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## 9 Plate change systems

### 9.1 General

The positioning for tensioning as well as opening and closing the clamping bar is automatic in all systems.

Explained below is the exact plate changing procedure presented in form of a so-called chain of steps. The complete plate change is divided into program steps followed by subsequent switching conditions. If a program step is completed, subsequent switching conditions must be met before the next program step can be initiated.


These chains of steps provide a clear presentation of complex processes, facilitate the comprehension of the function and is particularly helpful for error diagnostics. The immediately preceding condition for the subsequent switch was not met, if a program step in a certain procedure is not executed.

### 9.2 Explanation of abbreviations


The following abbreviations are used in this Chapter:


<b>APL</b>	<b>Automatic Plate Loading</b>
<b>DA</b>	<b>Druck-Anfang ( leading edge)</b>
<b>DE</b>	<b>Druck-Ende (tail edge )</b>
<b>DW</b>	<b>Druckwerk; Druckwerke (printing unit(s) )</b>
<b>PPL</b>	<b>Power Plate Loading</b>

### PPL / PPL 2 (Power Plate Loading)


 Semiautomatic plate change; the used printing plate must be pulled by hand from the DA rail, the new one has to be inserted into the DA rail also by hand.

### PPL (to S716)


 The closing of the DA rail is triggered by pressing a button.

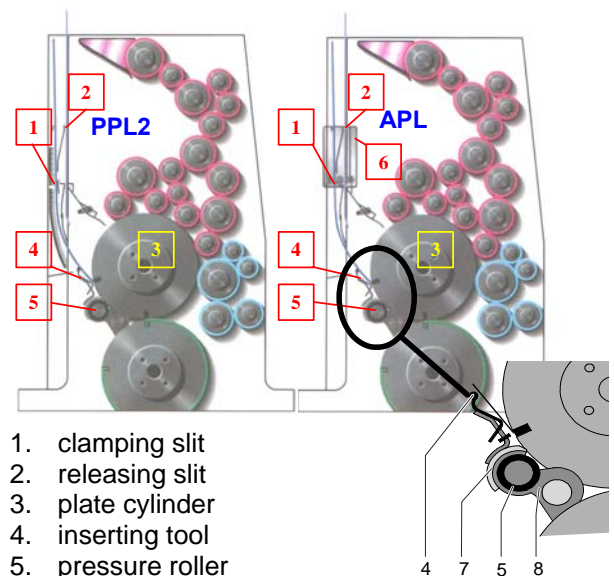
 The positioning to the next printing unit using the “crawl speed button” is started as soon as the plate change is completed in one printing unit.

### PPL 2 (from S717)

 The closing of the DA rail and the positioning to the next printing unit is automatic with PPL2.

### APL (Automatic Plate Loading)

 Fully automatic plate change; the printing plate is pulled into or pulled out of the DA rail by a motor driven plate transporting unit in the sliding guard.

