

BSD/CSD/CSDX T SFC Series

Air deliveries from 0.87 to 15.85 m³/min, Pressures 5.5 to 15 bar



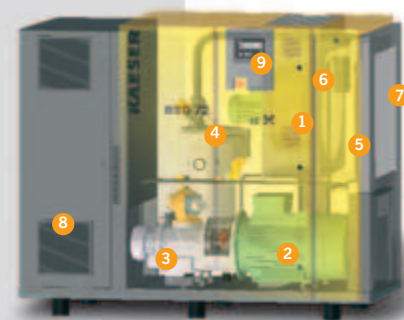
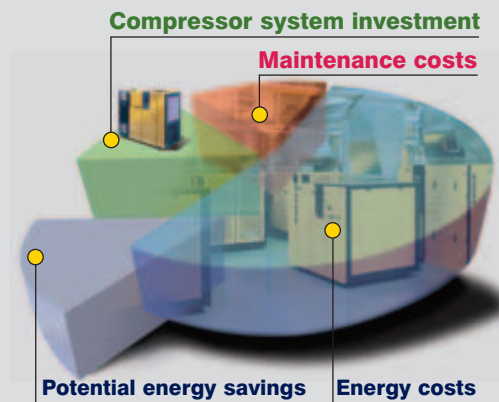
What do you look for in a compressor with variable frequency drive and refrigeration dryer?

As a user, you expect maximum efficiency, reliability and consistent air quality from your compressed air system. That may sound simple, but these advantages are influenced by many different factors:

Energy costs, for example, taken over the lifetime of a compressor, add up to a multiple of investment costs.

Efficient energy consumption therefore plays a vital role in every compressed air system, as does reliability of the compressor.

In addition, the compressed air should be free from condensate and treated to provide the required level of quality appropriate for the specific application. These measures ensure enhanced system reliability and significantly reduce maintenance costs in the air distribution network, pneumatic controls and all other associated compressed air powered equipment.



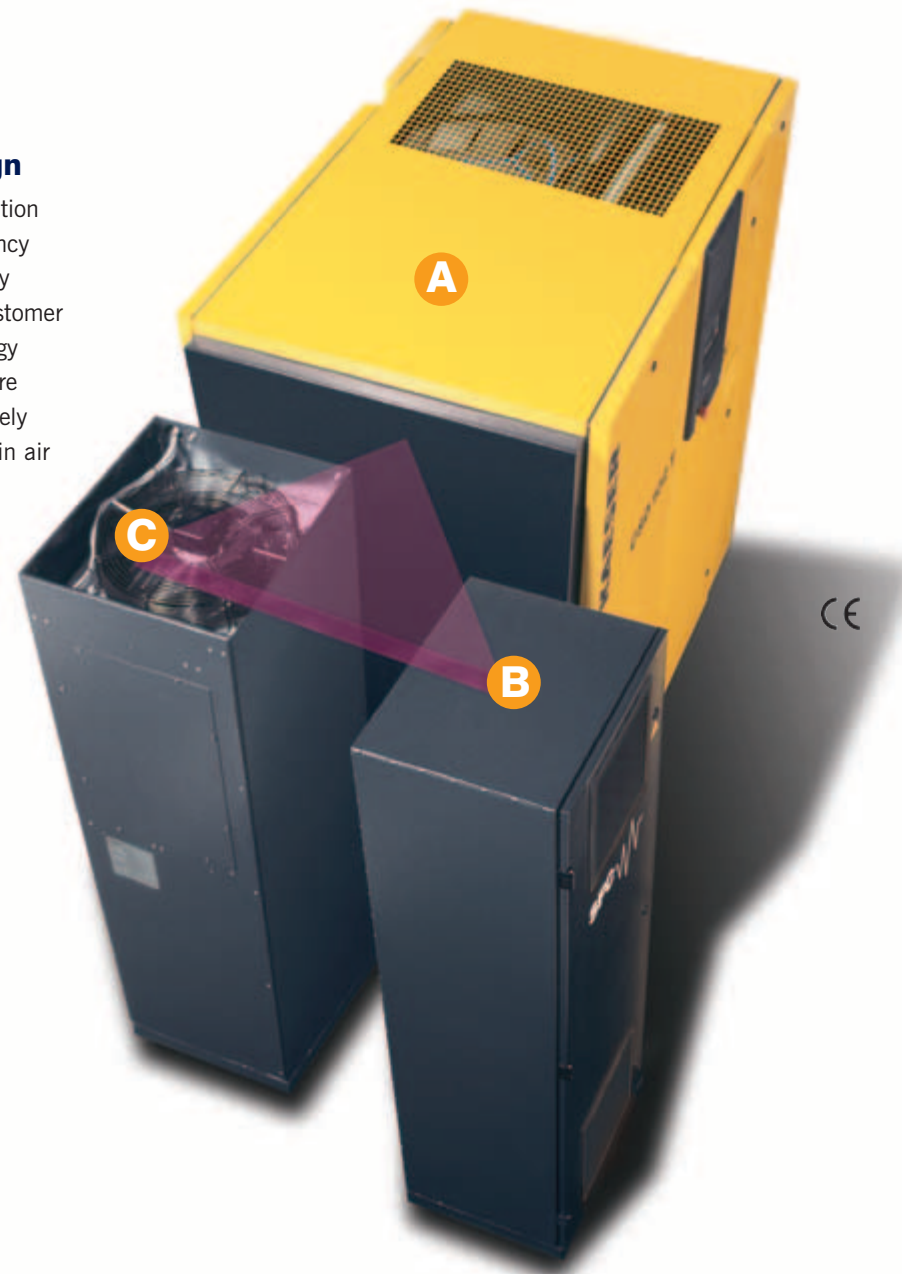
- 1 Inlet valve
- 2 Electric motor
- 3 Airend
- 4 Separator with cartridge
- 5 Fluid cooler
- 6 Fluid filter
- 7 Compressed air aftercooler
- 8 Control cabinet - frequency controller
- 9 Controller with industrial computer

