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Master IPS Nutrunner
Operation Manual

CORETEC
Pioneer for Factory Automation

Ver No.	1.01
Date : 2007/07	

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Master IPS Nutrunner Operation Manual

Introduction

Thank you very much for purchasing our Master IPS.
This manual describes the hardware scheme, installation procedures, connections, running, operations, communication, status LED and daily inspections.
Make sure to thoroughly understand the contents and use the product properly.

Request

We have made every effort to ensure the quality of this Manual, however, should your company have questions or find errors with the content of this Manual, we ask that you contact us and report any questions or discrepancies.

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*** Be sure to read in order to secure safety and quality.**

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Revision

Date	Ver	Contents
2005/05	1.00	Ver1.00
2007/07	1.01	Add the DeviceNet I/O information

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1. For safe use

1.1. Regarding symbols

Symbols are used to provide warnings in this instruction manual and for indication for proper product use and to prevent danger to the user or other people and damage to property (so called Product Liability accident) from occurring. Understand the indication meanings before reading this manual.

1.2. Observe the following for safety (General)

Danger	This symbol assumes the possibility that accidental death or serious injury may occur immediately to the user, if the symbol is neglected and the product is incorrectly handled.
	The IPS power source is as high as 200V. Look out for electric shock.

Warning	This symbol assumes that there is a potential for personal death or injury if this expression is ignored and this product is mishandled**.**
	In a case where the product is used in an application in which an accident resulting in death or injury or a serious expansion of damage is predictable, take safety measures such as installing a fail-safe device.
	Do not use around combustible gas. If disregarded, it may lead to an explosion.
	In a case of handling cables and connectors, etc., cut off the power temporarily without fail. If disregarded, it may lead to an electric shock.
	Do not remove the cover, disassemble, repair or modify the product. If disregarded, it may lead to an electric shock.
	Make sure to connect the protection conductor terminal to ground. Electric shock might be caused.
	Do not forcibly twist, pull or scratch the power cable.

Caution	This symbol assumes that there is a potential for personal death or injury if this expression is ignored and this product is mishandled.
	Set up the emergency stop and interlock circuit with the external circuit. This allows to prevent expansion of damage.
	Do not use the product at over the specified ambient temperature. If disregarded, it may lead to fire or electric shock.
	Use in an environment without condensation due to water or moisture. If disregarded, it may lead to an electric shock.
	When output cannot be obtained, or any other abnormality is found during operation, stop use immediately. It may lead to electric shock. Contact the distributor where you purchased the product or our company's sales office without fail.
	Lithium Battery replacement information- Replace Battery with same kind only. Use of another Battery may present a risk of Fire or Explosion.
	Lithium Battery misuse information- "CAUTION, Battery may explode if mistreated. Do not recharge, disassemble or dispose of in Fire. Or "CAUTION: Risk of fire, explosion, and burns. Do not Recharge, Disassemble, heat above 100℃ or incinerate."

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1.3. Caution on attachment and use.

Caution	This symbol assumes that there is a potential for personal death or injury if this expression is ignored and this product is mishandled.
!	Insert or pull off the connector only after turning off the power. Otherwise, controller might fail.
!	When attaching the IPS body, allow a space of 25 mm or more for the right and left directions and 80 mm or more for up and down directions for cooling.

1.4. Make sure to observe for PLC circuit

Warning	This symbol assumes that there is a potential for personal death or injury if this expression is ignored and this product is mishandled.
!	Design the PLC circuit under consideration of safety measure such as emergency stop.

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2. Before use

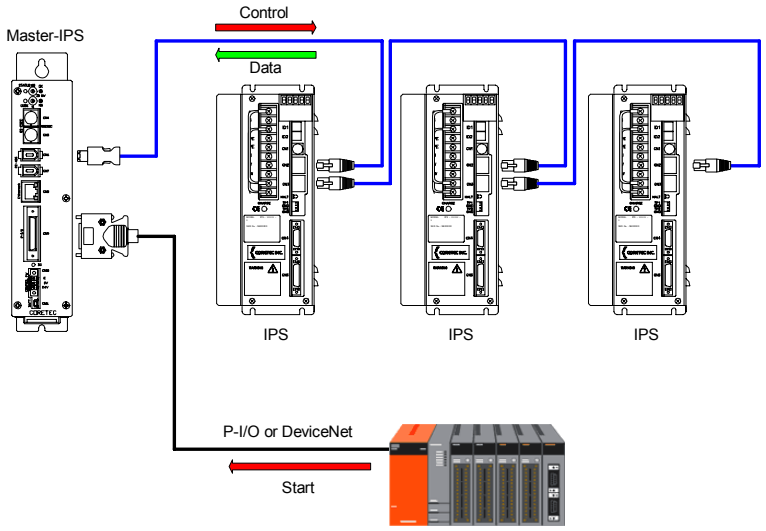
2.1. Feature of the New Master IPS

1) Multi IPS (max 32 spindles) control and data collection is possible. (Control mode : Multi mode)
2) Data collection without Multi IPS control is possible. (Control mode : Data collection mode)
3) Data collection via Ethernet (Communication with Multi Master IPS is possible.)
4) Data output to the Data terminal（RS-232C）
5) Barcode data is acceptable.（RS-232C）
6) Product Number from PLC is acceptable.（RS-232C）
7) Data output to the thermal printer（RS-232C）
8) Data output to PLC（RS-232C）

2.2. Regarding the control mode

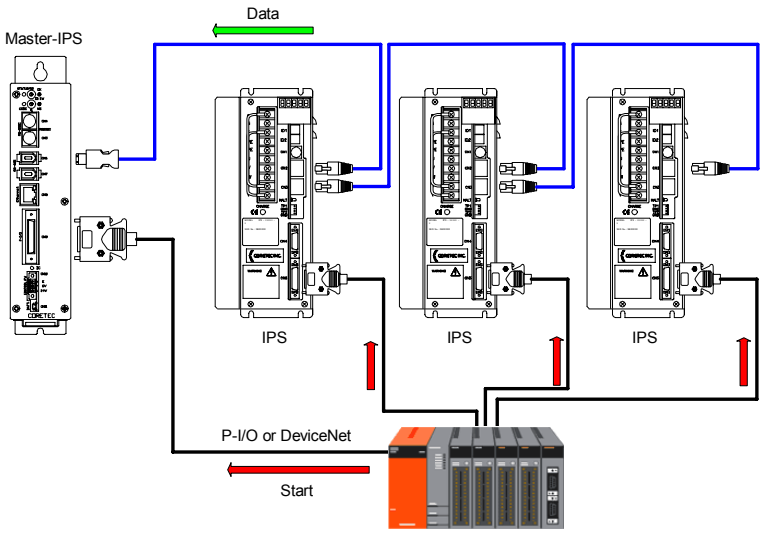
1. Multi mode

Multi spindle control (Retry, Group, Synchronous operation) can be possible creating an easy sequence program. There is no need to create a complicate PLC ladder programming.



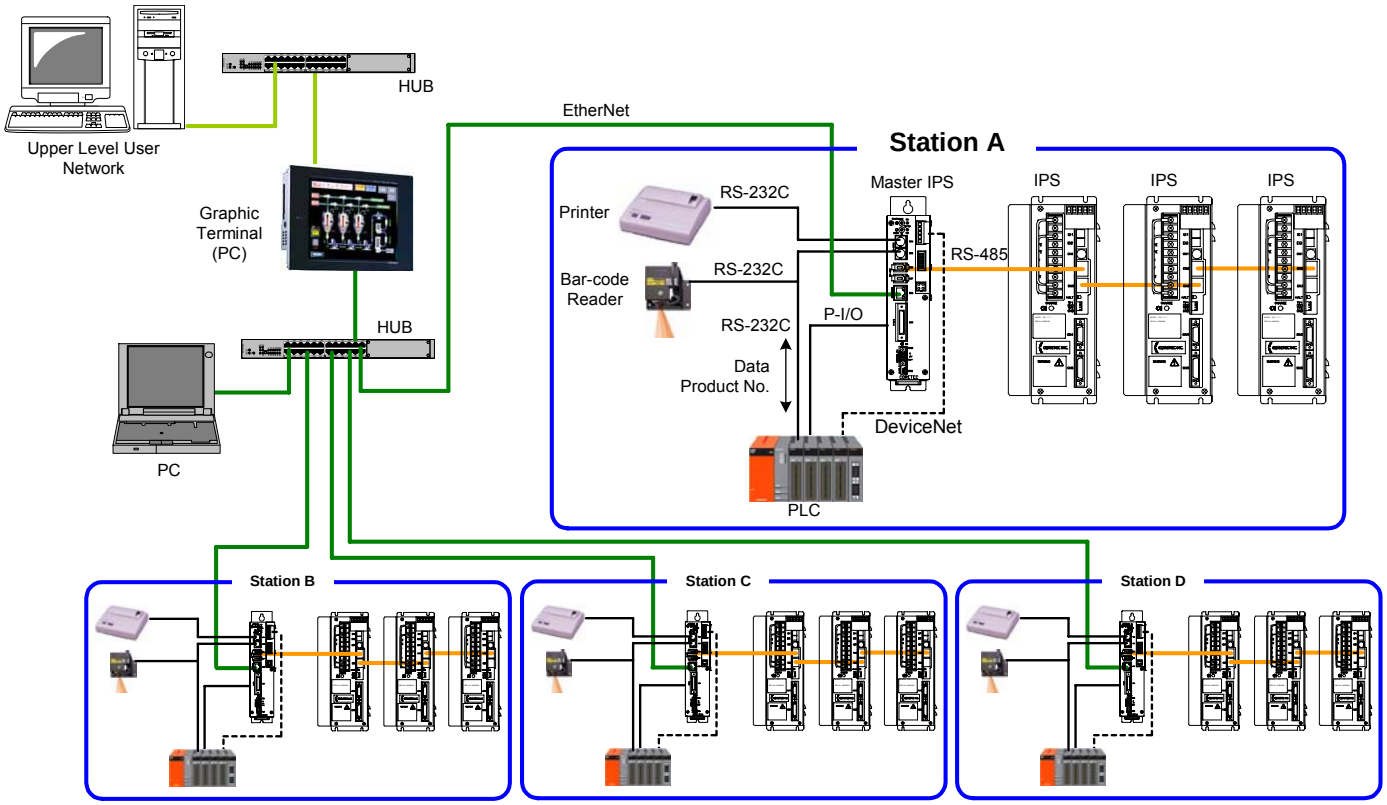
2. Data collection mode

The function of the Master-IPS is collecting data on this mode. Each IPS is controlled by the PLC.



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2.3. System Configuration（When multiple Master IPS are used）



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3. Specification

3.1. General specification

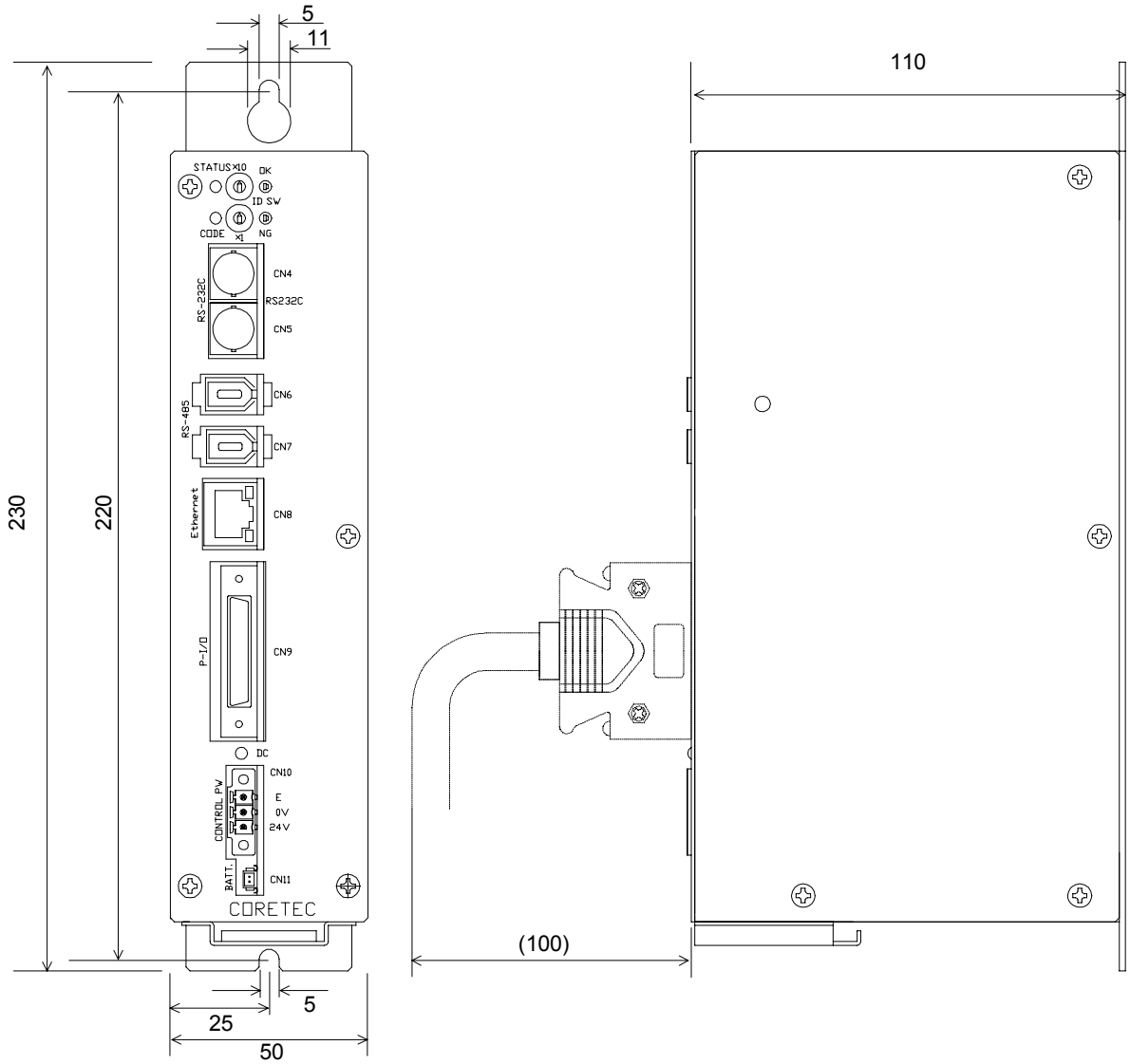
Items	Contents
Outline	Refer to outline diagram on the Appendix (Section 3 (3) Master-IPS)
Temperature	0-45°C
Humidity	85% or less (No condensation)
Altitude	Altitude 1000m or lower
Installing location	Harmful places with corrosive gas, cutting oil, metalpowder, oil etc are not allowed.
Power for drive	24V DC
Power consumption	8W (Except option)
Grounding	Third-class earth work (Preferably 30Ω or less)
Cooling procedures	Natural air cooling
Installing procedures	Installing on back panel

3.2. Basic specification

Type	M-IPS-NR	M-IPS-NR -DEV	M-IPS-NR -PRF	M-IPS-NR -CCL	M-IPS-NR -INT
Open network	No	DeviceNet	Profibus (under development)	CC-LINK (under development)	Interbus (under development)
EtherNet	UDP/IP protocol 10M/100Mbps				
RS-485 Communication	For communication with IPS (Use either port) 19.2K/38.4K/76.8Kbps baud rate can be selected.				
RS-232C Communication	For optional RS-232C devices×2 9.6K/19.2K/38.4Kbps baud rate can be selected. (Dedicated protocol)				
Parallel Input (For only M-IPS-NR *1)	16points Capacity 24V, 4.8mA, Filter time constant 50ms				
Parallel Output (For only M-IPS-NR *1)	16points Capacity 24V, 50mA, Filter time constant 50ms				
Status indicator (LED)	1 color LED×2 (For judgment) 3 colors LED×2 (For status)				
Number of IPS connection	32 spindles maximum				
Number of sequence(Multi) Number of data table(Data)	31 points				
Alarm history	Latest 30 alarms				