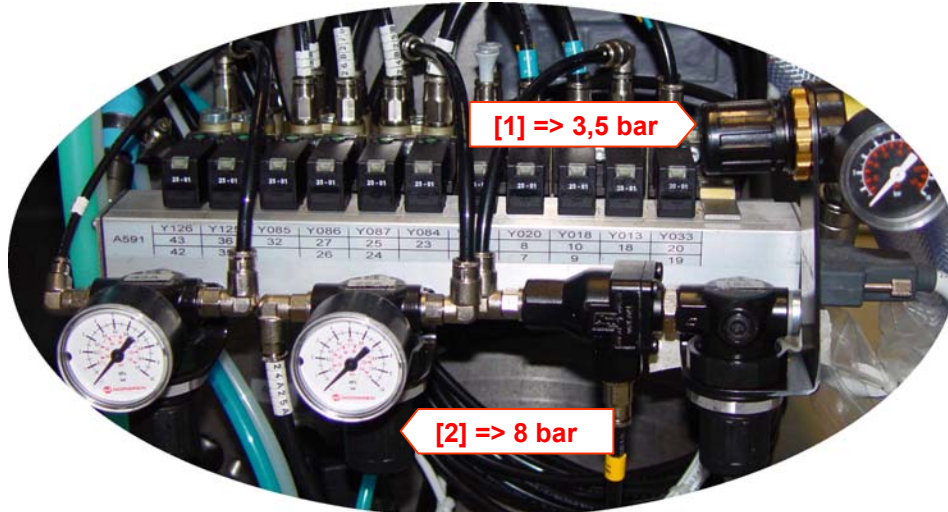


1. clamping slit
2. releasing slit
3. plate cylinder
4. inserting tool
5. pressure roller
6. plate transport system (only APL)
7. bending bar
8. swivel lever

#### Note:

**PPL features just one slit for mounting and ejecting the printing plate. Accordingly, the design of the sliding protection is different to that of the PPL2 / APL**

## 9.3 Electrical components



### Solenoid valves

PPL/APL	Description	Mounting location	Operation pressure
-Y084 (23)	Clamp DA rail (DA position) Mount DE rail (DE position) <b>Double function – depending on machine position</b>	B-side, outside	Max.
-Y085 (32)	Open DE rail (DE position)	A-side, inside	Max.
-Y086 (26/27)	Infeed tool ON/OFF (DA position) Bending bar ON/OFF (DE position) <b>[1]</b> <b>Double function – depending on machine position</b>	B-side, inside A-side, inside	until S736: Max. from S737: 3,5bar
-Y087 (24/25)	Pressure roller ON/OFF <b>[2]</b> <b>(when ejecting or mounting procedure of the printing plate)</b>	B-side, inside A-side, inside	to S739 3,5 bar from S740 8 bar (box version INOX)
<b>APL</b>			
-Y125 (35/36)	Transport rollers withdrawal <b>(mounting the printing plate in the DA rail)</b>	sliding guard	until S737: ca 2 bar from S738: Max.
-Y126 (42/43)	Transport rollers ejection <b>(ejecting the printing plate from the DA rail)</b>	sliding guard	until S737: Max. from S738: 6 bar
<b>Note:</b>	Solenoid number to <b>S716 (37/38)</b> and from <b>S717 (42/43)</b> , due to double assignment with the coating module ( <b>38=</b> coating form roller)		

Sensors			
PPL/PPL2/APL	Description	Mounting location	Basic position Signal
-B072	Proximity switch for <i>pneumatic cylinder</i> DA/DE rail clamping/mounting <i>ejected</i> (-Y084) <b>In basic position –B072 = 1</b>	B-side, outside	1
-B073	Proximity switch for <i>pneumatic cylinder</i> DE rail open <i>drawn in</i> (-Y085) <b>In basic position –B073 = 1</b>	A-side, inside	1
-B074	Proximity switch for <i>pneumatic cylinder</i> Infeed tool and bending bar <i>ejected</i> (-Y086) <b>In basic position –B074 = 1</b>	B-side, inside A-side, inside	1
PPL2/APL			
-B135	Register plate interrogation	A-side	1
-B136	Proximity switch for <i>pneumatic cylinder</i>	B-side	1
APL			
-B137	Proximity switch for <i>plate transport</i> If the plate is drawn in when the transport rollers are tilted (-Y125, or –Y126) and the motor is on (-M411), as a result of the flank change at the initiator one may assume that the plate is transported.	B-side, top in box	changing flanks

Motor for plate transport (APL)			
APL			Monitoring
-M411	Motor for <i>plate transport</i> 24V DC micro-motor transports the plate into or out of the DA rail depending on the transport rollers. (-Y125, or –Y126)	A-side, top in box	by -B137

## DC motor control (APL)

### Use, Compatibility, Dependencies

The "DC motor control with switchable current limit" pc-board, RS-no. A37V 1821 70, is used for the first time in the R700 from series 738. An upgrade for machines from series 717 is possible.



