SR83 Digital Controller

CC-LINK Interface

Instruction Manual

Thank you for purchasing our product. Please check that the delivered product is the actual item you ordered. Please do not begin operating this product until you read this instruction manual thoroughly and understand its contents.
Please ensure that this instruction manual is made easily accessible to the final user of the instrument.

This instruction manual describes the CC-Link communication interface, an optional function of the SR83 digital controller. For details on the performance and parameters of the SR83, please refer to the separate instruction manual.

SHIMADEN CO.,LTD.

SR80CC-1AE
July 2001

Safety Rules

(Read the following information before you begin to use the apparatus.)

In using this product, please be very careful and observe safety by handling the instrument properly. Only operate this product by following the instructions presented in this instruction manual and in the related manuals referred to herein.

The safety rules are limited to those that are directly related to the operation of this product. For safety rules concerning the product as a sequencer system, please refer to the user's manual for the CPU unit made by Mitsubishi Electric Corporation.

The safety rules are divided between "warnings" and "cautions" reflecting the seriousness of the notice in question.

⚠ Warning	This heading indicates that improper handling could create a hazardous situation that could result in severe injury or even death.
⚠ Caution	This heading indicates that improper handling could create a hazardous situation that could result in injury or damage to the product or surroundings.

Note that even those matters designated by "caution" could lead to a more serious outcome depending on the circumstances.

As both headings signify a matter demanding the utmost care and attention, please pay close attention to these notices.

Keep this manual at the work site to be referred to readily whenever necessary and ensure that it is always accessible by the end user.

[Notes on matters concerning design]

⚠ Warning
● Should the data link go out of communication, data of the master unit is retained. In a sequence program, an interlocking circuit should be formed so that the system works on the safety side by the use of communication status information.

⚠ Caution
● Control lines and communication cables should not be bundled with the main power supply cable and/or power lines or installed adjacently to the latter. They should be spaced apart by more than 100 mm as a guideline. Unfamiliar noises may signify an erroneous action.

Contents

Chapter 1 Outline

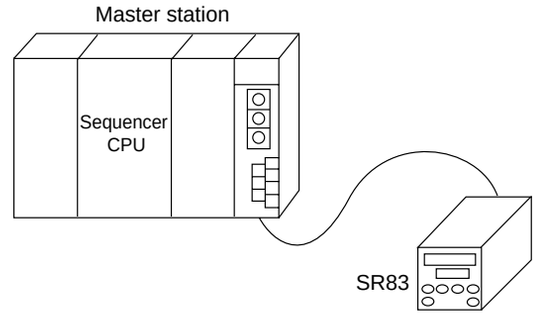
This instruction manual describes the specifications, names of parts and setting of a CC-Link remote device, that is, the SR83, to be used in combination with a MELSEC series sequencer CPU made by Mitsubishi Electric Corporation.

1.1 Outline

(1) This instruction manual describes the specifications, handling, programming method, etc., of the SR83 digital controller (hereinafter to be referred to as the SR83) for use as a remote device station of the CC-Link system.
(2) The SR83 takes in thermocouple, R.T.D., voltage or current input, allows comparison with set temperature and outputs control signals to an operating device. It is also capable of reading and writing measured temperature values, output values and various parameter settings.
(3) CC-Link is an abbreviation of "control and communication link" and the abbreviated form is used throughout this instruction manual.

The CC-Link is a system to connect an input/output unit, an intelligent function unit, a special function unit, and the like which are installed dispersedly and allows them to be controlled from a sequencer CPU.

1) When various units of a system are installed in a dispersed configuration, wiring for the entire system can be accomplished economically.
2) ON/OFF information concerning input and output of each unit and numerical data can be received/transmitted easily and quickly.
3) When a plurality of sequencer CPU's are connected, a simple dispersed system can be constructed.
4) As it is possible to connect various devices produced by the associated manufacturer, customers' systems can be extended or modified to meet a number of requirements.



Chapter 2 Specifications

This chapter deals with general specifications and performance specifications of the SR83 CC-Link.

2.1 General specifications

For general specifications, please refer to the instruction manual of the SR80 series.

2.2 Performance specifications

The SR83 performance specifications are shown in Table 2.2.

Table 2.2 Performance specifications

Item	Specification					
Version of CC-Link	1.10					
Communication system	Broadcast polling					
Synchronization system	Frame synchronization					
Type of transmission line	Bus type (Following RS-485: 3-line system)					
Transmission speed	156K/625K/2.5M/5M/10M bps					
Type of station	Remote device station					
The number of possessory stations	One station					
Type of device	Temperature controller					
Remote station numbers	1 ~ 64					
Maximum transmission distance	Transmission rate	156K	625K	2.5M	5M	10M
	Total distance	1200m	900m	400m	160m	100m
The number of connectable units	The number of stations which satisfies the following formulae (1) and (2): $(1 \times a)+(2 \times b)+(3 \times c)+(4 \times d) \leqq 64 \cdots (1)$ a: The number of stations with 1 possessory station b: The number of stations with 2 possessory stations c: The number of stations with 3 possessory stations d: The number of stations for 4 possessory stations $(16 \times A)+(54 \times B)+(88 \times C) \leqq 2304 \cdots (2)$ A: The number of remote I/O stations B: The number of remote device stations C: The number of local stations					
Connecting cable	Special cable for CC-Link					
Terminal resistance	110Ω					

Chapter 3 Connection

3.1 Special cable for CC-Link

(1) In the CC-Link system, a cable equivalent to the cable version 1.10 specified for CC-Link should be used.
(2) For the CC-Link, use the special cable recommended in Mitsubishi Electric Corporation CC-Link Master/Local Unit User's Manual (Detailed Instructions).
(3) If any other cable except the special cable for CC-Link is used, the performance of the CC-Link system will not be guaranteed.

3.2 Maximum transmission distance

The following table shows the relation between transmission rate and maximum transmission distance.

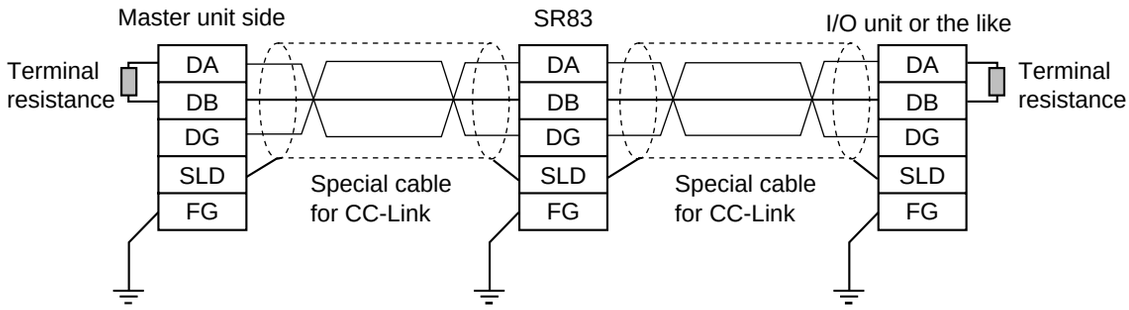
Transmission rate	Length of cable between stations	Maximum transmission distance
156Kbps	20cm or longer	1200m
625Kbps	20cm or longer	900m
2.5Mbps	20cm or longer	400m
5Mbps	20cm or longer	160m
10Mbps	20cm or longer	100m

3.3 Wiring of data link cable

The wiring of special cables for CC-Link for connecting the SR83 and the master unit is described in the following.

3.3.1 Connection of special cable for CC-Link

(1) The order of cable connection has nothing to do with the station numbers.
(2) Concerning the units on both ends of the CC-Link, the terminal resistances provided as accessories of those units should be connected. Connect each terminal resistance across DA and DB.
(3) Terminal resistances to be connected in the CC-Link system should be 110Ω 1/2W.
(4) The master unit can be connected other than on both ends.
(5) Avoid star connection.
(6) How to connect the SR83 and the master unit via special cable for CC-Link is illustrated below.