T SFC – Integrated Modular Design

KAESER's solution: Versatile modular design

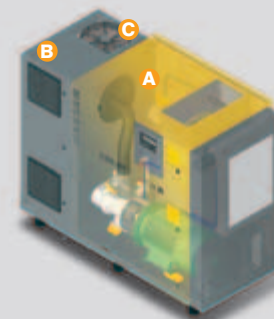
Available with a modular refrigeration dryer and/ or SFC variable frequency drive, BSD, CSD and CSDX rotary screw compressors fulfil every customer requirement: they are highly energy efficient, quieter than quiet, require minimal maintenance, are extremely reliable and deliver the very best in air quality.

Furthermore, these turnkey compressed air systems are simple to install and offer outstanding versatility.



Versatile Modular Design

KAESER's versatile range of modular design T SFC packages ensures that there is a model available to suit every compressed air requirement. The refrigeration dryer module (C) transforms a standard rotary screw compressor into a compact compressed air system that delivers quality dried-air in accordance with highest standards. With the addition of the SFC module (B), the compressor speed can be automatically adjusted to meet varying air demand. All possible combinations of these three modules are available.



- A = BSD, CSD or CSDX screw compressor
- B = SFC
- C = Refrigeration dryer

BSD, CSD and CSDX – Unrivalled Build Quality



The new BSD, CSD and CSDX series compressors with energy-saving 1:1 drive form the basis for the versatile modular concept. They are particularly efficient, durable and reliable as each is equipped a generously-sized low-speed airend featuring SIGMA PROFILE rotors.

T – Refrigeration dryer



BSD, CSD and CSDX compressors can be supplied with an integrated refrigeration dryer module as required. The compressor and dryer are housed in separate cabinets with individual cooling air apertures to increase operational reliability.

SFC – Sigma Frequency Control



The SFC variable frequency drive module is available for all BSD, CSD and CSDX compressors. The SFC module and the compressor form a compact, hard-wired unit with a compact footprint and short communication paths between the control electronics and drive motor.

Each package is delivered tested and ready to go.

BSD T – CSDX T with compact dryer

**Innovative:
BSD T, CSD T
and CSDX T series**

The new BSD T-, CSD T and CSDX T rotary screw compressor packages meet every customer requirement, as they combine maximum reliability with outstanding efficiency.

With the addition of the integrated refrigeration dryer module, these high-performance units are transformed into complete air supply systems.

Easy to maintain, the dryer is contained in its own separate housing within the unit to prevent exposure to heat from the compressor package, considerably increasing operational reliability and enabling use in ambient operating conditions of up to +45°C.



CSD 102 T rear view

Thermal insulation is omitted from the illustration.



Dependable centrifugal separator



A centrifugal separator with an electronically controlled ECO-DRAIN is installed between the compressor and the dryer. This ensures safe and efficient initial separation and drainage of the condensate even under conditions of high ambient temperature and humidity.

