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ADDI-DATA®

ADDI-DATA GmbH
Dieselstraße 3
D-77833 OTTERSWEIER

Technical support:
+49 (0)7223 / 9493 – 0

CE

Technical description

ADDIVARIOUS PX 8500

Relay output board

5th edition 11/2002

Guarantee and responsibility

Basically are effective our "general terms of delivery and payment". The manager receives them at the latest with the invoice. Claims for guarantee and responsibility in case of injuries and material damages are excluded, if they are due to one or some of the following causes:

- if the board has not been used for the intended purpose
- improper installation, operation and maintenance of the board
- if the board has been operated with defective safety devices or with not appropriate or non-functioning safety equipment
- non-observance of the instructions concerning: transport, storage, inserting the board, use, limit values, maintenance, device drivers
- altering the board at the user's own initiative
- altering the source files at the user's own initiative
- not checking properly the parts which are subject to wear
- disasters caused by the intrusion of foreign bodies and by influence beyond the user's control.

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- copying the software is forbidden (except for archiving/ saving data and for replacing defective data carriers).
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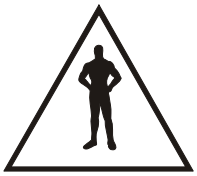
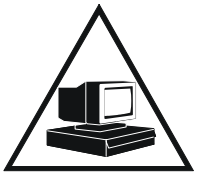
The original version of this manual is in German. You can obtain it on request.

WARNING

In case of wrong uses and if the board is not used for the purpose it is intended:



- **people may be injured,**



- **the board, PC and peripheral may be destroyed,**

- **the environment may be polluted**

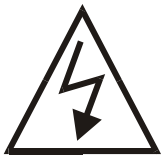
- **Protect yourself, the others and the environment!**
- **Read carefully the safety precautions (yellow leaflet).**

  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:**



WARNING! Shock hazard.
Designates a very dangerous situation. If the instructions are not respected, persons can be severely wounded.

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.

Figures

Tables

1 INTENDED PURPOSE OF THE BOARD

The relay board **PX 8500** is the switching component for load current circuits. It is to be used in a closed metallic housing. Digital 24 V output boards are necessary for the PC-controlled excitation of the relays.

The boards APCI-2032, APCI-2016, PA 2000, PA 200, APCI-1564, APCI-1516, APCI-/CPCI-1500, PA 1500 and PA 150 are suitable for this purpose.

These boards require an external 24 V voltage supply. When connected to the corresponding terminals of the relay board **PX 8500**, the green LED lights up.

The following table indicates the necessary connections:

Table 1-1: Connections

Current circuit	Connection to
Load current circuit (220 V mains)	Motor
Voltage supply of the output boards	24 V mains unit
24V excitation circuit	PC + APCI-2032 / APCI-2016 / PA 2000 / PA 200 or PC + APCI-1564 / APCI-1500 / CPCI-1500 / APCI-1516 / PA 1500 / PA 150

The relay board is to be used only if all aspects relevant to security are respected and for its intended purpose, together **with accessories recommended by us**. Data exchange between the board PX 8500 and the ADDI-DATA boards mentioned above is to occur through a shielded cable which has to be connected to the 37-pin SUB-D female connector of the relay output board PX 8500.

The connection with our standard cables ST010 and ST022 complies with the specifications:
- metallized plastic hoods
- shielded cable
- cable shield folded back and firmly screwed to the connector housing

The use of the board according to its intended purpose includes observing all advises given in this manual and in the safety leaflet.

The relays are not to be used for securing emergency stop functions.

Uses beyond these specifications are not allowed. The manufacturer is not liable for any damages which would result from the non-observance of this clause.

Make sure that the board remains in its protective blister pack until it is used. Do not remove or alter the identification numbers of the board.
If you do, the guarantee expires.

2 USER

2.1 Qualification

Only persons trained in electronics are entitled to perform the following works:
- installation
- use,
- maintenance.

