

Instruction Manual

UT37/UT38 Digital Indicating Controller Initial Setting Manual

IM 5B4B7-02E

UT37/UT38

Digital Indicating Controller

Initial Setting Manual

CONTENTS

1. HANDLING PRECAUTIONS	2
1.1 Confirmation of Specifications and Accessories	3
1.2 Structure and Function	4
1.3 Confirmation of Measurement Input Range Code and Control Output Type Code	5
1.4 Before Beginning Operation	6
2. HOW TO CHANGE INPUT/OUTPUT TYPE	7
2.1 How to Change the Input Range Code	8
2.2 How to Change the Control Output Type Code (only for UT37)	10
3. VARIOUS SETTING AND MODE SELECTION USING DIP SWITCH	11
3.1 Setting of Control Output Value for Abnormality	11
3.2 Setting of Secondary Setpoint (2.SP)	11
3.3 Selection of Operation/Setup Parameter Setting Mode	12
4. MOUNTING	13
4.1 Mounting Location	13
4.2 Installation Procedure	13
4.3 External Dimensions and Panel Cut Dimensions	14
5. WIRING	16
5.1 How to Wire	16
5.2 Cautions	17
5.3 Terminal Wiring Diagram	18
6. FRONT PANEL DISPLAY PANELS AND CONTROL KEYS	22
7. KEY OPERATION	24
8. OPERATION PARAMETERS	26
8.1 Operation Parameter Setting Flow	26
8.2 Operation Parameter List	28
8.3 Description of Operation Parameters	32
9. SETUP PARAMETERS	42
9.1 Setup Parameter Setting Flow	42
9.2 Setup Parameter List	44
9.3 Description of Setup Parameters	49
9.3.1 Parameters for Key Lock	49
9.3.2 Parameters for Measured Input	50
9.3.3 Parameters for Remote Setting Input	51
9.3.4 Parameters for Target Setpoint (SP)	51
9.3.5 Control Parameters	54
9.3.6 Parameters for Retransmission Output and Alarm	58
9.3.7 Valve Calibration Parameters (Only for UT38)	61
10. OTHER FUNCTIONS	62
10.1 Coordinated Operation	62
10.2 Transmitter Loop Power Supply	63
11. STANDARD SPECIFICATIONS	64

1. HANDLING PRECAUTIONS

The controller comes with two instruction manuals for your reference: This Initial Setting Manual and the separate Operation Manual.

Please keep this manual in your convenient location.

● Regarding Force Majeure

Yokogawa Electric Corporation assumes no liability to any party for any loss or damage, direct or indirect, caused by the use or any unpredictable defect of the product.

Initial Setting Manual

- ◎ Handling Precautions
- ◎ How to change input/output type
- ◎ Mounting
- ◎ Wiring
- ◎ Front panel displays and control keys
- ◎ Parameter lists and description
- ◎ Cooperated operation (General)
- ◎ Specifications

Operation Manual

- ◎ Cautions
- ◎ Key operation
 - Setting Setpoint
 - Setting operation parameters
 - Alarm values
 - PID constants and others.
 - Operation
 - Run/Stop
 - Mode selection and others
- ◎ Maintenance and Counter-measures against abnormality

History

1995 Jan.	IM 5B4B7-02E	New Publication
1995 Oct.	IM 5B4B7-02E	2nd Revision

■ Documentation Conventions

The symbolic conventions below are used in this manual.

⚠ WARNING: This marking on the product indicates that the operator must exercise special care to avoid electric shock or other dangers that may result in injury or the loss of life.

⚠ CAUTION: This marking on the product indicates that the operation must refer to an explanation in the instruction manual in order to avoid damage to the instrument.

1.1 Confirmation of Specifications and Accessories

Confirm that the delivered controller has the same model and suffix codes specified in ordering.

Model and Codes

Model	Suffix Code	Description
UT37	Digital Indicating Controller (Continuous/Time-Proportional PID Output Type)
UT38	Digital Indicating Controller (Position-Proportional PID Output Type)
Optional codes	/RET	Retransmission Output Signal (4 to 20 mA DC)
	/RSP	Remote Setting Input
	/RS422	RS-422A Communication Interface
	/LPS	Transmitter Loop Power Supply
	/ALM4	Alarm Output 4

Confirm that the following items are all properly included.

- UT37 or UT38 controller 1
- Bracket (for mounting) 2
- Unit label 1
- Instruction Manual: Initial Setting Manual 1
- Instruction Manual: Operation Manual 1
- Instruction Manual: Communication Manual 1*

*This item is included only when the optional code /RS422 is specified.

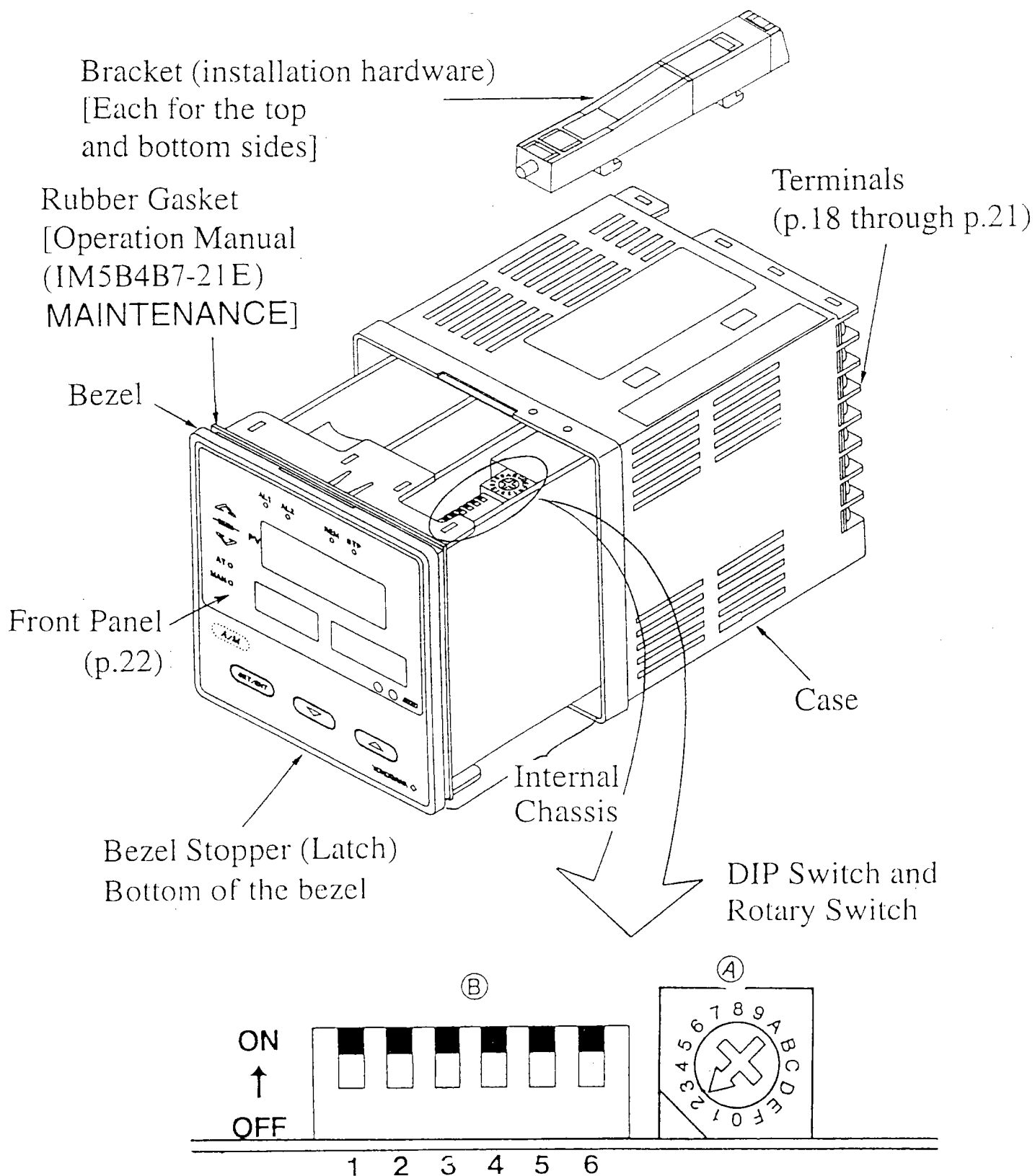
UT37 and UT38 have a better input accuracy and additional functions from the manufacturing of the beginning of February 1995. The manufacturer add the letter "E" to the model name on the front panel, in order to distinguish from the former product.

Because there are some differences in suffix codes and parameters between old and new products, please take care when you replace the product.

(For differences in parameters, refer to pages 28 to 31 and 44 to 47.)

1.2 Structure and Function

- UT37 or UT38 is made up as the below.



1.3 Confirmation of Input Range Code and Control Output Type

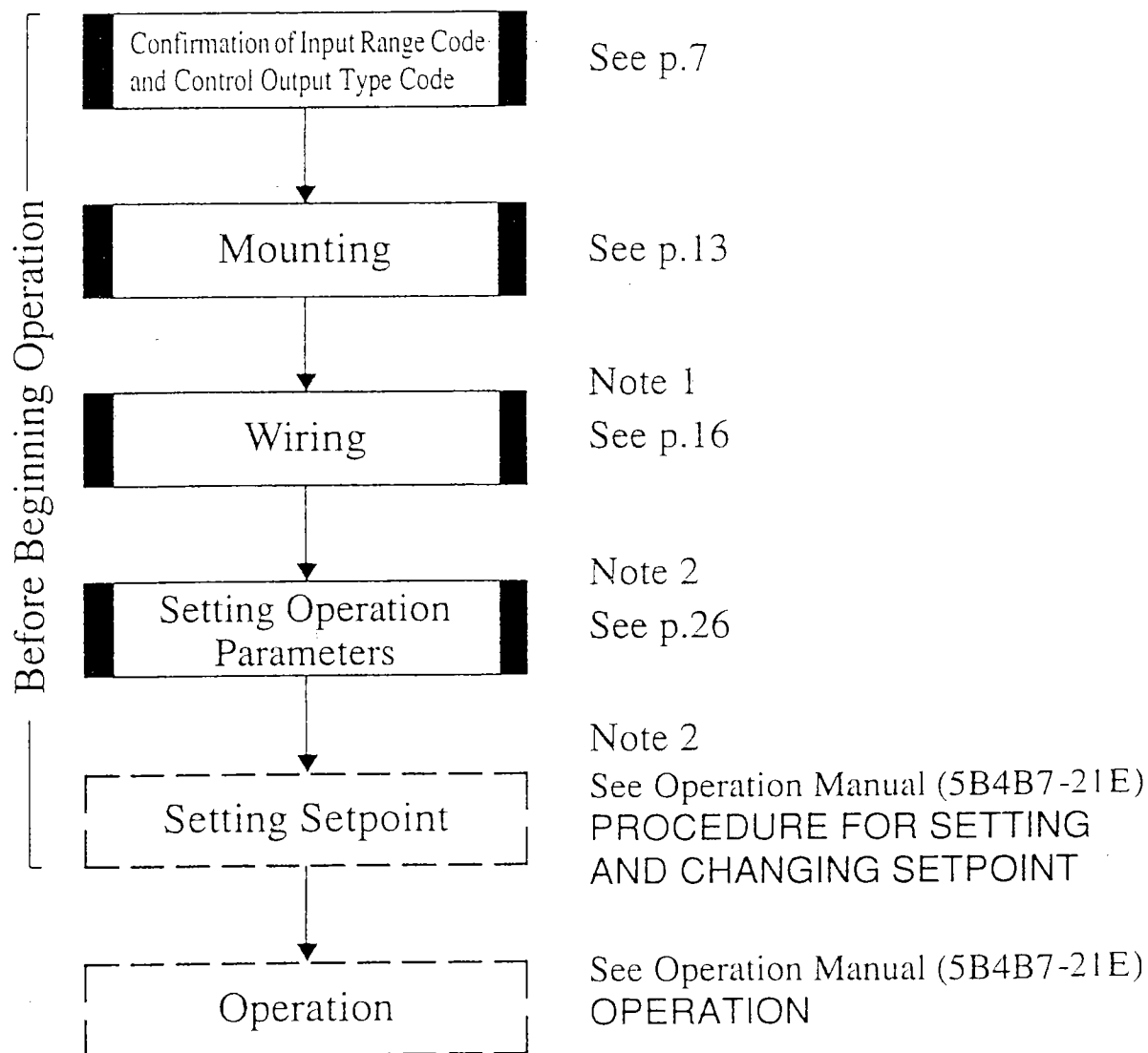
- Unless otherwise specified, UT37/UT38 is shipped from the factory with the following input range code and control output type set.

	Input range code	Control Output type
UT37	0 (TC: Type K, –200 to 1200°C) DIP switch No.1: ON	(Time-proportional PID/relay output) DIP switch No.5:ON,No.6:ON
UT38	0 (TC: Type K, –200 to 1200°C) DIP switch No.1: ON	Position-proportional PID output (No change of type is allowed.)

- The controller is also shipped from the factory with the control action set to reverse action.
- If any input/output type change is required for operation, see “2. How to Change Input/Output Type.”

1.4 Before Beginning Operation

Prepare for use according to the flow chart below.



Note 1: This instrument itself has no power switch. It will begin to operate and generate a control output as soon as power is supplied to it. We recommend that the device to be controlled not be connected until immediately before operation is to begin.

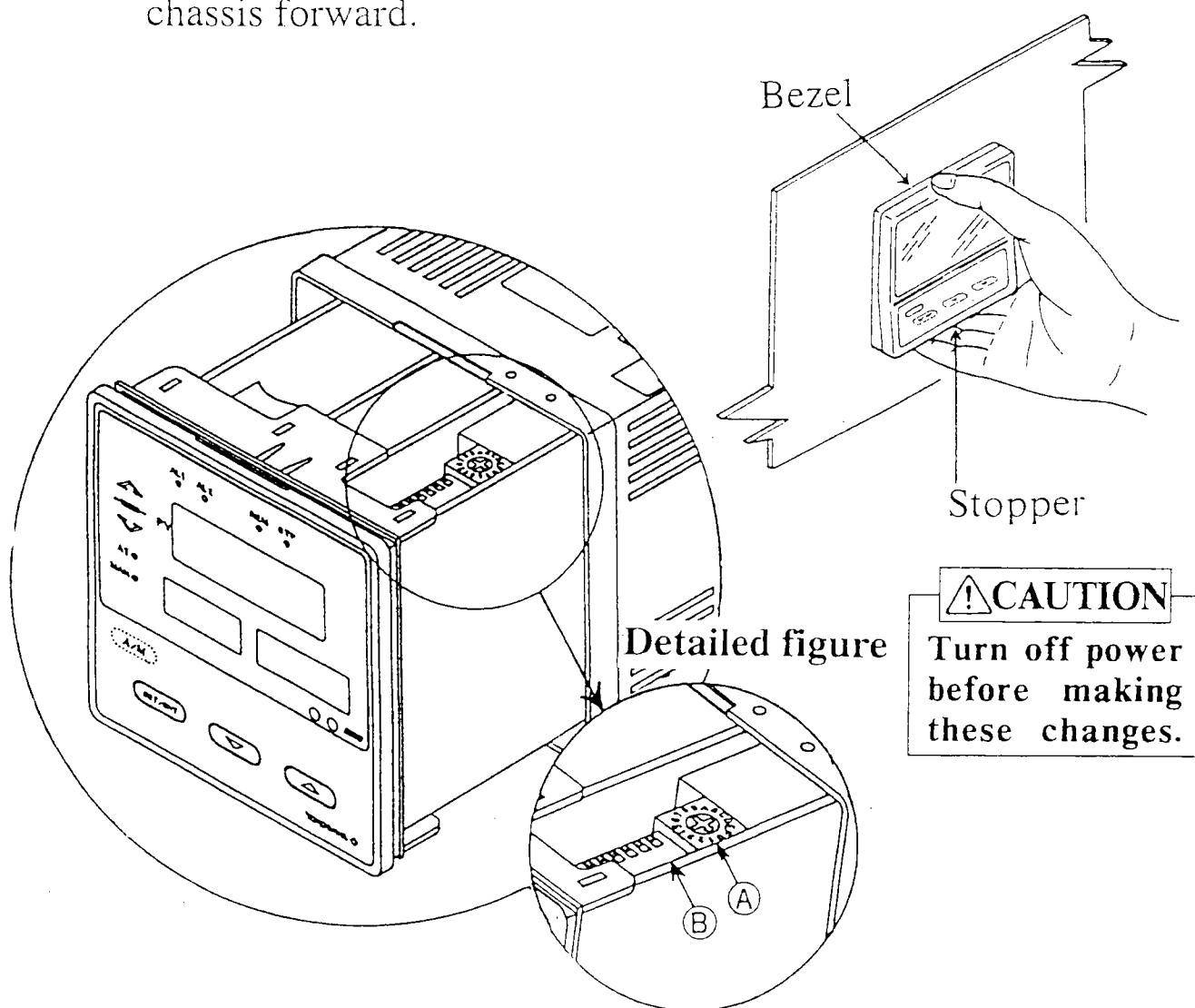
Note 2: The parameters and setpoint (SP) for this instrument will be set when shipped from the factory as described in Operation Parameter List.

2. HOW TO CHANGE INPUT/OUTPUT TYPE

In the UT37/UT38, the measurement input range code and the control output type code can be changed using a switch provided in the internal assembly.

Draw out the internal chassis, following the procedure described below:

- ① Turn OFF UT37/UT38 power.
- ② Pressing the stopper at the bezel bottom, pull the internal chassis forward.

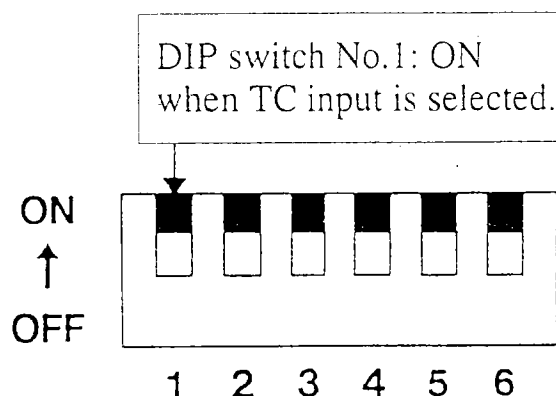


Note: After changing is completed, insert the chassis into the case and then turn ON power.

2.1 How to Change the Input Range Code

Change the input range code using the DIP switch ② and rotary switch ① (p.7)

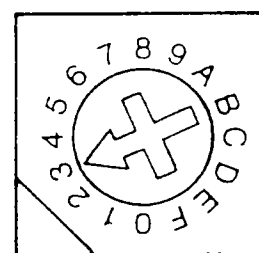
Use a jeweler's screwdriver (precision screwdriver) to set the arrow mark on the rotary switch ① to the desired input range code No. (Unless otherwise specified, the input range code is preset to "TC: Type K, -200 to 1200°C" on shipment.)



To select the thermocouple (TC) input type, set No.1 DIP switch to ON.

