Service Electronics

Handling Boards

ESD protection

	CAUTION! - The boards can be destroyed by static discharge!
	➜ Before opening the printer, place it on a grounded surface.
	➜ Earth your body using an ESD bracelet or other suitable means, before touching a board. If no suitable ESD protection is available, touch an earthed object, e.g. a heating radiator, before touching a board.
	➜ Only place boards on earthed surfaces.

Handling

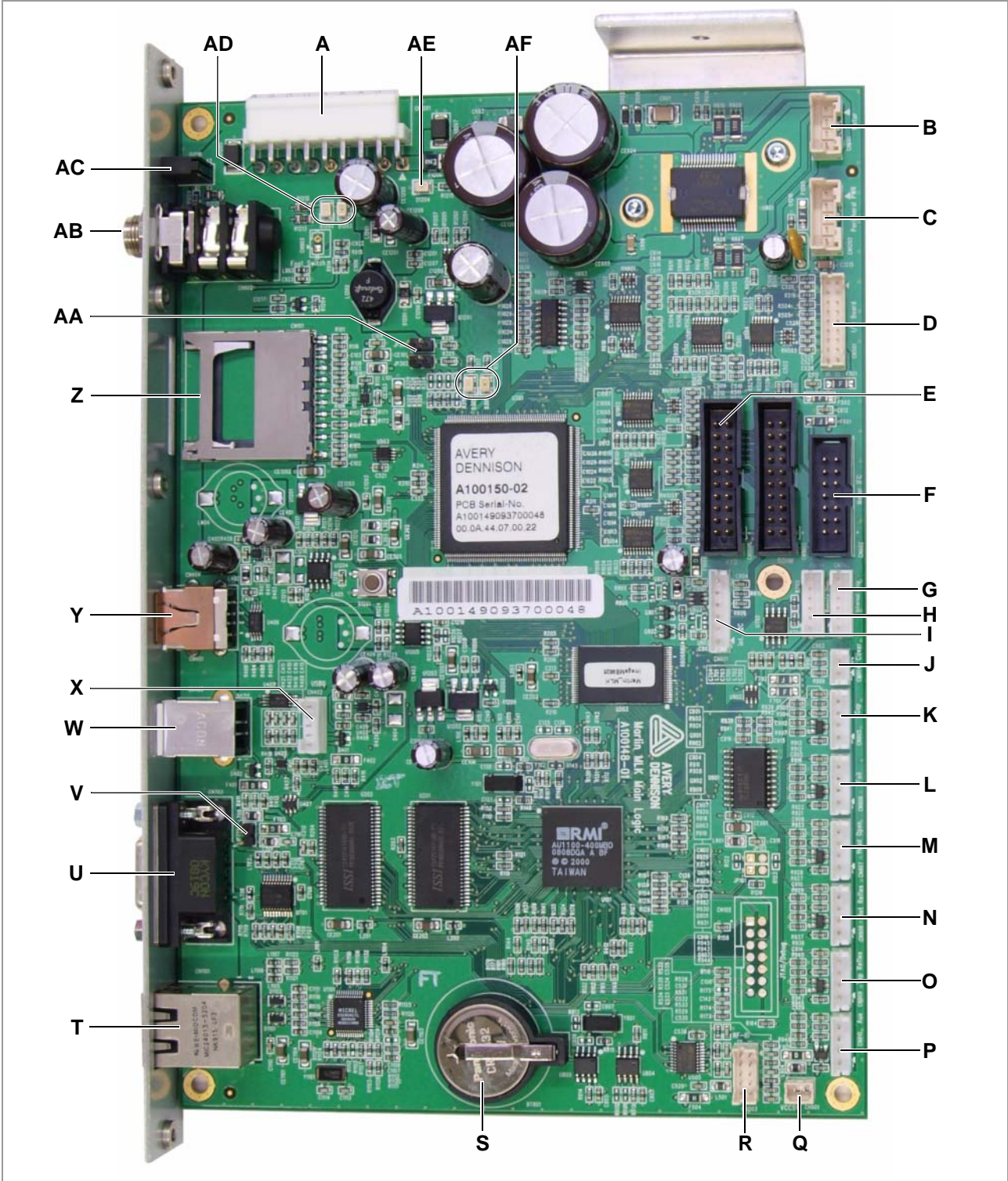|	CAUTION! - The conducting tracks on the boards are very thin. If a board is bent or warped, the conducting tracks can easily crack.
	➜ Avoid bending or warping boards.
	➜ Avoid the use of excessive force when removing or inserting boards.

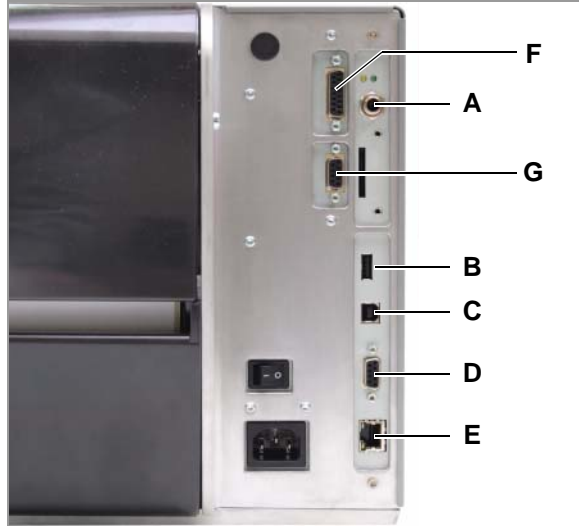# CPU board

Connections

[1]   CPU board connections (A100150).

- CNxxxx = Connector
- Dxxxx = LED
- JPxxx = Jumper

A CN1201: Power supply

B CN601: Feed motor

C CN1202: D-Sub harness, marking „POWER"

D CN501: I/O-board (option)

E CN1001: printhead

F CN602: Motor output stage board(s); Data line

G CN702: Operation panel

H CN701: External operation panel

I CN801: I^2C bus

J CN904: Not applied

K CN905: Label sensor (transmissive)

L CN906: Ribbon end sensor

M CN907: Locking lever sensor

N CN908: Label sensor (reflex bottom)

O CN909: Label sensor (reflex top)

P CN910: D-Sub harness, marking „AUX"

Q CN901: 5 V supply voltage

R CN503: RFID module (option)

S BT801: Battery for realtime-clock, see chapter Lithium Battery on page 7

T CN1101: Ethernet (10/100 Base T), see chapter Ethernet interface on page 6

U CN703: RS 232, see chapter Serial interface (RS 232) on page 6

V JP701: Jumper connects 5 V/170 mA supply voltage to pin 9 at the RS 232-connector

W CN403: USB (device)

X CN402: USB intern (host/device)

Y CN401: USB (host)

Z CN101: SD-card slot

AA JP301/302: Jumper set on JP301 = micromonitor; Jumper set on JP302 = Yamon

AB CN902: Foot switch, see Foot switch connector on page 5

AC D1210: Display supply voltage: yellow = 5 V, green = 45 V

AD D1202/1203: Display supply voltage: red = 3,3 V, green = 45 V

AE D1204: Display supply voltage: yellow = 5 V

AF D301/302: Display only for factory-internal use

Interfaces

Overview interfaces

[2]   External interfaces at the CPU board at AP 5.4/5.6.
    A Foot switch connector
    B USB host connector
    C USB device connector
    D Serial interface (RS 232)
    E Ethernet interface

➡ Interfaces [2F] and [2G] see chapter E/A-Platine 🗋 auf Seite 16.