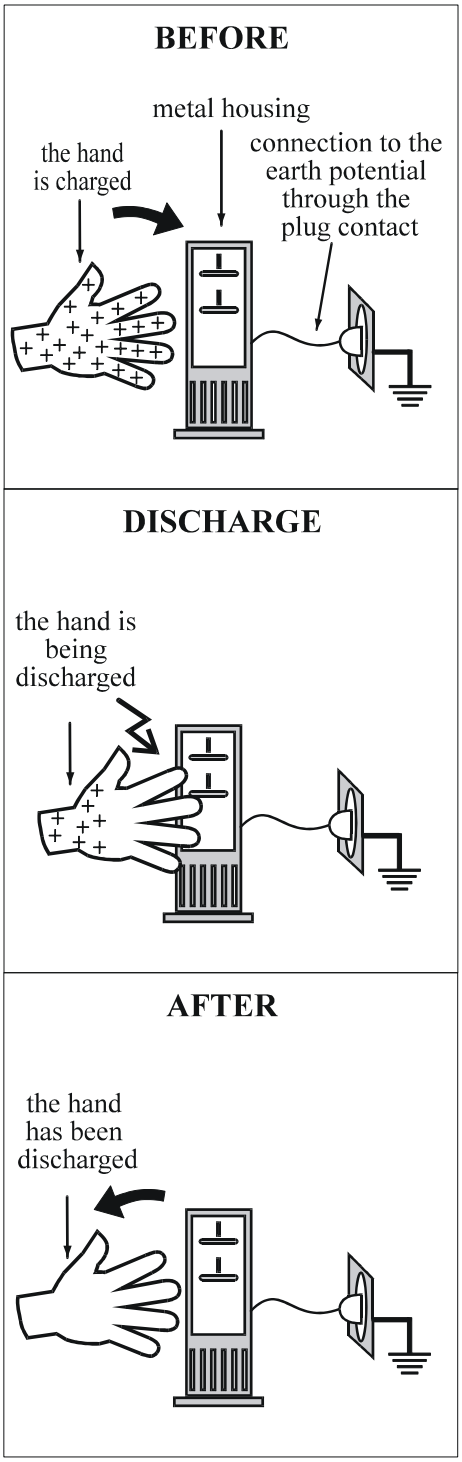
2.2 Personal protection

Consider the country-specific regulations about:
- the prevention of accidents
- electrical and mechanical installations
- radio interference suppression.

3 HANDLING OF THE BOARD

- **Discharge yourself** before touching the board.
- **Please consider the instructions in the following figure as well as in the delivered "safety precautions".**

Fig. 3-1: Electric discharge



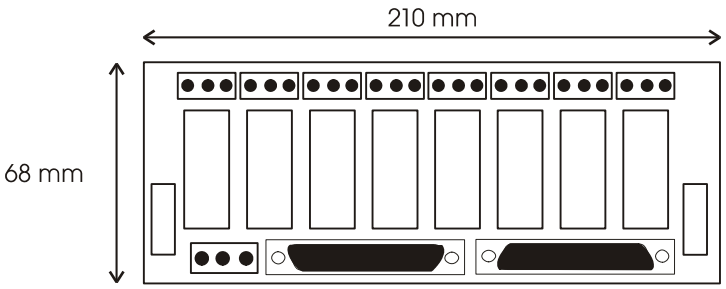
- **Seize the board** on its edge or by the housing.

4 TECHNICAL DATA

4.1 Physical set-up of the board

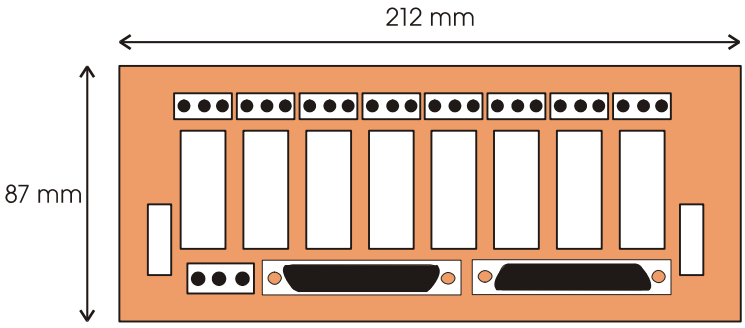
The board is assembled on a 2-layer printed circuit card.

Dimensions without housing:



Height: ..... 42 mm

Dimensions with housing:



Height: ..... 72 mm

Weight: .....approx. 390 g

4.2 Versions

The relay board is available in the following versions:

PX 8500-Vt: ..... with varistors
PX 8500-G: ..... with housing for mounting on a standard rail (DIN)
PX 8500-VtG: ..... with varistors and housing

4.3 Limit values

Max. altitude: ..... 2000 m
Operating temperature: ..... 0 to 60°C
Storage temperature: ..... -25 to 70°C
Relative humidity: ..... 30% to 99% non condensing

Relay data:
Contacts: ..... 8 change-over contacts
max. switching voltage: ..... 30 VDC/ 277 VAC
max. switching current: ..... 10 A
max. switching capacity: ..... 300 W - 2500 VA

Contact resistance: ..... <100 m Ω
Contact material: ..... Ag-alloy
Contact force, work/rest side: ..... 15/15 cN
Responding time: ..... 15 ms
Release time: 5ms
Mechanical life: ..... 5 x 10^6 operations
Operating life at max.
switching capacity:..... 10^5 operations

Control data:
Switching behaviour: ..... monostable
Operating voltage: ..... 24 V
Operating efficiency: ..... 533 mW
Switch frequency at max. load: ..... 20 switching / min.

