

# 7

## Corrective maintenance

### Overview

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# Introduction

## Training and qualification of personnel

Corrective maintenance work must be carried out only by trained personnel defined as 'maintenance technicians' in *Authorised personnel* on page 20 .

## Special safety guidelines for repair and service work

Warning



Dye and solvent are harmful by inhalation, in contact with skin and if swallowed! [R20/21/22]

Always use dye and solvent only with protective goggles and protective gloves. [S36/37]

Mouth protection and proper exhaust (e.g. with the unit under the hood in the production line) is highly recommended. [S51]

Warning



Cleaning solvents are harmful by inhalation, in contact with skin and if swallowed! [R20/21/22]!

Always use cleaning solvents only with proper exhaust (e.g. in a chemical cupel), protective goggles and protective gloves. [S51, S36/37]

# Corrective maintenance

Only the following list of corrective maintenance work can be carried out by staff of the end-user.

Any other repair on the system has to be coordinated with the manufacturer service department (see *Customer service information* on page 2).

Maintenance work	Possible cause	Description
Check and adjust chuck suction vacuum	Message "Vacuum of Spinner timeout"	<i>Check and adjust chuck suction vacuum</i> (page 78)
Check and adjust air pressure for intermediate tank filling	Messages "Dye Intermediate Tank no Vacuum" or "Solvent Intermediate Tank no Vacuum"	<i>Check and adjust air pressure for intermediate tank filling</i> (page 79)
Check and adjust position of lower edge wiping nozzle	Lower edge wiping nozzle replaced	<i>Check and adjust position of lower edge wiping nozzle</i> (page 81)
Clean spinner bowl	Long stop time	<i>Clean spinner bowl</i> (page 80)
Clear dispense tubes from air	Pumps or tanks exchanged	<i>Clear dispense tubes from air</i> (page 81)

Table 7: Corrective maintenance work

# Corrective maintenance work

## Check and adjust chuck suction vacuum

Possible reasons

Message “Vacuum of Spinner timeout”

Preparations

Have the following items available:

- Hex key driver 2,5 mm for screws at protective cover
- Short (at most 100 mm) screwdriver size 4.

Warning

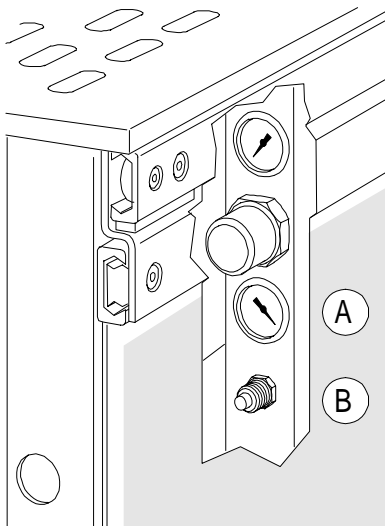


With the protective cover removed, keep your fingers off from the area behind the gauge.

Note

A vacuum gauge turns counter-clockwise for increasing values.

Procedure



- 1 Open the doser door
- 2 Locate gauge A in the background to the right of the cabinet, lower instrument.
- 3 The value must read 0.7 bar.
- 4 If the value is low,
  - a *Prepare Dye Coater Unit for maintenance* (page 63)
  - b Remove the protective cover above the electrical cabinet.
  - c Increase it by turning the throttle screw B clockwise.
  - d If the desired vacuum can not be reached with adjustment of the throttle, call for assistance<sup>1)</sup>
  - e Re-apply the protective cover.
  - f *Make Dye Coater Unit ready for operation* (page 63).

<sup>1</sup> Insufficient source of compressed air may be a reason for low vacuum.

## Check and adjust air pressure for intermediate tank filling

### Possible reasons

Messages “Dye Intermediate Tank no Vacuum” or “Solvent Intermediate Tank no Vacuum”

### Preparations

Have the following items available:

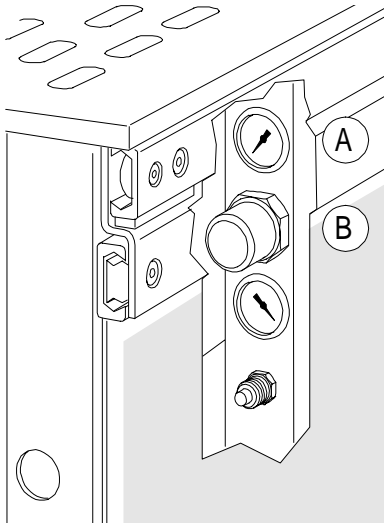
- Hex key driver 2,5 mm for screws at protective cover
- Short (at most 100 mm) screwdriver size 4.

