



Energy-Saving Refrigeration Dryers

SECOTEC® TA to TD Series

The savings specialists with stable pressure dew point

Flow rate 0.60 to 8.25 m³/min, Pressure 3 to 16 bar

The savings specialists with stable pressure dew point

The SECOTEC name has long been synonymous with high-quality KAESER refrigeration dryers built for industrial duty, stable pressure dew points, maximum reliability and minimal overall life-cycle costs. SECOTEC refrigeration dryers in the TA to TD series are used for drying compressed air down to a pressure dew point of $+3\text{ }^{\circ}\text{C}$, thanks to their highly efficient thermal mass control, which can be tailored to individual needs for outstanding savings. A generously-dimensioned thermal mass ensures low-wear operation and a stable pressure dew point.

Furthermore, with the climate-friendly refrigerant R-513A, KAESER guarantees your security of supply for the future. Made in Germany: All SECOTEC refrigeration dryers are built in accordance with the very highest quality standards at KAESER's plant in Gera.

Energy savings

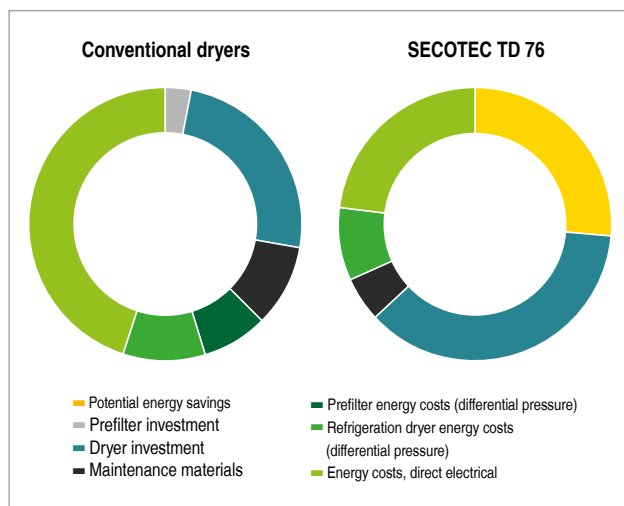
SECOTEC series refrigeration dryers feature very low energy consumption. With energy-saving control, the thermal mass can store excess cooling capacity until it is needed, enabling later drying without any power consumption – which is highly beneficial during partial load operation. The quick-response heat exchanger system ensures stable pressure dew points at all times, which in turn delivers huge potential energy savings in partial load operation and during periods of downtime.

Easy to maintain

SECOTEC refrigeration dryers are extremely low-maintenance. On the rare occasions when a service is needed, their enclosure design enables easy access to all service-relevant components, including the condenser, which is very easy to clean. All of these advantages significantly reduce servicing/testing requirements and therefore costs.

Long-term efficiency

SECOTEC series refrigeration dryers are an attractive choice with their highly durable, low-maintenance design. Their high-quality refrigerant circuit enables reliable performance in ambient temperatures up to $+43\text{ }^{\circ}\text{C}$ – with low material-load, thanks to the high-performance thermal mass. The generously-dimensioned stainless steel condenser and ECO-DRAIN condensate drain (type TA 8 and up) provide reliable condensate removal in all load phases, enabling a stable pressure dew point. The electrical equipment corresponds to standard EN 60204-1.



Reduce life-cycle costs

Three factors make the extremely low life-cycle costs of the new SECOTEC refrigeration dryers possible: their low-maintenance design, energy-efficient component selection and, first and foremost, the demand-dependent SECOTEC thermal mass control.

Thanks to these three factors, a SECOTEC TD 76 can save up to 26% of total life-cycle costs compared to conventional refrigeration dryers.

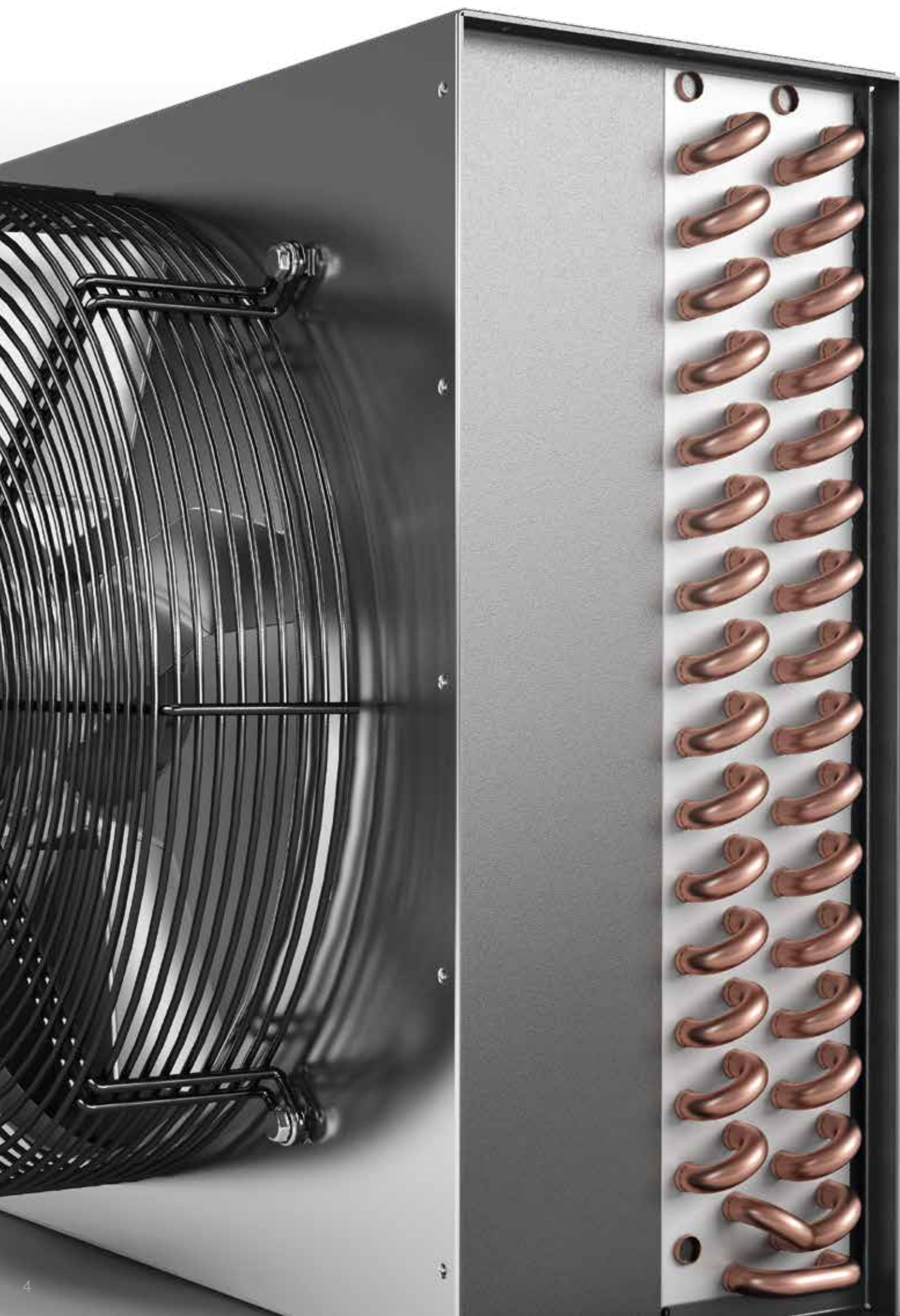
Example: SECOTEC TD 76 compared to a conventional dryer with hot gas bypass control:

