

Instruction Manual

Model UP25
Communication Interface
(RS422A and RS232C)

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1. INTRODUCTION

This instruction manual describes only the additional communication specifications (RS422 and RS232C) which go with the UP25 program controller. For the functions of the UP25 itself, see the UP25 Instruction Manuals (Operation and Reference).

2. COMMUNICATION SPECIFICATIONS

- (1) Table 2-1 compares RS422A and RS232C communications.
- (2) Note that RS422A and RS232C signal-wire connections differ.
- (3) Commands used in UP25 communication are the same for both RS422A and RS232C communications.

Table 2.1

	RS422A communication	RS232C communication	
Connection system	1 : N (N=1 to 16) HOST: UP25	1 : 1 (Point-to-point) HOST: UP25	*1
Communication system	4-wire, half-duplex	3-wire, half-duplex	
Synchronization system	Start-stop type	Start-stop type	
Communication procedure	Non-procedural	Non-procedural	
Maximum communication distance (m)	500	15	
Communication rate (BPS)	150, 300, 600, 1200, 2400, 4800, 9600	150, 300, 600, 1200, 2400, 4800, 9600	*1
Start bit length (bit)	1 (Fixed)	1 (Fixed)	*2
Data length (bit)	7 or 8	7 or 8	*1
Parity	Even, odd, without parity	Even, odd, without parity	*1
Stop bit (bit)	1 or 2	1 or 2	*1
Communication code	ASCII	ASCII	
Electric characteristics	Complying with E1A RS422A	Complying with E1A RS232C	

*1 See the communication parameter setting (page 7).

- For RS422A communication: A maximum of 16 UT/UP series instruments are available for communication with one host machine. Assign a communication address (1 to 16) to each UP25.
- For RS232C communication: Only one UP25 is used to communicate with one host machine. However, as 1 to 16 communication addresses are available, any one of these can be specified. (If not specified, "1" is assigned as the communication address.)

*2 Because communication is of the start-stop type, one bit is automatically added to the start bit, i.e., it does not need to be set.

3. COMMUNICATION TERMINAL

Figure 3.1 shows the UP25 communication terminal.

Note: Use only terminals 7, 9, 13 and 15 when RS232 (additional specifications) is specified. Do not connect terminals 8 and 14. (See item 3.2.1 Connection for RS232C Communication.)

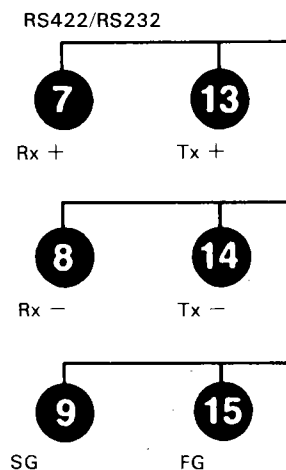
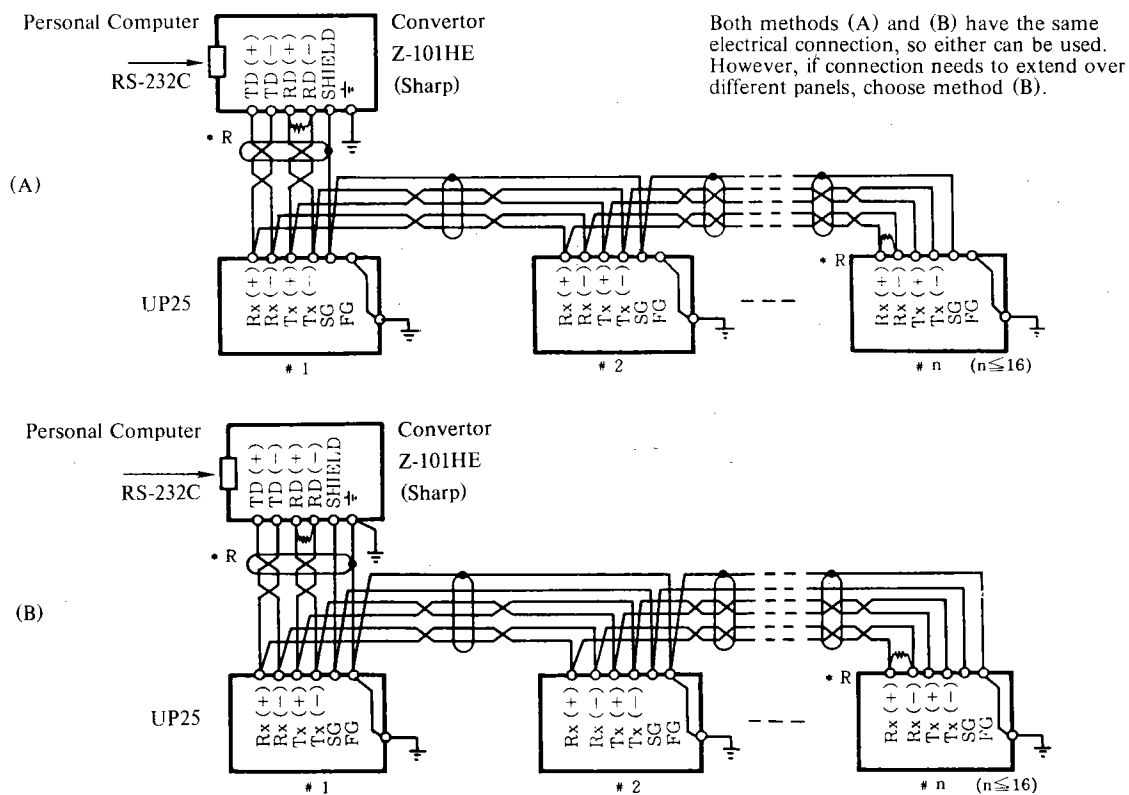


Figure 3.1

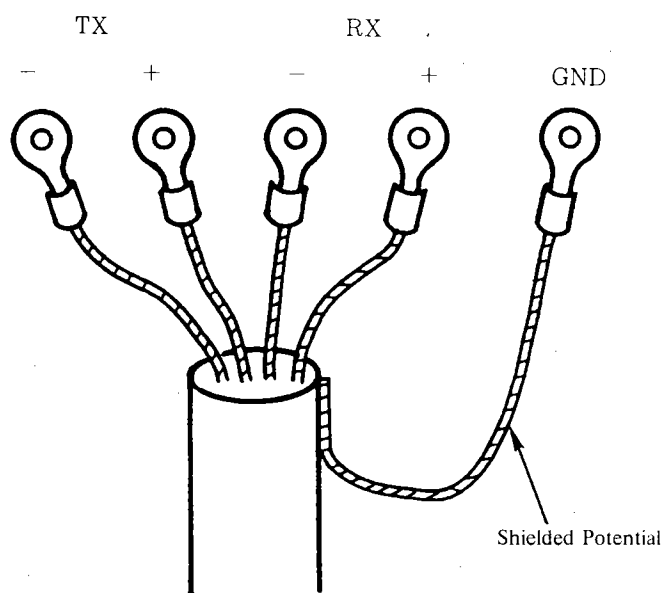
3.1 RS422A Communication

3.1.1 Connection for RS422A Communication

This paragraph describes RS422A communication connection using the Z-101 HE RS422A/RS232C convertor as an example.

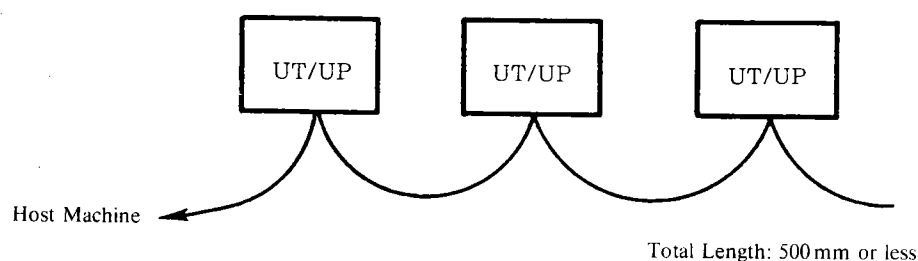


3.1.2 Termination of Cable to Be Used in RS422A Communication



3.1.3 RS422A Communication Connection Method

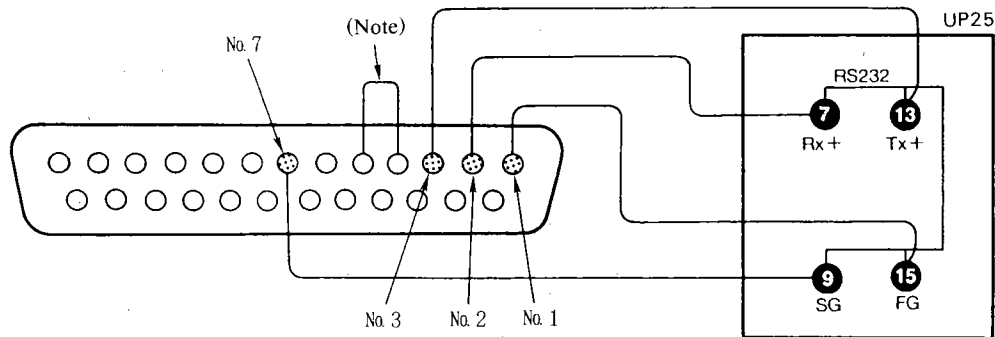
Use end-terminated cables to relay and connect UTs/UPs.