Foot switch connector
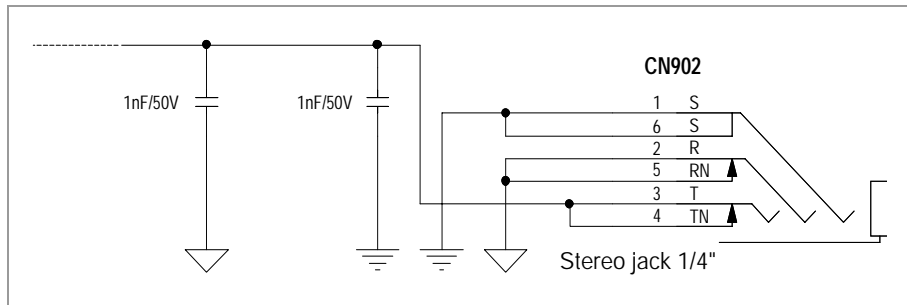
[3]   Connection diagram of the 1/4" 3-point jack for foot switch connection.

USB host connector

Pin	Signal
1	V_{CC}
2	Data-
3	Data+
4	GND

USB device connector
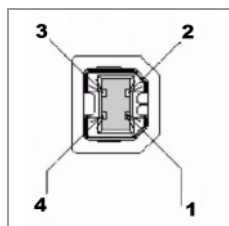
Pin	Signal
1	n. c.
2	Data-
3	Data+
4	GND

Suitable cable for PC connection: USB cable A/B (article number: A5799)

Serial interface (RS 232)
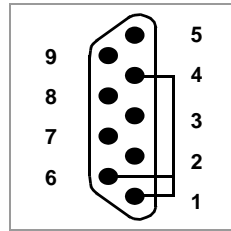
Pin	Signal
1	(CD)
2	RxD
3	TxD
4	(DTR)
5	GND
6	(DSR)
7	RTS
8	CTS
9	(RI)

Pin 9 supplies 5 V/170 mA, if JP701 is set.

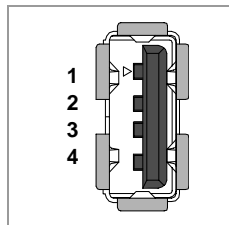Suitable cable for PC connection: D-Sub 9, 1:1, plug/jack (extension cable; article number: A1207)

Ethernet interface
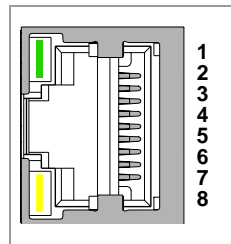
Pin	Signal
1	TD+
2	TD-
3	RD+
4	Termination
5	Termination
6	RD-
7	Termination
8	Termination

LED	Meaning
Green	*Lights:* high transmission rate (100 Mbit/s)
Yellow	*Lights:* printer is connected to network *Flashes:* network trafic

[Tab. 1]   Signal LEDs at Ethernet connector

Setting of the transmission rate by autonegotiation.

Sensor connections

Schematic diagram for connectors CN905 to CN909 on the CPU board:
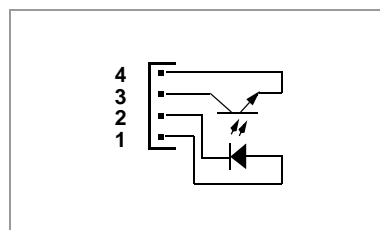
Pin	Belegung
1	Anode
2	Kathode
3	Kollektor
4	Emitter

Lithium Battery

| ⚠ | WARNING!

Danger of explosion if battery is incorrectly replaced.

➜ Replace only with the same or equivalent type recommended by the manufacturer.

➜ Take care of the correct polarity when replacing the battery.

➜ Discard used batteries according to the manufacturer´s instructions.

AVERTISSEMENT!

Il y a danger d´explosion s´il y a remplacement incorrect de la batterie.

➜ Remplacer uniquement avec une batterie du même type ou d´un type recommendé par le constructeur.

➜ Mettre au rébut les batteries conformément aux instructions du fabricant.

The CPU board used in the AP 5.4/5.6 is equipped with a realtime clock, which keeps its setting, if the printer is switched off. This is done by a lithium battery on the board.

➠ The battery is *not rechargeable*!

➠ The battery must be UL-listed!

Battery type   Panasonic CR2032 or an equivalent battery type.

Specifications

Characteristic	Value
Nominal voltage	3 V
Nominal capacity	220 mAh
Continous standard load	0.2 A
Operating temperature	-30 bis +60 °C
Max. abnormal charging current	5.0 mA
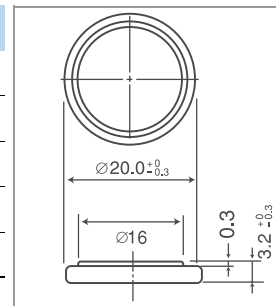
[Tab. 2]   Battery type CR2032 - specifications and dimensions.

Battery replacement

1. Switch off the printer. Disconnect the power cord.

2. Take off the rear hood.

   ➠ Prior to installation of the new battery: wipe the battery and the equipement terminal clean using a dry cloth.

   ➠ Ensure, that dust and other foreign substances will not cause shorting between the poles.

   ➠ When handling batteries, wear finger covers or gloves made of rubber, cotton, etc. to protect the battery from dirt.

3. Take used battery out of the socket; insert the new battery.

   ➠ Take care of the correct polarity [4]!
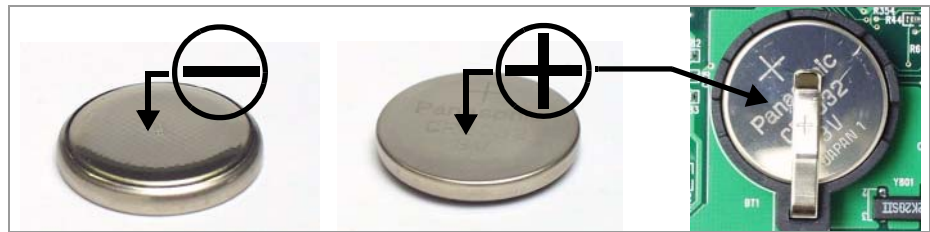
[4]   Correct battery polarity.

4. Reassemble the rear hood.

5. Reconnect the printer to the mains and switch it on.

6. Set time and date (SYSTEM PARAMETER > Realtime clock).

Output stage board for stepper motor

Connections, settings
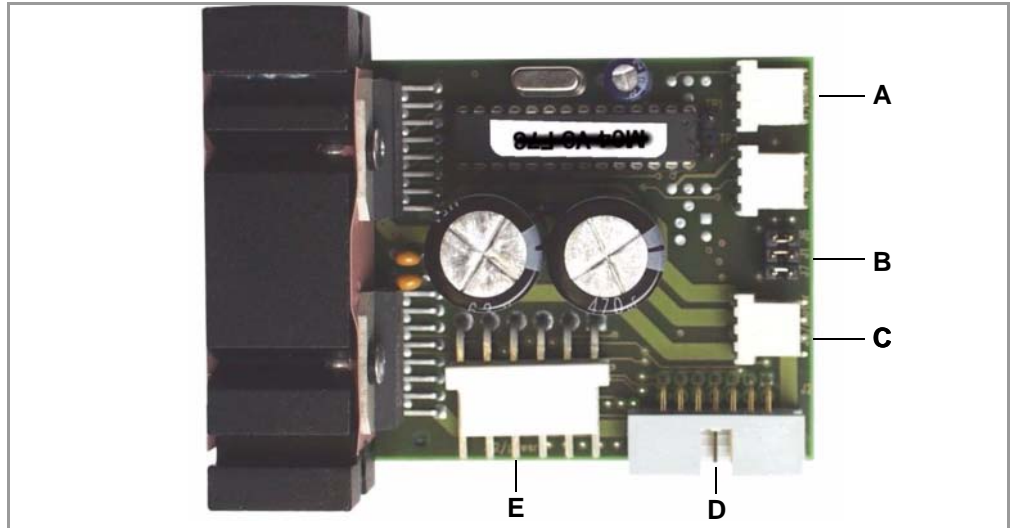
[5]　Connections at the output stage board (A2742)

A Connection for D-Sub-harness, sensor of the peripheral device (cable marking „SENSOR 1" (J4)

A
K (GND)
C
E (GND)
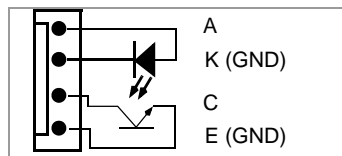
[6]　Connection diagram sensor.

