



# Energy-Saving Refrigeration Dryers

## SECOTEC® TA to TC Series

The savings specialists with stable pressure dew point

Flow rate 0.60 to 3.90 m<sup>3</sup>/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 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, 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 the KAESER plant in Gera.

## Energy savings

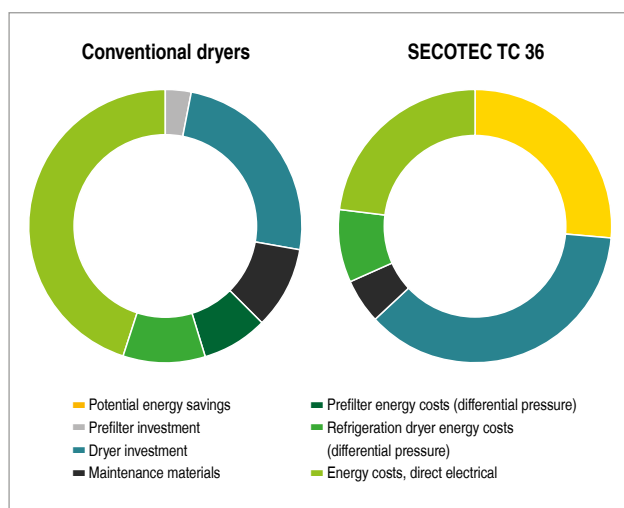
SECOTEC series refrigeration dryers feature very low energy consumption. With energy-saving control, the thermal mass can store excess cooling capacity until it is needed, enabling later drying without any power consumption – which is highly beneficial during partial load operation. The quick-response 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.

## Outstanding service-friendliness

SECOTEC refrigeration dryers are extremely low-maintenance. On the rare occasions when service is needed, their housing design enables easy access to all service-relevant components – including the condenser, which is very easy to clean. All of these advantages significantly reduce maintenance and 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 °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 (type TA 8 and up) provide reliable condensate removal in all load phases, thereby contributing to a stable pressure dew point. The electrical equipment complies with 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 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:

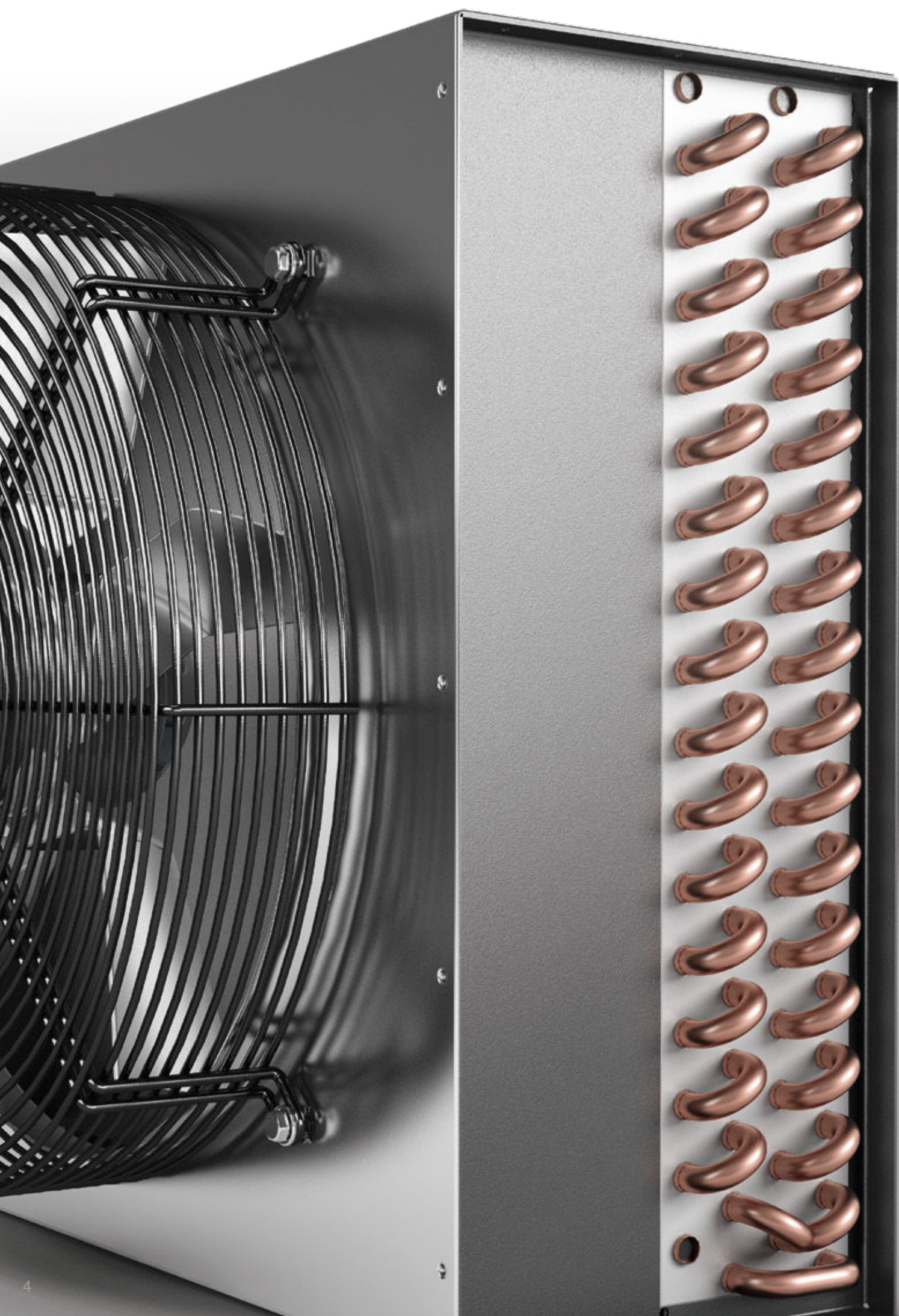
Flow rate 8.25 m³/min, 40% duty cycle, 6.55 kW/(m³/min), additional energy requirement 6%/bar, € 0.20/kWh, 6,000 operating hours per year, annual debt service over 10 years.