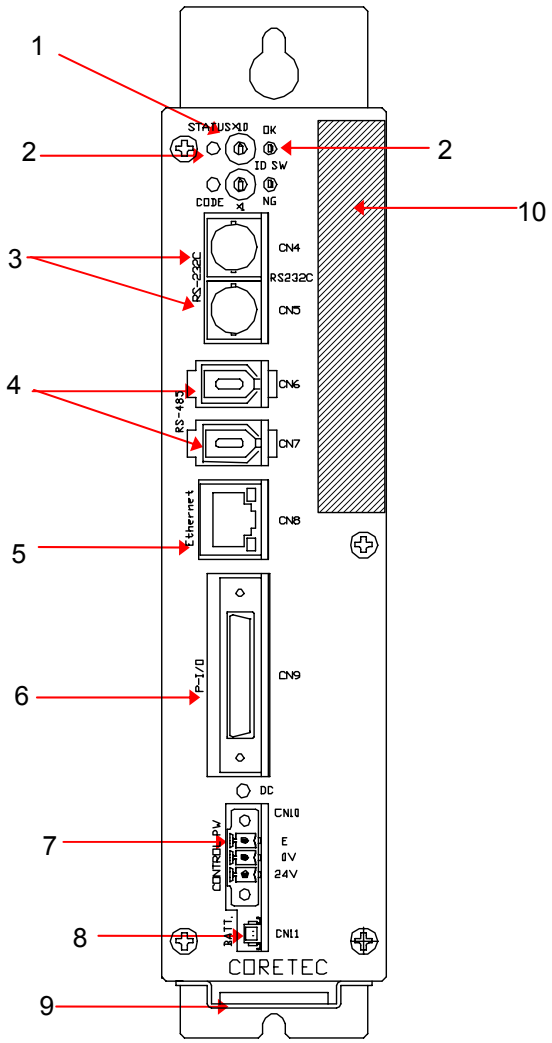
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3.3. Dimensions



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3.4. Interface (Name & Specification)



M-IPS-NR

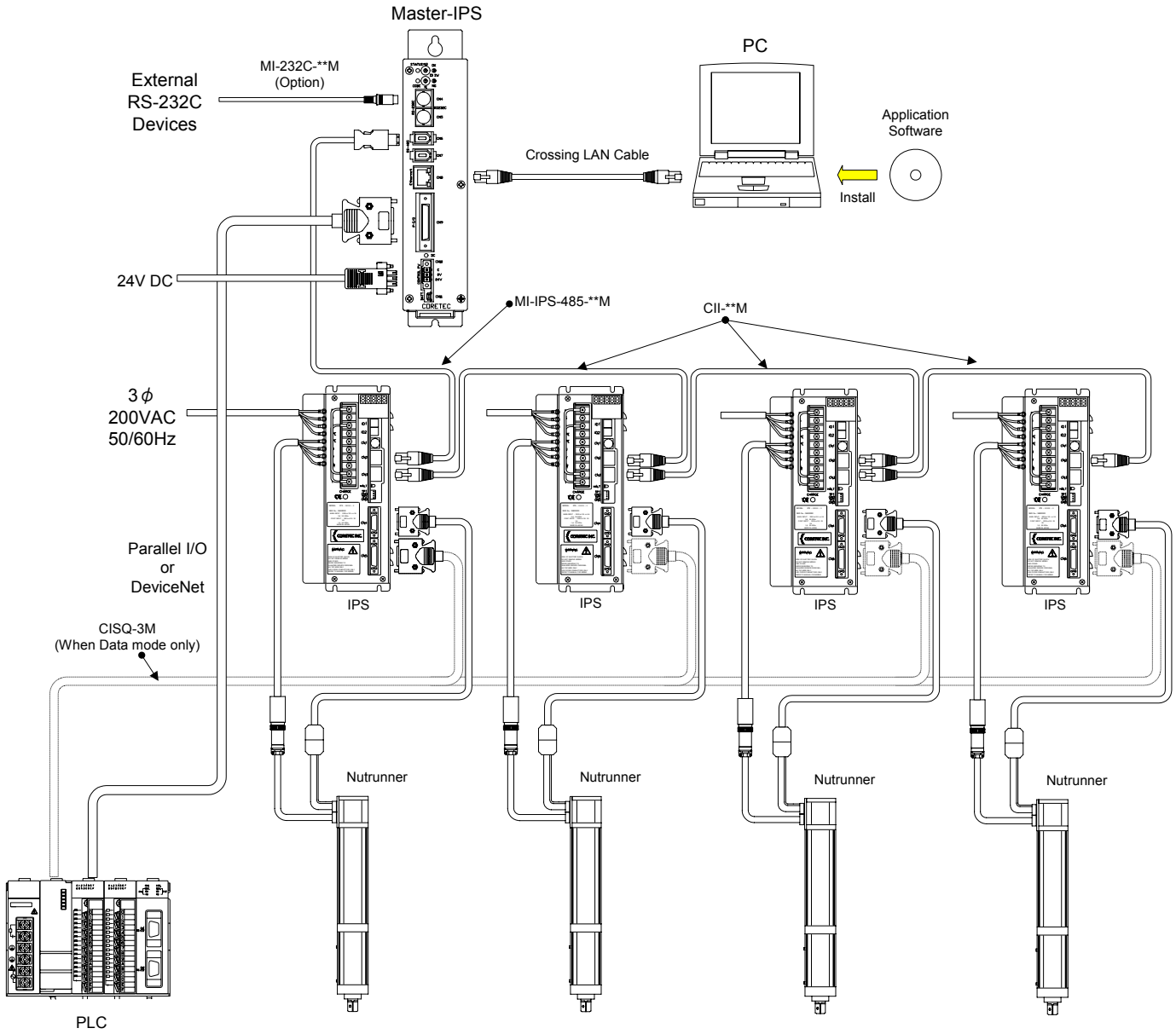
No.	Name	Contents
1	ID Switch （High Low）	Master IPS ID configuration SW
2	LED1/LED2/LED3/LED4	Indicator of Master IPS status (Refer to section6.) LED1: Status LED2: Status detail LED3: Judge(OK) LED4: Judge(NG)
3	RS-232C Port (Ch01, Ch02)	Communication port of the RS-232C devices.
4	RS-485 Port (Ch01, Ch02)	Communication port of the IPS.
5	Ethernet Port	Communication port of the PC.
6	Parallel I/O Port	Parallel I/O port（No concomitant use with DeviceNet）
7	Power LED	Power indicator.
8	Power supply CN	Master IPS shall be supplied with 24V DC on this connector.
9	Backup Battery CN	Connector for Backup Battery.
10	Anybus card slot	Anybus card can be set.(Option)

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4. Initialization

4.1. Connection of Master-IPS and IPS

Connect Master-IPS with IPS and PLC as indicated below. (Including option)

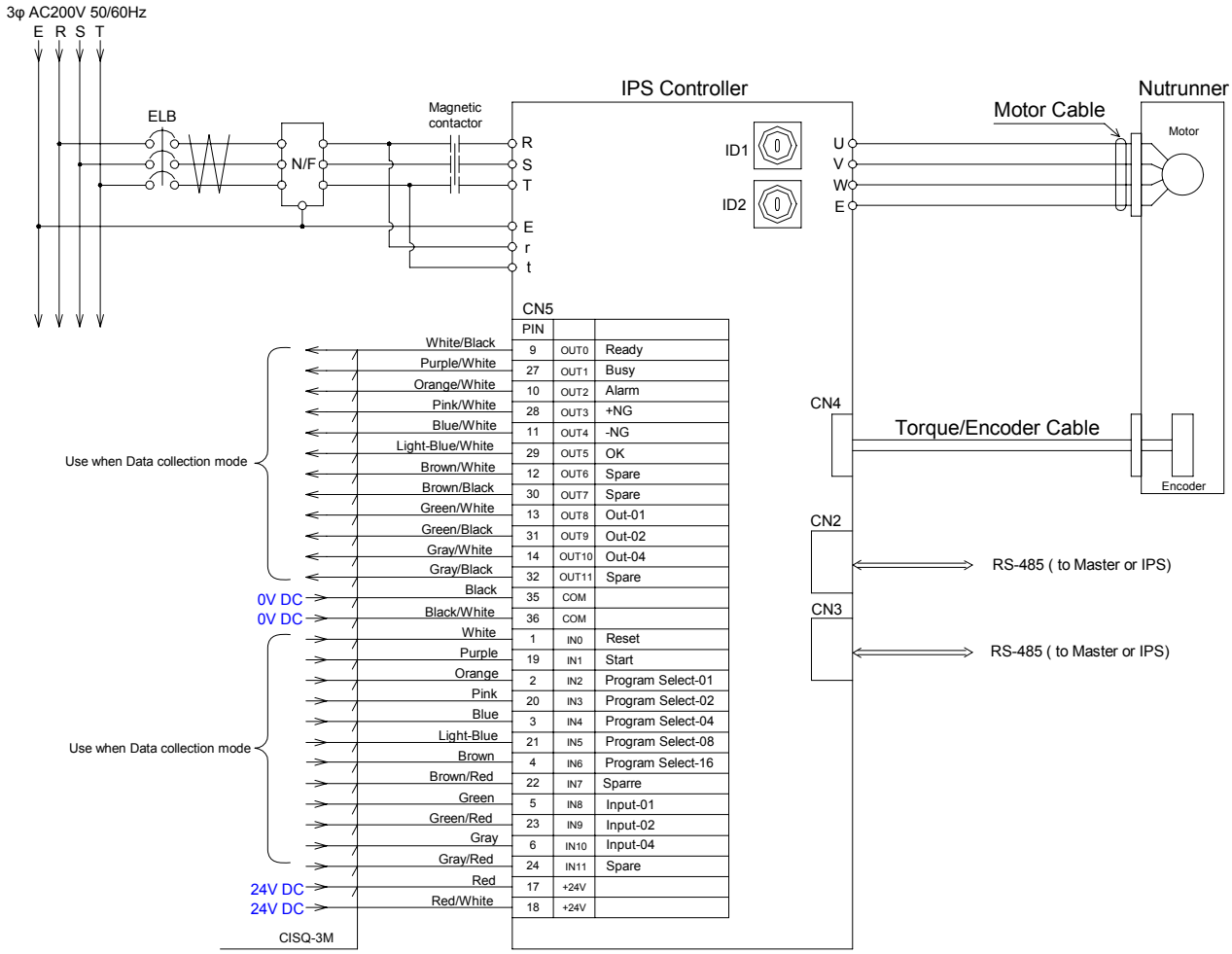


! Caution

Regarding the detail of IPS wiring, refer to the next page.

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4.2. Detail of IPS wiring



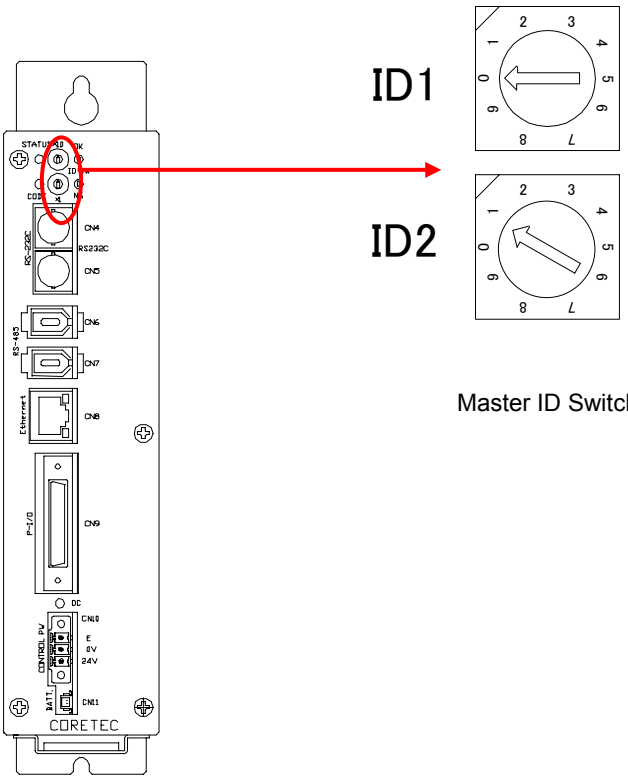
PIN		
9	OUT0	Ready
27	OUT1	Busy
10	OUT2	Alarm
28	OUT3	+NG
11	OUT4	-NG
29	OUT5	OK
12	OUT6	Spare
30	OUT7	Spare
13	OUT8	Out-01
31	OUT9	Out-02
14	OUT10	Out-04
32	OUT11	Spare
35	COM	
36	COM	
1	IN0	Reset
19	IN1	Start
2	IN2	Program Select-01
20	IN3	Program Select-02
3	IN4	Program Select-04
21	IN5	Program Select-08
4	IN6	Program Select-16
22	IN7	Sparre
5	IN8	Input-01
23	IN9	Input-02
6	IN10	Input-04
24	IN11	Spare
17	+24V	
18	+24V	

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4.3. Master IPS ID configuration

ID configuration shall be done when the power is off.

ID1 Switch means the second digit of Master IPS ID, and ID2 is the first digit.
(The ID 01 to 16 is available.)



Master ID Switch

ID	ID1	ID2
01	0	1
02	0	2
03	0	3
...	...	...
15	1	5
16	1	6

Master ID Setting

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4.4. DeviceNet Network setting

On a DeviceNet network, each node must be assigned it's own unique Mac ID. The Mac ID is a value between 0 and 63 used to identify each node. The Mac ID and Baud rate settings can be set either using a DIP-switch.

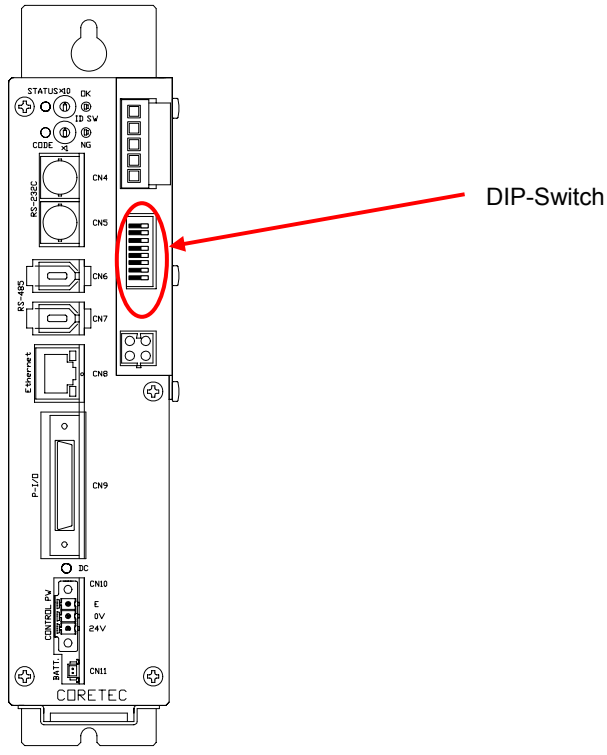
The DIP switches are numbered 1 through 8. Switch 1 and 2 are used to configure the Baud rate, and switches 3 through 8 are used to configure the Mac ID.

Mac ID	SW3	SW4	SW5	SW6	SW7	SW8
0	OFF	OFF	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	OFF	OFF	ON
2	OFF	OFF	OFF	OFF	ON	OFF
3	OFF	OFF	OFF	OFF	ON	ON
...	...	...	...	...	...	...
62	ON	ON	ON	ON	ON	OFF
63	ON	ON	ON	ON	ON	ON

Mac ID Setting

Baudrate	SW1	SW2
125K	OFF	OFF
250K	OFF	ON
500K	ON	OFF
(Reserved)	ON	ON

Baudrate Setting



M-IPS-NR-DEV

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4.5. Connection of Master-IPS and PLC (Parallel I/O)

4.5.1. Parallel I/O pin assignment and contents (Multi control mode)

Pin No.	Signal type	Signal Name (Output Bank0)		Signal Name (Output Bank1)	Signal Name (Output Bank2)	Signal Name (Output Bank3)
1	In01	Sequence start				
2	In02	Sequence select bit	01			
3	In03		02			
4	In04		04			
5	In05		08			
6	In06		16			
7	In07	Next step				
8	In08	Forcing next step				
9	In09	Sequence stop				
10	In10	Alarm reset				
11	In11	Judgment reset				
12	In12	QL backup input				
13	In13	CH1 request				
14	In14	CH2 request				
15	In15	Output Bank bit01				
16	In16	Output Bank bit02				
17	24V DC	Plus common				
18	24V DC	Plus common				
19	Out01	Master ready				
20	Out02	Sequence running				
21	Out03	Master alarm				
22	Out04	Total OK				
23	Out05	Total NG				
24	Out06	Data flag				
25	Out07 *1	Sequence answer bit	01	Alarm code bit01	Group01 OK	Group06 OK
26	Out08 *1		02	Alarm code bit02	Group02 OK	Group07 OK
27	Out09 *1		04	Alarm code bit04	Group03 OK	Group08 OK
28	Out10 *1		08	Alarm code bit08	Group04 OK	Group09 OK
29	Out11 *1		16	QL backup complete	Group05 OK	Group10 OK
30	Out12 *1	Step complete		Work No. input OK		
31	Out13 *1	No dormant spindle		Work No. input NG		
32	Out14 *1	Battery alarm				
33	Out15	Bank input answer bit01				
34	Out16	Bank input answer bit02				
35	0V DC	Minus common				
36	0V DC	Minus common				

*1 The purpose of Output07 to 14 will be switched with the combination of In15 and 16.

*2 The each signal require pulse width more than 100ms.