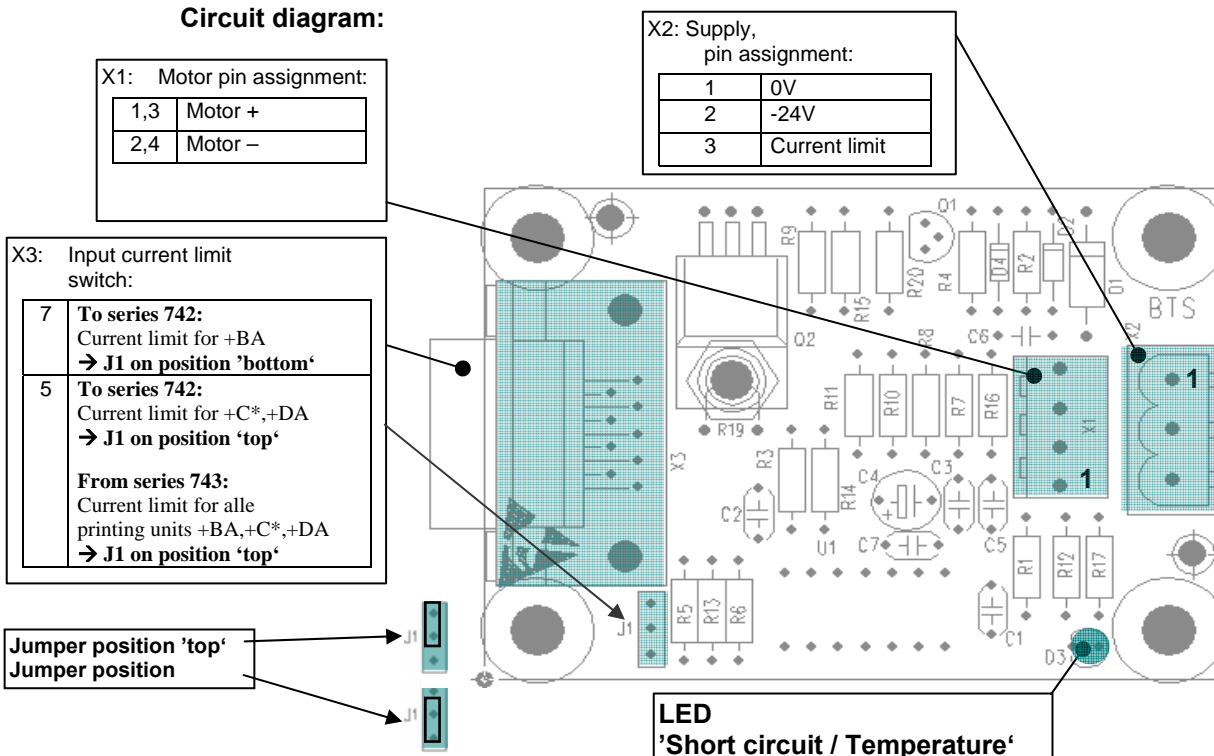
### In brief:

- Expected employment as motor control in R700 APL slide protection
- Current control with switchable current limit for 24V DC motor
- Activate-current-boost to increase the start-up torque,
- One direction of rotation
- Overtemperature and short circuit protection with LED display and lock. Reset by switching off and on again.

