

Getting Started TRNS/RECV command

EH-150 and Big-H series have a general purpose port, which can communicate with any device by TRNS or RECV command in the user program. If you use these command effectively, you will increase the application range of your Hitachi PLC considerably, for example, communication with inverters or bar code readers or other CPUs will be possible. Further, a function like LINK can be realised by this command.

(LINK function is supported Big-H series and H-200/252 series by using link module. Since the link area can be shared automatically by several CPU's, data communication is very easy.)

1. Functionality

TRNS 0 : Transferring data to an external device and receiving data (reply) from it.

(Receiving is optional.)

RECV 0 : Receiving data from an external device and transferring data to it.

(Transferring is optional)

The maximum data length is 256 byte for both TRNS and RECV command.

2. Parameters setting

2.1 General

TRNS 0 (d, s, t)

d : WY□□

Please assign the slot number on which the **output** module is mounted.

If EH-YTP16 is mounted on slot 3, assign WY30. Actual WY30 of YTP16 is not influenced.

s : WR□□ or WL□□ or WM□□

The area from s to s+14 is occupied and used for communication setting.

t : R□□ or L□□ or M□□

The area from t to t+11 is used for control bits and error flags.

➔ *Example : TRNS 0 (WY10, WR100, R200)*

RECV 0 (d, s, t)

d : WX□□

Please assign the slot number on which the **input** module is mounted.

If EH-XD16 is mounted on slot 3, assign WX30. Actual WX30 of XD16 is not influenced.

s : WR□□ or WL□□ or WM□□

The area from s to s+14 is occupied.

t : R□□ or L□□ or M□□

The area from t to t+11 is occupied.

➔ *Example : RECV 0 (WX10, WR100, R200)*

2.2 “s” parameter setting (Common to both TRNS and RECV)

“s” parameters are to specify the communication parameters.

Please set “s” parameters as follows.

The example is based on using TRNS 0 (WY□□, WR100, R□□)

	Example	Description	Setting Range	
s	WR100	Error code	Read only	a)
s+1	WR101	System area (Do not use this area.)	-	
s+2	WR102		-	
s+3	WR103	Time out setting	H0 – HFFFF (x10 ms)	b)
s+4	WR104	The start address of transferred data	HA(=WR) or HB(=WL) or HC(=WM)	c)
s+5	WR105		H0 – HFFFF (I/O number)	
s+6	WR106	Reserved area for transferring (word)	H0 – H007F	d)
s+7	WR107	The start address of received data	HA(=WR) or HB(=WL) or HC(=WM)	e)
s+8	WR108		H0 – HFFFF (I/O number)	
s+9	WR109	Reserved area for receiving (word)	H0 – H007F	f)
s+10	WR10A	Received data length (byte) (Note 1)	H0 – H00FF	g)
s+11	WR10B	Start code of received data (Note 1)	H0 or H80xx	
s+12	WR10C	End code of received data (Note 1)	H0 or H80xx	
s+13	WR10D	Baud rate	H0 – H6	h)
s+14	WR10E	Communication format	H0 – H7	i)

Note 1 : The format of received data can be selected. Please refer to the following (g).

a) Please refer to the manual.

b) Time out setting. (H1 = 10 ms, The max. HFFFF = 65,536 ms)

If the communication is not finished normally within this time, the error flag will be high.

c) Starting address of transferred data

If the start address is WR300, set s+4=HA, s+5=H300.

d) Transferred area size. (word)

This is to secure the area for transferring. In case of sending data of differing length, please set the biggest data length.

e) Starting address of received data

Refer to c).

f) Received area size (word)

This is to secure the area for receiving. In case of sending data of differing length, please set the biggest data length.

g) There are 4 ways to define the received data format.

In case the receive function is OFF, please set all 0.