- (a) No. of instruments to be connected: A maximum of 16 units, excluding the host machine.
- (b) Equipment other than the host machine has individual device numbers and communication with a device specified by the host machine is made on a one-to-one basis. (The host machine can specify only one device.)

3.2 RS232C Communication

3.2.1 Connection for RS232C Communication



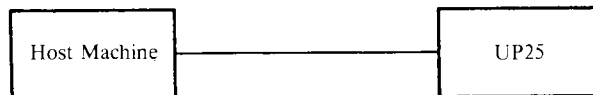
The numbers given above are RS232C interface connector pin numbers.

(Note) When connecting an instrument which has a standard 25-pin connector (such as an NEC PC9801, etc.), short pin numbers 4 and 5.

The UP25 RS232C communication interface does not support control signals (RTS, CTS, etc.), so treat host machine side control signals in accordance with the instruction manual of the host machine to be used.

3.2.2 RS232C Communication Connection Method

Use an end-terminated cable to connect instruments.



- (a) No. of instruments to be connected: One UP25 for one host machine.
- (b) The UP25 requires that the self-address be set, even in one-to-one RS232C communication. Further, the UP25 requires that the open command (described later), obtained from the host to specify its address, be used to activate the communication open status with the host machine.

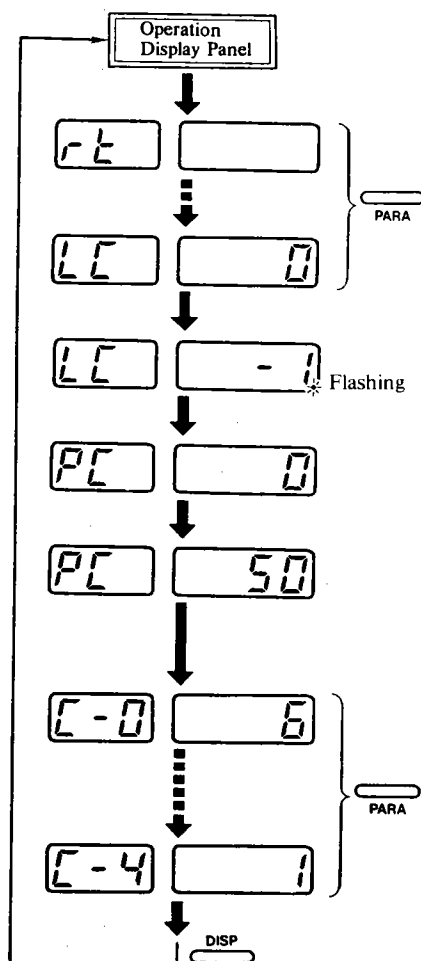
4. COMMUNICATION PARAMETER SETTING

This section describes the communication parameter (PC = 50) setting method used to communicate with the host machine. The communication parameters are keyed in, and the setting method is the same for both RS422A and RS232C.

(Set any one of 1 to 16 to the communication address, even for the RS232C.)

4.1 Setting Procedure

Follow the procedure below.



- (1) Start setting from the operation display panel. If the panel currently shown is not the operation display panel, press the **DISP** key to call up the operation display panel.
- (2) Press the **PARA** key to call up the basic parameter setting display panel. Press the **PARA** key the specified number of times (which differs with the specification code.) to display the key lock code setting display panel [LL].
- (3) Press the **RVS** and **ENT** keys simultaneously to show [LL - 1] (minus 1), then press the **ENT** key for assignment.

This causes the parameter call code [PC 0] to appear.

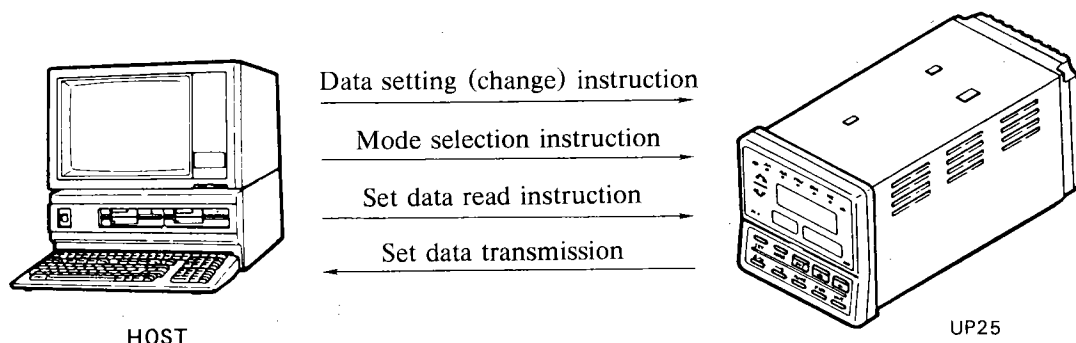
- (4) Use the **ENT** key (or **RVS** key) to display [PC 50] and then press the **ENT** key to assign it. (When this is done, the communication parameter (PC = 50) setting ready status is activated.)
- (5) The baud rate setting display panel appears. Set the baud rate to the communication address (see Table 4.1) by using the **ENT**, **PARA**, **RVS**, and **ENT** keys. (Use the **PARA** key to advance a parameter to the next one, and use that key together with the **RVS** key to reverse a parameter.)
- (6) After finishing communication parameter setting, press the **DISP** key to return to the operation display panel.

Table 4.1

Display	Symbol	Item	Unit	Setting Range	Initial Value	Remarks
[C-0]	C-0	Baud rate	—	0 to 6	—	0:150, 1:300, 2:600, 3:1200, 4:2400, 5:4800, 6:9600 BPS
[C-1]	C-1	Parity	—	0, 1, 2	0	0: Non-parity, 1: Even, 2: Odd
[C-2]	C-2	Stop bit	—	1, 2	1	1: 1 bit, 2: 2 bits
[C-3]	C-3	Transmission bit length	—	7, 8	8	7: 7 bits, 8: 8 bits
[C-4]	C-4	Communication address	—	1 to 16	1	

5. COMMUNICATION OUTLINE

The UP25 can set (change) data, select a mode, and read the data set to the UP25 and measured data from the host machine through communication with the host machine (via the RS422A or RS232C interface).



5.1 Settable Data

The following is data settable from the host to the UP25.

- (1) Setting parameter See (Note 1).
- (2) Manipulated variables (output value) in manual operations
- (3) Operation mode (Auto/Manual, Run/Stop, and Remote/Local) and ADVANCE.

5.2 Readable Data

The following data can be transmitted from UP25 to the host.

- (1) Setting parameter excluding PC50 and PC80
- (2) Manipulated variable (output value)
- (3) PV
- (4) RSP value in remote operations (SP in local operations is included in item 1 above.)
- (5) Operation mode
- (6) ALM (alarm) status

(Note 1) The following items cannot be handled by communication.

- PC10 P=0 to P=6 data setting (change)
- All PC50 (communication parameter) items
- All PC80 (valve calibration) items
- Parameters key-locked by LC (key lock code) (However, they can be set (changed) when a key lock releasing command is sent.)

(Note 2) When the UP25 is in a display status other than the operation display panel (each setting display panel), it does not accept a command from the host machine.

(Note 3) The UP25 allows only the following key operations during communication:

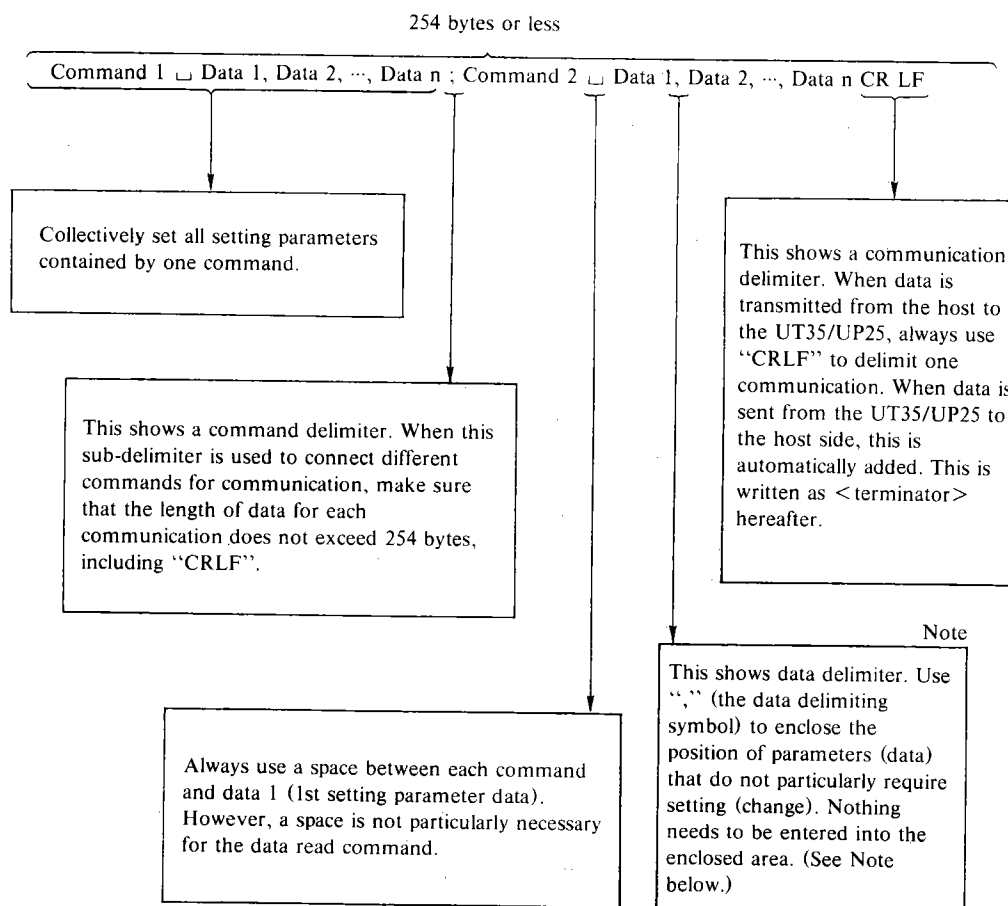
- Operation display panel selection using the **DISP** key.
- Control output in the MAN (manual operation) status.