Coil data:
Nominal voltage: ..... 24 VDC
Threshold voltage at +20°C: ..... 16.8 V
Release voltage at +20°C: ..... 2.4 V
Max. operation voltage at 60°C: ..... 31.2 V
Resistance at 20°C: ..... 1.1 kΩ

Terminals
Diameter of the connecting line
to the relay: ..... 0.75-2.5 mm^2
Nominal torque: ..... 0.5 Nm

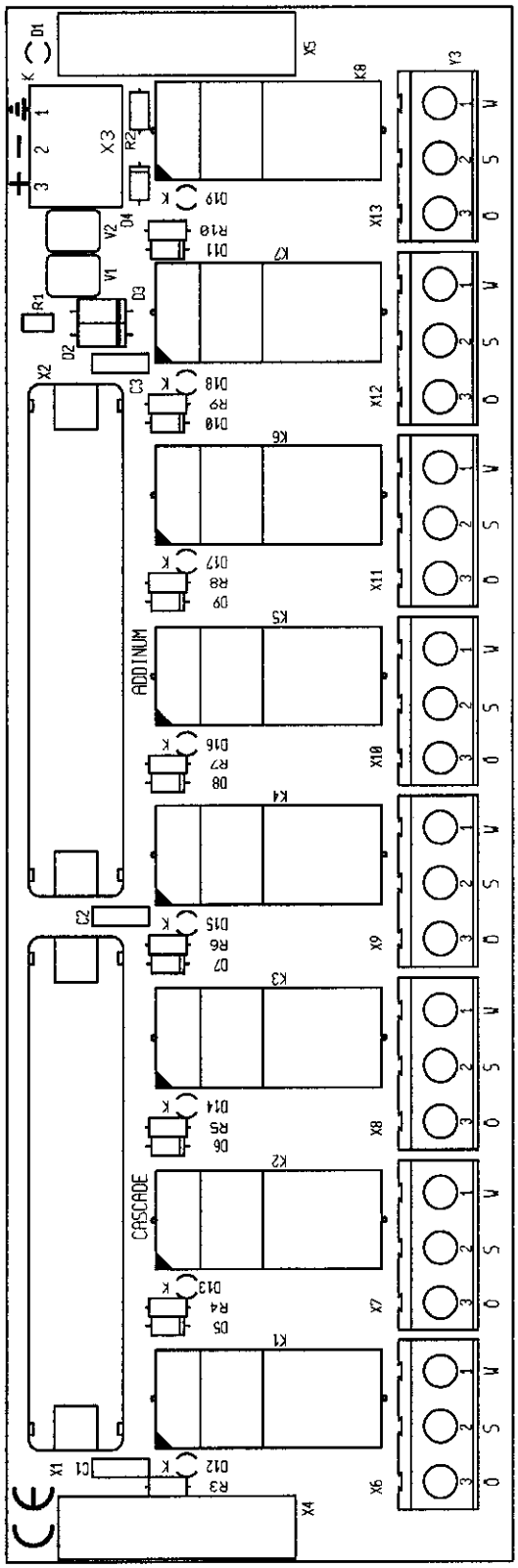
Nominal voltage of the creeping distance
Nominal insulating voltage according to VDE0411-100
between coil and contacts and between
the contacts: ..... 1000 V

Insulating class according to VDE 0110b/2.79
- between change-over contacts and opening contacts
  of adjoining relays: ..... Gr. C / 380 VAC / 450 VDC
- between change-over contacts,
  closer and opening contacts: ..... Gr. C / 250 VAC / 300 VDC

Conductor geometry
Copper overlay: ..... 70 µm
strip-conductor breadth on the load side: ... 3.5 mm

4.4 Component scheme

Fig. 4-1: Component scheme



5 INSTALLATION

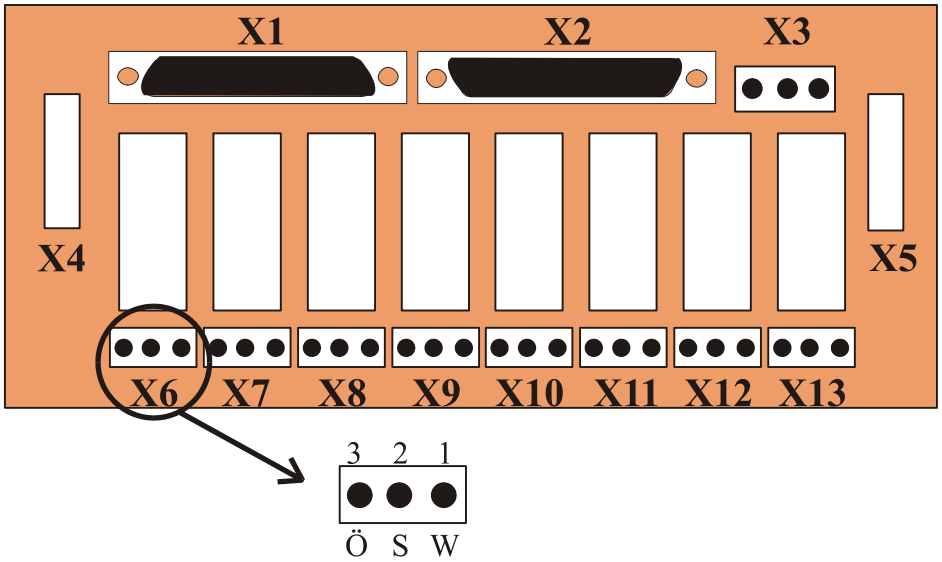
WARNING! SHOCK HAZARD
The relay board uses dangerous voltage levels.
A wrong use can cause mortal injury.