(1) Define as starting code and data length

s+10 : H□□ (□□=data length byte)

s+11 : H80□□ (□□=starting code)

s+12 : H0000

Start code	Data length (fixed)
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(2) Define as starting code and end code

s+10 : any

s+11 : H80□□ (□□=starting code)

s+11 : H80□□ (□□=end code)

Start code	any length	End code
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(3) Define as end code only >

s+10 : any

s+11 : H0000

s+12 : H80□□ (□□=end code)

any length	End code
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(4) Define as data length only

s+10 : H□□ (□□=data length byte)

s+11 : H0000

s+12 : H0000

Data length (fixed)

h) Baud rate

Baud rate	Setting value
19.2 kbps	H6
9600 bps	H5
4800 bps	H4
2400 bps	H3
1200 bps	H2
600 bps	H1
300 bps	H0

i) Communication format

7 or 8 bit	Parity	stop bit	Setting value
7	Even	2	H0
7	Odd	2	H1
7	Even	1	H2
7	Odd	1	H3
8	No	2	H4
8	No	1	H5
8	Even	1	H6
8	Odd	1	H7

2.3 “t” parameter setting (Common to both TRNS and RECV)

“t” parameters are control bits and error bits. Please set them as follows.

The example is based on using TRNS 0 (WY□□, WR□□, R100)

	Example	Description	Reset when	Read or Write
t	R100	Execution flag	End of communication	W
t+1	R101	Normal end flag	Beginning of communication	R
t+2	R102	Abnormal end flag	Beginning of communication	R
t+3	R103	Initialise TRNS command	t+4 ON	W
t+4	R104	Initialising normal end flag	Beginning of communication	R
t+5	R105	Receive function ON (Note 1)	End of communication	W
t+6	R106	Parity error	Beginning of communication	R
t+7	R107	Framing error	Beginning of communication	R
t+8	R108	Over run error	Beginning of communication	R
t+9	R109	Time out error	Beginning of communication	R
t+10	R10A	Receiving buffer full	Beginning of communication	R
t+11	R10B	Overlap of TRNS command	Beginning of communication	R

Note 1: In case of RECV command, Transferring function ON.

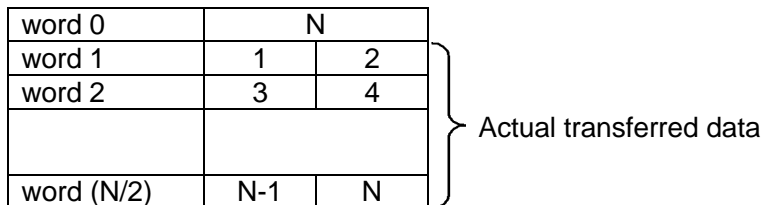
Note 2: CPU might not be able to receive immediate reply from the other device. If possible, please set wait time (10 ms or more) on the external device.

2.4 Transferred/Received Data format

< Transferring >

Please set data length (byte) in the head of the transferred data.

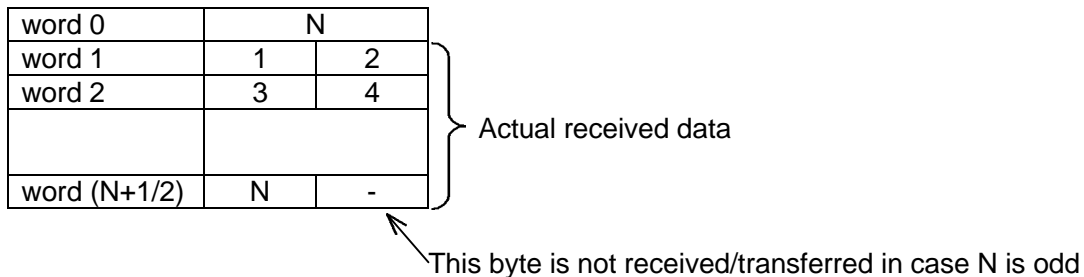
In case N is even



< Receiving >

The data length is set in the head of the received data as well the transferred data setting.