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♦ Explanation1 (Output Bank0)

Pin No.	Signal type	Signal Name (Output Bank-0)		Explanation
1	In01	Sequence start		Master reads the “Sequence select bit” at the start of this signal and starts Sequence program.
2	In02	Sequence select bit	01	These 5 inputs form a binary code which is capable of selecting up to 31 sequence programs.
3	In03		02	
4	In04		04	
5	In05		08	
6	In06		16	
7	In07	Next step		Sequence step can be promoted when “Step complete (Out12)” is ON.
8	In08	Forcing next step		Sequence step can be promoted forcibly.
9	In09	Sequence stop		When this signal is turned ON during sequence execution, sequence will stop. (The Judgment will be NG)
10	In10	Alarm reset		When this signal is turned ON, it will clear the alarm.
11	In11	Judgment reset		When this signal is turned ON, it will clear the judgment and data.
12	In12	QL backup input		When this signal is turned ON, it will switch NG judgment to OK judgment.
13	In13	CH1 data request		RS-232C port1 data request to option device (CN4)
14	In14	CH2 data request		RS-232C port2 data request to option device (CN5)
15	In15	Output shift bit01		Output Bank (Out07 to 14) select bit These 2 inputs form a binary code which is capable of selecting Bank.
16	In16	Output shift bit02		
19	Out01	Master ready		Output when the Master IPS is ready.
20	Out02	Sequence running		Output when the sequence is running.
21	Out03	Alarm		Output when the alarm (Master and IPS) occurs.
22	Out04	Total OK		Output when the judgment of all work position is OK.
23	Out05	Total NG		Output when the judgment of one (or more) work position is NG.
24	Out06	Data flag		Output when the Master IPS stores fastening data.
25	Out07 *1	Sequence answer bit	01	Output sequence select bit (binary code) that is input (01 to 31).
26	Out08 *1		02	
27	Out09 *1		04	
28	Out10 *1		08	
29	Out11 *1		16	
30	Out12 *1	Step complete		Output when the operation of the step has been complete. (“Step condition” setting is needed on Sequence.)
31	Out13 *1	No dormant spindle		Output when there is no dormant (no movement) spindle.
32	Out14 *1	Battery alarm *1		Output when the Master IPS detects low voltage of backup battery.
33	Out15	Bank input answer bit01		Output “Output Bank bit” (binary code) that is input (00 to 03).
34	Out16	Bank input answer bit02		

*1 The Master IPS will check voltage of backup battery only when the power is on.

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♦ Explanation2 (Output Bank1)

Pin No.	Signal type	Signal Name (Output Bank1)	Explanations
25	Out07	Alarm code bit01	When alarm occurs, these 4 outputs form a binary code which stands for alarm code.
26	Out08	Alarm code bit02	
27	Out09	Alarm code bit04	
28	Out10	Alarm code bit08	
29	Out11	QL backup complete	Output when the switch of judgment is completed.
30	Out12	Work No. input OK	Output when the work No. input by RS-232C is completed.
31	Out13	Work No. input NG	Output when the work No. input by RS-232C is timeout.
32	Out14		

♦ Explanation3 (Output Bank2)

Pin No.	Signal type	Signal Name (Output Bank2)	Explanations
25	Out07	Group01 OK	Output each group judgment. (only OK)
26	Out08	Group02 OK	
27	Out09	Group03 OK	
28	Out10	Group04 OK	
29	Out11	Group05 OK	
30	Out12		
31	Out13		
32	Out14		

♦ Explanation4 (Output Bank3)

Pin No.	Signal type	Signal Name (Output Bank3)	Explanations
25	Out07	Group06 OK	Output each group judgment. (only OK)
26	Out08	Group07 OK	
27	Out09	Group08 OK	
28	Out10	Group09 OK	
29	Out11	Group10 OK	
30	Out12		
31	Out13		
32	Out14		

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4.5.2. DeviceNet I/O assignment and explanation (Multi control mode)

4.5.2.1. Input

DeviceNet input occupies 5 words (10 bytes). The contents of “I1” are completely same as P-I/O input. Another optional function can be used when DeviceNet is used.

Word No.	Bit No.	Signal Name		Explanations
I1	0	Sequence start		Same as P-I/O input
	1	Sequence select bit	01	
	2		02	
	3		04	
	4		08	
	5		16	
	6	Next step		
	7	Forcing next step		
	8	Sequence stop		
	9	Alarm reset		
	A	Judgment reset		
	B	QL backup input		
	C	CH1 request		
	D	CH2 request		
	E	Output Bank bit01		
	F	Output Bank bit02		
I2	0	Dormant SP01		While these signals are ON, selected spindle is bypassed and “No dormant spindle” signal is turned OFF.
	1	Dormant SP02		
	2	Dormant SP03		
	3	Dormant SP04		
	4	Dormant SP05		
	5	Dormant SP06		
	6	Dormant SP07		
	7	Dormant SP08		
	8	Dormant SP09		
	9	Dormant SP10		
	A	Dormant SP11		
	B	Dormant SP12		
	C	Dormant SP13		
	D	Dormant SP14		
	E	Dormant SP15		
	F	Dormant SP16		

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Word No.	Bit No.	Signal Name		Explanations
I3	0	Dormant SP17		While these signals are ON, selected spindle is bypassed and “No dormant spindle” signal is turned OFF.
	1	Dormant SP18		
	2	Dormant SP19		
	3	Dormant SP20		
	4	Dormant SP21		
	5	Dormant SP22		
	6	Dormant SP23		
	7	Dormant SP24		
	8	Dormant SP25		
	9	Dormant SP26		
	A	Dormant SP27		
	B	Dormant SP28		
	C	Dormant SP29		
	D	Dormant SP30		
	E	Dormant SP31		
	F	Dormant SP32		
I4	0	Data request Work Position select bit	01	These 6 inputs form a binary code which is capable of selecting up to 32 Data request Work position.
	1		02	
	2		04	
	3		08	
	4		16	
	5		32	
	6	Data request		Master reads the “Data request Work Position select bit” at the start of this signal and outputs the data.
	7	Serial No. read		Master reads the “Serial No. bit” at the start of this signal and uses this data as a “Product No.”.
	8			
	9			
	A			
	B			
	C			
	D			
	E			
	F			

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Word No.	Bit No.	Signal Name	Explanations
I5	0	Serial No. bit1	These 15 inputs form a binary code which is capable of inputting “Serial No.” (up to 65535).
	1	Serial No. bit2	
	2	Serial No. bit4	
	3	Serial No. bit8	
	4	Serial No. bit16	
	5	Serial No. bit32	
	6	Serial No. bit64	
	7	Serial No. bit128	
	8	Serial No. bit256	
	9	Serial No. bit512	
	A	Serial No. bit1024	
	B	Serial No. bit2048	
	C	Serial No. bit4096	
	D	Serial No. bit8192	
	E	Serial No. bit16384	
	F	Serial No. bit32768	

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4.5.2.2. Output

DeviceNet input occupies 7 words (14 bytes). The contents of “O1” are completely same as P-I/O output.

Another optional function can be used when DeviceNet is used.

Word No.	Bit No.	Signal Name (Output Bank0)		Signal Name (Output Bank1)	Signal Name (Output Bank2)	Signal Name (Output Bank3)
O1	0	Sequence running				
	1	Alarm				
	2	Total OK				
	3	Total NG				
	4	Data flag				
	5	Sequence running				
	6	Sequence answer bit	01	Alarm code bit01	Group01 OK	Group06 OK
	7		02	Alarm code bit02	Group02 OK	Group07 OK
	8		04	Alarm code bit04	Group03 OK	Group08 OK
	9		08	Alarm code bit08	Group04 OK	Group09 OK
	A		16		Group05 OK	Group10 OK
	B	Step complete		Work No. input OK		
	C	No dormant spindle		Work No. input NG		
	D	Battery alarm				
	E	Bank input answer bit01				
	F	Bank input answer bit02				

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Word No.	Bit No.	Signal Name	Explanations
O2	0	Dormant SP01 answer	Output “Dormant SP No.” which is being selected now.
	1	Dormant SP02 answer	
	2	Dormant SP03 answer	
	3	Dormant SP04 answer	
	4	Dormant SP05 answer	
	5	Dormant SP06 answer	
	6	Dormant SP07 answer	
	7	Dormant SP08 answer	
	8	Dormant SP09 answer	
	9	Dormant SP10 answer	
	A	Dormant SP11 answer	
	B	Dormant SP12 answer	
	C	Dormant SP13 answer	
	D	Dormant SP14 answer	
	E	Dormant SP15 answer	
	F	Dormant SP16 answer	
O3	0	Dormant SP17 answer	Output “Dormant SP No.” which is being selected now.
	1	Dormant SP18 answer	
	2	Dormant SP19 answer	
	3	Dormant SP20 answer	
	4	Dormant SP21 answer	
	5	Dormant SP22 answer	
	6	Dormant SP23 answer	
	7	Dormant SP24 answer	
	8	Dormant SP25 answer	
	9	Dormant SP26 answer	
	A	Dormant SP27 answer	
	B	Dormant SP28 answer	
	C	Dormant SP29 answer	
	D	Dormant SP30 answer	
	E	Dormant SP31 answer	
	F	Dormant SP32 answer	

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Word No.	Bit No.	Signal Name		Explanations
O4	0	Step No.	01	Output “Step No.” of Work position which is selected as a binary code when “Data request” is turned ON.
	1		02	
	2		04	
	3		08	
	4		16	
	5	Torque -NG		Output “Lower NG item” of Work position which is selected when “Data request” is turned ON. If the result is OK these 5 outputs are OFF.
	6	Angle -NG		
	7	Time -NG		
	8	Tr1 -NG		
	9	Tr2 -NG		
	A	Torque +NG		Output “Upper NG item” of Work position which is selected when “Data request” is turned ON. If the result is OK these 5 outputs are OFF.
	B	Angle +NG		
	C	Time +NG		
	D	Tr1 +NG		
	E	Tr2 +NG		
	F			
O5	0	Data request Work Position select answer bit	01	Output “Data request Work Position” which is being selected now.
	1		02	
	2		04	
	3		08	
	4		16	
	5		32	
	6	Data read enable		Output when the data of requested Work position is ready.
	7			
	8			
	9			
	A			
	B			
	C			
	D			
	E			
	F			

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Word No.	Bit No.	Signal Name	Explanations
O6	0	Torque data bit1	Output “Torque data” of Work position which is selected as 16 bits binary data when “Data request” is turned ON. The decimal point is not attached.
	1	Torque data bit2	
	2	Torque data bit4	
	3	Torque data bit8	
	4	Torque data bit16	
	5	Torque data bit32	
	6	Torque data bit64	
	7	Torque data bit128	
	8	Torque data bit256	
	9	Torque data bit512	
	A	Torque data bit1024	
	B	Torque data bit2048	
	C	Torque data bit4096	
	D	Torque data bit8192	
	E	Torque data bit16384	
	F	Torque data code bit	
O7	0	Angle data bit1	Output “Angle data” of Work position which is selected as 16 bits binary data when “Data request” is turned ON. The decimal point is not attached.
	1	Angle data bit2	
	2	Angle data bit4	
	3	Angle data bit8	
	4	Angle data bit16	
	5	Angle data bit32	
	6	Angle data bit64	
	7	Angle data bit128	
	8	Angle data bit256	
	9	Angle data bit512	
	A	Angle data bit1024	
	B	Angle data bit2048	
	C	Angle data bit4096	
	D	Angle data bit8192	
	E	Angle data bit16384	
	F	Angle data code bit	

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4.5.3. Parallel I/O pin assignment and contents (Data collection mode)

Pin No.	Signal type	Signal Name (Output Bank0)		Signal Name (Output Bank1)	Signal Name (Output Bank2)	Signal Name (Output Bank3)
1	In01	Data Collection start				
2	In02	Data table select bit	01			
3	In03		02			
4	In04		04			
5	In05		08			
6	In06		16			
7	In07					
8	In08					
9	In09					
10	In10	Alarm reset				
11	In11	Data flag reset				
12	In12					
13	In13	CH1 data request				
14	In14	CH2 data request				
15	In15	Output shift bit01				
16	In16	Output shift bit02				
17	24V DC	Plus common				
18	24V DC	Plus common				
19	Out01	Master ready				
20	Out02	Data collecting				
21	Out03	Master alarm				
22	Out04					
23	Out05					
24	Out06	Data flag				
25	Out07 *1	Data table answer bit	01	Alarm code bit01		
26	Out08 *1		02	Alarm code bit02		
27	Out09 *1		04	Alarm code bit04		
28	Out10 *1		08	Alarm code bit08		
29	Out11 *1		16			
30	Out12 *1			Work No. input OK		
31	Out13 *1	No dormant spindle		Work No. input NG		
32	Out14 *1	Battery alarm				
33	Out15	Shift answer bit01				
34	Out16	Shift answer bit02				
35	0V	Minus common				
36	0V	Minus common				

*1 The purpose of Output07 to 14 will be switched with the combination of In15 and 16.

*2 The each signal require pulse width more than 300ms.

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♦ Explanation1 (Output Bank0)

Pin No.	Signal type	Signal Name (Output Bank0)		Explanations
1	In01	Data Collection start		Master reads the “Data table select bit” at the start of this signal and starts Data collection.
2	In02	Data table select bit	01	These 5 inputs form a binary code which is capable of selecting up to 31 Data table.
3	In03		02	
4	In04		04	
5	In05		08	
6	In06		16	
7	In07			
8	In08			
9	In09			
10	In10	Alarm reset		When this signal is turned ON, it will clear the alarm.
11	In11	Data flag reset		When this signal is turned ON, it will clear the data.
12	In12			
13	In13	CH1 data request		RS-232C port1 data request to option device (CN4)
14	In14	CH2 data request		RS-232C port2 data request to option device (CN5)
15	In15	Output Bank bit01		Output Bank (Out07 to 14) select bit These 2 inputs form a binary code which is capable of selecting Bank.
16	In16	Output Bank bit02		
19	Out01	Master ready		Output when the Master IPS is ready.
20	Out02	Data collecting		Output when the sequence is running.
21	Out03	Master alarm		Output when the alarm occurs.
22	Out04			
23	Out05			
24	Out06	Data flag		Output when the Master IPS stores fastening data.
25	Out07	Data table answer bit	01	Output Data table select bit (binary code) that is input (01 to 31).
26	Out08		02	
27	Out09		04	
28	Out10		08	
29	Out11		16	
30	Out12			
31	Out13	No dormant spindle		Output when there is no dormant (no movement) spindle.
32	Out14	Battery alarm *1		Output when the Master IPS detects low voltage of backup battery.
33	Out15	Shift answer bit01		Output “Output shift bit” (binary code) that is input (00 to 03).
34	Out16	Shift answer bit02		

*1 The Master IPS will check voltage of backup battery only when the power is on.

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♦ Explanation2 (Output Bank1)

Pin No.	Signal type	Signal Name (Output Bank1)	Explanations
25	Out07	Alarm code bit01	When alarm occurs, these 4 outputs form a binary code which stands for alarm code. .
26	Out08	Alarm code bit02	
27	Out09	Alarm code bit04	
28	Out10	Alarm code bit08	
29	Out11		
30	Out12	Work No. input OK	Output when the work No. input by RS-232C is completed.
31	Out13	Work No. input NG	Output when the work No. input by RS-232C is timeout.
32	Out14		

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4.5.4. DeviceNet I/O assignment and explanation (Data collection mode)

4.5.4.1. Input

DeviceNet input occupies 5 words (10 bytes). The contents of “I1” are completely same as P-I/O input.
Another optional function can be used when DeviceNet is used.

