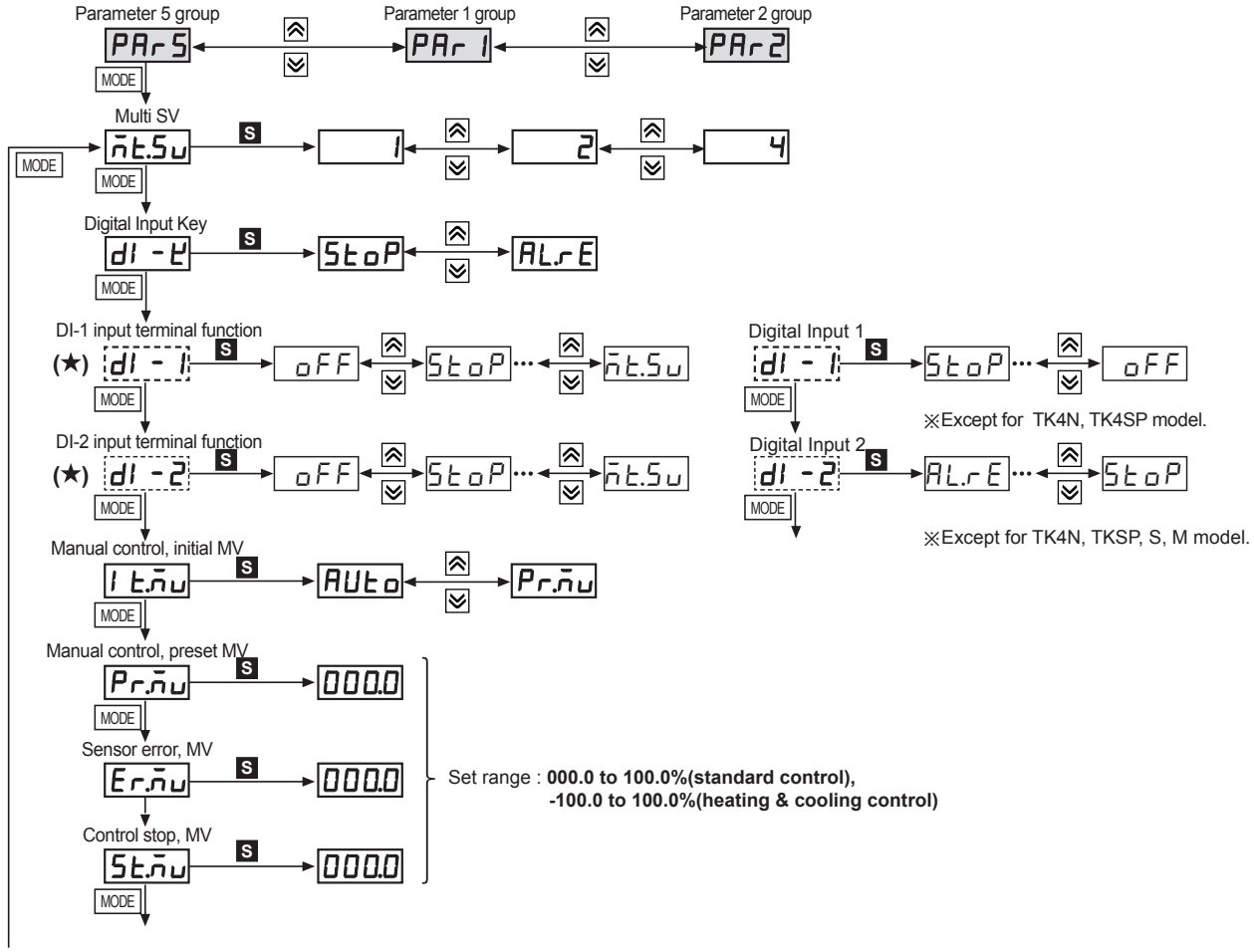


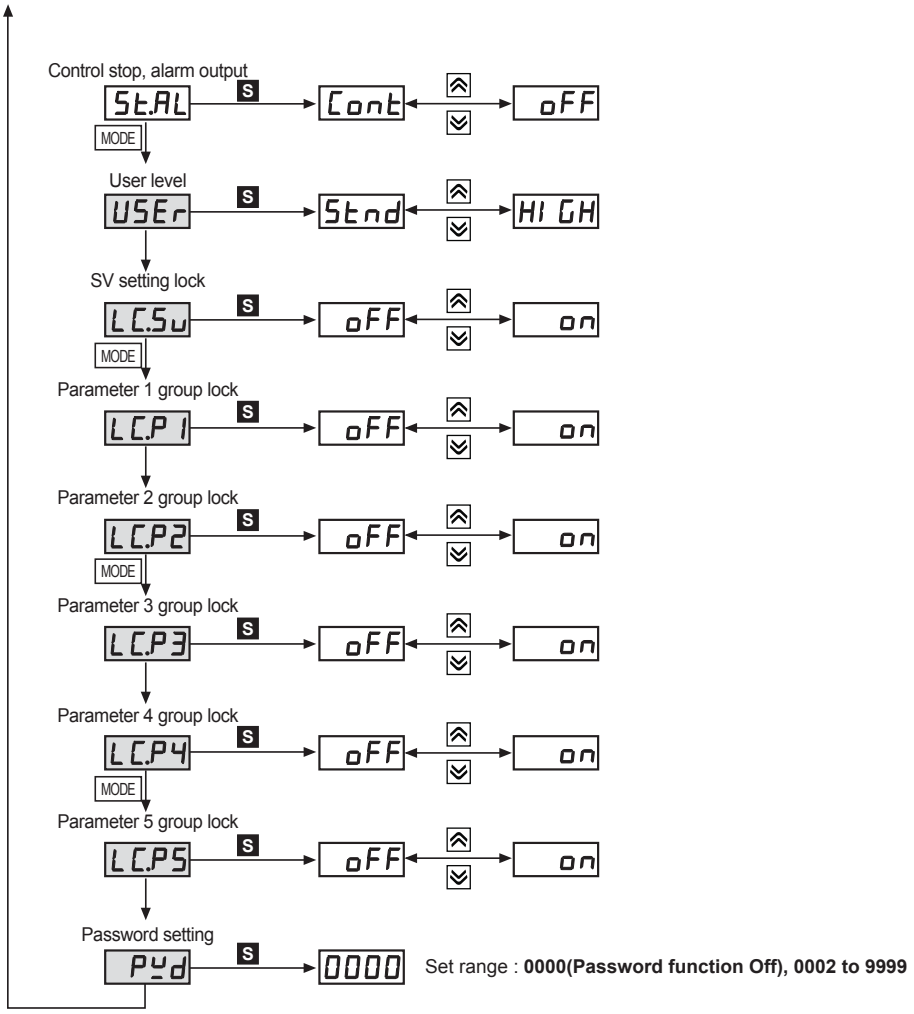

Alarm output3 operation mode
AL-3
S
MODE
oFF
dUCC
HbA
Alarm output3 option
AL3t
AL-A
AL-F
※Displayed only if alarm output3's operating mode(AL-3) is not set to oFF.
Alarm output3 hysteresis
A3HY
001
Set range : 001 to 100 digit [000.1 to 100.0]
※Displayed if alarm output3's operating mod (AL-3) is set to high-limit, low-limit, high/low-limit or reverse alarm for offset/absolute value.
※Displayed only with option output models that support alarm output2.
Alarm 3 N.O./N.C.
A3n
no
nC
Alarm 3 ON delay time
A3on
0000
Set range : 0000 to 3600 sec.
Alarm 3 OFF delay time
A3oF
0000
Set range : 0000 to 3600 sec.
※Displayed only if alarm output3's operating mode(AL-3) is not set to oFF.
LBA time
LbAt
0000
Set range : 0000 to 3600 sec.
LBA band
LbAb
0000
Set range : 0000 to 3600 sec.
※Displayed only when alarm output 1 or 2 operation mode(AL-1/2) is loop break alarm (LbA).
Analog trans. output1 mode
(★) AOn1
Pu
Su
C-nu
H-nu
Trans. output 1 low-limit value
(★) FSL1
-200
Set range : F.S.
Trans. output 1 high-limit value
(★) FSH1
-200
Set range : F.S.
Analog trans. output 2 mode
(★) AOn2
Pu
Su
C-nu
H-nu
Trans. output 2 low-limit value
(★) FSL2
-200
Set range : F.S.
Trans. output 2 high-limit value
(★) FSH2
-200
Set range : F.S.
Analog trans. output
Ao-n
Pu
Su
C-nu
H-nu
PV trans. output low-limit
FS-L
-200
Set range : F.S.
PV trans. output high-limit
FS-H
1350
Set range : F.S.
※Displayed only for transmission output model



