Combination Dryer

HYBRITEC

Flow rate 12.0 to 150.0 m³/min
Just set the pressure dew point
Most industrial applications require a source of quality, dry compressed air to prevent the accumulation of condensate in air distribution networks and to minimise the associated risk of costly system failures.

The pressure dew point (PDP) is the temperature at which compressed air reaches its humidity saturation point under pressure. Once the PDP is reached, any further reduction in temperature results in the accumulation of condensation. The required PDP for any given application should therefore be achieved as efficiently as possible.

Efficient drying
Refrigeration drying is the preferred method of compressed air treatment for pressure dew points down to +3 °C, whilst desiccant dryers are used for PDPs below +3 °C, although they do consume significantly more energy.

With its new HYBRITEC combination dryer range, KAESER KOMPRESSOREN has developed an energy-efficient solution for PDP values as low as -40 °C for flow rates from just 12 m³/min.

Configurability as standard
HYBRITEC dryers are not one-off custom-produced systems. Rather, they can be optimally configured to suit the needs of virtually any application simply by selecting the appropriate components from KAESER’s extensive range of refrigeration and desiccant dryers. Users are therefore able to benefit from optimum system reliability and cost-effective compressed air drying year-round.

Outstanding efficiency with low pressure dew points
KAESER HYBRITEC dryers offer an exceptional level of standardisation for both the desiccant and refrigeration drying stages, yet ensure outstanding flexibility when it comes to providing a tailored solution in order to meet the needs of a specific application. Moreover, such standardised processes ensure consistent production quality. KAESER is the only compressed air systems provider to offer combination solutions in this way.

Drying process | Pressure dew point °C | Typical specific power requirement kW/m³/min
--- | --- | ---
Refrigeration dryer | +3 | 0.1
Hybritec | +3 to -40 | 0.2
Heat-regenerating desiccant dryer | -40 | 0.8 to 0.8
Heatless regenerated desiccant dryer | +3 | 1.4 to 1.6
HYBRITEC
In a Class of their Own

Compact and ready-to-run
HYBRITEC dryers are quick and easy to install. Standardised components are mounted on a base frame ready for immediate operation – quick, easy and effortless.

Automatic temperature sensing
Equipped with a dependable thermostat control system, HYBRITEC dryers are able to automatically switch from frost protection operation at colder times of the year to pure refrigeration dryer mode during the warmer months.

Long desiccant service life
As the air entering the desiccant dryer section has already been dried to a PDP of +3 °C, it burdens the desiccant to a far lesser extent than untreated compressed air. Desiccant service life of up to 10 years is therefore possible, which, as a result, significantly reduces costs.

10-year desiccant service life
The reduced thermal and mechanical demands that are placed on the HYBRITEC’s desiccant dryer section not only significantly extend desiccant service life, but also mean that less desiccant material is actually required. Service costs are therefore kept to an absolute minimum.

DTE 120/192
Up to 26 hours*

www.kaeser.com
HYBRITEC

Double efficiency

Flexible standard products
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Seasonal temperature profile
The HYBRITEC’s combination approach for applications requiring frost protection has clear energy advantages both over stand-alone desiccant dryers and separate components installed in series.

Energy-saving modulating control
The modulating control systems, equipped as standard, deliver additional energy savings. Digital scroll control is used with the refrigeration dryers, whilst cylinder shutdown is also used to precisely control the refrigerant compressor. Desiccant dryers feature a PDP sensor and a corresponding regulator to adjust cycle times.

Up to 67 % energy savings
Hybritec dryers can provide significant savings compared with single-stage heat regenerated desiccant dryers. With an assumed frost period of four months a year for example, it is possible to reduce energy costs by up to 67 %. Even if the system is used to provide a pressure dew point of -40 °C year-round, the energy saving potential can still be as high as 50 %.
Function overview

**Compressed air inlet**
- **Summer**: Approx. +35 °C, Pressure dew point: Approx. +35 °C
- **Winter**: Approx. +35 °C, Pressure dew point: Approx. +35 °C
- Water content: 39.5 g/m³
- Relative humidity: 100%

**Compressed air outlet**
- **Summer**: Approx. +27 °C, Pressure dew point: Approx. +3 °C
- **Winter**: Approx. +27 °C, Pressure dew point: Approx. –40 °C
- Water content: 5.9 g/m³
- Relative humidity: 23.1%

**Micro-filtration**
- At approx. 3 °C

**Downstream from refrigeration dryer**
- **Summer**: Approx. +3 °C, Pressure dew point: Approx. +3 °C
- **Winter**: Approx. +3 °C, Pressure dew point: Approx. +3 °C
- Water content: 5.9 g/m³
- Relative humidity: 100%

**Adsorption**
- **Winter**: Approx. +3 °C, Pressure dew point: Approx. –40 °C
- Water content: 0.117 g/m³
- Relative humidity: 2%

**Regeneration**
- Alternating regeneration/adsorption (16 h/6 h)

**Conditions as per ISO 7183 Option A**
Equipment

Refrigeration dryer system

Control cabinet with energy-saving control

For all refrigeration dryers:
- Air/air and air/refrigerant plate heat exchanger and condensate separation system made from stainless steel.
- According to model, at least 2 ECO-DRAIN electronic condensate drains.
- Integrated FE microfilter installed at the coldest point.
- All cold system components insulated.
- Insulated bypass with shut-off valve for “Summer / Winter operation”.
- Powder-coated enclosure panels.
- All materials used are CFC-free.

