KAESER COMPRESSORS®

Energy-saving Refrigeration Dryers

SECOTEC® TA to TC Series

The savings specialists with stable pressure dew point

Flow rate 0.65 to 3.90 m³/min, Pressure 3 to 16 bar

www.kaeser.com

SECOTEC TA to TC series

The savings specialists with stable pressure dew point

The SECOTEC name has long been synonymous with high-quality KAESER refrigeration dryers built for industrial operation, stable pressure dew points, maximum dependability and minimal overall life-cycle costs. SECOTEC refrigeration dryers from the TA to TC series can be used for drying compressed air down to a pressure dew point of +3 °C, thanks to their highly efficient thermal mass control, which can be tailored to individual requirements for maximum cost savings. A generously dimensioned thermal mass ensures low-wear operation and a stable pressure dew point.

Furthermore, KAESER ensures future supply security with the environmentally friendly R-513A refrigerant. Made in Germany: All SECOTEC refrigeration dryers are constructed in accordance with the very highest quality standards at the KAESER plant in Gera.

Energy savings

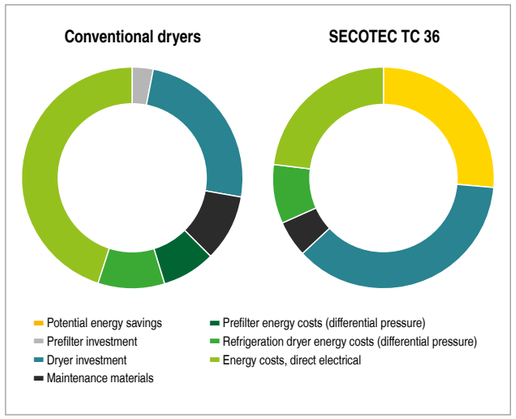
SECOTEC series refrigeration dryers boast exceptionally low energy consumption. With energy-saving control, the thermal mass can store excess cooling capacity until it is needed, enabling later drying without any power consumption – which is highly beneficial during partial load operation. The responsive heat exchanger system ensures consistently stable pressure dew points at all times. The result: significant savings during partial load operation and non-working time.

Outstanding service-friendliness

SECOTEC refrigeration dryers require very little maintenance. Additionally, their housing construction is optimised for easy access to all service-relevant components – including the condenser, which is quick and easy to clean. All of these advantages considerably reduce maintenance and testing requirements, and therefore costs.

Long-term reliability

SECOTEC series refrigeration dryers impress with their exceptionally robust and low-maintenance system design. Their high-quality refrigerant circuit enables reliable performance in ambient temperatures up to +43 °C – with low material wear, thanks to the high-performance thermal mass. The generously dimensioned, stainless steel condensate separator and electronic ECO-DRAIN condensate drain provide reliable condensate removal in all load phases, thereby contributing to a stable pressure dew point. The electrical equipment complies with the EN 60204-1 standard.



Reduce life-cycle costs!

Three factors are responsible for the exceptionally low life-cycle costs of the new SECOTEC refrigeration dryers: 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 TC 36 can save up to 26% of total life-cycle costs compared to conventional refrigeration dryers.

Example: SECOTEC TC 36 compared to a conventional dryer with hot gas bypass control:

Flow rate 8.25 m³/min, 40% duty cycle, 6.55 kW/(m³/min), additional energy requirement 6%/bar, €0.20/kWh, 6,000 operating hours per year, annual debt service over 10 years.

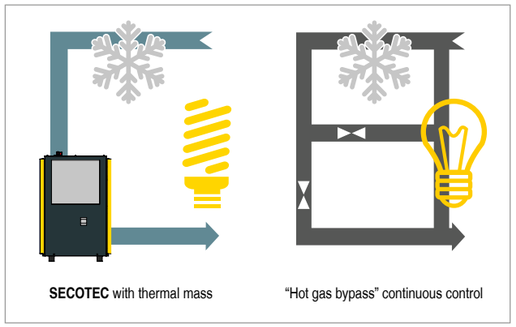
Perfect for every compressed air requirement

Image: SECOTEC TA 11, TC 36

SECOTEC TA to TC series

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.