# Perfect for every compressed air requirement



Image: SECOTEC TA 11, TC 36

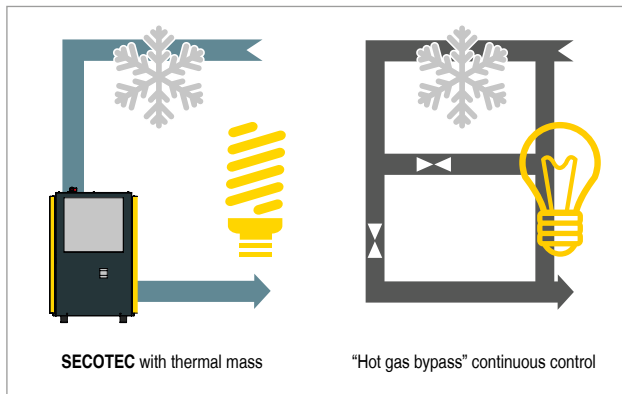




SECOTEC TA to TC series

## 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.



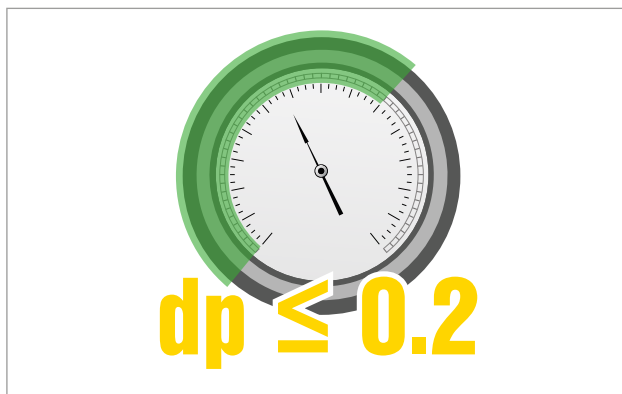
### SECOTEC CONTROL

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 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

SECOTEC series refrigeration dryers feature very low differential pressure. This is a result of the generously dimensioned flow cross-sections within the heat exchanger and compressed air connection 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 dependability

We do more than just talk about challenging operating conditions – we 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.



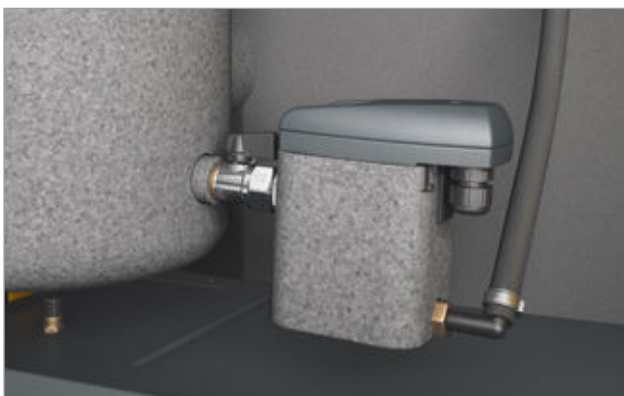
### Reliable separation

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



### High-performance 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 TA5) deliver dependable condensate separation – without pressure loss. They are also insulated to protect against condensation forming.



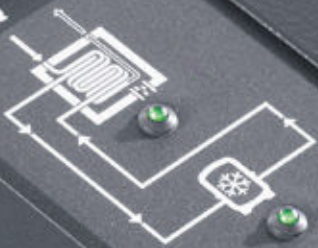
### Future-proof refrigerant

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





KAESER



SECOTEC CONTROL



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### Service-friendly condenser

The condenser is arranged on the front side of the unit, where it is exposed to the air stream in the absence of an upstream grille acting as a barrier. Any dirt accumulating 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 housing covers are quick and easy to remove, enabling straightforward service access. Taken together, these advantages significantly reduce maintenance requirement and therefore costs.

