

# DryStar 2000 SM/CD 102 SM 74

Instruction manual



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**Heidelberger Druckmaschinen Aktiengesellschaft**

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## 1 Foreword

### 1.1 This instruction manual...

...supports you in the operation, maintenance and troubleshooting of your DryStar 2000. The information in this manual applies to the following DryStar 2000 variants:

- SM 74
- SM 74 L
- SM 74 LX
- SM/CD 102
- SM/CD 102 L
- CD 102 L + ZT
- SM/CD 102 LX
- CD 102 LX + ZT
- SM 102/CD 102 with UV dryer

### 1.2 Formatting

Numbers used to identify components in figures or in legends are displayed as follows:

- 1 (text)
- 2 (text)
- 3 (text)

Operational steps are displayed as follows:

- 1. (text)
- 2. (text)
- 3. (text)

### 1.3 Abbreviations

- Fig. Figure
- A.S. Drive side
- B.S. Operator's side
- IR Infrared
- LED Light emitting diode
- PLC Programmable controller
- STA Interface adapter
- UV Ultraviolet

## **2 Safety**

### **2.1 Basic safety requirements**

Personnel in charge of assembling, operating and maintaining the unit and its components must have read and understood this manual, in particular the section on safety.

If necessary, in-house instruction should be provided, taking into account the technical qualification of the personnel concerned.

### **2.2 Organization of safety instructions**


This manual has three categories of instructions, which are explained below.

Each category is assigned a symbol (pictogram) with a specific meaning to clarify individual instructions. Pictograms may also appear on stickers affixed to the unit.


**Safety instruction category 1 (warning)**

This safety instruction draws attention to situations that could present a particular danger. Failure to heed warnings can result in serious injury. In extreme cases, this can result in a life-threatening situation. Failure to heed warnings can also result in damage to the machine and additional equipment.

*Associated pictograms with signal words:*

	<b>Warning - &lt;general danger&gt;</b>
	<b>Warning - explosive substances!</b>
	<b>Warning - hot surface!</b>

*Example:*

	<b>Warning - explosive substances!</b>
<p>Flammable vapours form when the IR radiators are cleaned using a cleaner containing solvents. This may cause an explosion if the dryer is activated immediately afterwards. Please ensure adequate ventilation to allow the vapours formed from the cleaning agent to dissipate fully before the dryer is switched on again.</p>	

**Safety instruction category 2 (caution)**

This safety instruction draws attention to situations that could present a particular danger. Failure to heed warnings can result in damage to the machines and additional equipment.

*Associated pictogram with signal word:*



*Example:*



IR radiators can be irreparably damaged by even slight application of pressure. Please be particularly careful when performing any work on the IR radiators. Dirt and grease deposits on the IR radiators can cause irreparable damage. Please wear protective gloves for all work on the IR radiators.

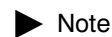
**Instruction category 3 (general note)**

This note offers additional information and tips on the use of the unit.

*Associated pictogram with signal word:*



*Example:*



An incorrectly installed air filter reduces air circulation.

**2.3 Operation, maintenance and troubleshooting**

- Please refrain from all methods or procedures which:
  - endanger the health and safety of the user or third parties,
  - are detrimental to the unit or others,
  - impair the safety and functionality of the unit,
  - do not comply with the safety instructions.
- All work on the unit such as operation, maintenance and troubleshooting may only be performed by persons who are familiar with this manual, have been instructed about potential dangers and who possess the necessary qualifications.
- Always check the unit safety devices before beginning work. Never remove or shut down safety devices.
- Check safety devices daily for proper function. Immediately report malfunctions or defects to Heidelberg Service.
- Maintenance work poses an increased risk of injury. Therefore, be sure to comply with the special safety instructions in the chapter “Maintenance” and perform maintenance work with extreme caution and attention.
- Never clean, perform maintenance work, change settings or troubleshoot while the printing press is running.
- Observe the instructions on the care and maintenance of the unit. Additional danger can result from a poorly or insufficiently maintained unit.
- Please observe the regulations in the Instruction Manual/Maintenance Instructions of your printing press.

- Switch off the machine/system (printing press main switch to “OFF”) when servicing (cleaning, maintenance, settings, troubleshooting). Secure the machine/system against unintentional reactivation.
- Have electrical equipment serviced by authorized Heidelberg Service only.
- Appropriate supports and protection must be used to avoid dangerous situations when assembling and disassembling heavy parts or components.
- Wear appropriate protective clothing when performing all maintenance work.

## 2.4 Handling cleaning agents, solvents, inks and varnishes

Cleaning agents, solvents, inks and varnishes can be combustible, explosive, corrosive, poisonous or volatile. Observe the following notes:

- Provide appropriate ventilation in the room.
- Avoid sources of ignition.
- Observe explosion prevention measures.
- No smoking, drinking or eating when working with these materials.
- Wear protective gloves.
- Comply with all accident prevention regulations, safety regulations and manufacturer's data sheets.
- Use only cleaning agents with a flash point of at least 55°C.
- When using dryers, use only inks and varnishes that do not constitute an explosion hazard as they are heated in the dryer.
- Do not heat paints and varnishes above their flash point.
- Store all cleaning agents, solvents, inks and varnishes in the appropriate and properly marked containers.
- Store these materials in closed containers.
- Remove any leaking materials immediately and in the correct manner.
- All waste must be disposed of consistent with existing regulations.
- Fumes from cleaning agents and solvents may not enter areas where air intake openings are present.

## 2.5 Handling anti-freezing agents

Anti-freezing agents can contain dangerous substances such as ethylene glycol, which are particularly hazardous to your health when swallowed.

Observe the following notes:

- Handle anti-freezing agents carefully to avoid contact with the skin and eyes.
- Wear impermeable gloves if your skin could come into contact for repeated or longer periods or time. In addition, wear safety goggles to protect your eyes.
- Make sure the room you are working in is properly ventilated when handling anti-freezing agents.
- Store anti-freezing agent in tightly sealed and appropriately labeled containers in a well-ventilated area. Do not place containers of anti-freezing agent in direct sunlight.
- Avoid polluting the soil, groundwater and natural bodies of water.
- Install a nonreturn valve at the drinking water supply/cooling circuit transfer location to avoid polluting the drinking with used cooling water.
- Build a dike with earth around anti-freezing agent as it exits and cover it with absorbant material. Pour the mixture into containers or plastic bags and prepare it for disposal.
- Dispose of anti-freezing agents at a recognized reprocessor or authorized incineration plant.
- Anti-freezing agent containers must be completely emptied of any residue before being disposed of.
- Pay particular attention to the specifications and notes on the safety data sheet of the anti-freezing agent used.