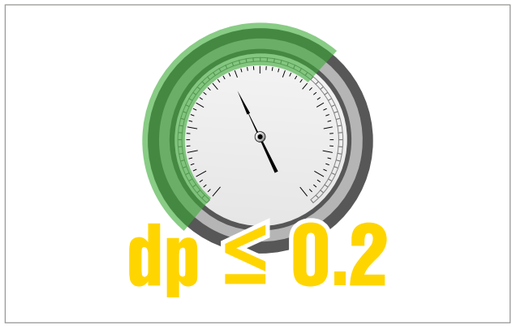


SECOTEC CONTROL

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

Efficient SECOTEC solid thermal mass

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



Minimal pressure loss

KAESER SECOTEC series refrigeration dryers truly shine with their exceptionally low differential pressure. This is a result of the generously dimensioned flow cross sections within the heat exchanger and compressed air connections.

No prefilter

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

SECOTEC TA to TC series

Long-term reliability

We don’t just talk about demanding operating conditions for refrigeration dryers – we actually create them in our advanced climate testing facilities. This allows us to fine-tune the design of SECOTEC refrigeration dryers to ensure maximum reliability at all times.

Reliable separation

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

High-performance refrigerant condenser

Generously dimensioned heat exchanger surfaces contribute to the significantly higher performance reserves of SECOTEC refrigeration dryers. Unlike typical dryers on the market, they handle load peaks (such as contamination and temperature spikes) much better and ensure a dependable supply of dry compressed air.

Reliable condensate drainage

ECO-DRAIN electronic condensate drains are installed as standard and deliver dependable condensate separation without pressure loss. They are also insulated to prevent condensation formation.

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 higher temperatures, whilst providing the best solution currently available for future supply security.

SECOTEC TA to TC series

Outstanding service-friendliness

KAESER truly understands its customers' needs, since the company itself operates numerous compressed air stations. From first-hand experience, we are well versed in every aspect of compressed air station planning, commissioning, operation and maintenance. We draw on this expertise to create user-friendly and low-maintenance products.

Service-friendly condenser

The condenser is arranged on the front side of the unit, where it is freely exposed to the air stream without any upstream grilles acting as a barrier. Potential dirt accumulation on this component can therefore be easily detected and effectively removed, ensuring long-term energy efficiency and pressure dew point stability.

Excellent accessibility

The SECOTEC refrigeration dryer's housing covers are quick and easy to remove, enabling straightforward service access. Taken together, these advantages significantly reduce labour and maintenance costs.