Refrigeration dryer with ECO DRAIN



The refrigeration dryer's electronically controlled ECO DRAIN operates according to the condensate level. This eliminates the pressure losses associated with conventional condensate drain systems and considerably enhances the reliability of the compressed air supply.

Stainless steel plate heat exchanger



Thermal insulation omitted

The dryer's stainless steel plate heat exchanger is resistant to corrosion, clogging and deposits. Even with a fluctuating airflow the heat exchanger reliably separates the accumulating condensate from the air. The dryer's components and piping are designed to provide exceptional operational safety and reliability.

Ready for use

Contained in its own separate cabinet there is more than sufficient space to allow all the components in the dryer to be generously sized yet easily accessible for maintenance. This design also prevents exposure of the refrigerant dryer to any heat from the compressor package. Individual cooling air apertures and an excellent design allow safe, reliable operation in ambient temperatures of up to +45°C whilst maintaining a +3°C pressure dew point.



SIGMA CONTROL



The SIGMA CONTROL compressor controller constantly monitors the compressor, refrigeration dryer and condensate drains. If required, messages from the dryer can be defined as alarms and forwarded to a control centre.

SFC – Ultimate efficiency

Innovative: BSD SFC, CSD SFC and CSDX SFC series

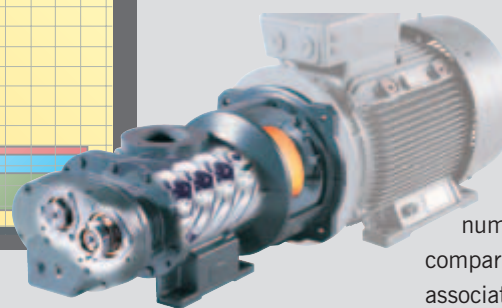
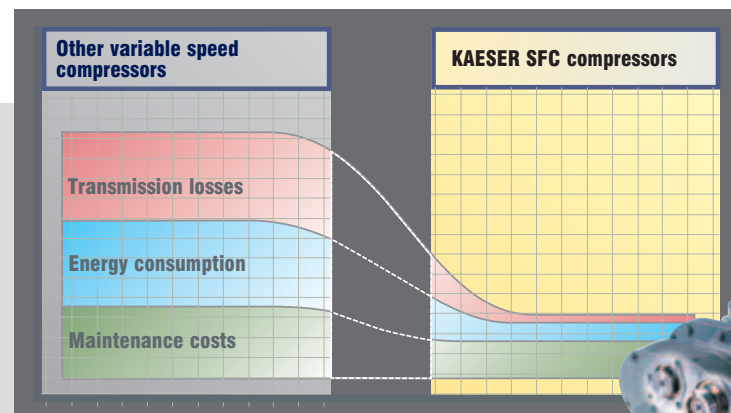
Every KAESER rotary screw compressor is equipped with a large, efficient airend featuring high performance SIGMA PRO-FILE rotors. The airends in BSD, CSD and CSDX units are powered by a direct drive system that eliminates the transmission losses associated with gear drive systems, enabling these compressors to provide significant energy savings.

Considerable savings can also be achieved with the addition of a SIGMA FREQUENCY CONTROL (SFC) module.

Depending on the size of the compressor installation, energy consumption in larger compressed air systems can be reduced by up to 50% .



CSDX 162 T SFC front view



All packages are designed to operate at full load, 7 days a week, yet require no additional maintenance. **Triple savings with 1:1 drive** – Significantly increasing reliability and service life, **1:1 drive** reduces the number of components needed in comparison with gear drive and eliminates the associated transmission losses. Sound levels are also considerably lower. The benefits speak for themselves: **efficient power transmission, optimal power consumption and reduced servicing / downtime costs.**

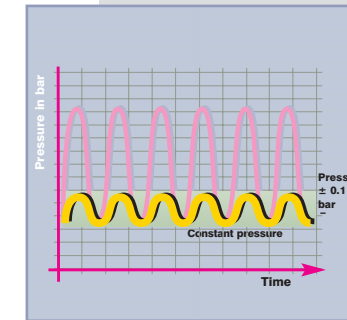
BSD SFC, CSD SFC and CSDX SFC compressor packages are highly efficient direct drive units featuring variable speed control. With high-efficiency performance throughout the entire control range, large, low speed airends featuring the energy saving SIGMA Profile have significant advantages over smaller, high speed airends.