### 2.6 Handling hot air/IR dryer slide-in units

- Hot dryer slide-in units (hot air/IR) pose a risk of burns. Always let the dryer slide-in units cool for a long period of time before handling them.
- IR radiation damages the eyes. Avoid looking directly into the IR radiators.
- IR radiators are pressure-sensitive. The pinch-type ducts at the ends are particularly sensitive. Therefore take extreme caution when dealing with IR radiators.
- IR radiators are sensitive to dirt. Grease and sweat from the hands burn into the quartz pipes and shorten their lifetime. Always wear clean gloves when handling IR radiators.
- If, however, the radiators become dirty, wipe then with a soft, lint-free cloth. The front side of the IR radiators can be cleaned with a cloth lightly soaked with alcohol. Alcohol may **not** be used to clean the gold-plated back of the IR radiators.

## 2.7 Working with compressed air

- When cleaning with compressed air, bear in mind that loose dust and powder particles are carried away and can cause injury to the eyes as well as damage the respiratory system. Always wear protective glasses and a dust mask when cleaning with compressed air.
- Compressed air can cause serious injury. Never direct a stream of compressed air at a person.
- The application of compressed air can result in damage to sensor engineering. Never clean sensors with high energy compressed air.

## 2.8 Proper use

The unit may only be used for the purpose described in chapter 4 "Description" in connection with the supplied and authorized components. Using the unit for purposes other than those mentioned is considered contrary to the proper use. The manufacturer cannot be held liable for any damage resulting from such use. The risk of such misuse lies entirely with the user.

## 2.9 Terms of warranty

The manufacturer's warranty becomes null and void in the following cases:

- Improper use.
- Failure to comply with this manual.
- Operation by insufficiently qualified personnel.
- Using spare parts not issued by **Heidelberger Druckmaschinen AG**.
- Unilateral changes to the unit and its components which were supplied by **Heidelberger Druckmaschinen AG**.

### 3 General information about the drying process

#### **Drying process**

Both inks and coatings are used for offset printing. Inks and coatings both dry in a different way. Offset ink dries, to a greater extent, through the chemical process of oxidation, and to a lesser extent, through the absorption of mineral oils by the print material. The coatings used are dispersion coatings, which dry through the physical process of the evaporation of the water content.

The drying process must be adapted accordingly. IR radiation is used to dry printing inks. The use of IR radiation has advantages in terms of production and is an efficient technique. This process allows IR offset inks and conventional offset inks to be dried. The process of hot air drying in conjunction with IR radiation and circulating air is used for drying coatings.

#### **IR radiators**

An IR dryer slide-in unit contains a maximum of five IR radiators. Its output can be manually or automatically set. The IR radiators are cooled by blow air. The air for cooling the radiators is still applied after the IR radiators have been switched off to dissipate the remaining heat generated by the IR radiators (run-out time). The output of the IR radiators is reduced to a harmless level to prevent the system from overheating if the cooling air system fails during operation.

Other sheet sizes can also be selected for the IR dryer slide-in unit, thus saving energy.

**Coating dryer**

The dryer slide-in unit of a coating dryer contains the IR radiators and other additional hot air nozzles. Hot air is blown out of these nozzles and onto the coating layer. The hot air heats the varnish and evaporates the water content of the varnish. The hot air also carries the air that is filled with water vapour away from the print sheet. The hot air is supplied by an additional blower which blows air through a heating element. The heating output is infinitely variable. An excess temperature switch prevents the temperature in the heating element from exceeding the specified limit.

**Extended delivery**

The extended delivery, unlike the conventional high-pile delivery, allows a maximum of four dryer slide-in units of different designs to be used. Therefore, the extended delivery of the DryStar Combination is equipped with a second IR dryer slide-in unit in addition to the normal configuration with hot air for even faster drying and a circulating blower to increase ventilation. This area of increased ventilation above the print sheet is absolutely necessary for processing dispersion varnishes with a high water content if you want to achieve maximum drying capacity. An additional fan row in the sheet ascent reduces the odour emissions (SM 74). Additional suction devices in the delivery ensure the constant removal of the air filled with water vapours and odorous substances from the delivery.

**Pile surface temperature**

The pile surface temperature is a measure for the drying state of the ink or varnish. It is recorded using the pile surface temperature sensor. Certain set points for the pile surface temperature must be defined, depending on the grammage of the print material, the quantity of ink or varnish and the desired gloss effect.

The pile surface temperature is controlled at a temperature between  $\pm 2^{\circ}\text{C}$ . Fine adjustments up or down are permitted. This allows the drying conditions to be optimally adapted to the process.

### 4 Description

#### 4.1 Function

The DryStar 2000 is an accessory for **Heidelberger Druckmaschinen AG** printing presses that supports the drying process of printed/coated sheets.

#### 4.2 Versions

Two versions of the DryStar 2000 are available:

- DryStar 2000 air-cooled version
- DryStar 2000 water-cooled version

##### 4.2.1 DryStar 2000 air-cooled version

The DryStar 2000 air-cooled version releases the waste heat of the sheet guide plate into the air via an air/water heat exchanger. The heated air should not be blown into the press room, but should be directed through an optional exhaust air hood and an exhaust air duct that must be installed additionally.

##### 4.2.2 DryStar 2000 water-cooled version

The DryStar 2000 water-cooled version conveys the waste heat to an external cooling circuit via a water/water heat exchanger. The recirculated heat can be used for auxiliary purposes. The exhaust air filled with odorous substances can escape by means of an optional exhaust air hood and an exhaust air duct that must be installed additionally.

#### 4.3 Operation

The DryStar 2000 is operated from the operating console of the printing press delivery and on the control panel of the dryer cabinet.

