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certified



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Preliminary version

Technical description

ADDIVARIOUS PX 901

Screw terminal panel

10th edition 06/2005

Product information

This manual contains the technical installation and important instructions for correct commissioning and usage, as well as production information according to the current status before printing. The content of this manual and the technical product data may be changed without prior notice. ADDI-DATA GmbH reserves the right to make changes to the technical data and the materials included herein.

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WARNING

The following risks result from improper implementation and from use of the board contrary to the regulations:



- ◆ **Personal injury**
- ◆ **Damage to the board, PC and peripherals**
- ◆ **Pollution of the environment**

- ◆ **Protect yourself, the others and the environment!**

- ◆ **Read carefully the safety precautions (yellow leaflet).**

If this leaflet is not with the documentation, please contact us and ask for it.

- ◆ **Observe the instructions of the manual.**

Make sure that you do not forget or skip any step. We are not liable for damages resulting from a wrong use of the board.

- ◆ **Used symbols:**



IMPORTANT!

designates hints and other useful information.



WARNING!

It designates a possibly dangerous situation.

If the instructions are ignored the board, PC and/or peripheral may be destroyed.

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1 DEFINITION OF APPLICATION

1.1 Intended use

The screw terminal panel **PX 901** is intended to connect up to 37 signal lines and/or signal-reference lines.

Digital, analogue and counter boards included in our product range can be connected over the 37-pin SUB-D female connector with our standard cable **ST010** (2 m) or **ST011** (5 m)¹.

The housing of the female connector is connected with two ground terminals so that the board is additionally earthed for more security. All components of the board are enclosed in an earthing strip also connected to the ground terminals.

Each terminal is directly connected to one pin of the 37-pin SUB-D female connector. The designations on the terminals indicate the respective connections for the 37-pin SUB-D female connector.

The connections are organised into two rows of terminals. The terminal rows can have different functions according to the ADDI-DATA board used.

The screw terminal panel **PX 901** is available in 3 versions:

1. **PX 901-D** for digital boards with status LEDs for indicator status connection through our shielded standard cable **ST010** or **ST011**.
- **PX 901-DG** **PX 901-D** with housing for mounting on a standard supporting rail.
2. **PX 901-A** for analogue boards with transil diodes connection through our shielded standard cable **ST010** or **ST011**.
- **PX 901-AG** **PX 901-A** with housing for mounting on a standard supporting rail.
3. **PX 901-ZG** for counter board PA 1700-2 and for analogue output boards with current outputs, with housing for mounting on a standard DIN rail.
Connection through our shielded standard cable **ST010** or **ST011**.

The connection with our standard cable **ST010** complies with the following specifications:

- metallized plastic hoods
- shielded cable
- cable shield folded back and firmly screwed to the connector housing.

¹ shielded round cables twisted in pairs with metallized plastic hoods

2 USER

2.1 Qualification

Only persons trained in electronics are entitled to perform the following works:

- installation
- use,
- maintenance.

2.2 Personal protection

Consider the country-specific regulations about:

- the prevention of accidents
- electrical and mechanical installations
- radio interference suppression.

3 TECHNICAL DATA

3.1 Physical set-up

A 1.5 mm printed circuit card supports the mechanical and electrical connection.

Dimensions of the printed circuit card (without housing):

Length: 130 mm
Width: 70 mm
Height: 35 mm

Dimensions of the printed circuit card (with housing):

Length: 132 mm
Width: 87 mm
Height: 70 mm

4 screw holes allow installing the printed circuit card on a housing rear panel or a mounting plate (intended for M3 screws).

3.2 Limit values



IMPORTANT!

Please observe the limit values of the connected board.

Screw terminals:

Conductor cross sections: max. 2.5 mm²
Test/rated load torque: 0.4 Nm

Current:

Status LEDs PX901-D

Current consumption: 2.3 mA at 24 V

Operating voltage protection PX901-D

Varistor (terminal 9,28)

Breakdown voltage: $V_{max} \sim 60$ V
 $V_{max} - 85$ V
 P_{max} 100 mW

Overvoltage protection diode

Breakdown voltage: V_{Br} 37.1 V
Leakage current: I_{RM} 5 μ A
Power dissipation: P_{max} 400 W/1 ms

Overvoltage protection PX901-A

Overvoltage protection diode

Breakdown voltage: V_{Br} 12.8 V

Leakage current: I_{RM} 5 μA
Power dissipation: P_{max} 600 W/1 ms

4 LAYOUT

The following sections will give you a short overview over the three different versions of the **PX 901**:

- **PX 901-DG** (see chapter 4.1)
- **PX 901-AG** (see chapter 4.2)
- **PX 901-ZG** (see chapter 4.3)

4.1 PX 901-DG

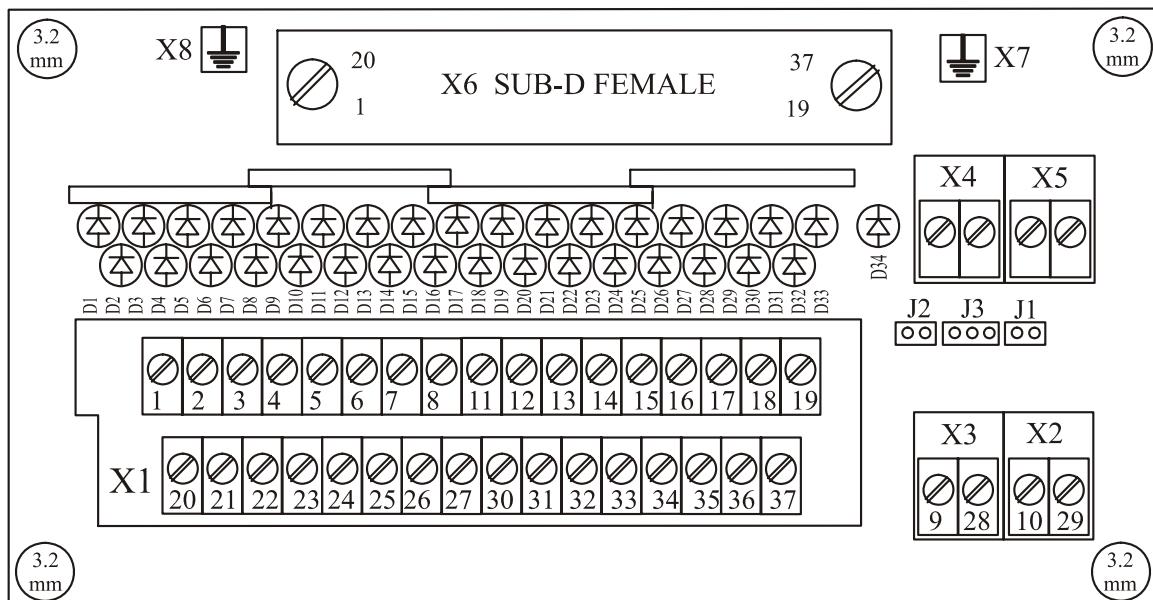
Brief description:

All digital 24 V input and output signals are driven from the 37-pin SUB-D front connector to the 2 rows of screw terminals through a green status LED. The voltage supply (24 V and load for digital output or digital load for digital input/output board) is driven through a separate screw terminal unit.

The screw terminal panel **PX 901-DG** allow the connection of **digital signals** to the following PC boards:

Table 4-1: Boards connectable to the PX 901-DG

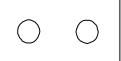
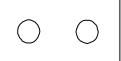
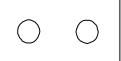
APCI-1016
APCI-1032
APCI-1032
APCI-1500
APCI-1516
APCI-1564
APCI-2016
APCI-2032
CPCI-1500
PA 100
PA 1000
PA 110
PA 150
PA 1500
PA 200
PA 2000
PA 216

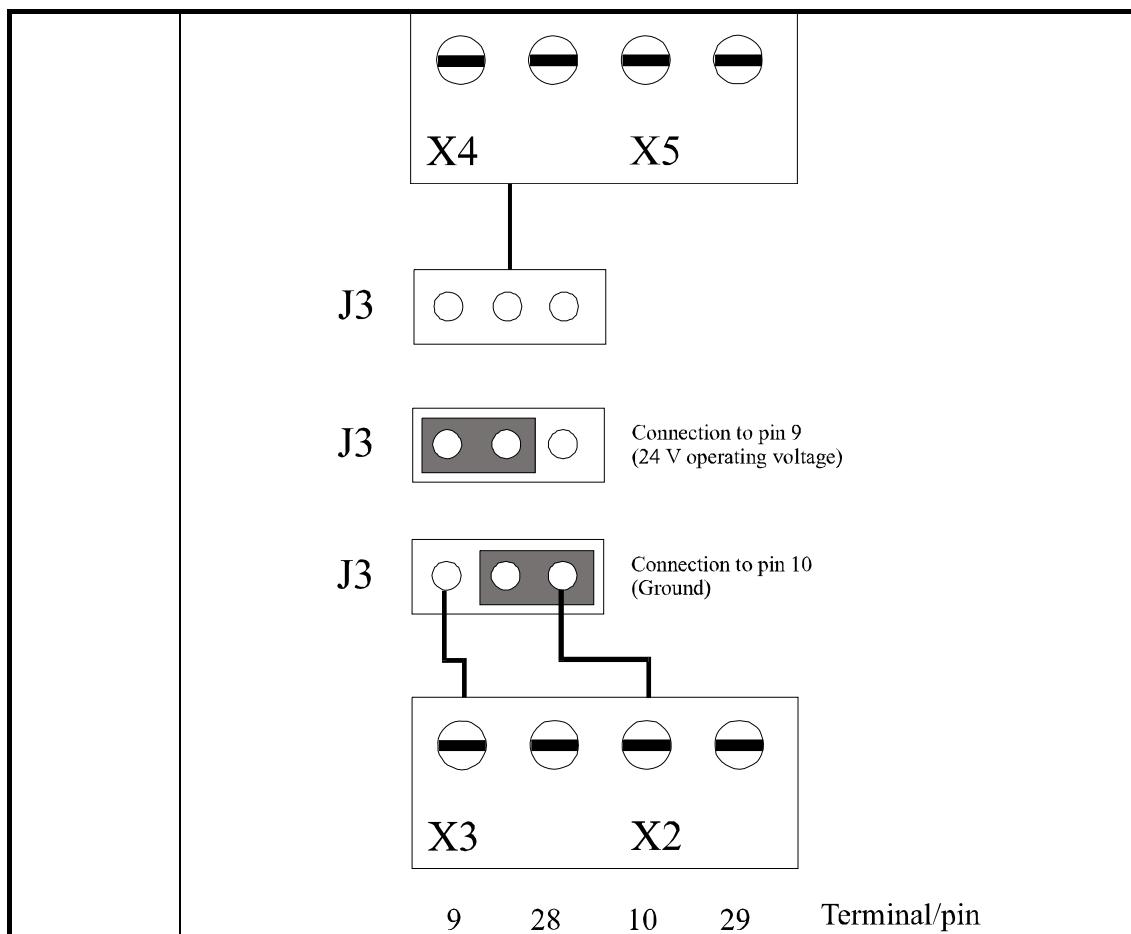
Fig. 4-1: PX 901-DG

D1-D33	<p>Red LEDs for the status display of the 24 V signals. D1 = Status LED for digital 24 V signal on screw terminal / connector pin 1 D2 = Status LED for digital 24 V signal on screw terminal / connector pin 20 D3 = Status LED for digital 24 V signal on screw terminal / connector pin 2 D4 = The lower row of LEDs corresponds to the lower row of the screw terminals. Also the upper row of LEDs corresponds to the upper row of the screw terminals.</p>
D34	Green LED for status display when connecting the 24 V operating voltage to screw terminal pin 9.
X1	<p>Double row screw terminal (33-pin) for the connection of the digital 24 V signals. Every terminal is assigned a pin of the 37-pin female connector X6. The pin number is indicated directly on the screw terminal of the circuit card.</p>
X2,X3	<p>Please observe the respective connector assignment to the PC board. The screw terminal X3 and X2 have different functions depending on the board you want to connect to the screw terminal panel PX 901-DG. Find more detailed pin assignments for your specific board in chapter 5.</p>

X4, X5	<p>Additional screw terminals for the distribution of the 24 V operating voltage or the load. You can select them with jumper 3 (J3).</p> <p>The screw terminals X4 and X5 have different functions depending on the board you want to connect to the screw terminal panel PX 901-DG</p> <p>Find more detailed pin assignment for your specific board in chapter 5.</p>
X6	37-pin SUB-D female connector for the connection of the connection cable ST010, ST011 .
X7, X8	Screw terminals for the ground connection.