▣ 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.
※ This parameter may or may not appear, depending on the model and related parameter settings.
※If you press the MODE key after changing the setting value of the parameter the setting value will be stored.





■ Parameter Initialization

Press ≪, ∨, ∧ to initialize all parameters in memory to default value.
Set [Init] parameter to 'YES' to initialize all parameters.
In case password function is on, it is required to enter valid password to initialize parameters.
Password is also initialized.

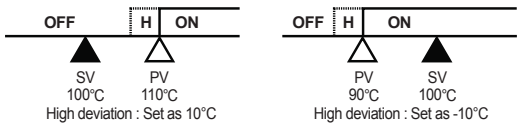
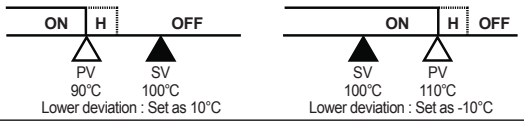
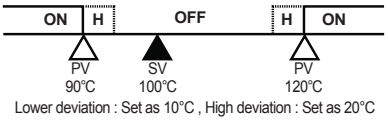
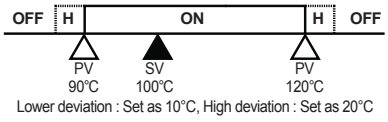
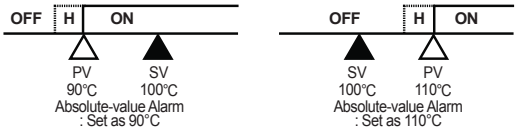
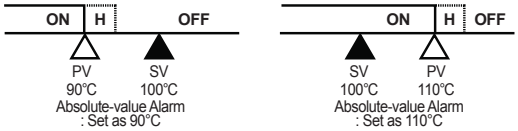
▣ Input type and range

Input type			Decimal point	Display	Input range(℃)	Input range(℉)
Thermocouple	K(CA)		1	K CA.H	-200 to 1350	-328 to 2463
			0.1	K CA.L	-199.9 to 999.9	-199.9 to 999.9
	J(IC)		1	J I C.H	-200 to 800	-328 to 1472
			0.1	J I C.L	-199.9 to 800.0	-199.9 to 999.9
	E(CR)		1	E Cr.H	-200 to 800	-328 to 1472
			0.1	E Cr.L	-199.9 to 800.0	-199.9 to 999.9
	T(CC)		1	t CC.H	-200 to 400	-328 to 752
			0.1	t CC.L	-199.9 to 400.0	-199.9 to 752.0
	B(PR)		1	b Pr	0 to 1800	32 to 3272
	R(PR)		1	r Pr	0 to 1750	32 to 3182
	S(PR)		1	S Pr	0 to 1750	32 to 3182
	N(NN)		1	n nn	-200 to 1300	-328 to 2372
	C(TT)※1		1	C tt	0 to 2300	32 to 4172
	G(TT)※2		1	G tt	0 to 2300	32 to 4172
	L(IC)		1	L I C.H	-200 to 900	-328 to 1652
			0.1	L I C.L	-199.9 to 900.0	-199.9 to 999.9
	U(CC)		1	U CC.H	-200 to 400	-328 to 752
			0.1	U CC.L	-199.9 to 400.0	-199.9 to 752.0
	Platinel II		1	PL I I	0 to 1390	32 to 2534
RTD	Cu 50Ω		0.1	CU 5	-199.9 to 200.0	-199.9 to 392.0
	Cu 100Ω		0.1	CU 10	-199.9 to 200.0	-199.9 to 392.0
	JPt 100Ω		1	JPt.H	-200 to 650	-328 to 1202
	JPt 100Ω		0.1	JPt.L	-199.9 to 650.0	-199.9 to 999.9
	DPt 50Ω		0.1	dPt 5	-199.9 to 600.0	-199.9 to 999.9
	DPt 100Ω		1	dPt.H	-200 to 650	-328 to 1202
	DPt 100Ω		0.1	dPt.L	-199.9 to 650.0	-199.9 to 999.9
	Nickel 120Ω		1	nI 12	-80 to 200	-112 to 392
Analog	Voltage	0 to 10V		Au 1	-1999 to 9999 (Display point will be changed according to decimal point position)	
		0 to 5V		Au2		
		1 to 5V		Au3		
		0 to 100mV		Ān u 1		
	Current	0 to 20mA		Ān A 1		
		4 to 20mA		Ān A2		