In case N is odd



3. Cable connection

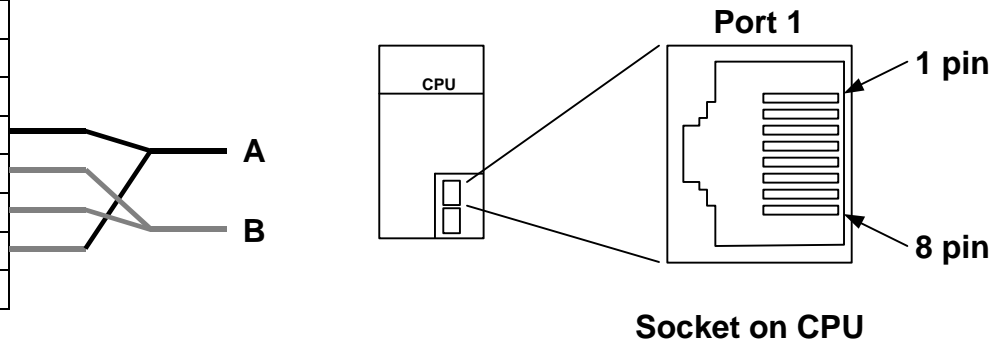
3.1 RS-232C

No.	Signal	Description	CPU	External device
1	SG	Signal Ground	←→	←→
2	CD	High during communication	←	—
3	ER1	High when communication is ready.	—	→
4	ER2	Always high	—	→
5	SD	Sent Data	—	→
6	RD	Received Data	←	—
7	DR	High when device is connected.	←	—
8	RS	High when CPU is ready to receive	—	→

3.2 RS-485 (for CPU308/316)

No.	Signal	Description	CPU	External device
1	SG	Signal Ground	←→	←→
2	CD	NC	←	—
3	ER1	NC	—	→
4	TX	Transferred Data (+)	—	→
5	TXN	Transferred Data (-)	—	→
6	RXN	Received Data (-)	←	—
7	RX	Received Data (+)	←	—
8	RS	NC	—	→

No.	Signal
1	SG
2	CD
3	ER1
4	TX
5	TXN
6	RXN
7	RX
8	RS



4. Dip switch setting

In case of general purpose (TRNS/RECV command), please set dip as follows.

Dip switch 2 OFF (Port 1 setting in case of dip switch 5 : ON - modem / OFF - TRNS/RECV)

Dip switch 5 OFF (Port 1 setting : ON - dedicated port / OFF - general purpose port)

Note : Port 2 does not support general purpose. Please use port 1.