Perfect performance even at high ambient temperatures



The generously-sized SFC module with its efficiently-cooled control cabinet allows trouble-free operation in ambient temperatures up to +45 °C.

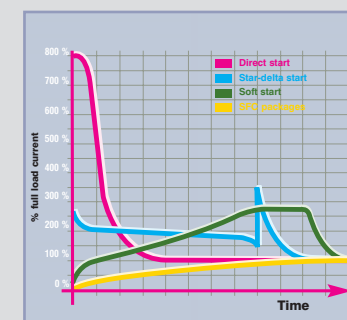
Precise pressure control



Air delivery from a BSD SFC, CSD SFC or CSDX SFC compressor can be matched to actual air demand according to required system pressure by continuously adjusting drive motor speed (and therefore the airend) within its specified control range. Depending on the buffer capacity of the downstream air network, it is

therefore possible to precisely maintain working pressure to within ± 0.1 bar and, as a result, to reduce maximum system pressure. This can lead to significant savings, as each 1 bar reduction in pressure amounts to a 7 percent reduction in energy consumption.

Soft start with no current spikes



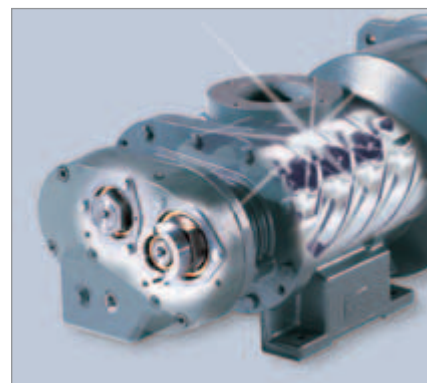
Soft start allows a gradual increase in drive motor current from zero to full load, enabling almost unlimited motor switching frequency i.e. the number of times the motor can be switched on within a defined time period without overheating. Current peaks that can potentially cause damage to power systems and equipment are reliably eliminated without the need for expensive electronics. In addition, the continuously variable acceleration and deceleration of moving parts reduces dynamic loading.



No interference
The electro-magnetic compatibility (EMC) of the components and of the complete machine has been tested and certified in accordance with all applicable regulations.



BSD/CSD/CSDX T SFC — Eight Decisive Advantages



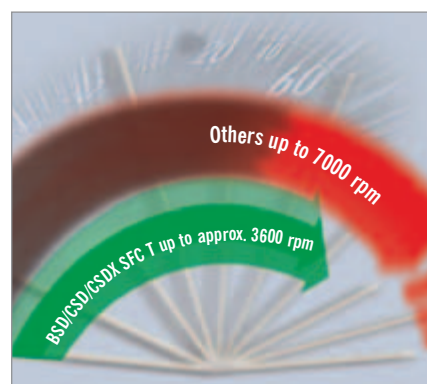
1 SIGMA PROFILE air end

A specific drive power can be used to turn a smaller air end at high speed or a larger air end at low speed. Larger, low speed air ends are more efficient, delivering more compressed air for the same drive power. That is why KAESER developed air ends especially for the BSD, CSD and CSDX series that precisely match the individual drive power and motor speed of each machine in the range. The slightly higher cost of the larger air end is quickly recovered by the energy saved during operation.



2 Energy-saving one-to-one drive

The advantage of this drive is not just the elimination of transmission losses. The motor and air end are joined by the coupling and its housing to form a compact and durable unit that, apart from greasing of the motor bearings, requires no regular maintenance. Should the coupling ever need to be replaced it takes just a few minutes without any disassembly of the unit; the opening in the coupling housing is more than large enough to replace the two coupling sections.



3 Large, low speed air ends

Each BSD SFC, CSD SFC and CSDX SFC compressor has exactly the same mechanical components as those used in KAESER's fixed speed compressors. This not only ensures unrivalled reliability and compressed air availability, but also guarantees optimum energy efficiency. The most efficient method of producing compressed air is by using large, low speed air ends – air ends in BSD/CSD/CSDX SFC compressors have a typical maximum rotation speed of approximately 3600 rpm. Further advantages include long service life and reduced maintenance requirement. The use of standardised drive motors also contributes to long-lasting compressed air availability.