### Warning



With the protective cover removed, keep your fingers off from the area behind the gauge.

### Procedure



- 1 Open the doser door.
- 2 Locate gauge A in the background to the right of the cabinet, upper instrument.
- 3 The value must read 1.5 bar.
- 4 If the value is not correct,
  - a *Prepare Dye Coater Unit for maintenance* (page 63)
  - b Remove the protective cover above the electrical cabinet.
  - c Increase the pressure by turning the knob B clockwise (about x turns per 0.1 bar).
  - d Decrease the pressure by turning the knob B counter-clockwise.
  - e Re-apply the protective cover.
  - f *Make Dye Coater Unit ready for operation* (page 63).

## Clean spinner bowl

Possible reasons

Production stop.

Preparations

Have the following items available:

- Clean upper and lower ring for exchange
- Bucket to take the old rings for cleaning
- Dropper bottle with cleaning solvent
- Solvent resistant brush

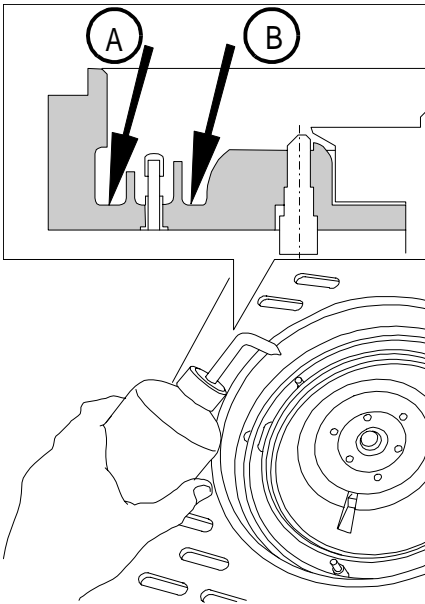
Caution



Use only the same solvent as used in the dye mixture. The waste will go to the dye and solvent return bottles.

Keep the tilted rings outside the centre of the spinning bowl. This avoids to spill residue dye and solvent into the middle groove (air exhaust).

Procedure



- 1 *Prepare Dye Coater Unit for maintenance* (page 63)
- 2 Place a disc on the chuck to protect the suction ring.
- 3 Issue host command **Rings up**
- 4 Remove the upper ring and put it into the bucket for cleaning outside the machine area.
- 5 Remove the lower ring and put it into the bucket for cleaning outside the machine area.
- 6 Clean the three areas between the holes in the outermost groove of the spinning bowl (A). For each area:
  - a Hold the dropper bottle in tangential direction (to avoid spilling into the middle groove).
  - b Drop a small amount of solvent onto the area to resolve residue of dye.
  - c Wipe with the brush from the middle of the area towards the holes (do not wipe in arbitrary directions).
- 7 If necessary, repeat step 6 for the inner groove (B, solvent from edge wiping).
- 8 Put the clean lower and upper rings in place.
- 9 *Make Dye Coater Unit ready for operation* (page 63)
- 10 Hand over the old rings to the cleaning room.

## Check and adjust position of lower edge wiping nozzle

Possible reasons

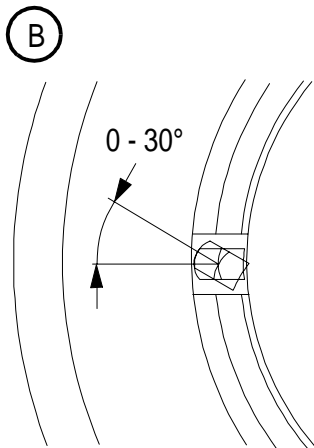
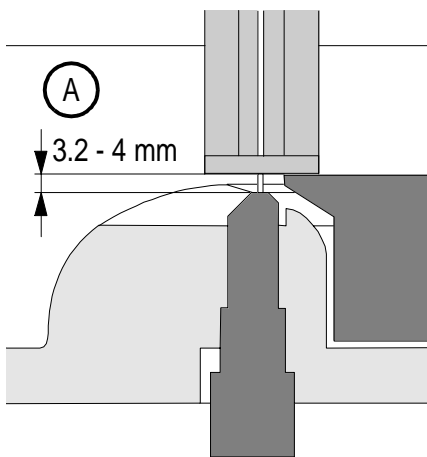
Replacement of lower edge wiping nozzle.

Preparations

Have the following items available:

- Sliding caliper with mm scale.
- *Nozzle key* (page 11).