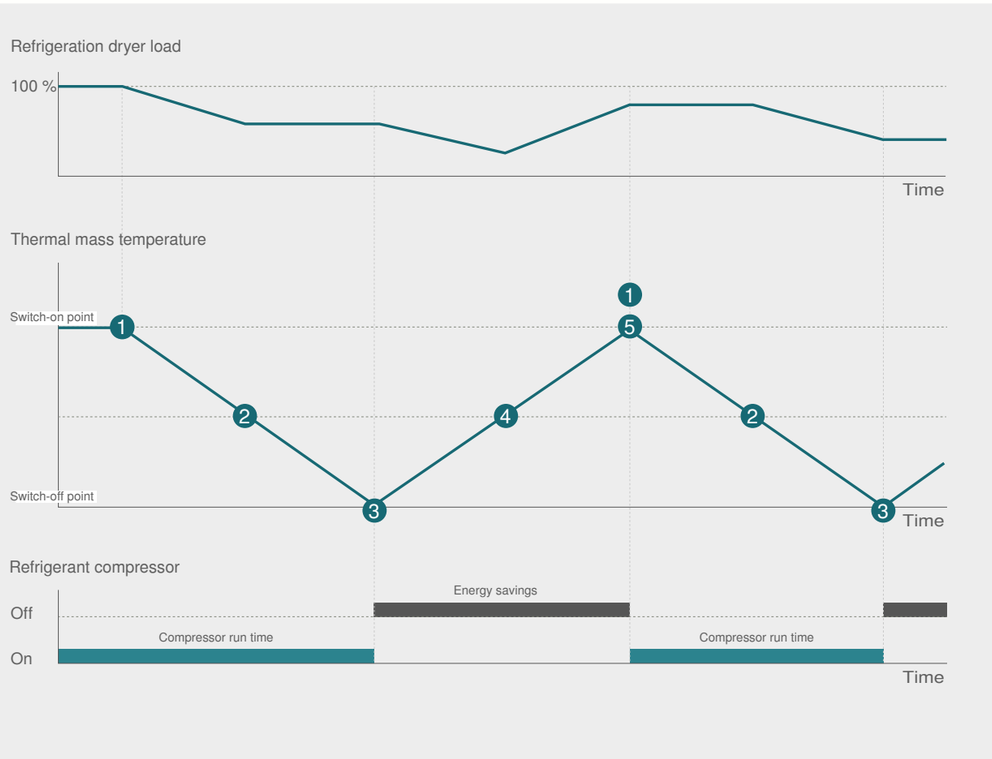
Easy-to-test refrigeration circuit

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 discharge-side service valves.

Checked for leaks and proper function

All wearing ECO-DRAIN components can be replaced with the service unit, without the need for gasket replacement. For trouble-free maintenance, the condensate drain and service unit are 100% factory-tested for leaks and proper function before leaving the plant.

SECOTEC CONTROL



SECOTEC thermal mass control

Partial load control with powerful thermal mass

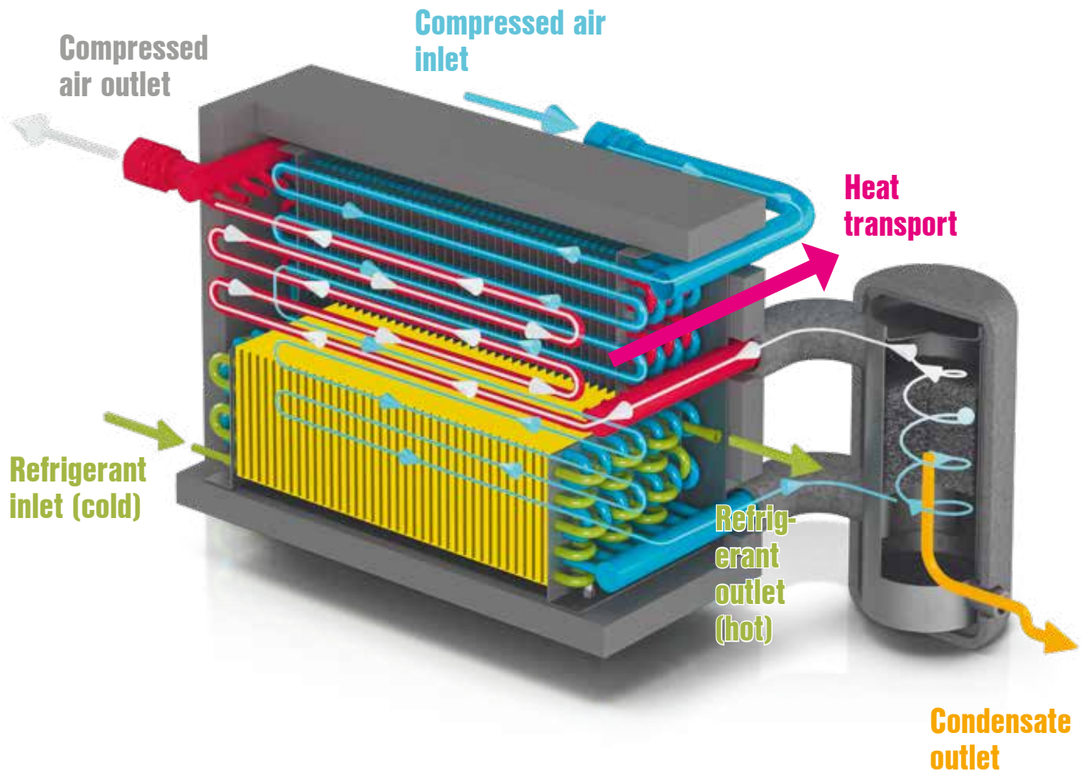
(1) Refrigerant compressor runs:
Cooling is supplied for compressed air drying and cooling of the thermal storage granules