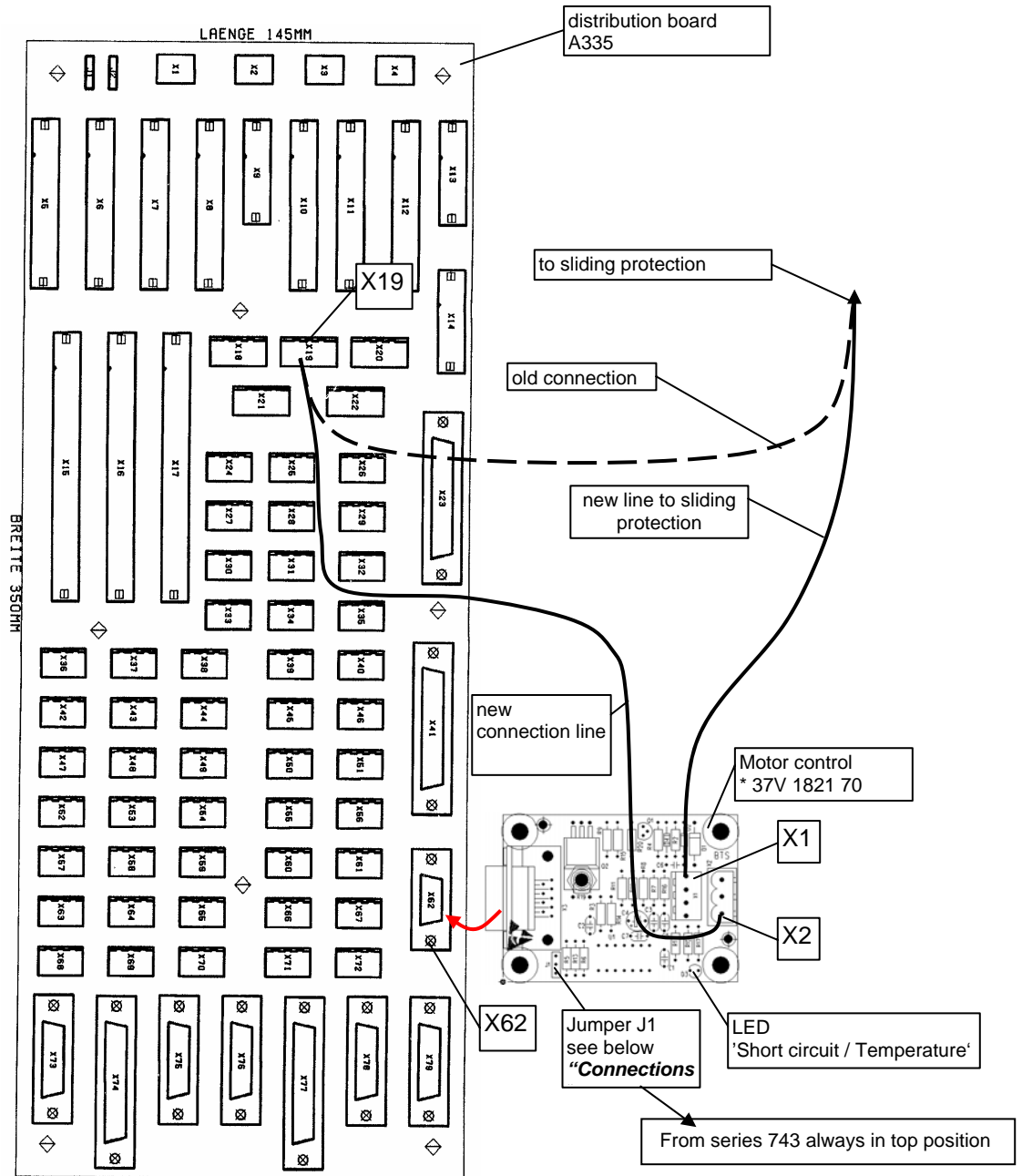
### Technical specifications:

- Voltage supply: +24VDC +- 10%
- Current limits (typ.)
  - Lo (normal) 0.26A
  - Hi ('Current limit' against -24V jumper): 0.78A
- Reaction time to temperature switching off: during cold start und Lo current limit 80 sec. typ.
- Temperature range: 0..55°C
- Connections:
  - X1 [Motor connection:] 4 pol. module
  - X2 [Current supply and current limit control input:] 3 pol. Combicon
  - X3 [Mounting and alternative current limit control input:] 9 pol. D-SUB