Word No.	Bit No.	Signal Name		Explanations
I1	0	Data Collection start		Same as P-I/O input
	1	Data table select bit	01	
	2		02	
	3		04	
	4		08	
	5		16	
	6			
	7			
	8			
	9	Alarm reset		
	A	Data flag reset		
	B			
	C	CH1 data request		
	D	CH2 data request		
	E	Output Bank bit01		
	F	Output Bank bit02		
I2	0	Dormant SP01		While these signals are ON, selected spindle is bypassed and “No dormant spindle” signal is turned OFF.
	1	Dormant SP02		
	2	Dormant SP03		
	3	Dormant SP04		
	4	Dormant SP05		
	5	Dormant SP06		
	6	Dormant SP07		
	7	Dormant SP08		
	8	Dormant SP09		
	9	Dormant SP10		
	A	Dormant SP11		
	B	Dormant SP12		
	C	Dormant SP13		
	D	Dormant SP14		
	E	Dormant SP15		
	F	Dormant SP16		

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Word No.	Bit No.	Signal Name		Explanations
I3	0	Dormant SP17		While these signals are ON, selected spindle is bypassed and “No dormant spindle” signal is turned OFF.
	1	Dormant SP18		
	2	Dormant SP19		
	3	Dormant SP20		
	4	Dormant SP21		
	5	Dormant SP22		
	6	Dormant SP23		
	7	Dormant SP24		
	8	Dormant SP25		
	9	Dormant SP26		
	A	Dormant SP27		
	B	Dormant SP28		
	C	Dormant SP29		
	D	Dormant SP30		
	E	Dormant SP31		
	F	Dormant SP32		
I4	0	Data request Work Position select bit	01	These 6 inputs form a binary code which is capable of selecting up to 32 Data request Work position.
	1		02	
	2		04	
	3		08	
	4		16	
	5		32	
	6	Data request		Master reads the “Data request Work Position select bit” at the start of this signal and outputs the data.
	7	Serial No. read		Master reads the “Serial No. bit” at the start of this signal and uses this data as a “Product No.”.
	8			
	9			
	A			
	B			
	C			
	D			
	E			
	F			

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Word No.	Bit No.	Signal Name	Explanations
I5	0	Serial No. bit1	These 15 inputs form a binary code which is capable of inputting “Serial No.” (up to 65535).
	1	Serial No. bit2	
	2	Serial No. bit4	
	3	Serial No. bit8	
	4	Serial No. bit16	
	5	Serial No. bit32	
	6	Serial No. bit64	
	7	Serial No. bit128	
	8	Serial No. bit256	
	9	Serial No. bit512	
	A	Serial No. bit1024	
	B	Serial No. bit2048	
	C	Serial No. bit4096	
	D	Serial No. bit8192	
	E	Serial No. bit16384	
	F	Serial No. bit32768	

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4.5.4.2. Output

DeviceNet input occupies 7 words (14 bytes). The contents of “O1” are completely same as P-I/O output.

Another optional function can be used when DeviceNet is used.

Word No.	Bit No.	Signal Name (Output Bank0)		Signal Name (Output Bank1)	Signal Name (Output Bank2)	Signal Name (Output Bank3)
O1	0	Master ready				
	1	Data Collecting				
	2	Master alarm				
	3					
	4					
	5	Data flag				
	6	Data table answer bit	01	Alarm code bit01		
	7		02	Alarm code bit02		
	8		04	Alarm code bit04		
	9		08	Alarm code bit08		
	A		16			
	B	Step complete		Work No. input OK		
	C	No dormant spindle		Work No. input NG		
	D	Battery alarm				
	E	Bank input answer bit01				
	F	Bank input answer bit02				

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Word No.	Bit No.	Signal Name	Explanations
O2	0	Dormant SP01 answer	Output “Dormant SP No.” which is being selected now.
	1	Dormant SP02 answer	
	2	Dormant SP03 answer	
	3	Dormant SP04 answer	
	4	Dormant SP05 answer	
	5	Dormant SP06 answer	
	6	Dormant SP07 answer	
	7	Dormant SP08 answer	
	8	Dormant SP09 answer	
	9	Dormant SP10 answer	
	A	Dormant SP11 answer	
	B	Dormant SP12 answer	
	C	Dormant SP13 answer	
	D	Dormant SP14 answer	
	E	Dormant SP15 answer	
	F	Dormant SP16 answer	
O3	0	Dormant SP17 answer	Output “Dormant SP No.” which is being selected now.
	1	Dormant SP18 answer	
	2	Dormant SP19 answer	
	3	Dormant SP20 answer	
	4	Dormant SP21 answer	
	5	Dormant SP22 answer	
	6	Dormant SP23 answer	
	7	Dormant SP24 answer	
	8	Dormant SP25 answer	
	9	Dormant SP26 answer	
	A	Dormant SP27 answer	
	B	Dormant SP28 answer	
	C	Dormant SP29 answer	
	D	Dormant SP30 answer	
	E	Dormant SP31 answer	
	F	Dormant SP32 answer	

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Word No.	Bit No.	Signal Name		Explanations
O4	0	Step No.	01	Output “Step No.” of Work position which is selected as a binary code when “Data request” is turned ON.
	1		02	
	2		04	
	3		08	
	4		16	
	5	Torque -NG		Output “Lower NG item” of Work position which is selected when “Data request” is turned ON. If the result is OK these 5 outputs are OFF.
	6	Angle -NG		
	7	Time -NG		
	8	Tr1 -NG		
	9	Tr2 -NG		
	A	Torque +NG		Output “Upper NG item” of Work position which is selected when “Data request” is turned ON. If the result is OK these 5 outputs are OFF.
	B	Angle +NG		
	C	Time +NG		
	D	Tr1 +NG		
	E	Tr2 +NG		
	F			
O5	0	Data request Work Position select answer bit	01	Output “Data request Work Position” which is being selected now.
	1		02	
	2		04	
	3		08	
	4		16	
	5		32	
	6	Data read enable		Output when the data of requested Work position is ready.
	7			
	8			
	9			
	A			
	B			
	C			
	D			
	E			
	F			

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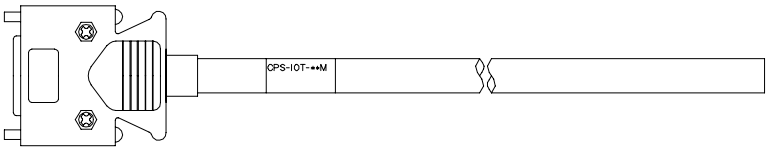
Word No.	Bit No.	Signal Name	Explanations
O6	0	Torque data bit1	Output “Torque data” of Work position which is selected as 16 bits binary data when “Data request” is turned ON. The decimal point is not attached.
	1	Torque data bit2	
	2	Torque data bit4	
	3	Torque data bit8	
	4	Torque data bit16	
	5	Torque data bit32	
	6	Torque data bit64	
	7	Torque data bit128	
	8	Torque data bit256	
	9	Torque data bit512	
	A	Torque data bit1024	
	B	Torque data bit2048	
	C	Torque data bit4096	
	D	Torque data bit8192	
	E	Torque data bit16384	
	F	Torque data code bit	
O7	0	Angle data bit1	Output “Angle data” of Work position which is selected as 16 bits binary data when “Data request” is turned ON. The decimal point is not attached.
	1	Angle data bit2	
	2	Angle data bit4	
	3	Angle data bit8	
	4	Angle data bit16	
	5	Angle data bit32	
	6	Angle data bit64	
	7	Angle data bit128	
	8	Angle data bit256	
	9	Angle data bit512	
	A	Angle data bit1024	
	B	Angle data bit2048	
	C	Angle data bit4096	
	D	Angle data bit8192	
	E	Angle data bit16384	
	F	Angle data code bit	

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4.5.5. Combination of the sequence and data table select bit

Sequence / Data table No.	Select Bit-1	Select Bit-2	Select Bit-4	Select Bit-8	Select Bit-16
1	ON	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF
5	ON	OFF	ON	OFF	OFF
...	...	...	...	...	...
30	OFF	ON	ON	ON	ON
31	ON	ON	ON	ON	ON

4.5.6. Parallel I/O cable



CPS-IO-**M

PIn No.	Signal type	Line color	PIn No.	Signal type	Line color
1	In01	Green	19	Out01	Sky blue/White
2	In02	Brown	20	Out02	Red/Black
3	In03	Blue	21	Out03	Green/Black
4	In04	Gray	22	Out04	Brown/Black
5	In05	Orange	23	Out05	Blue/Black
6	In06	Purple	24	Out06	Gray/Black
7	In07	Pink	25	Out07	Orange/Black
8	In08	Sky blue	26	Out08	Pink/Red
9	In09	White	27	Out09	Sky blue/Black
10	In10	Green/White	28	Out10	White/Black
11	In11	Brown/White	29	Out11	Green/Red
12	In12	Blue/White	30	Out12	Brown/Red
13	In13	Gray/White	31	Out13	Blue/Red
14	In14	Orange/White	32	Out14	Gray/Red
15	In15	Purple/White	33	Out15	Orange/Red
16	In16	Pink/White	34	Out16	Pink/Red
17	24V DC	Red	35	0V DC	Black
18	24V DC	Red/White	36	0V DC	Black/White

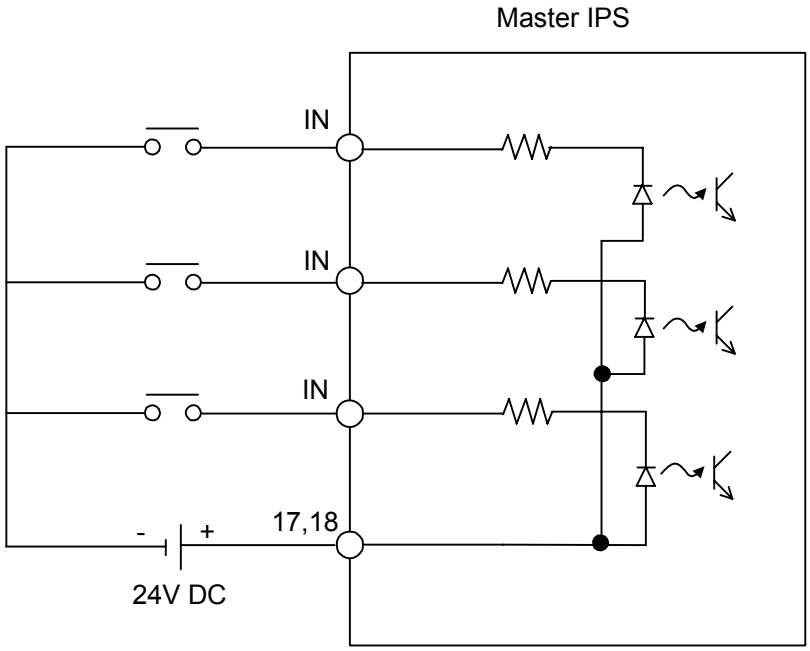
IPS-IO-**M Pin assignment and line color

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4.6. PLC input and output signal wiring diagram

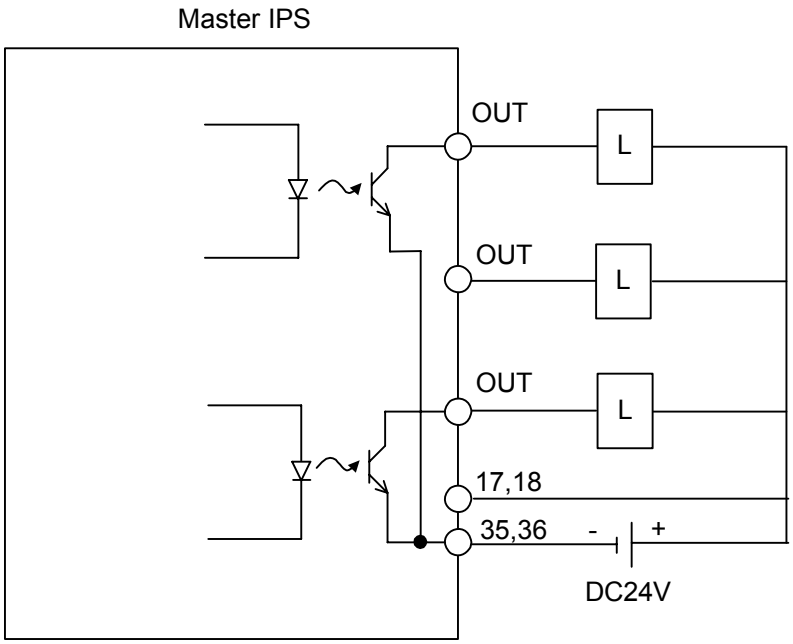
4.6.1. Wiring on input side (photo coupler input)

Photo coupler input is 24V DC. (Current is approximately 5mA/one circuit)



4.6.2. Wiring on output side

Open collector output (30mA/one output)

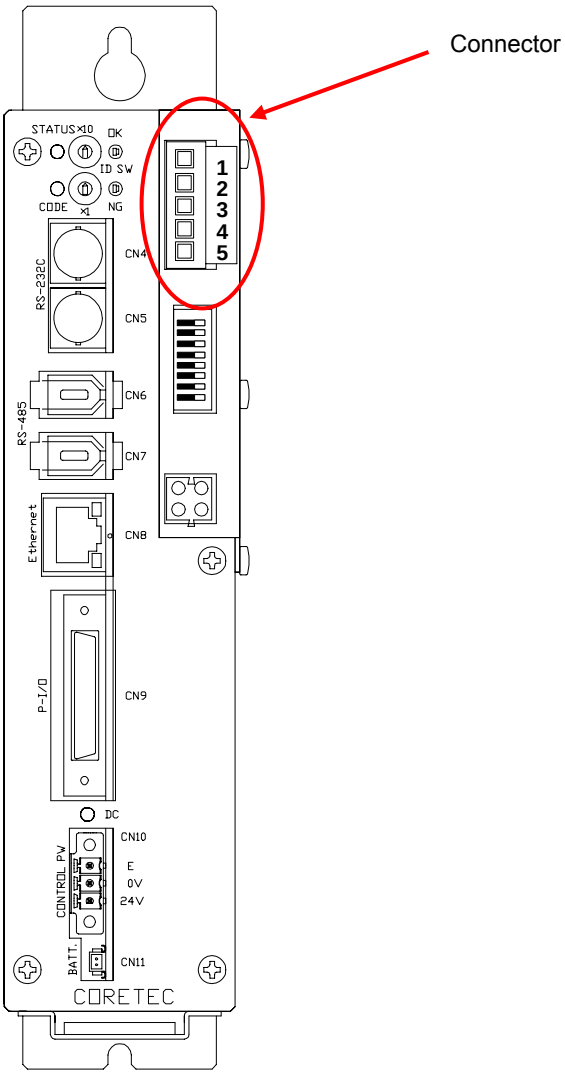


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4.7. DeviceNet wiring diagram

When DeviceNet is used, the cable should be wired to the connector as below.

Pin No.	Signal	Description
1	V-	0V DC
2	CAN_L	CAN_L bus line
3	SHIELD	Cable Shield
4	CAN_H	CAN_H bus line
5	V+	24V DC



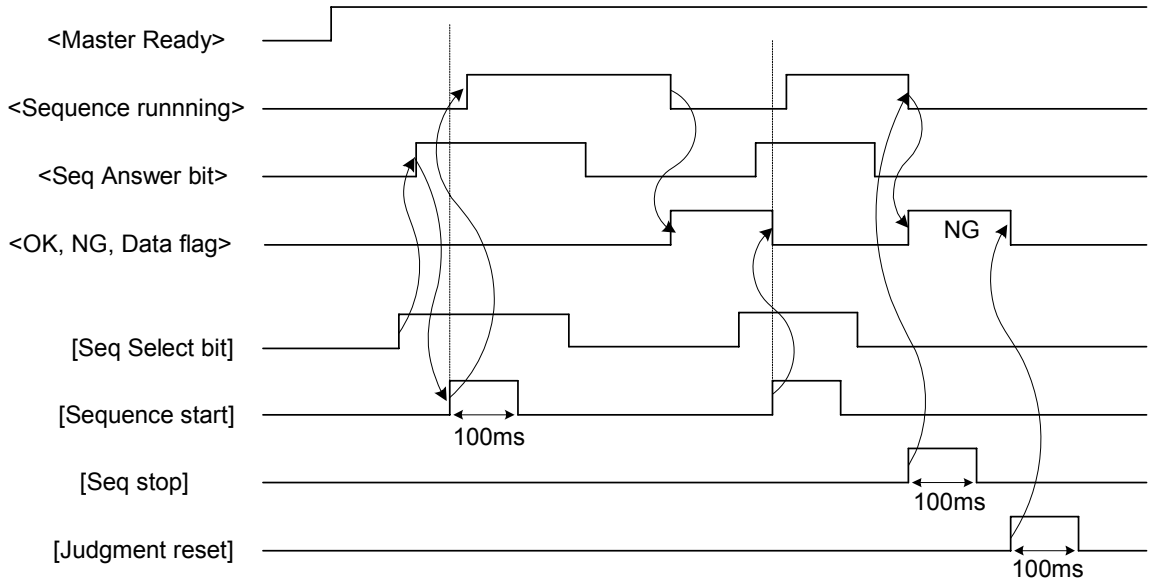
M-IPS-NR-DEV

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4.8. Timing chart (Multi mode)

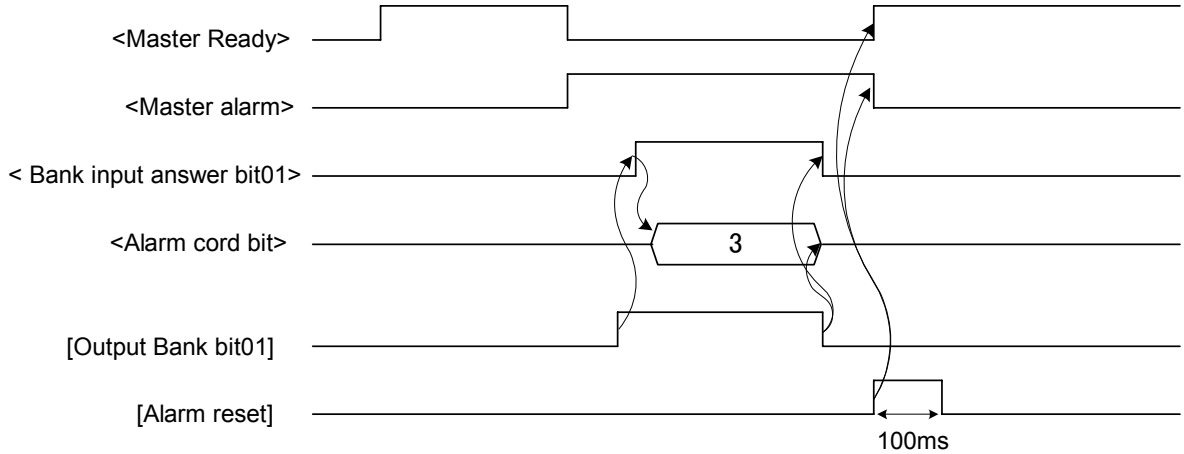
4.8.1. Execution of Sequence.

