

AIO-3322/3323
Isolated Analog I/O and
Digital I/O Card
User's Manual (V1.0)

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Notes on hardware installation

Please follow step by step as you are installing the control cards.

1. Be sure your system is power off.
2. Be sure your external power supply for the wiring board is power off.
3. Plug your control card in slot, and make sure the golden fingers are put in right contacts.
4. Fasten the screw to fix the card.
5. Connect the cable between the card and wiring board.
6. Connect the external power supply for the wiring board.
7. Recheck everything is OK before system power on.
8. External power on.

Congratulation! You have it.

For more detail of step by step installation guide, please refer the file “installation.pdf “ on the CD come with the product or register as a member of our user’s club at:

<http://automation.com.tw/>

to download the complementary documents.

1. Forward

Thank you for your selection of our PCI bus AIO-3322/3323 an isolated analog I/O, digital I/O and multi-function timer/counter card.

AIO-3322/3323 has isolated 8/16 channels analog output and isolated 8 channels analog input with programmable input range, 8 bit isolated digital input and 8 bit isolated digital output. The analog input data acquisition can be configured as analog, digital or software trigger to start the acquisition process. The sample rate can be also programmed at 110K, 10K, 1K and 100Hz to meet your application. The trigger out signal can be enabled or disabled, its width can be also configured.

The extra 2 32bit timer/counter ports also provide you versatile functions such as: programmable one-shot, rate generator, square wave generator, software/hardware triggered strobe, event timer/counter, triggered timer/counter, PWM generator, A small card with abundant functions.

Wish you would enjoy this card!

Other analog i/o card:

AIO-3310/1/2 8/16/24 single/differential 12 bit analog input, 16 TTL I/O card (PCI bus)

AIO-3315/A 12 /16 bit Analog I/O and Digital I/O Card (PCI bus)

AIO-3320/3321 isolated 8 12 bit A/D, isolated 8/16 16 bit D/A with 16 isolated digital I/O (PCI bus)

AIO-3382 Analog I/O Card, 8 AI 2 AO, 16 TTL , 2 multi- function timer/counter card (Include bracket kit for TTL I/O) (PCI bus)

AIO-3382A/B Analog I/O Card, 8 AI 2 AO, 16 TTL , 2 multi- function timer/counter card (2 current source/ sink AO)(Include bracket kit for TTL I/O) (PCI bus)

AIO-3384 Analog I/O Card, 8 AI 4 AO, 16 TTL , 2 multi- function timer/counter card (Include bracket kit for TTL I/O) (PCI bus)

AIO-3384AA/BB Analog I/O Card, 8 AI 4 AO, 16 TTL , 2 multi- function timer/counter card (4 current source / sink AO)(Include bracket kit for TTL I/O) (PCI bus)

AIO-3384AB Analog I/O Card, 8 AI 4 AO, 16 TTL , 2 multi-function timer/counter card (2 current source AO , 2 current sink AO)(Include bracket kit for TTL I/O) (PCI bus)

AIO-6328/A 12/16 bit Analog I/O and Digital I/O PCI-104 Module

Any comment is welcome,

please visit our website: <http://www.automation.com.tw/> for the up to date information.

2. Features

2.1 Main card

General:

2.1.1 PCI plug and play function with card ID for 16 identical cards

2.1.2 Security password blocks illegal copy of software

Analog input function:

2.1.3 Isolated 8 channel 12bit analog inputs

2.1.4 Software selectable input range: -10V~ +10V, -5V~ +5V , 0~10V, 0~5V

2.1.5 Auto data acquisition mode

-- up to 1024 data buffer

--3 trigger mode to start acquisition: digital, analog, software trigger mode

--Start event trigger out and complete trigger out available

Data acquisition specific digital I/O:

2.1.6 Digital trigger in: trigger I0

2.1.7 Digital trigger out:

-- data acquisition complete : trigger out O0

-- data acquisition event occurs: trigger out O1

Analog output function:

2.1.8 Isolated 8 channel 16bit analog output (AIO-3322)

Isolated 16channel 16bit analog output (AIO-3323)

output range: -10V~ +10V

Digital I/O function:

2.1.9 8 isolated digital input

2.1.10 8 isolated digital output

2.1.11 IN0, IN1 as trigger/counter in, OUT0, OUT1 as trigger out of timer/counter function

Timer/Counter function:

2.1.12 2 32bit multifunction counters with 4/33 MHz multi-clock input.