- **Switch out the mains supply.**
- **Pull the mains plug.**
- **Disconnect all cables to external devices.**

5.1 Connecting the peripheral

5.1.1 Layout

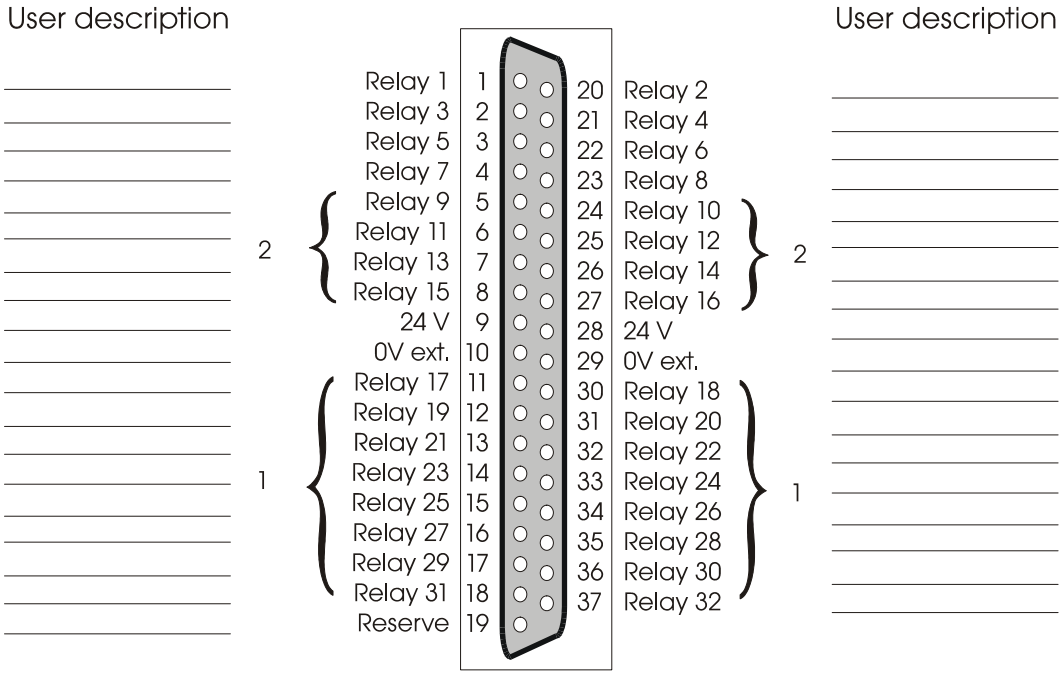
Fig. 5-1: Connector location on the PX 8500



X1:	37-pin SUB-D female connector, connection of the excitation circuits
X2	37-pin SUB-D female connector, cascade to the screw terminal board
X5:	10-pin. male connector for ribbon cable ST8500 for cascading to the next relay board PX 8500
X6 to X13:	Connections to the load current circuits

5.1.2 Connection of the excitation circuits

Fig. 5-2: 37-pin SUB-D female connector X1



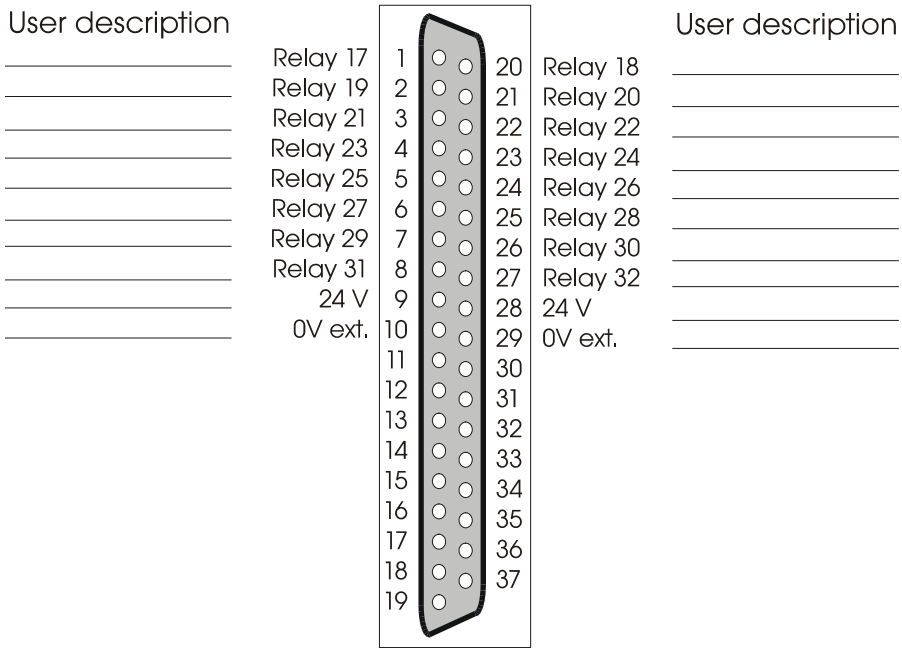
1: Excitation circuit, connection through ST022
2: Cascade through ST8500 to the next PX 8500, See 5.4 Connection examples.