B Jumper J6/J1/J7. Caution! - Fig. [5] doesn´t show the correct jumper setting.

J6
J1
J7
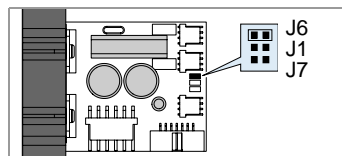
[7]　Jumper J6 geschlossen.

C Connection for D-Sub-harness, motor of the peripheral device (cable marking „MOTOR" (J3)

A
A\
B
B\
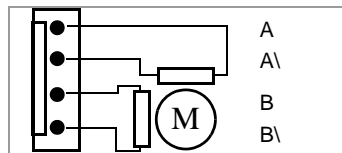
[8]　Connection diagram motor.

D Connection CPU board (J2)

E Connection power supply (J12)

Output stage board for brushless motor

Notes

- BLDC = brushless direct current
- Application: AP 5.4 with internal rewinder

Firmware version

- Drucker-Firmware: mind. 3.34
- Treiber-Firmware Endstufe: mind. 6

Checking the firmware version

➔ **Call** PRINT INFO > Service status.

Section „Peripheraldriver" on the printout lists all mounted output stage boards with the installed firmware versions.

Updating firmware

Updating the driver firmware is done the same way as with the printer firmware:

See topic section Firmware 🗋.

The following files are required: *BLDC_Vx.BAT* resp. *BLDCAP54Vx.S3B* (for firmware version x).

▥➡ CAUTION! - Don´t load the older firmware version 1 onto the new version 2!

Connections, settings
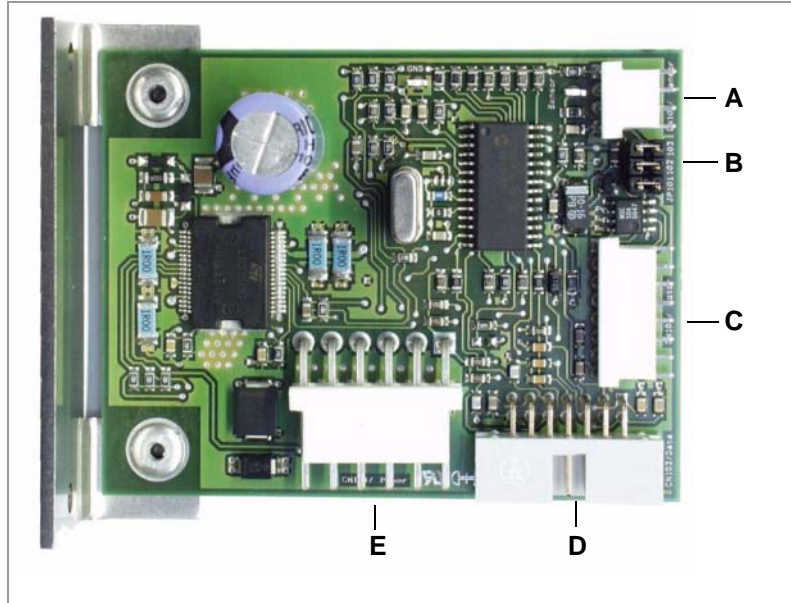
[9]   Connections on the BLDC output stage board (A4034).

A   Connection D-Sub cable harness, sensor of the peripheral device (CN101)

▪▪➡ Only used in AP 5.4/5.6 basic dispenser!

A
K (GND)
C
E (GND)
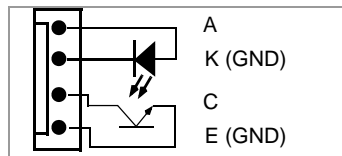
[10] Connection diagram sensor.

B   Jumper J101/102/103

J103
J102
J101
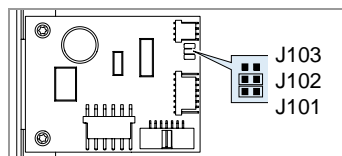
[11] Jumpers J101 and J102 connected.

C   Connection rewinder motor (CN102)

D   Connection CPU board (CN103)

E   Connection power supply (CN104)

I/O-board

Connections, settings
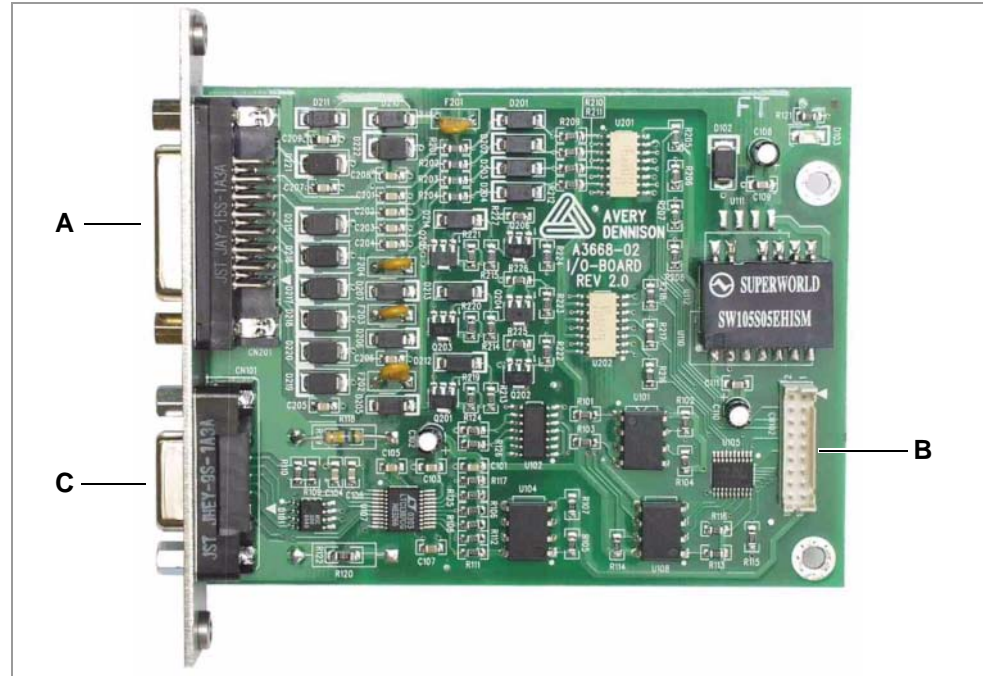
[12] Connections at the I/O-board (A3926).

A   Signal interface (D-Sub 15; CN 201)

B   Connection CPU board (CN 102)

C   RS 232/422/485 (D-Sub 9; CN 101)

Application

The I/O board may be used for 3 different applications:

- *2nd RS 232 interface:*

  The I/O board provides a RS 232 interface, which can be applied addition-ally to the one on the CPU board. The 2nd interface can e.g. be used to connect a bar code scanner.

- *RS 422/485 interface:*

  If there is a long distance between host and printer, RS 485 or RS 422 is sometimes used instead of RS 232 or Centronics. This is often realized in industrial plants, where galvanic isolation is required to avoid ground loops.

- *Signal interface:*

  If an applicator is applied with the printer, this requires the exchange of control signals between printer and applicator. Therefore, signals like „printing is finished" have to be generated by the printer and the printer it-self must wait for a signal like „start print" from the applicator, before it starts printing the next label. Galvanic isolation is provided for robustness. The output signals can also be used to drive signal lamps.

⫸ The two serial interface types cannot be used at the same time.