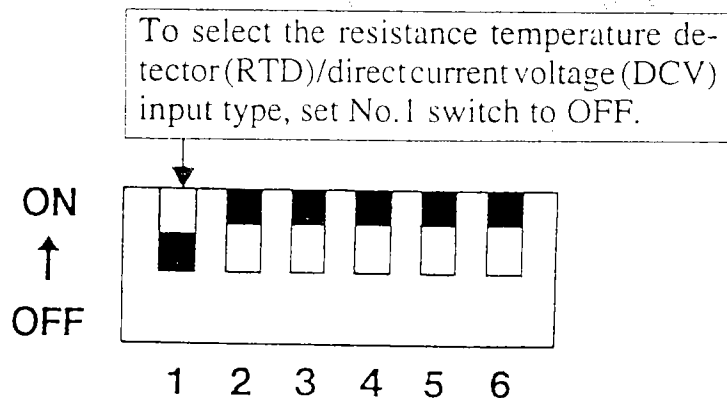
Table 1. Thermocouple Input Range Code*

TC Type	Instrument range		DIP Switch No.1	Input Range Code (Note 1)
K	-200~1200°C	-300~2300°F	ON	0
K	-199.9~999.9°C	0~2300°F		1
K	-199.9~500.0°C	-199.9~999.9°F		2
J	-199.9~800.0°C	-300~1500°F		3
T	-199.9~400.0°C	-199.9~750.0°F		4
T	0.0~400.0°C	-300~750°F		5
T	-199.9~200.0°C	-199.9~400.0°F		6
B	0~1800°C	32~3300°F		7
S	0~1700°C	32~3100°F		8
R	0~1700°C	32~3100°F		9
N	0~1300°C	32~2400°F		A
W	0~2300°C	32~4200°F		B
E	-199.9~800.0°C	-300~1500°F		C
L	-199.9~800.0°C	-300~1500°F		D
U	-199.9~400.0°C	-300~750°F		E
U	0.0~400.0°C	-199.9~750.0°F		F



Note 1:

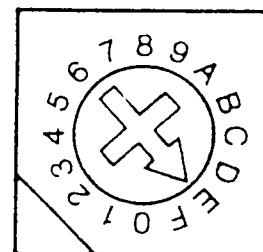
Set the arrow mark on the rotary switch ① to the desired input range code No. (In the above illustration, Type J thermocouple is selected.)



To select RTD/DCV input type, set Dip switch No.1 to OFF.

Table 2. RTD/DCV Input Range Code*

RTD/ DCV Type	Instrument range		DIP Switch No.1	Input Range Code (Note 2)
JPt100	-199.9~500.0°C	-199.9~999.9°F	OFF	0
	0.0~200.0°C	32.0~400.0°F		1
	0.0~100.0°C	32.0~200.0°F		2
	-100.0~100.0°C	-199.9~200.0°F		3
Pt100	-199.9~640.0°C	-300~ 1180°F		4
	-199.9~500.0°C	-199.9~999.9°F		5
	0.0~200.0°C	32.0~400.0°F		6
	0.0~100.0°C	32.0~200.0°F		7
	-100.0~100.0°C	-199.9~200.0°F		8
-10~10mV	Scaling available in the following four ranges.** -1999 ~ 9999 -199.9 ~ 999.9 -19.99 ~ 99.99 -1.999 ~ 9.999 (Decimal point position can be changed.)			9
0~10mV				A
0~100mV				B
0~1V				C
0~5V				D
1~5V				E
0~10V				F



Note 2:

Set the arrow mark on the rotary switch (A) to the desired input range code No. (In the above illustration, "DC voltage: 1 to 5V" is selected.)

Note: After changing is completed, insert the chassis into the case and then turn ON power.

Set to °C or °F the engineering unit by the parameter: UNI (Setup parameter for measured input)

* : The measuring accuracy for thermocouple, RTD, or DC voltage inputs varies with their ranges. (See measuring accuracy in the general specifications, GS 5B4B7-02E, or GS 5B4B8-02E.)

** : Scaling can be done using the PD (decimal point position), RH, and RL setup parameters. For details, see the description in Section 9.3.2, "Parameters for Measured Input."

2.2 How to Change the Control Output Type Code (Only for UT37)

To set the control output type, turn ON or OFF DIP switch No.5 and No.6 (Unless otherwise specified, the control output type is preset to "Time-proportional PID (relay) output" on shipment.)

Control output type	Specifications	DIP switch
Time-proportional PID (relay) output (Note 1)	Contact rating: 250V AC, 3A (resistive load) Cycle time: 1 to 240 sec (selectable)	
Time-proportional PID (voltage pulse) output	ON voltage: Approx. 12V DC or more OFF voltage: 0.1V DC or less (load resistance: 600Ω or more) Cycle time: 1 to 240 sec (selectable)	
Continuous PID output	Output current: 4 to 20mA DC (Load resistance: 600Ω or less) Accuracy: $\pm 0.3\%$ (of output span) Output update period: 200ms	
ON/OFF relay output (Note 1)	Contact rating: 250V AC, 3A (resistive load) Output update period: 200ms	

Note 1: If the control output relay deteriorates it should be replaced.

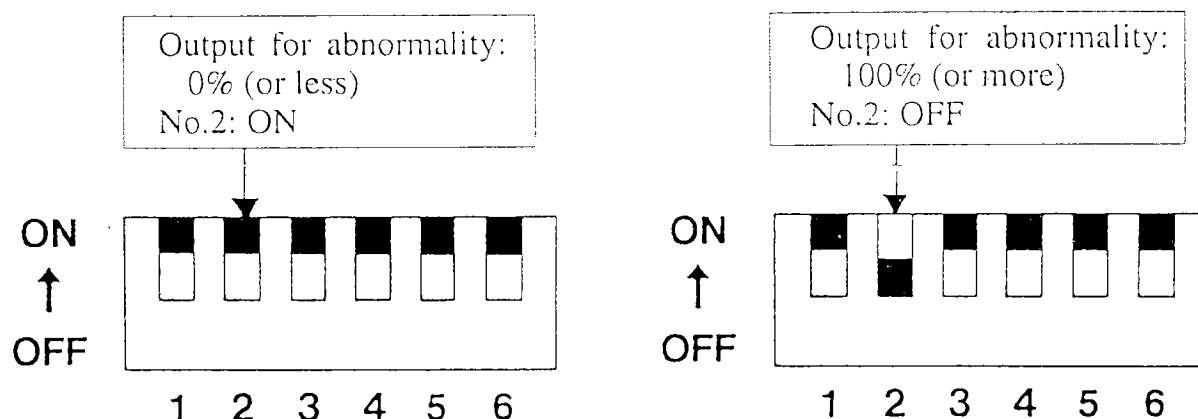
The UT37 and UT38 use DSP1-DC12V relays (Matsushita Electric). They may be ordered from your YOKOGAWA SALES REPRESENTATIVE or MATSUSHITA ELECTRIC OFFICES.

3. VARIOUS SETTING AND MODE SELECTION USING DIP SWITCH

The DIP switch is provided on the internal chassis. (For how to draw out the assembly, see p.7. All DIP switch are preset to ON on shipment.)

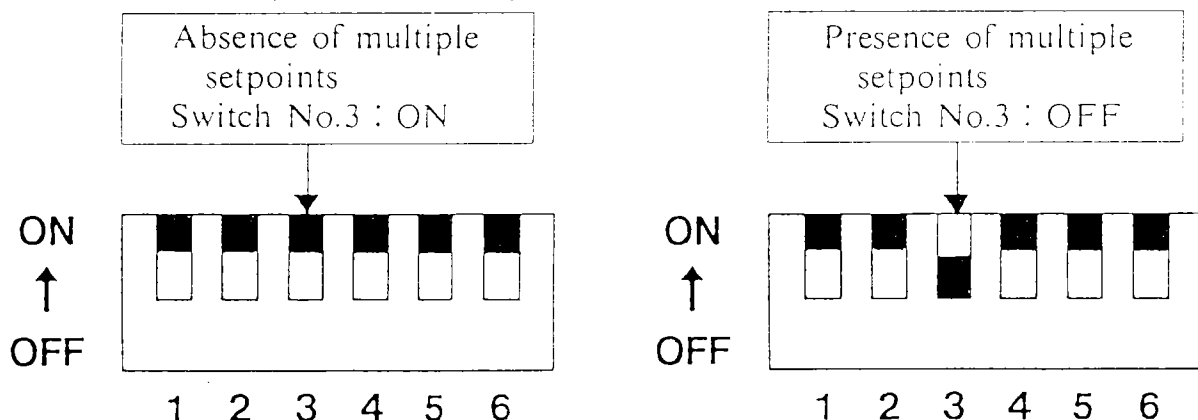
3.1 Setting of Control Output Value for Abnormality (Refer to IM5B4B7-20E, chapter 7)

To set the output value for abnormality to 0% (or less) or 100% (or more), turn ON or OFF DIP switch No.2.



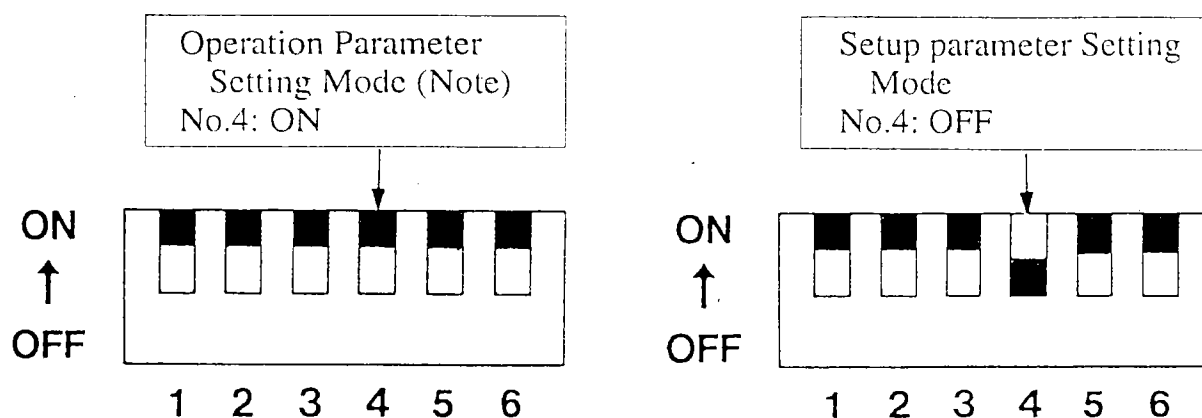
3.2 Setting of Existence of Multiple Setpoints (2.SP, 3.SP, and 4.SP)

The user can select the presence or absence of multiple setpoints by setting DIP switch No.3 ON or OFF. (If "presence of multiple setpoints*" is selected, the system adds setup parameters exclusively for setpoints 2.SP. to 4.SP. See page 26 for details.) * See Setup Parameter (DI Selection)



3.3 Selection of Operation/Setup Parameter Setting Mode

To select the operation parameter setting mode, turn ON DIP switch No.4. To select the setup parameter setting mode, turn OFF DIP switch No.4.



Note: To call up the selected operation parameter setting mode, press the **(SET/ENT)** key for three sec or more on the operation display panel. (See p.24)

4. MOUNTING

4.1 Mounting Location

To mount the controller, select a location as described below, where:

- (1) There is no mechanical vibration.
- (2) No corrosive gases are present.
- (3) Temperature is near the room temperature (23°C) and of low variation.
- (4) The controller is not subject to strong direct radiant heat.
- (5) The controller is not affected by electromagnetic fields.
- (6) The controller is not exposed to water splash or rain fall.

4.2 Installation Procedure

- (1) Insert this controller into the panel cutout from the front of the panel.
- (2) Mount the controller to the panel using the attached mounting brackets. When mounting, never fasten the brackets too tightly.



CAUTION

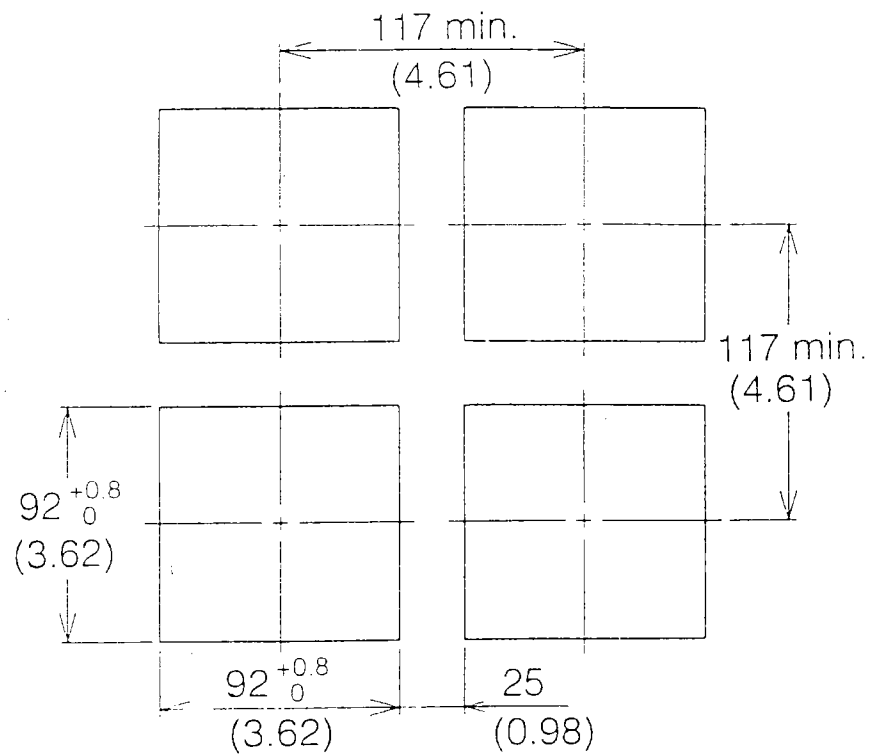
CAUTION: WHEN MOUNTING ON OR OVER A COMBUSTIBLE SURFACE, A PLATE OF AT LEAST 1.43mm GALVANIZED OR 1.6mm UNCOATED STEEL EXTENDED AT LEAST 150mm BEYOND THE EQUIPMENT ON ALL SIDES MUST BE INSTALLED

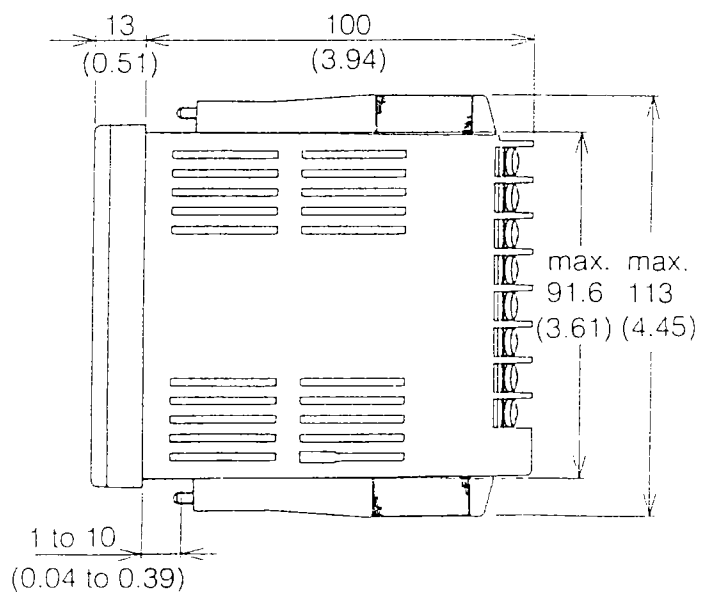
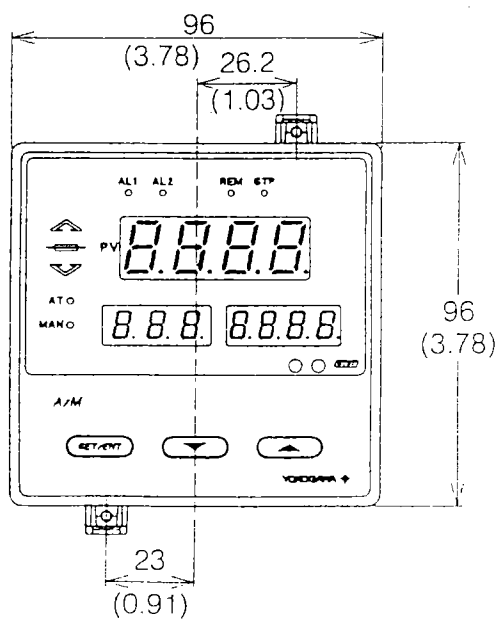
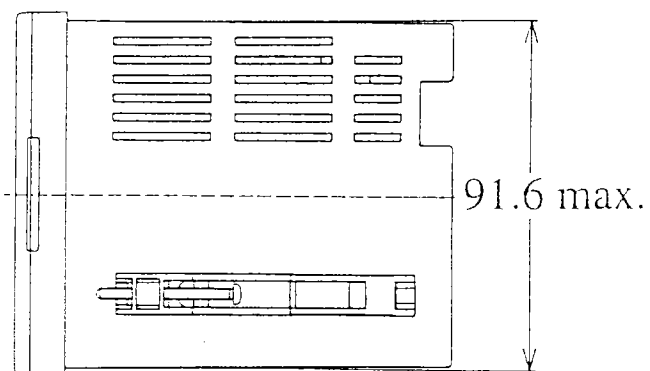
and

AVERTISSEMENT: LORSQUE L'APPAREIL EST INSTALLÉ SUR OU AU-DESSUS D'UNE SURFACE COMBUSTIBLE, ON DOIT PRÉVOIR UNE PLAQUE D'ACIER GALVANISÉ D'AU MOINS 1.43mm OU UNE PLAQUE D'ACIER SANS REVÊTEMENT DE 1.6mm SE PROLONGEANT SUR AU MOINS 150mm TOUT AUTOUR DE L'APPAREIL.

4.3 External Dimensions and Panel Cut Dimensions (Unit: mm)

(Common to both UT37 and UT38.)





5. WIRING

5.1 How to Wire

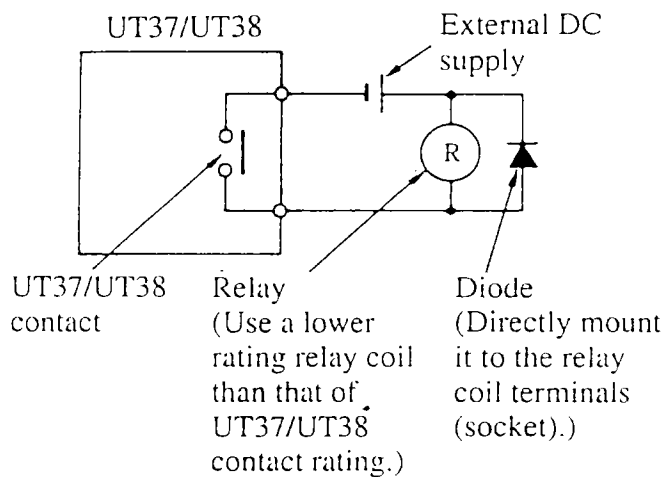
Referring to "5.3 Terminal Wiring Diagram," make wiring connection according to the following descriptions.

- (1) For thermocouple inputs, use the proper compensation leadwires.
- (2) For RTD (Resistance Temperature Detector) inputs, use three wires each of which have low resistance and all of which have equal wire resistance.
- (3) For power supply wiring, use leadwires or cables which have performance characteristics equivalent to, or better than, 600V grade polyvinyl chloride insulated wires (JIS C3307). if necessary, insert a noise filter into the power supply circuit.
- (4) Perform grounding with a thick wire whose cross section is 2 mm² or more, so that the grounding resistance is 100Ω or less.
- (5) Correctly install input circuit wiring so as not to induce noise.
 - (a) Install input circuit wiring, keeping the circuits away from the power circuits and ground circuits.
 - (b) For noise due to static induction, use of shielded wire is recommended. Connect the shield wire to the earth terminal of the controller UT37/UT38 as necessary. (Be careful not to create two-point grounding as a result.)
- (6) When connecting wires to each terminal, it is recommended to use a crimping terminal lug with an insulating sleeve (for ISO 3.5 mm screws.)