※1. Same as existing W5 (TT) type sensor ※2. Same as existing W(TT) type sensor

▣ Alarm

● Alarm operation

Mode	Name	Alarm operation	Description
oFF	-	-	No alarm output
duCC	Deviation high-limit alarm		If deviation between PV and SV as high-limit is higher than set value of deviation temperature, the alarm output will be ON.
]]du	Deviation low-limit alarm		If deviation between PV and SV as low-limit is higher than set value of deviation temperature, the alarm output will be ON.
]duC	Deviation high/low-limit alarm		If deviation between PV and SV as high/ low-limit is higher than set value of deviation temperature, the alarm output will be ON.
[duJ	Deviation high/low-limit reserve alarm		If deviation between PV and SV as high/ low-limit is lower than set value of deviation temperature, the alarm output will be OFF.
PuCC	Absolute value high limit alarm		If PV is higher than the absolute value, the output will be ON.
]]Pu	Absolute value low limit alarm		If PV is lower than the absolute value, the output will be ON.
LbA	Loop break Alarm	—	It will be ON when it detects loop break.
SbA	Sensor break Alarm	—	It will be ON when it detects sensor disconnection.
HbA	Heater break alarm	—	It will be ON when CT detects heater break.

※H: Alarm □ output hysteresis[A□.HY]

● Alarm option

Mode	Name	Description
AL-A	Standard alarm	If it is an alarm condition, alarm output is ON. If it is a clear alarm condition, alarm output is OFF.
AL-b	Alarm latch	If it is an alarm condition, alarm output is ON and maintains ON status.
AL-C	Standby sequence1	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.
AL-d	Alarm latch and standby sequence1	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.
AL-E	Standby sequence2	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.
AL-F	Alarm latch and standby sequence2	Basic operation is same as alarm latch and standby sequence1. 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 [AL - 1], [AL - 2] or alarm operation [AL - 1], [AL - 2], switching STOP mode to RUN mode.

▣ Front panel display when power is ON

When power is supplied, display will flash for 1 sec. Afterwards, model name and input sensor type will flash twice and then enter into RUN mode.

① Whole display part

② Model type display

③ Input sensor type display

④ Run mode

▣ Factory default

● SV setting group [SU]

Mode	Factory default
SU	0

● Password input parameter

Mode	Factory default
PASS	0001

● Parameter 1 setting group [PAr 1]

Parameter	Factory default	Parameter	Factory default	Parameter	Factory default	Parameter	Factory default
r-S	rUn	AL 1.H	1550	AL 3.H	1550	Su-3	0000
Su-n	Su-0	AL 2.L	1550	Su-0	0000		
Ct-A	0.0	AL 2.H	1550	Su-1	0000		
AL 1.L	1550	AL 3.L	1550	Su-2	0000		

● Parameter 2 setting group [PAr 2]

Parameter	Factory default	Parameter	Factory default	Parameter	Factory default	Parameter	Factory default
At	oFF	H-d	0000	H.oSt	000	rAnU	000
H-P	0 10.0	C-d	0000	C.HYS	002	rAnd	000
C-P	0 10.0	db	0000	C.oSt	000	r.Unt	nI n
H-I	0000	rESt	050.0	L-nu	-100.0		
C-I	0000	H.HYS	002	H-nu	100.0		