⫸ Signal interface and serial interface can be used at the same time. The signals of both interfaces must then be related to the same supply system (same ground potential).

Pin assignment serial interface
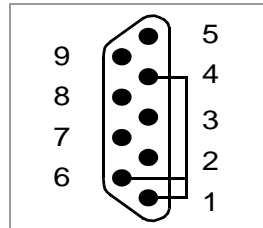
RS 232

[13] Pinout RS 232

⫸ CAUTION! - Pin assignment „viewed at from PC"! (printer = DCE)

Pin	Signal [a]	Signal direction from I/O-board
1	DCD	Short with DTR and DSR
2	RxD	Out
3	TxD	In
4	DTR	Short with DCD and DSR
5	GND	Masse
6	DSR	Short with DTR and DCD
7	RTS	In
8	CTS	Out
9	(RI)	Not connected

[Tab. 3] Pin assignment RS 232

a)   Host

RS 422/485
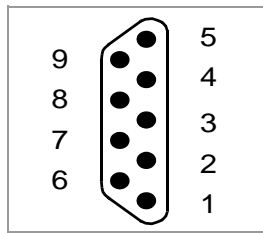
[14] Pinout RS 422/485

➠ CAUTION! - Pin assignment „viewed at from PC"! (printer = DCE)

Pin	Signal [a)]	Signal direction from I/O-board
1		Not connected
2	Rx-	Out
3	Tx-	In
4	Term.	Termination (110 Ohm)
5	GND	Ground
6	Term.	Termination (110 Ohm)
7	Tx+	In
8	Rx+	Out
9		Not connected

[Tab. 4] Pin assignment RS 422/485

a) Host

RS 422/485 termination

At the *last* printer at the RS 422/485 line, connect the following pins (inside of the cable connector):

- Pins 3 and 4 (Tx-)
- Pins 6 and 7 (Tx+)

RS 485 2-wire connection

At *each* printer on the bus line, connect the following pins (inside of the cable connector):

- Pins 2 and 3 (Tx-/Rx-)
- Pins 7 and 8 (Tx+/Rx-)

Pin assignment signal interface


```
GND       1          9  GND
5V_EXT    2          10 ERROR\
START_PRINT\  3      11 PRINT_END\
FEED\     4          12 GND
PAUSE\    5          13 GND
REPRINT\  6          14 GND
5VTO24V_EXT  7       15 MACHINE_STATUS\
GND       8
```

[15] Pin assignment signal interface

Signal	Description	Condition(s) for activating
5V_EXT	5 V supply voltage for external sensors	
START_PRINT\ Input	Start signal for printing Setable by I/O board > Start print mode	*All* of the following conditions: • Online mode • Printjob prevailing • No error message
FEED\ Input	Feeding of the label material as long as the signal is kept low Minimum feed length: 1 label Display: „I/O Board Feed"	*One of* the following conditions: • Offline mode • Printer is stopped • Pause mode [a)] *Or* *All of* the following conditions: • Online mode • No printjob loaded
PAUSE\ Input	A high-low change switches the printer to the pause mode. Another high-low change switches the printer back into online mode If the parameter I/O BOARD > Start print mode is set to „Level high active" or „Level low active", activating the pause mode stops the printer after the currently printed label. Display: „I/O Board Pause" ERROR\ is activated START_PRINT\ -Signals are discriminated	START_PRINT\ is high

[Tab. 5]   Signals at the signal interface

Signal	Description	Condition(s) for activating
REPRINT\ Input	The printing of the last printed label is repeated as long as REPRINT\ is kept low Minimum number of reprinted labels: 1 If REPRINT\ is activated while the printer is in pause mode (PAUSE\), the reprint is executed only when the pause mode is cancelled	*All* of the following conditions: • Online mode • START_PRINT\ = high
5VTO24V_EXT	5-24 V supply voltage for external sensors	
ERROR\ Output	Low, if the printer is not ready to print High during the initialization of the printer	*One* of the following conditions: • Pause mode • Printing stopped • Offline mode • Material end • No punch detected
PRINT_END\ Output	Setable by I/O BOARD > Ende Druck Mode	See parameter description (Info-Printouts and Parameters 🗎)
MACHINE_STATUS\ Output	Setable by I/O BOARD > Status output **and** I/O BOARD > Status polarity	

[Tab. 5]   Signals at the signal interface

a)   The pause mode is activated by the PAUSE\ signal.

Setting the Interface Parameters

With an I/O board mounted, the following additional menus appear in the print-
er menu:

- INTERF. PARAM. > COM3 PORT contains all parameters required to configure
  the serial interface.

- I/O BOARD contains all parameters required to configure the signal interface

Menu	Parameter	Setting
INTERF. PARAM. > COM2 PORT	Baud rate	9600
	No. of data bits	8
	Parity	None
	Stop Bits	1
	Data synch.	RTS/CTS
	Serial Port Mode	RS 232
SYSTEM PARAMETER	External signal	Singlestart
	Reprint function	Enabled
I/O BOARD	Start delay	0.0 mm
	Start print mode	Pulse falling
	Reprint signal	Enabled
	Feed	Standard
	Pause input	Standard
	Error output	Print error
	Error polarity	Level low active
	Status output	Print job ready
	Status polarity	Level low active
	End print mode	Mode3 low pulse

[Tab. 6]   Recommended parameter default settings.

For detailed parameter descriptions see topic section Info-printouts and
Parameters 🗋.

Circuit diagrams for signal inputs
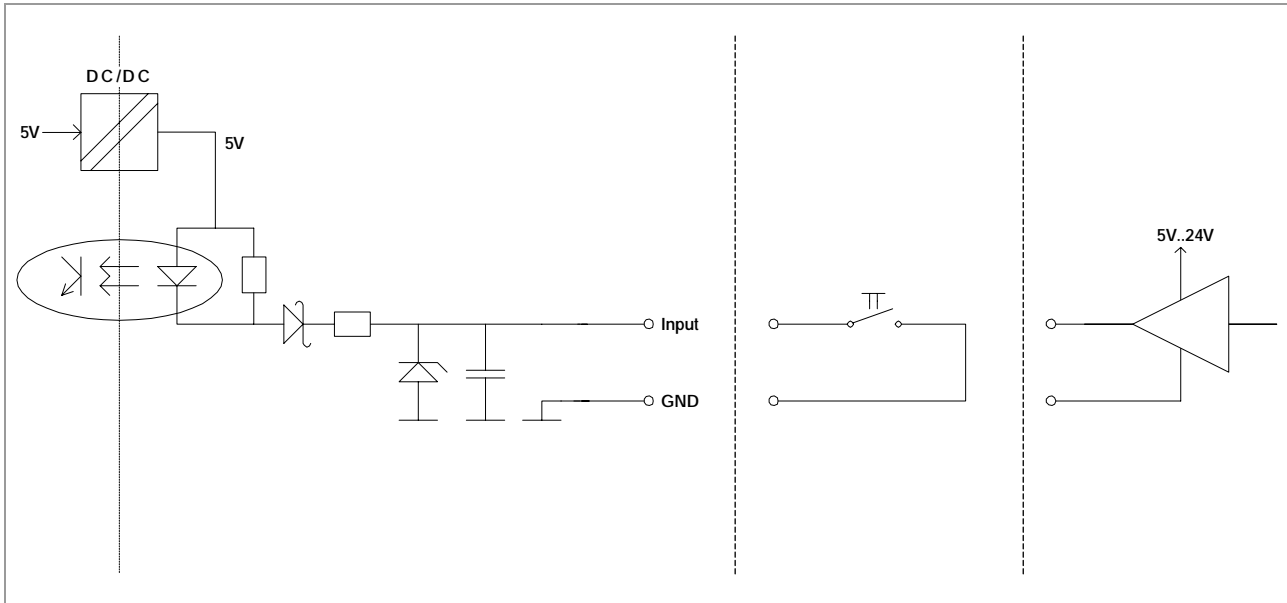
[16] I/O board: Input circuitry and possible connections to external electronics.