6. UP25 COMMUNICATION DATA FORMAT

- (1) Communication data: ASCII code
- (2) Maximum receiving data length: 254 bytes
- (3) Maximum transmission data length: 254 bytes
- (4) Terminator (Communication delimiting symbol): "CRLF"*
 - Sub-delimiter (Command delimiting symbol): ";"
 - Data delimiter (Data delimiting symbol): ","

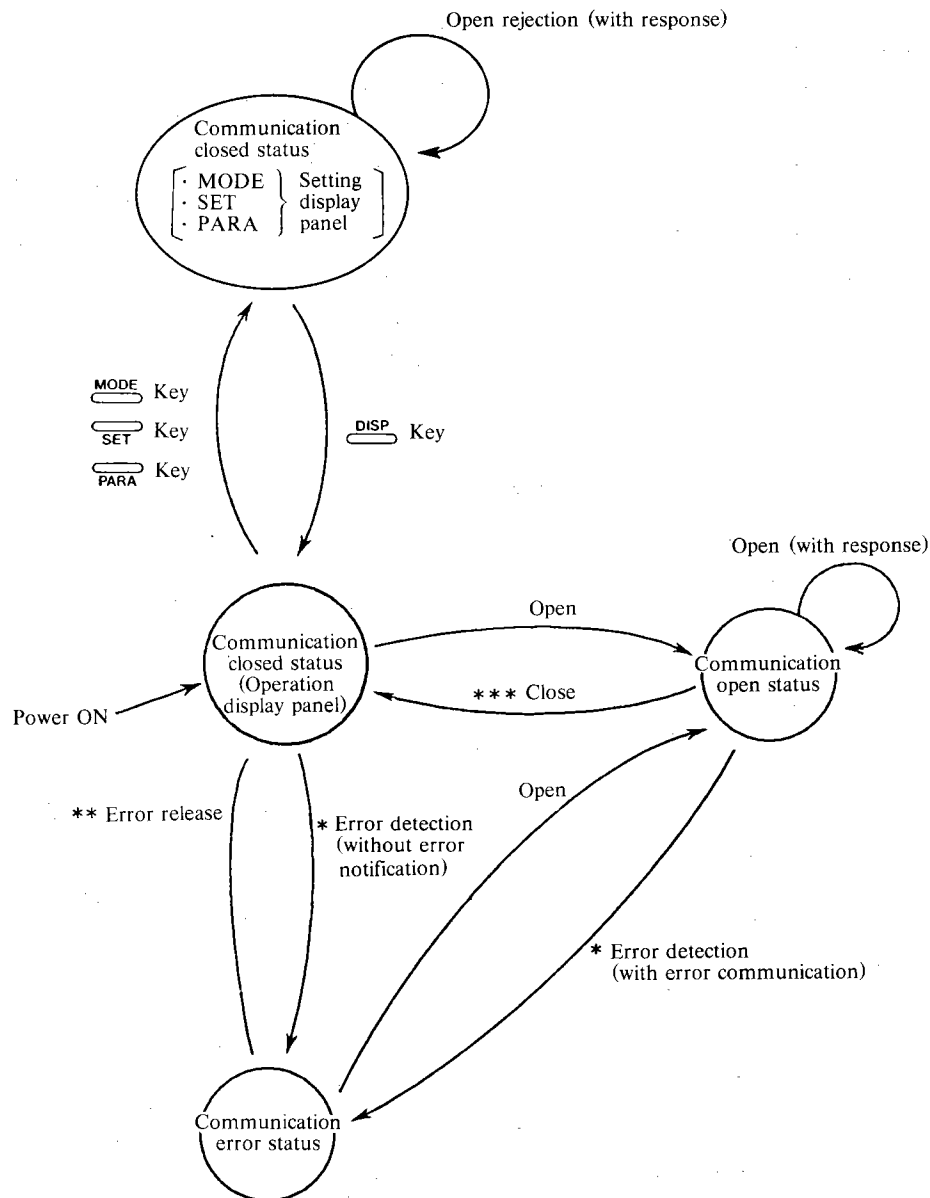
* This manual uses <terminator> as "CRLF" (ϕ DH ϕ AH) hereafter. However, when the UP25 is receiving data, even "CR" is accepted as <terminator>.

[Example]



Note: For description of the combined data construction of each communication command given in Chapter 8, for example, these correspond to parameters (data) enclosed with parentheses, like those given in 8.4 Setting Command S*. In other words, if *A1 does not need to be set (changed), transmitting data of S*□ (*SP), (*TM), , (*A2) <terminator> from the host to the UP25 is accepted. In this sense, each parameter is expressed by enclosing it with parentheses. On the other hand, transmission data from the UP25 to the host machine includes all parameter items and is not expressed using parentheses. This identifies both types.

7. COMMUNICATION STATUS TRANSITION





* Error detection
Errors given in this section are framing and parity errors.

** Error release

It is considered that correct setting of UP25 communication-related parameters (PC50) releases an error. (There might be disagreement between the communication conditions of the host machine and those of a temperature controller.)

*** Close

To change the communication open status to the communication closed status from the UP25, press the  and  keys simultaneously. This operation must be done if the host side is experiencing trouble.

7.1 Communication Closed Status

This status is that in which the UP25 is not specified (when specified, it is called "open" hereafter) by the host as a communication destination. This status does not accept data setting and data read commands. However, the keying operation is available.

7.1.1 The Communication Closed Status is Activated When:

- (1) Power is turned ON.
- (2) This UP25 receives " $\begin{bmatrix} E_{SC} \end{bmatrix}$ C $\begin{bmatrix} L \end{bmatrix}$ self-address $\begin{bmatrix} C_R \end{bmatrix}$ $\begin{bmatrix} L_F \end{bmatrix}$ " from the host side in the communication open status. In this case, the UP25 returns " $\begin{bmatrix} E_{SC} \end{bmatrix}$ C $\begin{bmatrix} L \end{bmatrix}$ self-address $\begin{bmatrix} C_R \end{bmatrix}$ $\begin{bmatrix} L_F \end{bmatrix}$ " to the host.
- (3) The UP25 receives " $\begin{bmatrix} E_{SC} \end{bmatrix}$ O $\begin{bmatrix} L \end{bmatrix}$ another address $\begin{bmatrix} C_R \end{bmatrix}$ $\begin{bmatrix} L_F \end{bmatrix}$ " from the host machine in the communication open status. In this case, the UP25 enters the communication closed status without returning anything to the host.
- (4) The UP25 does not display the operation display panel.

In this case, the UP25 does not change to the communication open status, even if it receives " $\begin{bmatrix} E_{SC} \end{bmatrix}$ O $\begin{bmatrix} L \end{bmatrix}$ self-address $\begin{bmatrix} C_R \end{bmatrix}$ $\begin{bmatrix} L_F \end{bmatrix}$ "; instead, it returns " $\begin{bmatrix} E_{SC} \end{bmatrix}$ O $\begin{bmatrix} L \end{bmatrix}$ 00 $\begin{bmatrix} C_R \end{bmatrix}$ $\begin{bmatrix} L_F \end{bmatrix}$ " to the host machine.

7.1.2 The Communication Closed Status Changes to Another Status When:

- (1) The UP25 receives " $\begin{bmatrix} E_{SC} \end{bmatrix}$ O $\begin{bmatrix} L \end{bmatrix}$ self-address $\begin{bmatrix} C_R \end{bmatrix}$ $\begin{bmatrix} L_F \end{bmatrix}$ " from the host machine when it displays the operation display panel in the communication closed status. In this case, the UP25 returns " $\begin{bmatrix} E_{SC} \end{bmatrix}$ O $\begin{bmatrix} L \end{bmatrix}$ self-address $\begin{bmatrix} C_R \end{bmatrix}$ $\begin{bmatrix} L_F \end{bmatrix}$ " to the host at the same time as changing to the communication open status.
- (2) An error (framing or parity errors) is caused. In this case, the UP25 changes to the communication error status.

7.2 Communication Open Status

This is a status in which the UP25 has been addressed.

This status accepts data setting and data read commands. However, operation display panel selection using the $\begin{bmatrix} DISP \end{bmatrix}$ key, and keying operations to achieve operation other than control output in the MAN (manual operation) status, are not available.