Table 4-2: Jumper positions

J2, J1	<p>On a few of our PC board several pins of the peripheral connector are joined to supply the energy from the board on several cable conductors. Please observe the technical description of the specific board and the detailed pin assignment in chapter 5 of the present document.</p> <p>The selection occurs through jumper 1 (J1) and jumper 2 (J2).</p> <table style="width: 100%; text-align: center;"> <tr> <td style="width: 50%;"> J2  <p>No connection between pin 9 and 28</p>  <p>Connection between pin 9 and 28</p> </td><td style="width: 50%;"> J1  <p>No connection between pin 10 and 29</p>  <p>Connection between pin 10 and 29</p> </td></tr> </table> <p>J1 set: Connection between pin 10 and pin 29 (e.g. for digital I/O boards) J1 not set: No connection between pin 10 and pin 29 J2 set: Connection between pin 9 and pin 28 J2 not set: No connection between pin 9 and pin 28.</p>	J2  <p>No connection between pin 9 and 28</p>  <p>Connection between pin 9 and 28</p>	J1  <p>No connection between pin 10 and 29</p>  <p>Connection between pin 10 and 29</p>
J2  <p>No connection between pin 9 and 28</p>  <p>Connection between pin 9 and 28</p>	J1  <p>No connection between pin 10 and 29</p>  <p>Connection between pin 10 and 29</p>		
J3	Extension of the terminals X2 and X3 through jumper 3 (J3)		



4.2 PX 901-AG

Brief description:

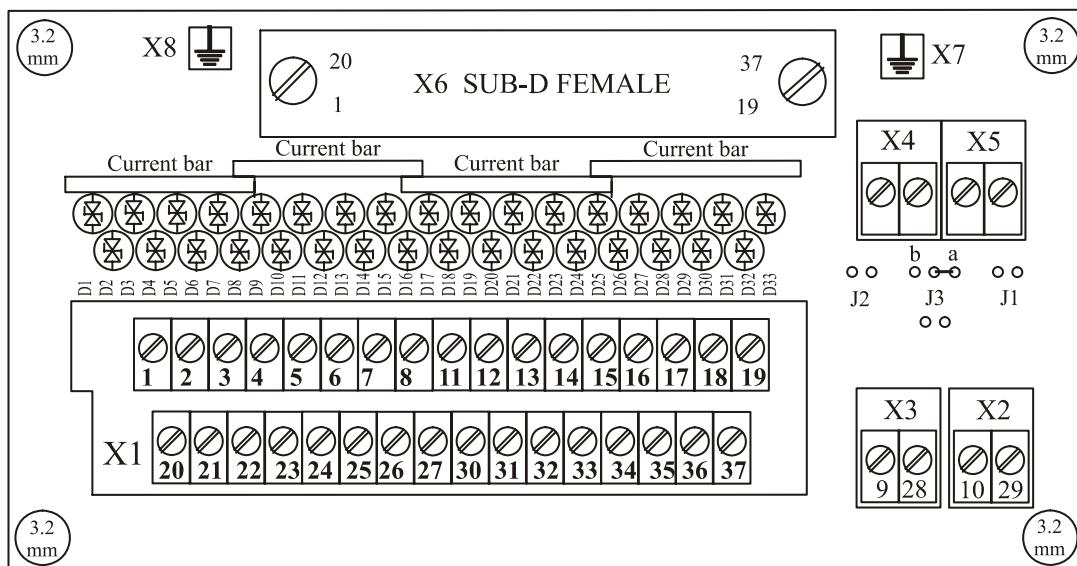
All analogue signals are driven from the 37-pin SUB-D connector to the double row terminal through voltage protection diodes. Overtvoltages > 13 V are derivated to the shield of the connector housing or the connection clamps X7 / X8.

According to the used board several additional signals are available on the screws (+5 V PC output: Trigger input etc.)

The screw terminal panel **PX 901-AG** allows the connection of **analogue signals** to the following PC boards of the product line **ADDIALOG**:

Table 4-3: Boards connectable to the PX 901-AG

APCI-3000
APCI-3001
APCI-3001
APCI-3002
APCI-3003
APCI-3006
APCI-3010
APCI-3016
APCI-3100
APCI-3106
APCI-3110
APCI-3116
APCI-3120
APCI-3501
CPCI-3001
CPCI-3120
PA 3000
PA 302
PA 3100
PA 311
PA 3110
PA 350
PA 3500

Fig. 4-2: PX 901-AG

D1-D33	Diode for overvoltage protection of the analogue inputs/outputs.
X1	33-pin double row terminal for the threaded terminal end of the analogue signals. A pin of the 37-pin female connector X6 is assigned to each terminal. The pin number is indicated directly on the circuit board.
X6	37-pin SUB-D female connector for the connection of the connection cable ST010, ST011
X7, X8	Screw terminals for the ground connection.
X3	Double terminals for the connection of the analogue signals to pin 9, 28 Please observe the specific pin assignment of your PC board!
X3	Double terminal for the connection of the analogue signals to pin 9, 28. Please observe the specific pin assignment of your PC board!
X4, X5	Terminals are connected electronically to pin 10 SUB- D connector or terminal X2.

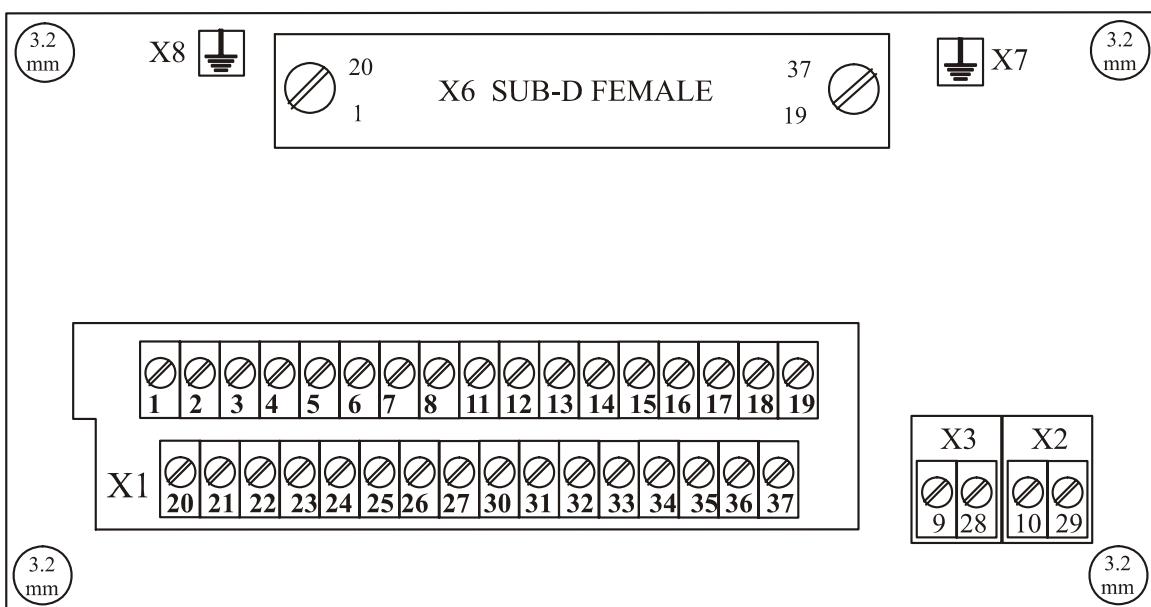
4.3 PX 901-ZG

The screw terminal panel **PX 901-ZG** allows the connection of the following boards:

Table 4-4: Boards connectable to the PX 901-ZG

Board	Remark
APCI-3001	For the connection of dig. I/O
APCI-3110	For the connection of dig. I/O
APCI-3501	For the connection of dig. I/O
PA 160	For the connection of TTL signals
PA 1610	For the connection of TTLs ignals
PA 1700-2	For the connection of counter signals
PA 3500	For the connection of dig. I/O
PA 355	For the connection of analogue outputs.

Fig. 4-3: PX 901-ZG



	33-pin double row terminal for threaded terminal end. A pin of the 37-pin female connector X6 is assigned to every terminal. The pin number is indicated directly on the circuit card.
X2	Please observe the specific connector assignment of your PC board.
X3	Please observe the specific connector assignment of your PC board.
X6	37-pin SUB-D female connector for the connection of the respecting connection cable ST010, ST011 .
X7, X8	Screw terminals for the ground connection.

5 CONNECTION TO THE ADDI-DATA BOARDS



IMPORTANT!

Do observe the safety precautions.

5.1 General remarks

The terminals are divided into several groups. All terminals accept conductor cross sections up to 2.5 mm².

To simplify the connection, the terminal numbers are connected in the ratio 1:1 with the pin numbers of the 37 pin female connector. Herewith the pin assignment of the PC board is the same as the pin assignment of the terminals.



IMPORTANT!

When operating the boards **APCI-/CPCI-3120**, **PA 3xx** and **PA 1700-2**, make sure that no 24 V external are connected as otherwise the board might be destroyed.

5.2 Signals of the 37-pin SUB-D female connector

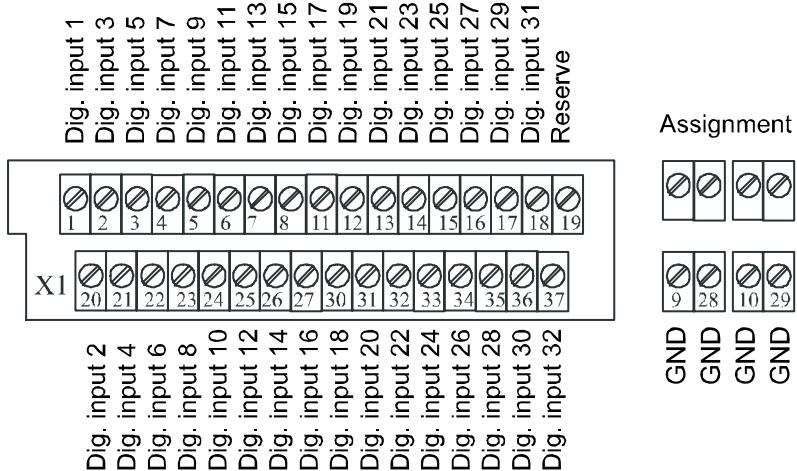
Terminal number	Pin number of the 37-pin SUB-D connector
1	1
2	2
3	3
...	...
37	37

5.3 Connection to the PX 901-DG

5.3.1 APCI-1032, APCI-1564 (dig. inputs), PA 1000

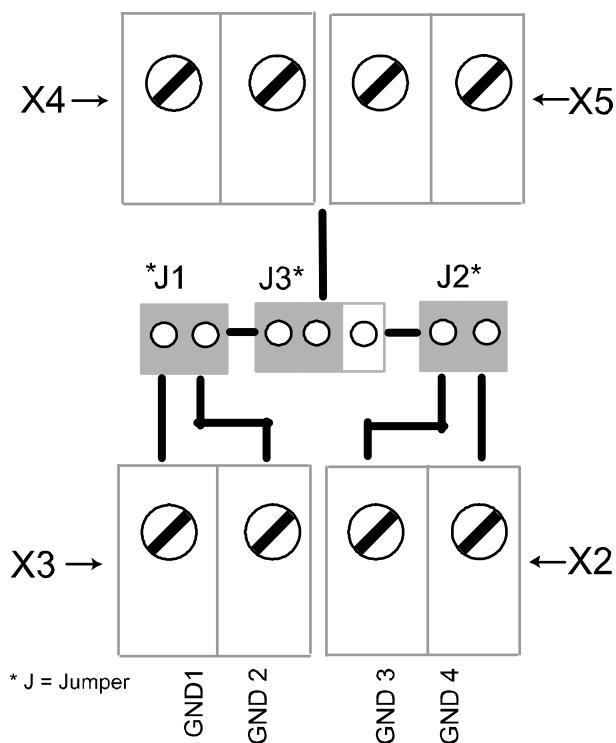
a) Terminal assignment

Fig. 5-1: Terminal assignment APCI-1032, APCI-1564, PA 1000



b) Jumper position

Fig. 5-2: Example: Jumper position APCI-1032, APCI-1564, PA 1000



Please observe:

The inputs 0-31 are lead to the same reference ground. Additionally, on the terminals X4 and X5 further connections are available for the reference ground.

