

Medical technology

Cooling systems for Computed Tomography



Service



Commercial Cooling



Medical Technology



Industrial Cooling

SIEMENS Healthcare and RIEDEL – A successful partnership with a long tradition

SIEMENS – Innovation leader for CT scanners

SIEMENS is the world's recognized innovation leader in the field of computed tomography. In the last 10 years, the market share has been steadily expanded in a highly competitive environment. With each new CT generation, SIEMENS reasserts its claim to leadership.

The preliminary highlight of this innovative power is the Dual Source CT. The newest generation has two x-ray tubes and detectors, which allow for scans at a previously unachievable speed and quality. However, the operation of these more and more powerful diagnostic imaging devices is also accompanied by an increasingly larger thermal load that must be dissipated. For over 20 years, RIEDEL has been responsible for the cooling of SIEMENS CT scanners and the accompanying cooling water supply.

RIEDEL – Customized Cooling Systems

The development of SIEMENS CT scanners also implies the constant development of cooling concepts and its responsible components. In order to optimally fulfill the current requirements and ensure the best possible system integration, engineers and developers from both companies are in constant dialog. This successful method of working has proven its worth. Due to its high production quality and ability to deliver, RIEDEL has already received the SIEMENS CT "Supplier of the Year" award five times.

In order to live up to this award as well in the future, the expansion of locations on all continents and the construction of additional production sites in the USA and Asia will be accelerated.

SIEMENS/RIEDEL Supply Chain

Delivery of the new product to the SIEMENS warehouse with inventory reserve (ensured delivery capacity)

**SIEMENS Healthcare
Computed Tomography**

RIEDEL
RIEDEL AG · RIEDEL GMBH · RIEDEL LTD · RIEDEL INC.

Supply to SIEMENS projects and clients worldwide within just a few days



Overnight delivery of spare parts; distribution of spare parts to SIEMENS warehouses in the USA, EU and Asia

**SIEMENS Healthcare
Customer Service**

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RIEDEL Cooling Systems for CT Scanners – Reliability is our highest priority

Today's modern diagnostic imaging technology simply cannot operate without a functional cooling system. Diagnostic devices, such as computed tomographs, produce a large amount of waste heat during the scanning process due to x-ray tube and drive systems. In order to ensure uninterrupted operations and optimally utilize the CT's capabilities, a powerful cooling system is necessary to reliably cope with the thermal load.

During the development of cooling systems we demand the highest requirements on components and parts. FMEA analysis aid us already at the beginning of the design to make sure the product is safe and error-free. All new developments are going through a comprehensive environmental simulation test in order to guarantee the highest possible operational reliability on a world-wide installation basis.



High reliability thanks to ...

- **Carefully selected materials and components**

- Only components from well-known manufacturers are used
- All products are built to be RoHS-compliant

- **Quality check-ups and practical tests**

- RIEDEL products are subject to strict quality controls and undergo environment type tests as early as the development phase

- **Certification**

- All RIEDEL systems have a product certification for the American and Canadian markets

- **Robust Technology**

- RIEDEL cooling systems can be used in the outdoor temperature range from 122 °F to -13 °F (+50 °C to -25 °C) and optionally even to -40 °F (-40 °C) without any problems

- **Service Concept**

- Defective cooling units are not repaired on-site, but instead are completely exchanged for new units

- **Availability of spare parts**

- 10 years after the end of series of the CT scanners

- **Minimized downtimes**

- Maintenance and repair can be performed within 2 hours
- Worldwide distribution of spare parts and technical support by SIEMENS Customer Service within 24 hours

- **Remote Monitoring**

- The proper operation of the cooling system is monitored by a central gantry control panel
- Malfunctions are reported accordingly and forwarded to the SIEMENS Customer Service

More flexibility for installation and implementation

The flexibility of the cooling system can already be seen in the planning of a new CT. The indoor and outdoor devices should come across as subtly and compactly as possible and follow fixed structural conditions without any problems.