The input signals are supplied by an internal, galvanically decoupled 5 V source.

▮▮▶ Maximum admissible input voltages: 0 to 24 V

Input signal	Voltage range	Current range
Low	$V_{IL} = 0\text{-}1\,V$	$I_{IL} \approx 10\text{-}20\,mA$
High	$V_{IH} = 40\text{-}24\,V$	$I_{IH} \approx 0\text{-}1\,mA$

[Tab. 7] Characteristics of the input signals.

AP 5.4 – AP 5.6

Circuit diagrams for signal outputs
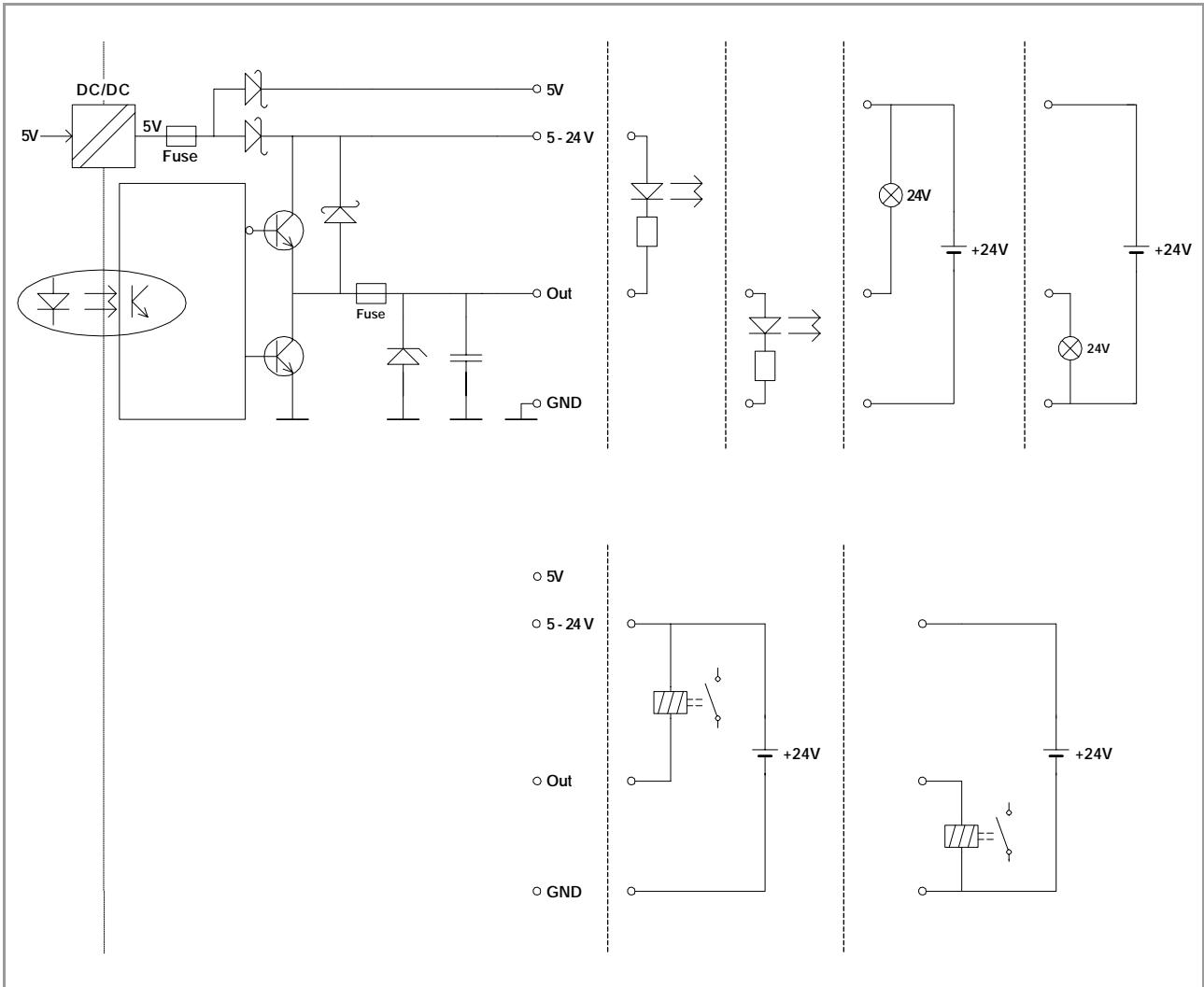
[17] I/O board: Output driver and possible connections to external electronics.

The output signals are powered by the internal 5 V source or by an external 5 to 24 V source. The output stages provide an active low transistor and also an active high transistor.

Output signal	Voltage range	Current
Low	$V_{OL} = 0.5 - 1\,V$	$I_{OL} \approx 200\,mA$
High	$V_{5-24\,V} - V_{OH} = 1.5 - 2.5\,V$	$I_{OH} \approx 200\,mA$

[Tab. 8] Characteristics of the output signals.

Internal supply　　　Internal supply: $V_{5-24\,V} = 4.5$ to 5 V at $I \leq 100\,mA$

▥➡ Maximum admissible output current: 100 mA

▥➡ External electronics, powered from this source, must not consume more than 0.5 W.

External supply	External supply: $V_{5\text{-}24\,V}$ = 5 to 24 V at I ≤ 600 mA
	The I/O board outputs may be powered by an external source from 5 V to 24 V (pin 7).
	⫸ Maximum admissible output current: 200 mA
Fuses	The fuses used on the I/O board are polymeric positive temperature coefficient resistors. If they trip, they don´t blow and after cooling down, they work again. They don´t need to be replaced.

Testing the Signal Interface

The USI-testbox was designed for use with the USI interface, the „big brother" of the I/O board, matching the 64-bit printer family. But it can also be applied to the I/O board, if the following is taken into account:

Not all of the output signals on the USI board are also available on the I/O board. The pins of not available signals are grounded on the I/O board. The following signal lamps for outputs are therefore always lighting on the testbox:

- RIBBON OUT
- MEDIA OUT
- WARNING

Those inputs are not available on the I/O board:

- PLC ERROR
- TOUCH DOWN SENSOR
- HOME POS. ERROR
- MATERIAL LOW

Application of the testbox

- Simulating inputs
- Checking outputs
- Monitoring of drive signals sent by the system control
- Aid for setting up the machine

Notes

The polarity of the testbox is low-active, therefore rules:

➥ Inputs are pulled low when the push-button is pressed.

➥ Outputs are low, when the LED lights.
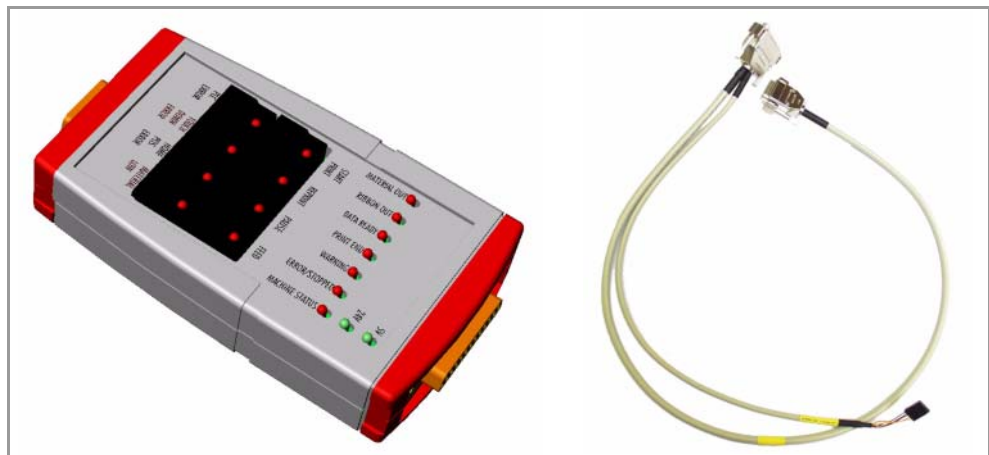
[18] Left side: The USI testbox (A2739). Right side: Connection cable (A2842). Both parts are required for the application.