Jumper position

GND 1 = GND 2

Reference ground input 0-7 is connected to reference ground input 8-15

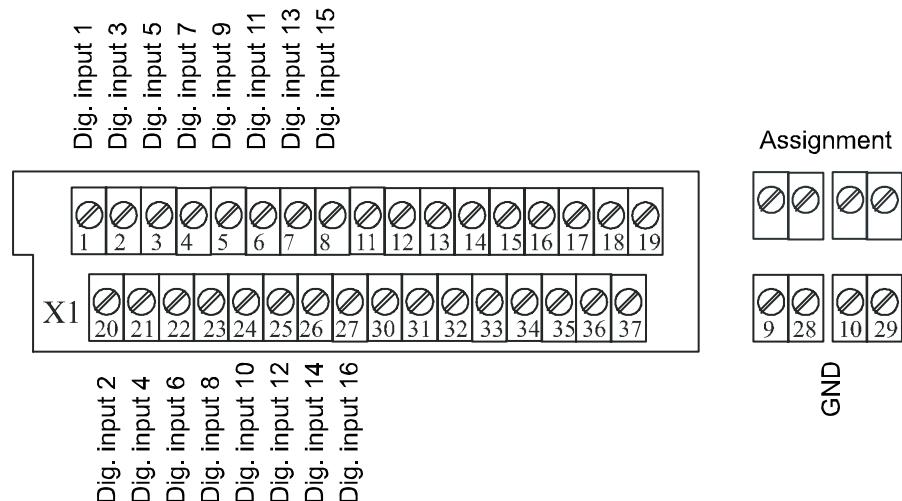
GND 3 = GND 4

Reference ground input 16-23 is connected to input 24-31

5.3.2 APCI-1016

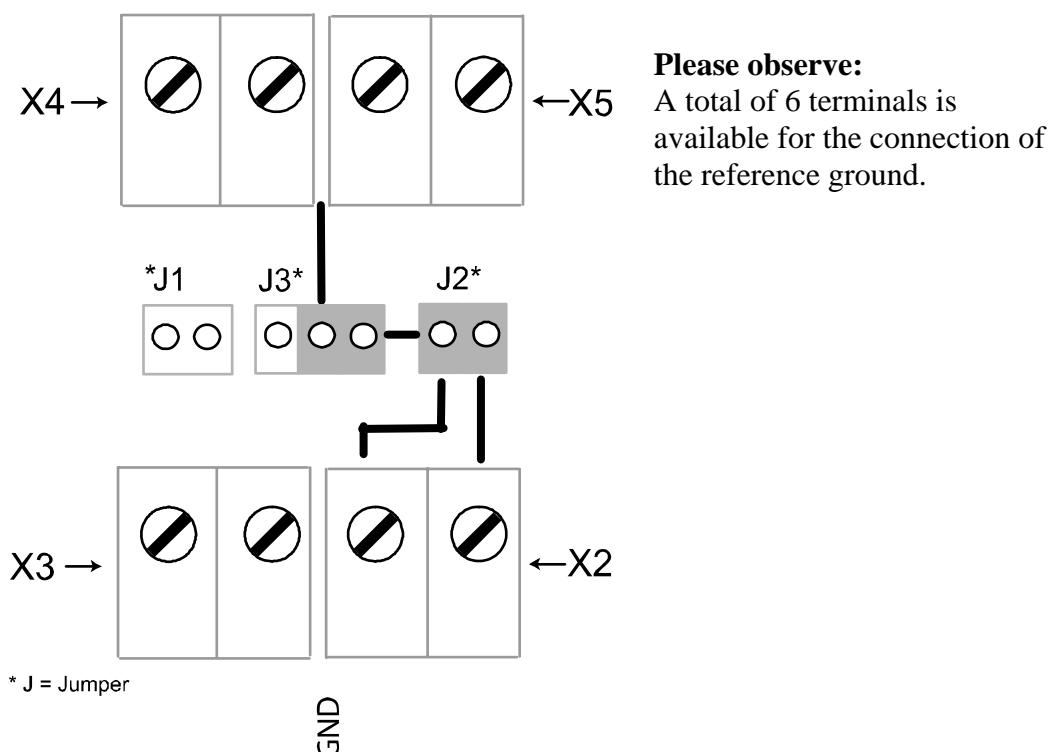
a) Terminal assignment

Fig. 5-3: Terminal assignment APCI-1016



b) Jumper position

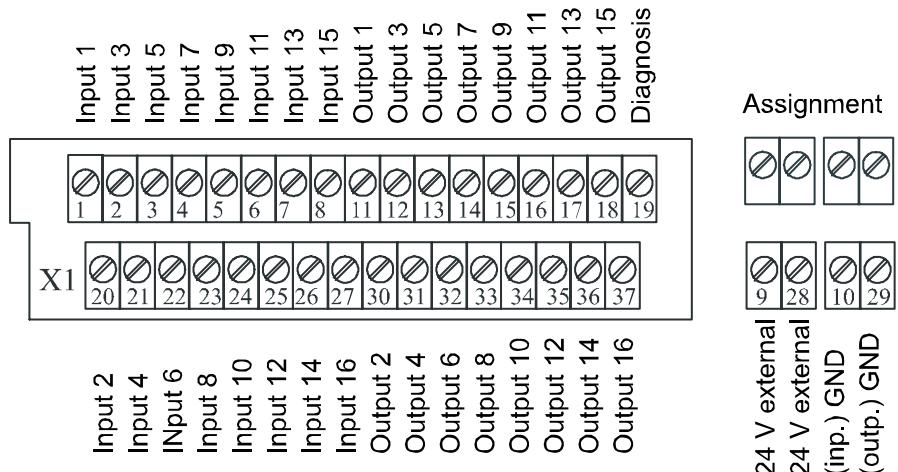
Fig. 5-4: Example: Jumper position APCI-1016



5.3.3 APCI-1500 and CPC-1500

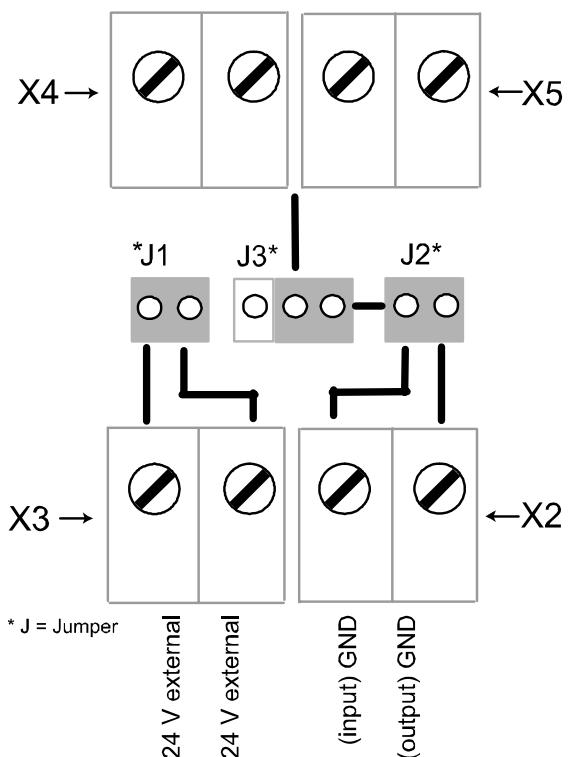
a) Terminal assignment

Fig. 5-5: Terminal assignment APCI-/CPCI-1500



b) Jumper position

Fig. 5-6: Example: Jumper position APCI-1500 and CPCI-1500



The reference ground of the digital inputs and outputs is on the same potential.

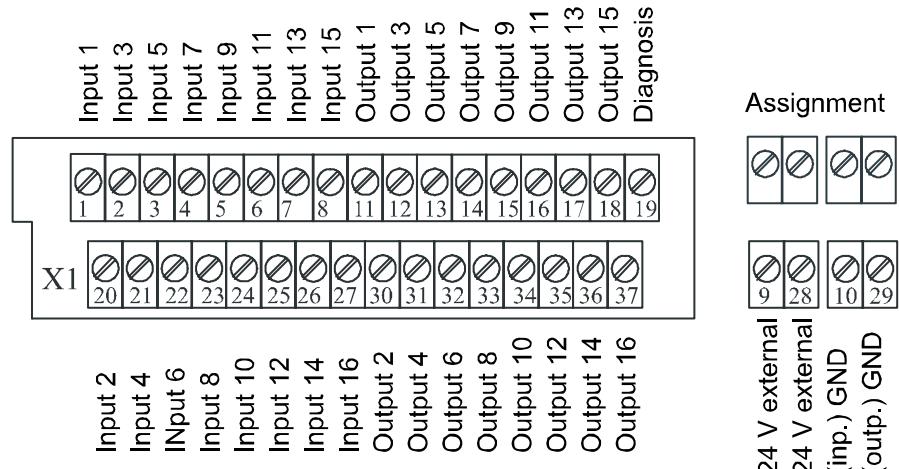
Jumper 2 (J2) and Jumper 3 (J3):
Additionally, 4 connection terminals
for the connection of the reference
ground are available.

Jumper 1 (J1):
The current for the outputs is lead to the board through 2 lines.