Flow rate $8.25\text{ m}^3/\text{min}$, 40% duty cycle, $6.55\text{ kW}/(\text{m}^3/\text{min})$, additional energy requirement $6\%/bar$, $\text{€ } 0.20/\text{kWh}$, 6,000 operating hours per year, annual debt service over 10 years.

Perfect for every compressed air need

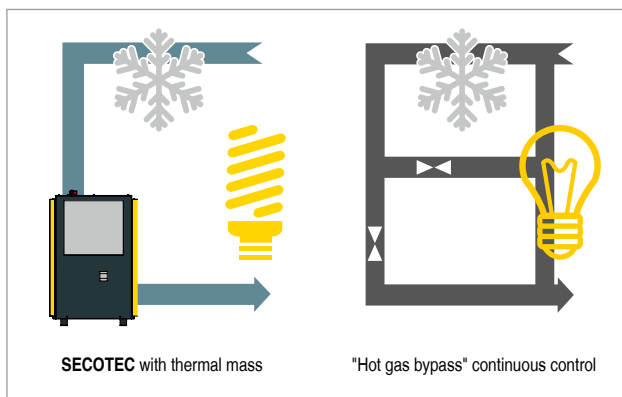


Image: SECOTEC TA 11, TD 76



The energy-efficient powerhouse

Consistent use of high-quality components and our decades of experience in system design allow SECOTEC refrigeration dryers to achieve exceptional energy efficiency – across the entire load range.



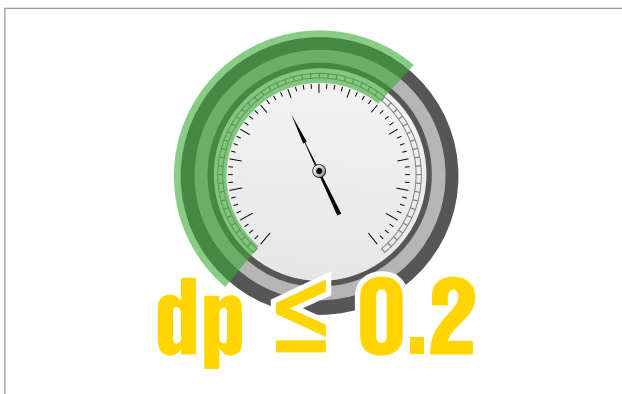
SECOTEC CONTROL

The SECOTEC thermal mass control significantly reduces energy consumption compared to conventional systems with continuous control. The refrigeration circuit is activated only when cooling is actually required.



Efficient SECOTEC solid thermal mass

At the heart of every SECOTEC refrigeration dryer is a thermal mass with exceptionally high capacity. Moreover, in the TA to TD series, the entire air/refrigerant heat exchanger is embedded in a storage medium and encased in efficient heat protection.



Minimal differential pressure

SECOTEC series refrigeration dryers feature very low differential pressure. This is made possible thanks to the generously-dimensioned flow cross-sections within the heat exchanger and compressed air lines.



No prefilter

SECOTEC energy-saving dryers do not require a prefilter (with piping unaffected by corrosion). This translates into significantly lower investment and maintenance costs, as well as lower pressure loss.

Long-term efficiency

We do not just talk about challenging operating conditions, but actually create them using our advanced climate testing facilities. This allows us to fine-tune the design of SECOTEC refrigeration dryers in order to ensure maximum reliability at all times.



Reliable separation

KAESER's corrosion-free stainless steel condensate separators provide dependable compressed air drying and ensure reliable condensate separation, even at partial load.



Powerful refrigerant condenser

Generously-dimensioned heat exchanger surfaces contribute to the significantly higher performance reserves of SECOTEC refrigeration dryers. Compared to other dryers on the market, this allows them to deal with load peaks (-> contamination, temperature peaks) significantly better, whilst reliably delivering dry compressed air.



Dependable condensate drainage

Integrated ECO-DRAIN electronic condensate drains installed as standard (all models except TA 5) deliver reliable condensate separation – without pressure loss. They are also insulated to protect against condensate formation on the exterior.



Future-proof refrigerant

The refrigerant circuit in SECOTEC refrigeration dryers is specifically designed for the use of R-513A refrigerant. This ensures maximum efficiency and reliability, even at the highest temperatures, whilst providing the best solution currently available for the security of your future supplies.





Service-friendly condenser

The condenser is arranged on the front side of the unit, where it is exposed to the air stream without an upstream mesh barrier. Any dirt accumulation on this component can therefore be easily detected and effectively removed, ensuring energy efficiency and pressure dew point stability over the long-term.



Excellent accessibility

The SECOTEC refrigeration dryer's enclosure covers are quick and easy to remove, enabling straightforward service access. Taken together, these advantages significantly reduce servicing requirement and therefore costs.