#### 4.4 Variants

##### 4.4.1 DryStar 2000 SM 74

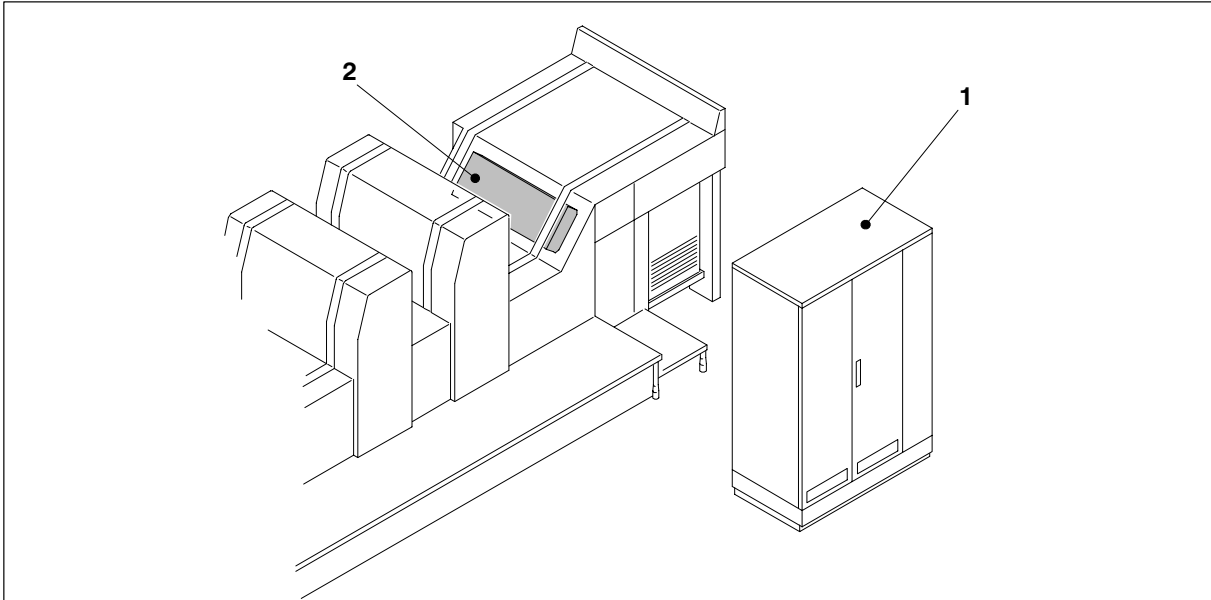


Fig. 1 Printing press with DryStar 2000 SM 74

The DryStar 2000 SM 74 is an accessory of the Speedmaster SM 74 (standard delivery without coating unit). It comprises the following main components:

- 1 Dryer cabinet
- 2 Dryer slide-in unit 1 (IR)

4.4.2 DryStar 2000 SM 74 L

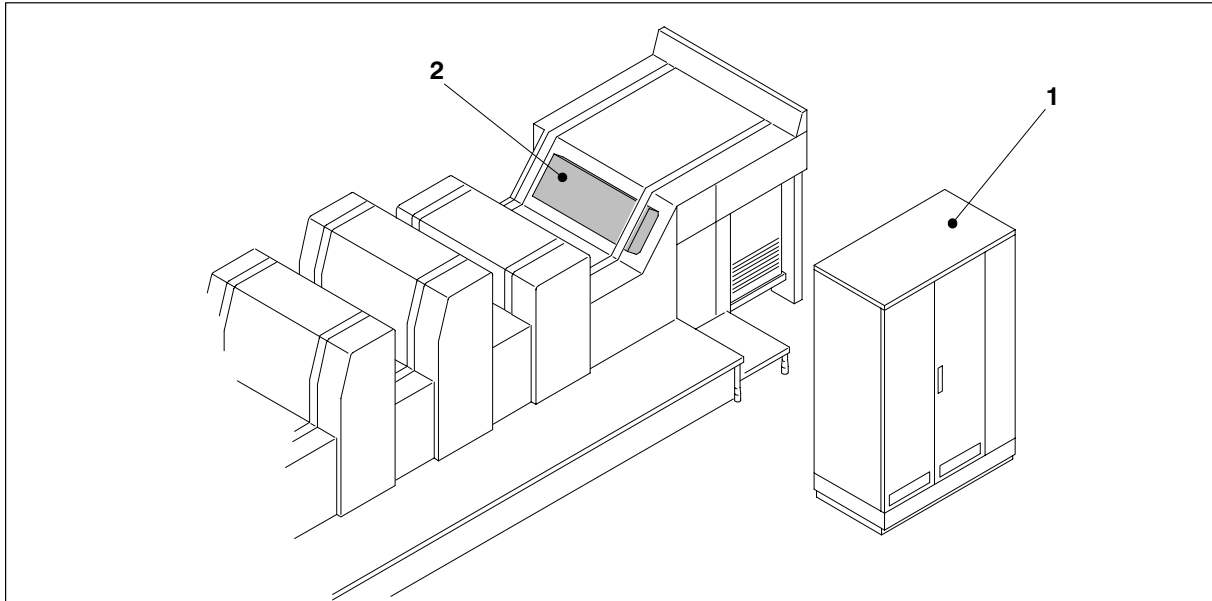


Fig. 2 Printing press with DryStar 2000 SM 74 L

DryStar 2000 SM 74 L is an accessory of the Speed-master SM 74 L (standard delivery with coating unit). It comprises the following main components:

- 1 Dryer cabinet
- 2 Dryer slide-in unit 1 (IR + hot air)