5.3.4 PA 1500

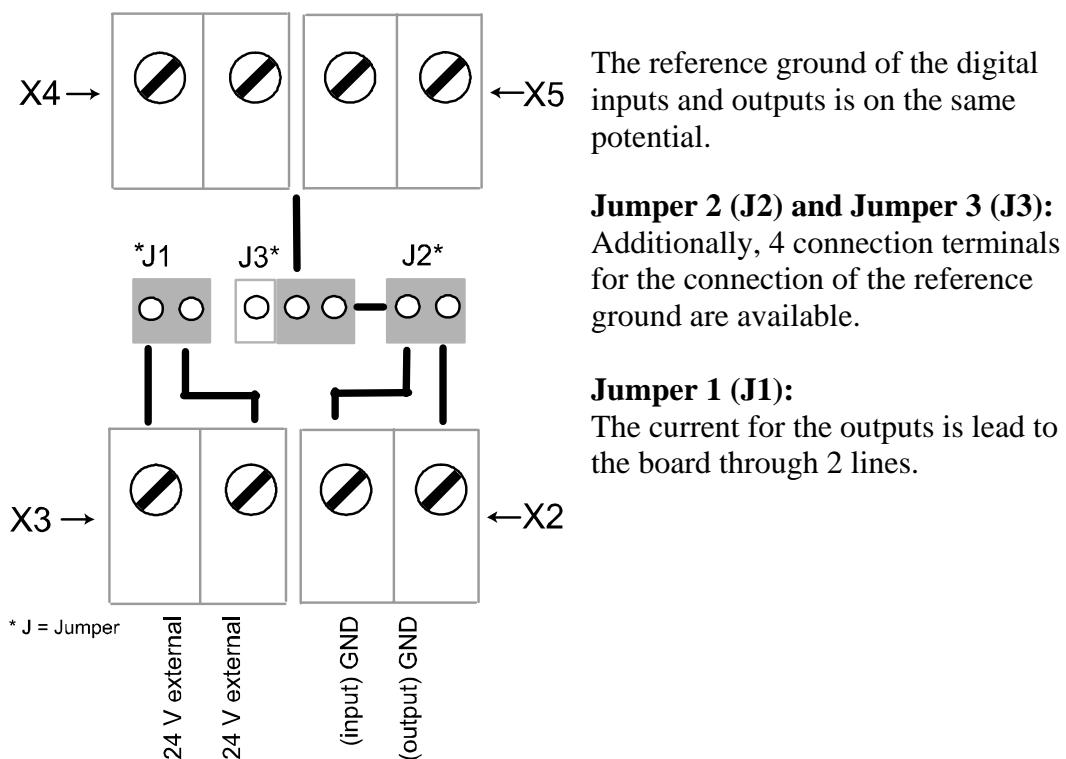
a) Terminal assignment

Fig. 5-7: Terminal assignment PA 1500



b) Jumper position

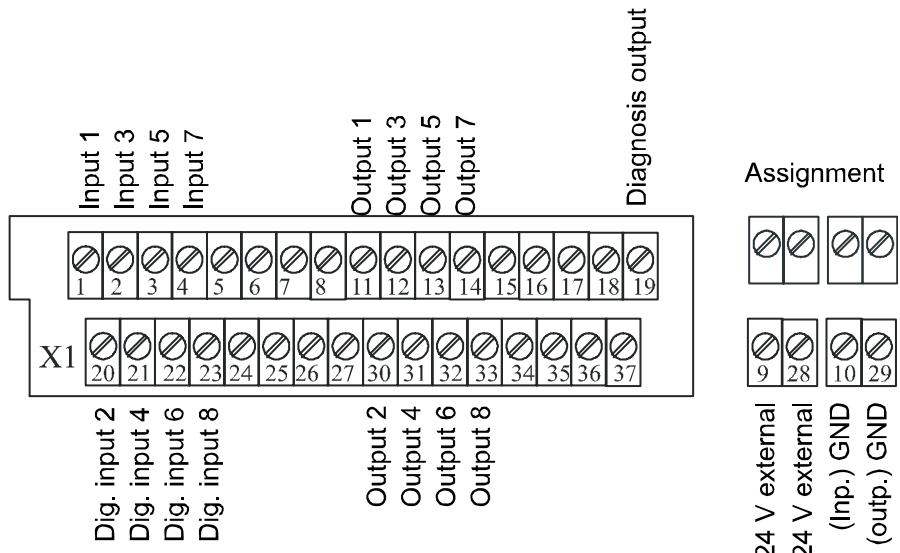
Fig. 5-8: Example: Jumper position of the PA 1500



5.3.5 APCI-1516

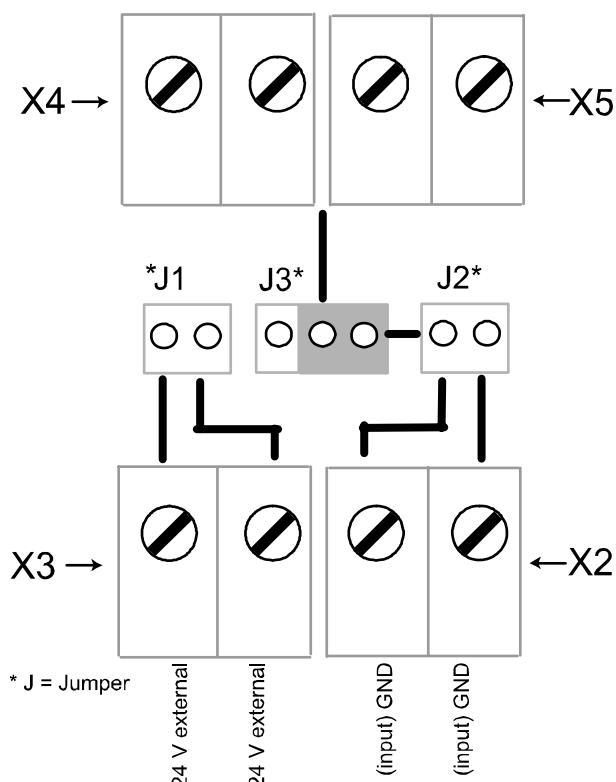
a) Terminal assignment

Fig. 5-9: Terminal assignment APCI-1516



b) Jumper position

Fig. 5-10: Example: Jumper position APCI-1516



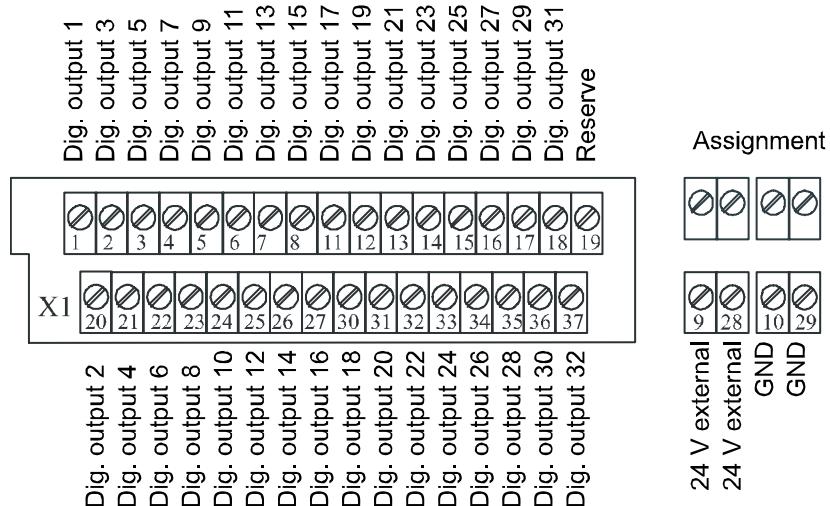
Please observe:

Additionally, the reference ground of the inputs 0-7 can be connected to the terminals X4 and X5.

5.3.6 PA 2000, APCI-2032, APCI-1564 (dig. outputs)

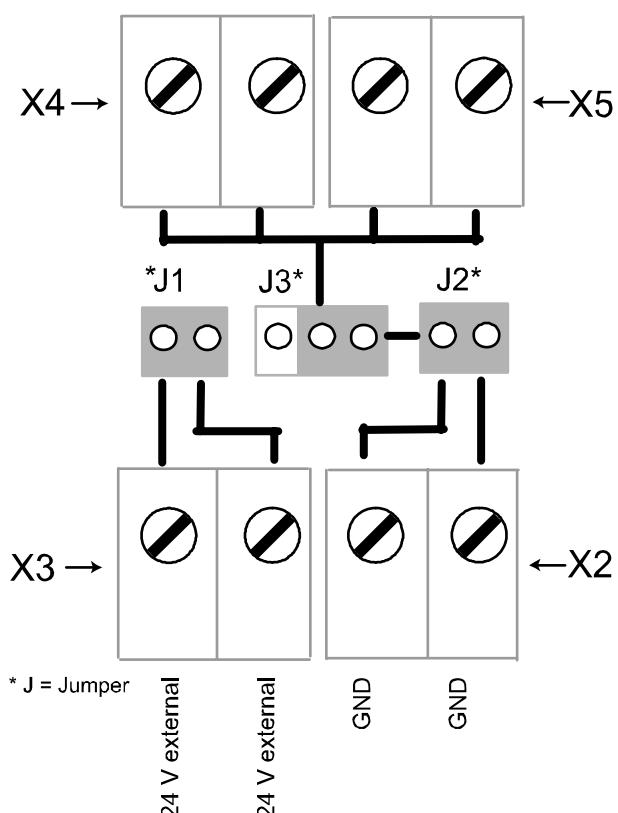
a) Terminal assignment

Fig. 5-11: Terminal assignment PA 2000, APCI-2032, APCI-1564



b) Jumper position

Fig. 5-12: Example: Jumper position PA 2000, APCI-2032, APCI-1564



Jumper 1 (J1) and jumper 3 (J3):

A total of 6 terminals is available for the connection of the reference mass of the outputs.

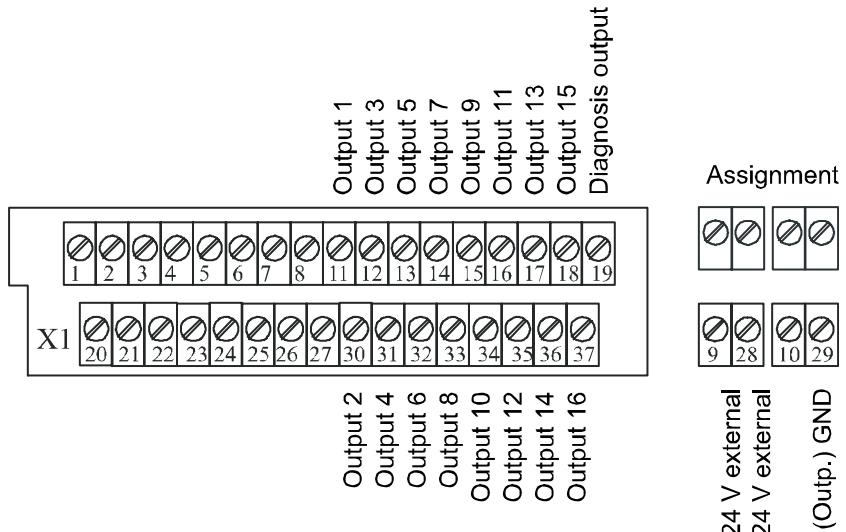
Jumper 2 (J2):

The current for the outputs is lead to the board through 2 lines.

5.3.7 APCI-2016

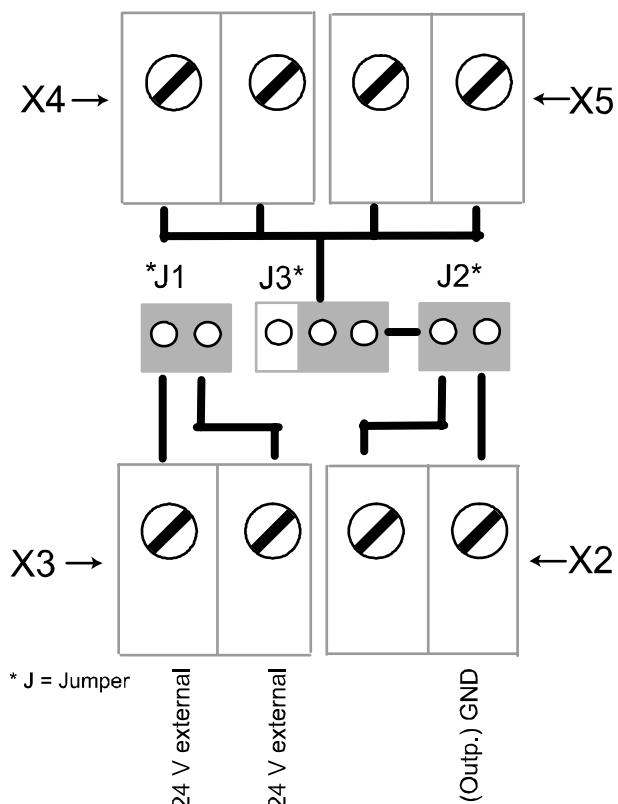
a) Terminal assignment

Fig. 5-13: Terminal assignment APCI-2016



b) Jumper position

Fig. 5-14: Example: Jumper position APCI-2016



Jumper 2 (J2) and jumper 3 (J3):
The reference ground of the outputs can be connected to the terminals X2, X4 and X5.