7.2.1 The Communication Open Status is Activated When:

- (1) The UP25 receives " $\begin{bmatrix} E_{SC} \end{bmatrix}$ O $\begin{bmatrix} L \end{bmatrix}$ self-address $\begin{bmatrix} C_R \end{bmatrix}$ $\begin{bmatrix} L_F \end{bmatrix}$ " from the host machine in the communication closed status. In this case, the UP25 returns " $\begin{bmatrix} E_{SC} \end{bmatrix}$ O $\begin{bmatrix} L \end{bmatrix}$ self-address $\begin{bmatrix} C_R \end{bmatrix}$ $\begin{bmatrix} L_F \end{bmatrix}$ " to the host and changes into the communication open status.
- (2) The UP25 receives " $\begin{bmatrix} E_{SC} \end{bmatrix}$ O $\begin{bmatrix} L \end{bmatrix}$ self-address $\begin{bmatrix} C_R \end{bmatrix}$ $\begin{bmatrix} L_F \end{bmatrix}$ " from the host machine in the communication error status. In this case, the UP25 returns " $\begin{bmatrix} E_{SC} \end{bmatrix}$ O $\begin{bmatrix} L \end{bmatrix}$ self-address $\begin{bmatrix} C_R \end{bmatrix}$ $\begin{bmatrix} L_F \end{bmatrix}$ " to the host and changes into the communication open status.



7.2.2 The Communication Open Status Changes to Another Status When:

- (1) The UP25 receives " $\begin{bmatrix} E_{SC} \end{bmatrix}$ C $\begin{bmatrix} L \end{bmatrix}$ self-address $\begin{bmatrix} C_R \end{bmatrix}$ $\begin{bmatrix} L_F \end{bmatrix}$ " from the host machine in the communication open status. In this case, the UP25 returns " $\begin{bmatrix} E_{SC} \end{bmatrix}$ C $\begin{bmatrix} L \end{bmatrix}$ self-address $\begin{bmatrix} C_R \end{bmatrix}$ $\begin{bmatrix} L_F \end{bmatrix}$ " to the host at the same time as changing to the communication closed status.
- (2) The UP25 receives " $\begin{bmatrix} E_{SC} \end{bmatrix}$ O $\begin{bmatrix} L \end{bmatrix}$ another address $\begin{bmatrix} C_R \end{bmatrix}$ $\begin{bmatrix} L_F \end{bmatrix}$ " from the host machine in the communication open status. In this case, the UP25 changes to the communication closed status without returning anything to the host.
- (3) An error (framing or parity errors) is caused in the communication open status. In this case, the UP25 returns ERR200 to the host and changes to the communication error status.

- (4) The UP25 power is turned OFF and then ON in the communication open status. In this case, the UP25 changes to the communication closed status without sending anything to the host.

7.3 Communication Error Status

This status accepts recovery action (re-open) from the host machine or recovery action on keying in new communication parameters (C-0 to C-4).









The communication error status causes  on the display unit ( in the parameter item area) to flash. Re-opening or re-setting the communication parameters enables the UP25 to recover from the communication error status, and the above flashing stops when the UP25 changes to another status.

If the flashing does not stop, even when the above-mentioned recovery action is taken, an EEPROM error is considered to have been caused, which requires correction. (See "List of other abnormal displays, Table 13.2" in the Instruction Manual's Operation Volume.)

7.3.1 Conditions Causing the Communication Error Status

- (1) An error (framing or parity errors) in the communication open status causes the UP25 to return ERR200 to the host machine before the UP25 changes to the communication error status.
- (2) An error in the communication close status causes the UP25 to send nothing to the host before changing to the communication error status.



7.3.2 The Communication Error Status Changes to Another Status When:

- (1) The communication parameters (C-0 to C-4) are keyed in to reset in the communication error status. This activates the communication closed status.
- (2) The UP25 receives "  O  self-address   " in the communication error status, enabling it to change to the communication open status. In this case, the UP25 returns "  O  self-address   " to the host.
- (3) The UP25 power is turned OFF and then ON in the communication error status, causing it to change to the communication closed status without returning anything to the host machine.

8. COMMANDS

This section describes the communication commands used with the UP25. Table 8.1 shows a list of the commands.

Table 8.1

Commands Category	Command Symbol	Function Outline	Command Classification		Reference Page
			For Setting	For Reading	
Open command (Reserve command)	 O	Used together with [ESC]. This enables the host machine to reserve (open) a temperature controller as the communication destination in response to [ESC]O. *1	○*2	—*3	P.15
Close command (Release command)	 C	Used together with [ESC]. This enables the host machine to release (close) the communicating temperature controller from communication in response to [ESC]C.	○	—	P.16
Mode commands	AM	Selects AUTO (automatic)/MAN (manual) and identifies the current mode.	○	○	P.17
	MD	Selects the operation mode and identifies its status.	○	○	P.18
	AT	Executes auto-tuning and identifies its status.	○	○	P.19
	AV	Advances the UP25 program to the next segment.	○	○	P.20
Setting commands	S*	* = 1 to 8 This sets (modifies) and reads out data from all the setting parameter items.	○	○	P.21
	SP	Sets (modifies) and reads out data from all UP25 operation parameter programmed operation parameter items.	○	○	P.22
	SL	Sets (modifies) and reads out data from UP25 operation parameter fixed setpoint control parameter items.	○	○	P.23
Basic parameter commands	PA	Sets (modifies) and reads out data from the basic parameter items (not including the key lock code).	○	○	P.24
	LC	Sets (modifies) and reads out data from the key lock code items.	○	○	P.25
Engineering parameter commands	PR	Reads out instrument range-and measuring range-related data. (For PC10)	—	○	P.26
	PI	Sets (modifies) and reads out data from (P-5) to (P-8) of PC10.	○	○	P.27
	P2	Sets (modifies) and reads out data from all PC20 parameter items.	○	○	P.28
	P3	Sets (modifies) and reads out data from all PC30 parameter items.	○	○	P.29
	P4	Sets (modifies) and reads out data from all PC40 parameter items.	○	○	P.30

*1 : [ESC] stands for 1 BH.

*2 : "○" stands for a relevant item.

*3 : "—" stands for an irrelevant item.

Commands Category	Command Symbol	Function Outline	Command Classification		Reference Page
			For Setting	For Reading	
Display commands	DA	Identifies whether the UP25 PV event is ON or OFF.	—	○	P.31
File data command	DP	Identifies temperature controller output value (OUT), measured value (PV), target setpoint (SP), and deviation (DV).	—	○	P.32
	DU	Identifies the controller's current unit.	—	○	P.33
	DR	Identifies data on currently program-executed, repetitive UP25 operations.	—	○	P.34
	DS	Identifies data on the current position of currently program-executed UP25 operations.	—	○	P.35
	DT	Identifies whether the UP25 time event status is ON or OFF.	—	○	P.36
	OP	Identifies controller output data and also allows output data to be modified when the operation mode is set to RUN (running) and MAN (manual).	○	○	P.37
	OO	Modifies and identifies valve opening time for the position proportional PID output temperature controller.	○	○	P.38
	OC	Modifies and identifies valve closing time for the position proportional PID output temperature controllers.	○	○	P.39
	PG	Sets (modifies) and reads out the UP25 pattern setting parameter.	○	○	P.40
	PP	Sets (modifies) and reads out the UP25 pattern and segment numbers.	○	○	P.41
	PE	Erases the UP25 pattern.	○	—	P.42
	PC	Copies the UP25 pattern to another pattern number.	○	—	P.43
	SE	Erases the segment of the currently selected UP25 pattern and segment numbers.	○	—	P.44
	SI	Inserts the current segment into the segment next to the currently selected UP25 pattern and segment numbers.	○	—	P.45
	TS	Reads out the total number of UP25 segments currently set.	—	○	P.46
	PS _{□m}	Reads out the number of segments set to a particular pattern. ("m" stands for the pattern number.)	—	○	P.47

8.1 Open Command

O This command specifies (opens) the communication destination from the host machine to the UP25. The command needs to be used together with ESC .

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	ESC O AA <Terminator>					An opening from the host the UP25 cannot be specified during valve calibration (when PC80 is manipulated) Note 1 · When the UP25 is opened in response to the opening designation, it returns "ESC O AA <terminator>". · If the UP25 cannot be opened in response to the opening designation, it returns "ESC O 00 <terminator>".
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	ESC O AA <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	ESC O AA <Terminator> ESC O 00 <Terminator> Notes 1 and 2					
Command O-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	Note 2 · If there is no relevant address in the UP25s physically connected to the host, each UP25 sends nothing in response to the open command from the host.
	AA	UP25 communication address	—	01 to 16 (ASCII)	01	

8.2 Close Command

C This command release (closes) the address status from the host machine to the UP25 and needs to be used together with ESC .