SECOTEC TA to TD series

Easy to maintain

KAESER understands our customers' needs very well, as the company itself operates numerous compressed air stations. From first-hand experience, we are well-versed in all aspects of compressed air station planning, commissioning, operation and maintenance. We draw on this expertise to create user-friendly products with minimal need for maintenance.



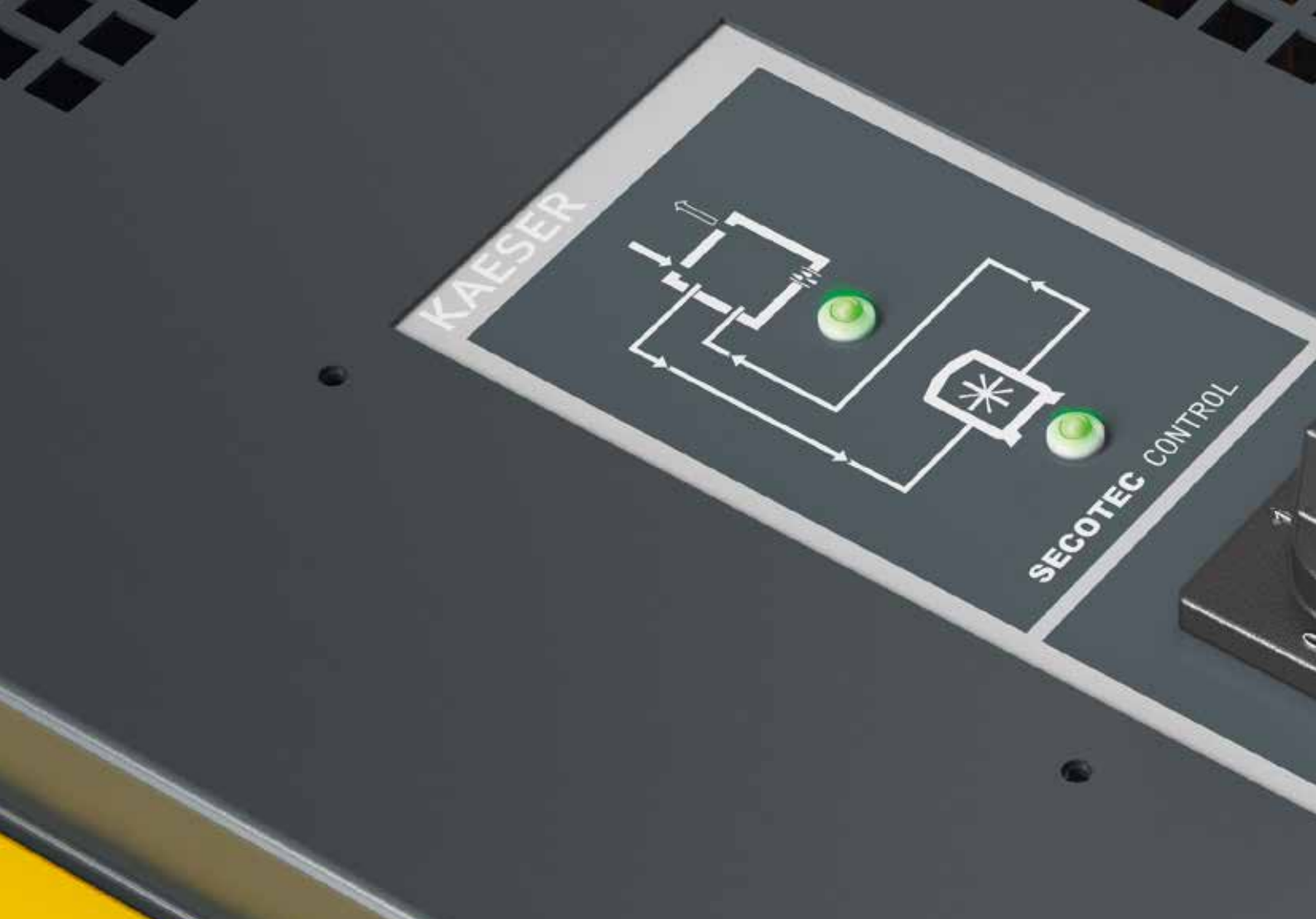
Easy-to-test refrigeration circuit

KAESER service technicians and our partners' technical staff are refrigeration technology experts. They not only check operation of the refrigeration dryer, but also of the cooling circuit itself using intake and pressure-side service valves.

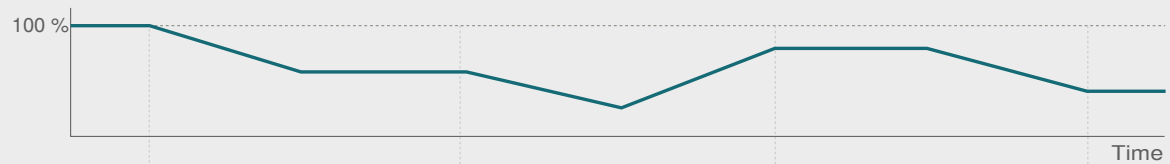


Checked for leaks and functionality

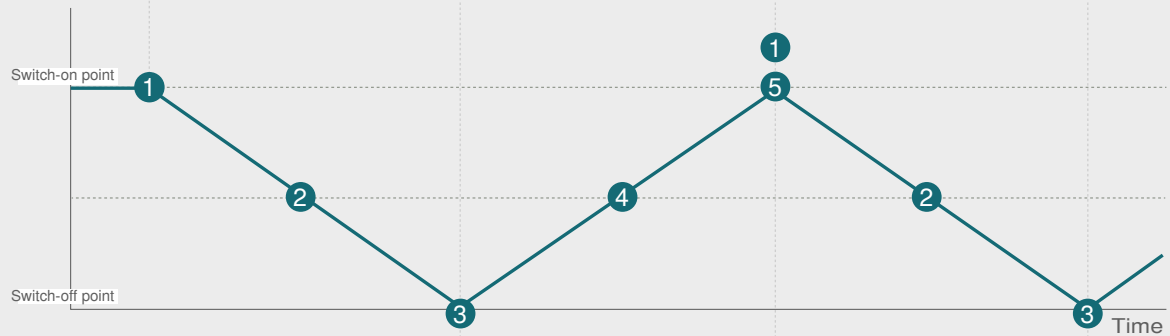
All wearing ECO-DRAIN components can be replaced with the service unit replacement, without the need to replace the seal. The condensate drain and service unit are 100% factory-tested for leaks and proper functioning before leaving the plant.