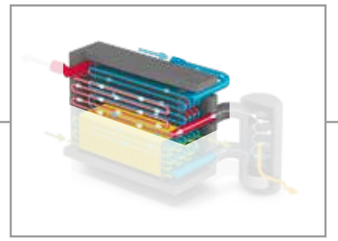
(2) Cooling capacity not required for compressed air drying continues to cool the storage medium until the cut-out point

(3) Refrigerant compressor switches off

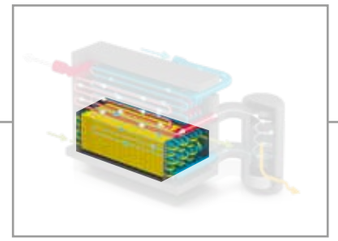
(4) Thermal storage granules supply cooling for compressed air drying and heat up

(5) Refrigerant compressor switches on:
Thermal storage granules heat up until the refrigerant compressor cut-in point is reached

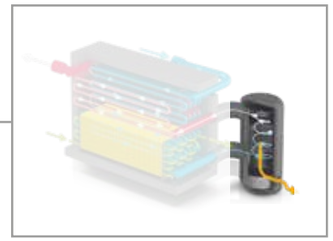




Air/air heat exchanger



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



Condensate separator

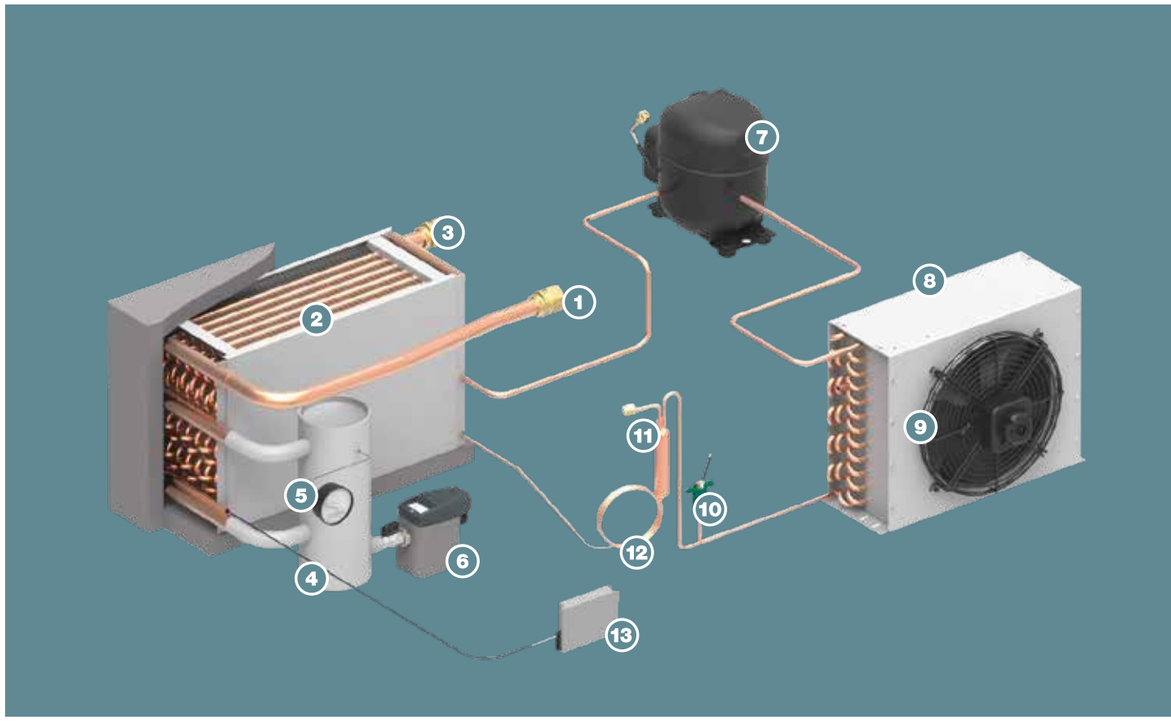
SECOTEC solid thermal mass

High storage capacity – high energy savings

TA to TC series SECOTEC refrigeration dryers are equipped with a high-performance 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.

Comparatively, this results in a significantly higher storage capacity, thereby providing added protection for the refrigerant compressor and fan motor. During partial load