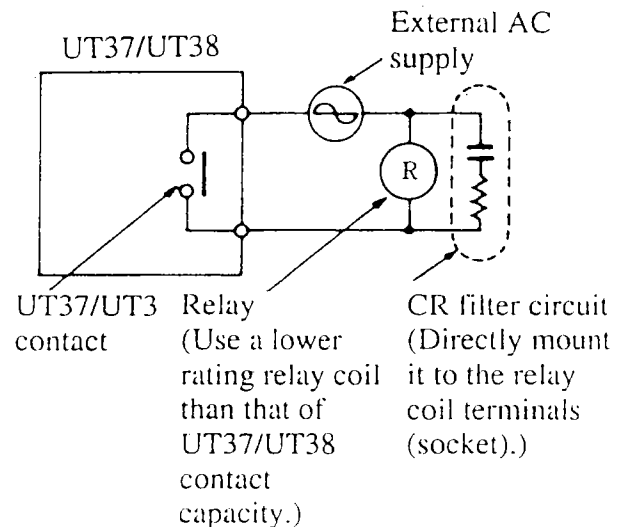
5.2 Cautions

- (1) No fuse or power switch is provided for the controller. If necessary, provide them outside the controller.
Use a time lag fuse of 250V, at a rated current of 1A.
- (2) When a relay contact output exceeds the contact capacity (250V AC, 3A, resistive load for control output and 250V AC, 1A, resistive load for the alarm outputs), use an auxiliary relay for turning ON/OFF the load.
- (3) If an inductive load such as an auxiliary relay is used for the relay contact output circuit, connect a CR network (for AC) or a diode (for DC) in parallel, as a surge suppressor circuit for spark elimination.

● For DC Relay:



● For AC relay:

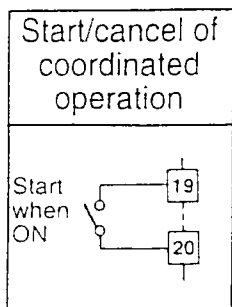
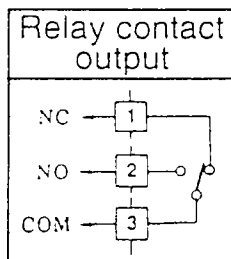


5.3 Terminal Wiring Diagram

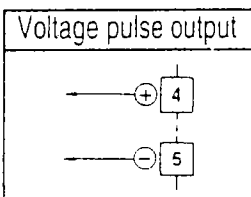
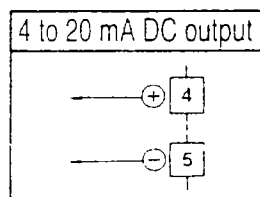
UT37

(With /RS422 specified)

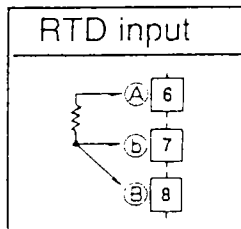
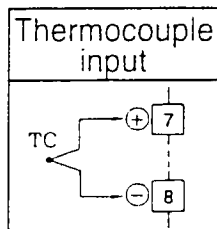
Control output relay
Contact rating:
250 V AC, 3 A
(resistive load)



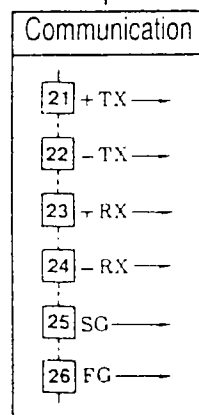
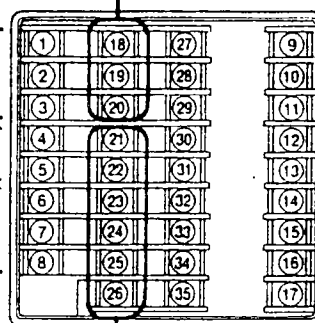
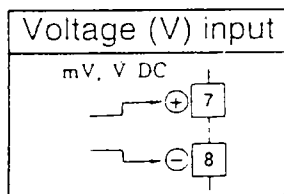
<Control output>



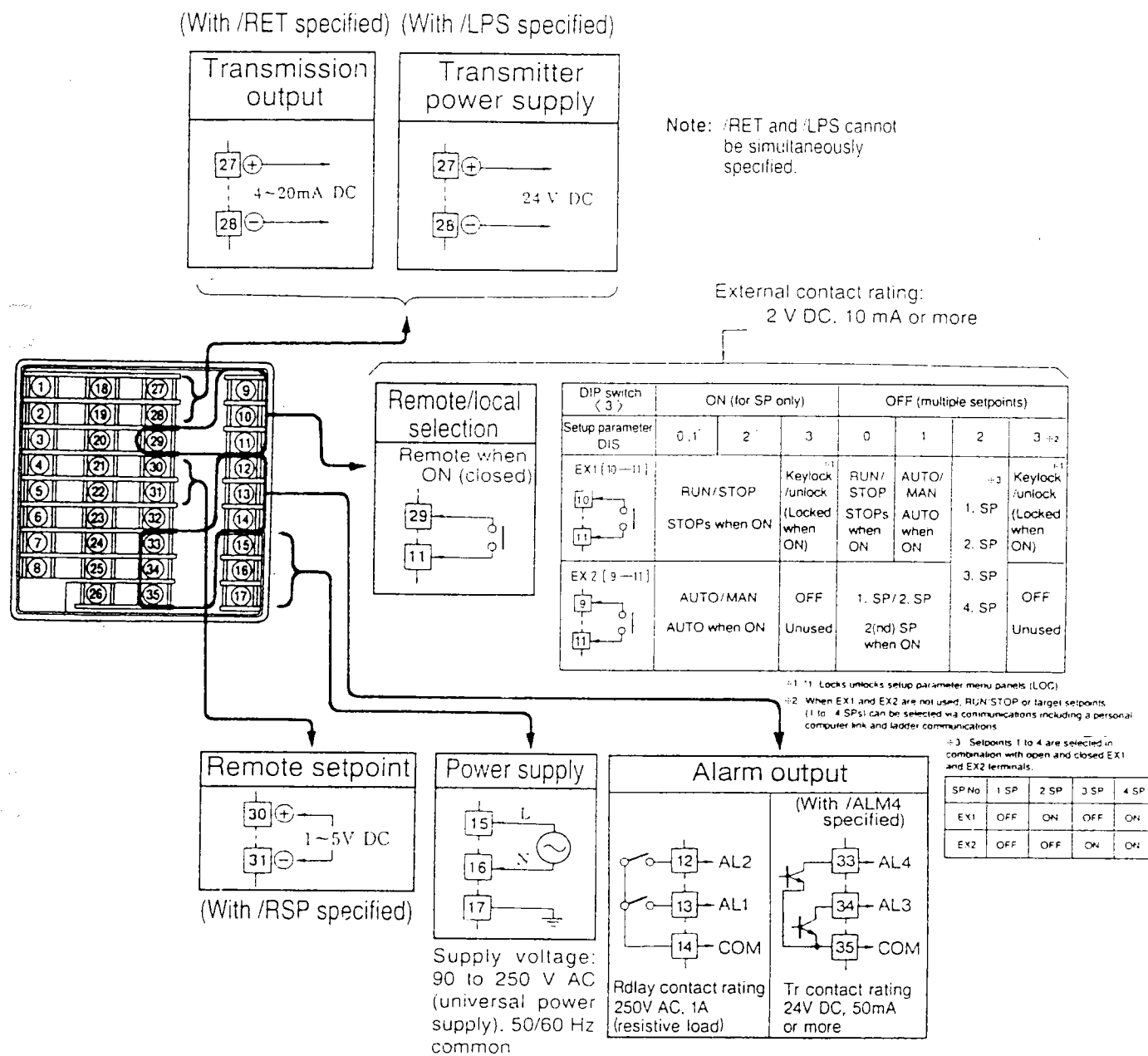
Note: UT37 allows flexible change of control output/measured input type: connect terminals meeting the desired input and output types.



<Measured input>

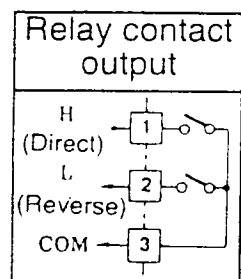


(With /RS-422 specified)

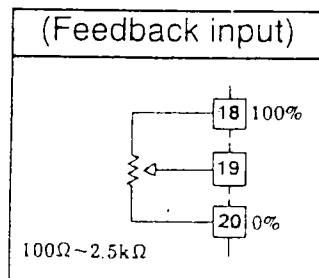


UT38

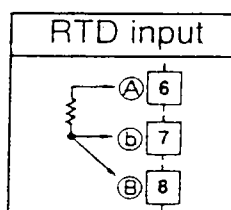
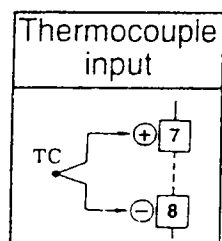
<Control output>



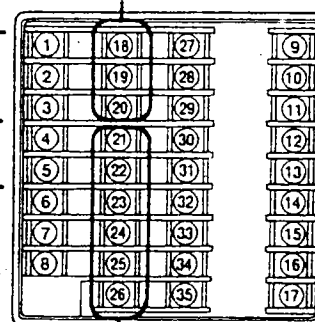
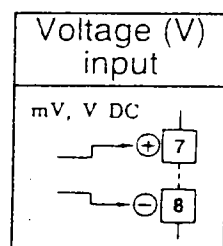
Relay contact rating:
250 V AC.
3 A (resistive load)



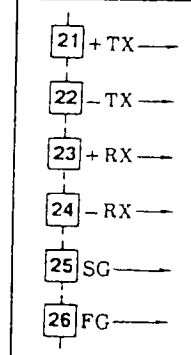
Note: UT37/38 allows flexible change of measured input type; connect terminals meeting the desired input type.



<Measured input>

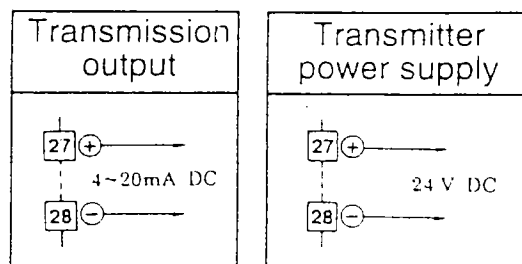


Communication



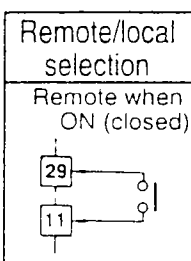
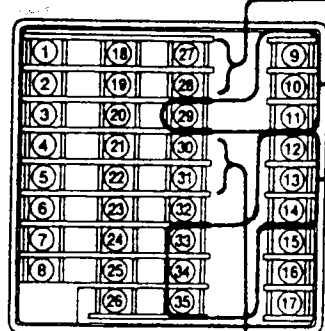
(With /RS-422 specified)

(With /RET specified) (With /LPS specified)



Note: /RET and /LPS cannot be simultaneously specified.

External contact rating:
 2 V DC, 10 mA or more

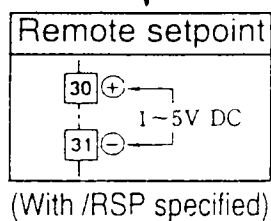


DIP switch { 3 }	ON (for SP only)			OFF (multiple setpoints)			
Setup parameter DIS	0, 1	2	3	0	1	2	3 + 2
EX1 { 10~11 }	RUN/STOP STOPs when ON		Keylock runlock (Locked when ON)	RUN/ STOP STOPs when ON	AUTO/ MAN AUTO when ON	1. SP 2. SP	Keylock runlock (Locked when ON)
EX2 { 9~11 }	AUTO/MAN AUTO when ON		OFF Unused	1. SP/2. SP 2(nd) SP when ON		3. SP 4. SP	OFF Unused

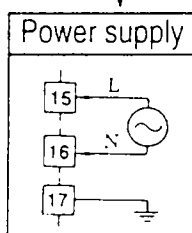
※1 Locks/unlocks setup parameter menu panes (LOC)

※2 When EX1 and EX2 are not used, RUN/STOP or target setpoints (1 to 4 SPs) can be selected via communications including a personal computer link and ladder communications.

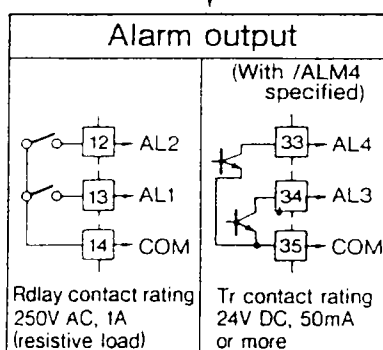
※3 Setpoints 1 to 4 are selected in combination with open and closed EX1 and EX2 terminals



(With /RSP specified)



Supply voltage:
 90 to 250 V AC
 (universal power supply), 50/60 Hz
 common



Relay contact rating
 250V AC, 1A
 (resistive load)

Tr contact rating
 24V DC, 50mA
 or more

SP No	1 SP	2 SP	3 SP	4 SP
EX1	OFF	ON	OFF	ON
EX2	OFF	OFF	ON	ON

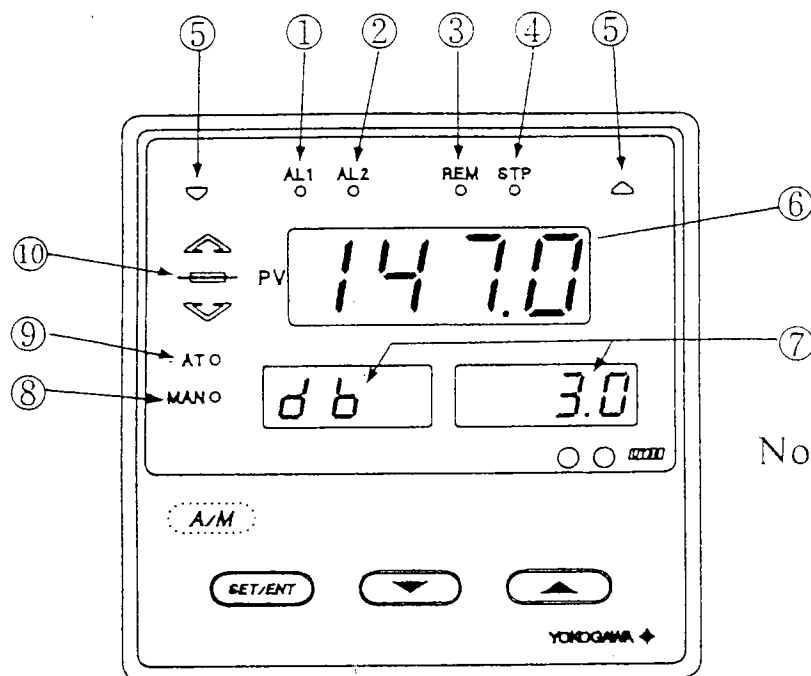


WARNING

To avoid electric shock, never touch the power supply terminals, control output terminals, and alarm output terminals when the power is on.








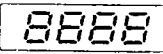

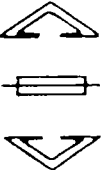



Carry out protective grounding to avoid electric shock.

6. FRONT PANEL DISPLAY PANELS AND CONTROL KEYS

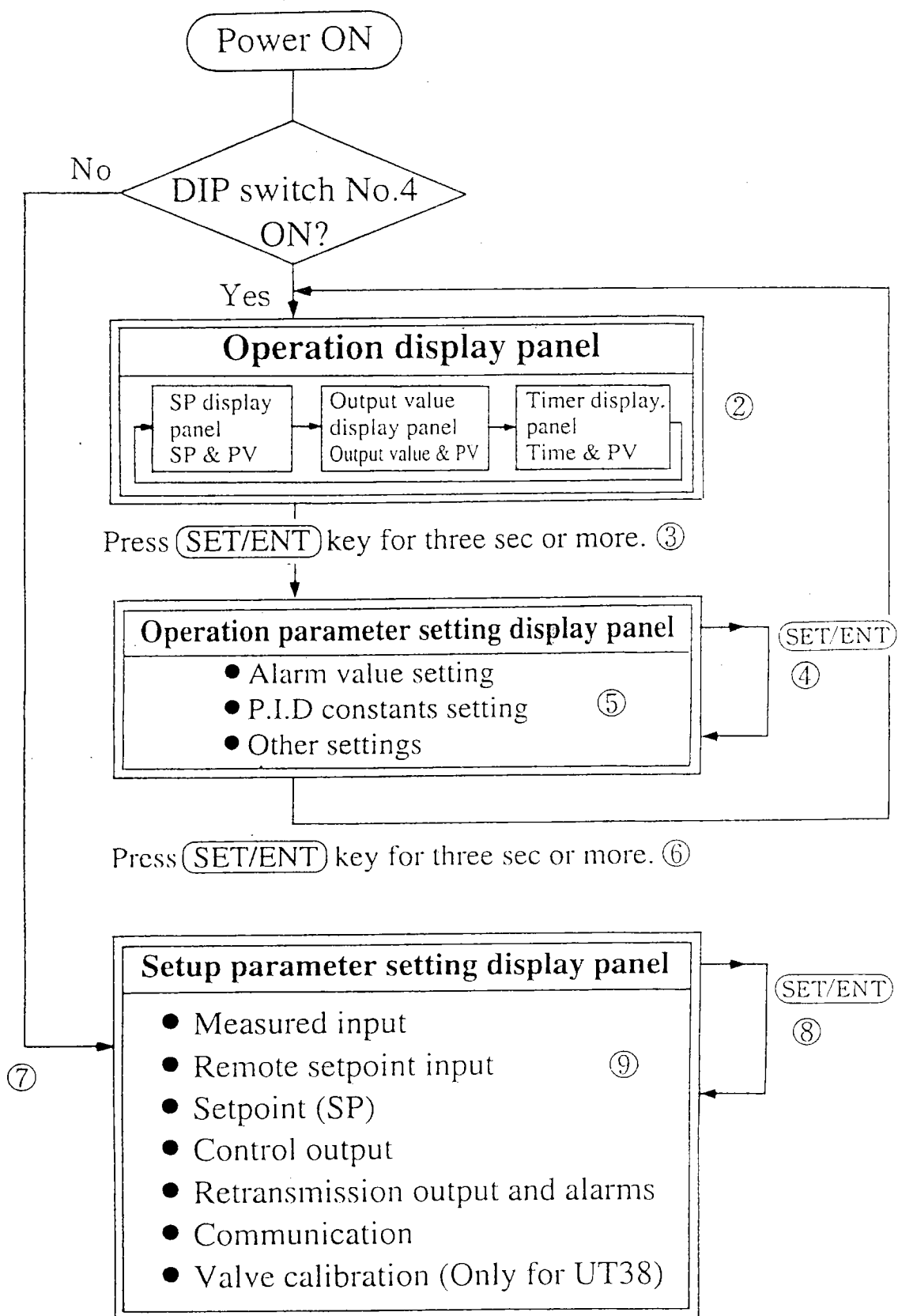


Note: No indicator lamps are provided for alarms 3 and 4. (when model with suffix code /ALM4 is specified)

Key	Function
SET/ENT	<ul style="list-style-type: none"> Transfers each operation display panel (when pressed within three sec). Alternatively transfers the operation display panel to the operation setting display panel and vice versa (when pressed for three sec or more). Calls up each parameter setting display panel. Registers numeric values.
<div>▼</div> <div>▲</div>	<p>Changes displayed numeric values of target setpoint, parameter, and output value (in the manual operation mode). ▼ (down) key for decrement and ▲ (up) key for increment. These keys change the numerical value by one every time pressed, but when held down change with increasing speed.</p>
A/M	Used for selecting AUTO (automatic) or MAN (manual) operation.