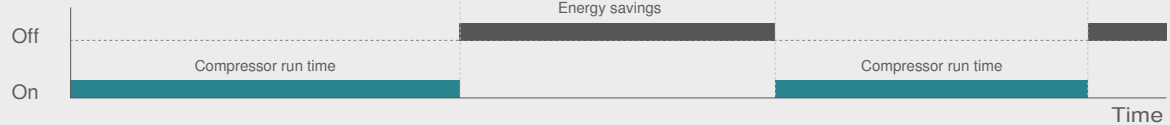
Refrigeration dryer load



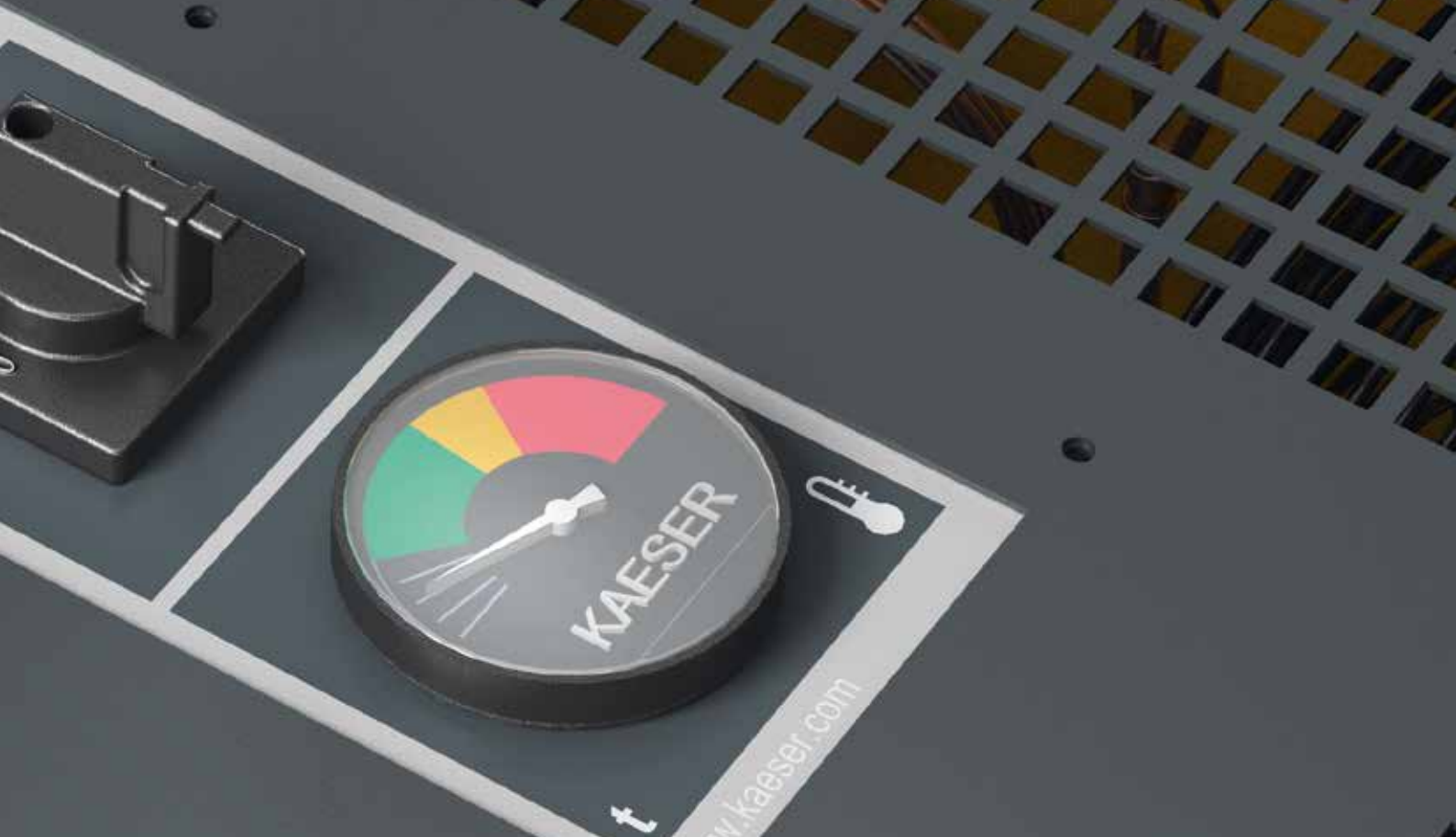
Thermal mass temperature



Refrigerant compressor



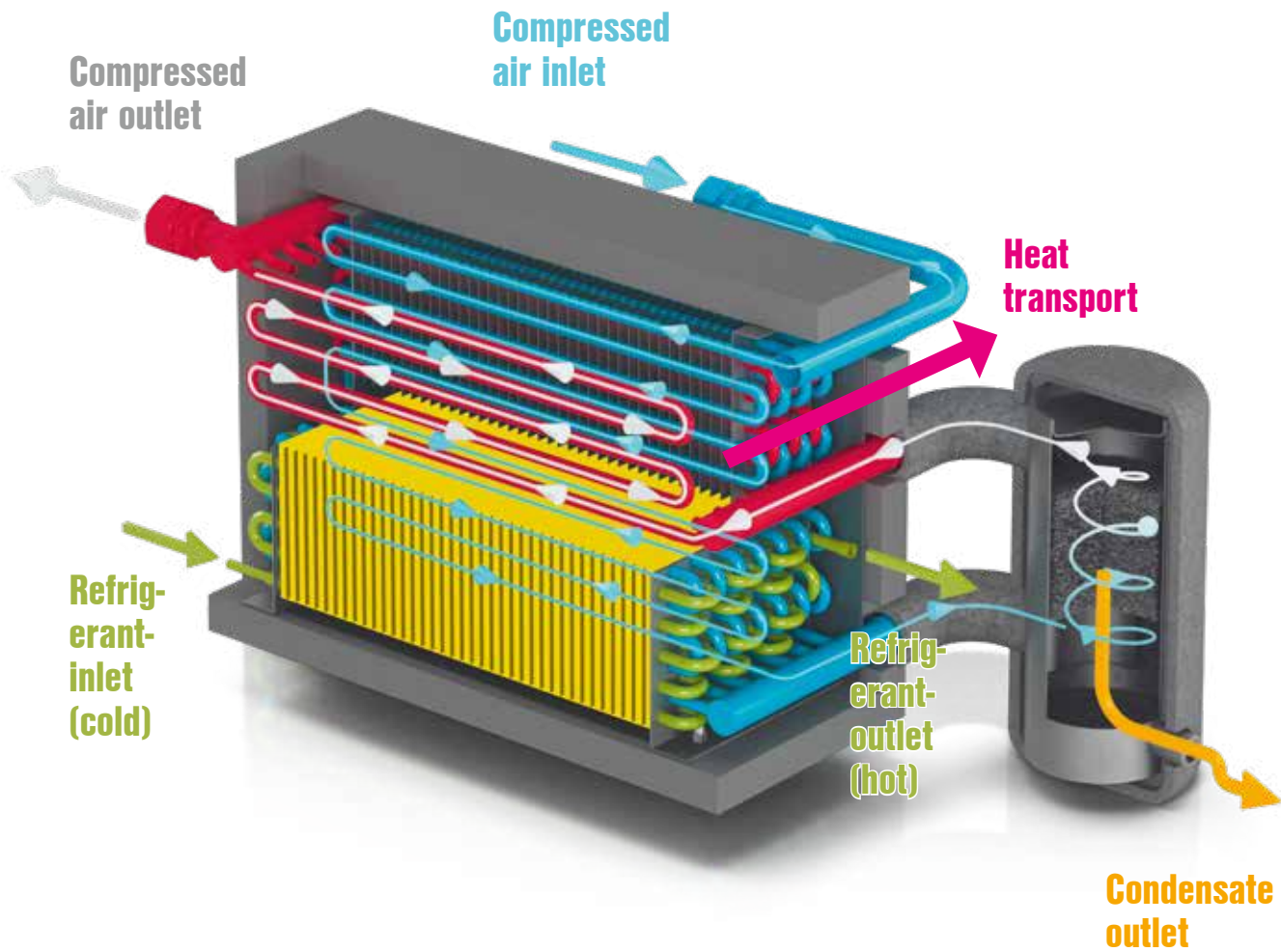
SECOTEC CONTROL



SECOTEC thermal mass control

Partial load control with powerful thermal mass

- (1) Refrigerant compressor runs:
Cooling is supplied for compressed air drying and cooling of the thermal storage granules
- (2) Cooling capacity not required for compressed air drying continues to cool the storage medium until the switch-off point.
- (3) Refrigerant compressor switches off.
- (4) Thermal storage granules supply cooling for compressed air drying and warm up.
- (5) Refrigerant compressor switches on.
Thermal storage granules warm up until the refrigerant compressor switch-on point is reached.



SECOTEC solid thermal mass

High storage capacity – high energy savings