In order to make the integration of the cooling system as easy as possible, we have taken many details into consideration and coordinated this with a high degree of integration flexibility for later operations. This philosophy is rounded off by a comprehensive installation package, which contains all of the necessary components, hoses and cooling medium.

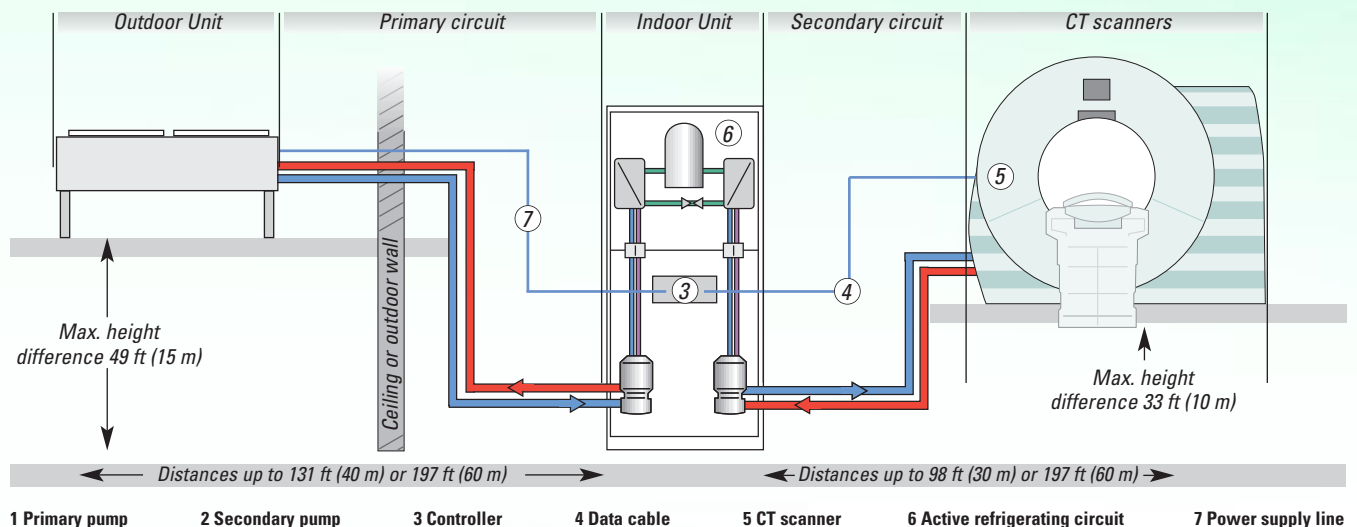
Planning Freedom

- **On schedule and flexible project planning for SIEMENS customers**
 - Short delivery times and 100% availability of all components from the SIEMENS Healthcare CT Warehouse
 - Vast variety of options for customer specific requirements
- **Flexible Device Installation**
 - Up to 197 ft (60 m) distance between the indoor unit and the gantry
 - Low sound emission from the outdoor unit, which can be installed on flat roofs, the exterior surroundings or in underground garages
 - Harmonious overall image through the use of SIEMENS system cabinets

Installation Example RIEDEL Water/Air Split System

The system consists of an indoor and an outdoor unit. The active refrigerating circuit, the circulation pumps for the cooling water supply and the electric switchbox with the specially developed microprocessor controller are located in the indoor unit in the form of a SIEMENS system cabinet.

The RIEDEL Water/Air Split system features a patented water cooled refrigeration circuit which offers unique advantages regarding the installation, the set-up and in particular for the service.