## 4.4.3 DryStar 2000 SM 74 LX

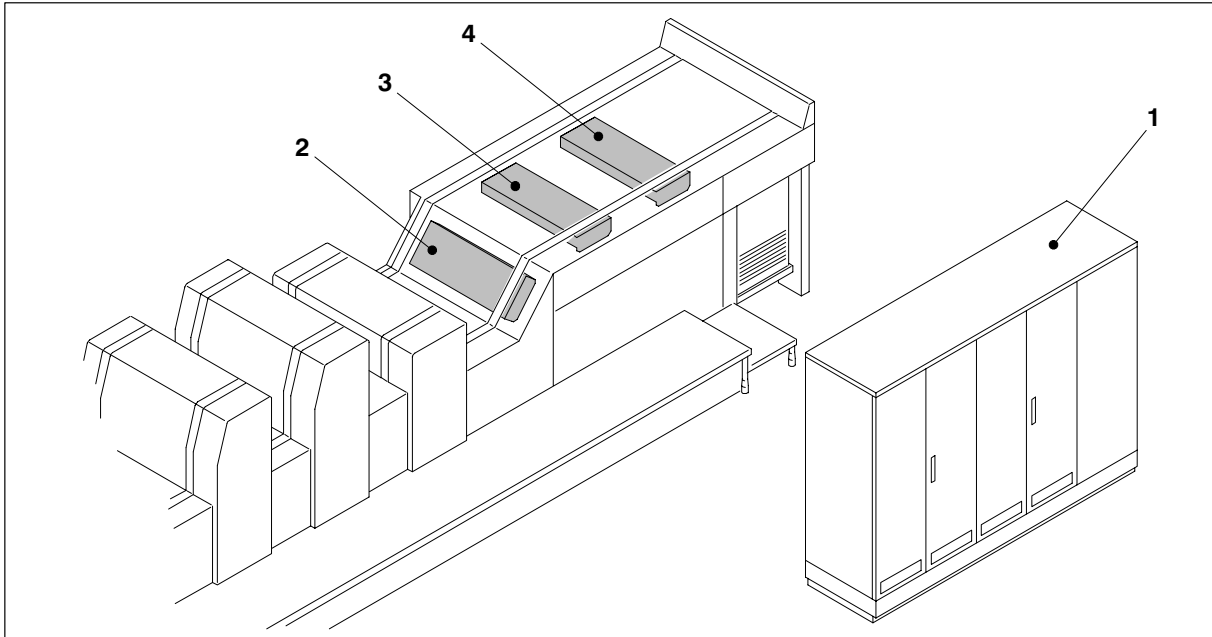


Fig. 3 Printing press with DryStar 2000 SM 74 LX

DryStar 2000 SM 74 LX is an accessory of the Speedmaster SM 74 LX (extended delivery with coating unit). It comprises the following main components:

- 1 Dryer cabinet
- 2 Dryer slide-in unit 1 (IR + hot air)
- 3 Dryer slide-in unit 2 (IR + hot air)
- 4 Dryer slide-in unit 3 (cold air)

4.4.4 DryStar 2000 SM/CD 102

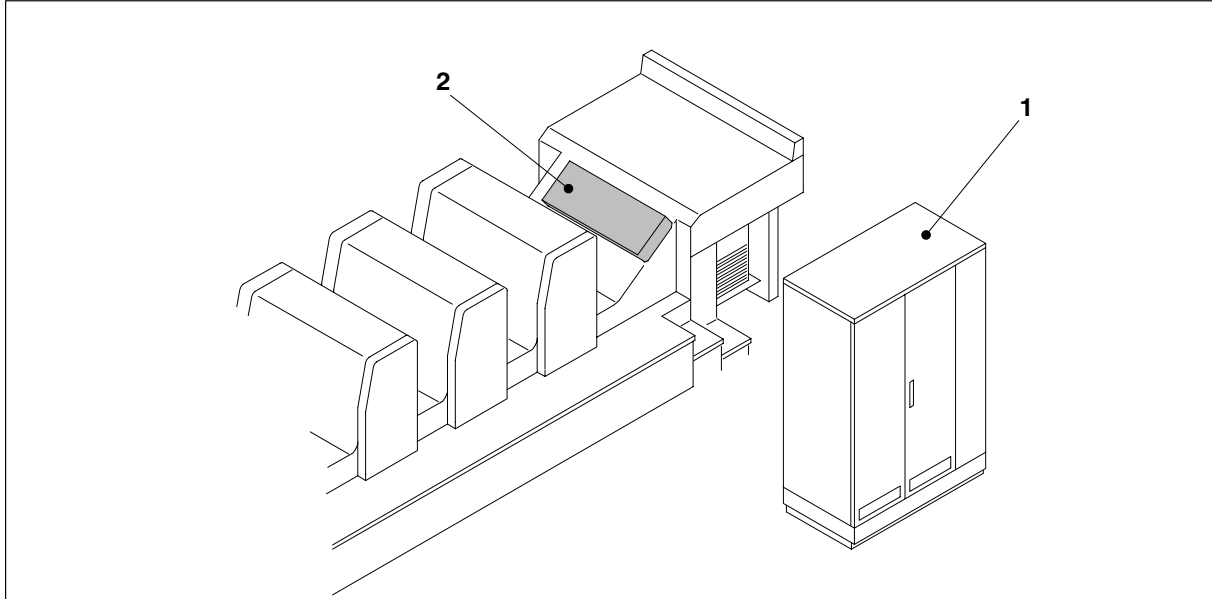


Fig. 4 Printing press with DryStar 2000 SM/CD 102

DryStar 2000 SM/CD 102 is an accessory of the Speedmaster SM/CD 102 (standard delivery without coating unit). It comprises the following main components:

- 1 Dryer cabinet
- 2 Dryer slide-in unit 1 (IR)