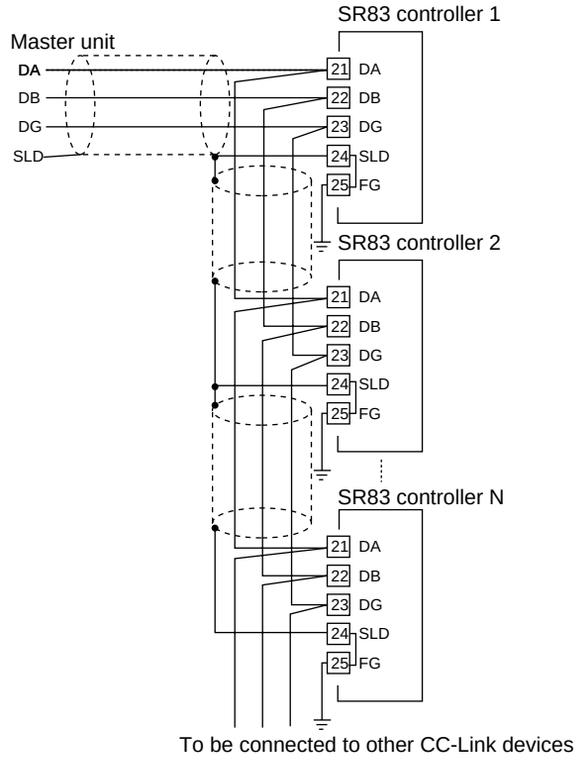
3.3.2 Notes on cable connection

(1) Concerning the special cable for CC-link, Version 1.00 and Version 1.10 should not be used together. If a Version 1.10 cable is mixed with a Version 1.00 cable in use, all cables are regarded as Version 1.00. In that case, however, normal data transmission cannot be guaranteed.
Connect the shielding wire of a special cable for a CC-link to the "SLD" of each unit, pass it through "FG" and carry out the D type (the 3rd grade) or higher type grounding on both ends of it.
Ensure that the D type (the 3rd grade) or higher type grounding for each FG terminal is carried out. If you fail to do so, the instrument may not operate correctly.
SLD and FG are connected inside the body of the SR83.

3.4 Wiring

Matters to be noted in wiring and an example of SR83 connection are shown.

3.4.1 Wiring of SR83



3.4.2 Matters to be attended to in wiring

- One of the requirements for enabling the SR83 to function thoroughly to establish a highly reliable system is external wiring that is not easily affected by noise. The following are matters to be attended to in performing external wiring.

(1) Use separate cables for AC and for the special cable for CC-Link to keep it unaffected by surge or induction on the AC side.

(2) The external line should not be bundled with or installed adjacently with a load line except those from the main power circuit line, a high voltage line and the sequencer. Otherwise it will easily be affected by noise, surge or induction.

(3) For a shielding wire or a shielded cable, one-point grounding should be carried out on the sequencer side. Depending on the condition of external noise, however, it may be better to ground on the external side.

Warning

- The SR83 should be used in environmental conditions as stated in the general specifications in its instruction manual. If it is used in any environment other than that noted in the general specifications, this could cause an electric shock, fire, erroneous operation, damage to the product or deterioration of its functionality.
- Do not directly touch a conductive part or an electronic component of the SR83 while it is energized. This could create an electric shock, erroneous operation or other failure.

Caution

- Make sure to ground the FG terminal using the D type (the 3rd grade) or higher grounding. If not, erroneous operation could result.
- Wire the SR83 correctly after confirming the rated voltage of the product and the terminal arrangement. Connection to a power source with voltage different from the rated one or with erroneous wiring will create a fire hazard or failure of the apparatus.
- Tighten the terminal screws within a torque range of M3.5 1.0N•m (10kgf•cm).
  (1) If a terminal screw is not sufficiently tightened, it will lead to a short or erroneous operation.
  (2) If a terminal screw is tightened excessively, the screw will be broken and it will lead to a short or erroneous operation.
- Take care not to allow foreign matter, such as the cutting powder from wire chips, to get into the unit. This can lead to fire, failure or erroneous operation.

3.5 Maintenance and inspection

Although there is no particular inspection item for the SR83, check the inspection items as described in the Mitsubishi Electric Corporation Sequencer CPU User's Manual so that your system can always be used under optimal conditions.

⚠ Warning

- Do not touch a terminal while the instrument is energized.
  This can result in an electric shock or erroneous operation.
- Before cleaning or tightening a terminal screw further, make sure to externally turn off power for all phases.
  Without cutoff in all phases, trouble or erroneous operation of the SR83 can result.

⚠ Caution

- Do not disassemble or remodel the SR83.
  This can lead to trouble, erroneous operation, an injury or a fire.
- The case of the SR83 is made of a plastic resin. It should not be allowed to fall or receive impact shock.
  This could result in serious damage to the SR83.
- Mount or remove the SR83 on/from the panel only after turning power off externally for all phases.
  Without cutoff in all phases, trouble or erroneous operation of the SR83 could be the result.

Chapter 4 Setting before operation and procedure

4.1 Sequencer setting

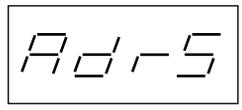
When SR83 setting is carried out through the CC-Link, the SR83 has to be regarded as a remote device occupying one station. Accordingly, CC-Link setting should be carried out in consideration of the number of units to be connected and the number of possessory stations.

4.2 SR83 parameter setting

There are three types of communication-related parameters for the SR83 as listed below and these parameters are unable to be changed through communication, that is, they should be set by key operation on the front panel.
For setting, follow the procedure by referring to the key sequence shown in the instruction manual of the SR80 Series.

- Communication address (station No.) setting screen 1-30

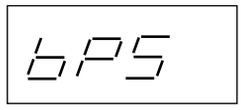
When the SR83 sets a station No., a data area to store information on I/O signals for control and read or written data is defined.



Initial value: OFF
Setting range: OFF, 1 ~ 64 (Setting OFF means resetting.)

- Communication (transmission) rate setting screen 1-31

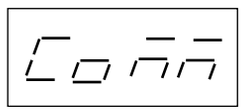
The speed of data transmission between the SR83 and the master station is set.



Initial value: 156 kbps
Setting range: 156k, 625k, 2.5M, 5M, 10Mbps
156k: 156k, 625k: 625k, 2.5M: 2.5M, 5M: 5M, 10M: 10M