- **Small foot print**

- Compact space requirements indoor unit $\leq 3 \text{ ft}^2$ (1 m²), outdoor unit $\leq 8.9 \text{ ft}^2$ (2.7 m²)

- **Low-noise construction concept**

- Low acoustic emission from the indoor unit, which means it can also be installed in the examination room

- **Worldwide application**

- RIEDEL cooling systems can be operated in nearly all climate zones – for outdoor temperatures from 122 °F to -13° F (+50 °C to -25 °C) and optionally even to -40 °F (-40 °C)
- Can be adapted to all voltages and frequencies
- Can be used at altitudes of up to 6562 ft (2000 m) above sea level

Simple installation and start-up

- Cooling systems can be set up and put into operation by a contractor – **no refrigerant technician or specialist required.**

- **Complete installation package**

- Ready-to-assemble delivery of the cooling system, including all necessary components. The standard package consists of:
 - Premium HDPE hoses
 - Cooling medium to fill the entire system
 - Power supply lines to connect the indoor and outdoor units
 - Data cable to the CT sensors





Sensation Cooling

Tried and tested for years

Since the introduction of the Sensation CT scanners, over 3000 systems are now being installed worldwide. For systems in the SOMATOM SENSATION family, we have developed two active cooling systems: Sensation Cooling System Water/Air and Sensation Cooling System Water/Air Split.

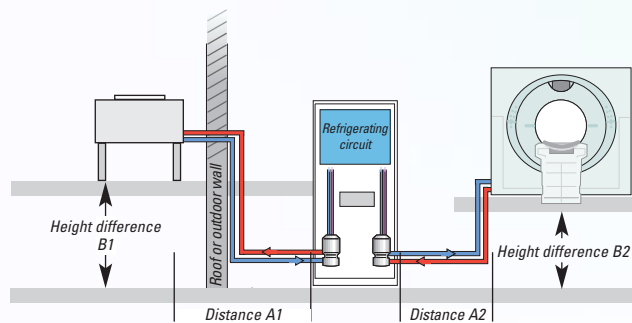
The cooling systems are designed for the following SIEMENS CT scanners:

- SOMATOM SENSATION 10
- SOMATOM SENSATION 16
- SOMATOM SENSATION CARDIAC
- SOMATOM SENSATION 40
- SOMATOM SENSATION 64
- SOMATOM SENSATION CARDIAC 64
- SOMATOM SENSATION OPEN

The passive water/water cooling system can be applied as long as the end customer has cooling water available on-site. It then acts as a system separator between the on-site supply and the CT system.

Installation Details

Sensation Water/Air Split – SIEMENS Part Number 8905320



	Standard	Option*
A1	up to 131 ft (40 m)	up to 197 ft (60 m)
B1	49 ft (15 m)	49 ft (15 m)
A2	up to 98 ft (30 m)	up to 197 ft (60 m)
B2	33 ft (10 m)	33 ft (10 m)

* Hardpipe Ø 2"

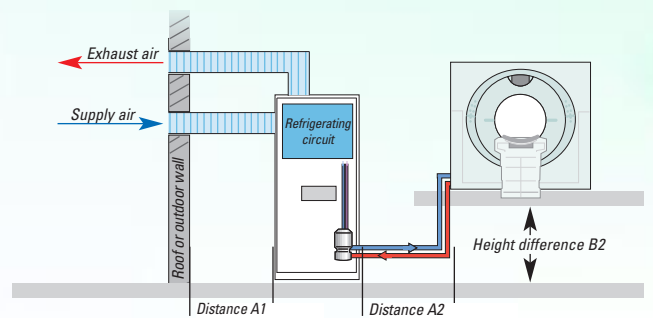
System Description

The Sensation Water/Air and Water/Air Split cooling systems are constructed in the same way in terms of the technical concept. The difference between the systems lies solely in the principle of the refrigerant circuit's heat dissipation. The Water/Air system has a direct air-cooled condenser with a ventilator unit, while the Water/Air Split cooling system releases waste heat via the outdoor unit. The accessories for the Water/Air system contain two soundproof air hoses for supply and exhaust air.

Design of the refrigerating circuit for the systems

The Sensation Water/Air and Water/Air Split cooling systems are equipped with two compressors in the refrigerating circuit. The cooling capacity for the basic load, i.e. in the scanner's standby mode, is thus tackled by the smaller compressor. If the demand of cooling capacity increases while in scanning mode, the second, more powerful compressor will then kick in as well. The demand-dependent activation of the second compressor makes the Sensation cooling systems extremely energy-efficient!