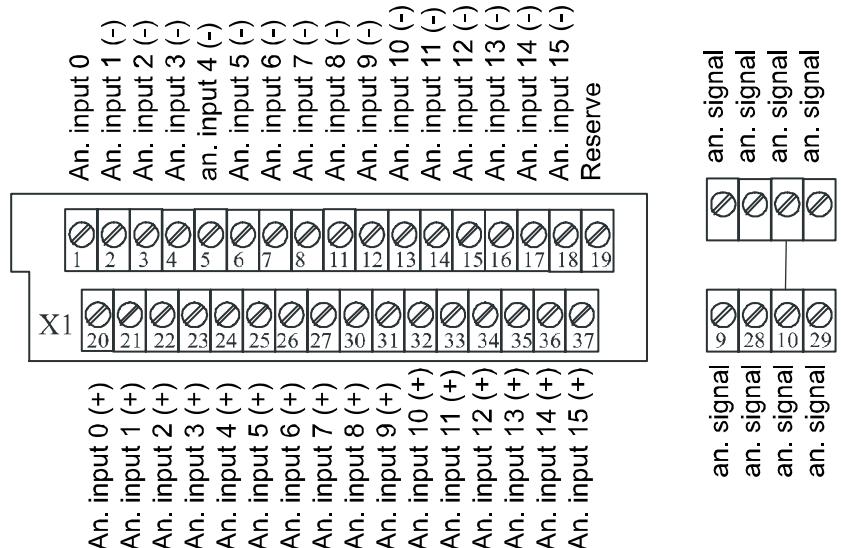
Jumper 1 (J1):
The current supply occurs through two lines.

5.4 Connection to the PX 901-AG

5.4.1 PA 3000

a) Terminal assignment

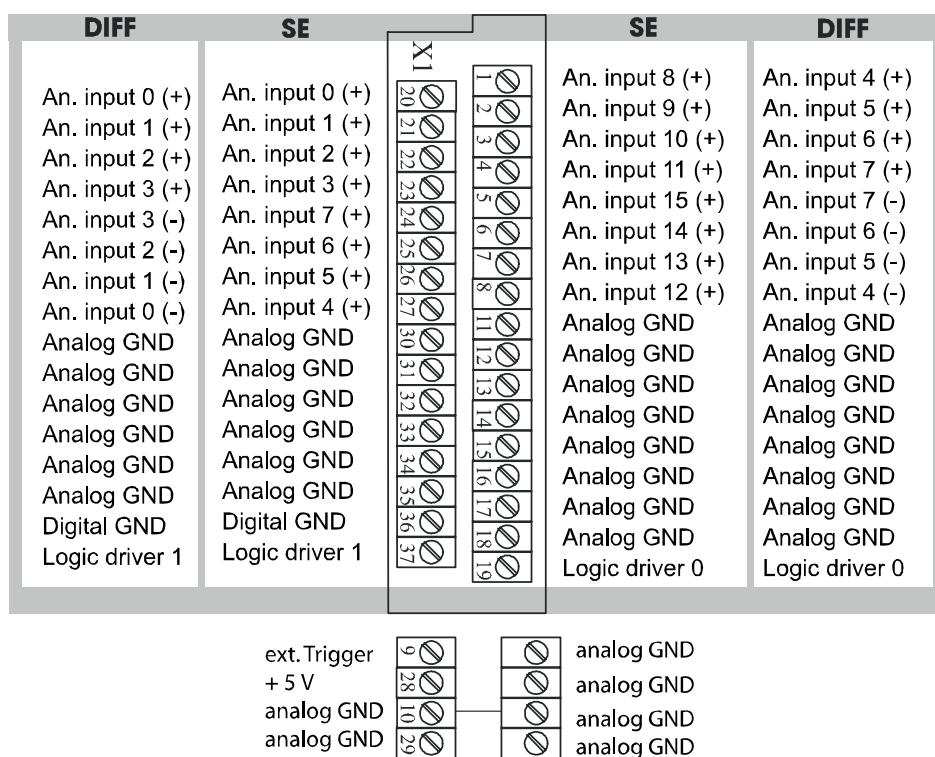
Fig. 5-15: Terminal assignment PA 3000



5.4.2 PA 302

Terminal assignment

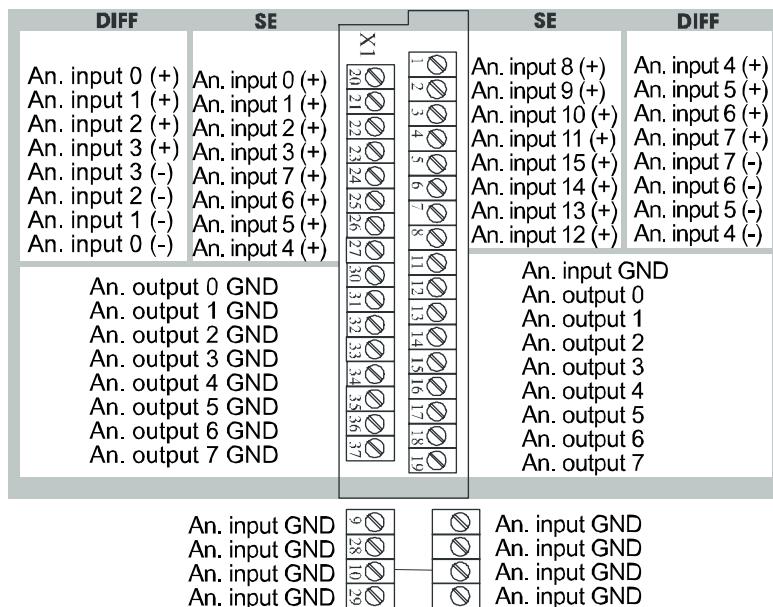
Fig. 5-16: Terminal assignment PA 302



5.4.3 PA 3100, PA 311, PA 3110

a) Terminal assignment

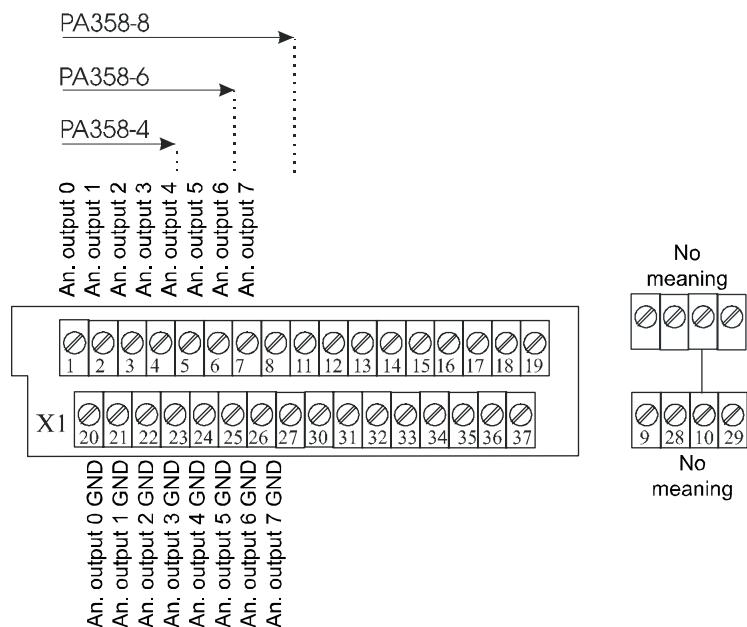
Fig. 5-17: Terminal assignment PA 3100, PA 311, PA 3110



5.4.4 PA 358

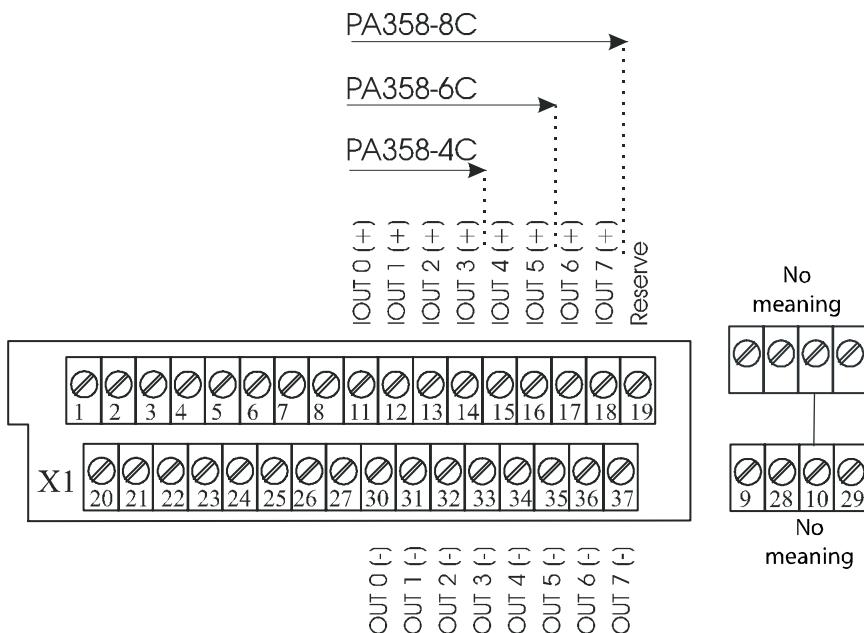
a) Terminal assignment – voltage version

Fig. 5-18: Terminal assignment PA 358 (voltage version)



b) Terminal assignment – current version

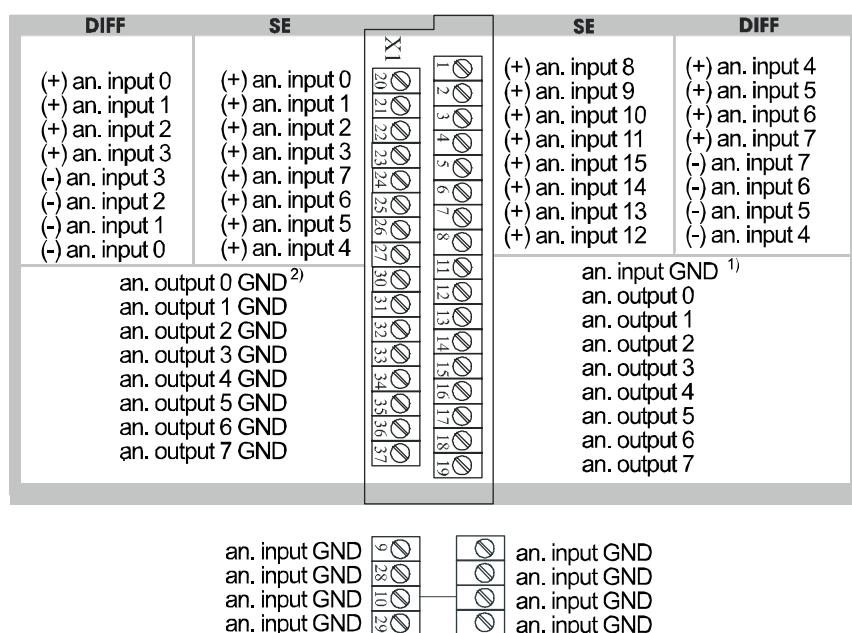
Fig. 5-19: Terminal assignment PA 358 (current version)



5.4.5 APCI-3120 and CPCI-3120

a) Terminal assignment

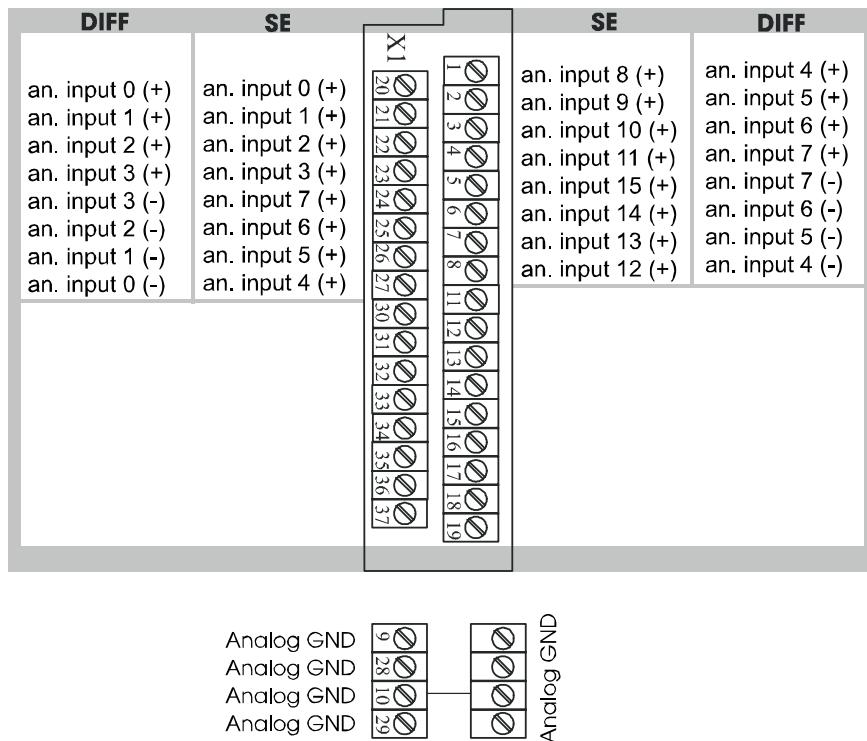
Fig. 5-20: Terminal assignment APCI-3120 and CPCI-3120



- 1: Common ground line for the analogue inputs.
- 2: Analogue single ground for the outputs, i.e. the same potential but with separated lines to the peripheral.