- Setting of communication mode 1-29

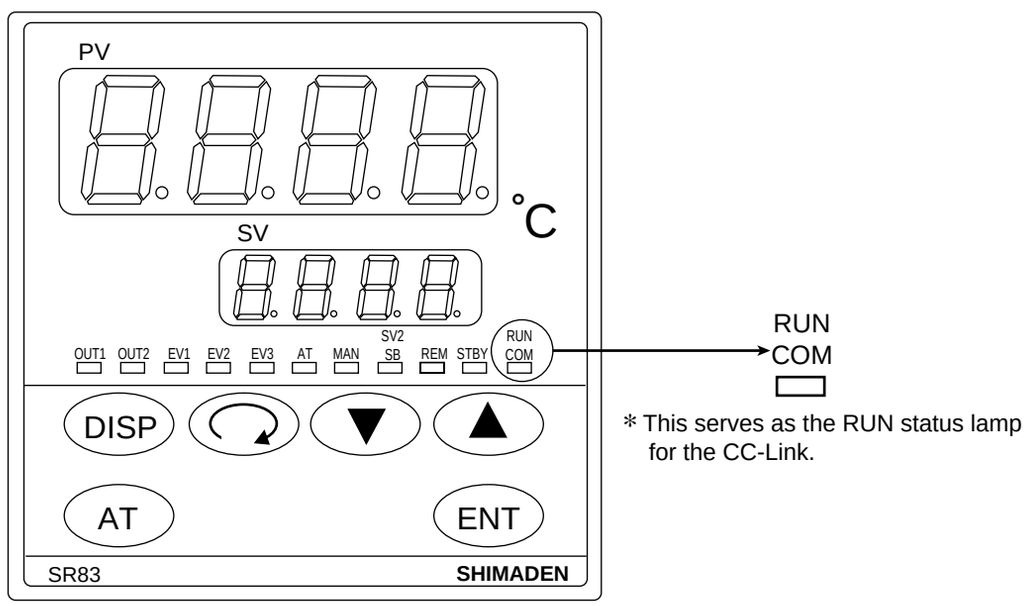
(1) A mode for the master station to write data by extended setting or the like is selected.
(2) A communication mode should be set as an extended setting. This means that a change of setting from the local mode (LOC) to the communication mode (COM) is not possible from the front panel.
Front key operation allows only the change from the communication mode (COM) to the local mode (LOC).
(3) The communication mode setting enables writing in the communication mode (COM) or the local mode (LOC) by extended setting.



Initial value: LOC
Setting range: LOC, COM
Loc: Local mode; only extended display through CC-Link communication is effective.
Com: Communication mode; extended display and extended setting through CC-Link communication are effective.

- Status lamp on front panel

The status lamp is provided on the right-hand side of the front panel display of the SR83. This lamp lights when the CC-Link is in the status of RUN and goes out when it is not in communication.



4.3 Linking to sequencer

(1) The SR83, as a remote device, is allocated for I/O in the relay/register area with the master unit.
(2) The allocated I/O area is treated as areas divided by channel. Data are exchanged between the connected SR83 and the master unit.

4.3.1 Sequencer areas used for CC-Link

SR83 data are allocated to remote input/output area and relay/register areas of the master unit.

	Remote I/O		Remote register	
	Input	Output	Input	Output
Classification	Relay	Relay	Register	Register
The number of points	32 bit	32 bit	4 Word	4 Word
Description Classification	Bit area allocated for input	Bit area allocated for output	Input register allocated on a unit of words	Output register allocated on a unit of words
Area	RXn0 ~ RX(n+1)F	RYn0 ~ RY(n+1)F	RWrm ~ RWrm+3	RWwm ~ RWwm+3

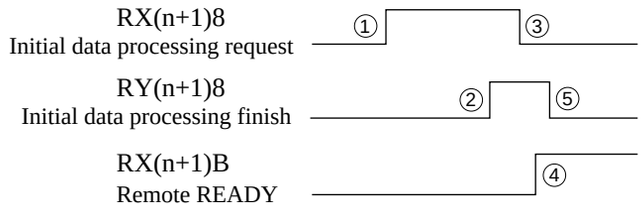
m, n: Addresses given to master unit by the station number setting
Numerical values used in the areas are hexadecimal numbers.

4.3.2 Notes on sequencer programming

● Procedure of requesting initial data processing

This section describes the SR83 action in response to the application of power, a station number change and a communication rate change, and presents the basic timing of a request for initial data processing.

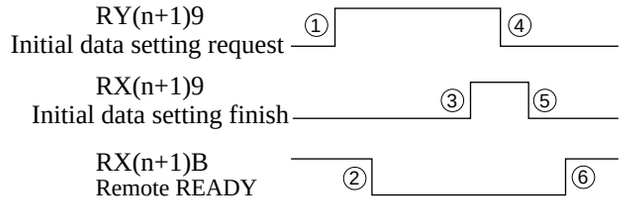
① When power is applied or a station number or a communication rate is changed, the SR83 turns the "initial date processing request flag" RX(n+1)8 of the remote input/output ON.
② The "initial data processing finish flag" RY(n+1)8 is turned ON by a higher order sequence.
③ Seeing the "initial data processing finish flag" RY(n+1)8, the SR83 turns the initial date processing request flag" RX(n+1)8 OFF.
④ "Remote READY" RX(n+1)B is turned ON.
⑤ RY(n+1)8 is turned OFF by the higher order sequence.



● Procedure of requesting initial data setting

A request for initial data setting does not cause internal processing of the SR83.
Basic timing of a request for initial data setting is shown in the following.

① The "initial data setting request flag" RY(n+1)9 is turned ON by a higher order sequence.
② The SR83 turns the "remote READY" RX(n+1)B OFF.
③ The SR83 turns the "initial data setting finish flag" RX(n+1)9 ON.
④ Seeing the "initial data setting finish flag" RX(n+1)9, the higher order sequence turns the "initial data setting request flag" RY(n+1)9 OFF.
⑤ The SR83 turns the "initial data setting finish flag" RX(n+1)9 OFF.
⑥ The "remote READY" RX(n+1)B is turned ON.



4.4 Remote input and output signals

Allocation of input and output signals and the respective functions are described in the following.

4.4.1 Remote input and output functions

● Remote input (Remote → Master)

The remote input area comprises the following:

(1) Event 1 and 2 alarm statuses
The statuses of the event 1 and 2 actions are shown. The RXnO and RXn1 bits turn ON when the event alarm is in action and the RXnO and RXn1 bits remain OFF when the event alarm is stopped or the optional event alarm function is not added.

(2) Burnout status
The RXn2 bit turns ON when scaleover happens at the higher or lower limit of PV or a cold point compensator goes into trouble. It remains OFF in normal action.

(3) Heater break alarm
The action status of the heater break alarm is shown. The RXn3 bit turns ON when the heater break alarm is in action and it remains OFF when the event alarm is stopped or the optional event alarm function is not added.

(4) PID/AT
The status of execution of auto-tuning is shown. The RXn4 bit turns ON when auto-tuning is in execution and it remains OFF during PID control.

(5) Communication mode
A communication mode is shown. The RXnA bit remains OFF in the local mode and it is ON in the communication mode.

(6) Status of remote register selection
The status of remote register selection is shown when a set value of temperature SV is set by using either the RWwm area or extended setting. The RXnB bit turns ON when extended setting is selected and it turns OFF upon selection of the remote register (RWwm).

(7) Remote register (RWwm) error flag
An error status in setting an SV value by using the RWwm is indicated. If an SV value is set in the local mode of communication, a set value is out of the setting range or auto-tuning is in execution, the RXnE bit turns ON and it turns OFF when setting is accomplished normally.

(8) Input area related to extended display/extended setting
A display or the like can be changed by using the RW area while "hand-shaking" with the SR83 and input flags for such hand shaking are allocated to RXnC and RXnD.
For details, see 4.6 "Extended display and extended setting."

(9) System area
Remote input called the system area is allocated to RX(n+1)8 ~ RX(n+1)B. This is the interface area between the CC-Link supported devices and the master module.

● Remote output (Master → Remote)

The remote output area comprises the following.

(1) Setting numbers for extended display and extended setting
In the remote register area, an item to be input or output can be changed from the user sequence by using a setting number and a hand shaking bit.
Such a remote register is defined as an extended area. Input is called display and output is called setting.
Areas in which a command number is written to decide for what purpose the extended area is used are secured in RYn0 ~ RYm5 and RYn6 ~ RYnB. RYnC, RXnC and RXnD are used as flag areas for such hand shaking.
For details, see 4.6 "Extended display and extended setting."

(2) System area
Remote output called the system area is allocated to RY(n+1)8 ~ RY(n+1)A. This is the interface area between the CC-Link supported devices and the master module.