Sensation Water/Air – SIEMENS Part Number 7393320



	Standard	Option*
A1	13 ft (4 m)	
A2	up to 98 ft (30 m)	up to 197 ft (60 m)
B2	33 ft (10 m)	



*Indoor Unit
Water/Air*

*Indoor Unit
Water/Air Split*

*Electric
panel*

*Pump and
hose connections*

*Outdoor Unit
Water/Air Split*

Technical Data

	Indoor Unit	Outdoor Unit*
Noise pressure level 3 ft (in 1 m) dBA	< 65	< 62
Dimensions (h x w x d)	mm 1,800 x 900 x 900	950 x 1,320 x 1,150
Weight (without packaging)	kg 380	150

* only for Water/Air





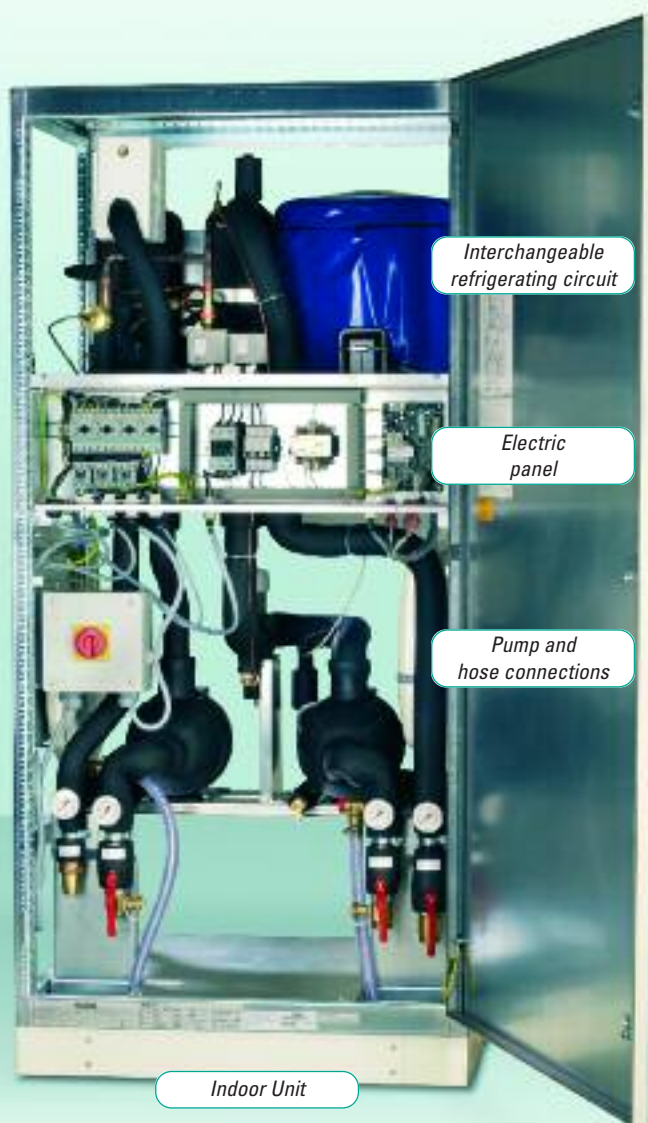
Definition/Definition AS Cooling

More flexibility and security

The CT scanners of the SIEMENS Definition family are some of the most modern and powerful systems available on the market. In order to meet the high demands of this diagnostic device, we have developed the right type of cooling – the Definition Cooling System.

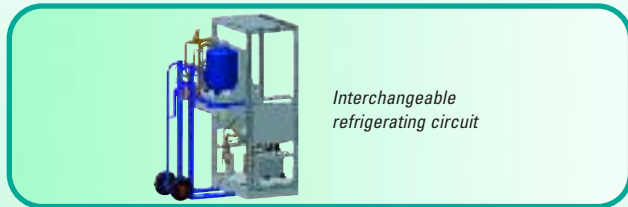
The cooling system can be applied in the following device types:

- SOMATOM Definition AS 20
- SOMATOM Definition AS 40
- SOMATOM Definition AS 64
- SOMATOM Definition AS+
- SOMATOM Definition
- SOMATOM Definition Flash