operation, smooth copper pipes in the refrigerant circuit transfer unneeded cooling capacity to the thermal storage granules 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 as needed. This allows the refrigerant compressor and fan motor to remain off for extended periods, contributing to 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.



Layout

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

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 current 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 can envision ourselves in any scenario and always consider not only your compressed air supply, but your business as a whole. This is how we help you to optimally shape your compressed air future – no matter 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.

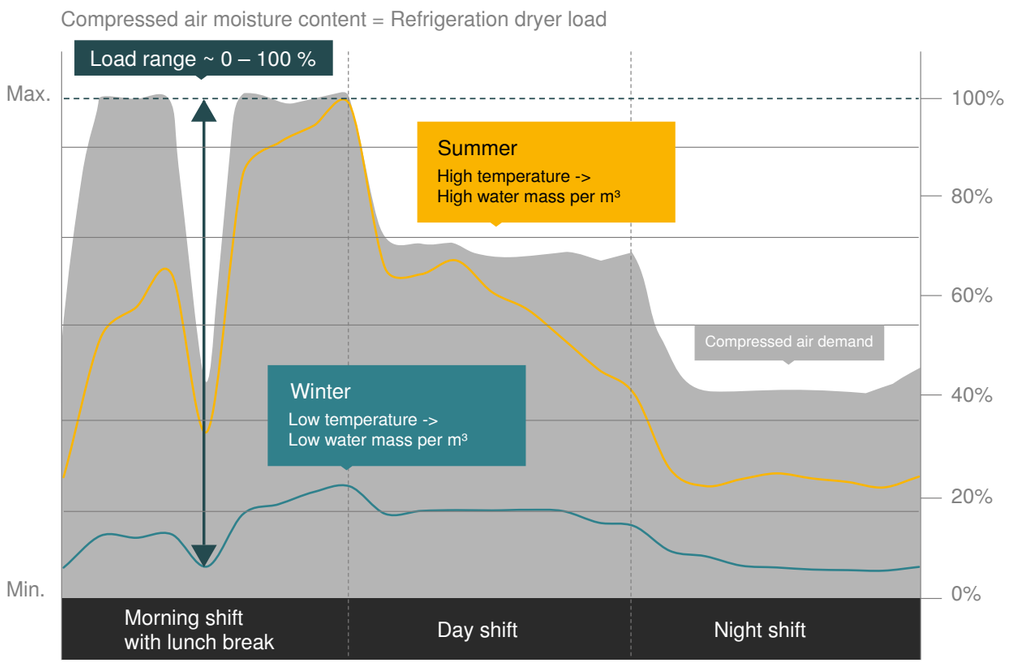
Our experience, your success:
From mining to brewing, from Bavaria to Bahrain – our customers benefit from our experience as a global player – in all conceivable sectors and on-site conditions.