No.	Display	Function
①	AL1  (Alarm 1 lamp)	Lights when alarm 1 is activated.
②	AL2  (Alarm 2 lamp)	Lights when alarm 2 is activated.
③	REM  (Remote mode indicating lamp)	Lights in REM (remote setting) mode. [Extinguishes in LOCAL (local setting) mode.]
④	STP  (Stop mode indicating lamp)	Lights in STP (operation stop) mode. [Extinguishes in RUN (operation) mode.]
⑤	 (Output monitor)	Functions only for UT38.  lights for L side output and  for H side output.
⑥	 (PV display)	Displays measured value (PV).
⑦	 (Setpoint and parameter display)	Displays the setpoint (SP) and various parameters.
⑧	MAN ○ (Manual mode execution display lamp)	Lights in MAN (manual operation) mode. [Extinguishes in AUTO (automatic operation) mode.]
⑨	AT ○ (Auto-Tuning execution display lamp)	Flashes during auto-tuning.
⑩	 (Deviation monitor)	When deviation (PV - SP) is within $\pm 1.0\%$ of full scale (F.S.),  (green) lights. If it is over $+1.0\%$ of F.S.,  (orange) lights. If it is under -1.0% of F.S.,  (orange) lights. The DVB (width of the deviation value) can be changed. These are displayed only on operation display panel.

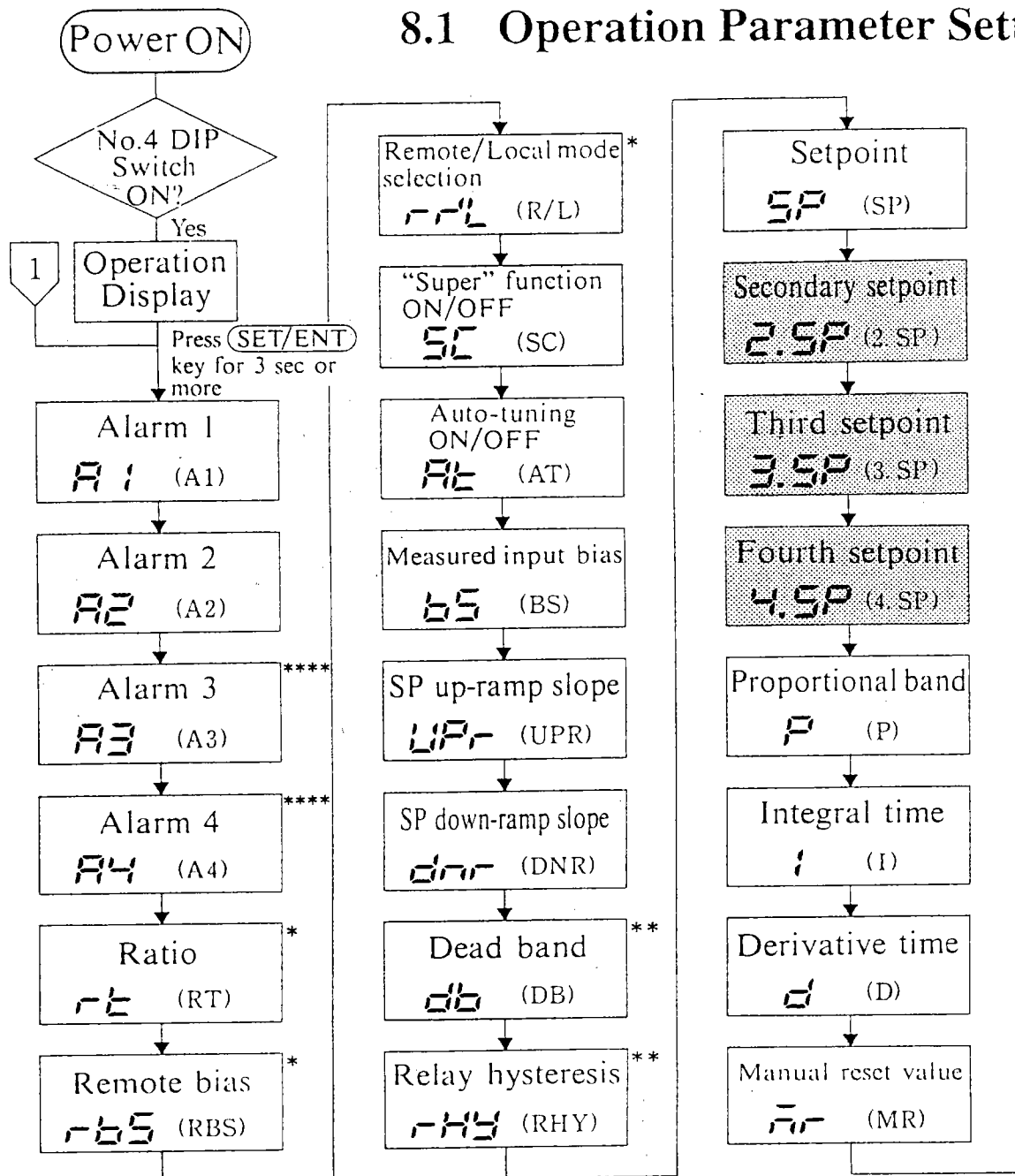
7. KEY OPERATION



- ① UT37/UT38 controller displays Operation Display. [Note that Operation Display appears only when the DIP switch No.4 is set to ON (Initialized value is ON). For approx. 2 sec after power ON, the controller displays Model, Input Range, etc., in the PV Display.]
 - ② Operation Display consists of three display panels as standard: SP Display, Output Value Display, and Timer Display (for details, see Operation Manual (IM5B4B7-21E) KEY OPERATION). To changeover each Operation Display, press **SET/ENT** key.
 - Select SP Display to change the SP value, pressing **▼** or **▲** + **SET/ENT** keys.
 - Select Output Value Display to change the control output value using **▼** or **▲** key.
 - Select Timer Display to change the timer setpoint, pressing **▼** and **▲** + **SET/ENT** keys.
 - ③ To change Operation Display to Operation Parameter Setting Display, press and hold **SET/ENT** key for three sec or more.
 - ④ To change each operation parameter item, press **SET/ENT** key within three sec.
 - ⑤ To change the (displayed) settings of each operation parameter item, use **▼** or **▲** key. (During changing, the decimal point flashes.) After changing a setting, press **SET/ENT** key to enter (register) it.
 - ⑥ Operation Parameter Setting Display is changed to Operation Display when
 - **SET/ENT** key is pressed and held for three sec or more.
 - ⑦ To change the display panel to Setup Parameter Setting Display, set the DIP switch No.2 key to OFF and turn power ON (Note 1).
 - ⑧ To change display panel for each setup parameter item, press **SET/ENT** key within three sec.
 - ⑨ To change the (displayed) settings of each setup parameter item, use **▼** or **▲** key. (During changing, the decimal point flashes.) After changing, press **SET/ENT** key to enter (register) the changed value.
- Note 1: Be sure to reset DIP switch No.4 key to ON after completing setup parameter setting.

8. OPERATION PARAMETERS

8.1 Operation Parameter Setting Flow



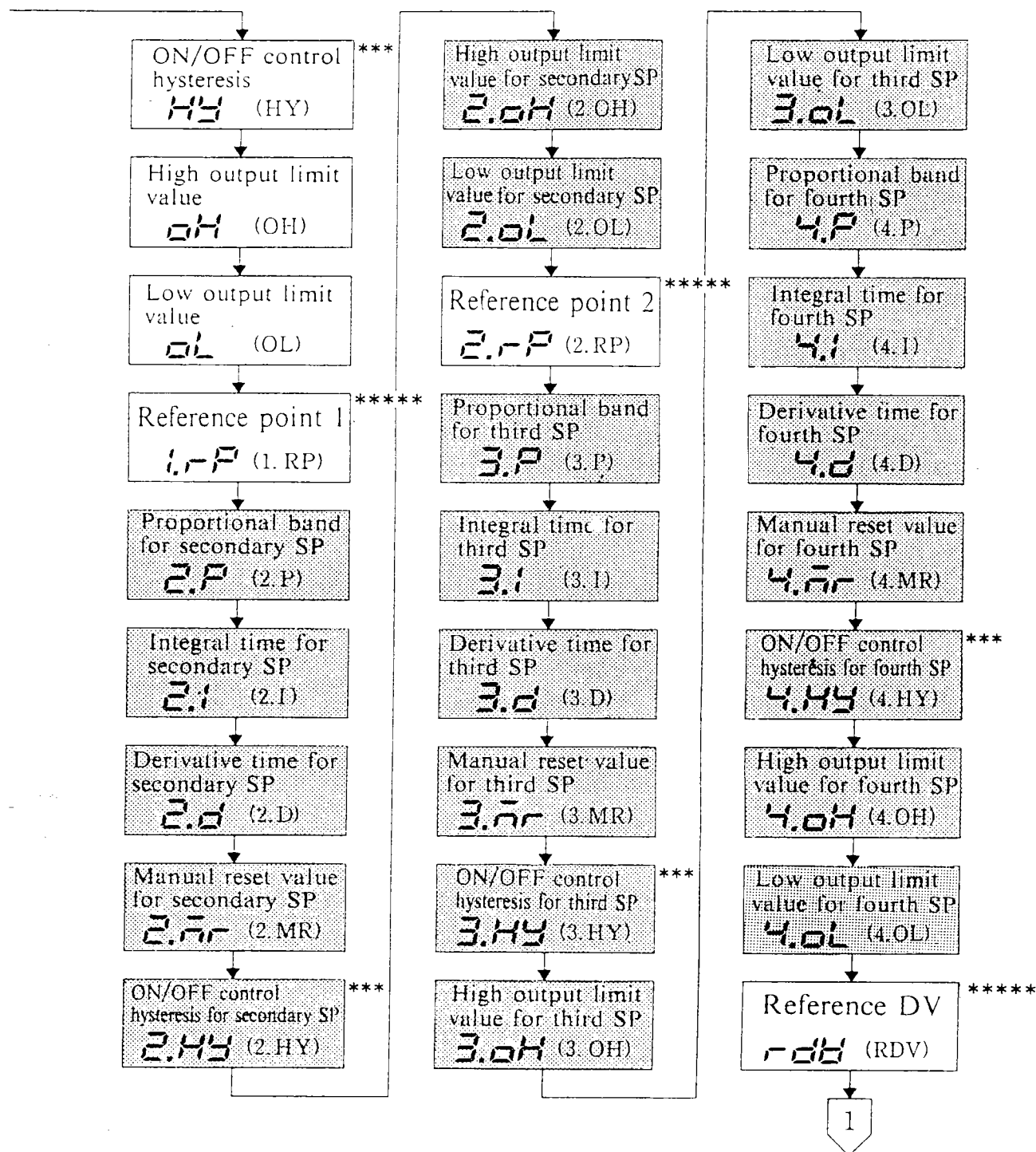
* Displayed only when /RSP (option) is specified. RT and RBS are not displayed when RSL (setup parameter) is OFF.

** Displayed only for UT38.

■ Displayed when “Presence of Multiple Setpoints” is specified by setting the DIP switch No.3 key to OFF (see p.11). When Multiple Setpoints is set, “1” is added on the displays of SP and P through OL, meaning No.1 (main). (See page 56, “DI Selection Parameter.”)

1.SP

All operation parameters are displayed in the order of this flow chart. Note that some parameters are displayed only by UT38 and other parameters are displayed only under special conditions.



*** Only HY is displayed when ON/OFF relay output is specified (see p.10). P, I, D, MR, OH, and OL as well as those for secondary SP are not displayed. 2.SP, 3.SP and 4.SP

**** Displayed only when model with suffix code ALM4 is specified.

***** Displayed only when Zone PID is used.

8.2 Operation Parameter List

Display	Setting Item	Setting Range	Initial set value	Customer's set value	Reference page
A1 (A1)	Alarm 1	<ul style="list-style-type: none"> • EU (0%) to EU (100%) for PV (measured value) alarm • EU (0%) S to EU (100%) S for deviation alarm • OFF or 0.00 to 59.99 min/sec (or hour/min) for A1 timer • Failure diagnosis output (A3 only) • FAIL output (A4 only) 	EU (100%) as PV high limit alarm		32
A2 (A2)	Alarm 2		EU (0%) as PV low limit alarm		32
A3 (A3)	Alarm 3		EU (100%) as PV high limit alarm		32
A4 (A4)	Alarm 4		EU (0%) as PV low limit alarm		32
RT (RT)	Ratio	0.000 ~ 9.999	1.000		32
RBS (RBS)	Remote bias	EU (−100%) S ~ EU (100%) S	EU (0%) S		32
R/L (R/L)	Remote/Local mode selection	LOCAL (local) or REM (remote)	LOCAL		32
SC (SC)	"SUPER" function ON/OFF	ON or OFF	OFF		33
AT (AT)	Auto-tuning ON/OFF	ON or OFF	OFF		33
BS (BS)	Measured input bias	EU (−100%) S to EU (100%) S	EU (0%) S		34
UPR (UPR)	SP up ramp slope	OFF or EU (0%) S /hr or min (Specify when setting "TMU") to EU (100%) S/hr or min (Specify when setting "TMU")	OFF (no gradient)		34
DNR (DNR)	SP down ramp slope		OFF (no gradient)		34

Ⓔ Added


Ⓔ Moved from Setup Parameter

This is the page No. of Initial Setting Manual (IM5B4B7-02E).



Display	Setting Item	Setting Range	Initial set value	Customer's set value	Reference page
db (DB)	Dead Band (only for UT38)	1.0 ~ 10.0% (Percentage to computed control output value)	3.0%		35
-HY (RHY)	Relay hysteresis (only for UT38)	0.1 ~ 0.5% (Percentage to computed control output value)	0.5%		35
SP (SP)	Setpoint (main)	EU (0%) to EU (100%)	EU (0%)		35
2.SP (2.SP)	Secondary setpoint	EU (0%) to EU (100%)	EU (0%)		36
3.SP (3.SP)	Third setpoint	EU (0%) to EU (100%)	EU (0%)		36
4.SP (4.SP)	Fourth setpoint	EU (0%) to EU (100%)	EU (0%)		37
P (P)	Proportional band	0.1 ~ 999.9%	5.0%		37
I (I)	Integral time	OFF or 1 ~ 6000 sec	240 sec		38
D (D)	Derivative time	OFF or 1 ~ 6000 sec	60 sec		38
MR (MR)	Manual reset value	-5.0 ~ 105.0%	50.0%		39
HY (HY)	ON/OFF control hysteresis	EU (0.0%) S ~ EU (100.0%)S	EU (0.5%) S		39
OH (OH)	Output high limit value	-5.0 ≤ OL < OH ≤ 105.0% (Percentage to computed control output value)	100.0%		39
OL (OL)	Output low limit value		0.0%		39

Ⓔ Added

This is the page No. of Initial Setting
Manual (IM5B4B7-02E). 

	Display	Setting Item	Setting Range	Initial set value	Customer's set value	Reference page
Ⓔ Added →	1.P (1.RP)	Reference point 1	EU (0%) to 2.RP	EU (100%)		40
	2.P (2.P)	Proportional band for secondary SP	0.1 ~ 999.9%	5.0%		37
	2.I (2.I)	Integral time for secondary SP	OFF or 1 ~ 6000 sec	240 sec		38
	2.D (2.D)	Derivative time for secondary SP	OFF or 1 ~ 6000 sec	60 sec		38
	2.MR (2.MR)	Manual reset value for secondary SP	-5.0 ~ 105.0%	50.0%		39
	2.HY (2.HY)	ON/OFF control hysteresis for secondary SP	EU (0.0%) S ~ EU (100.0%) S	EU (0.5%) S		39
	2.OH (2.OH)	Output high limit value for secondary SP	-5.0 ≤ 2.OL < 2.OH ≤ 105.0% (Percentage to computed control output value)	100.0%		39
	2.OL (2.OL)	Output low limit value for secondary SP		0.0%		39
Ⓔ Added {	2.RP (2.RP)	Reference point 2	2.RP to EU (100%)	EU (100%)		40
	3.P (3.P)	Proportional band for third SP	0.1 to 999.9%	5.0%		37
	3.I (3.I)	Integral time for third SP	OFF or 1 to 6000 sec	240 sec		38
	3.D (3.D)	Derivative time for third SP	OFF or 1 ~ 6000 sec	60 sec		38

This is the page No. of Initial Setting
Manual (IM5B4B7-02E).



Display	Setting Item	Setting Range	Initial set value	Customer's set value	Reference page
3.5r (3.MR)	Manual reset value for third SP	-5.0 to 105.0%	50.0%		39
3.HY (3.HY)	ON/OFF control hysteresis for third SP	EU (0.0%) to EU (100.0%)	EU (0.5%) S		39
3.OH (3.OH)	Output high limit value for third SP	-5.0 ≤ 3.OL < 3.OH ≤ 105.0% (Percentage of computed control value)	100.0%		39
3.OL (3.OL)	Output low limit value for third SP		0.0%		39
4.P (4.P)	Proportional band for fourth SP	0.1 to 999.9%	5.0%		37
4.I (4.I)	Integral time for fourth SP	OFF or 1 to 6000 sec	240 sec		38
4.D (4.D)	Derivative time for fourth SP	OFF or 1 to 6000 sec	60 sec		38
4.5r (4.MR)	Manual reset value for fourth SP	-5.0 to 105.0%	50.0%		39
4.HY (4.HY)	ON/OFF control hysteresis for fourth SP	EU (0.0%) to EU (100.0%)	EU (0.5%) S		39
4.OH (4.OH)	Output high limit value for fourth SP	-5.0 ≤ 4.OL < 4.OH ≤ 105.0% (Percentage of computed control value)	100.0%		39
4.OL (4.OL)	Output low limit value for fourth SP		0.0%		39
r.dv (RDV)	Reference Deviation	EU (0% to 100%) S EU (0%) : OFF	EU (0%)S (OFF)		41

⑤ Added

This is the page No. of Initial Setting
Manual (IM5B4B7-02E).