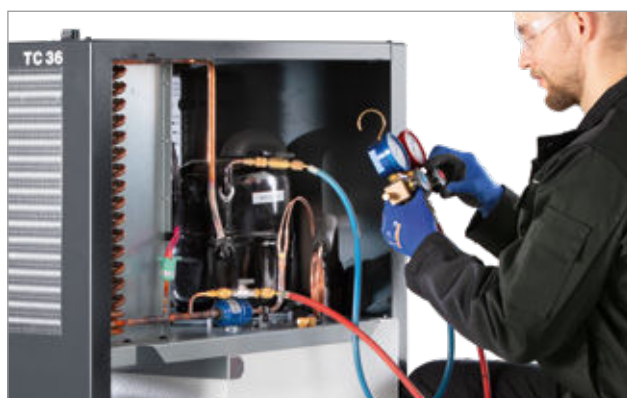




SECOTEC TA to TC series

## Outstanding service-friendliness

KAESER understands 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.



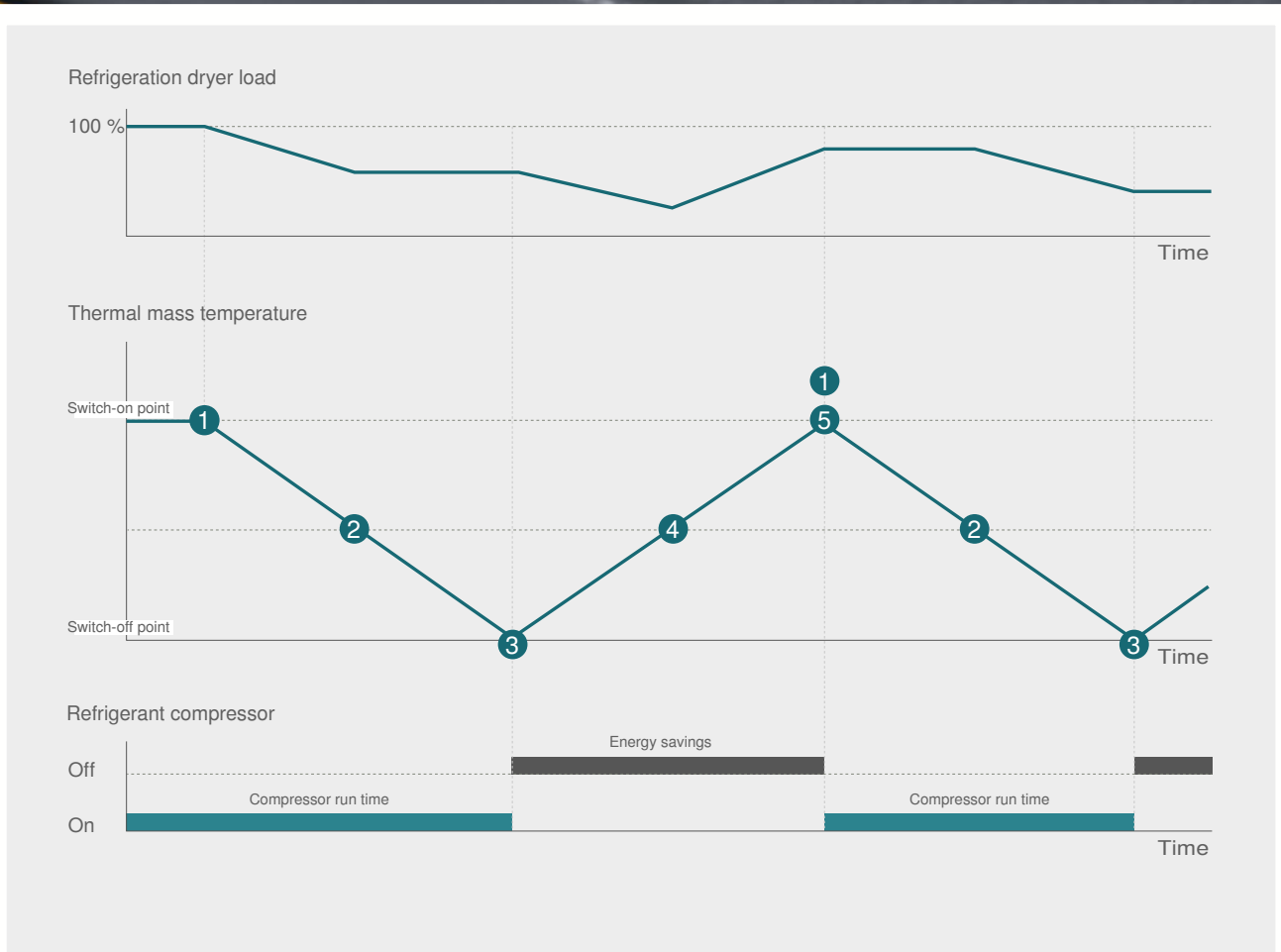
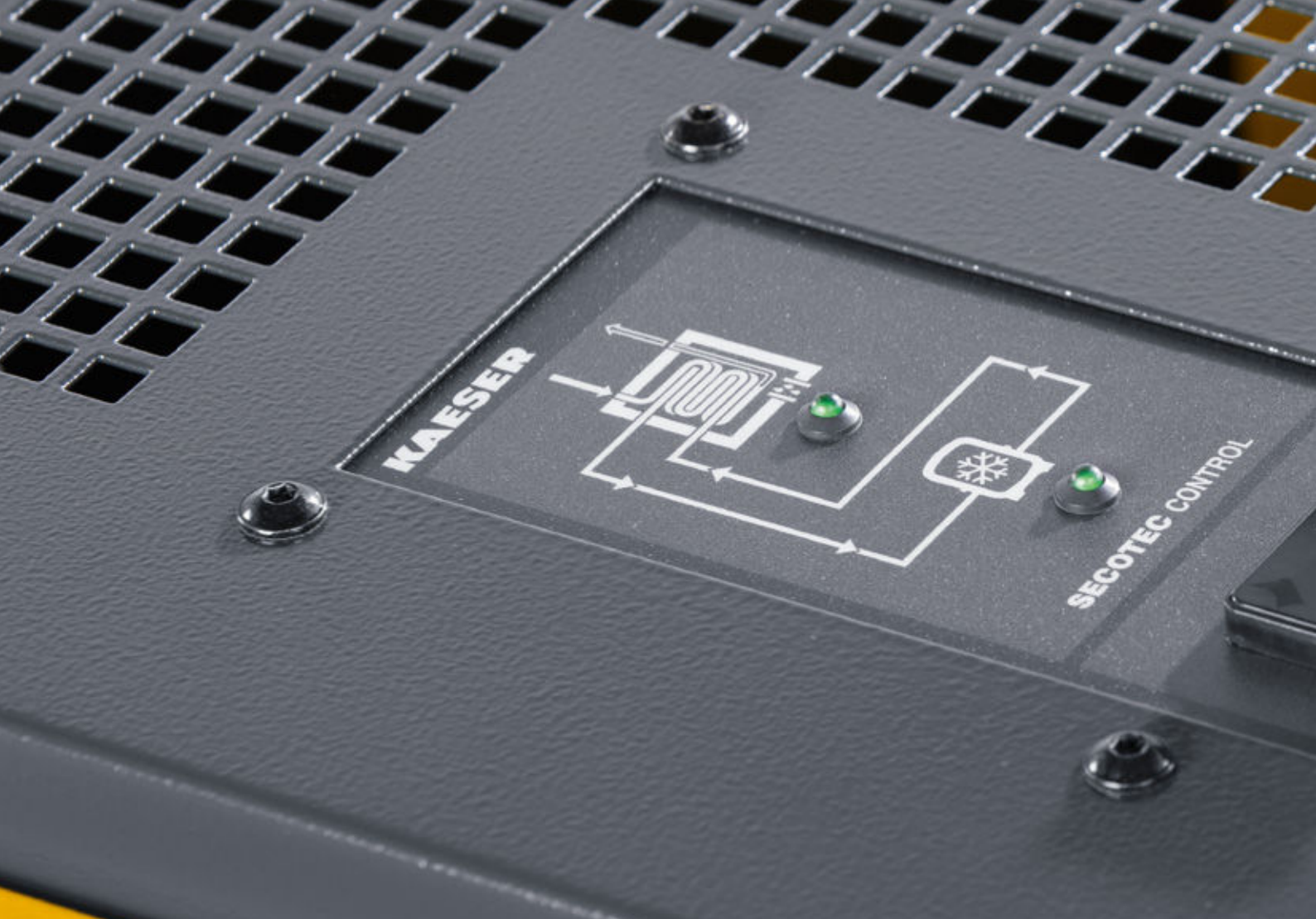
### Easy-to-test refrigeration circuit