Desiccant dryer system

Load dependent ECO CONTROL DW with specially designed pressure dew point sensor.

Control panel:
- Control:
  - Plain text display with English and German language options; indicator for, amongst others, cycle phase, alarm messages.
  - Acknowledgement key.
  - Monitoring of temperature and valve switching sequence.
  - Diagnostics mode with indicator for valve switching sequence.
  - Automatic mode for automatic restart.
- Additional indicators/regulators:
  - PDP display with adjustable PDP alarm value.
  - Temperature controller/indicator for regeneration-air temperature.
  - Light indicators: power supply, current cycle phase, alarm.
- Switches:
  - ON/OFF and main switch.
  - Floating contact for group alarm.
  - Two desiccant chambers with stainless steel flow diffusers.
  - Chambers and cold air lines insulated and stainless steel clad.
  - Also for regeneration air lines, control air filter, valve cluster, temperature sensors, silencer.
  - Surfaces finished and coated.
  - 10 high-quality changeover valves.
  - Radial layout of chamber in- and outlets.
  - Generously-sized connections for easy filling/emptying and for chamber inspections.
  - Disconnection of pipe bridges not necessary.
  - Moist compressed air and regeneration air is always fed against the direction of flow.

Improved moisture transportation. Minimised energy requirement for purge air generation. Reduced cooling-air requirement.
- Regeneration implemented via side channel fans, upstream inlet filter and external heating.
- High-quality SIGMA® Dry desiccant.
- Easy access particulate filter installed upstream from regeneration dryer inlet.
- All materials used are CFC-free.

Options

- Maximum pressure 16 bar(g).
- Water-cooled refrigeration dryer
- Refrigeration dryer with speed controlled fan motors from DTL 883/1101 (W).
- Installation in 20-foot container up to installation size DTI 667/901.
- Desiccant dryer with heat exchanger for regeneration.
- RAL custom colours.
- Automatic switch-over between summer/winter operation.
- Mains power connection: 500V / 3Ph / 50Hz.
- Additional soundproofing for venting process < 80 dB(A) (only up to DTI).

Refrigeration dryer system

Control cabinet with energy-saving control

Air/air and air/refrigerant plate heat exchanger and condensate separation system made from stainless steel.

Desiccant dryer system

Load dependent ECO CONTROL DW with specially designed pressure dew point sensor.

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  - Light indicators: power supply, current cycle phase, alarm.
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  - ON/OFF and main switch.
  - Floating contact for group alarm.
  - Two desiccant chambers with stainless steel flow diffusers.
  - Chambers and cold air lines insulated and stainless steel clad.
  - Also for regeneration air lines, control air filter, valve cluster, temperature sensors, silencer.
  - Surfaces finished and coated.
  - 10 high-quality changeover valves.
  - Radial layout of chamber in- and outlets.
  - Generously-sized connections for easy filling/emptying and for chamber inspections.
  - Disconnection of pipe bridges not necessary.
  - Moist compressed air and regeneration air is always fed against the direction of flow.

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## Technical specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Flow rate 1)</th>
<th>Air connection</th>
<th>Average effective total power consumption 2)</th>
<th>Mass</th>
<th>Dimensions W x D x H</th>
<th>Refrigerant charge</th>
<th>CO₂ equivalent</th>
<th>Hermetically sealed refrigerant circuit</th>
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<tbody>
<tr>
<td>DTE 120/192</td>
<td>12.0</td>
<td>G 2 ½</td>
<td>1.3</td>
<td>1.80</td>
<td>2730 x 1332 x 2907</td>
<td>5.5</td>
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<tr>
<td>DTE 160/240</td>
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<td>G 2 ½</td>
<td>1.9</td>
<td>1.80</td>
<td>2730 x 1332 x 2907</td>
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<td>DG 201/302 (W)</td>
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</table>

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1) ISO 7183, Option A: Reference conditions 1 bar(a), 30 °C, rel. humidity 21 % – Operation reference: Inlet pressure 7 bar(g), inlet temperature +35 °C, ambient temperature 20 °C, rel. humidity at dryer inlet 100 %, cooling water temperature 33 °C and -delta T 10 K
2) Data averaged over all cycle periods, at 100% flow rate
3) Includes RD fan, DD heating, DD fan, control systems
4) Includes DD heating, DD fan, control systems
5) Also available with water-cooled refrigeration dryer

contains the HFC refrigerant R 407c (GWP 2107) – DTE 160/240 – DTI 668/902
Contains the HFC refrigerant R 134a (GWP 1430) – DTE 120/192, DTL 833/1101 – DTL 1500/1775

## Views

### Front view

### Rear view

### Left view

### Right view

### Perspective view
KAESER – The world is our home

As one of the world’s largest compressed air systems providers and compressor manufacturers, KAESER KOMPRESSOREN is represented throughout the world by a comprehensive network of branches, subsidiary companies and authorised partners in over 100 countries.

With innovative products and services, KAESER KOMPRESSOREN’s experienced consultants and engineers help customers to enhance their competitive edge by working in close partnership to develop progressive system concepts that continuously push the boundaries of performance and compressed air efficiency. Moreover, the decades of knowledge and expertise from this industry-leading system provider are made available to each and every customer via the KAESER group’s global computer network.

These advantages, coupled with KAESER’s worldwide service organisation, ensure that all products operate at the peak of their performance at all times and provide maximum availability.