TA to TD series SECOTEC refrigeration dryers are equipped with a powerful solid thermal mass. Unlike conventional refrigeration dryers with switching operating modes and without an additional thermal mass, in SECOTEC dryers the entire air/refrigerant heat exchanger is embedded in thermal storage granules and encased in efficient heat protection.

Compared to conventional refrigeration dryers, this provides significantly higher storage capacity whilst also reducing load on the refrigerant compressor and fan motor. During partial load operation, the smooth copper pipe transfers unneeded cooling capacity to the thermal storage granules located in the intermediate spaces of the piped-fin heat exchanger, where it can be fed back into the

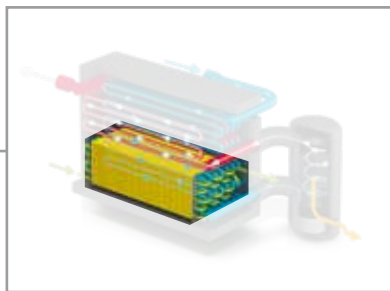
smooth copper pipes of the compressed air circuit (also located there) as needed. This enables the refrigerant compressor and fan motor to remain switched off for an especially long time – for greater energy savings.

The result:

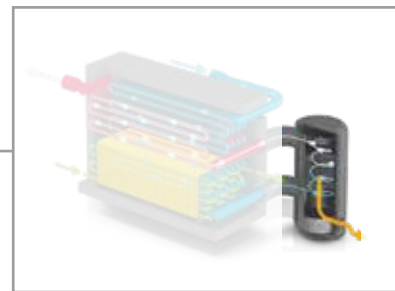
High storage capacity with low energy consumption on an as-needed basis, with stable pressure dew point and low-wear operation.