[ ]: Input
< >: Output



4.8.2. Confirmation of the alarm and alarm reset

[ ]: Input
< >: Output

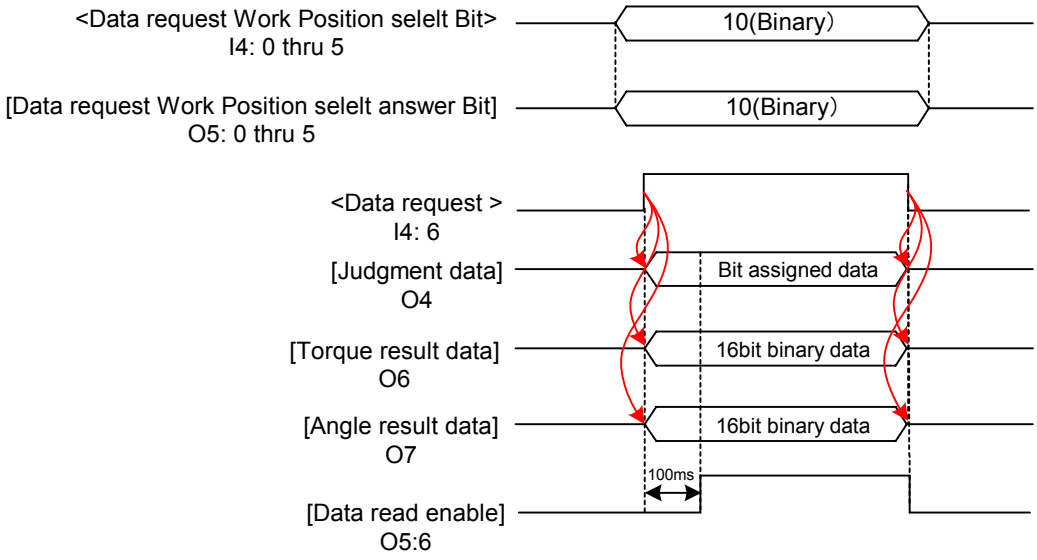


* The “Alarm code” should be received after “Bank input answer bit01” is turned ON.

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4.8.3. Confirmation of the result data (When Devicenet is used)

♦ When receiving the result data of WP10



* The “Data request” should be input after the correct “Data request Work Position answer bit” is turned ON.

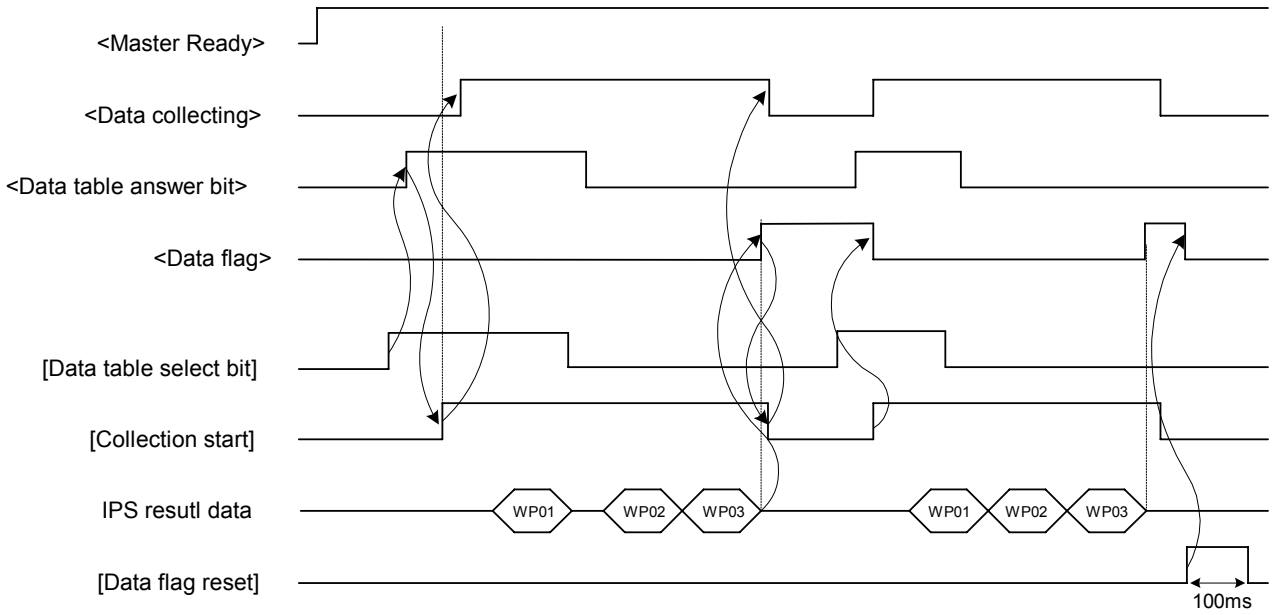
* The each result data should be received after “Data read enable” is turned ON.

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4.9. Timing chart (Data collection mode)

4.9.1. Data collection (Collect the data of 3 spindles)

♦ When collecting the data of 3 Work positions



* “Collection start” must be maintained until a “Data flag” is turned ON.

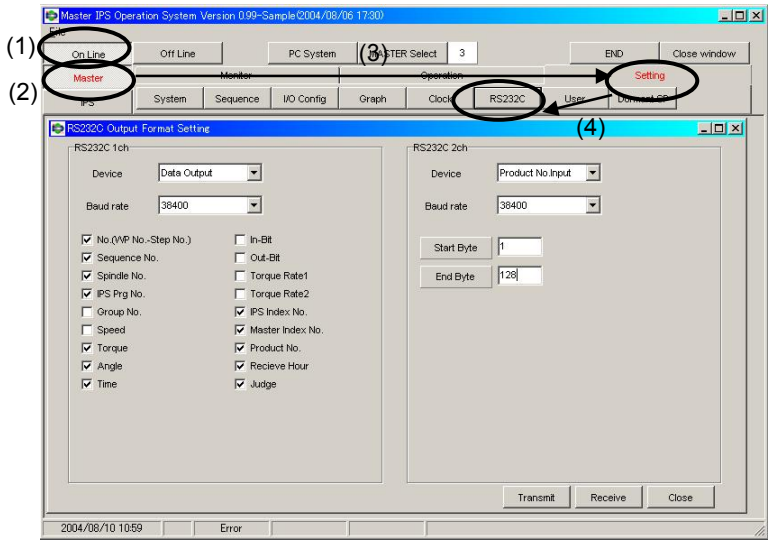
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5. RS-232C configuration

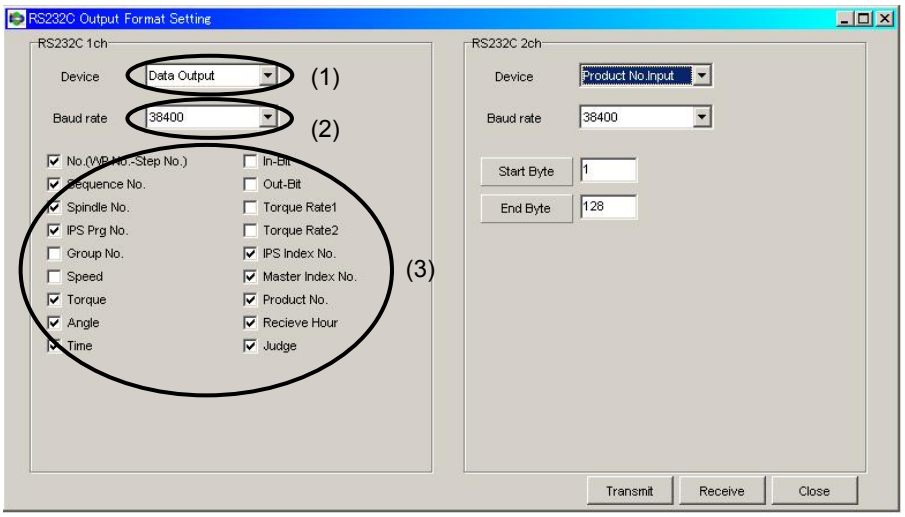
5.1. RS-232C device configuration

RS-232C configuration is valid when “Online” button is on.

Open the RS-232C configuration window by the below procedure. Current configuration will be received automatically.



Select the device and baud rate of the each channel.



No.	Name	Explanation
(1)	Device	Select the device.
(2)	Baud rate	Select the Baud rate. Other communication condition is fixed. Data length : 8 Parity : No Stop bit : 1
(3)	Other setting	According to the device, the content is different.

*** After transmitting, power must be cycled for this setting to take effect.**

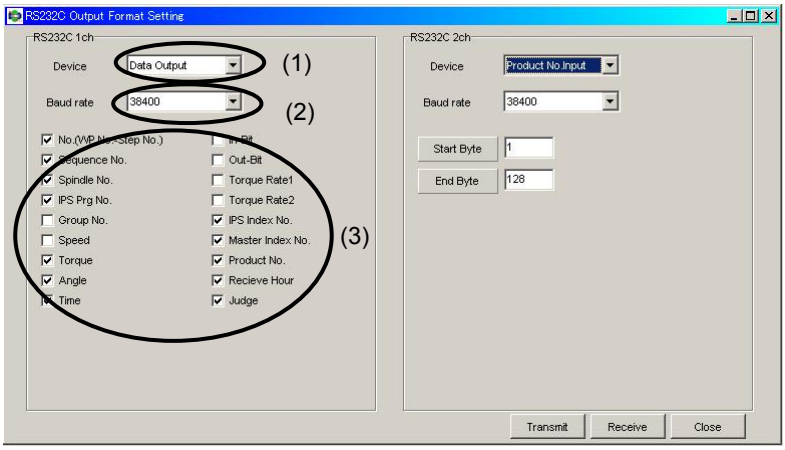
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5.2. Regarding RS-232C devices

5.2.1. Data output (to PLC)

1. Communication setting

Setting item	Setting value
Baud rate(bps)	9600 19200 38400 (Selective from PC)
Data length	8 (Fixed)
Parity	No (Fixed)
Stop bit	1 (Fixed)
Header	No
Terminator	CR LF (0Dh 0Ah)



No.	Name	Function
1	Device	Select “Data Output”
2	Baud rate	9600 19200 38400
3	Data items	Select the item to output

2. Data item

The data to be output is the final step data of each Work Position.

The turn to be output and size of each item is as follows.

No.	Item Name	Byte size	No.	Item Name	Byte size
1	Work Position No. and Step No.	5	10	In	2
2	Sequence No.	2	11	Out	2
3	IPS Spindle No.	2	12	Torque Rate1	6
4	IPS Program No.	2	13	Torque Rate2	6
5	Group No.	2	14	IPS Index No.	4
6	Speed	6	15	Master Index No.	4
7	Torque	6	16	Product No.	Max128
8	Angle	6	17	Receive time	8
9	Time	6	18	Judge	4

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3. Actual output Data

a. Hex (All items are selected.)

30 31 2D 30 31 2C 30 31 2C 30 31 2C 32 30 2C 30 30 2C 20 20 20 20 20 33 2C 20 20 31 30 30 36 2C 20 20 31 30 33 39 2C
1 2 3 4 5 6 7 8
20 20 20 20 31 38 2C 30 30 2C 30 30 2C 20 20 34 30 30 30 2C 20 20 20 20 20 30 2C 30 30 30 32 2C 30 30 30 34 2C
9 10 11 12 13 14 15
20 33 30 30 34 32 36 38 41 2D 33 30 42 2C 31 38 3A 34 31 3A 35 39 2C 30 30 30 30 20 0D 0A
16 17 18

b. ASCII

01-01 , 01 , 01 , 20 , 00 , #####3 , ##1006 , ##1039 , ####18 , 00 , 00 , ##4000 , #####0 , 0002 ,
1 2 3 4 5 6 7 8 9 10 11 12 13 14
0004 , 3004268A-30B , 18:41:59 , 0000
15 16 17 18

*1 “#” means the space(20h).
*2 “,” means the comma(2Ch).
*3 The decimal point (Torque,Time,TR1,TR2 data) is not appended.
*4 Each number under line corresponds with the chart No. of preceding page.
*5 “Product No.”(16) is a sample data.

4. Regarding the Judge Data

The high 2 bytes mean +NG code(Hexadecimal), and the low 2 bytes mean –NG code(Hexadecimal)

Ex)

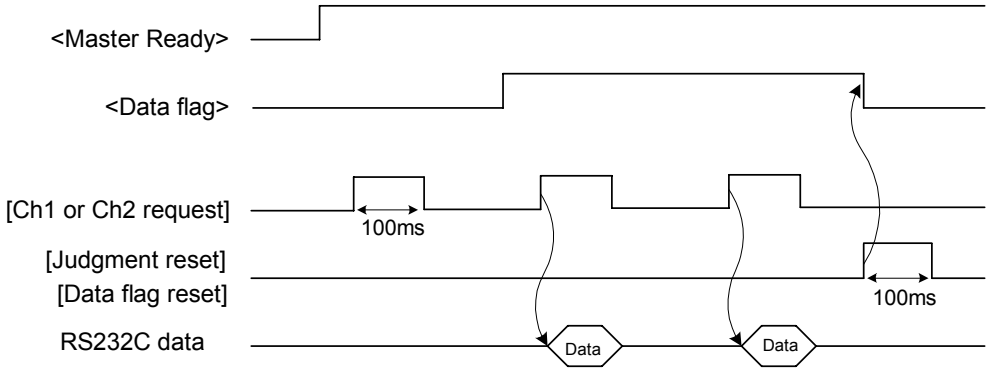
0 A(h) 0 4(h) Space(20h) (5bytes)
+NG -NG

+NG : Torque and Time
-NG : Angle

Bit	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Hex											20	10	8	4	2	1
Item											Tr2	Tr1	Time	Angle	Torque	Speed

NG Bit assignment

5. Timing chart



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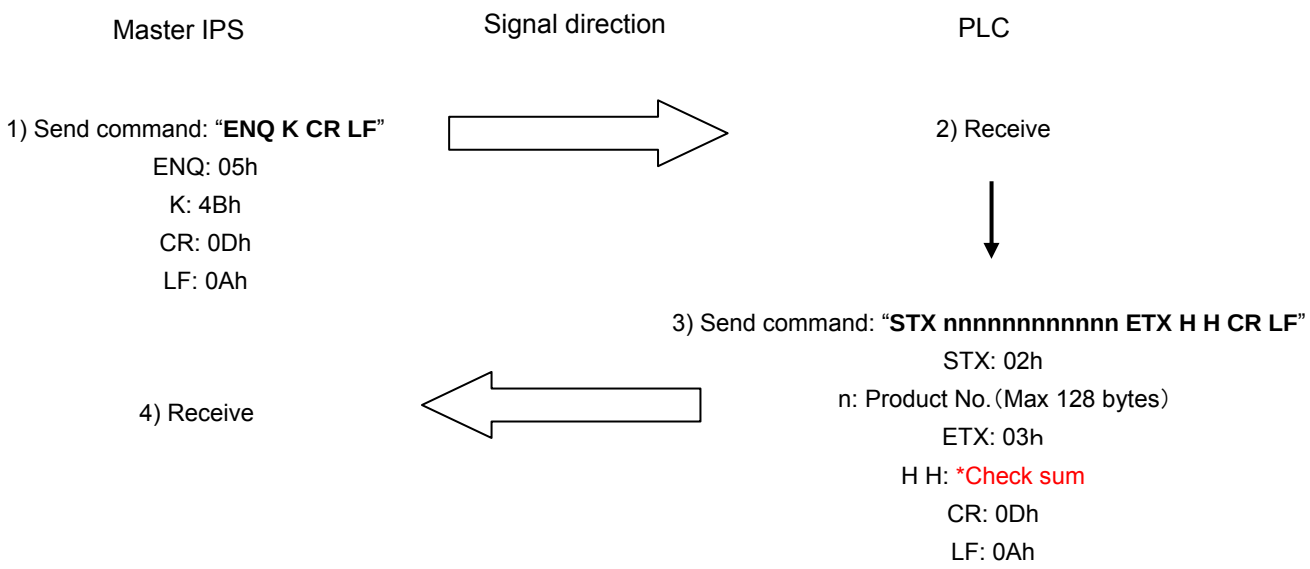
5.2.2. Product No. input (from PLC)

1. Communication setting

Setting item	Setting value
Baud rate(bps)	9600 19200 38400 (Selective from PC)
Data length	8 (Fixed)
Parity	No (Fixed)
Stop bit	1 (Fixed)
Header	No
Terminator	CR LF (0Dh 0Ah)

2. Send and receive command and procedure.

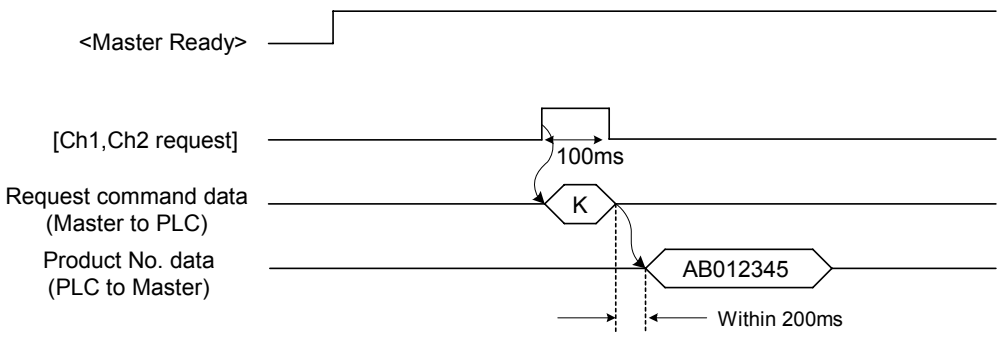
Send Product No. before Sequence or Data collection starts.