IMPORTANT!
Cascade through the ST8500 can only be completed **from connector X5** of the board **to the connector X4** of the next board (See Component scheme).

The relays 1 to 8 are connected onboard to the load current circuits K1 to K8.

5.1.3 Cascade of the relay boards

Fig. 5-3: 37-pin SUB-D female connector X2

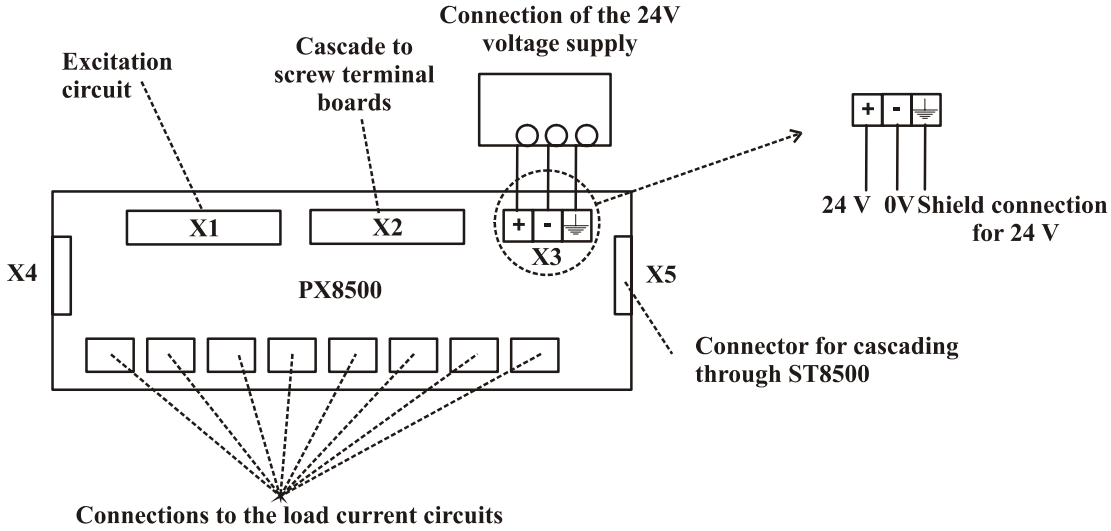


5.1.4 Connection of the voltage supply

- **Connect the excitation circuits and the 24V supply voltage.**

	Recommended accessories	Recommended tools	Remarks
Excitation circuit to APCI-/PA 2xxx	ST010/ST011	Screwdriver	Screw the cable tightly on both ends See Fig. 5-2
to xPCI-/ PA 15xx	ST021		
24 V voltage supply	AWG 18-14 wire terminal clip	Screwdriver or electric screwdriver Type DMS2 level 2	Strip wire on 7 mm. Squeeze the wire terminal clip, lead it in the clamp and screw tight. See Fig. 5-4.

Fig. 5-4: Connection of the 24 V voltage supply



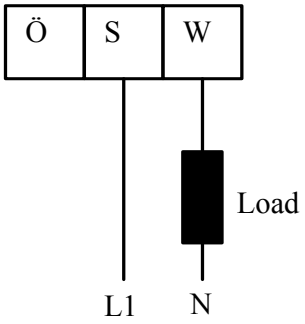
- **Switch on the 24 V supply voltage and the PC.**
- **Check before connecting the load current circuits that the green LED lights up** (the relay board is ready for operation)**.**
- **Run the control program. In DEBUG mode, you can control whether the red LED's go on and out at the right moment.**
- **Switch out the mains supply and pull the mains plug of the PC and of the 24 V supply voltage.**

WARNING: Shock hazard!
Never connect the load current circuits before having disconnected the mains supply.

- **Make sure that the 220 V mains supply is disconnected and that no dangerous voltage is led on the lines.**
- **Connect the load current circuits.**

	Recommended accessories	Recommended tools	Remarks
24 V voltage supply	AWG 18-14 wire terminal clip	Screwdriver or electric screwdriver Type DMS2 level 2	Strip wire on 7 mm. Squeeze the wire terminal clip, lead it in the clamp and screw tight. See Fig. 5-4.

Fig. 5-5: Connection of the load current circuits (example)



Is the relay excited, then the phase L1 is connected to the load through the closing contact.

Without excitation the load circuit is closed through the opening contact. The load is separated from the mains supply.

WARNING!
Overloading the relays by connecting ohmic, inductive or capacitive loads without protection circuitry can damage a relay or cause a premature wear-out.

- **Provide a protection circuitry on the load.**

5.2 Checking the connections

See Fig. 5-4: Connection of the 24 V voltage supply

- **Check whether all conducting lines are tightly screwed to the terminal.**
- **Check which contact circuits are closed in rest and in excitation state.**
- **All conducting lines must be protected through safety circuitries against the results of possible short-circuits.**

WARNING!
Fire hazard in case of short-circuit on the load circuits.