Further Enhancements

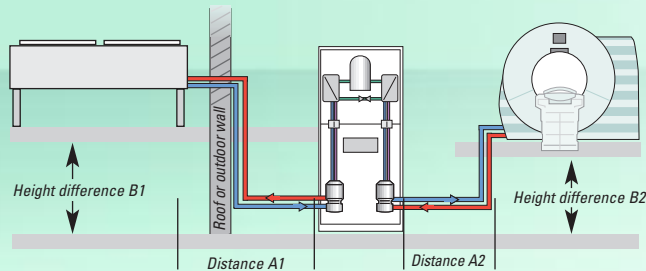
Just as the CTs are being developed further, we are also permanently working towards improving our cooling units and systems. For the cooling of the Definition series, an optimized indoor unit is available, which has a completely interchangeable refrigerating circuit in a modular design.



The benefit in the event of service case is clearly evident – the entire indoor unit device does not need to be replaced, only the defective refrigerating unit. Since only the water and electric connections have to be disconnected, it is possible to remove the unit without a refrigeration specialist. This reduces the repair time to less than two hours and lowers costs at the same time. Another benefit is the significantly lower utilization of refrigerant, which is limited to the refrigerating circuit module.

Installation Details

Definition/Definition AS Water/Air Split –
Siemens Part Number 7741437



	Standard	Option*
A1	up to 131 ft (40 m)	up to 197 ft (60 m)
B1	49 ft (15 m)	49 ft (15 m)
A2	up to 98 ft (30 m)	up to 197 ft (60 m)
B2	33 ft (10 m)	33 ft (10 m)

* Hard Pipe Ø 2"

Even more flexibility

The Definition Water/Air Split cooling system offers even more planning flexibility for integration in hospitals and radiology practices. The distance between the individual components of the cooling system or between the cooling system and the CT can be up to 197 ft (60 m) apart. For this system configuration, optional cable sets for the power supply and data cables as well as adapter kits for hard piping are available.

Even more security

Many radiologists and radiology centers insist that the system technology and periphery of their diagnostic imaging devices be set up redundantly, since even a repair time of 2 hours results in a high financial and organizational burden for the doctor. In this case, an alternative cooling water source can be integrated into the secondary circuit of the Definition cooling system using the optional Interface Panel.

This way, operations can still be maintained even in the event of a chiller malfunction. A service switch, which enables the outdoor unit to be electrically activated near the device, is available for the cooling system's outdoor unit. (OHSА lockout/ tagout regulation).



Technical Data

	Indoor Unit	Outdoor Unit
Noise pressure level 3 ft (in 1 m) dBA	< 65	< 40
Dimensions (h x w x d)	mm 1,810 x 905 x 900	987 x 2,425 x 1,100
Weight (without packaging)	kg 355	180

In an emergency, everything has to happen really fast – the RIEDEL Service Concept

Despite great care and strict quality check-ups, all technical devices can still experience malfunctions. In order to prevent an error message to turn into a breakdown, we have developed a service concept that promises the fastest possible reaction time and remedy.

Replacement instead of searching for errors

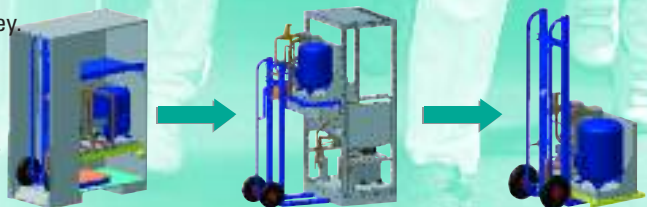
When a CT breaks down, it isn't only aggravating for the operator and patients – it also results in considerable financial losses at the same time. After an error message, your CT operations should be ready to use again as quickly as possible. If there is a breakdown in the active refrigerating circuit, the repair is generally time-intensive and must be carried out by a refrigeration specialist. This results in both high costs and a search for a regional refrigeration specialist.