4.4.2 List of remote input and output signals

For data exchange with the master unit, the SR83 uses 32 input points and 32 output points.
Table 4.1 shows the allocation of input and output signals and names of signals.
"RX" in the device numbers indicates that they input signals from the SR83 to the master unit and "RY" indicates that they are output signals from the master unit to the SR83.
For details of signals, see 4.4.3 "Details of remote input and output signals."

Table 4.1 List of remote input and output signals

Direction of signal: SR83 → Master unit		Direction of signal: Master unit → SR83		
Device No.	Name of signal	Device No.	Name of signal	
RXn0	Event 1 alarm status*	RYn0	[Extension] number setting for display	b0
RXn1	Event 2 alarm status*	RYn1		b1
RXn2	Burnout status	RYn2		b2
RXn3	Heater break alarm status*	RYn3		b3
RXn4	PID/AT	RYn4		b4
RXn5	Unused	RYn5		b5
RXn6		RYn6	[Extension] number setting for setting	b0
RXn7		RYn7		b1
RXn8		RYn8		b2
RXn9		RYn9		b3
RXnA	Communication mode status	RYnA		b4
RXnB	SV setting remote register selection status	RYnB		b5
RXnC	Extended display finish	RYnC	Extended display flag	
RXnD	Extended setting finish	RYnD	Extended setting flag	
RXnE	Remote register (RWwm) error flag	RYnE	Unused	
RXnF	Unusable	RYnF	Unusable	
RX(n+1)0		RY(n+1)0		
RX(n+1)1		RY(n+1)1		
RX(n+1)2		RY(n+1)2		
RX(n+1)3		RY(n+1)3		
RX(n+1)4		RY(n+1)4		
RX(n+1)5		RY(n+1)5		
RX(n+1)6		RY(n+1)6		
RX(n+1)7		RY(n+1)7		
RX(n+1)8	Initial data processing request flag	RY(n+1)8	Initial data processing finish flag	
RX(n+1)9	Initial data setting finish flag	RY(n+1)9	Initial data setting request flag	
RX(n+1)A	Error status flag	RY(n+1)A	Error reset request flag	
RX(n+1)B	Remote READY	RY(n+1)B	Unusable	
RX(n+1)C	Unusable	RY(n+1)C		
RX(n+1)D		RY(n+1)D		
RX(n+1)E		RY(n+1)E		
RX(n+1)F		RY(n+1)F		

n: Address given to the master unit by station number setting

Turning an unused device ON and OFF, will create no problems for the SR83.
In case an unusable device is turned ON and OFF in a sequence program, the proper functioning of the SR83 will not be guaranteed.

* Unable to be used unless the optional function is added.

4.4.3 Details of remote input and output signals

The functions of remote input and output signals are shown in table 4.2.

Table 4.2 Details of remote input and output signals

Device No.	Name of signal	Description
RXn0	Event 1 alarm status *	OFF: Alarm stopped ON: Alarm in action
RXn1	Event 2 alarm status *	OFF: Alarm stopped ON: Alarm in action
RXn2	Burnout status	OFF: Normal action ON: SCHH, SCLL, CJHH or CJLL has occurred.
RXn3	Heater break alarm status *	OFF: Alarm stopped ON: Alarm in action
RXn4	PID/AT	OFF: PID control ON: AT control
RXnA	Communication mode status	OFF: Local mode, only reading is possible. ON: Communication mode, both reading and writing are possible.
RXnB	SV remote register selection	Whether a set value of temperature is to be set by remote register (RWwm) or by extended setting is selected. 0: Remote register (RWwm) 1: Extended setting (setting No. 3)
RXnC	Extended display finish	To turn ON upon finishing display in RWr extended area To turn OFF when extended display flag (RYnC) turns OFF.
RXnD	Extended setting finish	To turn ON upon finish of setting in RWw extended area To turn OFF when extended setting flag (RYnD) turns off.
RXnE	Remote register (RWwm) error flag	To turn on in any of the following cases when writing in remote register (RWwm): • Communication local mode • Set value is out of setting range. • Auto tuning in execution
RX(n+1)8	Initial data processing request flag	Initial data processing request flag is turned ON by SR83 upon applying power or upon hardware resetting, to request initial data setting. The flag is turned OFF when initial data processing finishes (initial data processing finish flag RY(n+1)8 turning ON).
RX(n+1)9	Initial data setting finish flag	In response to request for initial data setting (RY(n+1)9 ON), this flag turns ON upon finishing of initial data setting. When initial data setting request flag turns OFF upon finishing of initial data setting, initial data setting finish flag also turns OFF.
RX(n+1)A	Error status flag	SR83 turns this flag ON in case of error in extended display or extended setting.
RX(n+1)B	Remote READY	To turn ON upon applying power, upon hardware resetting or when initial data setting finishes to complete data setting and it becomes READY for remote action. This flag remains OFF while extended display or extended setting is being processed and turns ON when the processing finishes. This is used as interlock in reading from and writing in master unit.
RYn0 ~ 5	[Extension] number setting for display	To set an item desired to be displayed in [extension] area of RWr by binary notation.
RYn6 ~ B	[Extension] number setting for setting	To set an item desired to be set in [extension] area of RWw by binary notation
RYnC	Extended display flag	When display in [extended] area of RWr is intended, this flag turns ON upon setting [extended] setting No. for display. It turns OFF upon confirmation that (RXnC) turns ON when extended display finishes.
RYnD	Extended setting flag	When display in [extended] area of RWr is intended, this flag turns ON upon setting [extended] setting No. for display. It turns OFF upon confirmation that (RXnD) turns ON when extended display finishes.
RY(n+1)8	Initial data processing finish flag	To turn ON upon applying power, hardware resetting or finishing of initial data processing
RY(n+1)9	Initial data setting request flag	To turn ON when initial data is to be set or changed
RY(n+1)A	Error reset request flag	When error reset flag is turned ON, error status flag turns OFF.

n: Address given to master unit by station No. setting

* Unable to be used unless optional function is added.

4.5 Remote register

The SR83 has a remote register for exchanging data with the master unit. The allocation of the remote register and the structure of data are described in the following.

4.5.1 Remote register function

● Remote register area: RWr (Remote → Master)

This area is used as an input area when viewed from the master unit.
The register operates differently depending on the setting of the SR83 as described in the following.

(1) Measured temperature value (PV): (standard)
It processes communication with the SR83 asynchronously with the master unit sequence and stores measured temperature values (PV) read regularly in the remote register.

(2) Control output value (OUT1): (standard)
It processes communication with the SR83 asynchronously with the master unit sequence and stores output values (OUT1) read regularly in the remote register.

(3) For extended display
For details, see 4.6 "Extended display and extended setting."

● Remote register area: RWw (Master → Remote)

This area is used as an input area when viewed from the master unit.
The register operates differently depending on the setting of the SR83 as described in the following.

(1) Set temperature value (SV)
It processes communication with the SR83 asynchronously with the master unit sequence and writes set temperature values (SV) stored regularly in the remote register.

(2) For extended setting
For details, see 4.6 "Extended display and extended setting."

4.5.2 Allocation of remote register

Measured temperature values (PV), output values (OUT1) and extended display values are stored in the remote register addresses RWrn ~ RWrn+3, channel by channel, while set temperature values (SV) and extended setting values are stored in the remote register addresses RWWm and RWwm+3, channel by channel. Values are in binary notation with 16-bit codes. (Negative digital values are noted by complements of 2.) The allocation of remote register is shown in Table 4.3.

Table 4.3. Allocation of remote register

Direction of data transfer	Address	Description	Default value
Master →Remote	RWwm	Set temperature value (SV)	0
	RWwm+1	Unused	———
	RWwm+2	Unused	———
	RWwm+3	Extended setting	0
Remote →Master	RWrn	Measured temperature value (PV)	0
	RWrn+1	Output value (OUT1)	0
	RWrn+2	Unused	———
	RWrn+3	Extended display	0

m, n: Addresses given to master unit by station number setting

Don’t read or write to the unused remote register addresses.
When read or written, the SR83 processes nothing and you should not use them for safety’s sake.