2.1.13 multi-function:

- programmable one-shot
- square wave generator
- event counter
- PWM generator

2.2 Din rail mounted wiring board

2.2.1 37 pin D-type connector to wiring terminals for AI0~AI7,DA0~DA7 and trigger I0,I1, trigger out O0,O1

2.2.2 25 pin D-type connector to wiring terminals for DA8~DA15

2.2.3 DIO-9201DIN for digital I/O

3. **Specifications**

3.1. AIO-3322/3323 Main card

General:

- 3.1.1 PCI data width — 32 Bits
- 3.1.2 Card ID — 0-15 selectable.
- 3.1.3 Security password — 5 words, user configurable
- 3.1.4 Interrupt — software disable/enable
- 3.1.5 Dimension — 175(W)*120(H)mm , 6.89(W) * 4.72(H)in

Analog input block:

- 3.1.6 input channels — isolated 8 channel single end.
- 3.1.7 resolution — 12bit
- 3.1.8 input range — -10V~ +10V, -5V~ +5V , 0~10V, 0~5V
- 3.1.9 range selection — software selectable.
- 3.1.10 conversion speed — 13us per channel
- 3.1.11 auto data acquisition — 110K, 10K,1K,100Hz sample rate
- 3.1.12 trigger mode — digital, analog, software trigger
- 3.1.13 trigger out — event start or complete
- 3.1.14 trigger out pulse width — 1 ~ 16777215 us
- 3.1.15 trigger out polarity — user programmable

Analog output block:

- 3.1.16 output channels — isolated 8/16 channel
- 3.1.17 resolution — 16bit
- 3.1.18 output range — -10V~ +10V
- 3.1.19 auto scan update rate — 2.1KHz

Digital I/O block:

- 3.1.20 i/o channels — isolated 8DI, 8DO
- 3.1.21 output range — open collector 0~45Vdc (without wiring board)
- 3.1.22 sink current — 500ma(peak) per output bit (without wiring board)
- 3.1.23 switch speed — 20KHz (without wiring board or MOS type output)
- 3.1.24 output rating — using wiring board ADP-9201DIN series
 - 3A @250Vac,30Vdc (relay)
 - 1A @24Vdc (PMOS)
 - 2A @240Vac(SSR)

Timer/Counter block:

- 3.1.25 channels — 2
- 3.1.26 data length — 32 bit
- 3.1.27 specific input — trigger in/ counter in via digital input port
- 3.1.28 specific output — trigger out / counter out via digital output port
- 3.1.29 time base — 4/33MHz
- 3.1.30 functions —
 - programmable one-shot
 - square wave generator
 - event counter
 - PWM generator