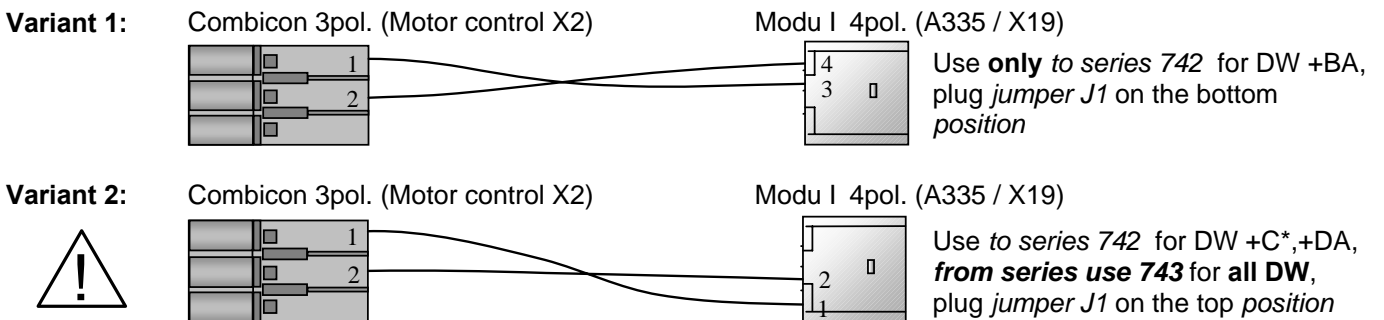
### Circuit diagram:



Connecting diagram “tower switch cabinet R700”:

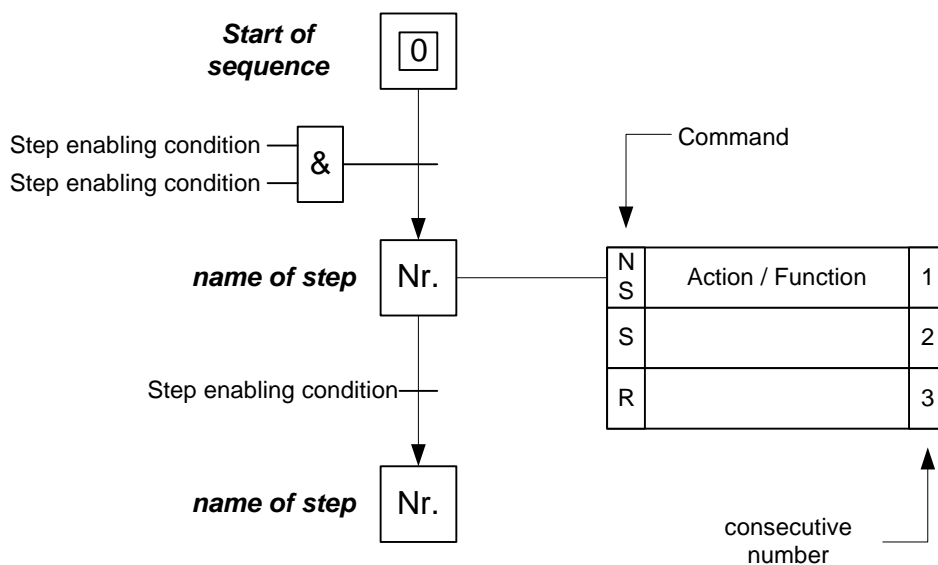


**New connection line between A335 / X19 ↔ motor control X2:**



## 9.4 Explanations of symbols used in chains of steps

<b>S</b>	Setzen (set)	Function is switched on in self-holding mode, it is switched off in a later step by reset (R)
<b>R</b>	Rücksetzen (reset)	Switch off in a previous step activates this function
<b>NS</b>	Nicht Setzen (not set)	Function is activated for the time of this step
<b>FC</b>	Erster Zyklus (first cycle)	Function is processed only in the first cycle of the program
<b>T / L</b>	Zeitglied (timer)	Function is activated or deactivated after a certain period
<b>&amp;</b>	UND-link (AND)	<b>All</b> listed conditions for subsequent switching must be met
<b>≥ 1</b>	ODER-link (OR)	<b>One</b> of the listed conditions for subsequent switching must be met
<b>tw</b>	waiting time	A subsequent switch takes place only after this time elapses
<b>TV</b>	jog forward	Machine function: jog operation forward
<b>TZ</b>	jog reverse	Machine function: jog operation reverse









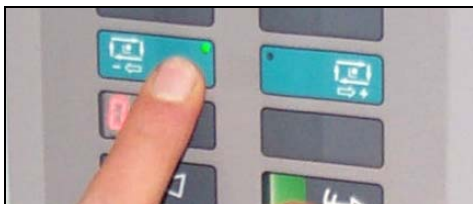
## 9.6 PPL – emergency program

### Machine stops, plate is outside the sliding protection

- The machine stops while the plate is being ejected.
- The plate protrudes over the sliding protection.
- When stopping, the PPL program switches automatically to emergency program (7-segment display shows **two blinking zeros**).