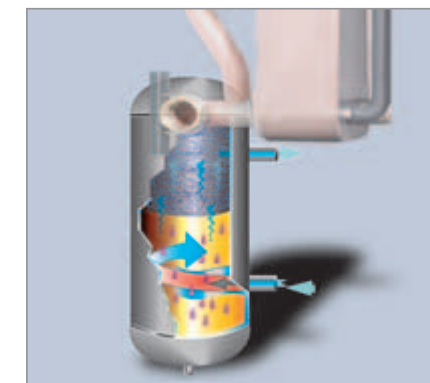


4 SIGMA CONTROL

Based on robust PC architecture, the SIGMA Control offers the possibility of Dual, Quadro, Vario and Continuous control. Clearly marked navigation and input keys on the user interface are used to move around within the menu options of the four line alpha-numeric display. This powerful compressor controller can also display information in any 1 of 30 selectable languages at just the press of a button. The SIGMA CONTROL automatically controls and monitors the compressor package. The Profibus interface enables exchange of data and operational parameters allowing the SIGMA Control to communicate with other air management systems such as the SIGMA Air Manager. Connection of a modem even allows maintenance and alarm messages to be sent via SMS to relevant service locations.

5 Efficient stainless steel condensate separator

The separator tank in the refrigeration dryer is made of stainless steel and is therefore completely corrosion resistant. A deflector plate forces the compressed air streaming into the separator into rotary motion. The air then flows through a stainless steel wire mesh in which 99.9 percent of the water in the air is separated. This figure remains almost constant, despite fluctuating airflow, reliably maintaining the required pressure dew point. Solid particles are also washed out and eliminated together with the condensate.



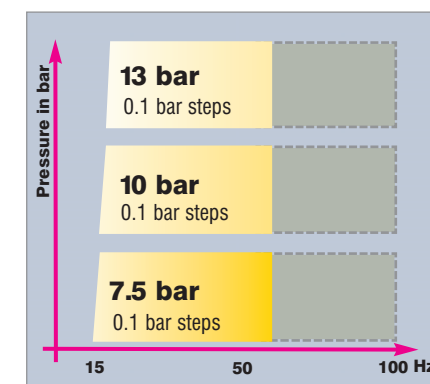
6 SFC module

Siemens frequency inverters are used exclusively in KAESER's speed controlled compressors for several reasons: Siemens manufacture the industrial PC-based SIGMA CONTROL compressor controller, which enables seamless communication with the SFC control cabinet. Furthermore, the worldwide presence of Siemens ensures dependable service. The SFC control cabinet and SIGMA CONTROL are tested and certified in accordance with all applicable electromagnetic compatibility regulations, both as individual components and as an integrated system.



7 Flexible pressure adjustment

The wide range of 1:1 drive air ends makes it possible to select the one that works most efficiently within the pressure and performance range required. This ensures that every BSD/CSD/CSDX SFC compressor operates with the most efficient pressure-frequency profile. In addition, the SIGMA CONTROL compressor controller is equipped with a pressure-to-frequency profile that guarantees maximum flexibility for air delivery and pressure whilst providing best possible efficiency.



8 Specific energy requirement is the key

Large, low speed air ends are more efficient than small high speed air ends because they supply more air for the same drive power. This is not just the case at full load, but also applies throughout the entire control range, which is particularly important for variable speed machines. The specific energy requirement of 6.4 kW per m³/min for a KAESER SFC compressor operating at 7.5 bar can be considered as an excellent indication of the machine's efficiency. Variable frequency controlled compressors are only truly efficient if they have low energy consumption throughout their entire control range.