3.2 Din rail mounted wiring board

JS51026 for AI0~AI7 and DA0~DA7

3.2.1 Connection cable — D-type 37P cable to connect main and wiring board

3.2.2 Dimension — 86(W)*113(L)*52(H)mm , 3.39(W)*4.45(L)*2.05(H)in

JS51050 for DA8~DA15

3.2.3 Connection cable — D-type 25P cable to connect main and wiring board

3.2.4 Dimension — 86(W)*79(L)*52(H)mm , 3.39(W)*3.11(L)*2.05(H)in

JD50053 Dummy type wiring board for digital I/O

3.2.5 Connection cable — 20P flat cable to connect main and wiring board

3.2.6 Dimension — 86(W)*79(L)*52(H)mm , 3.39(W)*3.11(L)*2.05(H)in

ADP-9201DIN Din rail mounted wiring board for digital I/O

3.2.7 Connection cable — 20P flat cable to connect main and wiring board

3.2.8 Dimension — ADP-9201DIN(R) / (P) : 86(W) * 103(L) *45(H)mm;
3.39(W)*4.06(L)*1.77(H)in

— ADP-9201DIN(S) : 86(W) * 103(L) *50(H)mm
3.39(W)*4.06(L)*1.97(H)in

3.2.9 indicators — LED, power x 1, digital input x 8, digital output x8

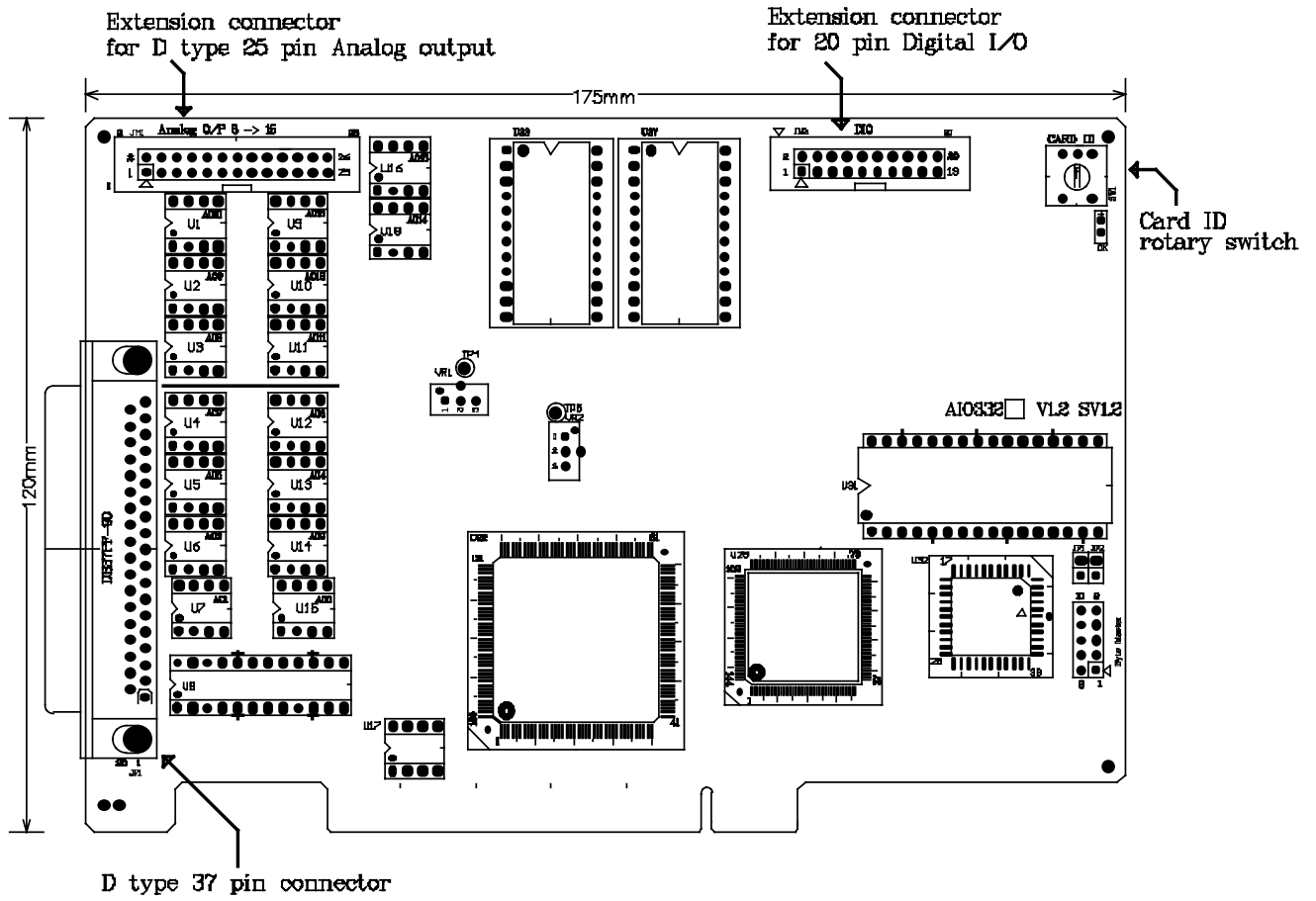
3.2.10 output rating — 3A @250Vac,30Vdc (relay)

1A @24Vdc (PMOS)

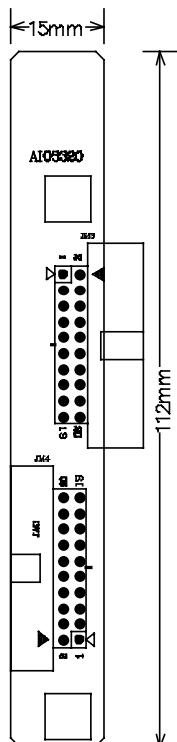
2A @240Vac(SSR)