## 4.4.5 DryStar 2000 SM/CD 102 L

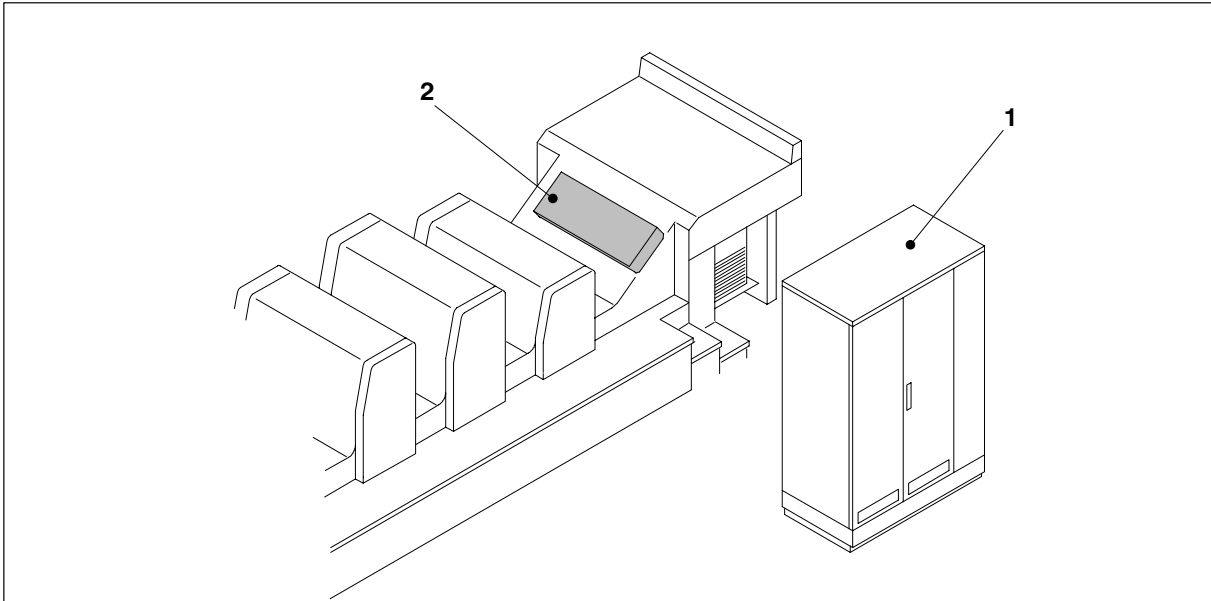


Fig. 5 Printing press with DryStar 2000 SM/CD 102 L

DryStar 2000 SM/CD 102 L is an accessory of the Speedmaster SM/CD 102 L (standard delivery with coating unit). It comprises the following main components:

- 1 Dryer cabinet
- 2 Dryer slide-in unit 1 (IR + hot air)

## 4.4.6 DryStar 2000 CD 102 L + ZT

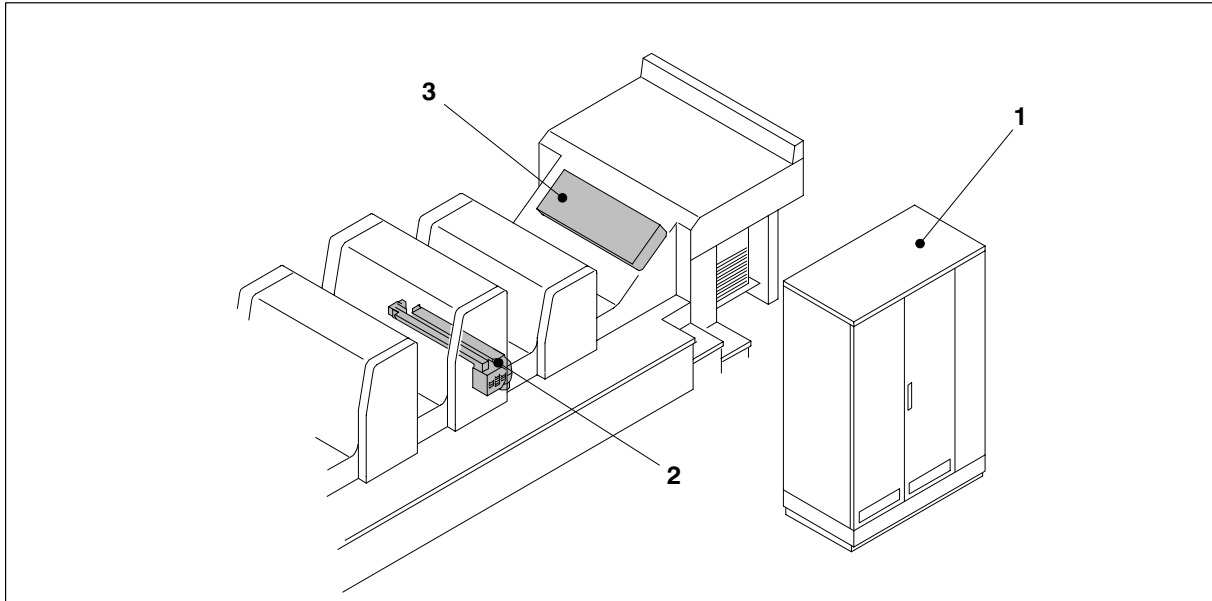


Fig. 6 Printing press with DryStar 2000 CD 102 L + ZT

DryStar 2000 CD 102 L + ZT is an accessory of the Speedmaster CD 102 L + ZT (standard delivery with coating unit and interdeck dryer). It comprises the following main components:

- 1 Dryer cabinet
- 2 Interdeck dryer (IR)
- 3 Dryer slide-in unit 1 (IR + hot air)