Operation panel

Connections
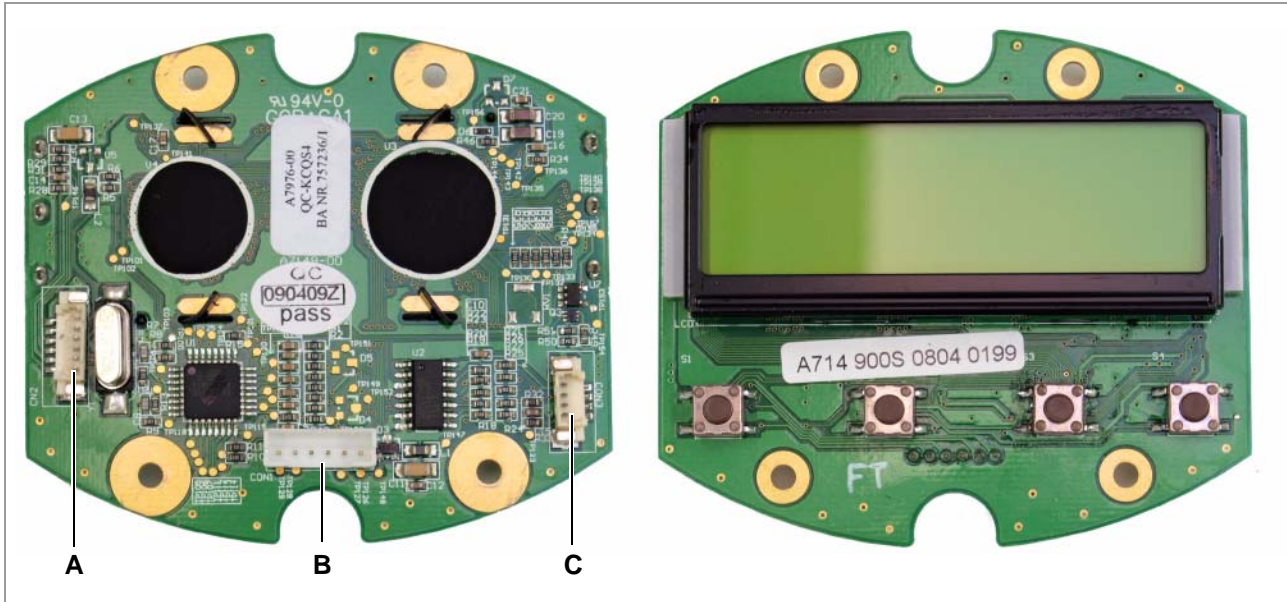
[19] Operation panel board (A7149).

A Connection programming adapter (only for factory-internal use)

B Connection CPU board

C Connection I^2C-bus (reserved)

Power supply

Connections
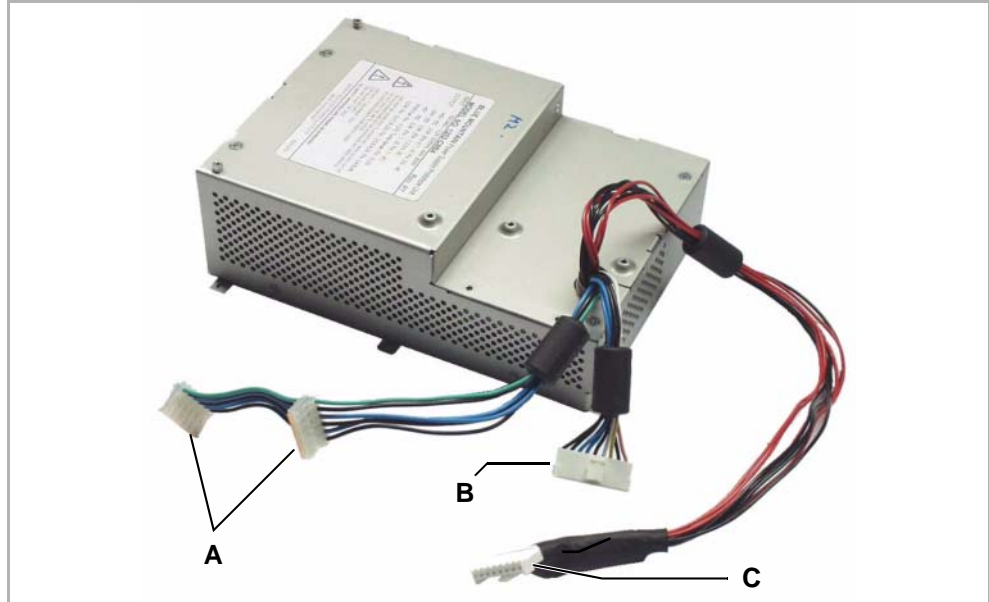
[20] Power supply (A3958).

A Connections for output stage boards


```
+45V ──────          ────── GND
GND  ──────          ────── +45V
+5V  ──────          ────── GND
```
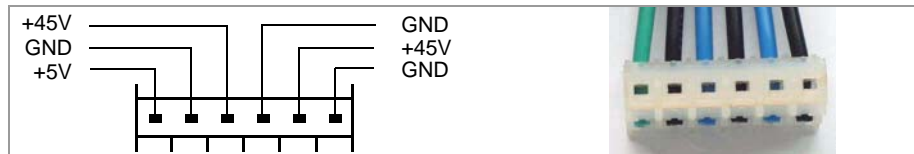
[21] Pin assignment connections for output stage boards.

B Connection for CPU board


```
GND  ──────          ────── Power Fail
+45V ──────          ────── Temp. Sense
+45V ──────          ────── GND
GND  ──────          ────── +5V
GND  ──────
```
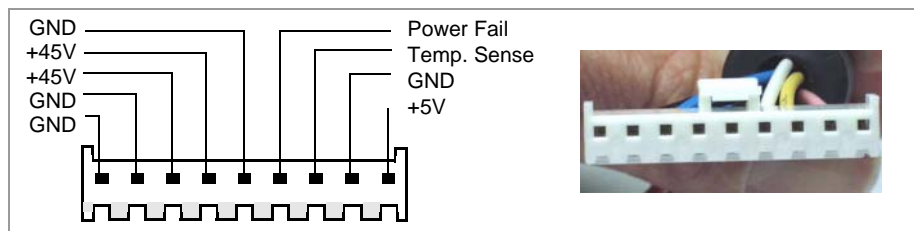
[22] Pin assignment connection CPU board.

C Connection for printhead


```
GND ──────          ────── +24V
GND ──────          ────── +24V
GND ──────          ────── +24V
GND ──────          ────── +24V
```
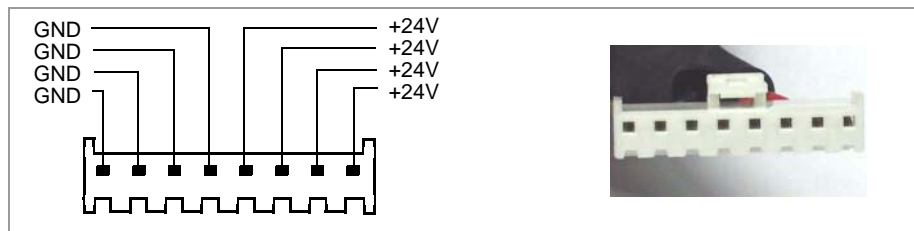
[23] Pin assignment printhead connection.