4. Layout and dimensions

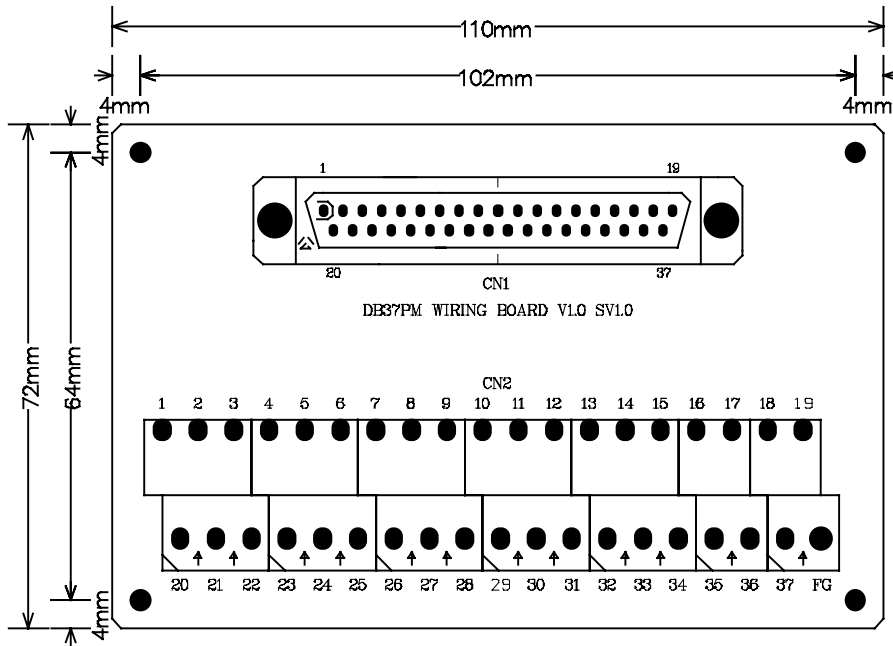
4.1 AIO3322/3323 Main card



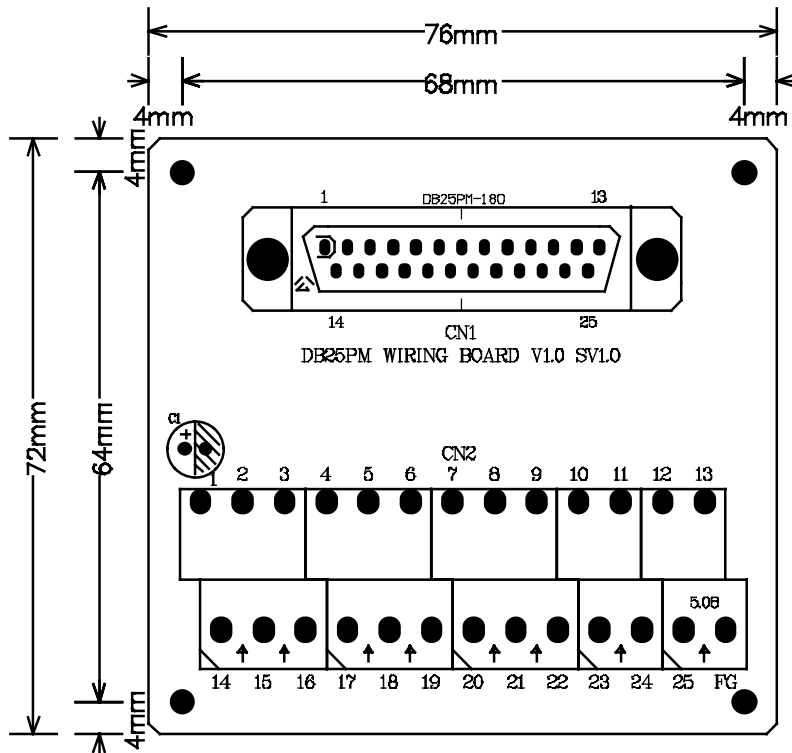
4.2. AIO3322/3323 Digital I/O extension card