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - <div>HOST → UP25</div>	<div>ESC C AA <Terminator></div>					<div>Note 1</div> <ul style="list-style-type: none">When the UP25 is closed in response to a close designation, it returns “ <div>ESC</div> C AA <terminator> ”.If the UP25 cannot be closed in response to a close designation, it returns “ <div>ESC</div> C 00 <terminator> ”. <div>Note 2</div> <ul style="list-style-type: none">If there is no relevant address to be closed in the UP25s physically connected to the host machine, each UP25 sends nothing in response to the close command from the host.
Structure of receiving data at data read - Data flow - <div>HOST → UP25</div>	<div>ESC C AA <Terminator></div>					
Structure of transmission data in response to data setting and read instructions - Data flow - <div>UP25 → HOST</div>	<div>ESC C AA <Terminator></div> <div>ESC C 00 <Terminator></div> <div>Notes 1 and 2</div>					
Command C-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	AA	UP25 communication address	—	01 to 16 (ASCII)	01	

8.3 Mode Command

AM This command selects the UP25's AUTO (automatic operation)/MAN (manual operation) and identifies its status.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	AM□(n) <Terminator>					AUTO (automatic operation)/MAN (manual operation) cannot be selected under the following conditions: • During auto-tuning • When the external contacts (terminals ⑦ and ⑨) are closed and the status is in AUTO (automatic operation) when [EX1] (additional specification) is specified. • When the key lock code (LC) is set to 2, 3, or 4.
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	AM <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	AM□n <Terminator>					
Command AM-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	n	AUTO (automatic operation)/MAN (manual operation) selection	—	0: MAN 1: AUTO	0	

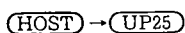
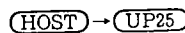
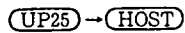
MD This command selects the UP25's operations modes and identifies its statuses.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - <div>HOST → UP25</div>	MD □(m), (n) <Terminator>					The operation mode can not be selected under the following conditions: • During auto-tuning • When the key lock code (LC) is set to 2, 3, or 4.
Structure of receiving data at data read - Data flow - <div>HOST → UP25</div>	MD <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - <div>UP25 → HOST</div>	MD □m, n <Terminator>					
Command MD-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	*	Selection between RESET, LOCAL, and PROGRAM	—	0: RESET 1: LOCAL 2: PROGRAM		
	n	HOLD execution	—	0: HOLD release 1: HOLD execution		

AT This command executes UP25 auto-tuning and identifies its status.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	AT□(n) <Terminator>					Auto-tuning cannot be executed when: · The RESET mode is selected. · The operation mode is set to MAN (manual operation). · A heating/cooling or 3-position control type is used. · The key lock code (LC) is set to 2, 3, or 4.
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	AT <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	AT□n <Terminator>					
Command AT-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	n	Auto-tuning execution/non-execution	—	0: Not in A.T. 1: In A.T.	0	

AV Executes the UP25's ADVANCE. (ADVANCE is a function that advances the program by one segment during program operations.)

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - 	AV <Terminator>					Note 1 The AV command executes ADVANCE only when it is used together with a terminator.
Structure of receiving data at data read - Data flow - 	This command does not function as a data read command.					
Structure of transmission data in response to data setting and read instructions - Data flow - 	AV □ ℓ, m <Terminator> (When ADVANCE is executed)					
Command AV-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	ℓ	ADVANCE-executed program pattern No.	—	0 to 4 or 0 to 8 which represent the already-set pattern numbers	—	
	m	Segment No. to which the program has progressed after ADVANCE has been executed		01 to 30 or 01 to 60 which represent the already-set segment numbers.		

8.4 Setting Command

S* Functions as data setting and data read commands for UP25 setting parameter items.
 ----- * : 1 to 8

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	S*□ (*P), (*I), (*D), (*Pc), (*Ic), (*Dc), (*OH), (*OL) (*RP) <Terminator> Notes 1, 2, and 3					Set “—” to the values of the following parameters under the conditions below. (In this case, those for the transmission data from the temperature controller also become “—”). • All parameter items for the 3-position control type. • (*Pc), (*Ic), and (*Dc) for an instrument other than the heating/cooling type. Note 1 *RP exists only when * is 1 to 6. Note 2 When * is 7, the position of *RP changes to “—”. Note 3 When * is 8, the position of *RP changes the “RDV” set value. A parameter cannot be set (modified) under the following conditions, (even though read is available): • During auto-tuning • When the key lock code (LC) is set to 3 or 4.
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	S* <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	S*□ *P, *I, *D, *Pc, *Tc, *Dc, *OH, *OL *RP <Terminator> Notes 1, 2, and 3					
Command S*-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	*P	Proportional band	%	0, 0.1 to 999.9	100.0	
	*I	Integral time	sec.	0, 1 to 6000	0	
	*D	Derivative time	sec.	0, 1 to 6000	0	
	*Pc	Proportional band (Cooling side)	%	0, 0.1 to 999.9	100.0	
	*Ic	Integral time (Cooling side)	sec.	0, 1 to 6000	0	
	*Dc	Derivative time (Cooling side)	sec.	0, 1 to 6000	0	
	*OH	High output limit value	%	- 5.0 ≤ OL < OH ≤ 105.0	100.0	
	*OL	Low output limit value			0.0	
	*RP	Reference point Note 1	EU	EU(0%) to EU(100%)	EU (100%)	
		Note 2	—	—	—	
	RDV	Reference DV Note 3	EU	EU(0%)S to EU(100%)S	EU	

SP Sets (modifies) and reads out data from among all UP25 operation parameter program items.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - <div>HOST → UP25</div>	SP□(PTN), (RC), (RS), (RE) <Terminator>					A parameter control be set (modified) under the following conditions, (even though read is available): <ul style="list-style-type: none">• During auto-tuning• When the key lock code (LC) is set to 3 or 4• When the operation mode is in the REM (remote setting) status.• When the PTNEX (additional specification) contact is set to ON.• When a pattern number whose pattern has not been set is selected.• When pattern No. = 0.
Structure of receiving data at data read - Data flow - <div>HOST → UP25</div>	SP <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - <div>UP25 → HOST</div>	SP□PTN, RC, RS, RE <Terminator>					
Command SP-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	PTN	Pattern No.	—	• 0 to 4 (4-pattern type) • 0 to 8 (8-pattern type)	0	
	RC	Repeat start segment No.	No. of times	0 to 999	0	
	RS	Repeat end segment No.	—	The range of segment Nos. set to the program pattern	1	
	RE	Repeat end segment No.	—	The range of segment Nos. set to the program pattern	Final segment No. within one pattern	

SL Sets (modifies) and reads out data from UP25 operation parameter constant-value control operation parameter items.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	SL □ (LSP) < Terminator >					A parameter control be set (modified) under the following conditions, (even though read is available): • During auto-tuning • When the key lock code (LC) is set to 3 or 4
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	SL < Terminator >					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	SL □ LSP < Terminator >					
Command SL-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	LSP	Target setpoint No.	EU	EU (0%) to EU (100%)	EU (0%)	

8.5 Basic Parameter Command

PA Functions as the data setting and data read commands for the basic parameter items excluding UP25's key lock and parameter call codes.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	PA□(WZ), (WT), (CT), (CTc), (HS), (DB), (HYS), (STC), (TC) <Terminator>					Set “—” to the values of the following parameters, under the conditions below. (In this case, those for transmission data from the temperature controller also become “—”.) · (CT) for an instrument other than the time proportional output type · (CTc) for an instrument other than the heating/cooling type (cooling side time proportional output type) · (HS) for the heating/cooling, 3-position control, and position proportional PID output types · (DB) and (HYS) for an instrument other than the heating/cooling, 3-position control, and position proportional PID output types · (TC) for the heating/cooling and 3-position control types
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	PA <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	PA□WZ, WT, CT, CTc, HS, DB, HYS, STC, TC <Terminator>					
Command PA-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	A parameter cannot be set (modified) under the following conditions, (even though read is available). · During auto-tuning · When the key lock code (LC) is set to 1, 2, 3, or 4. Note 1 There is no HS in the UP25 display. Therefore, when HS is keyed in, it is included in HYS. Note 2 1.0 to 10.0: Position proportional PID type 1.0 to 10.0: 3-position control type — 10.0 to 10.0: Heating/cooling type
	WZ	Wait zone	EU	EU(0%)S to EU(10%)S	EU(0%)S	
	WT	Wait time	Min./sec	0 to 100	0	
	CT	Cycle time	sec.	1 to 100	10	
	CTc	Cycle time (cooling side)	sec.	1 to 100	10	
	Note 1 HS	Hysteresis upon one output ON/OFF control	EU	EU(0.0%)S to EU(15.0%)S	EU(0.5%)S	
	DB	Dead band (neutral band)	%	Note 2	1.0	
	HYS	Hysteresis	%	0.1 to 0.5	0.1	
	STC	Start code	—	0, 1, 2	0	
	TC	Tuning code	—	0, 1, 2	2	
	SC	Super code	—	0, 1, 2	0	

LC Functions as data setting and data read commands for the UP25 key lock code.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	LC□(LC) <Terminator>					A parameter cannot be set (modified) during auto-tuning, (even though read is available).
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	LC <Terminator>					
Structure of transmission data in response to data, setting and read instructions - Data flow - (UP25) → (HOST)	LC□LC <Terminator>					
Command LC-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	LC	Key lock code	—	0, 1, 2, 3, 4	0	

8.6 Engineering Parameter Command

PR Functions as a data read command for some of the UP25 PC10 parameter items.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	This command has no data setting function.					Note 1 · For TC and RTD inputs (Min. range value) ≤ (P-3) < (P-2) ≤ (Max. range value) · For linear input -1999 ≤ (P-3) < (P-2) ≤ 9999 Note 2 P-4 is always 0 for the cryogenic type.
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	PR <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	PR □P-0, P-1, P-2, P-3, P-4 <Terminator>					
Command PR-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	P-0	Input range code	—	000 to 250	To be specified at ordering	
	Note 1 P-1	Linear range decimal point place	—	0, 1, 2, 3	1	
	P-2	Max. value in measuring range	EU	Note 2	EU (100%)	
	P-3	Min. value in measuring range	EU		EU (0%)	
	Note 3 P-4	Engineering unit	—	0, 1, 2, 3	0	

PI Functions as data setting and data read commands for some of the UP25 PC10 parameters.