- Press **crawl speed** button
- Machine positions to **DA**
- The turquoise **minus** button blinks
- Press the turquoise **minus** button



- The plate can be removed
- Press **Stop/Halt/Safe**
- The **DA** rail closes automatically and the normal PPL program is again active (**two constant zeros** on 7-segment display)



- Restart program procedure for this unit with **crawl speed**



## Machine stops, the plate is within the sliding guard

- The machine stops while the plate is being ejected.
- The plate is still within the sliding guard
- When stopping, the PPL program switches automatically to emergency program (7-segment display shows **two blinking zeros**).



- Jog the machine forward to **DE** while the guard is closed.



- Open sliding guard.
- Hold the plate firmly and press **crawl speed** button.



- The machine positions itself automatically to **DA**
- The turquoise **minus button** blinks, press the **minus button**, the **DA** rail opens.
- The plate can be removed.
- Close sliding guard.
- Press **Stop/Halt/Safe**.
- **DA** rail closes automatically and the normal PPL program is active (**two constant zeros** on the 7-segment display).
- Restart program procedure for this unit in **crawl speed**.



### Plate not released at DE

- The plate does not emerge from the sliding guard.
- Machine stands at **DA**.
- Remove new plate from the sliding guard.
- Select emergency PPL program using **Stop/Halt/Safe** (**two blinking zeros** on the 7-segment display).
- Now position machine so far back until the turquoise plus and minus buttons glow.
- Press 4x the turquoise minus button until the plate emerges from the **DE** rail.
  - ⇒ 1 = Release the DE rail.
  - ⇒ 2 = Open the DE rail.
  - ⇒ 3 = Clamp the DE rail.
  - ⇒ 4 = Close the DE rail.
- Jog the machine back a little until crawl speed starts blinking.
- Open sliding guard.
- Hold plate.
- Press crawl speed button, the machine positions itself automatically at **DA**.
- Press the turquoise minus button, the **DA** rail opens.
- The plate can be removed.
- Close sliding guard and press **Stop/Halt/Safe**.
- The **DA** rail closes automatically and the normal PPL program is again active (**two constant zeros** on the 7-segment display) Insert plate into the sliding guard.



## Plate change procedure PPL

- Machine positions on **DE**.
- The pressure roller engages, the **DE** rail unclamps, opens, clamps, closes.
- The plate emerges from the sliding guard in reverse position.
- Machine switches to lower speed just before **DA**.
- Machine stops at **DA**.
- Auxiliary device and bending bar move to **DA** rail.
- **DA** rail opens.
- Turquoise plus button blinks.
- The old plate is pulled out slightly.
- The new plate is placed on the register pins.
- If correctly positioned, the 7-segment display displays I I and closes **DA** rail automatically.
- Auxiliary device and bending swing off.
- Machine moves to **DE** position.
- Machine switches to lower speed just before **DE**.
- The pressure bar swings in at **DE** and presses the plate under the **DE** rail.
- **DE** rail opens, unclamps, closes and clamps.
- The pressure roller swings away.
- The plate change on this printing unit is complete.

## Exceeding the time limit when loading the plate DA rail

- 7-segment display displays I I .
- **DA** rail closes automatically.
- Crawl speed button blinks.
- Start crawl speed.
- The plate mounting procedure will now be conducted.

## No I I in the 7-segment display

- Printing plate not detected by interrogation (digits – observe display).
- Check how the printing plate fits and correct if necessary. Plate positioned correctly on the register pins.
- Close the **DA**-rail with the turquoise plus button.
- Start crawl speed.
- Plate loading procedure continues.