4.3. JS51026 37P Din rail mounted dummy wiring board



4.4. JS51050 25P Din rail mounted dummy wiring board



5. Pin definitions

5.1 Pin definitions for on card 37P connector

PIN	DESCRIPTIONS		PIN	DESCRIPTIONS
1	AI0:analog input 0	AI0 1	20	AGND
2	AI1:analog input 1	AI1 2	21	AGND
3	AI2:analog input 2	AI2 3	22	AGND
4	AI3:analog input 3	AI3 4	23	AGND
5	AI4:analog input 4	AI4 5	24	AGND
6	AI5:analog input 5	AI5 6	25	AGND
7	AI6:analog input 6	AI6 7	26	AGND
8	AI7:analog input 7	AI7 8	27	AGND
9	DA0:analog out0	DA0 9	28	AGND
10	DA1:analog out1	DA1 10	29	AGND
11	DA2:analog out2	DA2 11	30	AGND
12	DA3:analog out3	DA3 12	31	AGND
13	DA4:analog out4	DA4 13	32	AGND
14	DA5:analog out5	DA5 14	33	AGND
15	DA6:analog out6	DA6 15	34	AGND
16	DA7:analog out7	DA7 16	35	+5Vout
17	+5Vda: 5V out*	+5Vout 17	36	Trigger out O0
18	I0 (Digital trigger input)	Trigger I0 18	37	Trigger out O1
19	I1 (Digital trigger input)	I1 19		
			20	AGND: analog ground
			21	AGND: analog ground
			22	AGND: analog ground
			23	AGND: analog ground
			24	AGND: analog ground
			25	AGND: analog ground
			26	AGND: analog ground
			27	AGND: analog ground
			28	AGND: analog ground
			29	AGND: analog ground
			30	AGND: analog ground
			31	AGND: analog ground
			32	AGND: analog ground
			33	AGND: analog ground
			34	AGND: analog ground
			35	+5Vda: 5V out*
			36	O0 (Trigger out O0)
			37	O1 (Trigger out O1)

NOTE: +5Vda: a 5V output for user's application such as power of a trimmer, the voltage is isolated from the PC but the same ground with AGND.

5.2 Pin definitions for extension 25P connector

PIN	DESCRIPTIONS		PIN	DESCRIPTIONS
1	AGND: analog ground	AGND	14	AGND: analog ground
2	DA8: analog output8	DA8	15	AGND: analog ground
3	DA9: analog output9	DA9	16	AGND: analog ground
4	DA10: analog output10	DA10	17	AGND: analog ground
5	DA11: analog output11	DA11	18	AGND: analog ground
6	DA12: analog output12	DA12	19	AGND: analog ground
7	DA13: analog output13	DA13	20	AGND: analog ground
8	DA14: analog output14	DA14	21	AGND: analog ground
9	DA15: analog output15	DA15	22	AGND: analog ground
10	AGND: analog ground	AGND	23	+15V*
11	+15V*	+15Vout	24	-15V*
12	+15V*	+15Vout	25	-15V*
13	-15V*	-15Vout		

NOTE: +15V and -15V are voltage output for user's application such as power of a trimmer, the voltage is isolated from the PC but the same ground with AGND.

Please use the current rating totally under 50mA.

5.3 Pin definitions for extension 20P connector

PIN	DESCRIPTIONS		PIN	DESCRIPTIONS
1	IN0: input0	IN0	2	OUT0: output0
3	IN1: input1	IN1	4	OUT1: output1
5	IN2: input2	IN2	6	OUT2: output2
7	IN3: input3	IN3	8	OUT3: output3
9	IN4: input4	IN4	10	OUT4: output4
11	IN5: input5	IN5	12	OUT5: output5
13	IN6: input6	IN6	14	OUT6: output6
15	IN7: input7	IN7	16	OUT7: output7
17	DGND: digital ground	0V	18	DGND: digital ground
19	+24Ve: external input power supply	EXT +24Vin	20	+24Ve: external input power supply

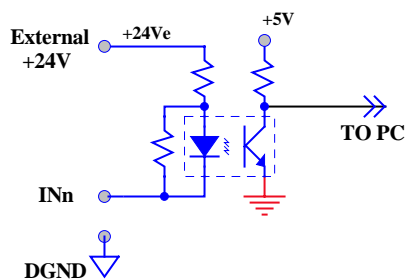
6. Hardware descriptions

6.1 Card id setting

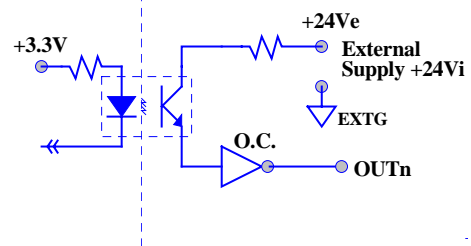
Since PCI cards have plug and play function, the card ID is required for programmer to identify which card he/she will control without knowing the physical address assigned by the Windows (OS). A 16 position rotary switch for distinguishing the 16 identical cards.

6.2 Digital I/O

There is one isolated input port and one isolated output port on card. The interface diagram is as follows.