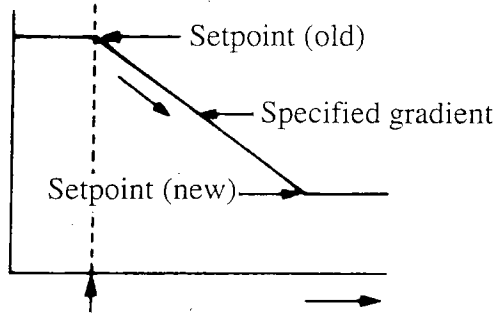
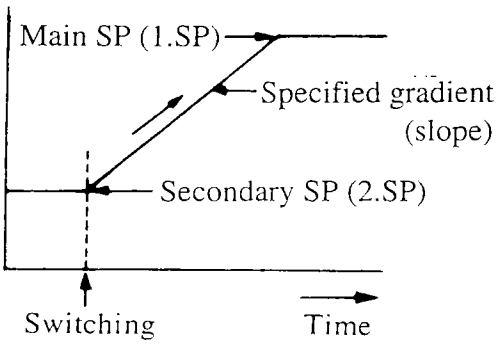
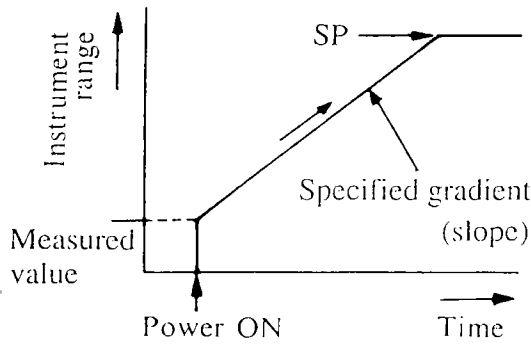


8.3 Description of Operation parameters (1/3)

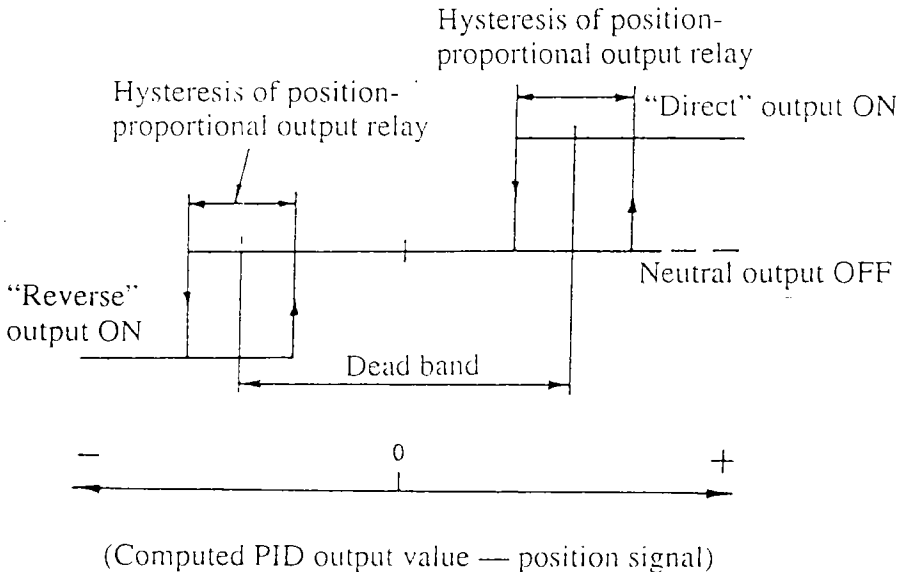
Parameter	Description
Alarm1 A1 (A1)	<ul style="list-style-type: none"> Set alarm 1, alarm 2, alarm 3 and alarm 4 values. For AL1, AL2, AL3 and AL4 (setup parameters) to select alarm type, see p.40. The unit of A1 is hour/min or min/sec when A1 is set as timer function (see p.52). A3 and A4 are displayed only when the suffix code /ALM4 is specified.
Alarm2 A2 (A2)	
Alarm3 A3 (A3)	
Alarm4 A4 (A4)	
Ratio r t (RT)	<p>RT and RBS are provided only when /RSP (option) is specified.</p> <ul style="list-style-type: none"> Set ratio and remote bias so that the controller can be adapted to applications such as load distribution on a zone basis or air fuel ratio control. The ratio is set as Ratio = 1, when the remote setting input span corresponds to the measured input span and represented with magnification to 1. <div style="text-align: center;"> <p>$(SP) = (RSP) \times (RT) + (RBS)$</p> <p>SP : Setpoint RT : Ratio RSP : Remote setting input RBS : Remote bias</p> <p>Variable ratio setting range</p> </div>
Remote bias -b5 (RBS)	
Remote/ Local mode selection r l (R/L)	<p>R/L is provided only when /RSP (option) is specified.</p> <p>LoL (Local) and -Eñ (Remote) are switched by pressing each key.</p> <p>(Local and Remote can be also switched by using external terminals. Key-pressing selection is subject to external terminal selection.)</p>

Parameter	Description
<p>“Super” function ON/OFF</p> <p>SC</p>	<p>○ Use “Super” function (overshooting suppress function):</p> <ul style="list-style-type: none"> ● To prevent overshooting. ● To increase startup speed. ● To accommodate frequent load variations. <div style="display: flex; justify-content: space-around;"> <div data-bbox="310 573 808 940"> <p>Step Response</p> <p>Response when “super” function is not used</p> <p>Setpoint</p> <p>Response when “super” function is used</p> <p>→ Time</p> </div> <div data-bbox="815 573 1330 940"> <p>Disturbance response</p> <p>Response when “super” function is not used</p> <p>Setpoint</p> <p>Response when “super” function is used</p> <p>→ Time</p> </div> </div>
<p>Auto-tuning ON/OFF</p> <p>AL</p> <p>(AT)</p> <p>Note: When High Output Limit Value is set to a value other than 100% and Low Output Limit Value to a value other than 0%, the control output becomes the specified values.</p>	<p>When auto-tuning is started (AT “ON”), the control output becomes 100% (or OH). The controller maintains the 100% (OH) output until PV reaches SP. If PV exceeds SP, the control output becomes 0% (or OL). The controller repeats this cycle three times, automatically determining the PID constant (Note).</p> <div style="text-align: center;"> <p>PV</p> <p>SP (2.SP, 3.SP, 4.SP or RSP)</p> <p>Peak</p> <p>PV</p> <p>AT “ON”</p> <p>MV</p> <p>100%</p> <p>0%</p> <p>t</p> </div> <p>Note: Auto-tuning can be started when UT37/UT38 operates AUTO and RUN mode.</p>

8.3 Description of Operation parameters (2/5)

Parameter	Description
Measured input bias bs (BS)	<p>This functions adds a bias value to the measured input value; the result is used on the UT37/38 display and in control.</p> $\boxed{\text{Measured value internal to instrument}} = \boxed{\text{Measured input value}} + \boxed{\text{bias value}}$ $\text{[EU(-100.0\%)S ~ EU(100.0\%)S]}$ <p>This function can be used when such error or difference as follows is observed; extension lead wire error, RJC error caused by the wire size or the environmental factors such as a wind, and the difference in temperature between the furnace to be controlled and the sensor's actual position.</p>
SP up-ramp slope UPr (UPR)	<p>Respectively set ascending and descending slope (rate-of-change) when rapid changing of setpoint (SP) is not desirable or when SP must be changed at a constant gradient (slope). Available in the following three cases.</p> <p>① When target setpoint is changed:</p>  <p>② When setpoint is switched to secondary setpoint ("2.SP") and vice versa:</p>  <p>③ When power is turned ON (or power failure is recovered): SP value changes at the gradient (slope) from the current measured value (PV) to setpoint.</p> 
SP down-ramp slope dnr (DNR)	
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> Slope setting unit (TMU) </div> <p>This parameter is set after PV tracking selection setting (See p.53.)</p>	

8.3 Description of Operation Parameters (2/3)


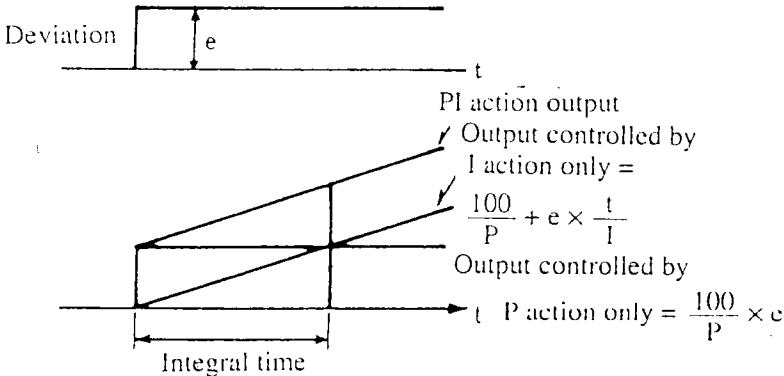

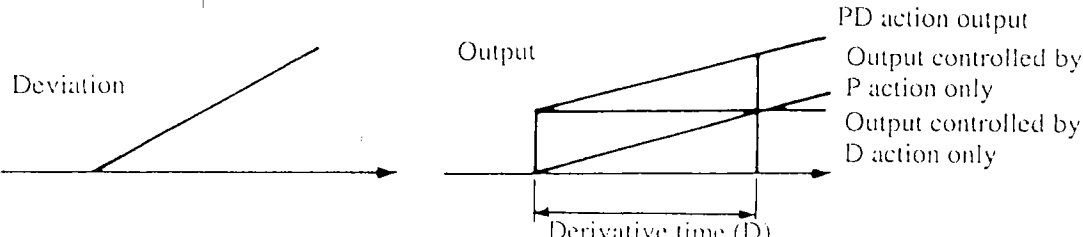
Parameter	Description
Dead Band db (DB) <div data-bbox="279 636 493 678" style="border: 1px solid black; padding: 2px; display: inline-block;">Only for UT38</div>	<div data-bbox="552 373 1138 432" style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Only UT38 displays DB and RHY.</div> <ul style="list-style-type: none"> Set dead band (DB) and relay hysteresis (RHY) to prevent relays (or motors) for position-proportional PID output from being frequently activated. DB is set for output action between two relays and RHY for each relay. When difference between computed PID output value and position signal at that time falls within the dead band, neither direct nor reverse action relays are activated.
Relay hysteresis rhy (RHY) <div data-bbox="279 947 493 989" style="border: 1px solid black; padding: 2px; display: inline-block;">Only for UT38</div>	<ul style="list-style-type: none"> If the above difference exceeds the dead band on the positive side, direct action relays are activated. If the difference exceeds the dead band on the negative side, reverse action relays are activated (during reverse action).
	 <p style="text-align: center;">(Computed PID output value — position signal)</p>
Setpoint SP (SP)	<p>Setpoint (SP) can be changed in the operation display panel. (See Operation Manual (IM5B4B7-21E) KEY OPERATION)</p> <p>SP parameter allows the controller to display/change SP value while control is performed on secondary setpoint basis.</p> <p>i.SP is displayed when multiple setpoint is setup.</p>





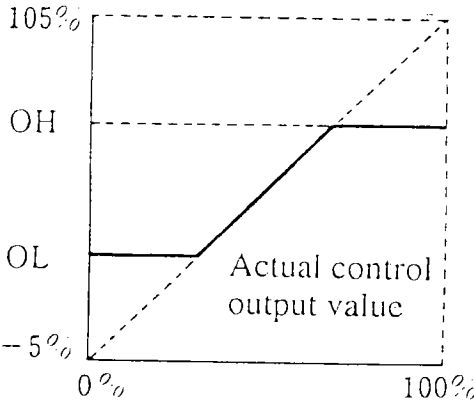
8.3 Description of Operation parameters (3/5)

Parameter	Description
<p>Secondary setpoint</p> <p>2.SP</p> <p>(2. SP)</p>	<p>This parameter appears only when DIP switch No.3 has been set to "presence of multiple setpoints" (see page 11) and the DI selection (setup parameter) has been set to either "0", "1" or "2". Use external contacts to switch to 3.SP (see below). If "presence of multiple setpoints" is selected, the panel displays the screen for setting parameters of up to the proportional band for the second setpoint (2.P), as discussed in "Operation Parameter Setting Flow" (see page 26).</p> <p>● When DI selection [DI 15] is "0" or "1"</p> <div data-bbox="565 657 792 898"> </div> <div data-bbox="824 699 1417 930"> <p>OFF (open): SP (setpoint) ON (closed): 2.SP (secondary setpoint)</p> <p>Voltage-free contact (contact capacity 12V DC and 10mA or more)</p> </div> <p>● When DI selection [DI 15] is "2"</p> <div data-bbox="540 1003 792 1266"> </div> <div data-bbox="824 1003 1417 1266"> <p>(ON) (OFF)</p> <p>The display is set to 2.SP (secondary setpoint) with the contacts set as follows. Voltage-free contact (contact capacity 12V DC and 10mA or more)</p> </div>
<p>Third setpoint</p> <p>3.SP</p> <p>(3. SP)</p>	<p>This parameter appears only when DIP switch No.3 is set to "presence of multiple setpoints" (see page 11) and the DI selection (setup parameter) is set to "2".</p> <p>Use external contacts to switch to 2.SP (see below). If "presence of multiple setpoints" is selected, the panel displays the screen for setting parameters from the proportional band (3.P) up to the output low limit value (3.OL) for the third setpoint, as discussed in "Operation Parameter Setting Flow" (see page 26).</p> <p>● When DI selection [DI 15] is "2"</p> <div data-bbox="540 1717 792 1980"> </div> <div data-bbox="824 1717 1417 1980"> <p>(OFF) (ON)</p> <p>The display is set to 3.SP (third setpoint) with the contacts set as follows. Voltage-free contact (contact capacity 12V DC and 10mA or more)</p> </div>

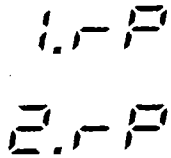
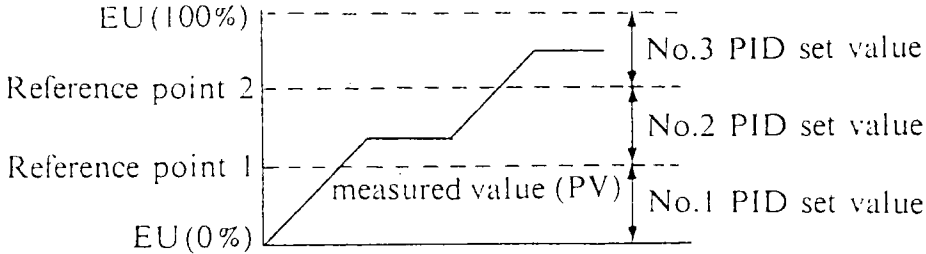
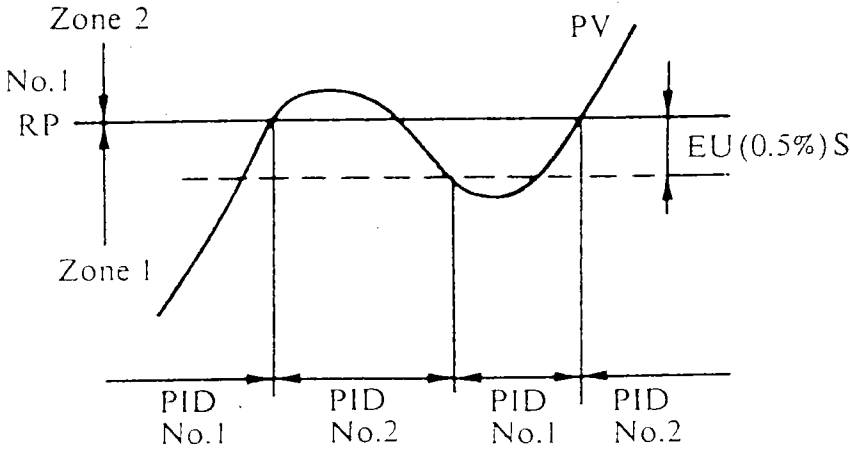
Parameter	Description
<p>Fourth setpoint</p> <p>4.SP</p> <p>(4. SP)</p>	<p>This parameter appears only when DIP switch No.3 is set to "presence of multiple setpoints" (see page 11) and the DI selection (setup parameter) is set to "2".</p> <p>Use external contacts to switch to 2.SP (see below). If "presence of multiple setpoints" is selected, the panel displays the screen for setting parameters from the proportional band (4.P) up to the output low limit value (4.OL) for the fourth setpoint (4.P), as discussed in "Operation Parameter Setting Flow" (see page 26).</p> <p>● When DI selection (4.15) is "2"</p> <div data-bbox="570 835 829 1108"> </div> <div data-bbox="857 842 1068 961"> </div> <div data-bbox="1192 842 1393 961"> </div> <p>The display is set to 4.SP (fourth setpoint) with the contacts set as follows. Voltage-free contact (contact capacity 12V DC and 10mA or more)</p>
<p>Proportional band</p> <p>P</p> <p>(P)</p>	<p>The proportional action control (P action) is a control method which generates control outputs whose values are proportional to deviations. For the control method, the measured-value changing (or deviation) which corresponds to 0 to 100% changing of control output (computed control output) must be represented in percentage. The changing rate in percentage is referred to as proportional band.</p> <p>When a measured value agrees with the setpoint, the output is generally 50%.</p> <p>In the proportional action, output oscillation which is a disadvantage of ON/OFF action can be eliminated.</p> <div data-bbox="654 1629 1390 1927"> </div> <p>Deviation = Measured value (PV) — Setpoint</p>

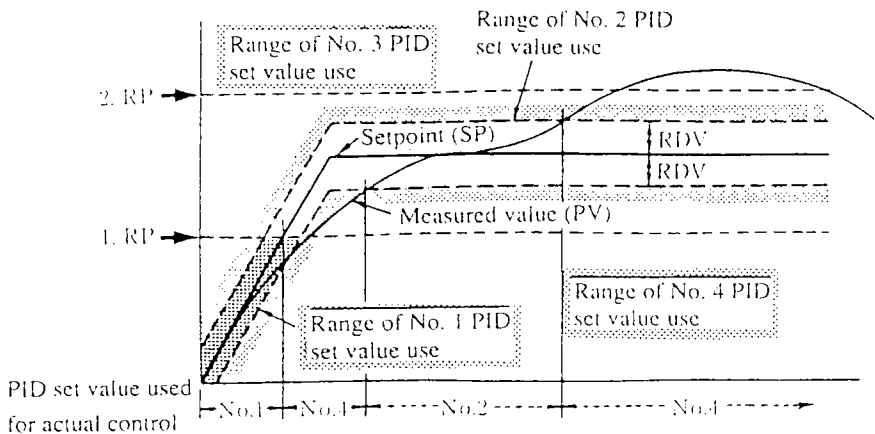
8.3 Description of Operation Parameters (3/3)

Parameter	Description
Integral time  (I)	<p data-bbox="542 352 1446 657">In P action, the measured value does not necessarily agree with the setpoint and deviation may occur. The integral action [I action] is a control method which automatically adjusts control outputs so that any deviation as described above is zero. I action uses a value, referred to as Integral Time, to determine output variation rate corresponding to the deviation. The shorter the integral time, the stronger the integral action (the larger the output variation rate).</p> <p data-bbox="542 663 1446 814">I action is usually used in combination with P action, as PI action. In this PI action, integral time [I] is the duration which the output controlled only by I action requires until it is equal to the output controlled only by P action after a step input is applied.</p> 
Derivative time  (D)	<p data-bbox="542 1325 1435 1539">If the time constant or dead time of controlled system is large, P or PI action may cause the response to be late or to generate overshoot, leading the control system to an unstable state. Derivative action (D action) can control the output so that it is proportional to the input (deviation) rate-of-change, attaining faster response and more stable operation of the control system.</p> <p data-bbox="542 1545 1435 1608">D action is used in combination with P or PI action, as PD or PID action.</p> <p data-bbox="542 1614 1435 1797">In PD action, the derivative time [D] is duration which the output controlled only by P action requires until it becomes equal to the output controlled only by D action after a ramp input (a constant rate-of-change input) is applied. The longer the derivative time, the stronger the derivative action.</p> 

Parameter	Description
Manual reset value  (MR)	<p>MR is effective only when integral time (I) is turned OFF. P and PD actions cannot always eliminate deviation, which is called offset. To eliminate the offset, adjust the manual reset value. (Integral action automatically performs this reset operation.)</p>
ON/OFF control hysteresis  (HY)	<p>HY is displayed only when ON/OFF relay output is selected using DIP Switch (B) (seep.10).</p> <p>ON/OFF control hysteresis is an operation gap which is set around ON/OFF operating point to prevent control output from chattering.</p>
Output high limit value  (OH) Output low limit value  (OL)	<p>The parameters limit the control output operating range between OL and OH values. OL and OH are useful to specify the maximum and minimum output values for system protection.</p> 