***Check sum = Last 2 digits of hexadecimal addition data from STX to ETX**

3. Timing chart

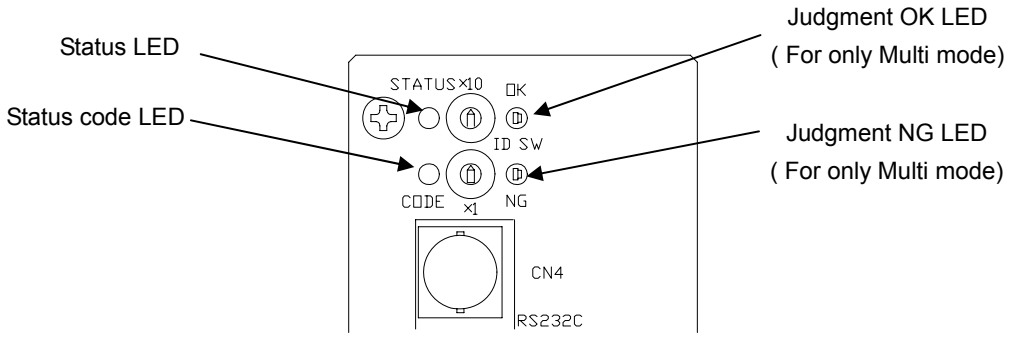
Ex) Product No. is "AB012345".



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6. Maintenance

6.1. Status LED



LED, Alarm code assignment

No.	Status LED	Code LED	Status LED	Code LED	Status	Explanation	Alarm code
1	○	○	OFF	OFF	Power OFF		
2	●	○	Green Lighting	OFF	Master IPS Ready	No alarm	
3	●	●	Green Lighting	Green Lighting	Sequence running Data colleting	Sequence running or Data collecting	
4	●	●	Green Lighting	Orange Lighting	Sequence step complete	Status of waiting for “Next step” signal when the sequence is running.	
5	●	●	Green Lighting	Red Lighting	Backup battery low voltage	Status that Master IPS detects low voltage of backup battery.	
6	●	□	Green Lighting	Green Blinking			
7	●	□	Green Lighting	Orange Blinking			
8	●	□	Green Lighting	Red Blinking			
9	●	○	Red Lighting	OFF	IPS communication error	Status that Master IPS can not communicate with IPS which is connected.	3
10	●	●	Red Lighting	Green Lighting	No sequence or data table	Sequence or data table which is executed has no parameter.	4
11	●	●	Red Lighting	Orange Lighting	Sequence execution error	“Start” signal is input before IPS alarm will be released.	5
12	●	●	Red Lighting	Red Lighting	Data check error	IPS data sum check error.	6
13	●	□	Red Lighting	Green Blinking			
14	●	□	Red Lighting	Orange Blinking	EEP-ROM check error	EEP-ROM data error occurs. (To be checked when the power is ON.)	1
15	●	□	Red Lighting	Red Blinking	RAM check error	RAM data error occurs. (To be checked when the power is ON.)	2
16	●	○	Orange Lighting	OFF	IPS alarm occur	IPS alarm occurs	7
17	●	●	Orange Lighting	Green Lighting	No IPS program	IPS program which is executed has no parameter.	8
18	●	●	Orange Lighting	Orange Lighting	IPS control error	Status that Master IPS can not change the IPS control mode.	9
19	●	●	Orange Lighting	Red Lighting			
20	●	□	Orange Lighting	Green Blinking			
21	●	□	Orange Lighting	Orange Blinking			
22	●	□	Orange Lighting	Red Blinking			

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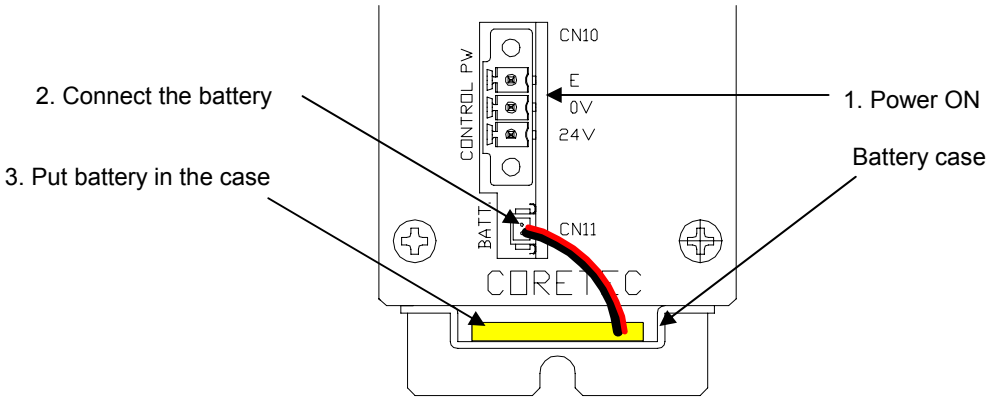
6.2. Installment and replacement of Backup battery

6.2.1. Installment

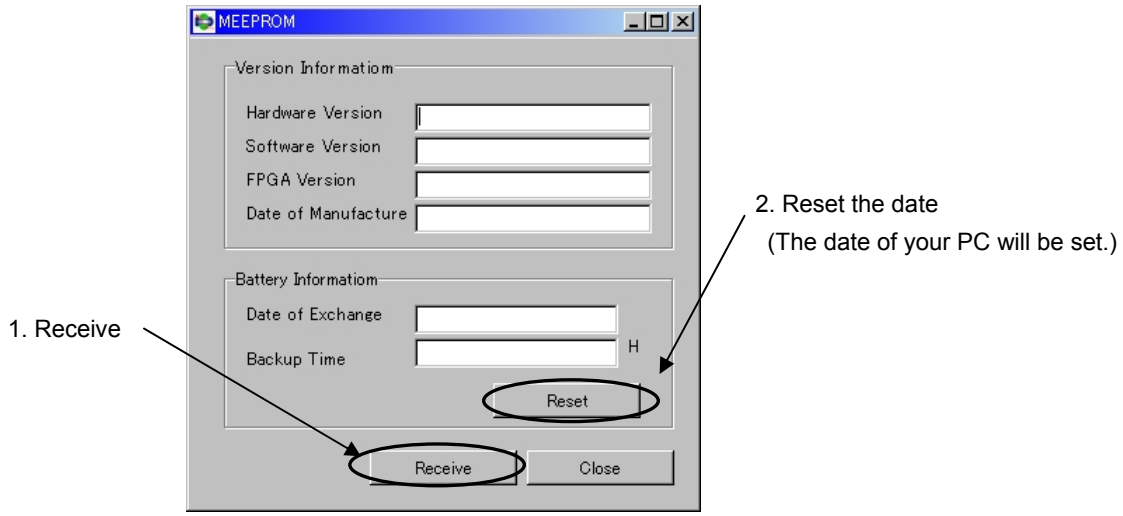
* **The installment of backup battery must be done when the power is supplied to Master IPS.**

♦ Installment procedure

1. Supply DC24V to the Master IPS.
2. Connect the battery to the Master IPS.
3. Put the battery in the battery case.



4. Set the date of installment from MasterIPS.exe. (Display -> Master -> Setting -> Maintenance)

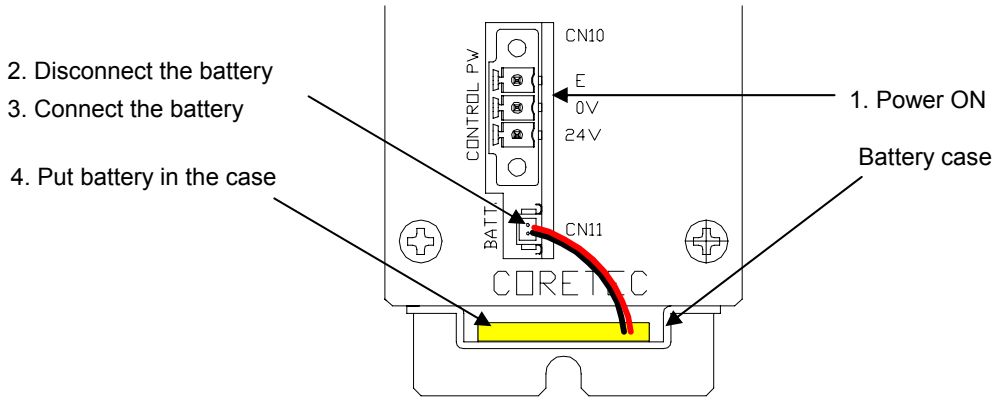


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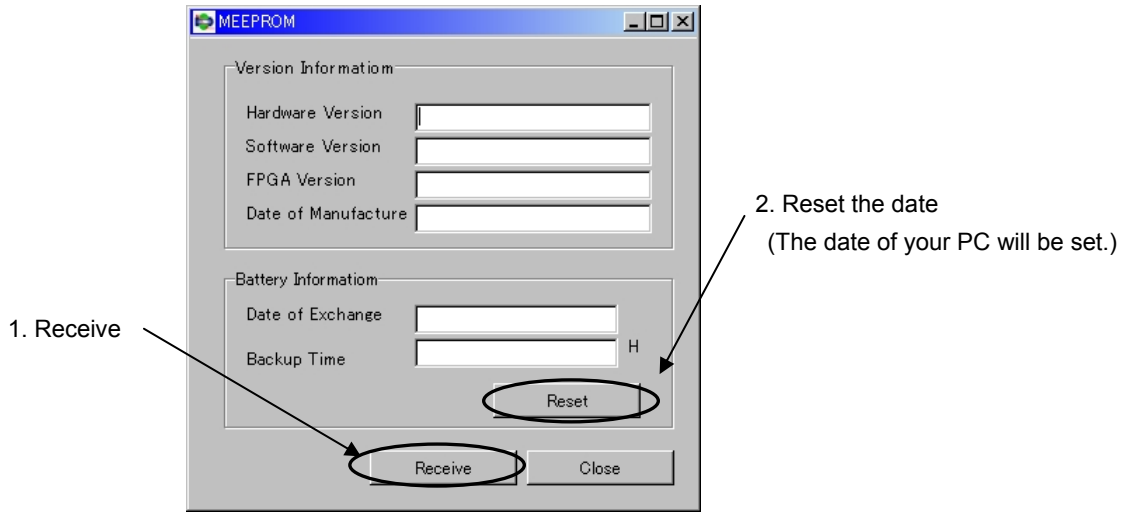
6.2.2. Replacement

* **The replacement of backup battery must be done when the power is supplied to Master IPS**.
* **Do not shut off the power when "Battery alarm" occurs. Setting data (Data table etc) will be erased.**
* **The Master IPS setting data should be backup.**

1. Supply 24V DC to the Master IPS.
2. Disconnect the battery from the Master IPS.
3. Connect the new battery to Master IPS.
4. Put the battery in the battery case.



5. Set the date of replacement from MasterIPS.exe. (Display -> Master -> Setting -> Maintenance)



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7. Install Software (MasterIPS.exe)

7.1. Operation environment

	Recommended spec
Corresponding OS	Windows 98/2000/XP
CPU	200MHz or higher
Memory	64M byte or higher
HDD capacity	50M byte or higher
Communication Port	Ethernet port

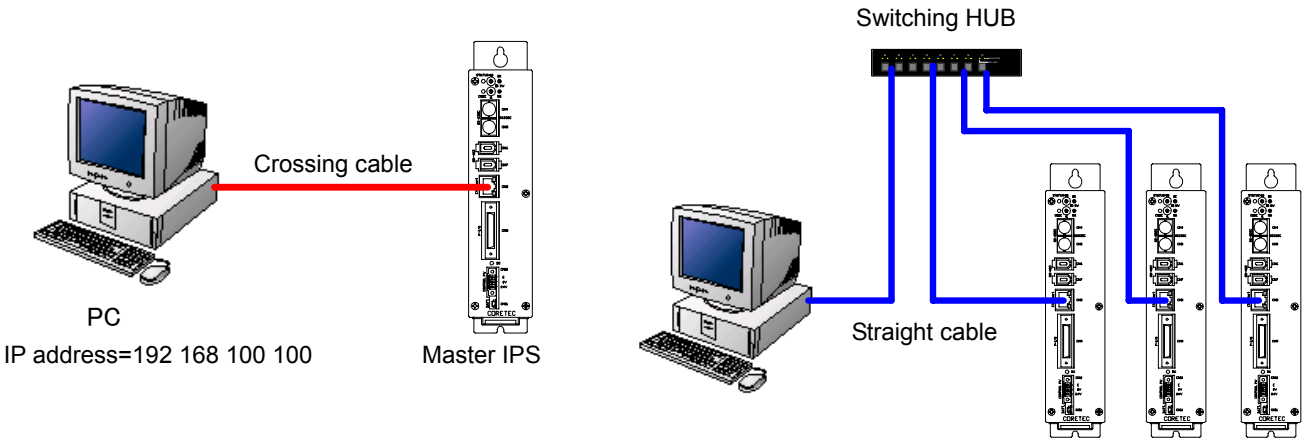
7.2. Install

Install “MasterIPS.exe” to your PC with following procedure.

1. Put the install CD in the CD-ROM drive.
2. Open the CD-ROM in My computer.
3. Double-click <Setup.exe>
4. When “Welcome” window appears, click <Next>.
5. Input the user information and serial. Serial is “ **MasterIPS-NR** “
6. When “Choose Destination Location” window appears, click <Next>.
7. When “Select Program Folder” window appears, click <Next>.
8. When “Start Copying Files” window appears, click <Next>.
9. When “Setup complete” window appears, click <Finish>.
10. Remove CD from the CD-ROM drive.

7.3. Communication setting

Connect CN8 of Master IPS and PC LAN port with crossing cable. (When use a switching HUB, cable is straight type.)
Regarding IP address setting, please refer to next page.



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8. Communication setup.

8.1. PC IP address setup

The setup can be done from application software (MasterIPS.exe)

After install the software, setup the fixed IP address for communication according to the following procedure.