4.6 Extended display and extended setting

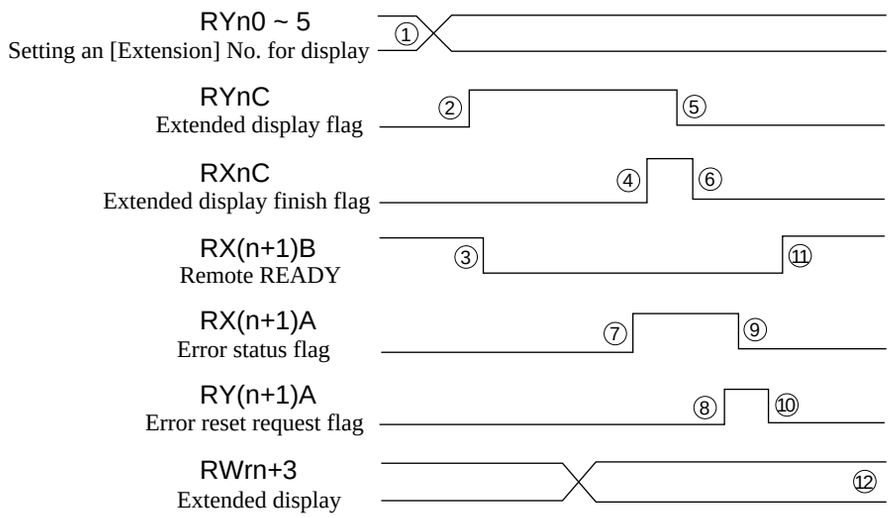
(1) For extended display and extended setting, the remote output area and the extended area in the remote register are used and changing of set values and reading of data are carried out from the master unit.
(2) A set value is changed or data is read once for the SR83 in response to each request for extended display or extended setting.
(3) When display or setting is carried out, parameters should be set in the remote register.
(4) A setting number and parameters should be set before scanning to be carried out simultaneously when the "extended display flag" or the "extended setting flag" is turned ON.
For details of parameters, see 4.6.2 "List of extended display/extended setting."

4.6.1 Outline of extended display and extended setting

● Procedure of extended display

The following is basic timing of extended display.

① The extension number of a desired display selected from the list of extension numbers is written, in the binary notation, by a higher sequence in the "extended display setting numbers" RYn0 ~ Ryn5 of remote I/O.
② The higher sequence turn the "extended display flag" RYnC of remote I/O ON.
③ The SR83 turns the "remote READY" RX(n+1)B of remote I/O OFF.
④ The SR83 turns the "extended display finish flag" RXnC of remote I/O ON.
⑤ After confirming that the "extended display finish flag" RXnC has been turned ON, the higher sequence turns the "extended display flag" RYnC OFF.
⑥ The SR83 turns the "extended display finish flag" RXnC of remote I/O OFF.
⑦ If an error arises, the SR83 turns the "error status flag" RX(n+1)A of remote I/O ON. In case it is not turned ON, proceed to ⑪.
⑧ When "extended display finish flag" RXnC of remote I/O is ON, the higher sequence turns the "error reset request flag" RY(n+1)A ON.
⑨ The SR83 turns the "error status flag" RX(n+1)A OFF.
⑩ The higher sequence turns the "error reset request flag" RY(n+1)A OFF. (To know the contents of the error, read an error code on an extended display.)
⑪ The SR83 turns the "remote READY" RX(n+1)B of remote I/O ON.
⑫ You can read display data on the "extended display" RWrn+3 of remote register through the higher sequence. (In the event the "error status flag" is turned ON, a previously displayed data remains in the remote register RWrn+3.)

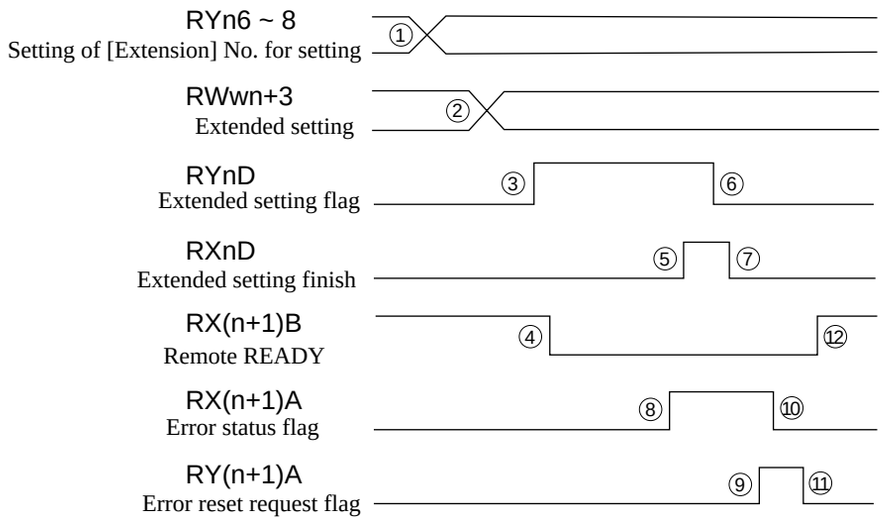


＊ Note: Proceed to the next processing only after confirming that the "remote READY" RX(n+1)B is turned ON.

● Procedure of extended display

The following is basic timing of extended display.

① A desired extension number selected from the list of extended setting numbers is written, in the binary notation, by a higher sequence in the "extended setting numbers" RYn6 ~ RYB of remote I/O.
② The higher sequence writes data of setting in "extended setting" RWwn+3 of remote register.
③ The higher sequence turns the "extended setting flag" RYnD ON.
④ The SR83 turns the "remote READY" RX(n+1)B of remote I/O OFF.
⑤ The SR83 turns the "extended setting finish flag" RXnD ON.
⑥ After confirming that the "extended setting finish flag" RXnD has been turned ON, the higher sequence turns the "extended setting flag" RYnD OFF.
⑦ The SR83 turns the "extended setting finish flag" RXnD OFF.
⑧ If an error arises, the SR83 turns the "error status flag" RX(n+1)A of remote I/O ON. In case it is not turned ON, proceed to ⑫.
⑨ When the "error status flag" RX(n+1)A is ON, the higher sequence turns the "error reset request flag" RY(n+1)A ON.
⑩ The SR83 turns the "error status flag" RX(n+1)A OFF.
⑪ The higher sequence turns the "error reset request flag" RY(n+1)A OFF. (To know the contents of the error, read an error code on an extended display.)
⑫ The SR83 turns the "remote READY" RX(n+1)B of remote I/O ON.



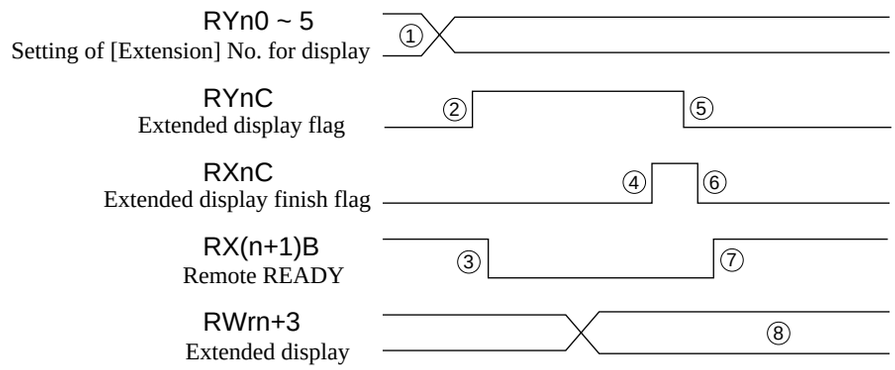
＊ Note: Proceed to the next processing only after confirming that the "remote READY" RX(n+1)B is turned ON.