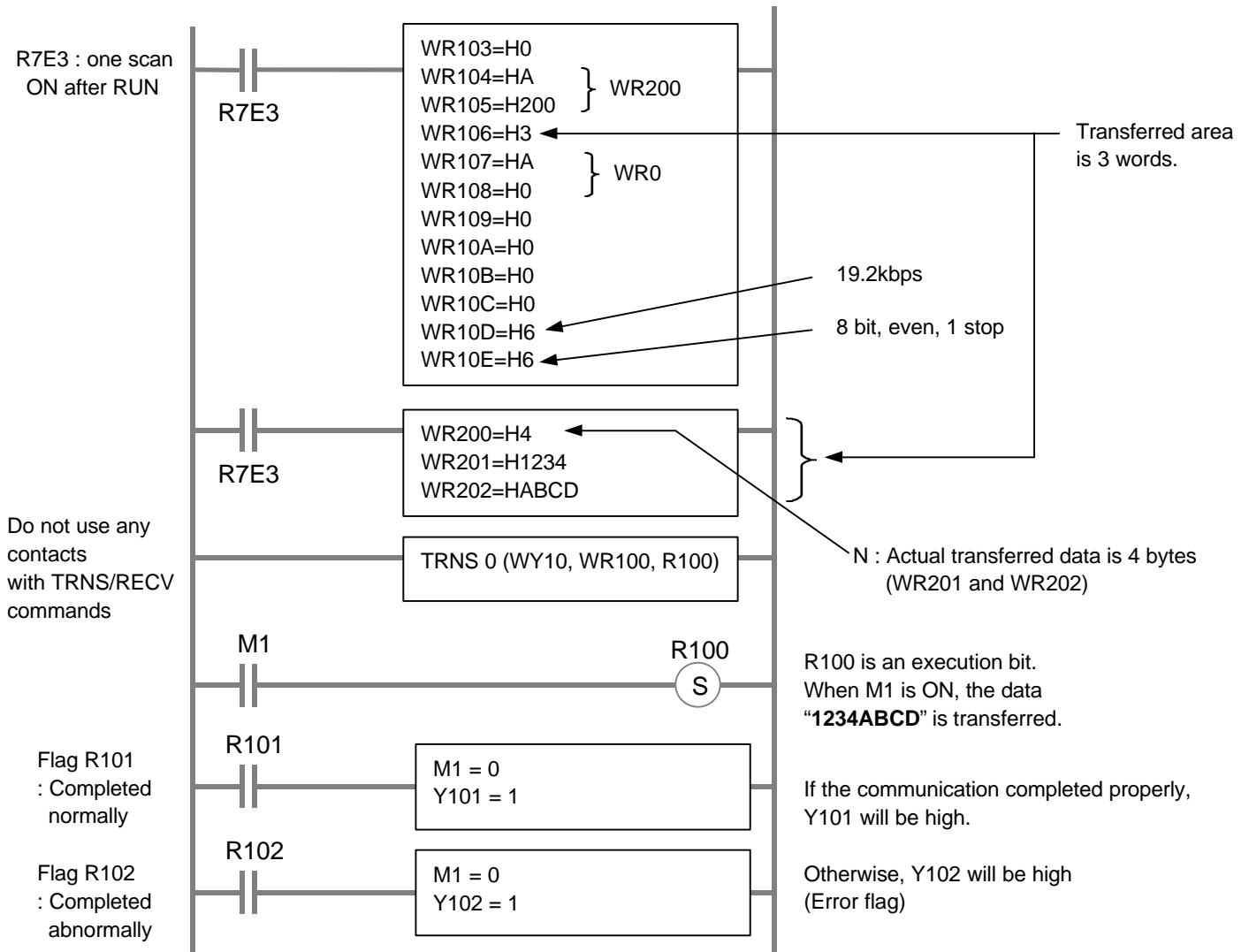
5. Other setting

Please set a value in WRF036 accordingly.