That is why the RIEDEL Service Concept is designed as follows:

For Sensation cooling units, the entire indoor unit is replaced, while only the cooling circuit must be replaced in the Definition series. After just a short period of time, CT operations can be resumed again without limitations.

Interchanging the refrigerating circuit in the field

1. The refrigerating circuit replacement part is delivered in seaworthy wooden packaging including a lifting and transport trolley.
2. The replacement can be done by a contractor – **a refrigeration specialist is not required.**
3. The unit is returned to RIEDEL for refurbishing via SIEMENS CS. The potentially **time-consuming search for errors is thus transferred from the customer to the factory.** After the repair, the unit is returned to the SIEMENS CS spare parts warehouse.



Timely information provides a head start

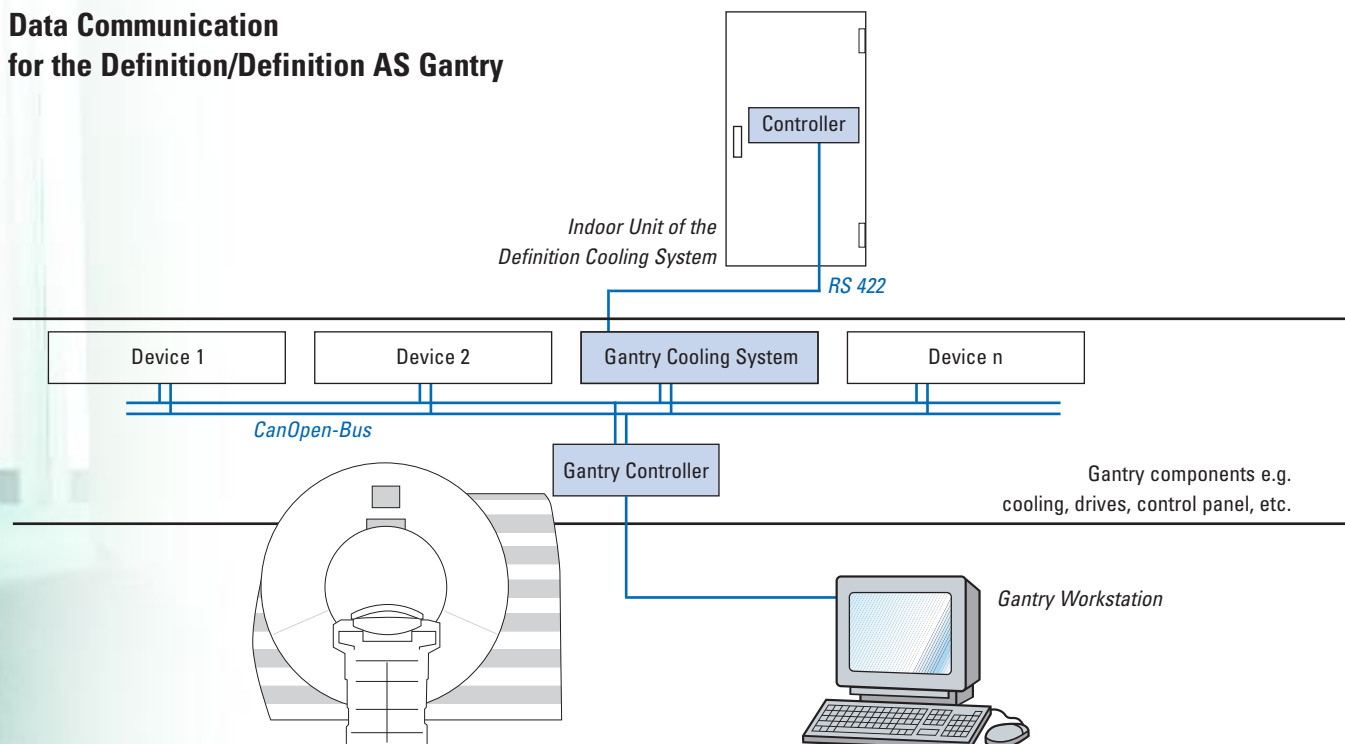
Our Sensation and Definition cooling systems communicate with the CT system. The data cable between the controller of the indoor unit and the central controlling unit of the CT ensures that status and alarm messages are transmitted early so that any disruption in the system can be prevented. During Service the existing error log efficiently supports the on-site technician with diagnosis and troubleshooting.