● Procedure of reading error code during extended display/extended setting

In the event an error arises on an extended display, the previous extended display value remains in the remote register RWrn+3. (In the case of start-up, it will be 0.)

If an error arises in the extended setting, there will be no writing. Data in the remote register RWwn+3 remains unchanged.

① The extended display number 61 is written, in the binary notation, by a higher sequence in the "extended display numbers" RYn0 ~ RYn5 of remote I/O.
② The higher sequence turns the "extended display flag" RYnC ON.
③ The SR83 turns the "remote READY" RX(n+1)B of remote I/O OFF.
④ The SR83 turns the "extended display finish flag" RXnC ON.
⑤ After confirming that the "extended display finish flag" RXnC has been turned ON, the higher sequence turns the "extended display flag" RYnC of remote I/O OFF.
⑥ The SR83 turns the "extended display finish flag" RXnC OFF.
⑦ The SR83 turns the "remote READY" RX(n+1)B of remote I/O ON.
⑧ You can read the error codes read into the remote register RWrn+3 by the high sequence. For the error codes, refer to "Table 5.1 Error code list."

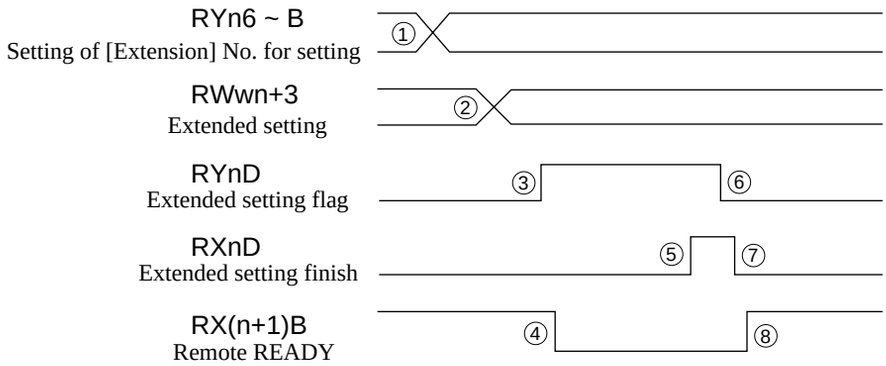


∗ Note: When power supply to the apparatus is turned OFF, the error codes turn to "0".

● Procedure of extension table switching

It is possible to change the extension table number even when communication is in the local (LOC) mode.

① The extended setting number 63 is written, in the binary notation, by a higher sequence, in the "extended setting numbers for setting" RYn6 ~ RYnB of remote I/O through.
② An extension table No. 0 or 1 is written in the remote register RWwn+3.
③ The higher sequence turns the "extended setting flag" RYnD ON.
④ The SR83 turns the "remote READY" RX(n+1)B of remote I/O OFF.
⑤ The SR83 turns the "extended setting finish flag" RXnD ON.
⑥ After confirming that the "extended setting finish flag" RXnD has been turned ON, the "extended setting flag" RYnD of remote I/O is turned OFF.
⑦ The SR83 turns the "extended setting finish flag" RXnD OFF.
⑧ The SR83 turns the "remote READY" RX(n+1)B of remote I/O ON.



∗ Note: When power supply to the apparatus is turned OFF, the extension table No. turns to "0."

4.6.2 Extended display/extended setting table

[Extension] Table (Common to display and setting) Extension table No. [0]

TBL	Setting No.	Description	Parameter	Details of parameter
0	0	Measured temperature value [Setting not possible]	PV	————
0	1	Control output 1 output value [Setting not possible]	OUT1	————
0	2	CT measured value *1 [Setting not possible]	HB_A	————
0	3	Set temperature value	SV1	Within SV setting limiter range (Writing without selecting SV setting remote register for extended setting results in write mode error.)
0	4	PID/AT	AT	0: AC stop: 1: AC in execution (Writing when AT is allocated for DI results in write mode error)
0	5	SV1 proportional band (OUT1)	P	0(OFF), 0.0 ~ 999.9%
0	6	SV1 integral time (OUT1)	I	0(OFF), 1 ~ 6000s
0	7	SV1 derivative time (OUT1)	D	0(OFF), 1 ~ 3600s
0	8	PV bias	PV_b	-1999 ~ 1999Unit
0	9	Event 1 set value *1	EV1_S	Higher limit absolute value alarm: Within range of measured value (PV) Lower limit absolute value alarm: Within range of measured value (PV) Higher limit deviation value alarm: -1999 ~ 9999Unit Lower limit deviation value alarm: -1999 ~ 9999Unit Deviation alarm (inside): 0 ~ 9999Unit Deviation alarm (outside): 0 ~ 9999Unit
0	10	Event 2 set value *1	EV2_S	
0	11	Unusable		
0	12			
0	13			
0	14			
0	15			
0	16	Communication mode LOC/COMM RUN flag switching	Comm	0: LOCAL, 1: COMMU (Writing possible even in local mode)
0	17	Stand-by switching EXE/STBY RUN flag switching	StbY	0: EXEC, 1: STNBY (Writing when standby switching is allocated for DI results in write mode error since DI is given priority.)
0	18	Manual switching AUTO/MAN RUN switching	Man	0: AUTO, 1: MANUAL (Writing when manual switching is allocated for DI results in write mode error since DI is given priority.)
0	19	SV switching *1 SV1/SB, SV2 RUN flag switching	SV_S	0: SV1, 1: SB, SV2 (Writing when SV switching is allocated for DI results in write mode error since DI is given priority.)
0	20	Remote switching *1 LOC/REM RUN flag switching	Rem	0: LOCAL, 1: REMOTE (Writing when remote switching is allocated for DI results in write mode error since DI is given priority.)
0	21	Set temperature value (SV2) *1	SV2	Within SV setting limiter range
0	22	Set value bias (SB) *1	Sb	-1999 ~ 9999Unit
0	23	Remote input value *1 [Setting not possible]	REM	————
0	24	OUT1 output value in manual operation	OUT1	0.0 ~ 100.0% (Reading and writing possible only in manual operation)
0	25	OUT2 output value in manual operation	OUT2	0.0 ~ 100.0% (Reading and writing possible only in manual operation)
0	26	OUT2 output value *2 [Setting not possible]	OUT2	————
0	27	Hysteresis	DF	1 ~ 1000Unit
0	28	Target value function	SF	0.00 ~ 1.00
0	29	Manual reset	MR	-50.0 ~ 50.0%
0	30	SV1 proportional band (OUT2) *2	P_2	0(OFF), 0.0 ~ 999.9%
0	31	SV1 integral time (OUT2) *2	I_2	0(OFF), 1 ~ 6000s
0	32	SV1 derivative time (OUT2) *2	D_2	0(OFF), 1 ~ 3600s
0	33	SV1 hysteresis (OUT2) *2	DF_2	1 ~ 1000Unit
0	34	SV1 dead band (OUT2) *2	DB_2	-1999 ~ 5000Unit
0	35	SV1 target value function (OUT2) *2	SF_2	0.00 ~ 1.00
0	36	SB, SV2 proportional band (OUT1) *1 *2	P21	0(OFF), 0.0 ~ 999.9%
0	37	SB, SV2 integral time (OUT1) *1 *2	I21	0(OFF), 1 ~ 6000s
0	38	SB, SV2 derivative time (OUT1) *1 *2	D21	0(OFF), 1 ~ 3600s