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

SECOTEC

The key to perfect refrigeration drying

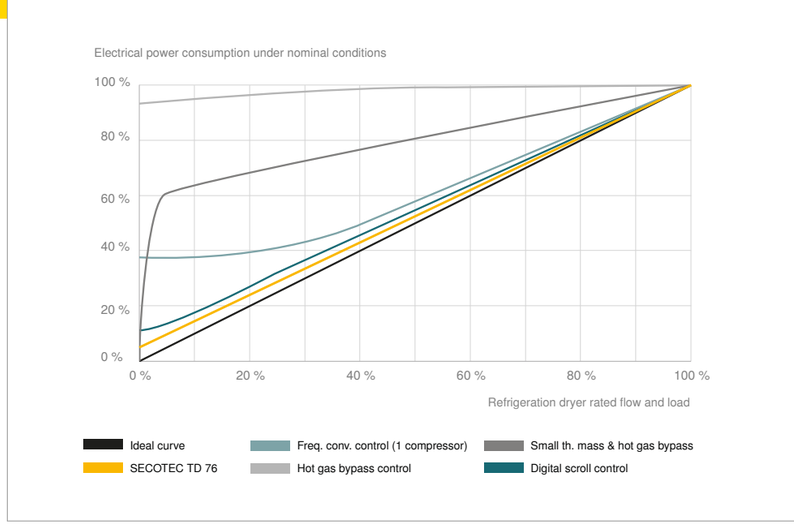


SECOTEC – Savings for all seasons

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 moisture the incoming compressed air contains. This volume of 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) months.

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 of these fluctuations, refrigeration dryers should always be designed to provide sufficient performance during peak load times, and should also have additional reserve capacity.

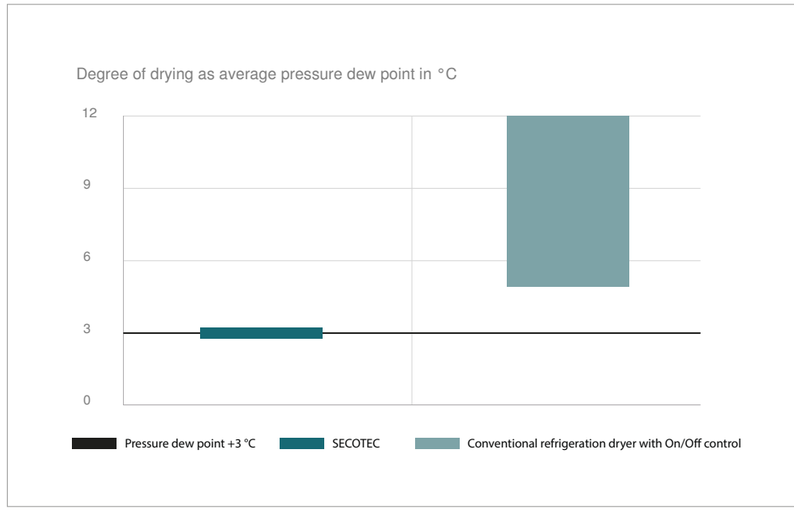
To accommodate these fluctuations in flow rate and temperature range, refrigeration dryers constantly operate in the load range between 0 and 100%. Because the SECOTEC thermal mass control ensures energy is only used as and when needed across the entire load range, users benefit from exceptional savings.



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% capacity. **The TC 36 model typically saves 2,100 kWh/year based on 6,000 operating hours.** In contrast to conventional systems, the thermal mass in SECOTEC dryers always remains cool. 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 use 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 stable pressure dew points of up to +3 °C during full load operation. Thanks to their narrow fluctuation range, pressure dew points are also significantly 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 back on at much higher pressure dew points. The resulting pressure dew point fluctuations negatively affect drying performance. This can be risky, since corrosion can take hold even with relative compressed air humidity of 40% – meaning that corrosion can occur even without condensate formation.