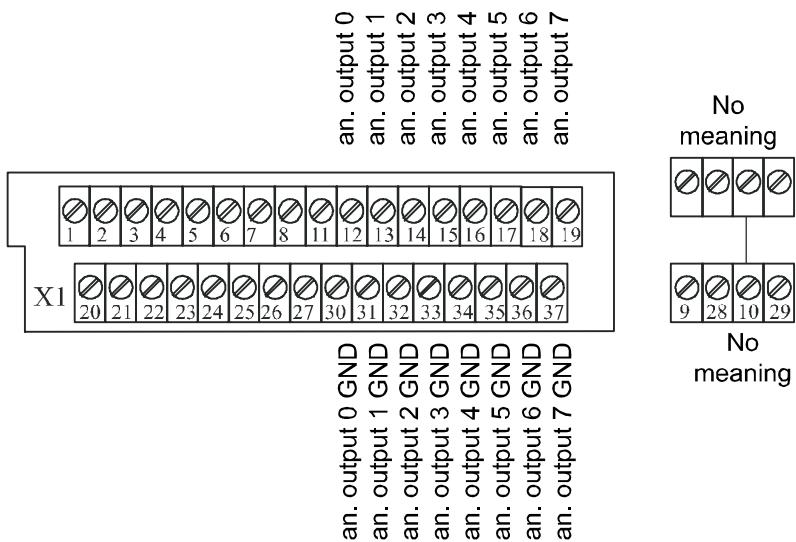
5.4.6 APCI-3001 and CPCI-3001

Fig. 5-21: Terminal assignment APCI-3001 and CPCI-3001



5.4.7 APCI-3501

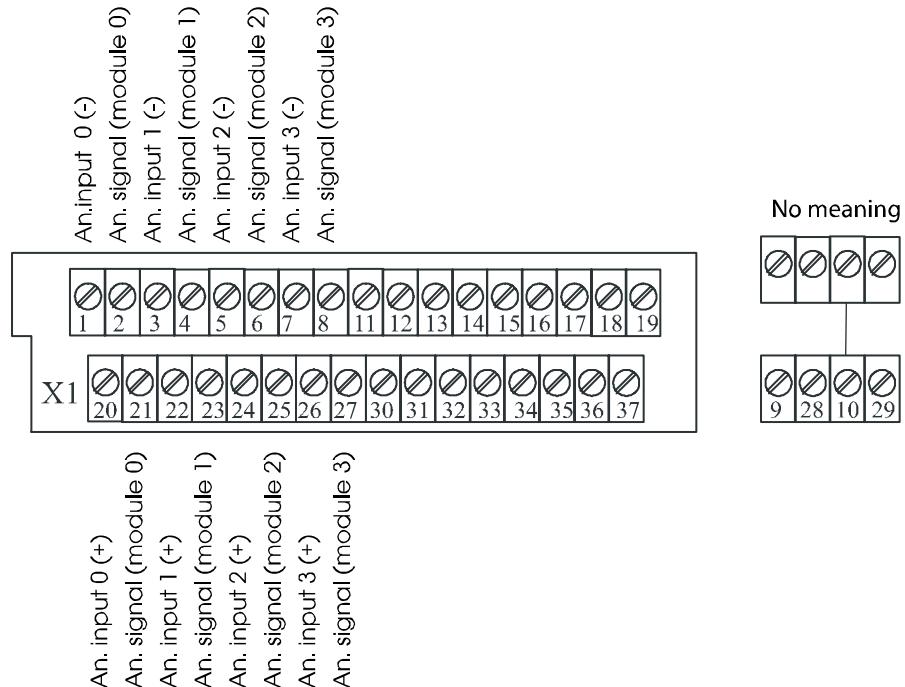
Fig. 5-22: Terminal assignment APCI-3501