TBL	Setting No.	Description	Parameter	Details of parameter
0	39	SB, SV2 hysteresis (OUT1) *1 *2	DF21	1 ~ 1000Unit
0	40	SB, SV2 target value function (OUT1) *1 *2	SF21	0.00 ~ 1.00
0	41	SB, SV2 manual reset (OUT1) *1 *2	MR21	-50.0 ~ 50.0%
0	42	SB, SV2 proportional band (OUT2) *1 *2	P22	0(OFF), 0.0 ~ 999.9%
0	43	SB, SV2 integral time (OUT2) *1 *2	I22	0(OFF), 1 ~ 6000s
0	44	SB, SV2 derivative time (OUT2) *1 *2	D22	0(OFF), 1 ~ 3600s
0	45	SB, SV2 hysteresis (OUT2) *1 *2	DF22	1 ~ 1000Unit
0	46	SB, SV2 dead band (OUT2) *1 *2	DB22	-1999 ~ 5000Unit
0	47	SB, SV2 target value function (OUT2) *1 *2	SF22	0.00 ~ 1.00
0	48	Event 1 action type *1	E1_M	0: Higher limit absolute value alarm 1: Lower limit absolute value alarm 2: Higher limit deviation value alarm 3: Lower limit deviation value alarm 4: Deviation alarm (inside) 5: Deviation alarm (outside) 6: Scaleover (Changing the type of event 1 action will change the set value of event 1.)
0	49	Event 1 hysteresis *1	E1_d	1 ~ 1000Unit
0	50	Event 1 stand-by type *1	E1_I	0: Without stand-by 1: With stand-by (upon applying power) 2: With stand-by (upon applying power and upon switching from stand-by to execution 3: With stand-by (upon applying power, upon switching from stand-by to execution and upon changing SV) 4: With stand-by (at the time of scaleover, alarm action turned OFF during stand-by)
0	51	Event 1 delay time *1	E1_t	0(OFF), 1 ~ 9999sec
0	52	Event 2 action type *1	E2_M	0: Higher limit absolute value alarm 1: Lower limit absolute value alarm 2: Higher limit deviation value alarm 3: Lower limit deviation value alarm 4: Deviation alarm (inside) 5: Deviation alarm (outside) 6: Scaleover (Changing the type of event 2 action will change the set value of event 2.)
0	53	Event 2 hysteresis *1	E2_d	1 ~ 1000Unit
0	54	Event 2 stand-by type *1	E2_I	0: Without stand-by 1: With stand-by (upon applying power) 2: With stand-by (upon applying power and upon switching from stand-by to execution 3: With stand-by (upon applying power, upon switching from stand-by to execution and upon changing SV) 4: With stand-by (at the time of scaleover, alarm action turned OFF during stand-by)
0	55	Event 2 delay time *1	E2_t	0(OFF), 1 ~ 9999sec
0	56	Event 3 action type *1	E3_M	0: Higher limit absolute value alarm 1: Lower limit absolute value alarm 2: Higher limit deviation value alarm 3: Lower limit deviation value alarm 4: Deviation alarm (inside) 5: Deviation alarm (outside) 6: Scaleover (Changing the type of event 3 action will change the set value of event 3.)
0	57	Event 3 set value *1	E3_S	Higher limit absolute value alarm: Within measuring range Lower limit absolute value alarm: Within measuring range Higher limit deviation value alarm: -1999 ~ 9999Unit Lower limit deviation value alarm: -1999 ~ 9999Unit Deviation alarm (inside): 0 ~ 9999Unit Deviation alarm (outside): 0 ~ 9999Unit

TBL	Setting No.	Description	Parameter	Details of parameter
0	58	Event 3 hysteresis *1	E3_d	1 ~ 1000Unit
0	59	Event 3 stand-by type *1	E3_I	0: Without stand-by 1: With stand-by (upon applying power) 2: With stand-by (upon applying power and upon switching from stand-by to execution 3: With stand-by (upon applying power, upon switching from stand-by to execution and upon changing SV) 4: With stand-by (at the time of scaleover, alarm action turned OFF during stand-by)
0	60	Event 3 delay time *1	E3_t	0(OFF), 1 ~ 9999sec
0	61	Error code [Setting not possible]		For details of error codes, see Table 5.1 Error code list.
0	62	SV setting remote register selection		0: Remote register (RWwm) 1: Extended setting (Setting No.) SV setting remote register selection can be set even when communication mode is LOC.
0	63	Extension table No.		0: Extension table No. 0 1: Extension table No. 1 Extension table No. can be set even when communication mode is LOC.

- Higher limit side PV_SO, CJ_SO, b_ _ _ , REM_SO, HB_SO = 7FFFH
- Lower limit side PV_SO, CJ_SO, c_ _ _ , REM_SO, HB_SO = 8000H
- Invalid data of HB = 7FFEH
- The error codes and the extension No. turn to "0" when power supply to the apparatus is turned OFF.

*1 Unusable unless the optional function is added. (ERR to be displayed)
*2 Unusable unless the instrument is of the 2 two output type. (ERR to be displayed)

[Extension] Table (Common to display and setting) Extension table No. [1]

TBL	Setting No.	Description	Parameter	Details of parameter
1	0	Measured temperature value (PV) [Setting not possible]	PV	————
1	1	Control output 1 output value [Setting not possible]	OUT1	————
1	2	CT measured value *1 [Setting not possible]	HB_A	————
1	3	Set temperature value	SV1	Within SV setting limiter range (Writing without selecting SV setting remote register for extended setting results in write mode error.)
1	4	PID/AT	AT	0: AT stop, 1: AT in execution (Writing when AT is allocated for DI results in write mode error)
1	5	SV1 proportional band (OUT1)	P	0(OFF), 0.0 ~ 999.9%
1	6	SV1 integral time (OUT1)	I	0(OFF), 1 ~ 6000s
1	7	SV1 derivative time (OUT1)	D	0(OFF), 1 ~ 3600s
1	8	PV bias	PV_b	-1999 ~ 1999Unit
1	9	Event 1 set value *1	EV1_S	Higher limit absolute value alarm: Within range of measured value (PV) Lower limit absolute value alarm: Within range of measured value (PV) Higher limit deviation value alarm: -1999 ~ 9999Unit Lower limit deviation value alarm: -1999 ~ 9999Unit Deviation alarm (inside): 0 ~ 9999Unit Deviation alarm (outside): 0 ~ 9999Unit
1	10	Event 2 set value *1	EV2_S	
1	11	Unusable		
1	12			
1	13			
1	14			
1	15			
1	16	Communication mode LOC/COMM RUN flag switching	Comm	0: LOCAL, 1: COMMU (Writing possible even in local mode)
1	17	DI1 Type of action *1	Di1	0: NOP, 1: STB, 2: SV(SB), 3: AT, 4: MAN, 5: DA, 6: STP, 7: REM
1	18	DI2 Type of action *1	Di2	
1	19	Type of heater alarm *1	Hb_m	0: LOCK, 1: REAL
1	20	Heater break alarm set value *1	Hb_S	0.0 ~ 50.0A
1	21	Heater loop alarm set value *1	HL_S	0.0 ~ 50.0A
1	22	Upward ramping value *1	rP_u	0(OFF), 1 ~ 9999Unit
1	23	Downward ramping value *1	rP_d	0(OFF), 1 ~ 9999Unit
1	24	Ramp unit *1	rP_U	0: sec, 1: min
1	25	Ramp rate *1	rP_r	0: × 1, 1: × 0.1
1	26	Remote bias *1	rE_b	-1999 ~ 1999Unit
1	27	Remote filter *1	rE_F	0 (OFF), 1 ~ 100sec
1	28	Remote point *1	rE_P	0 (OFF), 0.1 ~ 50.0%
1	29	Remote hysteresis *1	rE_d	0.1 ~ 10.0%
1	30	Remote lower limit side scaling value *1	rE_L	Within measured value (PV) range
1	31	Remote higher limit side scaling value *1	rE_H	Within measured value (PV) range
1	32	Type of SV *1	SV_M	0: NON, 1: SV, 2: SB
1	33	SV set value lower limit limiter *1	SV_L	Within measured value (PV) range
1	34	SV set value higher limit limiter *1	SV_H	Within measured value (PV) range
1	35	Output characteristics	ACT	0: REV, 1: DIR (Writing when output characteristics is allocated for DI results in write mode error since DI is given priority.)
1	36	Control output 1 proportional output cycle	O_C	1 ~ 120sec
1	37	Control output 2 proportional output cycle *2	O_2C	1 ~ 120sec
1	38	SV1 control output 1 lower limit output limiter	O_L	0.0 ~ 99.9%
1	39	SV1 control output 1 higher limit output limiter	O_H	0.1 ~ 100.0%
1	40	SV1 control output 2 lower limit output limiter *2	O_2L	0.0 ~ 99.9%
1	41	SV1 control output 2 higher limit output limiter *2	O_2H	0.1 ~ 100.0%
1	42	SB, SV2 control output 1 lower limit output limiter *1 *2	021L	0.0 ~ 99.9%
1	43	SB, SV2 control output 1 higher limit output limiter *1 *2	021H	0.1 ~ 100.0%
1	44	SB, SV2 control output 2 lower limit output limiter *1 *2	022L	0.0 ~ 99.9%
1	45	SB, SV2 control output 2 higher limit output limiter *1 *2	022H	0.1 ~ 100.0%
1	46	Unused		