SECOTEC refrigeration dryers, on the other hand, ensure material-friendly 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 with no impact 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 R-513A refrigerant.

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 with ball valve on the condensate inlet line, incl. insulation of cold surfaces.

Housing

Powder-coated housing with machine feet and removable side panels for service access.

Connections

High-quality, smooth 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”. Integrated control cabinet with IP 54 protection.

Calculating flow rate

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

At deviating 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:			
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} operation = $V_{Reference}$ x k_p x k_{Ti} x k_{Ta}
V_{max} operation = 4.7 m³/min x 1.1 x 0.83 x 0.99 = 4.25 m³/min

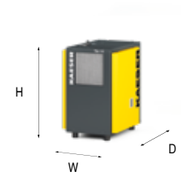
Technical data

Model		TA series			TB series		TC series	
		TA 5	**TA 8**	**TA 11**	**TB 19**	**TB 26**	**TC 31**	**TC 36**
Flow rate [1]	m³/min	0.65	0.85	1.25	2.10	2.55	3.20	3.90
Pressure loss, refrigeration dryer [1]	bar	0.07	0.14	0.17	0.19	0.20	0.17	0.17
Elect. power consumption at 100% flow rate [1]	kW	0.30	0.29	0.39	0.44	0.62	0.74	0.89
Elect. power consumption at 50% flow rate [1]	kW	0.16	0.16	0.20	0.24	0.34	0.34	0.41
Weight	kg	70	80	85	108	116	155	170
Dimensions W x D x H	mm	630 x 484 x 779			620 x 540 x 963		764 x 660 x 1009	
Comp. air connection	G	¾			1		1 ¼	
Condensate drain connection	G	¼			¼		¼	
Power supply		230 V / 1 Ph / 50 Hz			230 V / 1 Ph / 50 Hz		230 V / 1 Ph / 50 Hz	
R-513A refrigerant mass	kg	0.28	0.22	0.37	0.56	0.53	0.80	1.00
R-513A refrigerant mass as CO_2 equivalent	t	0.18	0.14	0.23	0.35	0.33	0.50	0.63
Hermetic refrigeration circuit as defined by F-gas Reg.		Yes			Yes		Yes	
Options / Accessories								
Floating contacts: refrigerant compressor running, high pressure dew point		Option			Option		Standard	
ECO-DRAIN electronic condensate drain with floating alarm contact		Option			Option		Option	
Bolt-down machine feet		Option			Option		Option	
Separate autotransformer for adapting to deviating mains voltages		Option			Option		Option	
Special colour (RAL)		Option			Option		Option	
Silicone-free version (VW factory standard 3.10.7)		Option			Option		Option	

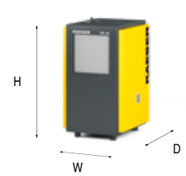
Note: Suitable for ambient temperatures of +3 to +43°C. Max. compressed air inlet temperature +55°C; overpressure min./max. 3 to 16 bar; contains fluorinated greenhouse gas R-513A (GWP = 629)

[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

TA series



TB series



TC series

More compressed air for less energy

The world is our home

As one of the world's largest manufacturers of compressors, blowers and compressed air systems, KAESER KOMPRESSOREN is represented throughout the world by a comprehensive network of wholly owned subsidiaries and authorised distribution partners in over 140 countries.

By offering innovative, efficient and reliable products and services, KAESER KOMPRESSOREN's experienced consultants and engineers work in close partnership with customers to enhance their competitive edge and to develop progressive system concepts that continuously push the boundaries of performance and technology. Moreover, decades of knowledge and expertise from this industry-leading systems provider are made available to each and every customer via the KAESER group's advanced global IT network.

These advantages, coupled with KAESER's worldwide service organisation, ensure that every product operates at the peak of its performance at all times, providing optimal efficiency and maximum availability.

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