Parameters for some of the UP25 FC10 parameters.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	PI□(P-5), (P-6) <Terminator>					A parameter cannot be set (modified) under the following conditions. (However, read is available.) · During auto-tuning · When the key lock code (LC) is set to 1, 2, 3, or 4.
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	PI <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	PI□P-5, P-6 <Terminator>					
Command PI-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	P-5	Input signal bias	EU	EU(−5%)S to EU(5%)S	EU(0%)S	
	P-6	Process input filter	sec.	0, 1 to 150	0	

P2 Functions as data setting and data read commands for UP25 PC20 parameter items.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	P2□(E-0), (E-1), (E-4), (E-6) <Terminator>					A parameter cannot be set (modified) under the following conditions, (even though read is available). • During auto-tuning • When the key lock code (LC) is set to 1, 2, 3, or 4.
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	P2 <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	P2□E-0, E-1, E-4, E-6 <Terminator>					
Command P2-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	E-0	High setpoint limit value	EU	EU(0%) ≤ E-1 < E-0 ≤ EU(100%)	EU (100%)	
	E-1	Low setpoint limit value			EU(0%)	
	E-4	SP tracking selection	—	0, 1	0	
	E-6	Selection of time units	—	0, 1	0	

P3 Functions as data setting and data read commands for UP25 PC30 parameter items.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	P3□(F-0), (F-1), (F-2), (F-3), (F-4) <Terminator>					Set “—” to the values of the following parameters under the conditions below. · (F-0), (F-1) and (F-2) for the 3-position output type · (F-1) for the heating/cooling type A parameter cannot be set (modified) under the following conditions, (even though read is available). · During auto-tuning · When the key lock code (LC) is set to 1, 2, 3, or 4.
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	P3 <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	P3□F-0, F-1, F-2, F-3, F-4 <Terminator>					
Command P3-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	F-0	Manual reset value	%	— 5.0 to 105.0	50	
	F-1	Direct/reverse action	—	0, 1	0	
	F-2	Output velocity limit	%/sec.	0, 0.1 to 100.0	0	
	F-3	Preset output value	%	— 5.0 to 105.0	0.0	
	F-4	Restart mode	—	0, 1, 2	0	

P4 Functions as data setting and data read commands for UP25 PC40 parameter items.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - <div>HOST → UP25</div>	P4□(G-0), (G-1), (G-2), (G-5), (G-6) <Terminator>					Set “—” to the values of the following parameters under the conditions below. (In this case, those for transmission data from UP25 also become “—.”): · (G-0), (G-1), and (G-2) when RET1 or RET2 (option) is not specified. Note 1 When this parameter is set to code 1 or 4, transmission output is subject to the setting range limit of high setting limit values “E-0” and “E-1”. A parameter cannot be set (modified) under the following conditions, (even though read is available). · During auto-tuning · When the key lock code (LC) is set to 1, 2, 3, or 4.
Structure of receiving data at data read - Data flow - <div>HOST → UP25</div>	P4 <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - <div>UP25 → HOST</div>	P4□G-0, G-1, G-2, G-5, G-6 <Terminator>					
Command P4-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	G-0	Retransmission output selection	—	Note 1 0, 1, 2, 3, 4	0	
	G-1	Max. value in retransmission range	EU	EU(0%) ≤ G-2 < G-1 ≤ EU(100%)	EU(100%)	
	G-2	Min. value in retransmission range			EU(0%)	
	G-5	Hysteresis of alarm 1	EU	EU(0.0%)S to EU(5.0%)S	EU(0.5%)S	
	G-6	Hysteresis of alarm 2	EU	EU(0.0%)S to EU(5.0%)S	EU(0.5%)S	

8.7 Display Command

DA Determines whether UP25 PV events 9 and 10 are set to ON or OFF.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	This command has no data setting function.					
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	DA <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	DA □m, n <Terminator>					
Command DA-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	m	PV event 9 ON/OFF	—	0: PV event OFF 1: PV event ON	—	
	n	PV event 10 ON/OFF	—	0: PV event OFF 1: PV event ON	—	

DP Reads out UP25's control output value, measured value, target setpoint, deviation, and PID No. (set number of setting parameters).

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - <div>HOST → UP25</div>	This command has no data setting function.					Set “-” to the value of parameter (PID No.) for the 3-position control type. Note 1 The control output value, measured value, target setpoint, and deviation are expressed by ASCII character strings. Note 2 • When measurement input exceeds the limit: “+ OVER” is output (when it is 105% or more). “- OVER” is output (when it is - 5% or less). • In the event of measurement input disconnection: “BURN OUT” data is output. Further, if A/D converter error, reference cold junction compensation failure, or improper auto-tuning is caused, the following data is output after measured value data. <div>* E 3 φ φ * RJC_ERR * E 2 φ φ</div> <div>↓ Priority order</div>
Structure of receiving data at data read - Data flow - <div>HOST → UP25</div>	DP < Terminator >					
Structure of transmission data in response to data setting and read instructions - Data flow - <div>UP25 → HOST</div>	Note 1 DP □ ℓ, m, n, o, p < Terminator >					
Command DP-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	ℓ	Control output value	—	—	—	
	m	Measured value Note 2	—	—	—	
	n	Target setpoint	—	—	—	
	o	Deviation	—	—	—	
	p	PID No.	—	1 to 8	1	

DU Reads UP25 using units.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	This command has no data setting function.					Note 1 Only 0:K is available for the cryogenic type.
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	DU <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	DU□n <Terminator>					
Command DU-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	n	Unit	—	0: °C Note 1 1: °F 2: ‰ 3: No unit	0	

DR Reads data on currently program-executed, repetitive UP25 operations.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - <div>HOST → UP25</div>	This command has no data setting function.					
Structure of receiving data at data read - Data flow - <div>HOST → UP25</div>	DR <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - <div>UP25 → HOST</div>	DP □ℓ, m, n, o <Terminator>					
Command DR-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	ℓ	Current No. of repetitions	No. of times	0 to 999	0	
	m	Total No. of repetitions	No. of times	0 to 999	0	
	n	Repeat start segment No.	—	The range of segment Nos. set to the program pattern	1	
	o	Repeat end segment No.	—	The range of segment Nos. set to the program pattern	Final segment No. within one pattern	

DS Reads data on currently operated UP25 program segment.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - <div>HOST → UP25</div>	This command has no data setting function.					
Structure of receiving data at data read - Data flow - <div>HOST → UP25</div>	DS < Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - <div>UP25 → HOST</div>	DS□n < Terminator>					
Command DS-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	Note 1 Either seconds or minutes are available as time units. Use the PC20 E-6 parameter to select seconds/minutes.
	ℓ	Wait time (during a wait action) Segment time (during a case other than wait action)	Note 1	Wait time: 0 to 100 Segment time: 0 to 9999	—	
	m	Program pattern No. being operated	—	1 to 4 (4-pattern type) 1 to 8 (8-pattern type)	—	
	n	Program segment No. being operated	—	1 to 30 (4-pattern type) 1 to 60 (8-pattern type)	—	
	o	Total No. of segments in the program pattern being operated	—	1 to 30 (4-pattern type) 1 to 60 (8-pattern type)	—	

DT Determines whether UP25 time events 1 to 4 are set to ON or OFF.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - <div>HOST → UP25</div>	This command has no data setting function.					
Structure of receiving data at data read - Data flow - <div>HOST → UP25</div>	DT <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - <div>UP25 → HOST</div>	DT□ℓ, m, n, o <Terminator>					
Command DT-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	ℓ	Time event 1 ON/OFF	—	0: Time event OFF 1: Time event ON	—	
	m	Time event 2 ON/OFF	—	0: Time event OFF 1: Time event ON	—	
	n	Time event 3 ON/OFF	—	0: Time event OFF 1: Time event ON	—	
	o	Time event 4 ON/OFF	—	0: Time event OFF 1: Time event ON	—	

OP Modifies and reads UP25 control output values.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - <div>HOST → UP25</div>	OP _□ (ℓ) <Terminator>					The control output value cannot be modified (or data set) when the UP25 is set to operation modes other than RUN (running) and MAN (manual operation). Set “—” to the values of parameters m and n when an instrument other than the heating/cooling or 3-position control types is used. (In this case, those of transmission data from the UP25 also become “—”.)
Structure of receiving data at data read - Data flow - <div>HOST → UP25</div>	OP <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - <div>UP25 → HOST</div>	OP _□ ℓ, m, n <Terminator>					
Command OP-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	ℓ	Control output value	—	—	0	
	m	Heating side control output value	—	—	0	
	n	Cooling side control output value	—	—	0	