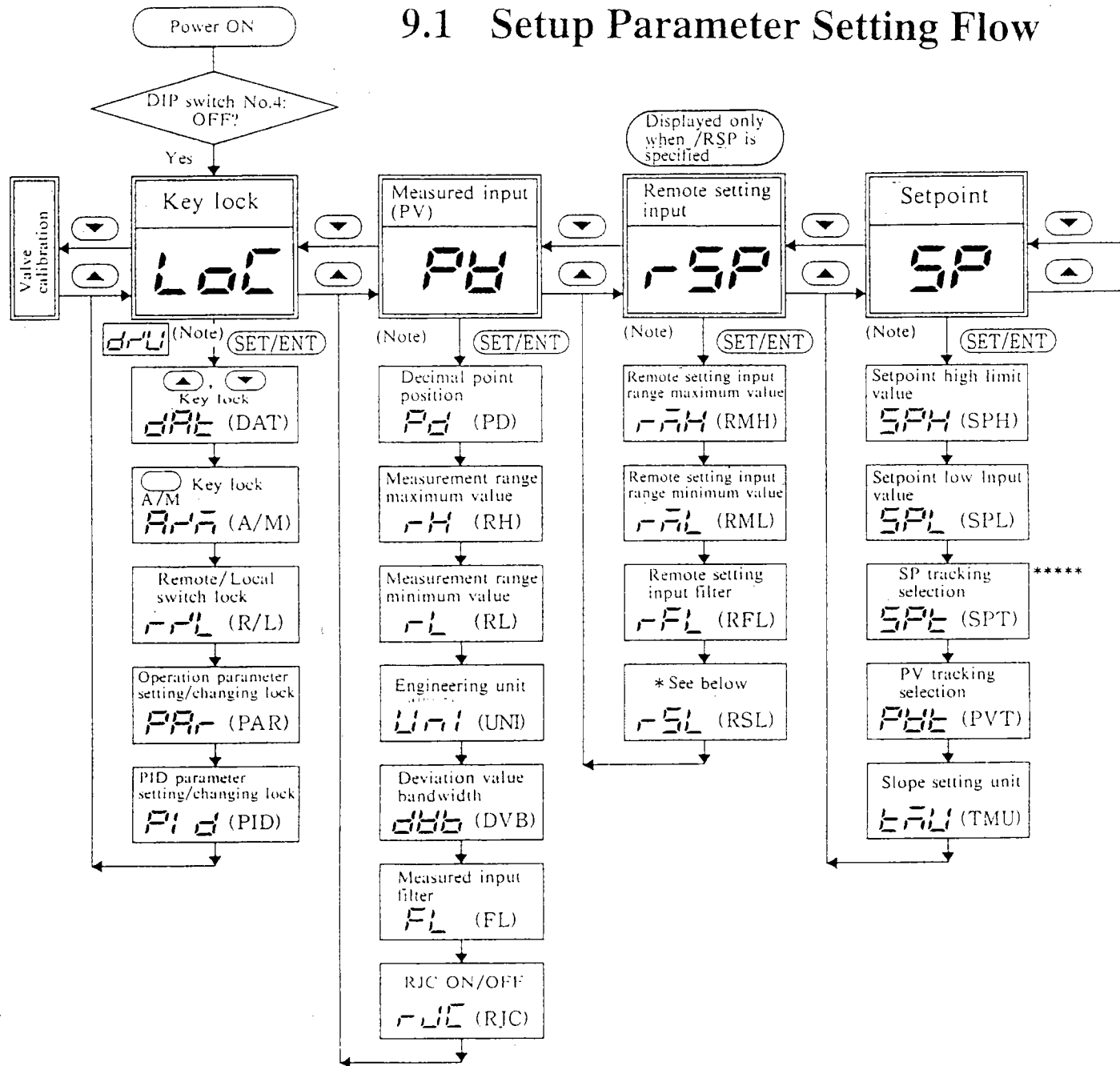
8.3 Description of Operation parameters (5/5)

Parameter	Description
Reference points 1 and 2  This parameter is available when Zone PID is used.	<p>There are two reference points, each of which defines a PV (measured) value at which the PID set value is to be switched over to a different value.</p>  <p>When the UT37 is shipped from the factory, the reference points are both set at EU(100%). Unless these values are changed, the No.1 PID set value applies to the entire measurement range.</p> <p>In addition, a hysteresis band is provided for the PID set value switchover as shown in the figure. This band is fixed at EU (0.5%S).</p>  <p>©To use Zone PID, set the following:</p> <ol style="list-style-type: none"> ① Set DIP switch No.3 to ON. ② Set the setup parameter "$d15$" to 2. <p>(See "DI selection of setup parameter ($d15$)" on page 55.)</p>

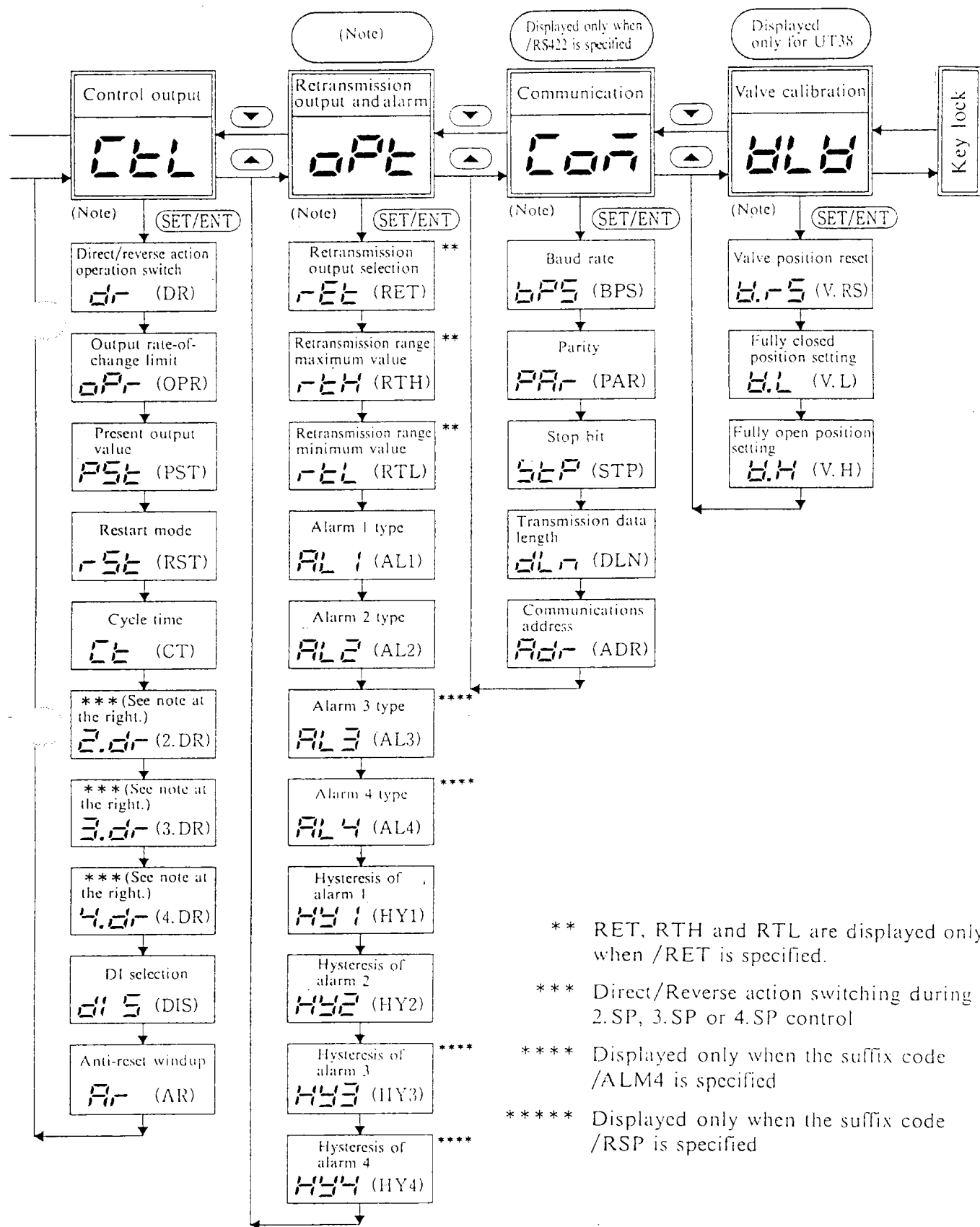
Parameter	Description
<p>Reference deviation</p> <p>rdv</p> <p>This parameter is available when Zone PID is used.</p>	<p>The reference deviation parameter defines a deviation (DV) value which, if exceeded during local setpoint control, will cause a different PID set value (No.4 PID set value) to be employed. This set value selection function has priority over the reference-point set value selection functions described above. It can therefore be applied to bring deviation quickly back within a target deviation band whenever a large excursion occurs, by increasing the control sensitivity (i.e., by narrowing the proportional band).</p> <p>If the reference DV is set to OFF, this function is disabled.</p> <p>The accompanying figure shows the ranges in which the No.1 to No.3 PID set value, and the No.4 PID set value selected by the reference deviation, will apply in operation. A hysteresis like that provided for the reference points is provided for reference deviation, also.</p>  <p>The graph illustrates the selection of PID set values based on the reference deviation (RDV). The vertical axis represents the Setpoint (SP) and Measured value (PV). The horizontal axis represents the PID set value used for actual control, with regions labeled No.1, No.4, No.2, and No.4. The graph shows a hysteresis loop for RDV, with shaded regions indicating the ranges for No.1, No.2, No.3, and No.4 PID set value use. Key points include 1. RP and 2. RP on the vertical axis, and RDV and RDV' on the horizontal axis.</p>
<p>The parameters from Proportional Band for secondary SP (2. P) to Low Output Limit Value for secondary SP (2.OL) are not explained, because their functions are virtually the same as those from Proportional Band (P) to Low Output Limit Value (OL).</p>	

9. SETUP PARAMETERS



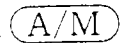
9.1 Setup Parameter Setting Flow



(Note) **rSP** is displayed on the Setpoint and parameter display (left side).
 "d" express: ▼ key and "U" does ▲ key. Parameter group is moved to the next by pressing ▼ or ▲ key, for example, from Key lock to Measured input.



9.2 Setup Parameter List (1/3)

Related function	Code	Setting Item	Setting Range	Initial value	Custom-er's set value	Ref-erence page
Key lock	dAt (DAT)	  Key lock	OFF or ON	OFF (Unlocked)		P. 49
	A/M (A/M)	 Key lock	OFF or ON	OFF (Unlocked)		P. 49
	r/L (R/L)	Remote/ Local switch lock	OFF or ON	OFF (Unlocked)		P. 49
	PAR (PAR)	Operation parameter setting/ changing lock	OFF or ON	OFF (Unlocked)		P. 49
	PId (PID)	PID parameter setting/ changing lock	OFF or ON	OFF (Unlocked)		P. 49
Measured input	Pd (PD)	Decimal point position	0, 1, 2, or 3	1		P. 50
	rH (RH)	Measure- ment range maximum value	$EU(0\%) \leq RL < RH \leq EU(100\%)$	EU (100%) [100 for linear input]		P. 50
	rL (RL)	Measure- ment range minimum value	<div>For linear input -1999 < RL ≤ RH ≤ 9999</div>	EU (0%) [0.0 for linear input]		P. 50
	Uni (UNI)	Engineer- ing unit	°C or F	°C		P. 50
	dBB (DVB)	Deviation value bandwidth	EU(0%)S ~ EU(100%)S	EU (1%)S		P. 50
	FL (FL)	Measured input filter	OFF.1 ~ 120 sec.	OFF (No filter)		P. 50

(E) Added →

"BS" is ←
(E) moved to
Operation
Parameter.

Related function	Code	Setting Item	Setting Range	Initial value	Custom-er's set value	Ref-erence page
Measured input	rJC (RJC)	Reference junction temperature compensation	OFF or ON	ON		P. 50 ← ㊦ Added
Remote setting input	rRH (RMH)	Remote setting input range maximum value	$-1999 \leq RML < RMH \leq 9999$	Same as RH		P. 51
	rRL (RML)	Remote setting input range minimum value		Same as RL		P. 51
	rFL (RFL)	Remote setting input filter	OFF, 1 ~ 120 sec	OFF (No filter)		P. 51
	rSL (RSL)	Remote setting input, Ratio, Ratio bias ON/OFF	OFF or ON	OFF		P. 51
Setpoint (SP)	SPH (SPH)	Setpoint high limit value	Measurement range maximum value $RL \leq SPL < SPH \leq RH$	Same as RH		P. 51
	SPL (SPL)	Setpoint low limit value	Measurement range minimum value	Same as RL		P. 51
	SPT (SPT)	SP tracking selection	OFF or ON	ON (Tracking is specified.)		P. 52 → "UPR" "DNR" are moved ㊦ to Operation Parameter.
	PVT (PVT)	PV tracking selection	OFF or ON	OFF (Tracking is not specified.)		P. 53
	TMU (TMU)	Slope setting unit	0(hr) or 1(min)	0 (hr)		P. 53

9.2 Setup Parameter List (2/3)

	Related function	Code	Setting Item	Setting Range	Initial value	Custom-er's set value	Ref-erence page
	Control output	dr (DR)	Direct/reverse action operation switch	0 (Reverse) or 1 (Direct)	0 (Reverse)		P. 54
		opr (OPR)	Output rate-of-change limit	OFF, 0.1 ~ 100.0% per sec (of output value)	OFF		P. 54
		PSt (PST)	Preset output value	-5.0 to 105.0% (of output value)	0.0%		P. 55
		rSt (RST)	Restart code	0.1 or 2	0 (Continuing after power recovery)		P. 55
		Ct (CT)	Cycle time	1 ~ 240 sec	30 sec		P. 55
		2.dr (2. DR)	Direct/Reverse action switch during 2.SP control	0 (Reverse action) or 1 (Direct action)	0 (Reverse action)		P. 50
		3.dr (3. DR)	Direct/Reverse action switch during 3.SP control	0 (Reverse action) or 1 (Direct action)	0 (Reverse action)		P. 56
		4.dr (4. DR)	Direct/Reverse action switch during 4.SP control	0 (Reverse action) or 1 (Direct action)	0 (Reverse action)		P. 56
⑤ Added →		dis (DIS)	DI selection	0, 1, 2 or 3	0		P. 56
⑤ Changed →		Ar (AR)	Anti reset wind-up	0.0 to 999.9%	0.0%		P. 57

⑤ Added →

Related function	Code	Setting Item	Setting Range	Initial value	Custom-er's set value	Ref-erence page
Retransmission output and alarm	RET (RET)	Retransmission output selection	0, 1, 2, 3 or 4	0		P. 58
	RTH (RTH)	Retransmission range maximum value	$EU(0.0\%) \leq RTL < RTH \leq EU(100.0\%)$	Same as RH [EU (100.0%)]		P. 58
	RTL (RTL)	Retransmission range minimum value		Same as RL [EU (100.0%)]		P. 58
Retransmission output and alarm	AL 1 (AL 1)	Alarm 1 type	OFF, 1~24	1 (Measured value high limit)		P. 58
	AL 2 (AL 2)	Alarm 2 type	OFF, 1~20	2 (Measured value high limit)		P. 58
	AL 3 (AL 3)	Alarm 3 type	1~21 21: Failure diagnosis output	1 (Measured value high limit)		P. 58
	AL 4 (AL 4)	Alarm 4 type	1~21 21: Fail output	2 (Measured value low limit)		P. 58
	HY 1 (HY1)	Alarm 1 hysteresis	$EU(0.0\%)S \sim EU(100.0\%)S$	$EU(0.5\%)S$		P. 61
	HY 2 (HY2)	Alarm 2 hysteresis	$EU(0.0\%)S \sim EU(100.0\%)S$	$EU(0.5\%)S$		P. 61
	HY 3 (HY3)	Alarm 3 hysteresis	$EU(0.0\%)S \sim EU(100.0\%)S$	$EU(0.5\%)S$		P. 61
	HY 4 (HY4)	Alarm 4 hysteresis	$EU(0.0\%)S \sim EU(100.0\%)S$	$EU(0.5\%)S$		P. 61

⑤ Added

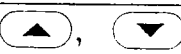
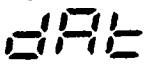

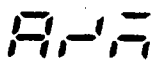

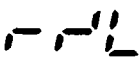
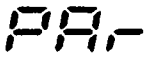
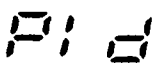
⑤ Added

Related function	Code	Setting Item	Setting Range	Initial value	Custom-er's set value	Ref-erence page
Communication	bPS (BPS)	Baud rate	150, 300, 600, 1200, 2400, 4800, 9600 BPS	9600BPS		See Instruction Manual (Communication Manual)
	PAR (PAR)	Parity	NONE, EVEN or ODD	NONE (No parity)		
	STP (STP)	Stop bit	1 (1 bit) or 2 (2 bit)	1 (1 bit)		
	DLN (DLN)	Transmis- sion bit length	7 (7 bit) or 8 (8 bit)	8 (8 bit)		
	ADR (ADR)	Communi- cations address	1 to 98 (or 99 for coordination operation) (the maximum number of units to be connected is 16)	1		
Valve calibration (only for UT38)	V.RS (V.RS)	Valve position reset	To reset the valve position to the pre- adjustment status, register "1."	—		P. 61
	V.L (V.L)	Fully closed position setting	Approx. 0%	—		P. 61
	V.H (V.H)	Fully open position setting	Approx. 100%	—		P. 61

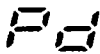
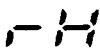
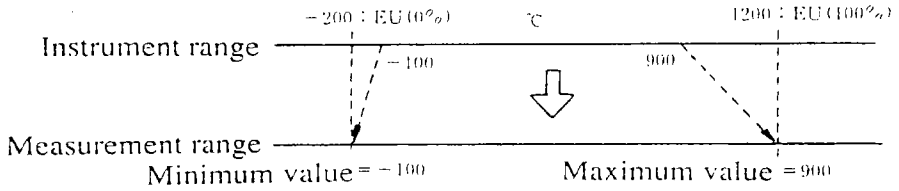

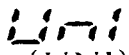
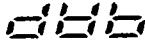




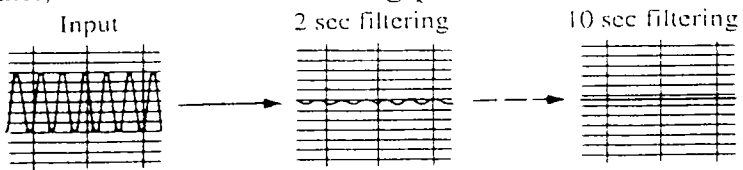

9.3 Description of Setup Parameters

9.3.1 Parameters for Key Lock


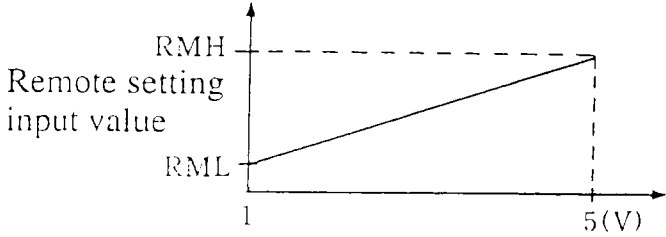

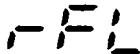
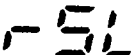
Select ON (Key Lock) or OFF (No key Lock) for the following parameters. Key Lock is provided against mis-operation. Operation display panel can be changed in Key Lock mode.

Parameter	Description (for Key Lock status)
 Key lock  (DAT)	Disables you to set and change all parameters by key operation (except the key operation for canceling this Key Lock status).
 Key lock  (A/M)	Disables you to switch AUTO (automatic operation) / MAN (manual operation) using  key. AUTO/MAN can be selected using external contact even when this parameter is set to ON.
Remote/Local switch lock  (R/L)	Disables you to switch REM (remote)/LOCL (local) by key operation. (When this is set to ON, "R/L" parameter display disappears.) REM/LOCL can be selected using external contact.)
Operation parameter setting/ changing lock  (PAR)	Disables you to set and change operation parameters by key operation.
PID param- eter setting/ changing lock  (PID)	Disables you to set and change the following operation parameters: P, I, D, MR, HY, OH, OL, 2.P, 2.I, 2.D, 2.MR, 2.HY, 2.OH, 2.OL, 3.P, 3.I, 3.D, 3.MR, 3.HY, 3.OH, 3.OL, 4.P, 4.I, 4.D, 4.MR, 4.HY, 4.OH, and 4.OL (When this is set to ON, parameter displays disappear.)