Specifications

Power

- Maximum continuous average output power: 196 W
- Peak power: 276 W

⫸ Peak must not last longer than 30 ms

⫸ Limitation of peaks per minute: max. 3

Voltage range

Output	Range	Max.	Min.
+45 V	+5% -10%	+47.25 V	+40.5 V
+24 V	±3%	+24.72 V	+23.28 V
+5 V	±5%	+5.25 V	+4.75 V

[Tab. 9]　Output voltage ranges.

⫸ Precondition to be able to measure the output voltages correctly, is, that a minimum output current of 0.3 A is drawn from the 5 V output (minimal load). This is e. g. reached by connecting the CPU board to the power supply.

⫸ At the 24 V and 45 V outputs, *no* minimum output current is required to measure the voltages correctly.

Current range

Output	Min.	Typical	Peak
+45 V	0 A	2 A	2.8 A
+24 V	0 A	3.8 A	7 A
+5 V	0.3 A	3.0 A	4.0 A

[Tab. 10] Output current ranges.

⫸ The 24 V output provides a continuous current of 6 A for 10 s in typical operation.

⫸ Without a minimum load at the 5 V output, the voltage at 24 V and 45 V supply should not be higher than 28 V and 50 V respectively.

Interface for peripheral devices

This interface is only available at AP 5.4/5.6 „peripheral".

⚠	CAUTION! Connecting non-original devices to this interface can damage the printer. In the worst case the printer can start to burn. ➜ Only connect original Avery Dennison peripheral devices to this interface.
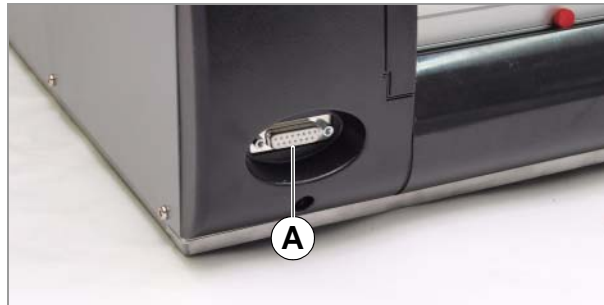
[24] D-Sub 15 connection for peripheral devices at an AP 5.6 „peripheral".
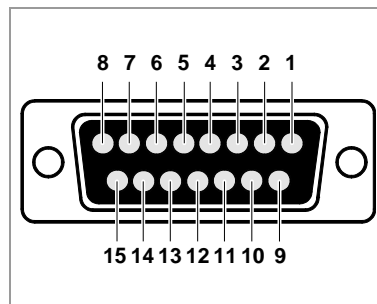
Pin	Signal
1	Emitter 2 (GND)
2	Collector 2 (sensor input signal)
3	Collector 1 (sensor input signal)
4	Emitter 1 (GND)
5	+5 V (supply voltage)
6	+45 V (supply voltage)
7	Motor A (motor voltage)
8	Motor /A (motor voltage)
9	LED-Kathode 2 (light sensor)
10	LED-Anode 2 (light sensor)
11	LED-Anode 1 (light sensor)
12	GND (supply voltage)
13	GND (supply voltage)
14	Motor B (motor voltage)
15	Motor /B (motor voltage)

Sensor settings

Setting sensors

The following cases require the sensor or all sensors to be set newly:

- A sensor was replaced

- The CPU board was replaced

- A punch sensor fork with additional reflex sensor was mounted (only possible with AP 5.4).

Punch sensor

1. Start the printer in production mode and call parameter
   SERVICE FUNCTION > Sensor Adjust.

   For more information about production mode, refer to the description of parameter SYSTEM PARAMETERS > Access authoriz..

   The following message shows up:

   > Sensor Adjust
   > 140   Punch   16

   The *left* value is the control value for the LED current (Default: 140).

   The *right* value is the sensor value read back.

   The more light the sensor receives, the less is the read back value.

2. Remove any material from the label sensor fork.

3. Increase or decrease the control value by pressing the Feed or Cut button until the read back value is in the range of *8..20* (best at 13..15).

4. Insert some standard material backing paper (labels peeled off) to verify the read back value.

   ⫸ Glossy side up.

   ⫸ The backing paper must cover the light barrier.

   The read back value should match the range of *40..90*.

5. Insert some standard self-adhesive material (paper label on backing paper) to verify the read back value.

   The read back value should match the range of *100..220* and it *must* be more than *50* (best: 100) digits higher than the value measured with bare backing paper.

   If the value doesn´t match this range: modify the control value by pressing the Cut or Feed button.

6. Press the Online button to save the setting.

7. Press the Esc button to exit the parameter.

   With this, the punch sensor is set.

Ribbon sensor

1. Start the printer in production mode and call parameter
   SERVICE FUNCTION > Sensor Adjust.

2. Press the Online button repeatedly, until the following is displayed:

   > Sensor Adjust
   > 128   Foil   6

   The *left* value is the control value for the LED current (Default: 128).

   The *right* value is the sensor value read back (here: 6).

3. Turn the ribbon unwinding mandrel by hand and watch the read back value.

   Sensor uncovered: the value should match the range *5..7*.

   Sensor covered: the value should match the range *220..255*.

   If the value doesn´t match this range: modify the control value by pressing the Cut or Feed button.

4. Press the Online button to save the setting.

5. Press the Esc button to exit the parameter.

   With this, the ribbon sensor is set.

Printhead sensor

1. Start the printer in production mode and call parameter
   SERVICE FUNCTION > Sensor Adjust.

2. Press the Online button repeatedly, until the following is displayed:

   > Sensor Adjust
   > 128   Head   236

   The *left* value is the control value for the LED current (Default: 128).

   The *right* value is the sensor value read back (here: 236).

3. Open and close the pressure lever by hand and watch the read back value.

   Pressure lever open: the value should match the range *5..7*.

   Pressure lever closed: the value should match the range *220..255*.

4. Press the Online button to save the setting.

5. Press the Esc button to exit the parameter.

   By doing so, the printhead sensor is set.

Reflex sensor

➠ Setting only for AP 5.4/5.6 with optional reflex mark label sensor!

1. Start the printer in production mode and call parameter
   SERVICE FUNCTION > Sensor Adjust.

2. Press the Online button repeatedly, until the following is displayed:

   > Sensor Adjust
   > 112   Reflex   17

   The *left* value is the control value for the LED current (Default: 112).

   The *right* value is the sensor value read back (here: 17).

3. Insert some white paper.

4. Increase or decrease the control value until the read back value matches the range of *8..20* (best: 10).

5. Remove the white paper to verify the read back value. It should match the range of *50..160*.

6. Insert some black paper to verify the read back value. It should match the range of *190..255*.

7. Press the Online button to save the setting.

8. Press the Esc button to exit the parameter.

   By doing so, the reflex sensor is set.

Punch sensor for short labels

➠ Setting only for AP 5.4/5.6 dispenser with optional punch sensor for short labels!

For further information about this punch sensor, see topic section
Service Mechanics 🗎, paragraph „Punch sensor for short labels".

1. Start the printer in production mode and call parameter
   SERVICE FUNCTION > Sensor Adjust.

2. Press the Online button repeatedly, until the following is displayed:

   > Sensor Adjust
   > 140   optn.1   7

   The *left* value is the control value for the LED current (Default: 140).

   The *right* value is the sensor value read back (here: 7).

3. Remove any material from the label sensor fork.

4. Increase or decrease the control value by pressing the Feed or Cut button until the read back value is in the range of *8..20* (best at 13..15).

5. Insert some standard material backing paper (labels peeled off) to verify the read back value.

   The read back value should match the range of *30..90*.

6. Insert some standard self-adhesive material (paper label on backing paper) to verify the read back value.

   The read back value should match the range of *100..220* and it *must* be more than *50* (best: 100) digits higher than the value measured with bare backing paper.

If the value doesn´t match this range: modify the control value by pressing the Cut or Feed button.