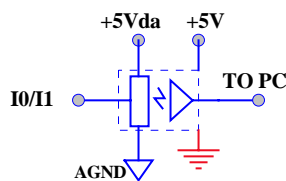


I/P diagram

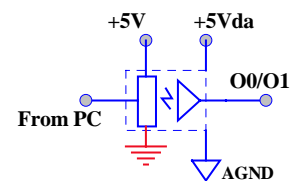


O/P diagram

IN0,IN1 and OUT0,OUT1 can be configured as dedicated i/o for timer/counters (refer to software manual for detail function).



Trigger I0,I1 diagram



Trigger out O0,O1 diagram

Trigger I0 can be used as digital trigger input for auto data acquisition or general purpose high speed digital input as I1 does, trigger out O0 can be configured as dedicated output of finish of auto data acquisition, trigger out O1 auto data acquisition event trigger output and both trigger out O0 and trigger out O1 can be used as general purpose fast output if trigger out not configured. (refer to software manual for detail function)

6.3 Timer/Counter

There are 2 timer/counters on board. Each one has 32 bit register length, if you program as PWM mode, the register is divided as 2 16 bit width, the upper 16 bit work as the pulse high width and the lower 16 bit work as PWM frequency register. The card also provide end of count interrupt function of both the timer/counters.

6.4 Analog input

There are 8 channels of analog input on card, which are electric isolated from PC . The hardware may accept 0-5V, 0-10V,-5V-+5V, -10V - +10V range according you configuration.

6.5 Analog output

There are 8/16 channels of analog output on card, which are electric isolated from PC and scanned by hardware without occupying PC's resource. The output of DA is 16 bit width and -10V ~+10V range.

7. Applications

7.1 Analog input section:

For measurement of analog signal such as:

- temperature
- voltage
- current
- flow
- light
-

Note: The analog signal should be pre-processed to the acceptable range of the card.

7.2 Analog output section:

For control or signal generation such as:

- inverter speed
- servo motor speed
- wave generation
- valve control
- light control
-

7.3 Digital section:

For the control of digital I/O:

- switch input
- relay control
- trigger output
- ...

7.4 Counter/Timer section:

- event counting
- periodic interrupt source
- PWM generator (can work as D/A with external low pass filter)
- counter/timer with trigger out
- duration counter

8. Ordering information

<u>PRODUCT</u>	<u>DESCRIPTIONS</u>
AIO-3322	Isolated Analog I/O Card, 12bit AI x8 with triggered data acquisition, 16 bit AO x8 and 16 isolated digital i/o and 2 32bit multi function timer/counter (include bracket kit for digital I/O)
AIO-3323	Isolated Analog I/O Card, 12bit AI x8 with triggered data acquisition, 16 bit AO x16 and 16 isolated digital i/o and 2 32bit multi function timer/counter (include bracket kit for digital I/O and AO)
JS51050	Dummy DIN rail mounted wiring board (D-type 25P to terminals) (for AIO-3323 only)
JS51026	Dummy DIN rail mounted wiring board (D-type 37P to terminals)
JD50053	Dummy DIN rail mounted wiring board (20P flat cable to terminals)
ADP-9201DIN(R)	DIN rail mounted wiring board with 16 i/o LED indicators and relay output for 8 DI, 8DO. (M23207 flat cable include, for AIO-3322/3323 DIO)
ADP-9201DIN(P)	DIN rail mounted wiring board with 16 i/o LED indicators and PMOS output for 8 DI, 8DO. (M23207 flat cable include, for AIO-3322/3323 DIO)
ADP-9201DIN(S)	DIN rail mounted wiring board with 16 I/O LED indicators and SSR output for 8 DI, 8DO. (M23207 flat cable include, for AIO-3322/3323 DIO)
M270337X0	D type 37p male-female cable 1.5M
M270337X0S	D type 37p male-female cable 1.5M, shielding
M270337X2	D type 37p male-female cable 3.0M
M270337X2S	D type 37p male-female cable 3.0M, shielding
M270325X4	D type 25p male-female cable 1.5M (for AIO-3323 only)
M270325X4S	D type 25p male-female cable 1.5M, shielding (for AIO-3323 only)
M270325X0	D type 25p male-female cable 3.0M (for AIO-3321 only)
M270325X0S	D type 25p male-female cable 3.0M, shielding (for AIO-3323 only)
M23207	20 pin flat cable 1.5M
M23209	20 pin flat cable 3.0M
SM23404	Extension kit for JM1 (bracket for 25p D-type connector , 26p flat cable) (3323 only)