5.4.8 APCI-3003

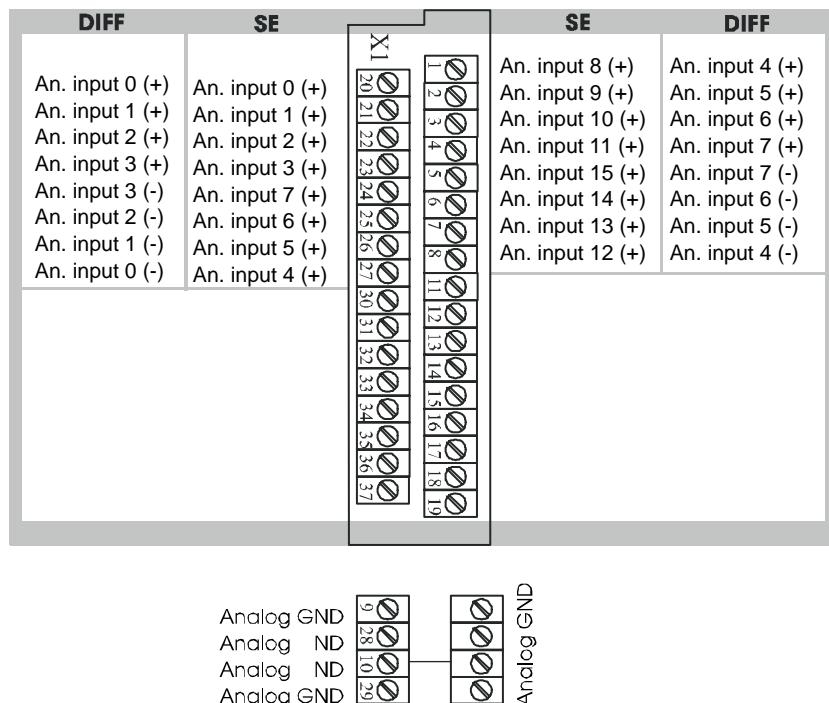
Terminal assignment

Fig. 5-23: Terminal assignment APCI-3003



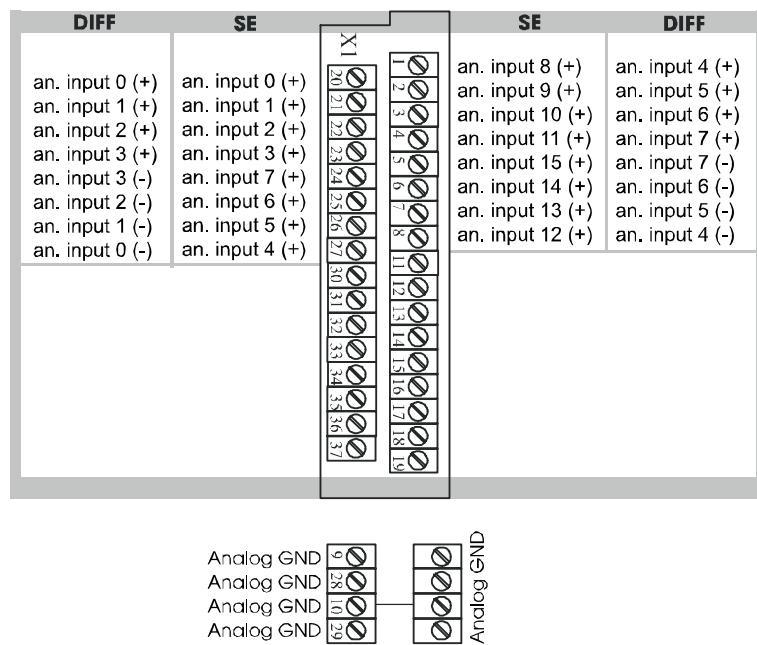
5.4.9 APCI-3006

Fig. 5-24: Terminal assignment APCI-3006



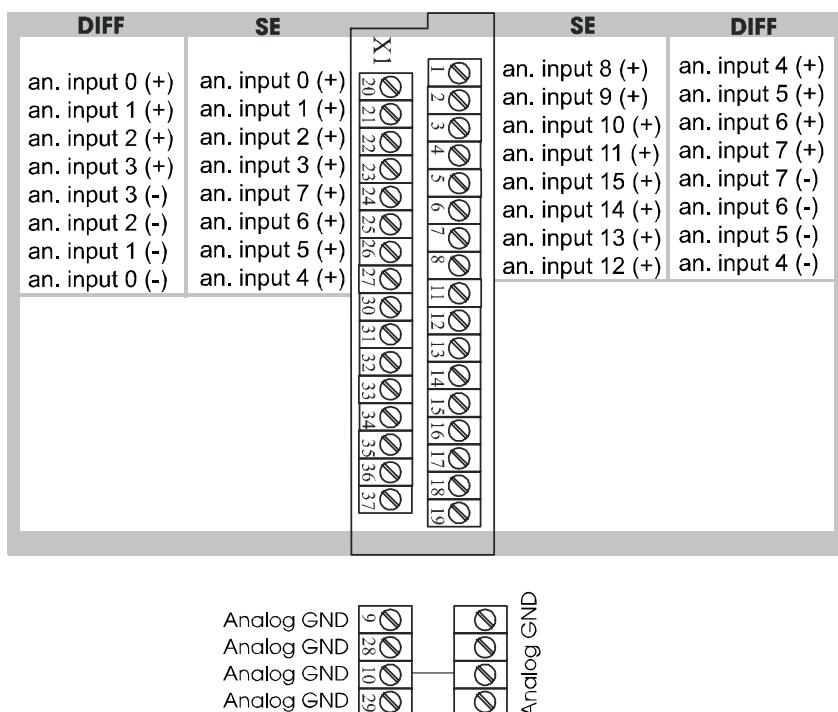
5.4.10 APCI-3010

Fig. 5-25: Terminal assignment APCI-3010



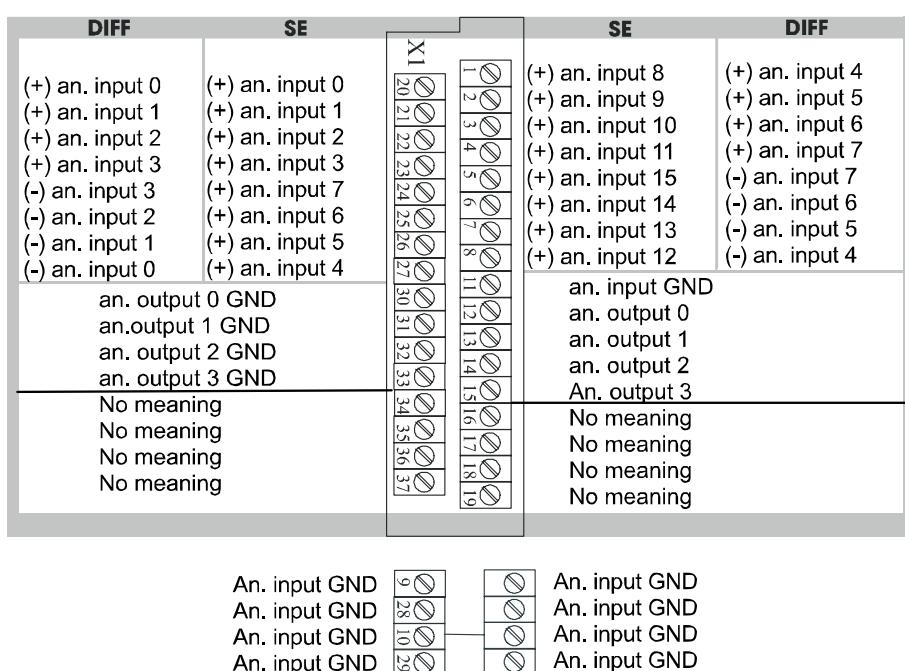
5.4.11 APCI-3016

Fig. 5-26: Terminal assignment APCI-3016



5.4.12 APCI-3106

Fig. 5-27: Terminal assignment APCI-3106



5.4.13 APCI-3116

Fig. 5-28: Terminal assignment APCI-3116

DIFF	SE	SE	DIFF
(+) an. input 0	(+) an. input 0	(+) an. input 8	(+) an. input 4
(+) an. input 1	(+) an. input 1	(+) an. input 9	(+) an. input 5
(+) an. input 2	(+) an. input 2	(+) an. input 10	(+) an. input 6
(+) an. input 3	(+) an. input 3	(+) an. input 11	(+) an. input 7
(-) an. input 3	(+) an. input 7	(+) an. input 15	(-) an. input 7
(-) an. input 2	(+) an. input 6	(+) an. input 14	(-) an. input 6
(-) an. input 1	(+) an. input 5	(+) an. input 13	(-) an. input 5
(-) an. input 0	(+) an. input 4	(+) an. input 12	(-) an. input 4
an. output 0 GND		an. input GND	
an. output 1 GND		an. output 0	
an. output 2 GND		an. output 1	
an. output 3 GND		an. output 2	
No meaning		No meaning	
No meaning		No meaning	
No meaning		No meaning	
No meaning		No meaning	

An. input GND An. input GND An. input GND An. input GND

5.4.14 APCI-3500

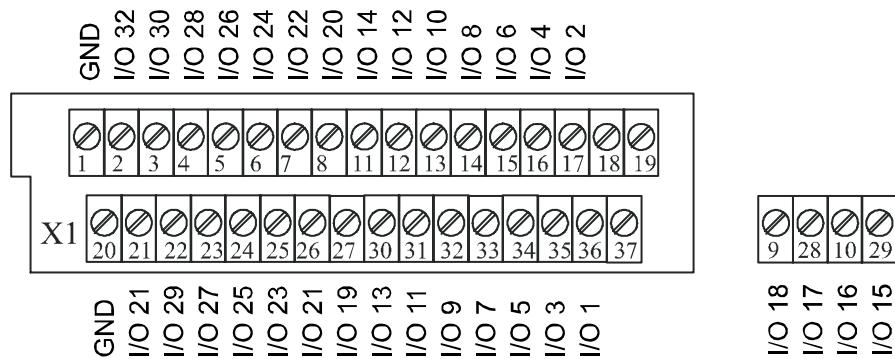
Fig. 5-29: Terminal assignment APCI-3500

X1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	an. output 0 an. output 1 an. output 2 an. output 3	No meaning No meaning No meaning No meaning
	20 21 22 23 24 25 26 27 30 31 32 33 34 35 36 37	an. output 0 GND an. output 1 GND an. output 2 GND an. output 3 GND	No meaning No meaning No meaning No meaning
			No meaning
			No meaning
			No meaning

5.5 Connection to the PX 901-ZG

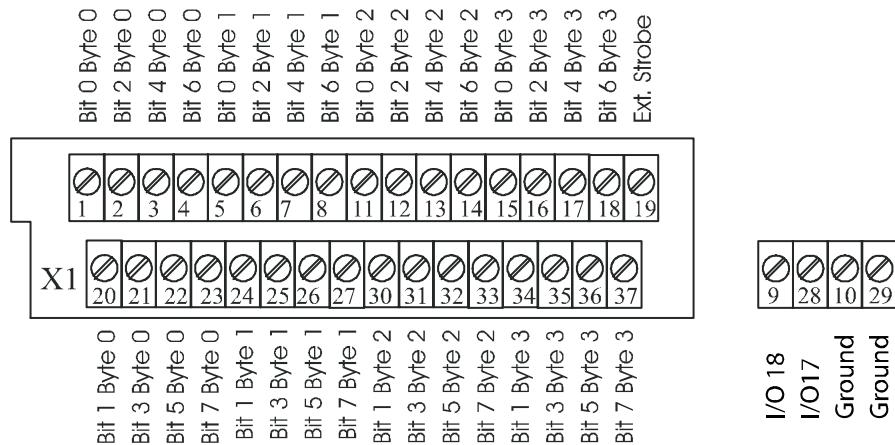
5.5.1 PA 1610

Fig. 5-30: Terminal assignment PA 1610



5.5.2 PA 160

Fig. 5-31: Terminal assignment PA 160



5.5.3 PA 1700-2

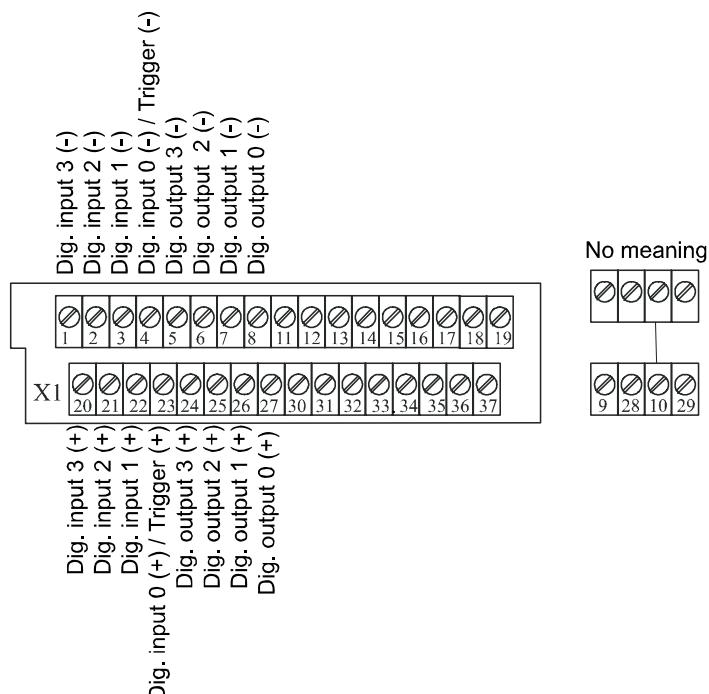
Fig. 5-32: Terminal assignment PA 1700-2

Pegel	Signal	Signal	Pegel
Diff./TTL	+ 5V vom PC	X1	GND
	- AS3	1	- AS1
Diff./TTL	+ AS3	2	+ AS1
TTL	Ref3	3	+ AS2
Diff./TTL	- Index3	4	- AS2
TTL	Ref2	5	+ Index3
TTL	Ext. strobe 3/2	6	Ref1
Diff./TTL	- Index1	7	Ext. strobe 3/1
Diff./TTL	- B3	8	+ A3
TTL	Ext. strobe 2/2	9	+ B3
TTL	Ext. strobe1/2	10	Ext. strobe 2/1
Diff./TTL	- A2	11	Ext. strobe 1/1
Diff./TTL	- B2	12	+ A2
Diff./TTL	- A1	13	+ B2
Diff./TTL	- B1	14	+ A1
TTL	Timer2 out	15	+ B1
		16	GND
		17	
		18	
		19	
		20	
		21	
		22	
		23	
		24	
		25	
		26	
		27	
		28	
		29	
		30	
		31	
		32	
		33	
		34	
		35	
		36	
		37	

(Diff./TTL) + Index1
(Diff./TTL) - Index2
(Diff./TTL) + Index2
(Diff./TTL) - A3

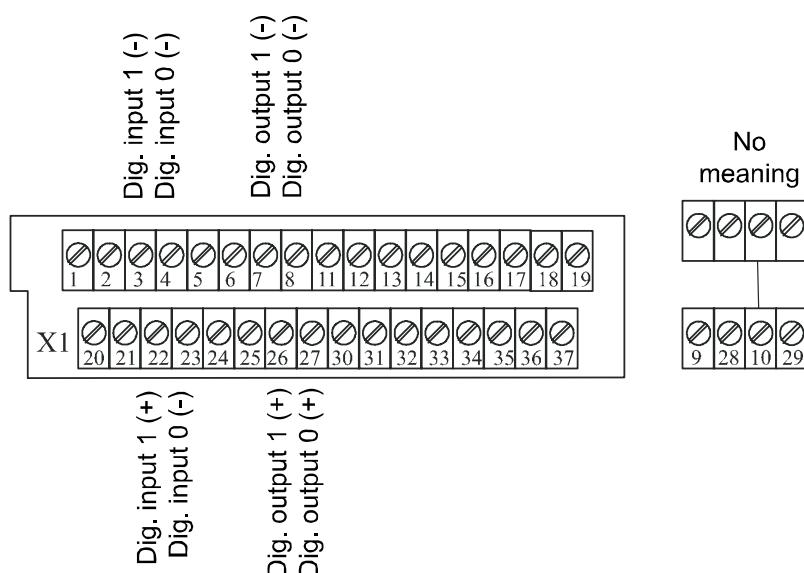
5.5.4 APCI-3001, APCI-3120 (for digital I/O)

Fig. 5-33: Terminal assignment APCI-3001 and APCI-3120



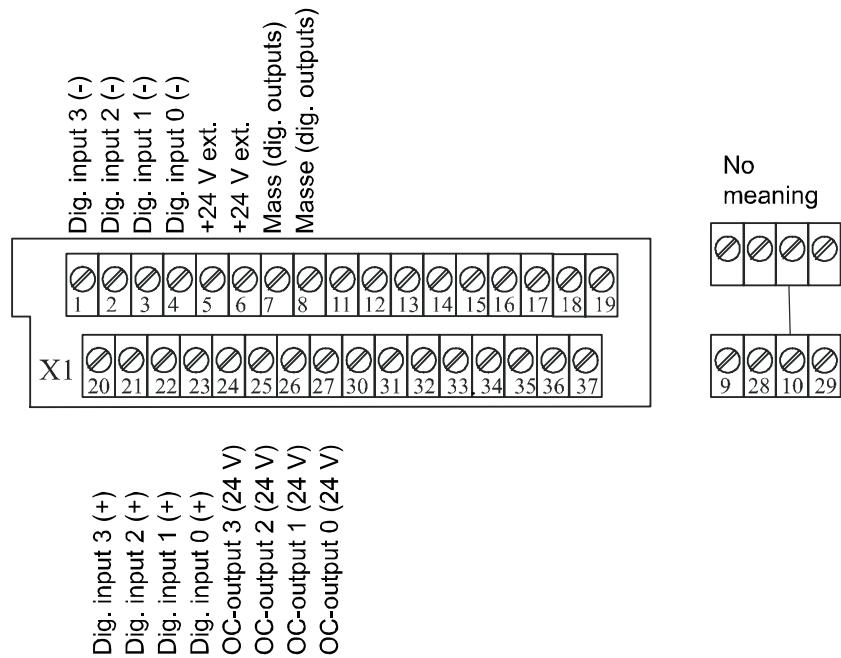
5.5.5 APCI-3501

Fig. 5-34: Terminal assignment APCI-3501



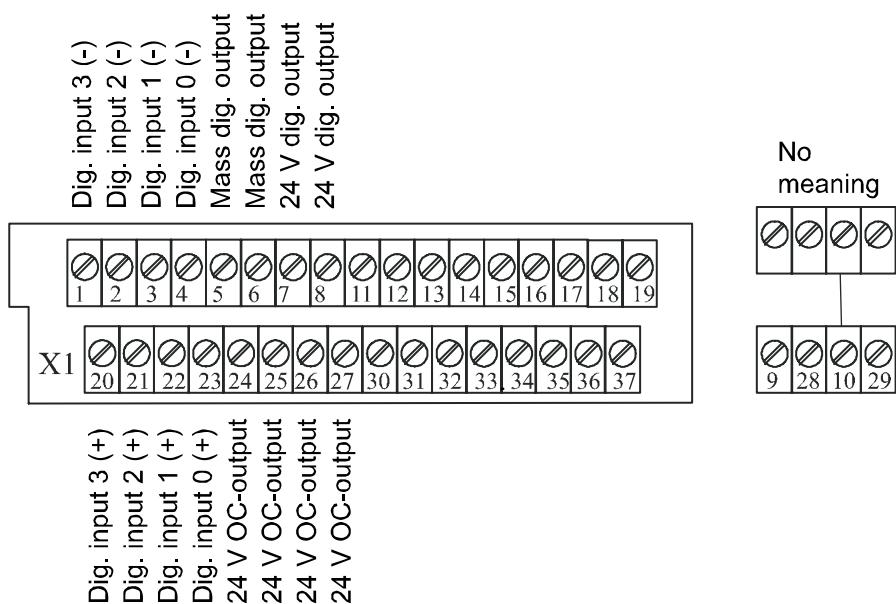
5.5.6 APCI-3002 (for digital I/O)