With the corresponding system configuration, the entire system can be viewed by SIEMENS Customer Service via remote monitoring. This way, no time is lost and many alarm messages can be dealt with directly.

The following data for the cooling system can be accessed and/or set via the gantry:

- Medium temperatures
- Set-point temperature for the medium
- Medium category temperatures
- Malfunction delay
- Status messages from the components
compressor, primary pump, secondary pump, outdoor unit
- Error messages in the area of
medium temperature, high pressure error, low pressure error,
freezing protection, over-current for the secondary pump or
primary pump, over-current for the compressor and outdoor
unit, safety shut-off primary temperature < 77 °F (< 25 °C)
- System Identification Data

Data Communication for the Definition/Definition AS Gantry



Options and Accessories for the Definition and Sensation Cooling Systems

Options for Systems Security

1 Flow Heater – SIEMENS Part Number 10161829

The optional available flow heater allows for the cooling system to operate at an outdoor temperature of up to -40 °F (-40 °C).

The unit runs independently from the cooling system, i.e. it has its own controller and power supply. It can be upgraded without any problems and compactly installed wall side close to the indoor unit.

2 Interface Panel – SIEMENS Part Number 10161883

The Interface Panel serves as a switch station between two sources of cooling water for the CT. If necessary, the cooling water supply from the Definition cooling system can be switched by hand to another cooling system or to the emergency cooling using house water within just a few minutes.

Accessories for National Requirements

3 Service Switch – SIEMENS Part Number 10161887

The service switch fulfills the requirements of the National Electrical Code (NEC) and the National Fire Code (NFC).

Integrated into the electric supply wiring for the outdoor unit, it allows for electric lockout near the device. The switch can be secured against resetting and is UL-compliant.

4 Transformer – SIEMENS Part Number 07741585

The optional transformer generates all known voltages, which deviate from 400 V / 50 Hz to 460 V / 60 Hz. The unit is installed in the bottom of the indoor unit's system cabinet.

Accessories for Enhanced System Integration

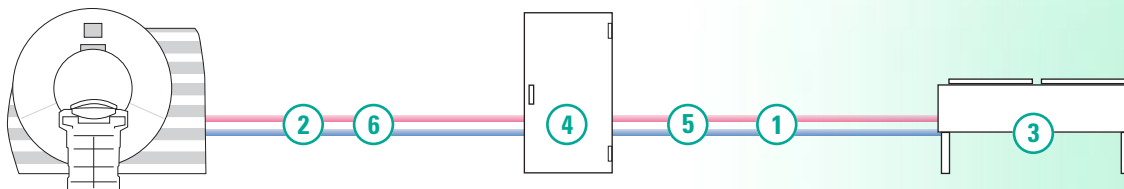
5 Cable Sets W820 – SIEMENS Part Number 10186346

6 Cable Sets W821 – SIEMENS Part Number 10094659

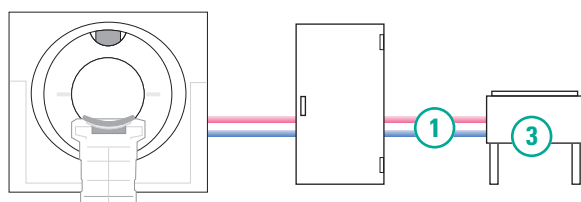
In order to more easily realize distances of up to 197 ft (60 m) between the individual system components, there are two optional system cables W820 (power supply line from the indoor unit to the outdoor unit) and W821 (data cable from the indoor unit to the CT) with a length of 203 ft (62 m).