The protection circuitries must be able to interrupt the short-circuit current before the line has reached a dangerous temperature.
Example: PVC insulated lines with a permissible operating temperature of 70°C can only warm up from 70 to 160°C (during max. 5 s) due to the short-circuit current.

- **Use the intended connection lines for the load current circuits (AWG14 at max. load).**

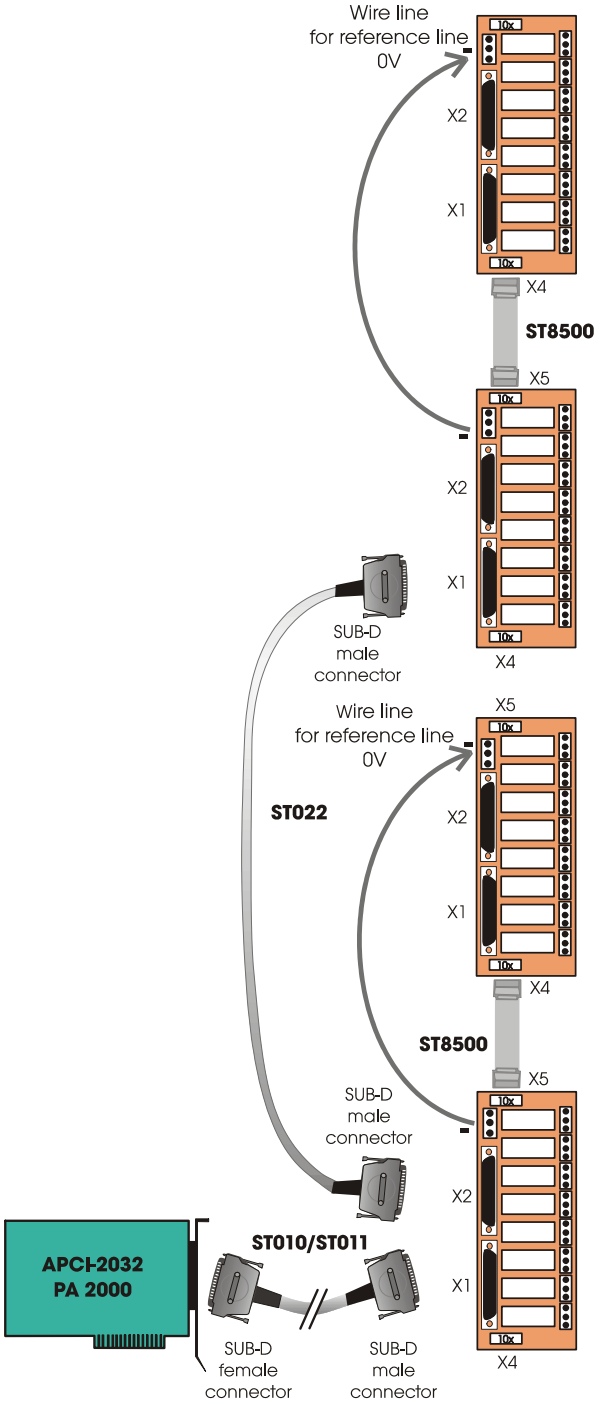
5.3 Mounting the relay output board

- **Snap up the relay board on the supporting rail and close the housing.**
- **Switch on the 24 V voltage supply and the PC.**
- **Check whether all connected units are ready for operation.**
- **Start your control program.**

5.4 Connection examples

5.4.1 Digital output boards APCI-/PA 20xx

Fig. 5-6: Connection of the digital output boards (Maximum configuration)



IMPORTANT!
Cascade through the ST8500 can only be completed **from connector X5** of the board **to the connector X4** of the next board (See Component scheme).

5.4.2 Digital input and outputs (xPCI-/PA 15xx)

Fig. 5-7: Connection of the APCI-1516 (8 inputs and 8 outputs)