Fig. 5-35: Terminal assignment APCI-3002



5.5.7 APCI-3003 (for digital I/O)

Fig. 5-36: Terminal assignment APCI-3003



6 CONNECTION EXAMPLES

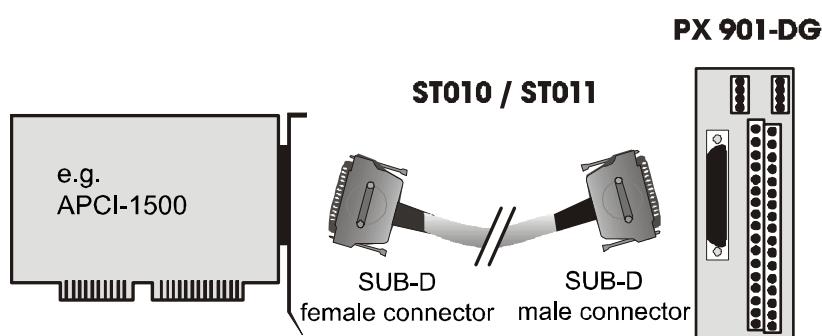
6.1 Connection to the PX 901-DG

6.1.1 Direct connection

Table 6-1: Boards connectable to the PX 901-DG

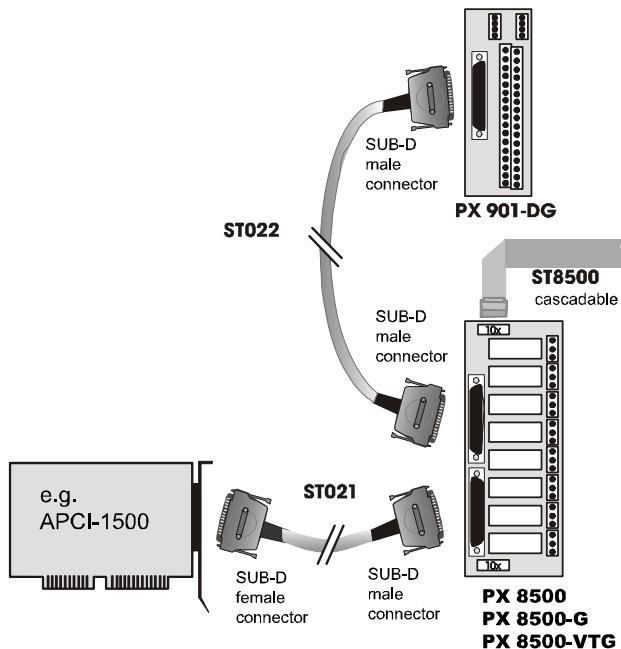
APCI-1016
APCI-1032
APCI-1032
APCI-1500
APCI-1516
APCI-1564
APCI-2016
APCI-2032
APCI-3003
CPCI-1500
PA 100
PA 1000
PA 110
PA 150
PA 1500
PA 200
PA 2000
PA 216

Fig. 6-1: Direct connection



6.1.2 Connection to the PX 901-DG through PX 8500

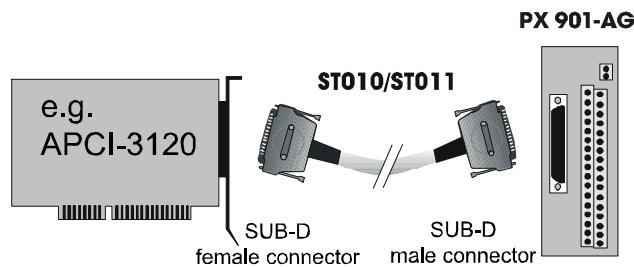
Fig. 6-2: Connection example: PX 901-DG through the relay board PX 8500



6.1.3 Connection to the PX 901-AG

Table 6-2: Boards connectable to the PX 901-AG

APCI-3000
APCI-3001, CPCI-3001
APCI-3001
APCI-3002
APCI-3003
APCI-3006
APCI-3010
APCI-3016
APCI-3100
APCI-3106
APCI-3110
APCI-3116
APCI-3120, CPCI-3120
APCI-3500
APCI-3501
PA 3000
PA 302
PA 3100, PA 311, PA 3110
PA 350
PA 3500
PA 358

Fig. 6-3: Connection example: PX 901-AG

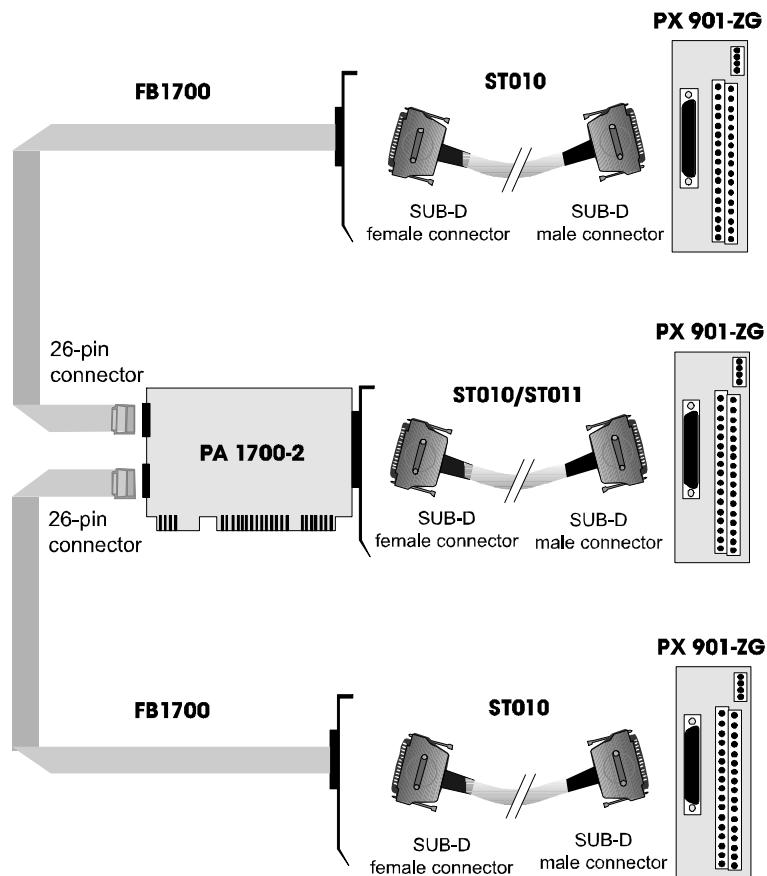
6.2 Connection to the PX 901-ZG

Table 6-3: Boards connectable to the PX 901-ZG

Board	Remark
APCI-3001	For the connection of the dig. I/O
APCI-3110	For the connection of the dig. I/O
APCI-3501	For the connection of the dig. I/O
PA 160	For the connection of the TTL signals
PA 1610	For the connection of the TTL signals
PA 1700-2	For the connection of the counter signals
PA 3500	For the connection of the dig. I/O
PA 355	For the connection of the analogue outputs

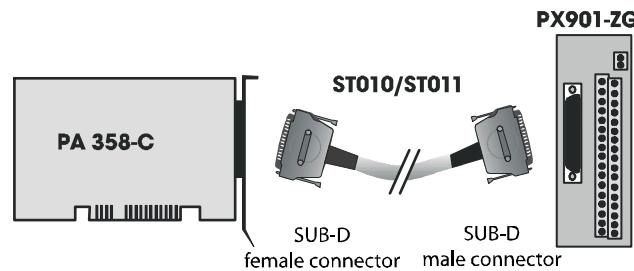
6.2.1 Connection of the counter board PA 1700-2

Fig. 6-4: PX 901-ZG with counter board PA 1700-2



6.2.2 Connection of the board PA358-C for the current outputs

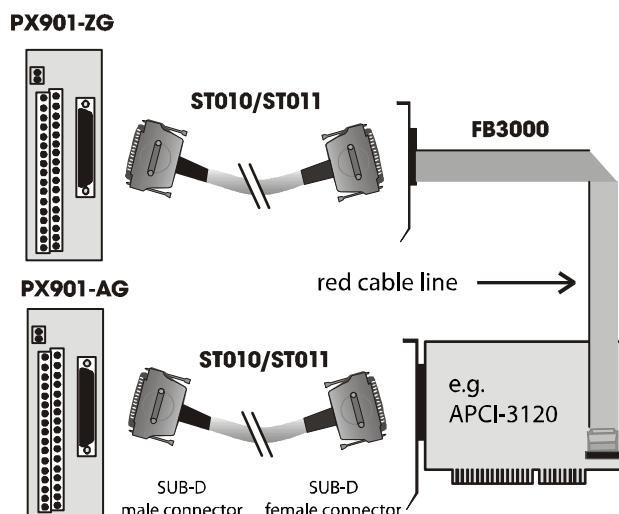
Fig. 6-5: Connection example: PX 901-ZG with PA358-C



6.3 Combined connections

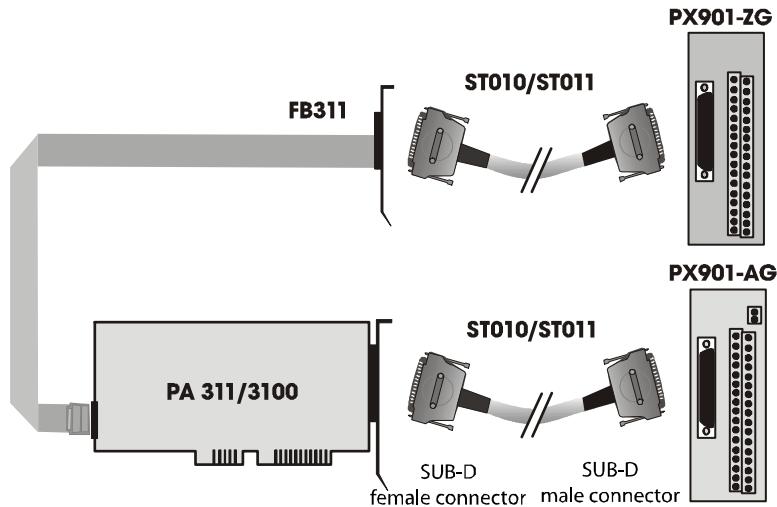
6.3.1 APCI-3120, CPCI-3120, APCI-3001, CPCI-3001, PA 3000

Fig. 6-6: Combined connection example 1: PX901-ZG and PX901-AG



6.3.2 Connection of the PA 311 / PA 3100

Fig. 6-7: Combined connection example 2: PX901-ZG and PX901-AG



6.3.3 Connection of a PA 3500 (current version)

Fig. 6-8: Connection example: PA 3500 (current version)