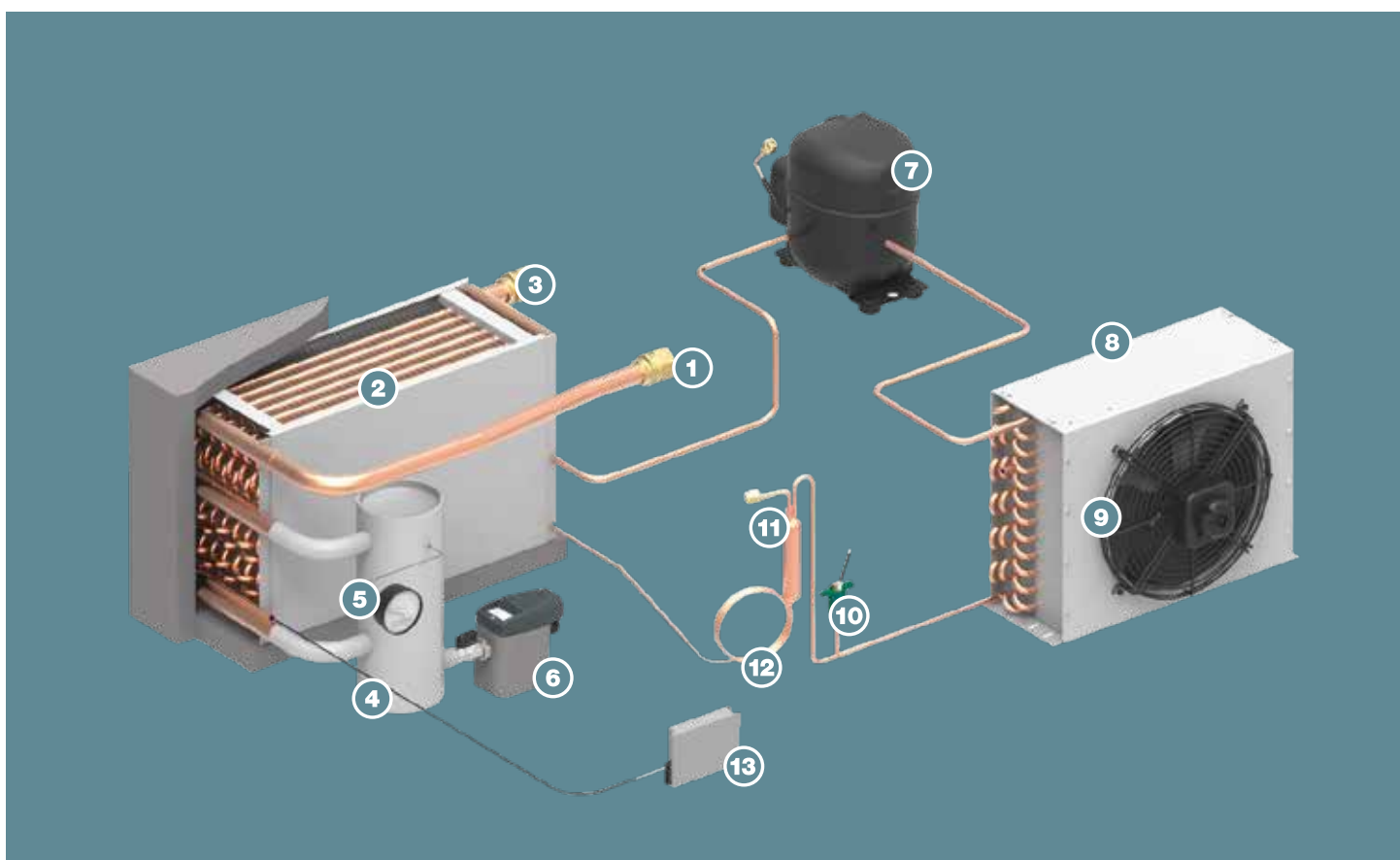
Air/air heat exchanger



Air/refrigerant heat exchanger with thermal mass (yellow area)



Condensate separator



Layout

- | | | | |
|-----|---|------|-----------------------|
| (1) | Compressed air inlet | (8) | Refrigerant condenser |
| (2) | Heat exchanger system with SECOTEC solid thermal mass | (9) | Fan |
| (3) | Compressed air outlet | (10) | High-pressure switch |
| (4) | Condensate separator | (11) | Filter dryer |
| (5) | Dew point trend indicator | (12) | Capillaries |
| (6) | ECO-DRAIN condensate drain | (13) | Control unit |
| (7) | Refrigerant compressor | | |





New system planning

Time to reset the clock

Are you forcing yourself to live with a compressed air station that has grown over the years and yet no longer meets present requirements? Or are you planning a new system and searching for solutions with outstanding long-term efficiency?

As your experienced **compressed air system solutions partner**, we understand every imaginable scenario. And in addition to providing the best compressed air supply, we always keep in mind your business as a whole. This is how we help you design your optimal compressed air future – whether you have 2 employees or 20,000.

Convenient one-stop shop

As a compressed air systems provider, we not only supply compressors and compressed air treatment components, we also supply the control equipment and even the complete infrastructure when necessary.

Our experience, your success:

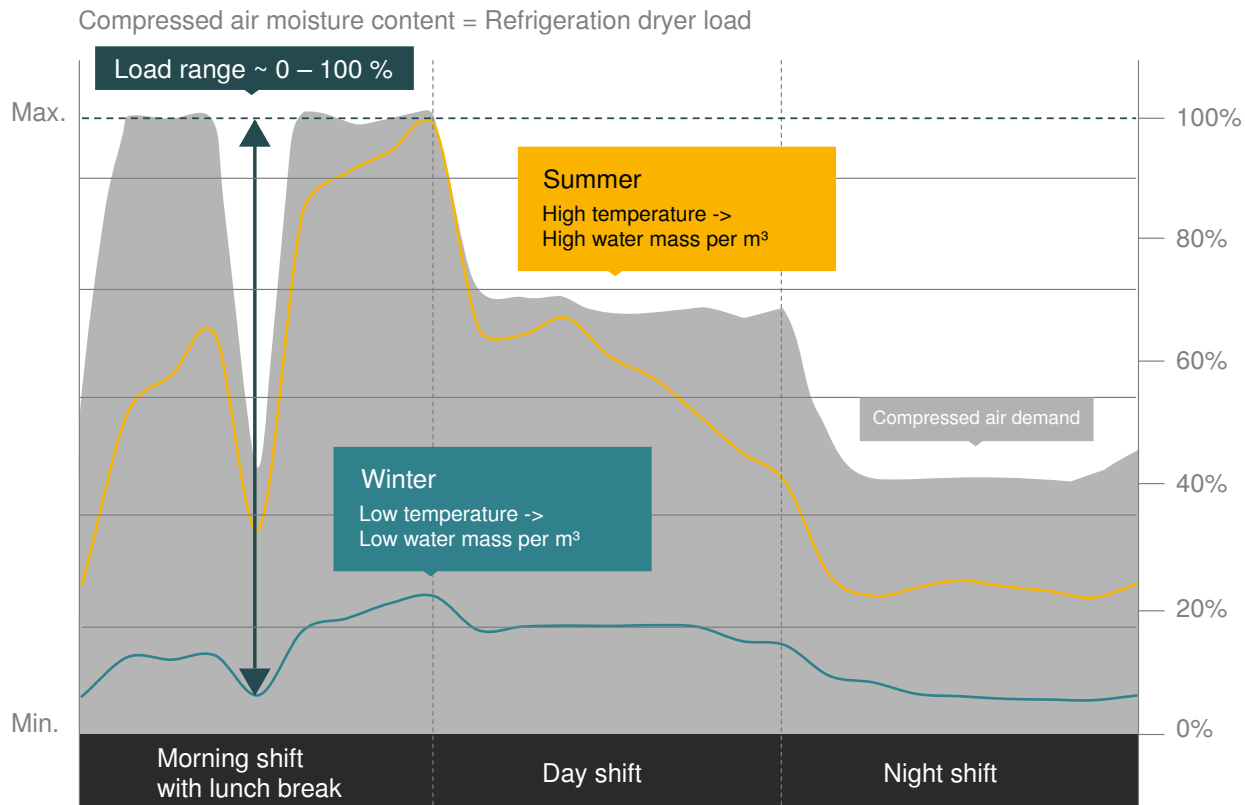
From mining to brewing, from Bavaria to Bahrain – our customers benefit from our experience as a global player – with all conceivable sectors and on-site conditions.