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 proper function

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





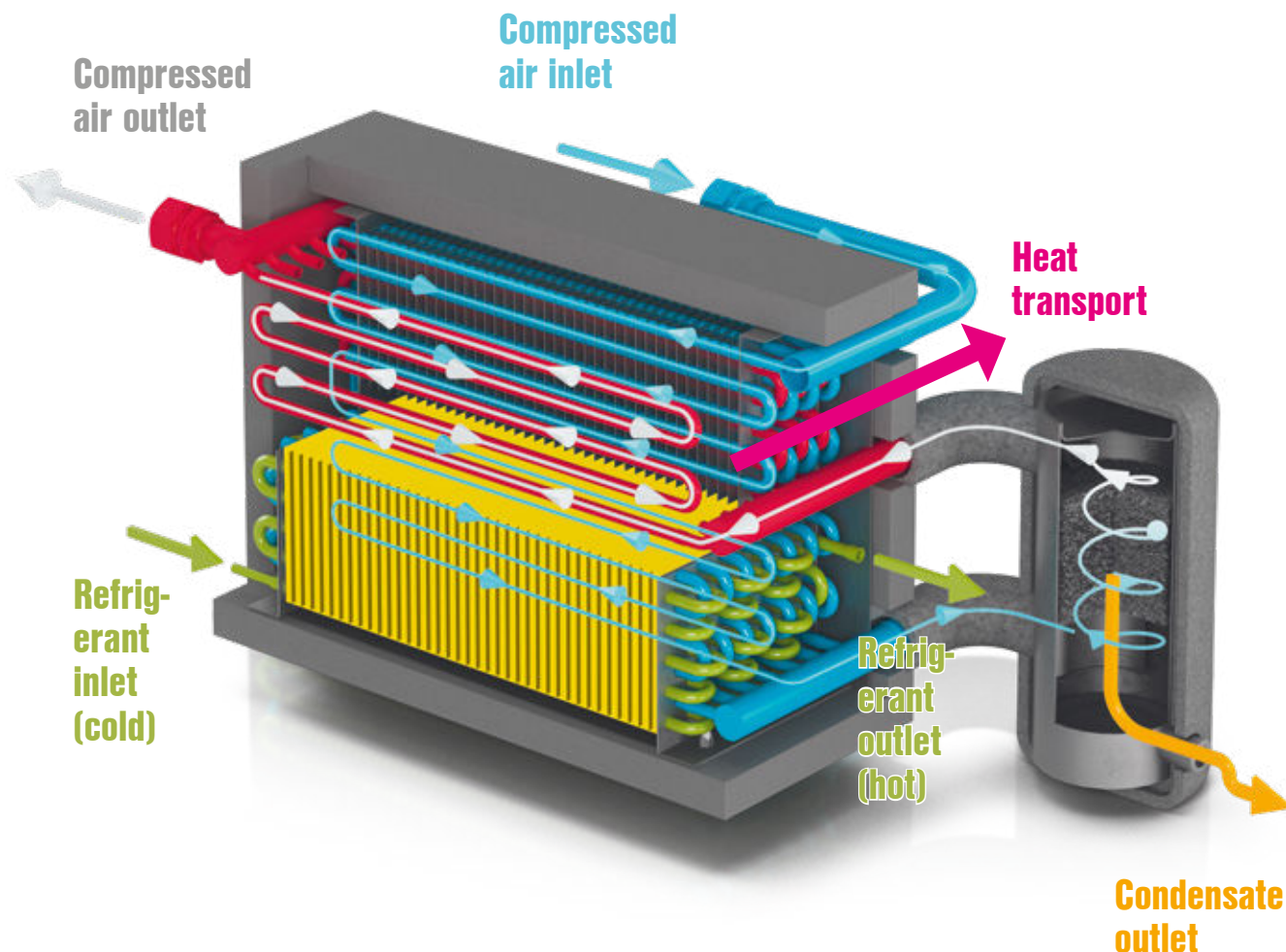
# SECOTEC CONTROL



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.



SECOTEC solid thermal mass

## High storage capacity – high energy savings

TA to TC 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 stress on 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 enables the refrigerant compressor and fan motor to remain switched off for a particularly long time – for greater energy savings.

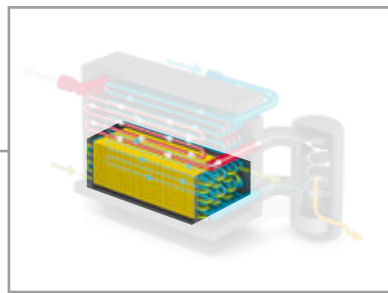
### The result:

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

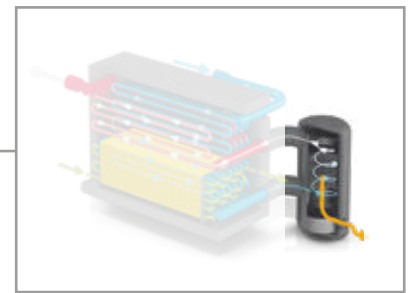




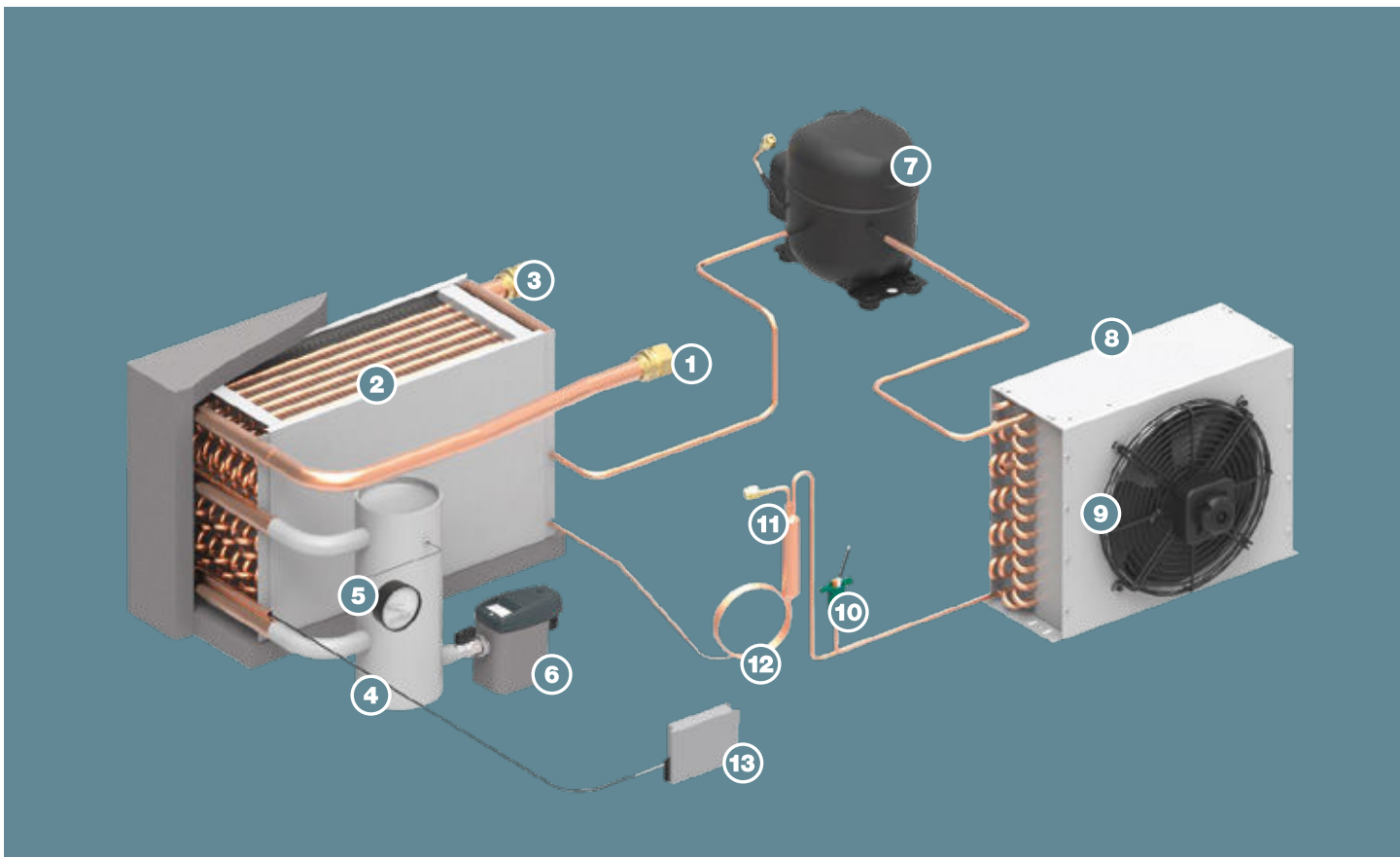
Air/air heat exchanger



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



Condensate separator



## Layout

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

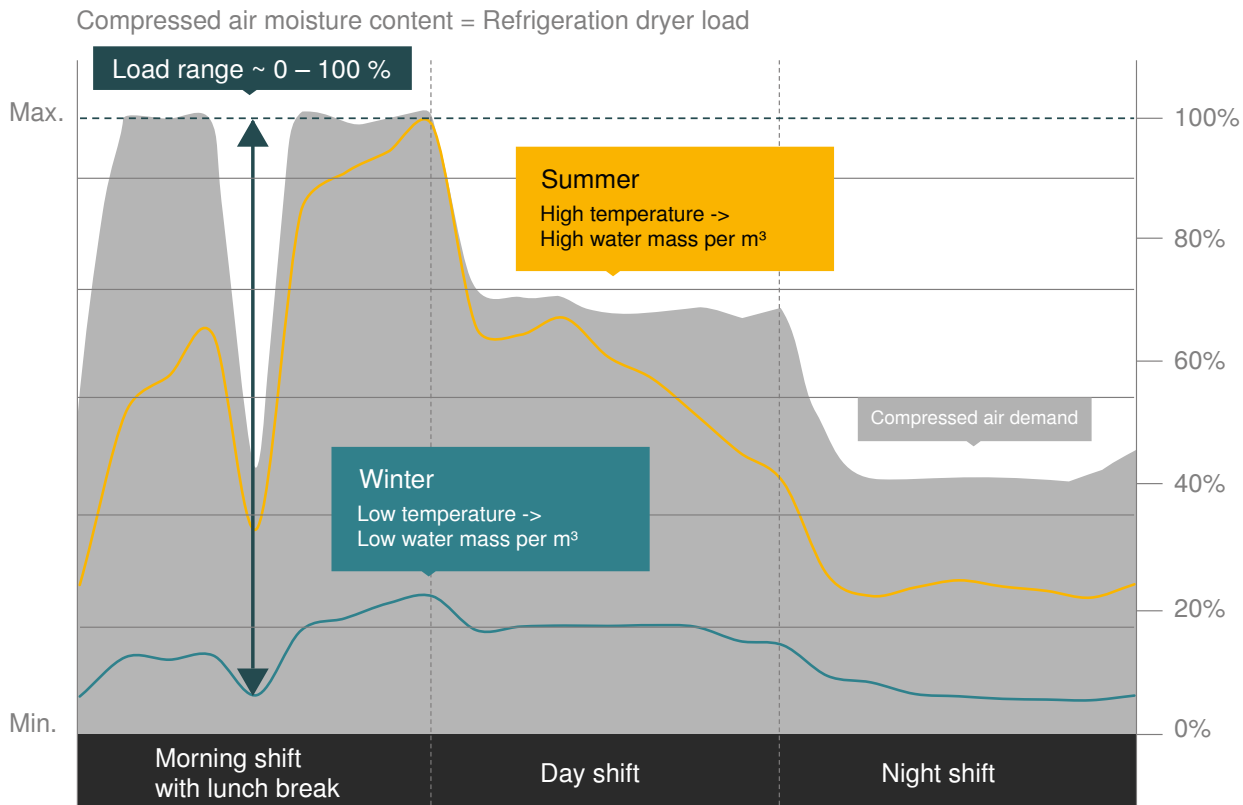
From mining to brewing, from Bavaria to Bahrain – our customers benefit from our experience as a global player, in all conceivable sectors and on-site conditions.

### 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

# 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 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 needed across this entire load range, users benefit from exceptional savings.



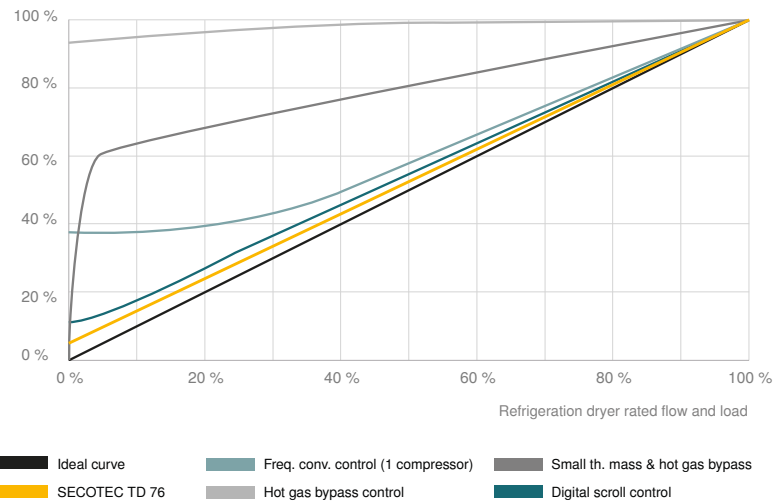