7. Press the Online button to save the setting.

8. Press the Esc button to exit the parameter.

With this, the punch sensor is set.

Setting the material end sensor

This printer type is equipped with a single light sensor which is designed to detect both, punches and material end. The sensor must be able to detect three different states:

- No material
- Only backing paper
- Backing paper + label face

The parameter SERVICE FUNCTION > Matend adjust can set the limit between being recognized as „only backing paper" or as „material end" [4].

➠ Before you even think about changing the setting of this parameter, make sure that the sensor is correctly adjusted!

See chapter Setting sensors 🗎 on page 26.

Proceed as follows to set the materialend sensor:

1. Call parameter SERVICE FUNCTION > Matend adjust:

> Matend adjust
> yyy Level :   xx

2. Take the label material out of the sensor fork.

3. Set the value xx to 20 by pressing the Cut/Feed buttons.

   All measured values below the set limit (that is <20), are recognized by the electronics as material end, values lying above are recognized as „only backing paper".

   ➠ To be able to process *transparent label stock*, the parameter has to be set to zero.
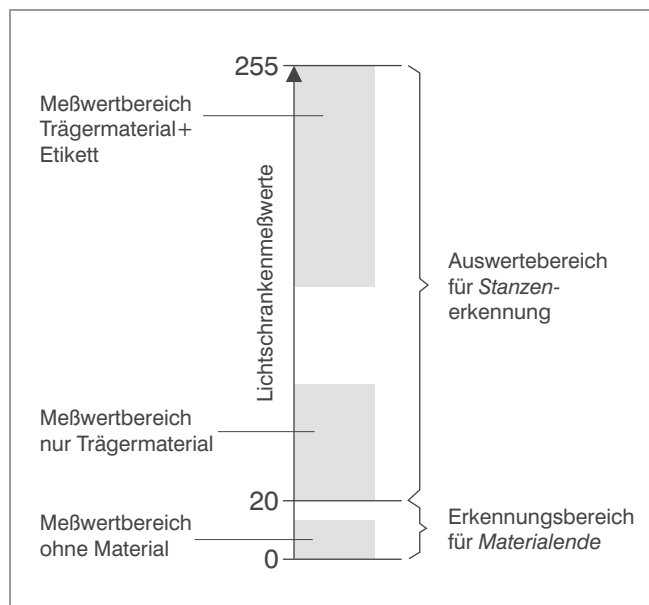
[25] The measurement ranges of the combined punch/material end sensor - schematically illustrated.

Sensor test

General notes

➜ Activating the sensor test: call parameter SERVICE FUNCTION > Sensor test.

By means of the sensor test, you can check the function of each sensor:

```
Sensor test
0.01    Punch    11
  |        |        |
  A        B        C
```

[26] Display after calling „Sensor test".
  A Sensor ID
  B Sensor name
  C Value

Analog values

- If the value shown on the printer display exceeds the range given in the chart below, the respective sensor is possibly dirty and has to be cleaned (blow the dirt off with compressed air).

- Check the sensor function, e.g. by covering it. If the displayed value doesn´t change when the sensor is covered, it is possibly not connected or defective.

  General rule for all analog sensor values:

    – Full light leads to values <= 10
    – No light leads to values >= 220

- To sensors which function as a switch applies the following: Values between 10 and 220 mean that the sensor is poorly set, dirty or close to the end of its life.

Digital values

Some sensors work digitally, what means that they don´t provide a value range, but the two values „1" or „0".

Sensors on the CPU board

Sensor #	Sensor name	Connector #	Typical value	Condition
0.01	Punch	CN 905	8-20	No material in light barrier
			30-90	Only backing paper in light barrier
			140-255	Label material in light barrier
0.02	Foil	CN 906	4-8	Light barrier open
			220-255	Light barrier covered
0.03	Lever	CN 907	4-8	Light barrier open
			220-255	Light barrier covered
0.04	Reflex	CN 908	7-30	White material over sensor
			30-180	No material
			180-255	Black material over sensor
0.05	Optn. 1	CN 909	0-255 analogous	Reserved for special functions
			Punch sensor for short labels: [a]	
			8-20	No material in light barrier
			30-90	Only backing paper in light barrier
			140-255	Label material in light barrier
0.06	Optn. 2	CN 910	0-255 analogous	Reserved
0.07	H-Temp	CN 901-903	appr. 100-140	Printhead is very hot
			appr. 141-255	Normal printhead temperature
0.08	P-Temp	CN 701		Power supply temperature (depends on the PS type)
0.09	H-Supp	CN 901-903	0	No 5 V supply for printhead [b]
			1	5 V supply for printhead o.k.
0.10	M-Supp	CN 701	0	No motor supply voltage
			1	Motor supply voltage o.k.
0.11	Start	CN 803/804	0	Start signal low (IN1)
			1	Start signal high

[Tab. 11] Sensor test conditions for sensors, which are connected to the CPU board (AP 4.4/AP 5.4).

Sensor #	Sensor name	Connector #	Typical value	Condition
0.12	O Foil	calculated value	0	Foil diameter unknown
			appr. 35-80	Foil diameter in mm
0.13	H (°C)	Value calculated out of 0.07	appr. 25-70	Temperature at printhead in °C [c]

[Tab. 11] (Cont.)Sensor test conditions for sensors, which are connected to the CPU board (AP 4.4/AP 5.4).

a)   Special functions.
b)   Occurs e.g., if the printhead is connected to the wrong connector on the CPU board (three possibilities).
c)   Below 30°C the measurement is not accurate.

Sensors on the stepper motor output stage board

Sensor #	Sensor name	Conn. #	Periph.	Typical value	Condition
4.01	Peri. 1	J4	Dispensing edge sensor	0	Dispensing edge light barrier open
				255	Dispensing edge light barrier covered
			Cutter	<=10	Cutter in end position
				255	Cutter not in end position
			External Rewinder	0…255	Dancer arm position

[Tab. 12] Sensor test conditions for sensors, which are connected to the output stage board.

Sensors on the BLDC motor output stage board

➠ Only valid for AP 5.4/5.6 „basic dispenser", what means, that the dispensing edge sensor is connected to the BLDC output stage board.

Sensor #	Sensor name	Connector #	Typical value	Condition
8.01	Rew.S.	J4	0	Dispensing edge light barrier open
			255	Dispensing edge light barrier covered
8.02	O Rew	calculated Value	0	Ø of the backing paper rewinder roll is not known
			ca. 35-120	Ø of the backing paper rewinder roll in milimeters

[Tab. 13] Sensor test conditions for sensors, which are connected to the BLDC motor output stage board.

Sensors on the I/O board:

Sensor #	Sensor name	Connector #	Typical value	Condition
15.01	Start	CN 803/804	0	Start signal activated
			1	Default start signal [a]
15.02	Feed	CN 804	0	Feed signal activated
			1	Default feed signal
15.03	Pause	CN 804	0	Pause signal activated
			101	Dynamic signal, see T and F
			255	Default pause signal
15.04	Reprt	CN 804	0	Reprint signal aktivated
			1	Default reprint signal
15.05	T (us)	CN 804	0	APSF signal periodic time < 1 µs
			1-254	Periodic time in µs
			255	Periodic time > 254 µs
15.06	T (ms)	CN 804	0	APSF signal periodic time < 1 ms
			1-13	Periodic time in ms
			255	Invalid value
15.07	F (Hz)	CN804	0	APSF signal frequency < 76 Hz
			76-254	Frequency in Hz
			255	Frequency more than 254 Hz
15.08	F100Hz	CN804	0	APSF signal frequency < 100 Hz
			1-ca. 140	Frequency in multiples of 100 Hz [b]

[Tab. 14] Sensor test conditions for sensors, which are connected to the I/O board.

a)   Is identical with 0.12
b)   Take care about the maximum frequency rating of the I/O-board!