9.3.2 Parameters for Measured Input

Parameter	Description
Decimal point position  (PD)	Set decimal point position of input range for voltage input such as 1 to 5V DC. 0 : -1999 to 9999 (No decimal point) 1 : -199.9 to 999.9 (Up to first decimal point position) 2 : -19.99 to 99.99 (Up to second decimal point position) 3 : -1.999 to 9.999 (Up to third decimal point position)
Measurement range maximum value  (RH)	<p>Set the maximum and minimum values in a instrument range code to fix a measurement range as needed.</p>  <p>Instrument range: -200 : EU (0.2%) 1200 : EU (100%)</p> <p>Measurement range: Minimum value = -100 Maximum value = 900</p> <p>Meter accuracy is not subject to measurement range changing.</p> <p>Parameters that Change if RH or RL Changes</p> <div style="display: flex; justify-content: space-between;"> <div> <p>Operation Parameters</p> <p>Set-up Parameters</p> </div> <div> <p>A1, A2, A3, A4, RBS, BS, UPR, DNR, SP, 2.SP, 3.SP, 4.SP, HY, 2.HY, 3.HY, 4.HY</p> <p>RH, RL, RMH, RML, SPH, SPL, RTH, RTL, HY1, HY2, HY3, HY4</p> </div> </div>
Measurement range minimum value  (RL)	
Engineering unit  (UNI)	Set to °C or °F the engineering unit for temperature input (through TC or RTD). The unit cannot be set for voltage input. (Use an attached "unit" label.)
Deviation value bandwidth  (DVB)	If, for example, DVB = 1,  (green) turns on when the deviation (PV-SP) remains within EU (±1.0%)S. If the deviation exceeds EU(1.0%)S,  (red) lights, and if it exceeds EU(-1.0%)S,  (red) lights. This parameter appears only when the panel displays operation screens.
Measured input filter  (FL)	Useful when noise in input signals causes noticeable fluctuation of displayed value. Set the parameter as a time constant of the first-order lag type filter. The longer the time constant, the better the filtering performance. <div style="text-align: center;">  <p>Input 2 sec filtering 10 sec filtering</p> </div>
RJC ON/OFF  (RJC)	Usually input values are compensated with the RJC function provided for the controller. However, if it is necessary to rigorously compensate the values with a device other than the function of the controller, for example with a zero-compensator, the RJC function of the controller can be suspended by turning off the RJC parameter.

9.3.3 Parameters for Remote Setting Input

Parameter	Description
Remote setting input range maximum value  (RMH)	RMH and RML are set for scaling of remote setting input and not subject to instrument range. 
Remote setting input range minimum value  (RML)	
Remote setting input filter  (RFL)	Remote setting input signal can be filtered. The function is the same as that of measured input filter (see p.44).
Remote setting input, ratio, ratio bias ON/OFF  (RSL)	Set RSL as ON when the function ratio and ratio bias is needed. RT and RBS is effective when RSL is set as ON (see p.28).


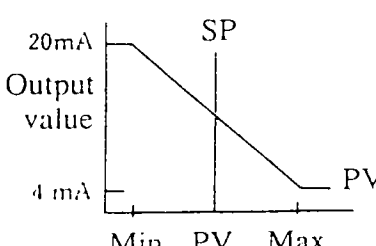
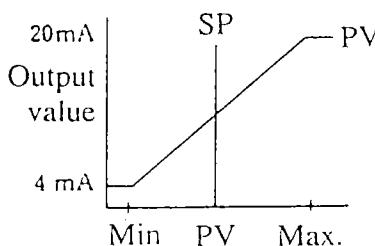

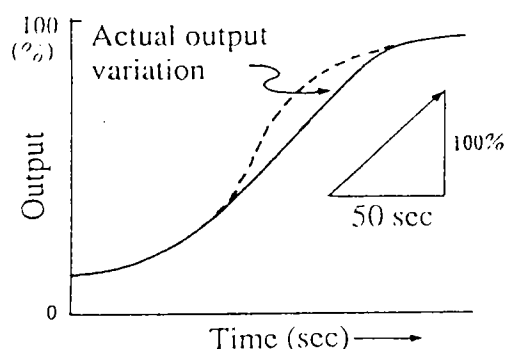
9.3.4 Parameters for Setpoint (SP)

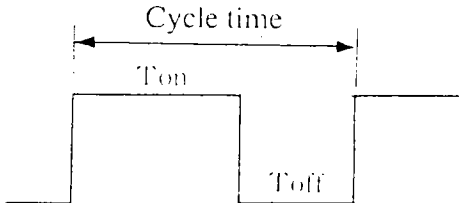
Parameter	Description
Setpoint high limit value  (SPH)	SPH and SPL limit Setpoint range within Measurement range. This is effective for Remote setting input.
Setpoint low limit value  (SPL)	

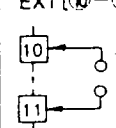
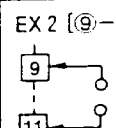
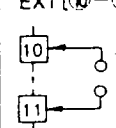
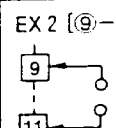
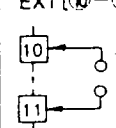
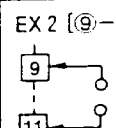
Parameter	Description
SP tracking selection SPT (SPT)	<p>Use SPT parameter to select or not select SP Tracking. When SP Tracking is selected, the local (internal) setpoint is tracked to the remote setpoint in REM (remote) mode. SP Tracking therefore suppresses output variation due to deviation caused when REM is changed to LOCAL mode.</p> <div data-bbox="526 615 1117 682" style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> OFF: Not select ON : Select </div>
	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div data-bbox="316 806 852 1297" style="width: 45%;"> <p style="text-align: center;">• SP Tracking ON</p> </div> <div data-bbox="857 806 1425 1297" style="width: 45%;"> <p style="text-align: center;">• SP Tracking OFF</p> </div> </div>

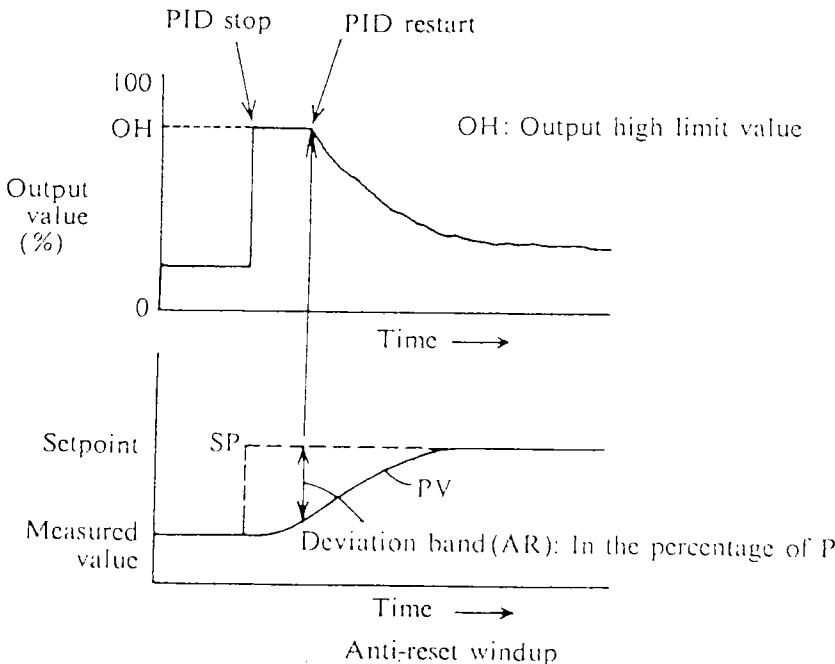
Parameter	Description
PV tracking selection PVL (PVT)	<p>Use PVT parameter to select or not select PV Tracking. When PV tracking is selected, the setpoint (SP) is tracked to the measured value (PV). Thereby, PV Tracking suppresses output variation caused when an operation mode is changed to AUTO and RUN mode (as shown below).</p> <div data-bbox="557 636 1143 701" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> OFF : Not select ON : Select </div> <ol style="list-style-type: none"> ① Change from MAN (manual) and RUN (operation) to AUTO (automatic) and RUN (operation) ② Change from MAN (manual) and STOP (operation stop) to AUTO (automatic) and RUN (operation) ③ Turning ON power, setting to AUTO (automatic) and RUN (operation)
	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div data-bbox="354 1031 893 1507" style="text-align: center;"> <p>● PV Tracking ON</p> <p>Time</p> </div> <div data-bbox="893 1031 1453 1507" style="text-align: center;"> <p>● PV Tracking OFF</p> <p>Time</p> </div> </div> <p>When PV tracking is selected, the setpoint (SP) is tracked once to the measured value (PV) and then to the original SP value according to rate-of-change. [Note: PV tracking is not activated when UPR or DNR is set to OFF.]</p>
Slope setting unit EAU (TMU)	<p>Operation parameter UPR or DNR (see p.34) rate-of-change unit to 0 (hour) or 1 (min).</p>

9.3.5 Control Parameters

Parameter	Description				
Direct/Reverse Action operation switch  (DR)	The direct/reverse action determines, as shown below, whether output increases or decreases when deviation (PV – SP) is positive or negative.				
	PV > SP		PV < SP		
Action	Reverse	Direct	Reverse	Direct	
ON-OFF	OFF	ON	ON	OFF	
mA output	Current decreases.	Current increases.	Current increases.	Current decreases.	
ON OFF time proportional control	ON time decreases.	ON time increases.	ON time increases.	ON time decreases.	
Position- proportional control	L-C closes.	H-C closes.	H-C closes.	L-C closes.	
Output variation direction	<div>Reverse action</div> 		<div>Direct action</div> 		
Output rate-of change limit  (OPR)	<div>Set the output rate-of-change limit to prevent rapid output changing from imparting shock to the process or actuators. This parameter limits the output rate-of-change. (Note: Setting of output rate-of-change limit may offset the derivative action effect.)</div> <div><div></div><div><div>———— Example ————</div><div>Limiting rate-of-change = 2.0 (% per sec)</div><div>To change output from 0 to 100% for 50 sec, set the parameter to 2.0 (% per sec).</div></div></div>				

Parameter	Description															
<div>Preset output value</div> <div>PSt</div> <div>(PST)</div>	<p>PST allows preset output value, neither automatic nor manual output value, to be generated when operation mode is changed from RUN to STOP.</p> <p>The preset output value is not limited by Output High Limit Value nor by Low Limit Value.</p> <p>Change the mode from STOP to RUN in balanceless-bumpless mode using external terminals ⑩ and ⑪. (OFF: RUN, ON: STOP) (See “DI selection” on page 56.)</p> <table><tr><td rowspan="2">Mode</td><td colspan="2">RUN (operation)</td><td>STOP</td></tr><tr><td colspan="2">Control program is running.</td><td>Control program is stopped.</td></tr><tr><td></td><td>AUTO</td><td>MAN</td><td>—</td></tr><tr><td>Output</td><td>Output value based on computed control results</td><td>Output value entered by manual key operation</td><td>Preset output value</td></tr></table>	Mode	RUN (operation)		STOP	Control program is running.		Control program is stopped.		AUTO	MAN	—	Output	Output value based on computed control results	Output value entered by manual key operation	Preset output value
Mode	RUN (operation)		STOP													
	Control program is running.		Control program is stopped.													
	AUTO	MAN	—													
Output	Output value based on computed control results	Output value entered by manual key operation	Preset output value													
<div>Restart code</div> <div>rSt</div> <div>(RST)</div>	<p>Select status controller enters after recovery from power failure.</p> <p>0 : Controller continues the operation before power failure.</p> <p>1 : Controller enters MAN (manual) mode. Control output is preset-output-value described above.</p> <p>2 : Controller continues the operation before power failure. Control output is preset-output-value described above.</p>															
<div>Cycle time</div> <div>CT</div> <div>(CT)</div>	<p>Controller outputs computed PID results in the form of ON/OFF signal pulse width when it operates in time-proportional PID output (relay or voltage pulse output) mode. This output time ratio (%) corresponds to the ratio of T-on time to the cycle time.</p> 															

Parameter	Description																																																							
<p>Toggling between direct/reverse action during SP2, SP3 or SP4-mode operation</p> <p>2.dr (2. DR)</p> <p>3.dr (3. DR)</p> <p>4.dr (4. DR)</p>	<p>This function allows direct or reverse action to be selected during operation at the second, third or fourth setpoint. (This selection is possible independent of the operation at the respective setpoints.)</p> <p>For details on the direct and reverse actions, see the descriptions on DR (page 54).</p>																																																							
<p>DI selection</p> <p>d1 5 (DIS)</p>	<p>The DI terminal provides different functions depending on the setting of DIP switch No.3 (see page 11), i.e., the presence or absence of multiple setpoints. This DIS parameter allows you to select a function depending on your choice of the presence of multiple setpoints.</p> <table><tr><th>DIP switch < 3 ></th><th colspan="3">ON (for SP only)</th><th colspan="4">OFF (multiple setpoints)</th></tr><tr><th>Setup parameter DIS</th><th>0,1</th><th>2</th><th>3</th><th>0</th><th>1</th><th>2</th><th>3 *2</th></tr><tr><td><p>EX1 [(10)-(11)]</p></td><td colspan="2">RUN/STOP STOPs when ON</td><td>*1 Keylock /unlock (Locked when ON)</td><td>RUN/ STOP STOPs when ON</td><td>AUTO/ MAN AUTO when ON</td><td>*3 1. SP 2. SP</td><td>*1 Keylock /unlock (Locked when ON)</td></tr><tr><td><p>EX2 [(9)-(11)]</p></td><td colspan="2">AUTO/MAN AUTO when ON</td><td>OFF Unused</td><td colspan="2">1. SP/2. SP 2(nd) SP when ON</td><td>3. SP 4. SP</td><td>OFF Unused</td></tr><tr><td>PID</td><td>One PID unit for SP</td><td>Four zone PID units</td><td>One PID unit for SP</td><td colspan="2">Two PID units for SP1 and SP2</td><td colspan="2">Four PID units for SP1, SP2, SP3, and SP4</td></tr></table> <p>*1 *1 Locks/unlocks setup parameter menu panels (LOC).</p> <p>*2 When EX1 and EX2 are not used, RUN/STOP or target setpoints (1 to 4 SPs) can be selected via communications including a personal computer link and ladder communications.</p> <p>*3 Setpoints 1 to 4 are selected in combination with open and closed EX1 and EX2 terminals.</p> <table><tr><th>SP No.</th><th>1.SP</th><th>2.SP</th><th>3.SP</th><th>4.SP</th></tr><tr><td>EX1</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td></tr><tr><td>EX2</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr></table>	DIP switch < 3 >	ON (for SP only)			OFF (multiple setpoints)				Setup parameter DIS	0,1	2	3	0	1	2	3 *2	<p>EX1 [(10)-(11)]</p> 	RUN/STOP STOPs when ON		*1 Keylock /unlock (Locked when ON)	RUN/ STOP STOPs when ON	AUTO/ MAN AUTO when ON	*3 1. SP 2. SP	*1 Keylock /unlock (Locked when ON)	<p>EX2 [(9)-(11)]</p> 	AUTO/MAN AUTO when ON		OFF Unused	1. SP/2. SP 2(nd) SP when ON		3. SP 4. SP	OFF Unused	PID	One PID unit for SP	Four zone PID units	One PID unit for SP	Two PID units for SP1 and SP2		Four PID units for SP1, SP2, SP3, and SP4		SP No.	1.SP	2.SP	3.SP	4.SP	EX1	OFF	ON	OFF	ON	EX2	OFF	OFF	ON	ON
DIP switch < 3 >	ON (for SP only)			OFF (multiple setpoints)																																																				
Setup parameter DIS	0,1	2	3	0	1	2	3 *2																																																	
<p>EX1 [(10)-(11)]</p> 	RUN/STOP STOPs when ON		*1 Keylock /unlock (Locked when ON)	RUN/ STOP STOPs when ON	AUTO/ MAN AUTO when ON	*3 1. SP 2. SP	*1 Keylock /unlock (Locked when ON)																																																	
<p>EX2 [(9)-(11)]</p> 	AUTO/MAN AUTO when ON		OFF Unused	1. SP/2. SP 2(nd) SP when ON		3. SP 4. SP	OFF Unused																																																	
PID	One PID unit for SP	Four zone PID units	One PID unit for SP	Two PID units for SP1 and SP2		Four PID units for SP1, SP2, SP3, and SP4																																																		
SP No.	1.SP	2.SP	3.SP	4.SP																																																				
EX1	OFF	ON	OFF	ON																																																				
EX2	OFF	OFF	ON	ON																																																				

Parameter	Description
Anti-reset windup Ar- (AR)	<p>A continuous relatively large deviation while starting up control operation, for example, may lead to the buildup of an excess output due to integral action, which may cause the measured input to exceed a setpoint, resulting in an overshoot. To prevent this, UT37/UT38 both have a function that can bring the PID computation to restrain "over-integration" (anti-reset windup function).</p> <p>The AR parameter enables you to set the bandwidth of the deviation between PV and SP at which the halted PID computation resumes.</p> <p>AR : 0 (default)</p> <p>When the output reaches the high or low limit, the temperature controller automatically determines the point at which the PID computation resumes.</p> <p>: 0.1 to 999.9 (%)</p> <p>When the output reaches the high or low limit, the PID computation resumes if the deviation reaches the AR (%) of the proportional band.</p> <p>$AR = \text{Measured value (PV)} - \text{Setpoint (SP)} / P \text{ (proportional band)} \times 100$</p> 

9.3.6 Parameters for Retransmission Output and Alarm

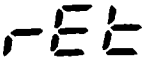
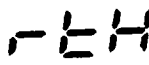
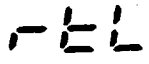
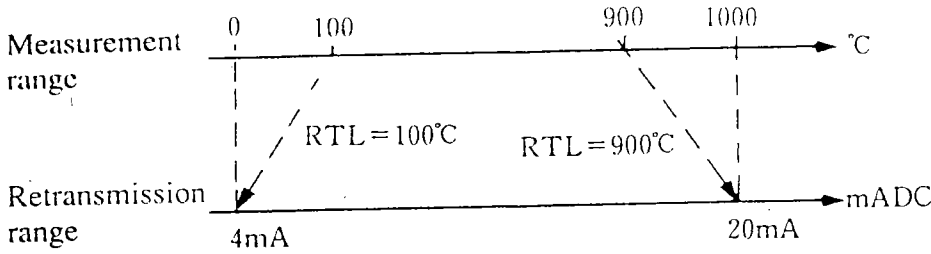
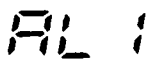
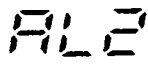
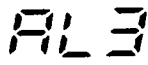
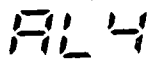
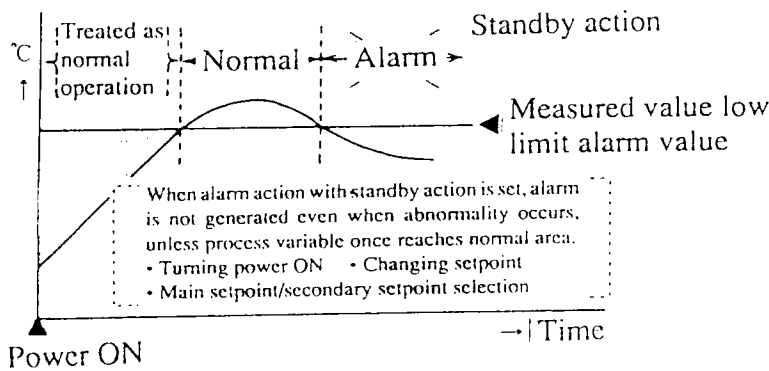
Parameter	Description
Retransmission output selection  (RET)	Displayed only when /RET (option) is specified. (4 to 20mA DC output) Select retransmission output signal from among the following five values. 0 : Measured value (corresponding to Measurement range minimum value (RL) through Measurement range maximum value (RH)) 1 : Setpoint (same as above) 2 : Output value 3 : Measured value (corresponding to Retransmission range minimum value (RTL) through Retransmission range maximum value (RTH)) 4 : Setpoint (same as above)
Retransmission range maximum value  (RTH) Retransmission range minimum value  (RTL)	If 3 or 4 is selected for retransmission output selection (RET), the retransmission range is represented with the measurement range scaled with RTH and RTL. Accuracy is consistent with the relationship between instrument range and measurement range. (See p.50.) 
Alarm 1 type  (AL1) Alarm 2 type  (AL2) Alarm 3 type  (AL3) Alarm 4 type  (AL4)	<ul style="list-style-type: none"> The desired type for alarms 1, 2, 3 and 4 can be set separately using the type codes shown in the table on the next page. Alarm 1 has a timer function as shown in Table 9.1 (see next page). Alarms with standby-action behave as shown in the following figure (example of an alarm with standby-action for the PV low limit) <p>Example of Measured value low limit alarm with standby action</p>  <ul style="list-style-type: none"> Alarm 3 can provide a failure diagnosis output (input burnout or failure in A/D converter or reference function compensation). Alarm 4 can provide a FAIL output (failure in program or error in ROM or RAM) Neither alarm 3 nor alarm 4 has an OFF function.