♦ For Win2000 or XP

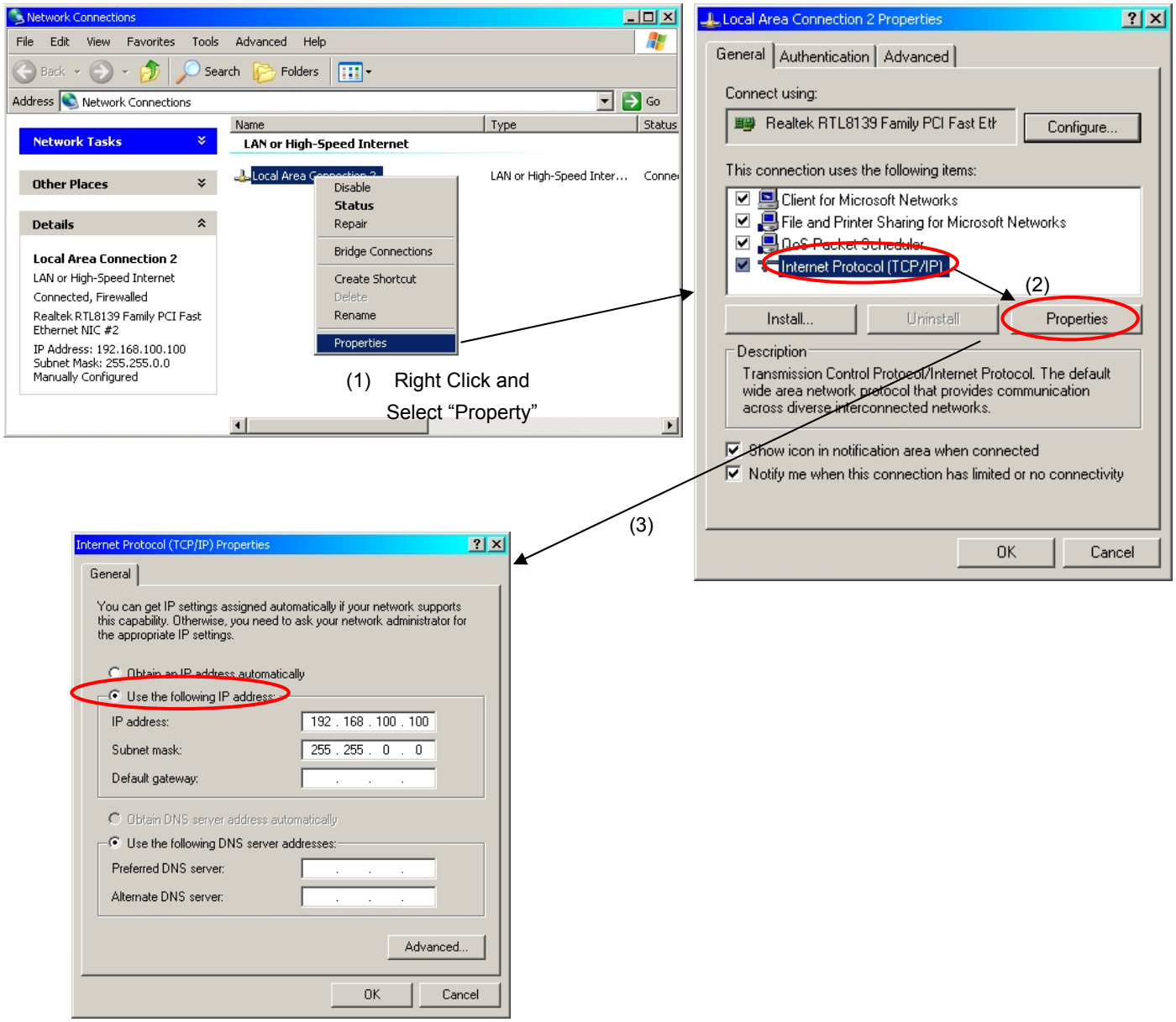
Procedure

My Network > Property > (1): Local Area Connection (LAN port for MasterIPS) > Property > (2): Internet Protocol > (3): TCP/IP > Setup

Set value

IP address = 192. 168. 100. 100

Subnet mask = 255. 255. 0. 0.

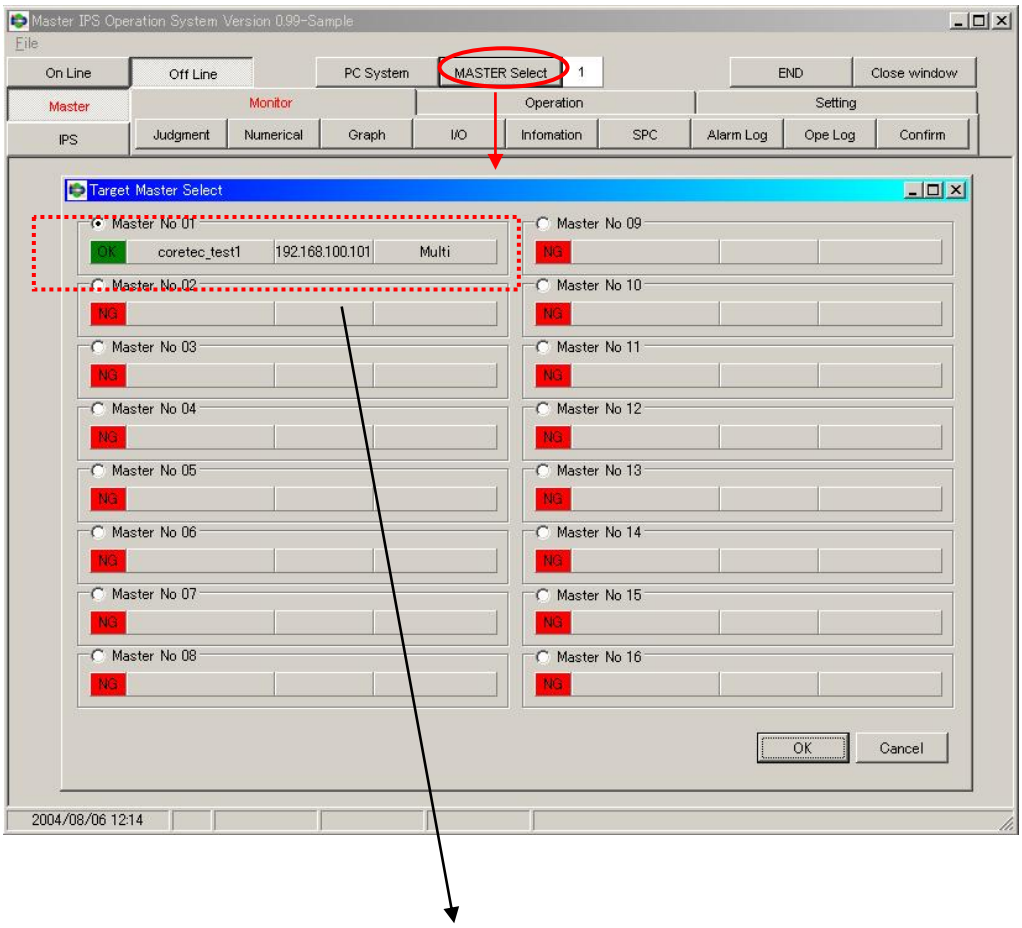


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8.2. Connection Master IPS setup

After setup the IP address, setup Control mode and connection spindle.

1. Turn on the power of Master IPS.
2. Open the application of Master IPS and click the “MASTER Select” button.
   This window can be monitored if the communication between PC and Master is correct or not.
   Select the Master IPS you would like to configure.





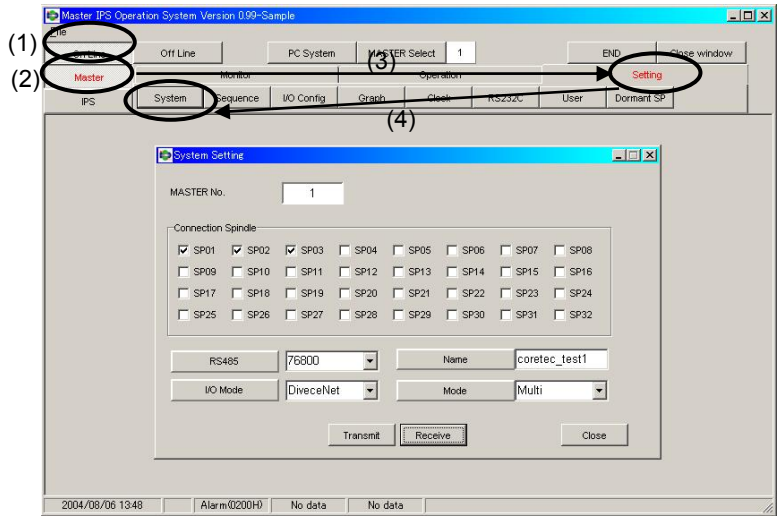
No.	Name	Explanation
(1)	Master No(= ID)	This application communicates the Master IPS selected by this radio button.
(2)	Status indicator	Indicator of communication.
(3)	Master IPS Name	The name of the Master IPS is displayed.
(4)	IP address	Master IPS IP address.
(5)	Master IPS mode	Communication port of the PC.

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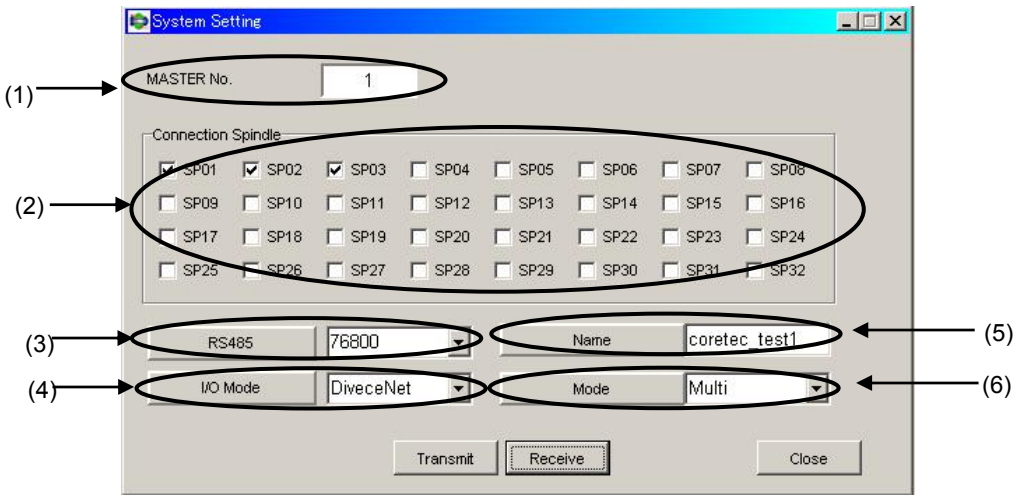
9. Control mode setup

Setup the control mode by following procedure

1. Open the System setting window.



2. Configure the Master IPS system and transmit.



No.	Name	Explanation
(1)	Master No(= ID)	The Master IPS ID which communicates with PC is displayed.
(2)	Connection Spindle	Configure the number of IPS (ID) connected with the Master IPS.
(3)	RS-485	Configure the Baud Rate of between Master and IPS (Default 19200)
(4)	I/O Mode	Select the DeviceNet or the Parallel I/O.
(5)	Name	The Name of Master IPS can be input. (as the need arises)
(6)	Mode	Select the control mode Multi: Spindle control and data collection. Data: Data collection only.

*** After transmitting, power must be cycled for this setting to take effect.**

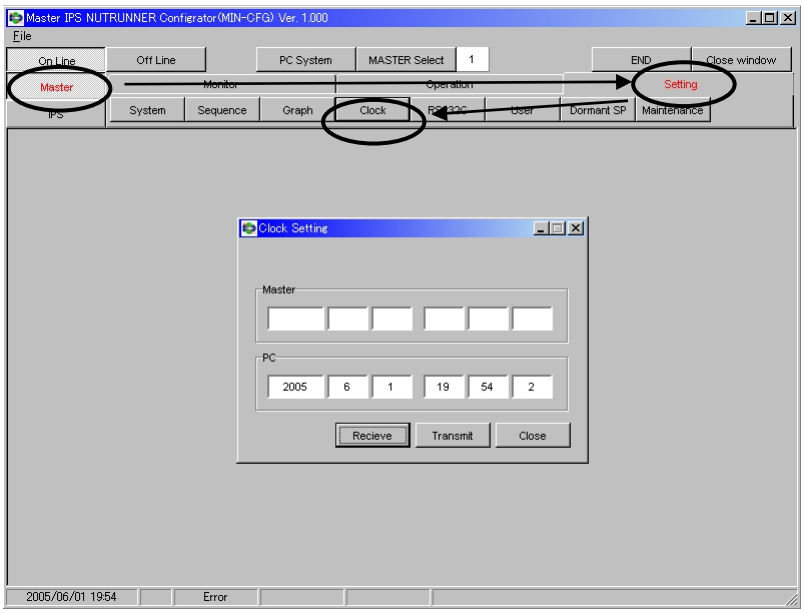
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10. Master clock setup

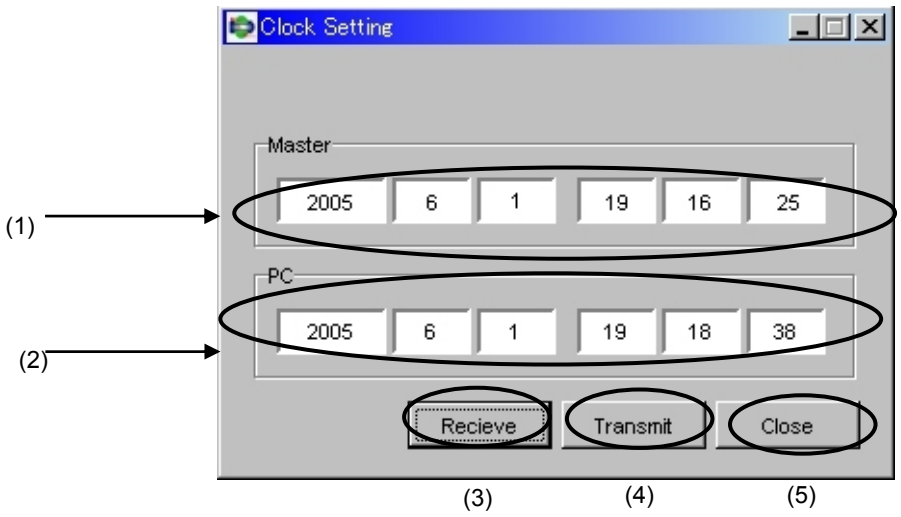
Setup the internal clock of Master IPS by following procedure.

1. Open the “Clock setting” window

   Master -> Setting -> Clock



2. Transmit current PC clock to Master IPS.



No.	Name	Explanation
(1)	Current Master IPS clock	Indicate current Master IPS clock.
(2)	Current PC clock	Indicate current PC clock
(3)	Receive	Receive clock data from Master IPS.
(4)	Transmit	Transmit PC clock to Master IPS
(5)	Close	Close this window.

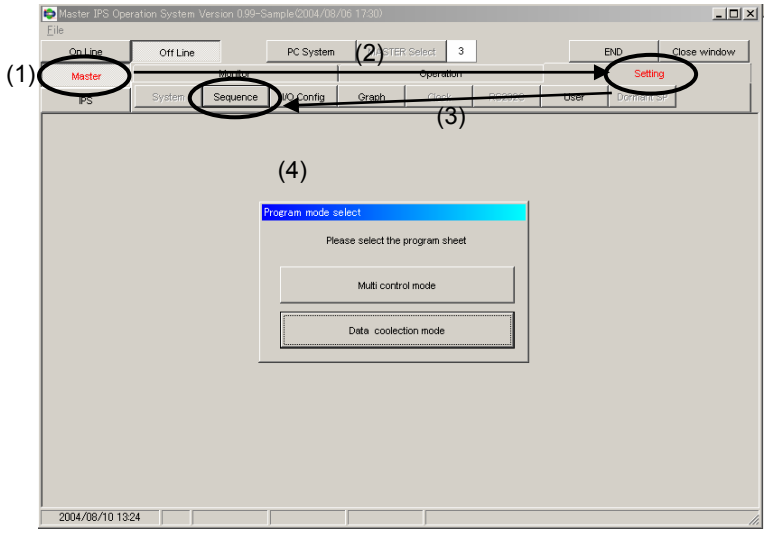
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11. Sequence and Data table setting

11.1. Sequence (Control mode : Multi mode)

Open the Sequence window by the below procedure.

When the control mode is Multi mode and online, Sequence window is displayed automatically.

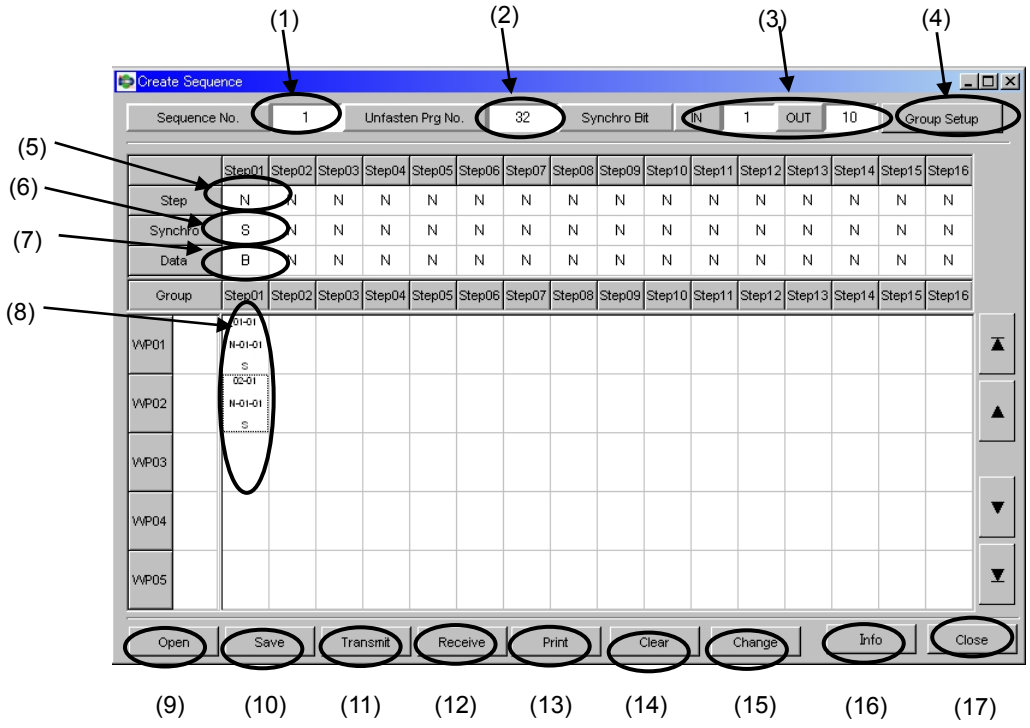


♦ “Create Sequence” window

Fastening sequence can be created in this window.