● Parameter 3 setting group [PAr 3]

Parameter	Factory default	Parameter	Factory default	Parameter	Factory default	Parameter	Factory default
In-t	tCA.H	H-SC	100.0	o-Ft	HEAt	o 1.Sr	Stnd
Unit	°C	d.Unt	°Fo		H-C	o 1.nA	4-20
L-rG	00.00	In-b	0000	C-nd	PId	oUt2	CUrr
H-rG	10.00	nAu.F	000.1		P.P	o2.nA	4-20
dot	0.0	L-Su	-200	At.t	tUn1	H-t	020.0(Relay)
L-SC	000.0	H-Su	1350	oUt1	CUrr	C-t	002.0(SSR drive)

● Parameter 4 setting group [PAr 4]

Parameter	Factory default	Parameter	Factory default	Parameter	Factory default	Parameter	Factory default
AL-1	duCC	A2.n	no	LbA.t	0000	bPS	96
AL 1.t	AL-A	A2.on	0000	LbA.b	002	PrtY	nonE
A1.HY	001	A2.oF	0000	Ao.n1	Pu	StP	2
A1.n	no	AL-3	oFF	FS.L1	-200	rSYt	20
A1.on	0000	AL 3.t	AL-A	FS.H1	1350	ConY	En.A
A1.oF	0000	A3.HY	001	Ao.n2	Pu		
AL-2	JJdu	A3.n	no	FS.L2	-200		
AL 2.t	AL-A	A3.on	0000	FS.H2	1350		
A2.HY	001	A3.oF	0000	AdrS	01		

● Parameter 5 setting group [PAr 5]

Parameter	Factory default	Parameter	Factory default	Parameter	Factory default	Parameter	Factory default
nt.Su	1	Pr.nu	000.0	LC.Su	oFF	LC.PS	oFF
dI-t	StoP	Er.nu	000.0	LC.P1	oFF	PYd	0000
dI-1	oFF	St.nu	000.0	LC.P2	oFF		
dI-2	oFF	St.AL	Cont	LC.P3	oFF		
It.nu	AUto	USEr	Stnd	LC.P4	oFF		

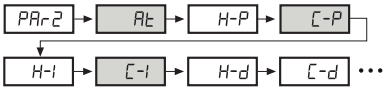
※ Shaded parameters are for the heating & cooling model.

▣ Functions

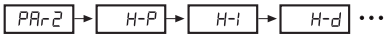
◎ Parameter mask(★)

- 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



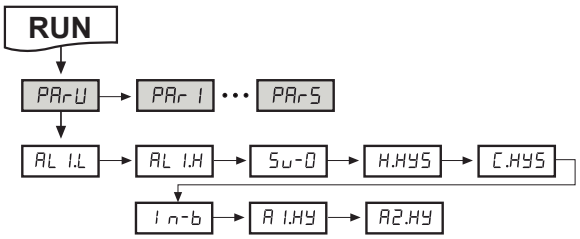
After applying mask



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

◎ User parameter group[PArU] setting(★)

- This function is able to set the frequently used parameters to the user parameter group. You can quickly and easily set parameter settings.
- User parameter group can have up to 30 parameters in the integrated device management program (DAQMaster). For more information, refer to the DAQMaster user manual.
- 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 1.L], alarm output 1 high-limit value [AL 1.H], SV-0 set value [Su-0] parameter of parameter 1 group, heating hysteresis[H.HYS], cooling hysteresis [C.HYS] parameters of parameter 2 group, input correction [In-b] parameter of parameter 3 group, alarm output 1 hysteresis [A 1.HY], alarm output 2 hysteresis [A2.HY] parameters of parameter 4 group.

◎ Auto tuning[At]

In PID control, auto-tuning determines 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.