Table Alarm Type Code

Alarm type	Alarm action Open/Closed represents relay contact status. (Lit)/(Extinguished) represents lamp status.	Alarm type code		Alarm type	Alarm action Open/Closed represents relay contact status. (Lit)/(Extinguished) represents lamp status.	Alarm type code	
		Contact closed on alarm generation	Contact open on alarm generation			Contact closed on alarm generation	Contact open on alarm generation
Without alarm		OFF					
PV high limit		1	11	De-energize on deviation low limit alarm		6	16
PV low limit		2	12	Deviation high/low limit		7	17
Deviation high limit		3	13	Within deviation high/low limit		8	18
Deviation low limit		4	14	De-energize on PV high limit		9	19
De-energize on deviation high limit			15	De-energize on PV low limit			20

Note: Codes 1 to 10 are for alarm without standby action. Codes 11 to 20 are for alarm with standby action.

Table Timer Type Code (Only AL1)

Timer function details	Timer type code
Detection direction: Upward Time unit: Hour, min	21
Detection direction: Downward Time unit: Min, sec	22
Detection direction: Upward Time unit: Hour, min	23
Detection direction: Downward Time unit: Min, sec	24

Note 1: When timer codes listed at the left are specified for alarm type 1, setting range of alarm 1 (A1) setting is:

OFF, 00.00 to 99.59 hour/min

or

OFF, 00.00 to 99.59 min/sec

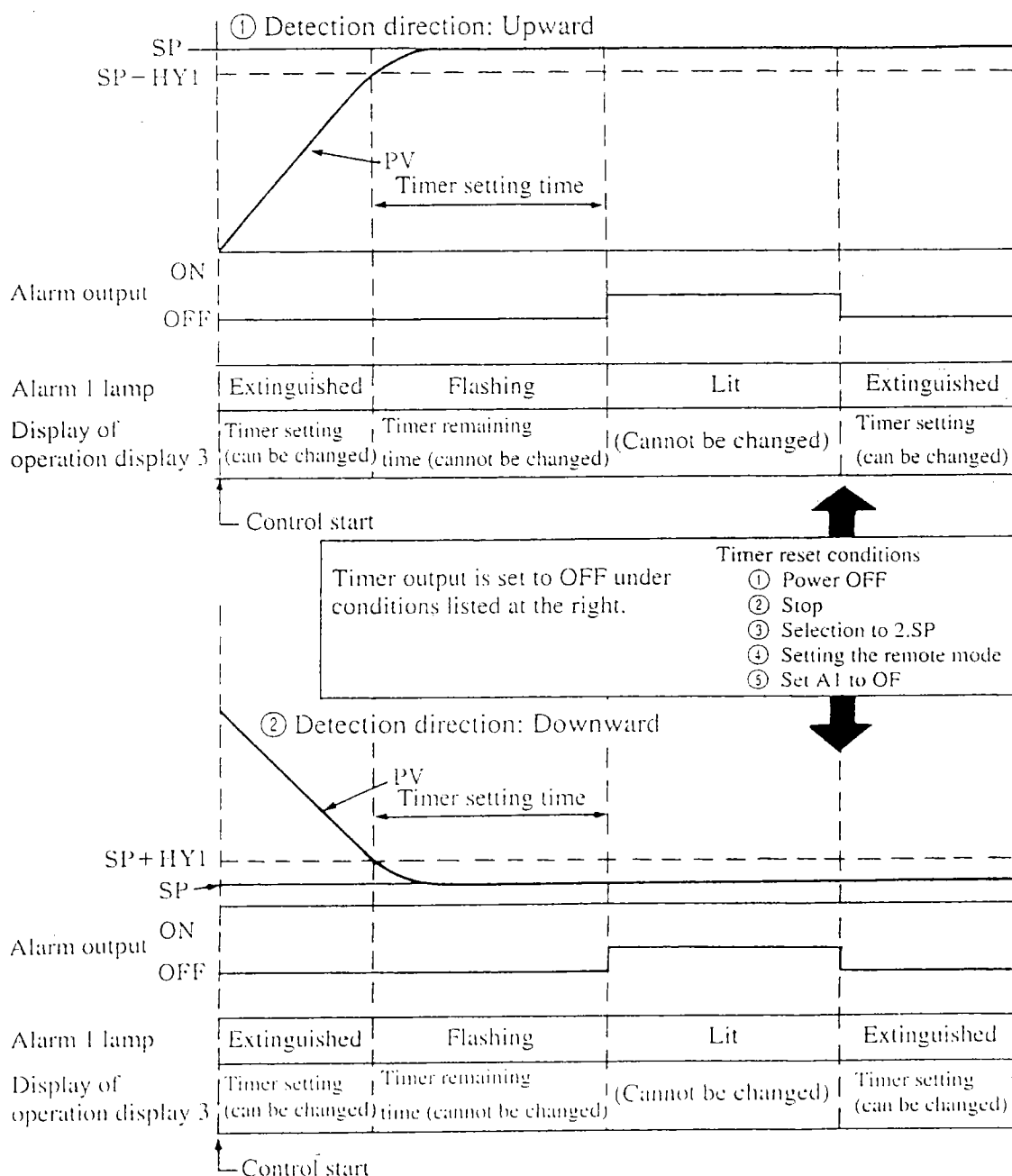
Note 2: For alarm 1 type, timer display appears when the timer codes listed at the left are specified. Instruction manual (IM5B4B7-21E) Operation Display ③

- The alarm type code for Alarm 3, failure diagnosis output (input burnout, A/D converter failure, or faulty reference function compensation), is "21."
- The alarm type code for Alarm 4, FAIL output (program failure, ROM failure, or RAM failure), is "21."

Timer function operation is described below.

Timer function turns ON the relay output for alarm 1 when time specified (by A1) for the internal UT37/38 timer elapses from the time when input measured value (PV) reaches setpoint (SP) (and its hysteresis width area specified by HY1).

Note: Timer does not work for 2.SP, 3.SP, 4.SP



Note: Timer start counting when PV reach the final target SP in case "SP up/down-ramp slope" function is used.

Parameter	Description
Hysteresis of alarm 1 H3 1 (HY1)	Set the hysteresis width to suppress hysteresis error, when alarm repeats ON/OFF frequently. Alarm 1, alarm 2, alarm 3 and alarm 4 are used independently of each other. For hysteresis width for each alarm type (set by AL1, AL2, AL3 and AL4), see p.52 of the table “Alarm Type Code.”
Hysteresis of alarm 2 H3 2 (HY2)	
Hysteresis of alarm 3 H3 3 (HY3)	
Hysteresis of alarm 4 H3 4 (HY4)	
For communication parameters, see the separate Instruction Manual (Communication Manual) (IM5B4B7-51). These parameters are displayed only when /RS422 (optional code) is specified.	

9.3.7 Valve Calibration Parameters (Only for UT38)

Parameter	Description
Valve position reset V.R 5 (V. RS) Note	V.L and V.H are initialized when V.RS is set to "1" and SET/ENT key is pressed. Valve position is displayed when V.RS is set to "0" and SET/ENT key is pressed.
Fully closed position setting V.L (V. L) Note	V.L is flashing when V.L is not set. Fully closed position can be adjusted by V.L Press ▼ key to close the valve fully. After the valve is closed fully, press SET/ENT key to finish adjustment. When SET/ENT key is pressed, 0.0 is displayed and V.L lights.
Fully open position setting V.H (V. H) Note	V.H is flashing when V.H is not set. Fully open position can be adjusted by V.H Press ▲ key to open the valve fully. After the valve is open fully, press SET/ENT key to finish adjustment. When SET/ENT key is pressed, 100.0 is displayed and V.H lights.

Note: Be sure to adjust the valve because it is not adjusted by initial value.

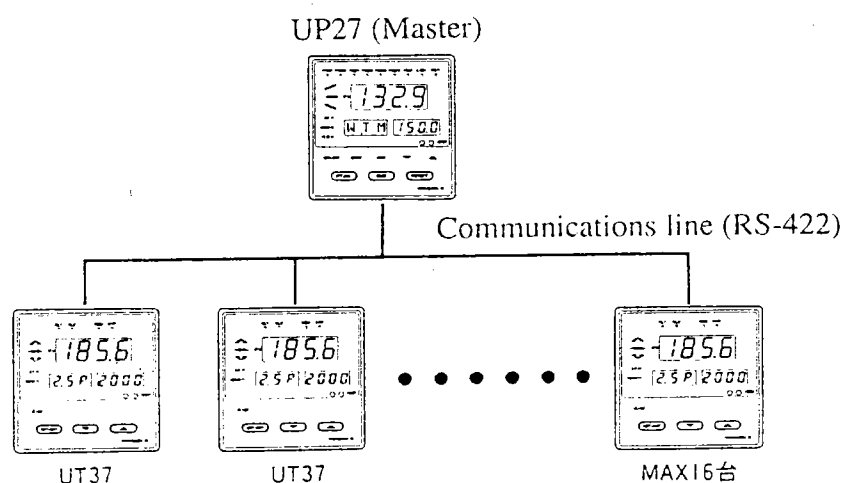
10. OTHER FUNCTIONS

10.0 Coordinated Operation

Coordinated operation works when /RS422 is specified.
(UT38 has no coordinated operation function.)

Feature of Coordinated operation

- With a UP27 as the master station, UT37s (up to 16 units) can be connected using the communications bus for program operation.



(Note: UT38 has no coordinated operation function)

- Through coordinated operation, the following information can be downloaded by the UP27:
 - ① Select UT37's PID parameters on a zone basis.
 - ② Select UT37 operation mode.
 - ③ Transmit setpoints to UT37 without error.
 - ④ Transfer information required to optimize SUPER operation.
- In the details, see Instruction Manual (Communication Manual) IM5B4B7-51E.

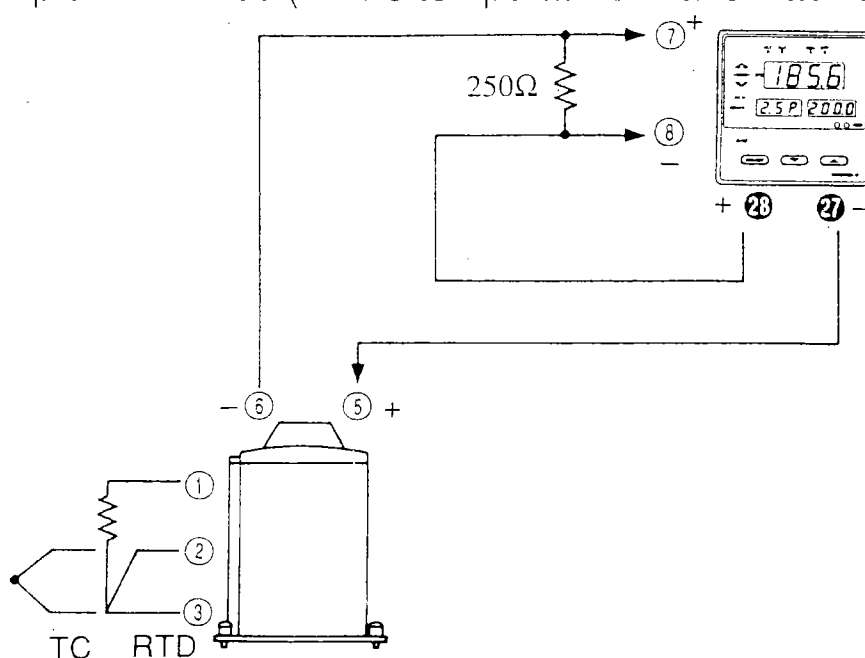
10.2 Transmitter Loop Power Supply

The transmitter power supply can be built in. (Shunt resistor of 250Ω is required.)

Power supply voltage: 21.6 ~28.0V(30mA MAX)

Terminal No.: ②⑦(+), ②⑧(-)

Example of ZT1000 (2-wire temperature Transmitter Connection)



Note: /LPS is not available if digital communication is simultaneously performed, overlaying the signal line.

NOTE

For the lightloader (setting card), there are some parameters which cannot be used due to the expansion of functions or performance of the UT37/UT38 digital indicating controller. The parameters that cannot be used are those marked "Ⓔ Added" in the operation parameter list (P.28 to 31) and the setup parameter list (P.44 to 47) in this manual. In addition, the parameters marked "Ⓔ Changed" can be used but changed parts cannot.

11. STANDARD SPECIFICATIONS

Input: Universal Method (Input Type Selectable)	
Input sampling period:	200 ms
Input accuracy:	± 0.1 of F.S. ± 1 digit (Accuracy is different according to input type/range) Refer to GS5B4B7-02E, GS5B4B8-02E
Input resistance:	Thermocouple input $1\text{M}\Omega$ or more Voltage input Approx. $1\text{M}\Omega$
Permissible signal source resistance:	Thermocouple 250Ω or less Voltage $2\text{k}\Omega$ or less
Permissible wiring resistance:	RTD input 10Ω or less/wire
Permissible input voltage:	Thermocouple, DC voltage/current input within $\pm 10\text{V}$
Noise rejection ratio:	Normal mode 40 dB (50/60Hz) or more Common mode 120 dB (50/60 Hz) or more
Filter:	OFF, 1 to 120 sec (first order lag. OFF: no filter.)
Measured input bias:	-100.0 to 100.0% of measuring span
Thermocouple standards:	IEC/DIN (U and L)/JIS
RTD standards:	IEC/DIN/JIS '89 JPT100, PT100
Display function	
Display contents:	Process variable (PV), setpoint/parameter, status lamps (6)
Process variable display:	4-digit, 7-segment LEDs (red)
Setpoint or parameter display:	3-digit + 4-digit, 7-segment LEDs (red) (variable from EU (0%) to EU (100%)) EU(0%)S ~ EU(100%)S changeable
Deviation monitor:	Green LED lights when deviation is within ± 1.0 of F.S. If deviation exceeds this range, Orange LED lights.
Setting Specifications	
Setting range	
Measured input:	Within instrument range
Target value (setpoint):	0 to 100% of the range
Setpoint high and low limits:	0 to 100% of the range
Proportional band (P):	0.1 to 999.9%
Integral time (I):	OFF, 1 to 6000 sec (OFF: Integral action is OFF)
Derivative time (D):	OFF, 1 to 6000 sec (OFF: Derivative action is OFF)
Setpoint Resolution for Process Input	
Thermocouple input	1°C or 0.1°C (1°F or 0.1°F)
RTD input	0.1°C (0.1°F)
Target Value (Setpoint) Selection	
Number of selectable setpoints:	4
Number of PID settings:	4 (to be set for each setpoint)
Setpoint selection:	Voltage-free remote contact (External contact rating: 12V DC or more, 10mA or more)

UT37 Output: Universal Method (Output Type Selectable)

Output type:	Time proportional PID (relay output) Time proportional PID (voltage pulse output for driving external SSR) Continuous output PID (4 to 20mA DC output) ON/OFF (relay output)
Relay output contact rating:	250V AC, 3A (resistive load)
Voltage pulse output:	ON voltage Approx. 12V DC or more (load resistance: 60Ω or more) OFF voltage 0.1V DC or less
4 to 20mA DC output:	Load resistance of 600Ω or less, accuracy of $\pm 0.3\%$ of F.S., output updating period of 200 ms
Cycle time:	1 to 240 sec (relay and voltage pulse output)
Output high and low limits:	-5 to 105%

UT38 Output: Position Proportional PID Output Only

Output type:	Position proportional PID relay output Output updating period 100 ms
Relay output contact rating:	250V AC, 3A (resistive load)
Feedback resistance:	100Ω to 2.5KΩ (arbitrary)
Position proportional input resolution:	0.15 (display)
Dead band:	1.0 to 10.0% (of position signal span)
Relay gap:	0.1 to 0.5%
Output action selection:	Direct/reverse action selectable
AUTO/MAN selection:	Balanceless, bumpless selection
Output velocity limit:	0.0 to 100.0%/sec (0.0%/sec means OFF.)
Other functions:	Auto-tuning, key lock, input burn-out, and SUPER .
Isolation:	Measured input and control output circuits are isolated from each other.

Alarm Function

Setting content:	Process variable high and low limits, deviation high and low limits, etc. (selectable for each point from among 20 types. Timer function can be specified. For a failure diagnosis output or a FAIL output)
Alarm value:	0 to 100% of the set range
Number of settings:	2 + 2 (Optional Codes)
Output:	Relay output contact rating: 250V AC 1A (resistive load)' (A1, A2)
Display:	LED lamp display on the front panel Tr output contact rating: 24V DC and 50mA or less (A3, A4)

Environmental Condition	
Normal operating condition	
Ambient Temperature:	0 to 50°C
Ambient Humidity:	20 to 90% R.H. (non-condensing)
Reference Junction	
Temperature Compensation Error:	0 to 50°C: $\pm 1^{\circ}\text{C}$
Magnetic Field:	400 AT/m or less
Warm-up Time:	30 min or more
Effects on operating conditions	
Ambient Temperature Effect:	Input stability
	Within ($\pm 1\mu\text{V}/^{\circ}\text{C}$ or $\pm 0.01\%/^{\circ}\text{C}$, whichever is greater)
	Output stability
	Within (4 to 20mA DC) $\pm 0.05\%/10\text{V}$
Power Supply Variation:	Input stability
	Within ($\pm 1\mu\text{V}/10\text{V}$ or $\pm 0.01\%/10\text{V}$, whichever is greater)
	Output stability
	Within (4 to 20mA DC) $\pm 0.05\% 10\text{V}$
Transmit/storage conditions	
Temperature:	-25 to 70°C
Humidity:	5 to 95% R.H. (non-condensing)
Construction, Dimensions, and Weight	
Construction:	Dustproof, drip-proof construction (front panel)
Mounting:	Flash mounting
Case:	Plastic molding (ABS resin)
Dimension:	96W \times 96H \times 100D mm
Weight:	Approx. 1Kg
Safety Standard	
CSA C22.2 No.142	
UL 508	

General Specifications

Insulation resistance:	Between each terminal and ground: 20 MΩ or more at 500 V DC
Withstand voltage:	Between power terminals and ground: 1500V AC for 1 min Between input terminals and ground: 1000 V AC for 1 min Between output terminals and ground: 1500V AC for 1 min
Supply voltage:	100 to 240V AC (universal power supply) (permissible supply voltage range: 90 to 250V AC)
Power frequency:	50/60 Hz common
Power consumption:	Approx. 12 A (100V)
Memory protection:	Nonvolatile memory

Recovery from Power Failure

Power failure of 2 sec or less

Instrument continues normal operation as if there were no power failure.

Alarm with standby action enters standby action

Power failure of more than 2 sec

Alarm Alarm with standby action restart at the status of standby

Setting parameter Resistered

Auto-tuning Canceled

Control For RST - 0

Operation continues before power failure

For RST = 1

Controller enters MAN mode

Control output is preset output value

For RST = 2

Operation continues before power failure

Control output is preset output value

If power failure occurs during setting using a key, error code **XX04** may appear.



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