TBL	Setting No.	Description	Parameter	Details of parameter
1	47	Unused		
1	48	Unused		
1	49	Unused		
1	50	Unused		
1	51	Control output 1 error output	O_E	0.0 ~ 100.0%
1	52	Control output 2 error output *2	O_2E	0.0 ~ 100.0%
1	53	PV filter	PV_F	0(OFF), 1 ~ 100sec
1	54	AT point	AT_P	0 ~ 5000Unit
1	55	Keylock	Lock	0(OFF): Keylock release 1: Keylock except SV, AT and MAN 2: Keylock except SV 3: Total keylock
1	56	PV scale lower limit side [Setting not possible]	PV_L	Measuring (PV) range lower limit value
1	57	PV scale higher limit side [Setting not possible]	PV_H	Measuring (PV) range higher limit value
1	58	PV decimal point position [Setting not possible]	DP	Measuring (PV) decimal point position
1	59	RUN flag [Setting not possible]	EXE_FLG	For details, see below.
1	60	EVENT flag *1 [Setting not possible]	EXE_EV	For details, see below.
1	61	Error codes [Setting not possible]		For details of error codes, refer to Table 5.1 Error code list
1	62	SV setting remote register selection		0: Remote register (RWwm) 1: Extended setting (Setting No. 3) SV setting remote register can be selected even when communication mode is LOC.
1	63	Extension table No.		0: Extension table No. 0 1: Extension table No. 1 Extension table No. can be set even when communication mode is LOC.

- Higher limit side PV_SO, CJ_SO, b_ _ _ , REM_SO, HB_SO = 7FFFH
- Lower limit side PV_SO, CJ_SO, c_ _ _ , REM_SO, HB_SO = 8000H
- Invalid data of HB = 7FFEH
- Details of EXE_FLG, EV_FLG are as follows:

	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
EXE_FLG	0	0	0	0	0	REM/L	AT/W	COM	STOP	RMP	0	SB/SV2	REM	STBY	MAN	AT
EV_FLG	0	0	0	0	0	0	0	0	0	0	0	0	0	EV3	EV2	EV1

- The error codes and the extension No. turn to "0" when power supply to the apparatus is turned OFF.

*1 Unusable unless the optional function is added. (ERR to be displayed)

*2 Unusable unless the instrument is of the two output type. (ERR to be displayed)

Chapter 5 Troubleshooting

5.1 Extended display/extended setting data error codes

(1) When extended display data is read from the sequencer CPU or data is written in the extended setting, the SR83 checks specifications, whether or not of optional functions, write mode, execution command, range of data and the like and if an error arises, it stores an error code in a 16-bit binary value through extended display in the the remote register RWrn+3. For details of error codes, please refer to Table 5.1 Error code list.

(2) For resetting the error codes, turn the "error reset request" RY(n+1)A ON, and the SR83 turns the "error status flag" RX(n+1)A OFF.

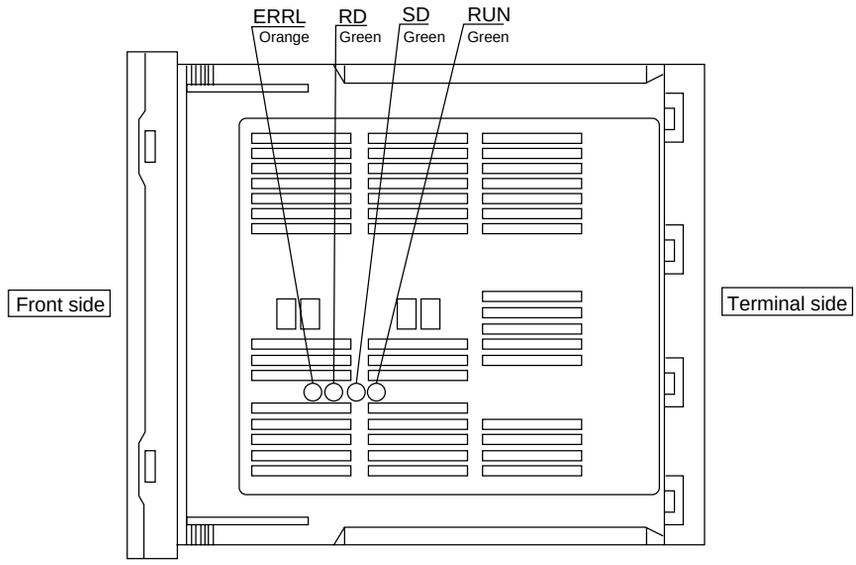
■ Details of error codes

Table 5.1 List of error codes

Error code	Type of error	Description
0000	Normal response	Normal response during extended display or extended setting
0008	Data error in text	Data in text is different from specified format. Data address or the number of data does not meet specification.
0009	Data error	Written data is out of allowable setting range of the data.
000A	Execution command error	Extended setting was carried out when execution command was unable to be accepted.
000B	Write mode error	Extended setting was carried out when that type of data should not be changed.
000C	Specification or option error	Extended setting was carried out for an item that is not included in specifications or for an optional function that is not added.

5.2 Lamps for CC-Link communication

The LED lamps on the top of the SR83 show communication statuses. If some problem is suspected, see which lamp(s) light(s) or flash(es).



Top plan view of the apparatus

5.3 Lamps for CC-Link communication abnormality

■ CC-Link communication abnormality

Table 5.2 LED indication

LED indication				Situation	Remedial method
RUN	SD	RD	ERRL		
●	◎	●	○	Data link is normal.	
●	◎	●	◎	Communication goes on normally but communication cable is affected by noise.	Check cable and protect cable from noise.
○	○	○	○	Break or short of cable	Check cable connection.
○	△	△	△	Something is out of order in wiring.	Check cable connection.
○	△	●	○	Addresses (station Nos.) overlap.	Check the setting of addresses (station Nos.)
○	○	●	○	Not set in parameters of master station (set at a reserved station)	Check the setting of master station and set.
○	○	●	○	Transmission rate is set erroneously.	Check transmission rate.

●: Lighting ○: Not lit ◎: Flashing △: Indefinite

In the event a normal condition is not restored, please call us after checking that which LED lamp(s) light(s) or flash(es).

— MEMO —

— MEMO —

Temperature and Humidity Control Specialists

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PRINTED IN JAPAN