Long-term cost savings

Optimal consulting, technical advantages in research and manufacturing, and a highly efficient service organisation providing protection against downtime: Kaeser customers benefit from lower life-cycle costs.

Image: Compressed air system solution

The key to perfect refrigeration drying



SECOTEC – Savings for all seasons

The load on a refrigeration dryer depends not only on the volume of compressed air to be dried (grey area), but more importantly, on how much water the incoming compressed air contains. This volume of water (moisture) increases as the temperature rises, so the load on refrigeration dryers increases dramatically when ambient temperatures are high, such as during the summer (yellow curve).

Lower temperatures during the winter (teal blue curve) therefore reduce the load on refrigeration dryers accordingly. To maintain a stable pressure dew point throughout all these fluctuations, refrigeration dryers should always be designed to provide sufficient performance during peak load times, and should also have additional reserve capacity.

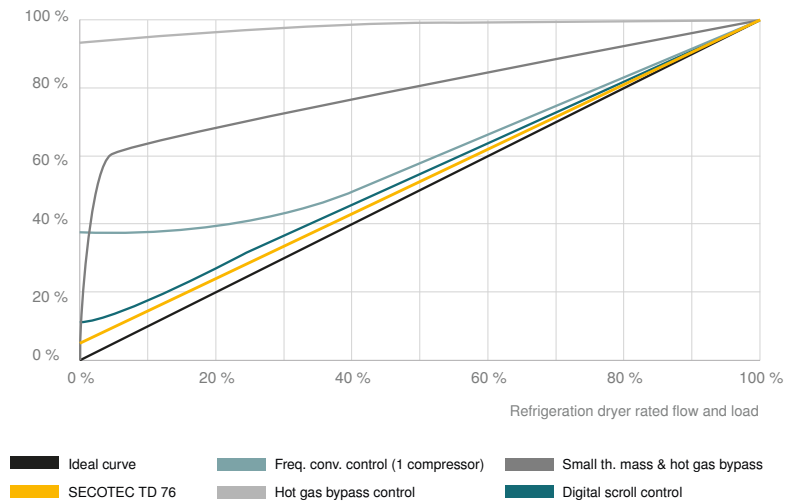
Aside from these fluctuations in air flow and temperature, the output of refrigeration dryers constantly varies between 0 and 100% of capacity. Because the SECOTEC thermal mass control ensures energy is only used as needed across this entire load range, users benefit from exceptional savings.

Maximum energy savings thanks to thermal mass control

Refrigeration dryer load constantly fluctuates between 0 and 100%. Unlike conventional partial load control systems, SECOTEC thermal mass control precisely adjusts electrical power consumption during all load phases.

This allows SECOTEC refrigeration dryers to save almost 60% of energy costs compared to refrigeration dryers with hot gas bypass control running at an average of 40% of capacity. **The TD 76 model typically saves 4,000 kWh/year based on 6,000 operating hours.** In contrast to conventional systems, the thermal mass in SECOTEC dryers always remains cool.

Electrical power consumption under nominal conditions



This means compressed air can be dried effectively even during start-up phases. The high-quality insulation around the thermal mass also helps keep energy usage to a minimum. Compressed air drying with SECOTEC refrigeration dryers not only ensures exceptional energy efficiency, but also, thanks to their impressive thermal capacity, provides low-wear operation.

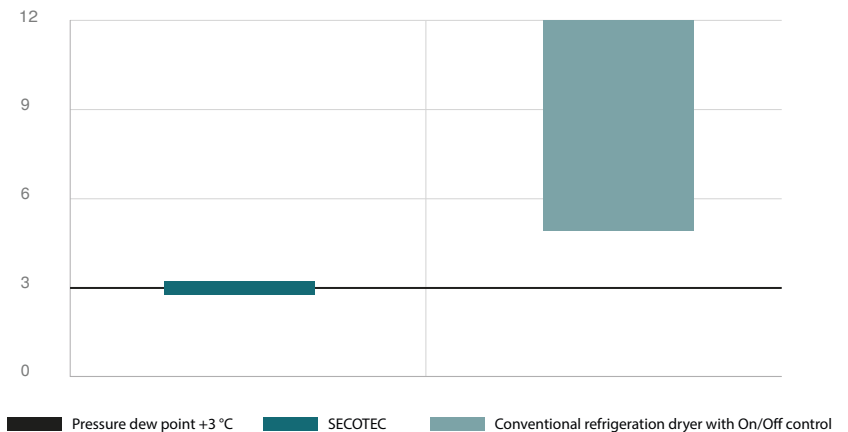
Optimal drying with low-wear operation

SECOTEC refrigeration dryers efficiently maintain pressure dew points down to +3°C during full load operation. Thanks to their narrow fluctuation range, pressure dew points are also more stable during partial load operation than is the case with conventional refrigeration dryers.

Conventional refrigeration dryers with switching operating modes, but without an additional thermal mass, use the heat exchanger material itself as a thermal mass. In these dryers it is therefore necessary to switch the refrigerant compressors and fan motors on and off much more frequently, in order to maintain the required cooling performance.

To reduce switching frequency and wear, the refrigerant circuit therefore only switches on at much higher pressure dew points. The resulting fluctuations in the pressure dew point negatively affect drying performance. This can be risky, since corrosion can take hold even with relative compressed air humidity of 40% – corrosion can therefore occur even without condensate formation.

Degree of drying as average pressure dew point in °C



SECOTEC refrigeration dryers, on the other hand, ensure long-life operation thanks to their high thermal mass storage capacity. Once the thermal mass has been charged, the refrigerant compressor and fan motor can remain switched off for much longer without impacting on pressure dew point stability.