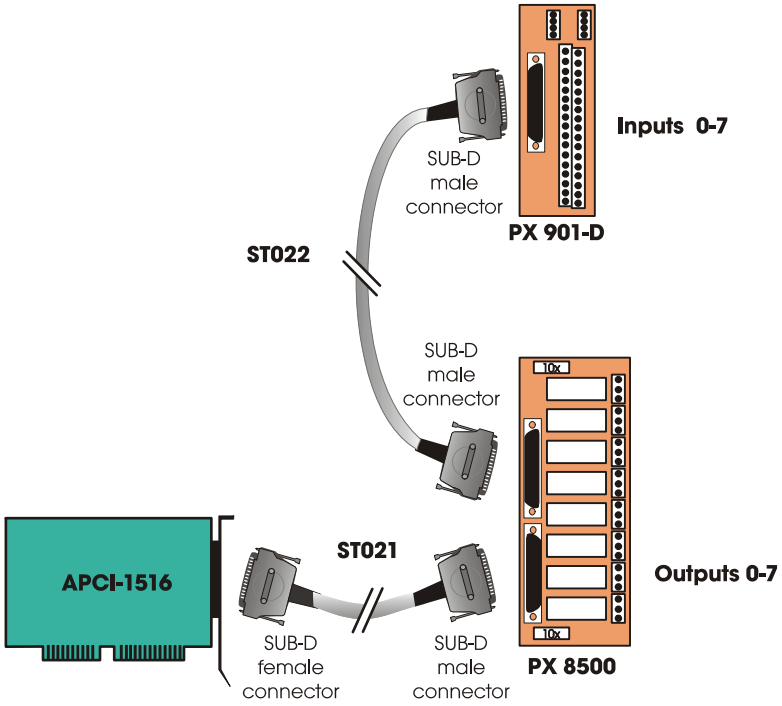


Fig. 5-8: Connection of the digital input and output board xPCI-/PA 1500 (16 inputs, 16 outputs)

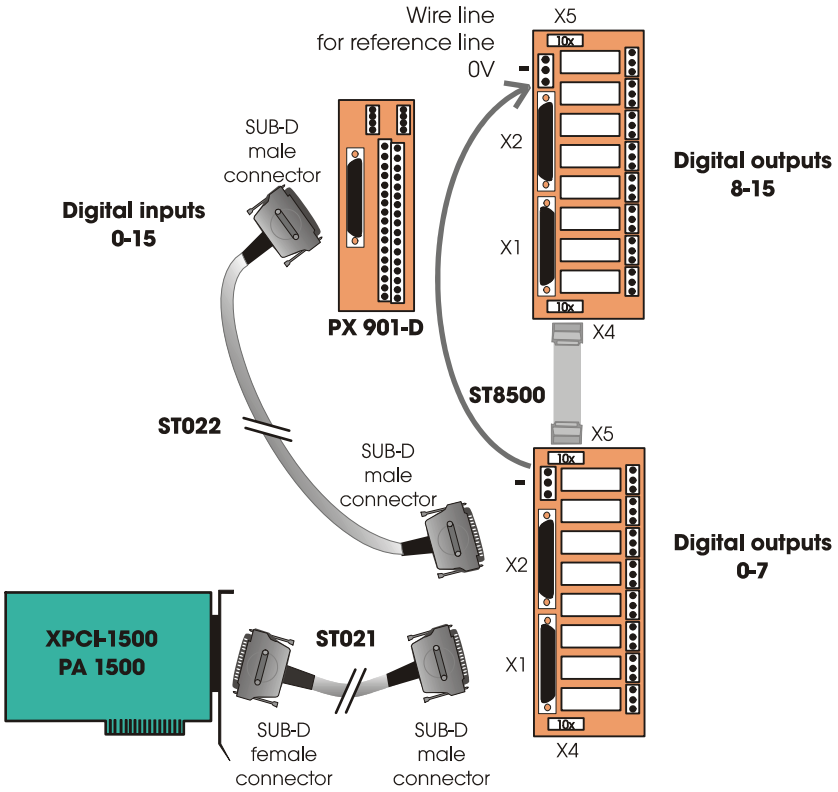
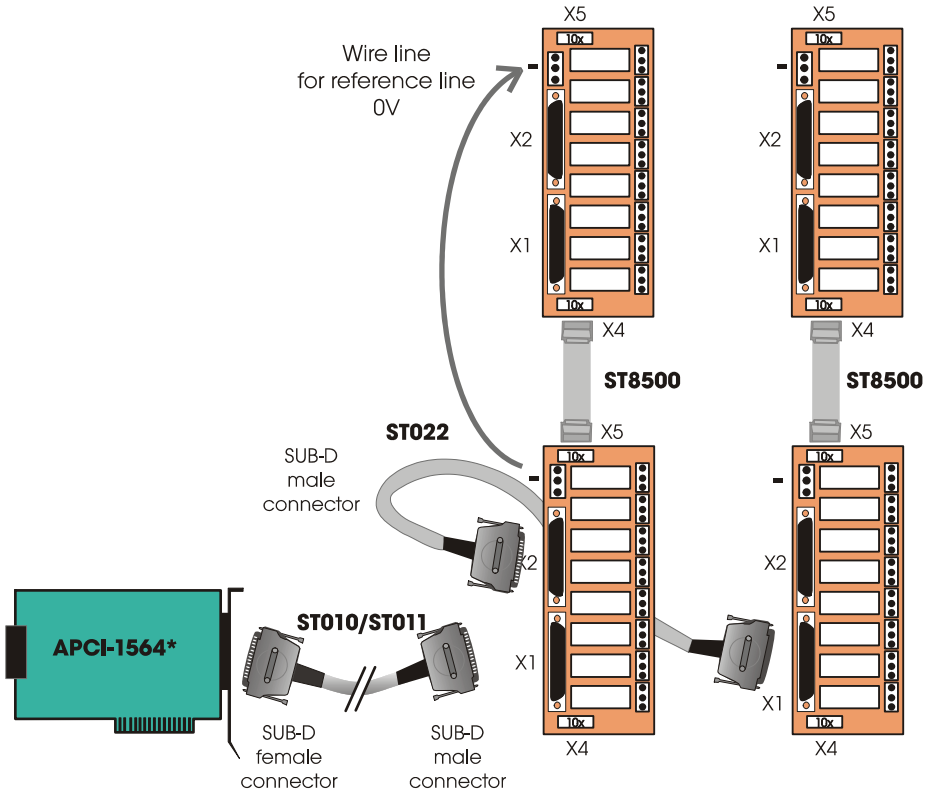


Fig. 5-9: Connection of the digital I/O board APCI-1564 (Maximum configuration)



*: the digital inputs are connected to the screw terminal board through a connector for ribbon cable.