OO Sets the UP25 position proportioning output outputting time to the valve-opening side and reads the current outputting time to the valve-opening side.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - <div><div>HOST</div>→<div>UP25</div></div>	OO□(n) <Terminator>					When the UP25 is set to operation modes other than RUN (running) and MAN (manual operation), it is not possible to set outputting time to the valve-opening side. For instruments other than the position proportional output type, this transmission data parameter from the UP25 becomes “—”, even when the UP25 receives the data read command.
Structure of receiving data at data read - Data flow - <div><div>HOST</div>→<div>UP25</div></div>	OO <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - <div><div>UP25</div>→<div>HOST</div></div>	OO□n <Terminator>					
Command OO-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	n	Open side output time		0 to 100	—	

OC Sets the UP25 position proportioning output outputting time to the valve-closing side and reads the current outputting time to the valve-closing side.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	OC□(n) < Terminator >					When the UP25 is set to operation modes other than RUN (running) and MAN (manual operation), it is not possible to set outputting time to the valve-closing side. For instruments other than the position proportional output type, this transmission data parameter from the UP25 becomes “-”, even when the UP25 receives the data read command.
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	OC < Terminator >					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	OC□n < Terminator >					
Command OC-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	n	Close side output time		0 to 100	—	

8.8 File Data Command

PG Functions as data setting and read commands for UP25 program segment-related parameters.

Note: Use this command together with command PP (the file data command) to determine which program segment is to be set/read.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	Note 1 PG \square (TSP), (TIME), (EV No.), (EVA), (EVB), (EV No.), (EVA), (EVB), (JC) <Terminator>					This command is not available when the UP25 operation mode is in the REM (remote) status. Note 1
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	PG <Terminator>					• Up to four sets of parameters that define an (EV No.), (EVA), and (EVB) event can be specified for each program segment.
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	PG \square TSP, TIME, EV No., EVA, EVB, EV No., EVA, EVB, JC <Terminator>					• When (EV No.) = 0, there is no event and, therefore, data (0), (—), and (—) are assigned to (EV No.), (EVA), and (EVB) respectively. (This is also the case with transmission data.)
Command PG-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	• When (EV No.) = 1 to 4, a time event is available. Therefore, data (1 to 4), (ON time) and (OFF time) are assigned to (EV No.), (EVA) and (EVB) respectively. (This is also the case with transmission data.) • When (EV No.) = 9 to 10, a PV event is available. Therefore, data (9 or 10), (PV event type), and (PV event setpoint) are assigned to (EV No.), (EVA), and (EVB) respectively. (This is also true of transmission data.) Note 2 Either seconds or minutes are available as time units. The PC20 E-6 parameter is used to select seconds/minutes. Note 3 Parameter JC cannot be modified during program operation. A parameter cannot be set under the following conditions, (event though read is available): • During auto-tuning • When the key lock code (LC) is set to 1, 2, 3, or 4.
	TSP	Target setpoint	EU	EU (0%) to EU (100%)	EU (0%)	
	TIME	Segment time	Note 2	0 to 9999	—	
	EV No.	Event No.	—	0 1 to 4 Note 1 9, 10	0	
	EVA	Event data A	—	ON time or PV event type	—	
	EVB	Event data B	—	OFF time or PV event setpoint	—	
	JC	Junction code	—	0 to 3 Note 3		

PP Specifies the UP25 program pattern and program segment numbers.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - HOST → UP25	PP□(m), (n), <Terminator>					Caution: Note that executing any command other than those shown below after command PP has been executed, causes the pattern and segment numbers to be automatically set to 0 and 1 respectively. Commands: PG, PP, SE, and SI A parameter cannot be set under the following conditions, (event though read is available): · During auto-tuning · When the key lock code (LC) is set to 1, 2, 3, or 4.
Structure of receiving data at data read - Data flow - HOST → UP25	PP <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - UP25 → HOST	PP□m, n <Terminator>					
Command PP-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	m	Program pattern No.	—	0 to 4 (4-pattern type) 0 to 8 (8-pattern type)	—	
	n	Segment No.	—	0 to 30 (4-pattern type) 0 to 60 (8-pattern type)	—	

PE Erases the UP25 program pattern.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - <div>HOST → UP25</div>	PE□n <Terminator>					Note 1 The PE command always needs to be used together with the number of the pattern to be erased. Note 2 The UP25 sends “NOP” when it is program-operating or if the relevant pattern number is not set to the pattern number to be erased. The program pattern cannot be erased under the following conditions: · During auto-tuning · When the key lock code (LC) is set to 1, 2, 3, or 4.
Structure of receiving data at data read - Data flow - <div>HOST → UP25</div>	This command has no data read function.					
Structure of transmission data in response to data setting and read instructions - Data flow - <div>UP25 → HOST</div>	PE□n <Terminator> PE□NOP <Terminator>					
Command PE-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	n	Pattern No. to be erased	—	The range of program pattern Nos. set to UP25	—	

PC Copies the UP25 program pattern to another program pattern number.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	PC□m, n <Terminator>					Note 1 The Pc command always needs to be used together with the number of the pattern to be copied. Note 2 The UP25 sends “NOP” when it is program-operating or if the pattern number to be copied and copy destination pattern number parameters are not relevant to communication data (m and n). The program pattern cannot be copied under the following conditions: · During auto-tuning · When the key lock code (LC) is set to 1, 2, 3, or 4.
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	This command has no data read function.					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	PC□m, n <Terminator> PC□NOP <Terminator>					
Command PC-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	m	Pattern No. to be copied	—	The range of program pattern Nos. set to UP25	—	
	n	Copy destination pattern No.	—	1 to 4 (4-pattern type) 1 to 8 (8-pattern type)	—	

SE Erases the UP25 program segment being currently selected.

Note: Use this command together with command PP (the file data command) to determine which program segment is to be erased. If a program segment is not specified by the PP command, the program segment currently being operated will be erased.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	SE <Terminator>					Note 1 Use command SE only to erase a program segment. This command has no data read function and, therefore, care should be exercised so that it is not used as a data read command. Note 2 The UP25 sends “NOP” when it is program-operating or if there is no program segment number to be erased. The program segment cannot be erased under the following conditions: · During auto-tuning · When the key lock code (LC) is set to 1, 2, 3, or 4.
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	This command has no data read function.					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	SE <Terminator> SE NOP <Terminator> Note 2					
Command SE-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
		Nothing				

SI Inserts the current segment into the segment next to the UP25's current pattern and segment numbers.

Note: Use this command together with command PP (the file data command) to determine which program segment is to be inserted. If a program segment is not specified by the PP command, the program segment currently being operated will be inserted into the next segment.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - <div><div>HOST</div>→<div>UP25</div></div>	SI <Terminator>					Note 1 Use command SI only to insert a program segment into the next segment. This command has no data read function, and therefore, care should be exercised so that it is not inadvertently used as a data read command. Note 2 The UP25 sends “NOP” when it is program-operating if there is no program segment number to be inserted, or if the insert destination segment number exceeds the range settable within one program pattern. The program pattern cannot be inserted under the following conditions: · During auto-tuning · When the key lock code (LC) is set to 1, 2, 3, or 4.
Structure of receiving data at data read - Data flow - <div><div>HOST</div>→<div>UP25</div></div>	This command has no data read function.					
Structure of transmission data in response to data setting and read instructions - Data flow - <div><div>UP25</div>→<div>HOST</div></div>	SI <Terminator> SI□NOP <Terminator> <div>Note 2</div>					
Command SI-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
		Nothing				