## 4.4.7 DryStar 2000 SM/CD 102 LX

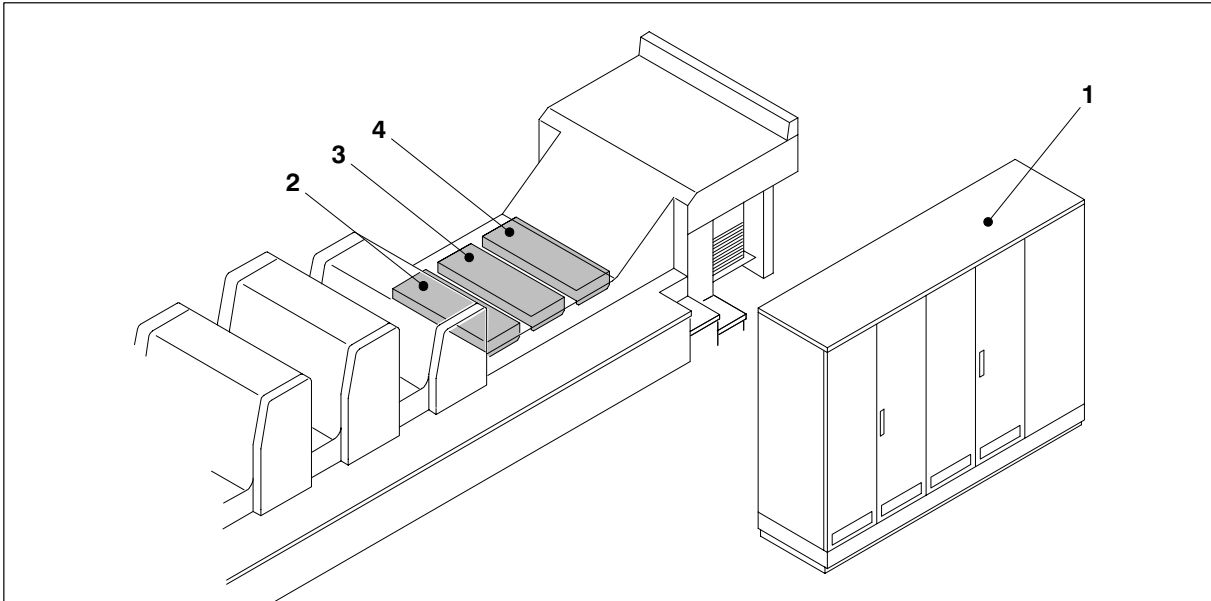


Fig. 7 Printing press with DryStar 2000 SM/CD 102 LX

DryStar 2000 SM/CD 102 LX is an accessory of the Speedmaster SM/CD 102 LX (extended delivery with coating unit). It comprises the following main components:

- 1 Dryer cabinet
- 2 Dryer slide-in unit 1 (IR + hot air)
- 3 Dryer slide-in unit 2 (IR + hot air)
- 4 Dryer slide-in unit 3 (cold air)

4.4.8 DryStar 2000 CD 102 LX + ZT

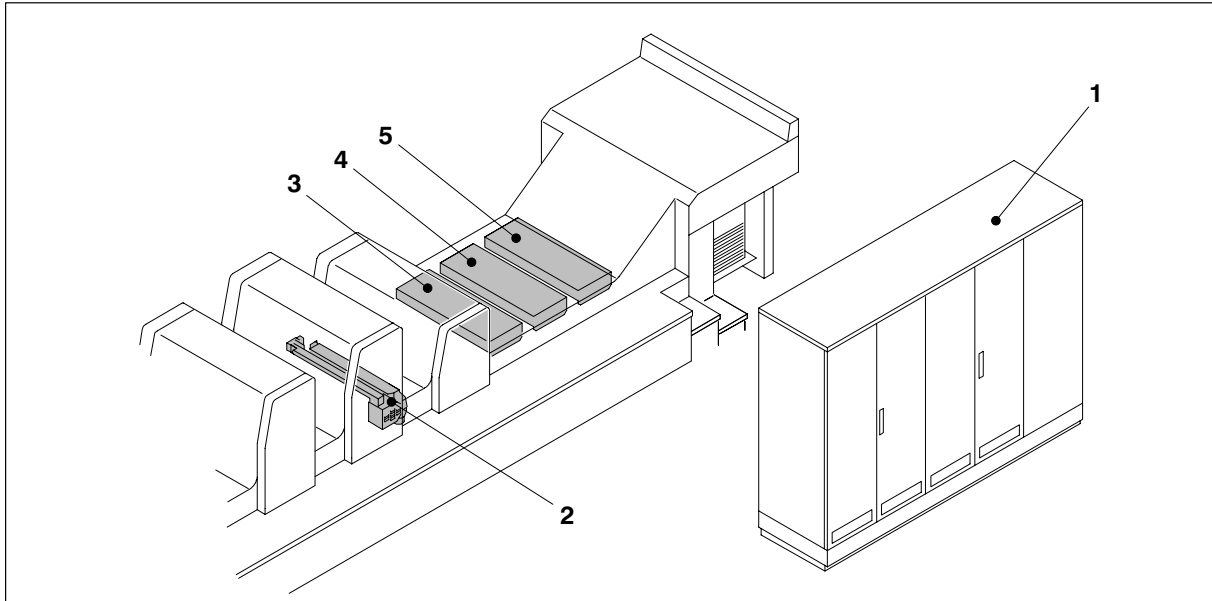


Fig. 8 Printing press with DryStar 2000 CD 102 LX + ZT

DryStar 2000 CD 102 LX + ZT is an accessory of the Speedmaster CD 102 LX + ZT (extended delivery with coating unit and interdeck dryer). It comprises the following main components:

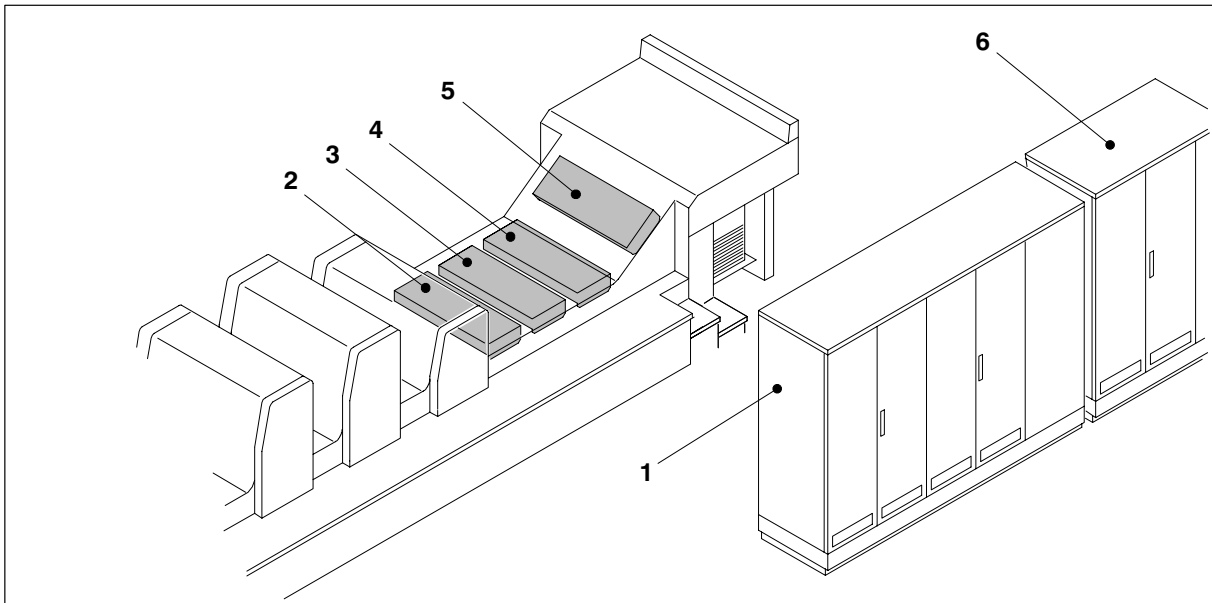
- 1 Dryer cabinet
- 2 Interdeck dryer (IR)
- 3 Dryer slide-in unit 1 (IR + hot air)
- 4 Dryer slide-in unit 2 (IR + hot air)
- 5 Dryer slide-in unit 3 (cold air)