Multi-spindle synchronous control and group motion can also be set up.

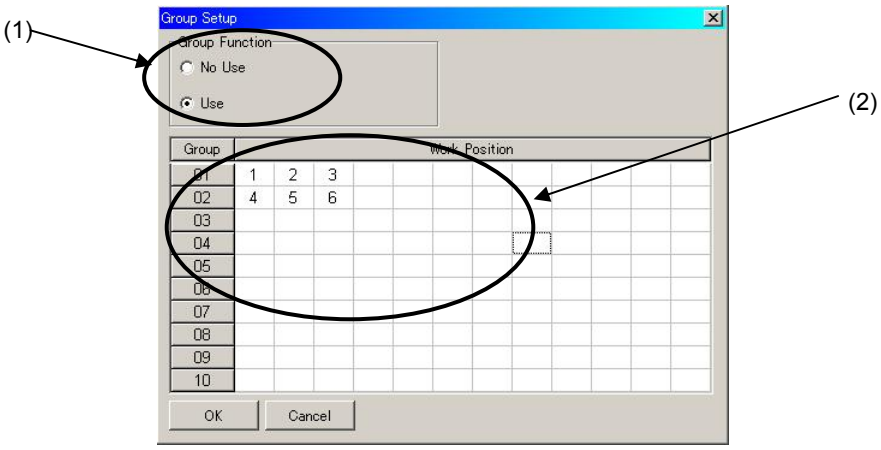
Click a tab to set up each step.



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No.	Name	Function
1	Sequence No.	Select Sequence No. to be set up. (01-31)
2	Unfasten Prg No.	Set up Unfastening Program No. to be executed when “Retry” is available in Sequence Parameter. (Common No. for all spindles)
3	Synchro Bit	Set up I/O bit to IPS program for multi-spindle synchronous control. This parameter is only displayed when “Syncro control” is selected in (6). (Common No. for all spindles)
4	Group Setup	Open the “Group Setup” window.
5	Step proceeding condition	Set up step-to-step proceeding conditions. Set up fastening sequence “step up” conditions. C: No Condition → Proceed to next step when all spindles are complete for the step. I: Signal Input → When all spindles are complete in the step, Master outputs “step complete” signal to external device. Next step will be executed when “Next step” signal is input from outside.
6	Synchronous control	Set up multi-spindle synchronous control within the step. N: No Synchro Control → Synchronous control will NOT be performed. S: Synchro Control → Synchronous control will be performed using I/O bit which is input in “Synchro Bit”. The same “I (input)” and “O(output)” value should be setup in the each IPS program. If Group function is used, synchronous control will be performed by the Group.
7	Data (Data acquisition setup)	Set up IPS data acquisition for the step. N: Not Acquire → Master does NOT send IPS data to PC. S: Numerical Data Only → Master sends IPS data to PC. (Numerical data only) H: Graph Data Only → Master sends IPS data to PC. (Waveform data only) B: Both Data → Master sends IPS data to PC. (Both numerical and waveform data)
8	Sequence Parameter	Set up Spindle No. / Program No. to be operated.
9	Open	Open Sequence file saved.
10	Save	Save Sequence as a file.
11	Transmit	Transmit Sequence to Master IPS.
12	Receive	Receive Sequence from Master IPS.
13	Print	Print out Sequence.
14	Clear	Clear Sequence.
15	Change	Change Sequence window.
16	Info	Indicate information of each parameter.
17	Close	Close this window.

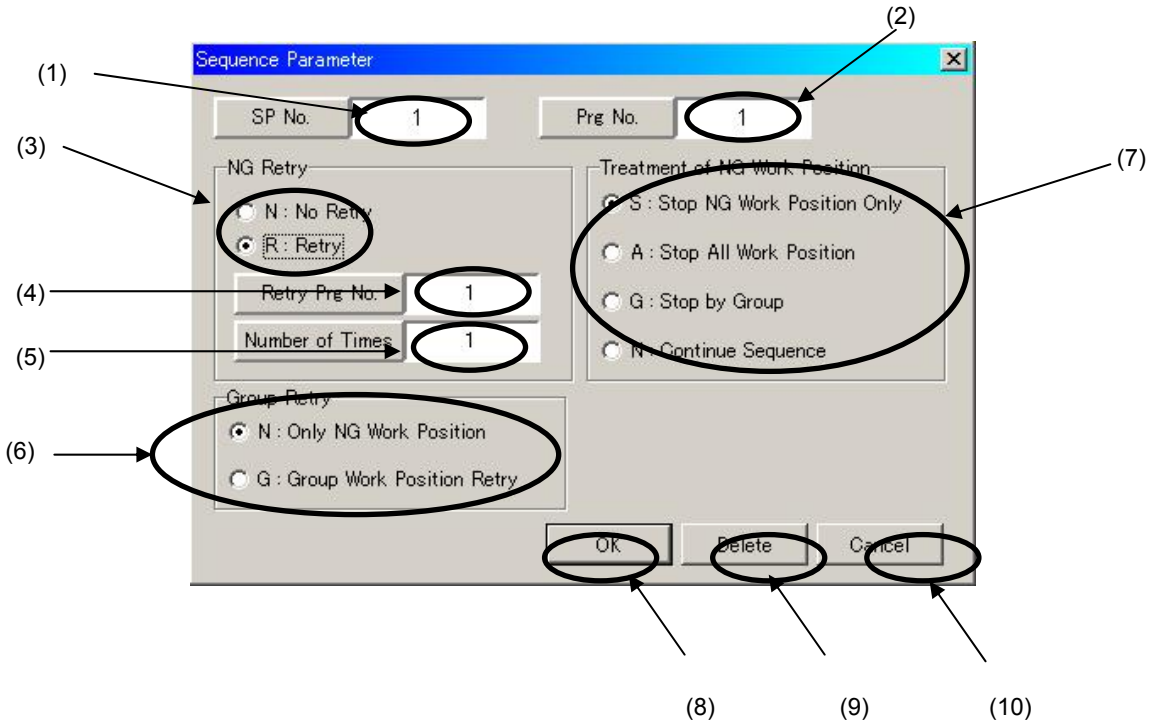
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Group setup window

Fastening sequence groups can be set up in this window.
Using groups, “Synchronous control” by group and “Group retry “ motion can be performed.

No.	Name	Function
1	Group Function	Select to use or not to use Group Function for each position. “No Use” → Group function NOT to be used. “Use” → Group function to be used.
2	Group No. Setup	Input Position No. for each Group No. (Up to 10 positions for each group.)

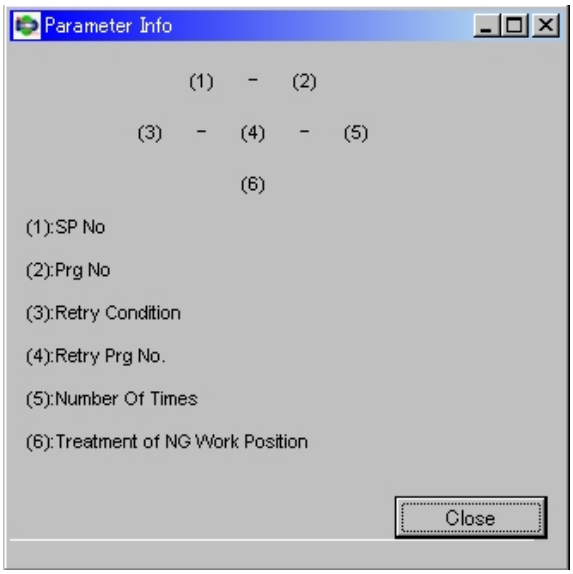


“Sequence Parameter” window

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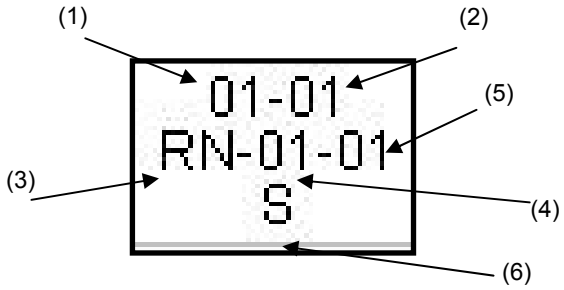
No.	Name	Explanation
1	SP No.	Set up Spindle No. for the position selected.
2	Prg No.	Set up IPS Program No. for the position selected.
3	NG Retry	Select to use or not to use “Retry” in case of NG occurrence. N: No Retry → “Retry” will NOT be performed. (#7) condition will be executed. R: Retry → Retry Program No. (#4) will be executed (#5) number of times.
4	Retry Prg No.	Set up Retry Program No. when “Retry” is selected (#3). Retry Program No. is executed after Unfastening Program No. is done.
5	Number of times	Set up number of execution times for Retry Program No. (#4) For every Retry, Retry Program is executed only after Unfastening Program is performed. After Retry, data is overwritten with new information and saved as final fastening data for the position.
6	Group Retry	Select Group Retry setting for the case of “Retry” (#3) selected. N: Only NG Work Position → Only NG Work Position will be retried. (Default) G: Group Work Position Retry → All Work Positions under the same Group No. will be retried.
7	Treatment of NG Work Position	Set up how to proceed with the program when fastening result is judged NG. S: Stop NG Work Position Only → Only NG Position will stop and will NOT proceed to next step. (The same spindle can operate for other Work Positions.) (e.g.) When SP01 is used for WP01 and WP05, SP01 can operate at WP05 even if WP01 is judged NG. A: Stop All Work Position → All Positions within the Step will stop. NO proceed to next step. Total NG judgment will be output. G: Stop by Group → All Positions under the same Group will stop. NO proceed to next step. N: Continue Sequence → All Positions will NOT stop. Operate according to the Sequence Step Condition settings.
8	OK	Enter settings.
9	Delete	Delete cell settings selected.
10	Cancel	Cancel settings.

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Info window

♦ Explanation of Parameter Cell is below.



Refer to the following description for the meaning of each symbol.

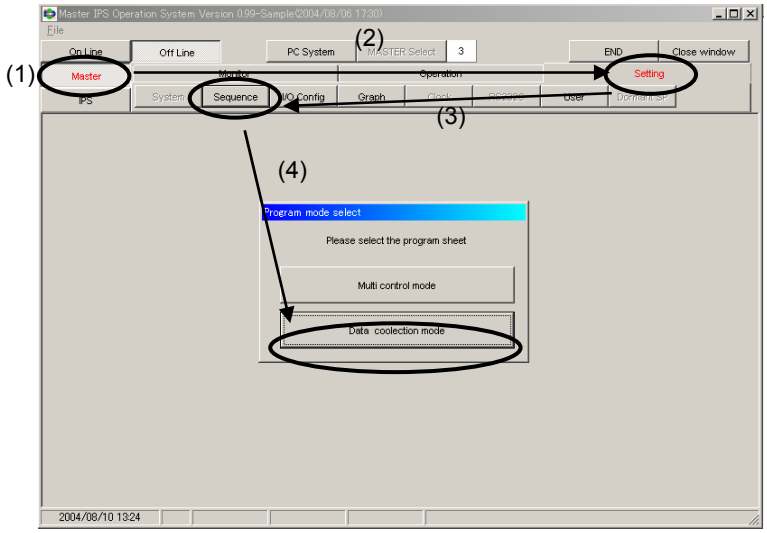
No.	Name	Explanation
1	SP No.	Spindle No. to fasten the position.
2	Prg No.	CPS Program No. to be executed in the position.
3	Retry Condition	Retry settings: N: No Retry RN: Only NG Work Position will be retried. RG: All Work Positions under the same Group will be retried. ("RN" or "RG" can be selected in the "Group Retry" area in the Sequence Parameter window.)
4	Retry Prg No.	IPS Program No. for Retry. If Retry Condition (#3) is "N" (No Retry), this value should be disregarded.
5	Number of Times	Number of execution times for Retry Program. If Retry Condition (#3) is "N" (No Retry), this value should be disregarded.
6	Treatment of NG Work Position	How to proceed with the program when fastening result is judged NG.

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11.2. Data table (Control mode: Data collection mode)

Open the Data table window by the below procedure.

When the control mode is Data collection mode and online, data table window is displayed automatically.

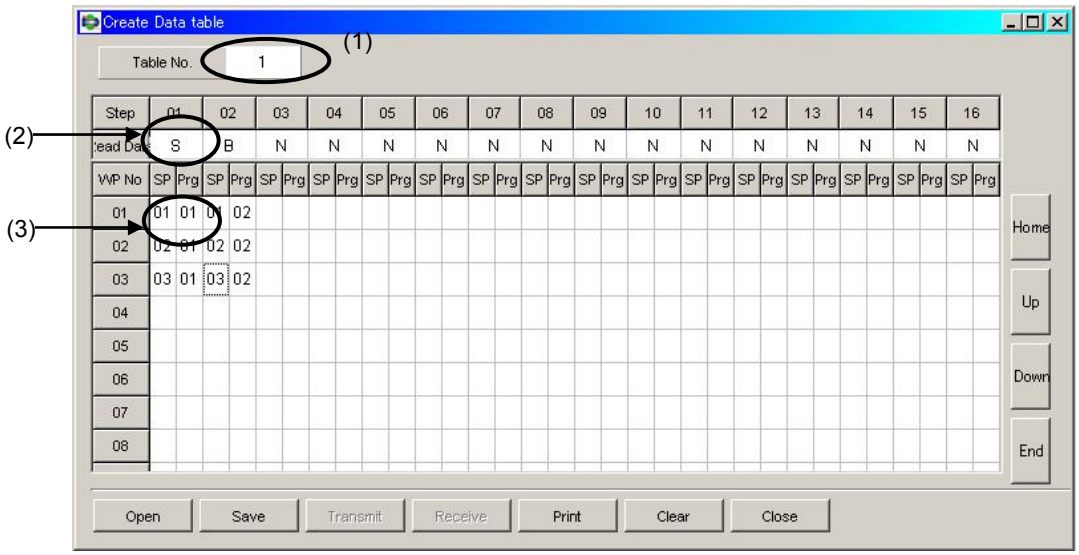


♦ “Create Data table” window

In Data collection mode, Master IPS doesn’t control execution of IPS program.

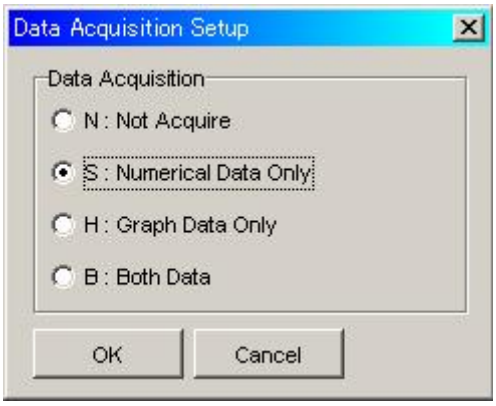
Data table can be created in this window.

Configure the operation spindle and program No, treatment of the collection data here.



No.	Name	Explanation
(1)	Table No.	Select the table No.(01-31)
(2)	Data Acquisition setup	Configure treatment of the collection data in each step. Click a grid to configure. (“Data Acquisition Setup” window is displayed)
(3)	Spindle and Program No	Configure the spindle and program No. to be executed in the step. Click a grid to configure. (“Step Condition” window is displayed)

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"Data Acquisition Setup" window

	Name	Function
	Data Acquisition	Set up IPS data acquisition for the step. N: Not Acquire → Master does NOT send IPS data to PC. S: Numerical Data Only → Master sends IPS data to PC. (Numerical data only) H: Graph Data Only → Master sends IPS data to PC. (Waveform data only) B: Both Data → Master sends IPS data to PC. (Both numerical and waveform data)



"Step Condition" window

No.	Name	Explanation
1	SP No.	Spindle No. to be executed in the position.
2	Prg No.	IPS Program No. to be executed in the position.
3	Delete	Delete the setup value.

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If there are any unclear points or if you have further inquiries regarding the MasterIPS Nutrunner, please contact us at the address and numbers listed below.

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