Equipment

Refrigeration circuit

Refrigeration circuit comprising refrigerant compressor, condenser with fan, high-pressure switch, filter dryers, capillary tubes, heat exchanger system featuring SECOTEC solid thermal mass, future-proof refrigerant R-513A.

SECOTEC solid thermal mass

Air/refrigerant copper-piped flow-fin heat exchanger embedded in thermal storage granules, stainless steel separator, air/air copper-piped flow-fin heat exchanger (type TA 8 and up), heat insulation jacket and temperature sensor.

SECOTEC CONTROL

Controller for SECOTEC thermal mass control, dew point trend indicator, status LED for storage/load mode.

Condensate drainage

ECO-DRAIN 30 electronic condensate drain (type TA 8 and up) with ball valve on the condensate inlet line, insulation of cold surfaces.

Enclosure

Power-coated enclosure with machine feet and removable side panels for service access.

Connections

Smooth-bore copper compressed air piping, brass compressed air connections with rotation lock, bulkhead fitting for connection of external condensate line, and cable tunnel for network connection on the rear wall.

Electrical equipment

Electrical equipment and testing to EN 60204-1 "Safety of machinery". IP 54 integrated control cabinet protection rating.

Calculating flow rate

Correction factors for deviating operating conditions (flow rate in m³/min x k...)

At deviating gauge working pressure (bar)														
bar	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Factor	0.75	0.84	0.90	0.95	1.00	1.04	1.07	1.10	1.12	1.15	1.17	1.19	1.21	1.23

Compressed air inlet temperature T_i							
T_i (°C)	30	35	40	45	50	55	60
k_{Ti}	1.20	1.00	0.83	0.72	0.60	0.49	

Ambient temperature T_a					
T_a (°C)	25	30	35	40	43
k_{Ta}	1.00	0.99	0.97	0.94	0.92

Example:			
Gauge working pressure:	10 bar _(g)	(See table)	$k_p = 1.10$
Compressed air inlet temperature:	+40 °C	(See table)	$k_{Ti} = 0.83$
Ambient temperature:	+30 °C	(See table)	$k_{Ta} = 0.99$

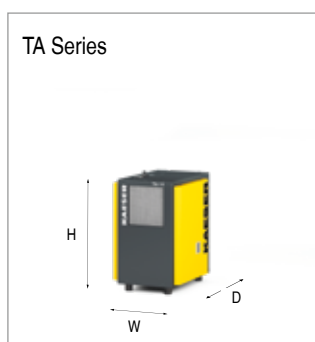
TC 44 refrigeration dryer with flow rate of 4.7 m³/min	
Max. possible flow rate under operating conditions	
$V_{\max \text{ Operation}} = V_{\text{Reference}} \times k_p \times k_{Ti} \times k_{Ta}$	
$V_{\max \text{ Operation}} = 4.7 \text{ m}^3/\text{min} \times 1.1 \times 0.83 \times 0.99 = 4.25 \text{ m}^3/\text{min}$	

Technical specifications

Model		TA Series			TB Series		TC Series			TD Series		
		5	8	11	19	26	31	36	44	51	61	76
Flow rate ¹⁾	m³/min	0.60	0.85	1.25	2.10	2.55	3.20	3.90	4.70	5.65	7.00	8.25
Pressure loss, refrigeration dryer ¹⁾	bar	0.07	0.14	0.17	0.19	0.20	0.17	0.17	0.18	0.11	0.17	0.17
Elect. power consumption at 100% flow rate ¹⁾	kW	0.30	0.29	0.35	0.44	0.62	0.74	0.89	0.88	0.97	1.25	1.67
Elect. power consumption at 50% flow rate ¹⁾	kW	0.18	0.16	0.19	0.24	0.34	0.34	0.41	0.44	0.55	0.71	0.80
Mass	kg	70	80	85	108	116	155	170	200	251	251	287
Dimensions W x D x H	mm	630 x 484 x 779			620 x 540 x 963		764 x 660 x 1009			1125 x 759 x 1187		
Compressed air connection	G	¾			1		1 ¼			1 ½		2
Condensate drain connection	G	¼			¼		¼			¼		
Electrical supply		230 V / 1 Ph / 50 Hz			230 V / 1 Ph / 50 Hz		230 V / 1 Ph / 50 Hz			400 V / 3 Ph / 50 Hz		
R-513A refrigerant mass	kg	0.27	0.22	0.36	0.56	0.53	0.80	1.00	1.04	1.25	1.30	1.50
R-513A refrigerant mass as CO ₂ equivalent	t	0.17	0.14	0.23	0.35	0.33	0.50	0.63	0.66	0.79	0.82	0.95
Hermetic refrigeration circuit as defined by F-gases reg.		Yes			Yes		Yes			Yes		
Options / Accessories												
Floating contacts: refrigerant compressor running, high pressure dew point		Optional			Optional		Standard			Standard		
Floating contacts: refrigerant compressor running, high pressure dew point, condensate drain alarm		Not available			Optional		Optional			Optional		
Adjustable machine feet		Optional			Optional		Optional			Optional		
Separate autotransformer for adapting to deviating mains voltages		Optional			Optional		Optional			Optional		
Special colour (RAL)		Optional			Optional		Optional			Optional		
Silicone-free version (VW factory standard 3.10.7)		Optional			Optional		Optional			Optional		

Note: Suitable for ambient temperatures of +3 to +43 °C. Max. compressed air inlet temperature +55 °C; gauge pressure min./max. 3 to 16 bar; contains fluorinated greenhouse gas R513A (GWP = 631)

¹⁾ As per ISO 7183, option A1: Reference point: 1 bar(abs), +20 °C, 0% relative humidity; operating point: pressure dew point +3 °C, working pressure 7 bar(g), inlet temperature +35 °C, ambient temperature +25 °C, 100% relative humidity



The world is our home

As one of the world's largest compressed air system 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 every product operates at the peak of its performance at all times and provides maximum availability.



KAESER KOMPRESSOREN SE

P.O. Box 2143 – 96410 Coburg – GERMANY – Tel +49 9561 640-0 – Fax +49 9561 640-130
e-mail: productinfo@kaeser.com – www.kaeser.com