## Maximum energy savings thanks to thermal mass control

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 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.

Electrical power consumption under nominal conditions



## Optimal drying with low-wear operation

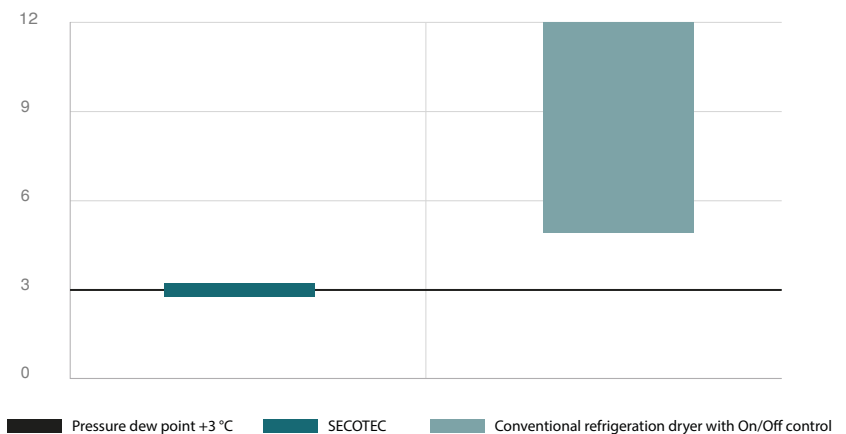
SECOTEC refrigeration dryers efficiently maintain stable pressure dew points down to +3°C during full load operation. Thanks to their narrow fluctuation range, pressure dew points are also significantly more stable during partial load operation than is the case with conventional refrigeration dryers.