RS-232C : H3, RS-422 : H5, RS-485 : H9

6. Sample programs

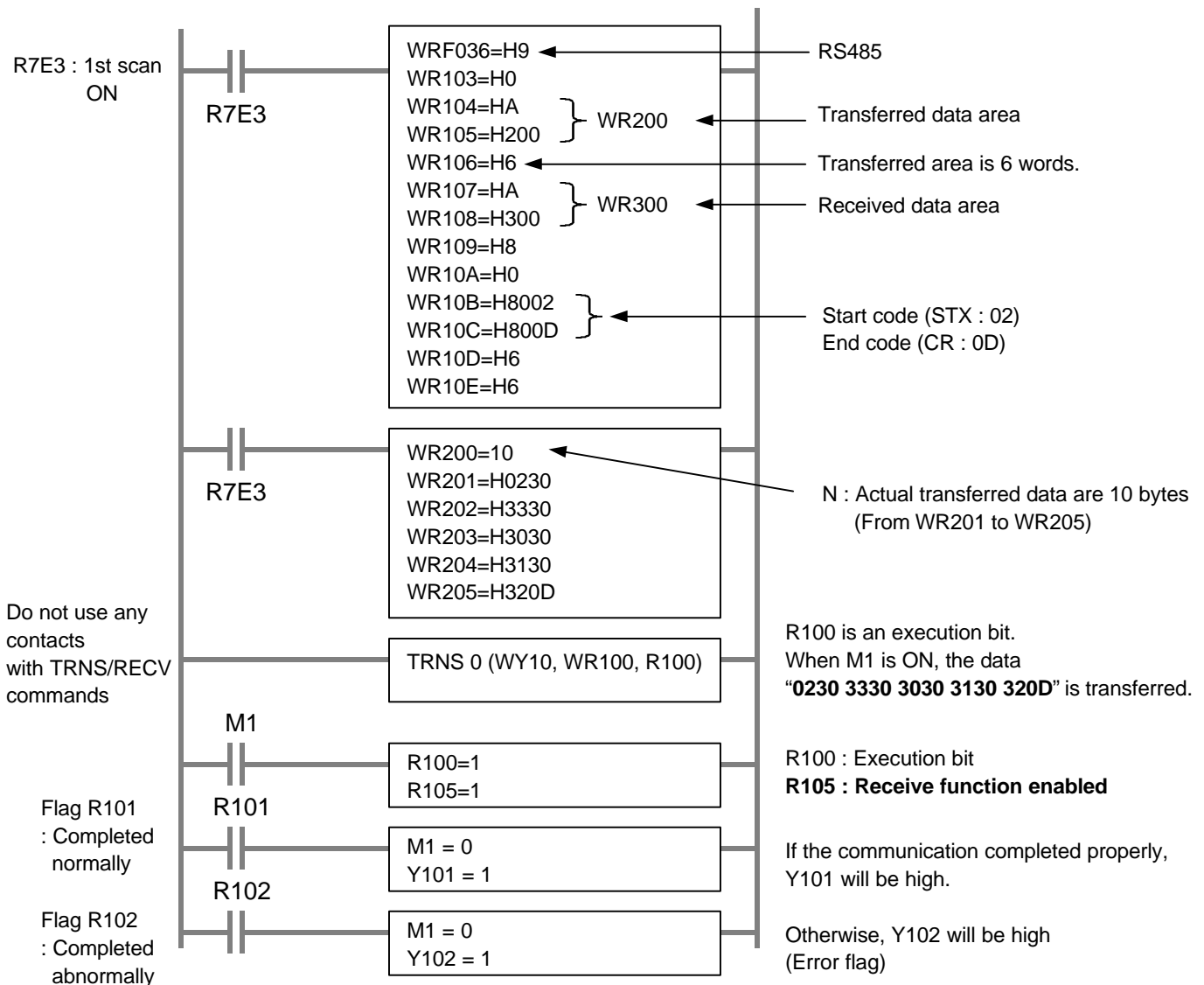
(1) This is the simplest program for TRNS command, which transfers 2 words in **WR201-WR202**



(2) Communication with inverter SJ300 on RS-485.

(RS-485 is supported by EH-CPU308 and EH-CPU316)

Conditions	
- Inverter number	: 03
- Command/data	: Operation/start
- Transferred command	: STX 03 00 01 BCC CR (operation start for No.3 inverter)
- Transferred command (ASCII)	: 02 30 33 30 30 30 31 30 32 0D (10 bytes)
- Received data (OK)	: STX 03 ACK BCC CR
- Received data (OK, ASCII)	: 02 30 33 06 30 35 0D
- Received data (NG)	: STX 03 NAK xx xx BCC CR (xx xx : Error code)
- Received data (NG, ASCII)	: 02 30 33 15 xx xx xx xx 0D
- Baud rate	: 19.2 kbps



Some settings are required on inverter side in A001, A002, C070-78 etc. Please refer to the manual of SJ300. Please set waiting time (20ms) in inverter (C078) because PLC might not get immediate reply.

Big-H series and H-252 have several ASCII conversion commands, which can make ASCII data handling easier.

Reply from inverter	
< ACK >	< NAK >
WR300=H7	WR300=9
WR301=H0230	WR301=H0230
WR302=H3306	WR302=H3315
WR303=H3035	WR303=Hxxxx
WR304=H0D00	WR304=Hxxxx
	WR305=H0D00