6 MAINTENANCE

6.1 Removing the relay board

6.1.1 Switching off the application/system

- **First switch out the supply of the controlling unit (ex: PC).**
- **Disconnect the mains supply from the load and excitation current circuits.**
- **Switch out the 24V voltage supply.**
- **Open the switch cabinet first when you are sure that the energy supply is interrupted.**

6.1.2 Removing the connection lines

- **Remove the connection lines on both ends.**

If the board is to be replaced, you should immediately connect the lines again in order to avoid confusions.

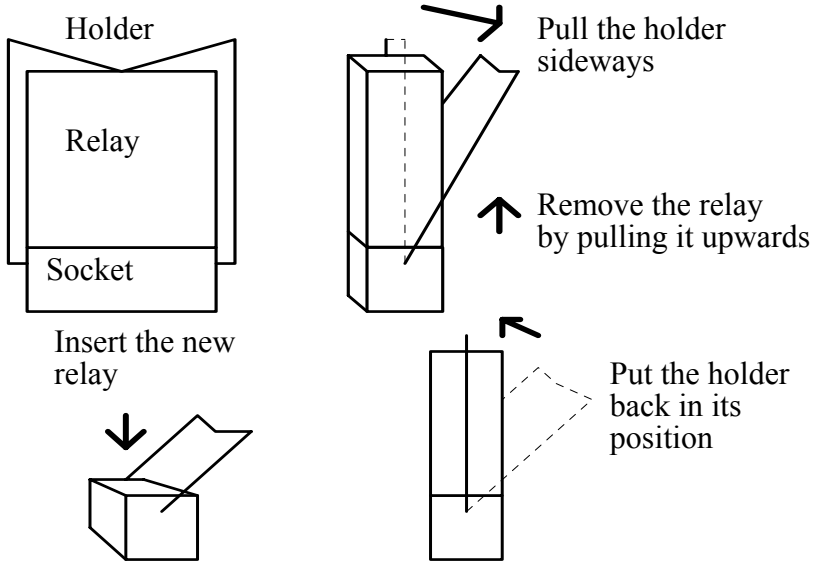
WARNING!
Connection lines which are disconnected on one end can cause short-circuits and shock hazard.

- **Remove** all disconnected lines.
- **Remove** the board from the supporting rail.

6.2 Replacing the relays

The relays must be replaced after 100,000 operations (at max. ohmic load and 20-30°C).

Fig. 6-1: Replacing the relays



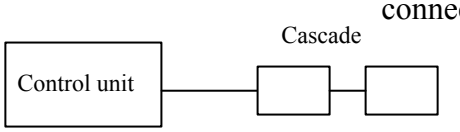
IMPORTANT!
The relay may only be replaced with one of the same type.
Type description: **JW 1FSN-24V**

7 GLOSSARY

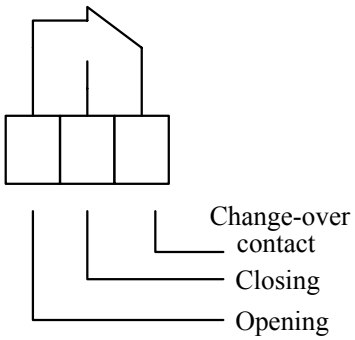
Ag Silver

AWG AWG18-14 corresponds to a line cross section of 0.75-2.5 mm^2

Cascade The relay boards PX 8500 can be cascaded. That means that the board allows to connect several boards to the control unit through a connecting cable



Change-over contact A combination of two contact circuits, which is composed of three contact members having one of both contact circuits in common. When one of these contact circuits is open, the other is closed.



Closing contact A current circuit which contact is closed when the relay is in work state. The contact opens in rest state.

Debug The debug mode allows running a control program step by step.

Excitation circuit Current circuit including the relay coil. (Excitation circuit = input circuit of the relay)

LED Light emitting diode

Load current circuit Current circuit including the load. By relays the load current circuit is connected to change-over and closing contact. (Load current circuit = output circuit of the relay)

Mechanical working life Working life of a relay when no load is connected.

Opening contact	An output circuit which contact is open when the relay is in work state. The contact closes in rest state.
Rest state	Switch position of the relay when no electric excitation is sent
Switching cycle	A switching cycle is the responding and releasing of the relay when an excitation is sent and then stopped.
Work state	Switch position of the excited relay