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.

Degree of drying as average pressure dew point in °C



# 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.

## 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 <sub>i</sub> |      |      |      |      |      |      |    |
|---|------|------|------|------|------|------|----|
| T <sub>i</sub> (°C)                             | 30   | 35   | 40   | 45   | 50   | 55   | 60 |
| k <sub>Ti</sub>                                 | 1.20 | 1.00 | 0.83 | 0.72 | 0.60 | 0.49 |    |

| Ambient temperature T <sub>a</sub> |      |      |      |      |      |
|------------------------------------|------|------|------|------|------|
| T <sub>a</sub> (°C)                | 25   | 30   | 35   | 40   | 43   |
| k <sub>Ta</sub>                    | 1.00 | 0.99 | 0.97 | 0.94 | 0.92 |

| Example:                          |                       |             |                        |
|-----------------------------------|-----------------------|-------------|------------------------|
| Working pressure:                 | 10 bar <sub>(g)</sub> | (See table) | k <sub>p</sub> = 1.10  |
| Compressed air inlet temperature: | +40 °C                | (See table) | k <sub>Ti</sub> = 0.83 |
| Ambient temperature:              | +30 °C                | (See table) | k <sub>Ta</sub> = 0.99 |

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

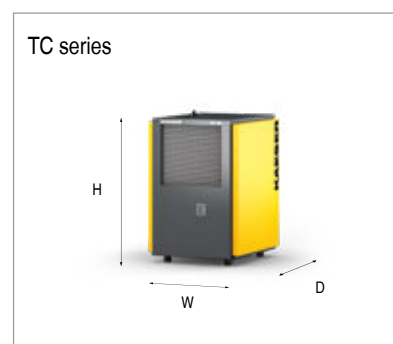
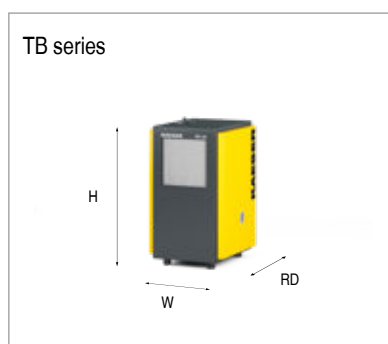
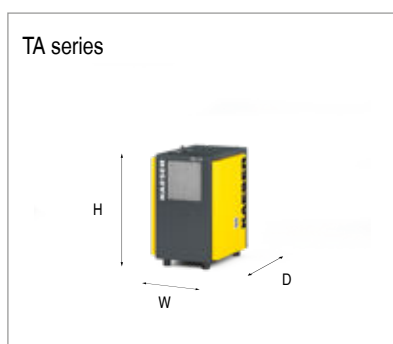


# Technical specifications

| Model  |        | TA series        |      |       | TB series        |       | TC series        |       |
|--|--------|------------------|------|-------|------------------|-------|------------------|-------|
|  |        | TA 5             | TA 8 | TA 11 | TB 19            | TB 26 | TC 31            | TC 36 |
| Flow rate <sup>1)</sup>  | m³/min | 0.60             | 0.85 | 1.25  | 2.10             | 2.55  | 3.20             | 3.90  |
| Pressure loss, refrigeration dryer <sup>1)</sup>   | bar    | 0.07             | 0.14 | 0.17  | 0.19             | 0.20  | 0.17             | 0.17  |
| Elect. power consumption at 100% flow rate <sup>1)</sup>   | kW     | 0.30             | 0.29 | 0.39  | 0.44             | 0.62  | 0.74             | 0.89  |
| Elect. power consumption at 50% flow rate <sup>1)</sup>  | kW     | 0.18             | 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 <sub>2</sub> 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                         |        | Optional         |      |       | Optional         |       | Standard         |       |
| Floating contacts: refrigerant compressor running, high pressure dew point, condensate drain alarm |        | Not available    |      |       | Optional         |       | Optional         |       |
| Bolt-down machine feet   |        | Optional         |      |       | Optional         |       | Optional         |       |
| Separate autotransformer for adapting to deviating mains voltages                                  |        | Optional         |      |       | Optional         |       | Optional         |       |
| Special colour (RAL)   |        | Optional         |      |       | Optional         |       | Optional         |       |
| Silicone-free version (VW factory standard 3.10.7)   |        | 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 R-513A (GWP = 631)

<sup>1)</sup> 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 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.



## KAESER KOMPRESSOREN SE

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