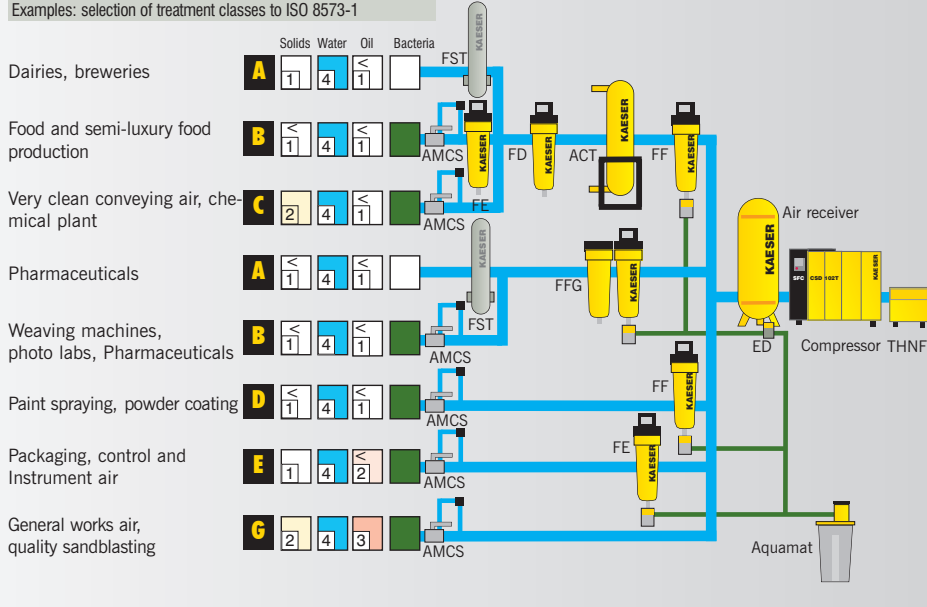


Different fields of application require different grades of air treatment

Choose the required grade of treatment according to your field of application:

Air treatment using a refrigeration dryer (+3 °C pressure dew point)

Examples: selection of treatment classes to ISO 8573-1



- A** Oil vapour content $\leq 0.003 \text{ mg/m}^3$, particle retention $> 0.01 \mu\text{m}$, sterile, odourless and tasteless
- B** Oil vapour content $\leq 0.003 \text{ mg/m}^3$, particle retention $> 0.01 \mu\text{m}$
- C** Oil vapour content $\leq 0.003 \text{ mg/m}^3$, particle retention $> 1 \mu\text{m}$
- D** Aerosol oil $\leq 0.001 \text{ mg/m}^3$ particle retention $> 0.01 \mu\text{m}$
- E** Aerosol oil $\leq 0.01 \text{ mg/m}^3$, particle retention $> 0.01 \mu\text{m}$
- G** Aerosol oil $\leq 1 \text{ mg/m}^3$ particle retention $> 1 \mu\text{m}$

Contaminants:

- + solids -
- + water -
- + oil -
- + bacteria -

Explanation:

- THNF = bag filter**
cleans dusty and highly contaminated intake air
- ZK = centrifugal separator**
separates accumulating condensate
- ED = ECO Drain**
electronic level-controlled condensate drain
- FD = particulate filter $1 \mu\text{m}$**
separates dust particles (attrition) $1 \mu\text{m}$
- FE = microfilter 0.01 ppm**
separates aerosol oils and solid particles $> 0.01 \mu\text{m}$, oil content $\leq 0.01 \text{ mg/m}^3$
- FF = microfilter 0.001 ppm**
separates aerosol oils and solid particles $> 0.01 \mu\text{m}$, oil content $\leq 0.001 \text{ mg/m}^3$
- FG = activated carbon filter**
for adsorption of oil vapours, oil vapour content $\leq 0.003 \text{ mg/m}^3$
- FFG = combination filter**
comprising FF and FG
- rotary screw compressor SFC T**
rotary screw compressor with attached refrigeration dryer; pressure dew point down to $+3 \text{ }^\circ\text{C}$; compressor available with variable frequency drive
- FST = sterile filter for bacteria-free air**
- Aquamat = condensate treatment system**
- AMCS = air-main charging system**

Degree of filtration:

ISO 8573-1 Class	Solid particles				Humidity Pressure dew point (x = liquid water in mg/m^3)	Overall oil content mg/m^3
	Max. no. of particles per m^3 with size d (μm)	$0.1 < d \leq 0.5$	$0.5 < d \leq 1.0$	$1.0 < d \leq 5.0$		
0	≤ 0.1	-	-	-	-	-
1	-	100	1	0	$\leq -70 \text{ }^\circ\text{C}$	≤ 0.01
2	-	100000	1000	10	$\leq -40 \text{ }^\circ\text{C}$	≤ 0.1
3	-	-	10000	500	$\leq -20 \text{ }^\circ\text{C}$	≤ 1.0
4	-	-	-	1000	$\leq +3 \text{ }^\circ\text{C}$	≤ 5.0
5	-	-	-	20000	$\leq +7 \text{ }^\circ\text{C}$	-
6	-	-	-	≤ 5	$\leq +10 \text{ }^\circ\text{C}$	-
7	-	-	-	≤ 40	≤ 10	-
8	-	-	-	≤ 5	$x \leq 0.5$	-
9	-	-	-	-	$0.5 < x \leq 5.0$	-
10	-	-	-	-	$5.0 < x \leq 10.0$	-



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