Procedure



**Initial steps**

- 1 *Prepare Dye Coater Unit for maintenance* (page 63)
- 2 If necessary, remove disk from chuck

**Check and adjust vertical distance (A):**

- 1 Measure the distance between upper surface of the edge wiping nozzle and the surface of the chuck.
- 2 If the measured distance is not in the range 3.2 to 4 mm:
  - Increase the distance by turning the nozzle with the key clockwise (1 turn per mm).
  - Decrease the distance by turning the nozzle with the key counter-clockwise (1 turn per mm).

**Check and adjust horizontal alignment (B):**

- 1 Check the proper alignment (0 - 30° in turning direction) visually.
- 2 If the nozzle is not aligned properly, adjust the alignment with the nozzle key.

**Final steps**

- 1 Place a disc on the chuck
- 2 *Make Dye Coater Unit ready for operation* (page 63)

## Clear dispense tubes from air

Possible reasons

Exchange of pumps or tanks.

Procedure for the dye system

Issue host command **Dye doser motor purge**.

Procedure for the solvent system

Issue host command **Solvent doser motor purge**.

## Set process parameters

For each step of a process (pre conditioning, dye coating, and edge wiping) a movement profile can be defined. This profile is set up as a vector of several values bound to the location of the dispense arm.

No physical movement can change its speed from one value to another in zero time. The transition from one speed to the next can have various characteristics (depending on the motor type). In the vector tables these are called ramp types:

- 0 no change (keep value between points)
- 1 edge (change value as abruptly as possible)
- 2 ordinary ramp (change value linearly)
- 3 inverse function (change is rapid near higher value)
- 4 logarithmic function (change is rapid near lower value)

Procedure to change parameter values

Enter “maintenance mode” at the host system. This requires special privileges (a password).

- 1 Issue host command **Parameter setting**
- 2 Issue host command (for example) **Dye coating**
- 3 Enter the values in the table provided. This table may span several screens full, depending on the number of vectors.
- 4 Issue host command **Download** (may take some seconds), acknowledge download (**OK**).
- 5 After leaving maintenance mode initialise the Dye Coater Unit.

Special values

In the vector tables the values 999 and 0.0 have special meaning:

- 999        Dispense arm / doser motor moves to the home position.  
             Spinner speed is a function of time (column 3) set in the previous vector.
- 00         Process is complete. Hence the last entry in a table must have value 00 in the time column.
- x          Process control ignores this value.



## Pre conditioning

For pre conditioning at most 10 vectors (points on the movement characteristic) can be entered. The vector numbers for pre conditioning start with 101. The following is a sample vector table.

Vector #	Solvent arm position [0.1 mm]	Time [0.1 s]	Spinner n [RPM]	Spinner speed ramp type	Solvent dosing quantity [10µl]	Solvent dosing ramp type
101	200	x	800	x	x	x
102	600	20	270	3	100	3
103	999	30	6000	2	x	x
104	x	00	x	x	x	x

Table 8: Sample vector for pre conditioning

## Dye coating

For dye coating at most 50 vectors can be defined. Vector numbers start with 201. The following is a sample vector table for dye coating.

Vector #	Dye arm position [0.1 mm]	Time [0.1 s]	Spinner n [RPM]	Spinner speed ramp type	Dye dosing quantity [10µl]	Dye dosing ramp type
201	45	0	800	0	0	0
202	20	3	1600	3	0.5	0
203	23	0.3	1600	0	0.1	0
204	40	0.6	1000	3	0.2	0
205	99	3	3000	2	0	0
206	0	4	7000	2	0	0
207	0	2	7000	0	0	0
208	x	00	x	x	x	x

Table 9: Sample vector for dye coating

## Edge wiping

For edge wiping at most 10 vectors can be defined. Vector numbers start with 301. The following is a sample vector table for edge wiping.

Vector #	Solvent arm position [0.1 mm]	Time [0.1 s]	Spinner n [RPM]	Spinner speed ramp type	Solvent dosing quantity [10µl]	Solvent dosing ramp type
301	61	0	1000	1	0	2
302	58	0.5	1000	1	0.4	2
303	58	2	1000	1	1.2	2
304	61	0.5	1000	1	0.4	2
305	99	4.0	7000	2	0	0
306	x	00	x	x	x	x

Table 10: Sample vector for edge wiping

# Additional information

## External documentation

The following items are located in the *Machine documentation*:

- Profibus signals including control and parity signals (chapter 7)
- Electrical schema (chapter 6)
- Pneumatic schema (chapter 5)

## Service address

See *Customer service information* (page 2).