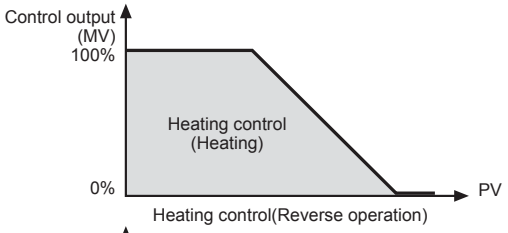
Setting value	Descriptions
oFF	Auto tuning end
on	Auto tuning run

Setting group	Parameter	Set range	Factory default	Unit
PAr2	At	oFF/on	oFF	-

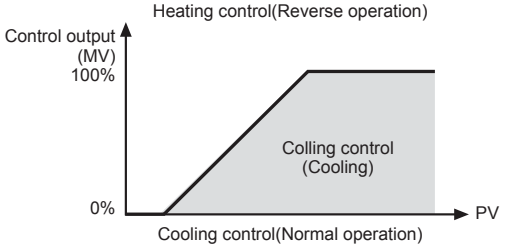
※Manual interruption or a sensor disconnection error when auto-tuning is in progress restores the PID time constant to the value used prior to the auto-tuning session.
※Auto-tuning continues to run even if the temperature reading exceeds or falls below the input range.
※When auto-turning is in progress, parameters can only be referenced and not altered.
※Auto-tuning is not available in manual control.

◎ Control output operation mode[o-Ft]

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



Heating control(Reverse operation)



Cooling control(Normal operation)

Setting group	Parameter	Set range	Factory default	Unit
PAr3	o-Ft	Standard model HEAt/CooL	HEAt	-
		Heating & Cooling model HEAt/CooL/H-C	H-C	-

◎ Heating control[HEAt]

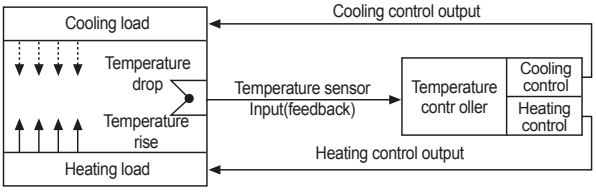
Heating control mode: the output will be provided in order to supply power to the load (heater) if PV (Present Value) falls below SV (Setting Value).

◎ Cooling control[CooL]

Cooling control mode: the output will be provided in order to supply power to the load (cooler) if PV (Present Value) rises above SV (Setting Value).

◎ Heating and cooling control[H-5C]

Heating and cooling control mode: 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.

◎ Control output (OUT1/OUT2) selection [oUt1/oUt2]

●In case of selecting the Models with current control output, both current and SSR outputs are available. You can therefore choose the right output type depending on application environments.
●OUT1 : Selects OUT1 control output.
●OUT2 : Selects OUT2 control output.

Setting group	Parameter	Set range	Factory default	Unit
PAr3	oUt1 oUt2	SSr/CUrr	SSr	-

◎ For more information, refer to the user manual.

▣ Proper usage

◎ Simple "error" diagnosis

●In case, the load (Heater etc) is not operated, please check operation of the out lamp located in front panel of the unit. If lamp does not operate, please check the parameter of all programmed mode. If lamp is operating, please check the output (Relay, Driving voltage of SSR, DC4-20mA current) after separating output line from the unit.
●When it displays "oPEn during operation.
This is a warning that external sensor is cut off. Please turn off power and check the state of sensor.
If sensor is not cut off, 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. 2kV) flows in the unit, it can be damaged.

◎ Caution for using

1. Please use separated line from high voltage line or power line in order to avoid inductive noise.
2. Please install power switch or circuit-breaker in order to cut power supply off.
3. The switch or circuit-breaker should be installed near by users.
4. This unit is designed for temperature controlling only. Do not apply this unit as a voltage meter or a current meter.
5. In case of using RTD sensor, 3-wire type must be used. If you need to extend the line, 3-wires must be used with the same thickness as the line. It might cause temperature difference if the resistance of line is different.
6. In case of making power line and input signal line close, line filter for noise protection should be installed at power line and input signal line should be shielded.
7. Keep away from the high frequency instruments.(High frequency welding machine & sewing machine, big capacitive SCR controller)
8. Installation environment
   ①It shall be used indoor
   ②Altitude Max. 2000m
   ③Pollution Degree 2
   ④Installation CategoryII.