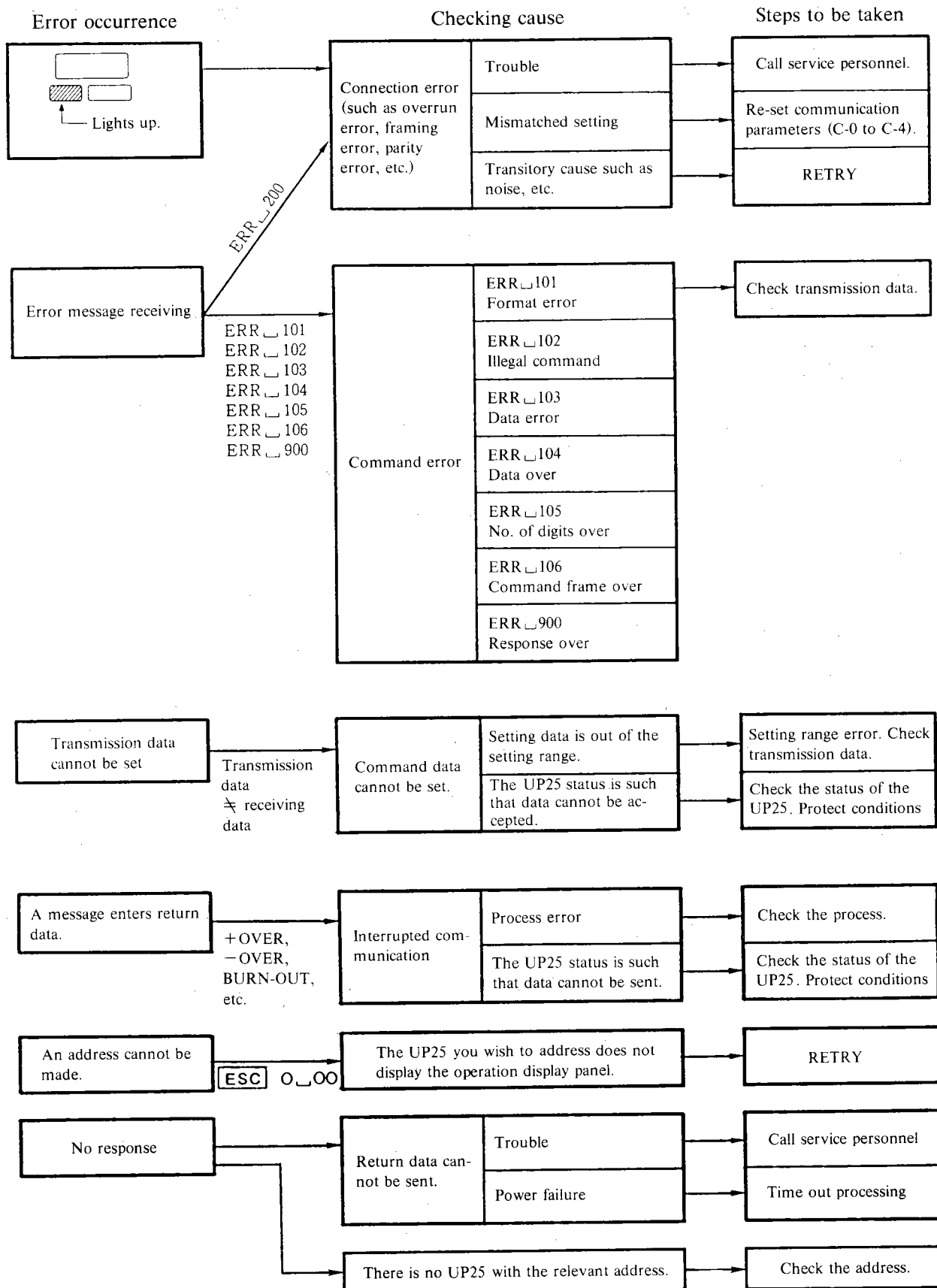
TS Reads out the total number of segments currently set to all UP25 program patterns.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	This command has no data setting function.					
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	TS <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	TS□n <Terminator>					
Command TS-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	n	Total No. of set segments	Quantity	0 to 60 (4-pattern type) 0 to 118 (8-pattern type)	0	

PS Reads out the total number of segments currently set to the UP25's particular program pattern.

Application Model	UP25					Remarks
Structure of receiving data at data setting - Data flow - (HOST) → (UP25)	This command has no data setting function.					Note 1 Use “PS” command together with the number of the pattern to be read. Note 2 UP25 returns “NOP” to host when PS command is used together with a number of pattern which is not set.
Structure of receiving data at data read - Data flow - (HOST) → (UP25)	PS□m <Terminator>					
Structure of transmission data in response to data setting and read instructions - Data flow - (UP25) → (HOST)	PS□m, n <Terminator> PS□NOP <Terminator>					
Command PS-corresponding parameter list	Symbol	Item	Unit	Setting Range	Initial Value	
	m	Program pattern No.	—	1 to 4 (4-pattern type) 1 to 8 (8-pattern type)	—	
	n	Segment No.	Quantity	1 to 30 (4-pattern type) 1 to 60 (8-pattern type)	—	

9. COMMUNICATION ERROR ORGANIZATION



9.1 Errors

Error Display	Error Item	Description
ERR □101	Format error	The communication frame's 3rd byte is not SPC or C/R.
ERR □102	Illegal command	A command (2 bytes) is not defined.
ERR □103	Data error	There is a prohibited character in the data position. (Anything other than 0 to 9, -, :, and *)
ERR □104	Data over	The number of data items exceeds the specified value.
ERR □105	No. of digits over	Data consists of more than six characters per data.
ERR □106	Command frame over	The 254 character limit has been exceeded.
ERR □200	Connection error	Framing error such as parity, bit length, etc. (This is notified only in the addressed state.)
ERR □900	Response over	A response cannot be made as the response character string exceeds 254 characters. However, commands are available.

9.2 Communication Command Processing and Error Notification

1. DP Command and PV Parameter

When +OVER is output	→ +OVER
When -OVER is output	→ -OVER
When RJC ERROR is output	→ *RJC□ERR
When ADC ERROR is output	→ *E300
When BURN-OUT is output	→ BURN-OUT
When AUTO-TUNING is in a failure	→ *E200

2. PE, PC, SE, and SI Commands

When they are not executed	→ NOP
----------------------------	-------

10. PROGRAM EXAMPLES

(1) When HP9000 Series is used

```

1  |-----All RS-232C control lines are not used.
2  |   UT/UP RS232C  TEST PROGRAM
4  |-----C0 6 : 9600
5  DIM B$(255),D$(255)                      C1 0 : NONE
90  CONTROL 9,3;9600                          C2 2 : 8 bits + 1 STOP bit
100 CONTROL 9,4;DVAL("000011",2)           C3 1 : Address 01
120 D$=CHR$(27)&"0 01"
130 OUTPUT 9;D$
150 ENTER 9;B$
160 IF D$<>B$ THEN
161             PRINT "ADDRESS ERROR"
170             GOTO 290
180             ELSE
190             PRINT B$
200 END IF
220 LINPUT "CMD=",D$
230 IF D$="END" THEN GOTO 280
240 OUTPUT 9;D$
250 ENTER 9;B$
260 PRINT B$
270 GOTO 220
280 D$=CHR$(27)&"C 01"
290 OUTPUT 9;D$
300 ENTER 9;B$
310 IF D$<>B$ THEN
311             PRINT "ADDRESS ERROR"
320             ELSE
330             PRINT "TEST END"
340 END IF
350 END

```

(2) When YEWMAC300 (built-in RS-232C) is used

```

100 DIM A$512,D$512
110 A$=CHR$(27)+"0 01"
120 OUTPUT 99,1;A$
130 ENTER 99,1;D$
140 PRINT D$
150 IF LEFT$(A$,4)<>LEFT$(D$,4) THEN PRINT "ADDRESS ERROR":GOTO 270
160 PRINT "CMD=";
170 LINPUT A$
180 IF A$="END" THEN GOTO 230
190 OUTPUT 99,1 ;A$
200 ENTER 99,1;D$
210 PRINT D$
220 GOTO 160
230 A$=CHR$(27)+"C 01"
240 OUTPUT 99,1;A$
250 ENTER 99,1;D$
260 IF LEFT$(A$,4)<>LEFT$(D$,4) THEN PRINT "ADDRESS ERROR" ELSE PRINT "TEST E
ND"
270 END

```

(3) When IBM PC is used

```

10 '-----
20 ' IBM PC <--> UT/UP RS422 (RS232C) TEST PROGRAM
30 '-----
40 DIM L$(80)
50 OPEN "COM1:9600,N,8,1,CS0,DS0" AS #1
60 A$=CHR$(27)+"O 01"
70 PRINT #1,A$
80 LINE INPUT #1,L$
90 IF MID$(L$,1,1)=CHR$(&HA) THEN L$=MID$(L$,2,80)
100 IF A$<>L$ THEN PRINT "ADDRESS ERROR":GOTO 240
110 PRINT L$
120 LINE INPUT "CMD=",C$
130 IF C$="END" THEN GOTO 190
140 PRINT #1,C$
150 LINE INPUT #1,L$
160 IF MID$(L$,1,1)=CHR$(&HA) THEN L$=MID$(L$,2,80)
170 PRINT L$
180 GOTO 120
190 A$=CHR$(27)+"C 01"
200 PRINT #1,A$
210 LINE INPUT #1,L$
220 IF MID$(L$,1,1)=CHR$(&HA) THEN L$=MID$(L$,2,80)
230 IF A$=L$ THEN PRINT "TEST END" ELSE PRINT "ADRESS ERROR"
240 CLOSE
250 END

```

C0 6 : 9600

C1 0 : NONE

C2 2 : 8 bits + 1 STOP bit

C3 1 : Address 01

(4) When NEC PC9801 is used

```

1 '=====
2 '
3 '
4 '      RS 422  TEST PROGRAM
5 '
6 '=====
10 'SAVE "1:UTRSTST"
20 OPEN "COM:N81NN" AS #2
30 A$=CHR$(&H1B)+"O 01"
40 PRINT #2,A$
50 LINE INPUT #2,D$
60 IF A$<>D$ THEN PRINT "ADDRESS ERROR":GOTO 180
70 LINE INPUT "CMD=",C$
80 IF C$="END" THEN GOTO 130
90 PRINT #2,C$
100 LINE INPUT #2,D$
110 PRINT D$
120 GOTO 70
130 A$=CHR$(&H1B)+"C 01"
140 PRINT #2,A$
150 LINE INPUT #2,D$
160 IF A$<>D$ THEN PRINT "ADDRESS ERROR":GOTO 180
170 PRINT "TEST END"
180 CLOSE
190 END

```

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