**4.4.9 DryStar 2000 SM/CD 102 with UV dryer**

► **Note**

The UV dryer slide-in unit and the UV dryer cabinet are not included in the scope of delivery of the DryStar 2000.

**DryStar 2000 SM/CD 102 LX + UV**



**Fig. 9** Printing press with DryStar 2000 SM/CD 102 LX + UV

DryStar 2000 SM/CD 102 LX + UV is an accessory of the Speedmaster SM/CD 102 LX + UV (extended delivery with coating unit and UV dryer). It comprises the following main components:

- 1** Dryer cabinet
- 2** Dryer slide-in unit 1 (IR + hot air)
- 3** Dryer slide-in unit 2 (IR + hot air)
- 4** UV dryer slide-in unit
- 5** Dryer slide-in unit 3 (cold air)
- 6** UV dryer cabinet

## DryStar 2000 CD 102 LX + ZT + UV

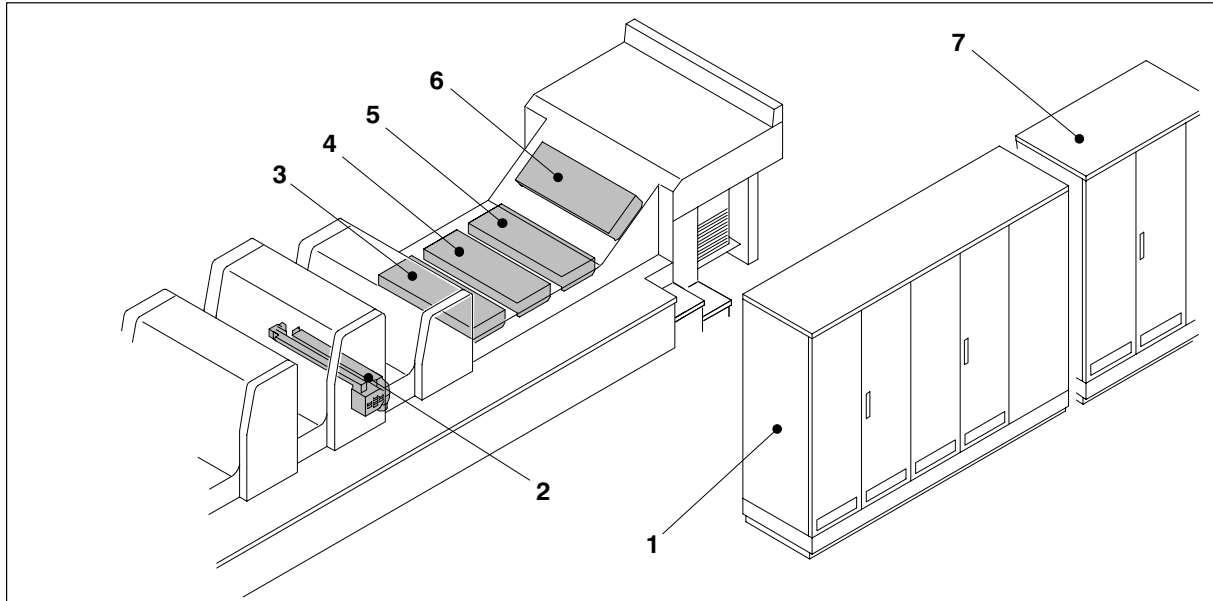


Fig. 10 Printing press with DryStar 2000 CD 102 LX + ZT + UV

DryStar 2000 CD 102 LX + ZT + UV is an accessory of the Speedmaster CD 102 LX + ZT + UV (extended delivery with coating unit, interdeck dryer and UV dryer). It comprises the following main components:

- 1 Dryer cabinet
- 2 Interdeck dryer (IR)
- 3 Dryer slide-in unit 1 (IR + hot air)
- 4 Dryer slide-in unit 2 (IR + hot air)
- 5 UV dryer slide-in unit
- 6 Dryer slide-in unit 3 (cold air)
- 7 UV dryer cabinet

**5 Main components**

**5.1 Dryer cabinet**

The dryer cabinet contains the blowers and cooling units for the drying process.  
The control system and all electronics are located in the electrical module of the dryer cabinet.

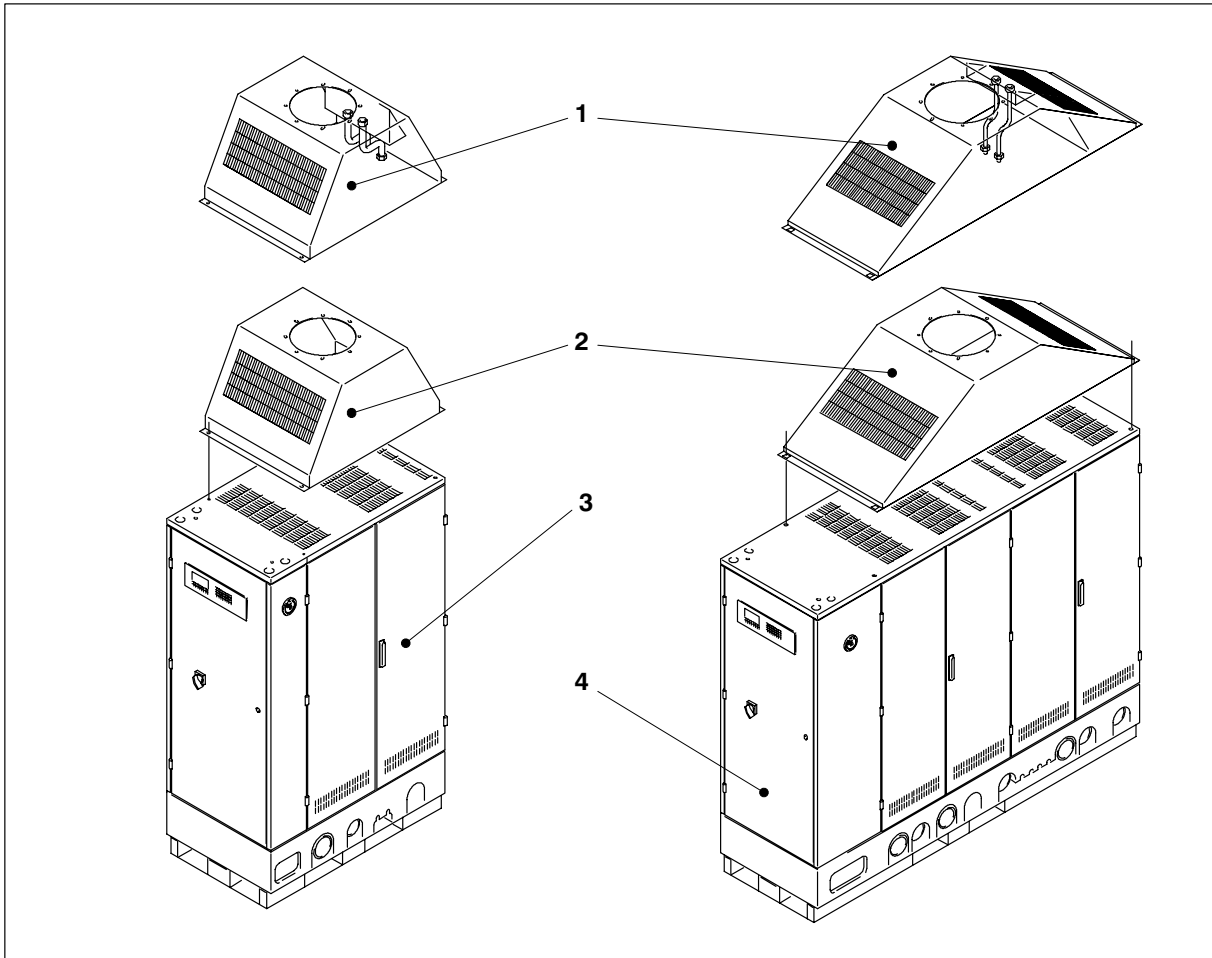


Fig. 11 Dryer cabinets with exhaust air hoods

- 1 Exhaust air hoods (optional) for the DryStar 2000 water-cooled version
- 2 Exhaust air hoods (optional) for the DryStar 2000 air-cooled version
- 3 Dryer cabinet for standard delivery
- 4 Dryer cabinet for extended delivery

## 5.2 Dryer slide-in unit 1 (IR)

## 5.2.1 DryStar 2000 SM 74

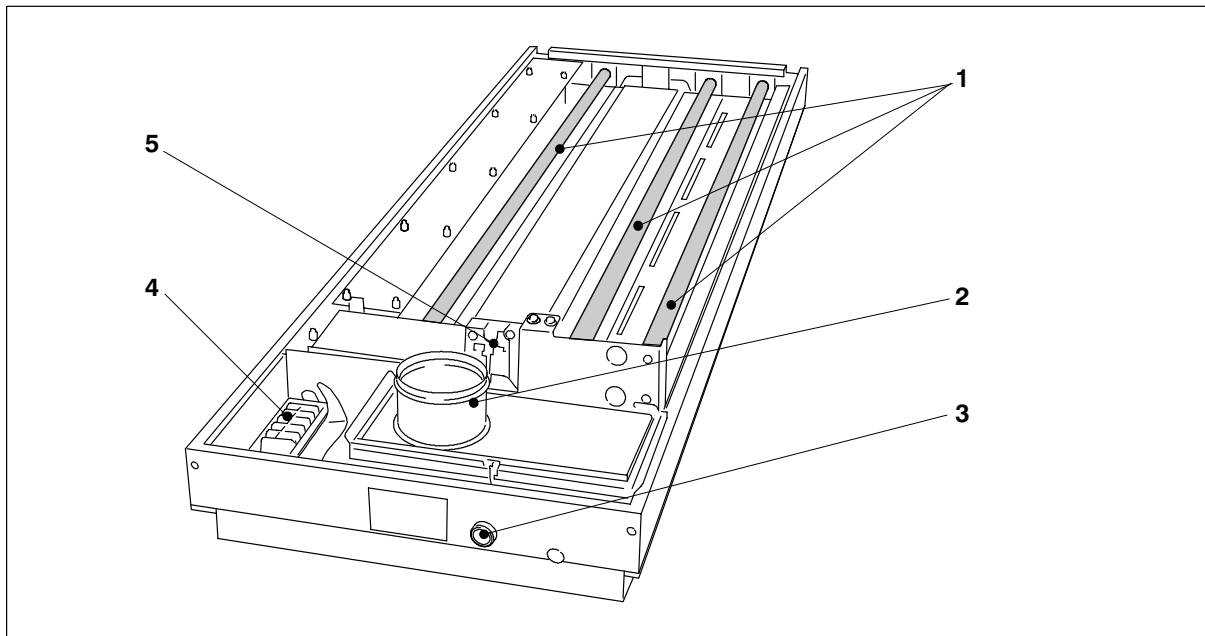


Fig. 12 Dryer slide-in unit 1 (IR)

- 1 IR radiators
- 2 Connection piece for blow air (cooling air)
- 3 Unlocking button
- 4 Plug connector
- 5 Safety limit switch

The IR radiators (Fig. 12/1) in the dryer slide-in unit generate intense heat radiation. The heat radiation dries the sheets that are being guided through. Cooling air is supplied to the IR radiators through the blow air connection piece (Fig. 12/2).