Integration of Options

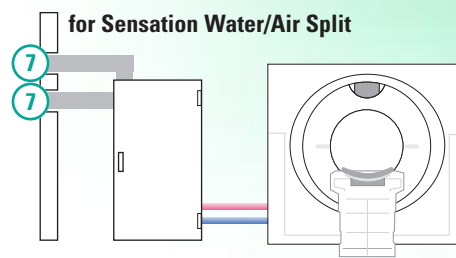
for Definition/Definition AS



for Sensation Water/Air



for Sensation Water/Air Split



Technical Data		Definition Water/Air Split	Sensation Water/Air	Sensation Water/Air Split
Cooling Capacity (50 Hz / 60 Hz)	tons [kW]	4.5 [16.0] / 5.2 [18.3]		3.8 [13.5] / 4.5 [16.0]
Refrigerant and amount	lbs [kg]	R134a / 5 [2.3]	R407c / 9.9 [4.5]	R407c / 5.5 [2.5]
Cooling Water Medium Primary Circuit		Water / Glycol		Water / Glycol
Cooling Water Medium Secondary Circuit		Water		Water
Ambient temperature range, max.	°F [°C]	-40.0* [-40.0] to +122 [+50.0]		-13 [-25.0] to +104 [+40.0]
Chilled Water temperature	°F [°C]	50 [10]		64.4 [18.5]
Chilled Water flow/pressure	gpm [l/h] / psi [bar]	13.2 [50] / 45 [3.1]		13.2 [50] / 45 [3.1]
Power circuit (50 Hz / 60 Hz)	V/Ph/Hz	400/3/50 / 460/3/60		400/3/50 / 460/3/60
Full load amps (50 Hz / 60 Hz)	A	19 / 23		16 / 18

* With optimal Flow Heater

7 Wall Duct Set – RIEDEL Part Number 2NK6 828

The wall duct set allows for a clean installation of the wall connections for the supply and exhaust air lines of the Sensation Water/Air cooling system.



Additional accessories such as hose extensions and adapters for the fixed installation of the hoses can be found in the **SIEMENS Healthcare spare parts catalog**.

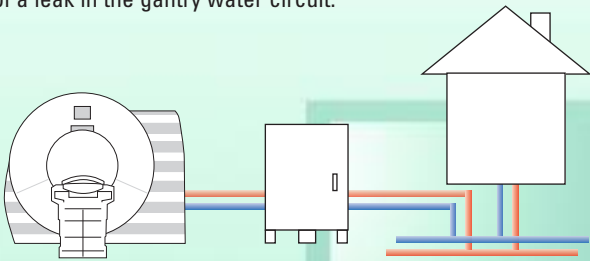
Options and Accessories directly from RIEDEL

Interface Heat Exchanger

RIEDEL Part Number 2NK6 747

The interface heat exchanger is a system separation station, which was specially developed to connect a Definition CT to a facility chilled water supply.

It is possible to compensate for the weak points of chilled water plant pipelines. The interface heat exchanger balances out fluctuating pressures so that the gantry is constantly cooled. Any contaminations and associated damages to the sensitive gantry are avoided, as is unchecked water drainage in the event of a leak in the gantry water circuit.



Should the operator require a system separation of a water-glycol cooling circuit to the application circuit with water, this can also be done with the interface heat exchanger.

External Medical Chiller

RIEDEL MC Series

The external, ready-to-connect chillers can be applied if, for example, an indoor set-up of the Definition or Sensation cooling system is not possible.

These chillers for outdoor installation have been precisely coordinated with the technical specifications of modern medical technology. The systems cover a broad capacity range and can be customized to meet the needs of individual customers.

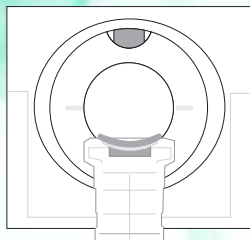
The External Medical Chillers round off the product portfolio of RIEDEL Medical Technology as a comprehensive supplier for the systems cooling of diagnostic imaging devices.



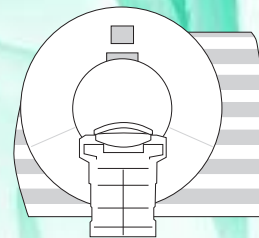
More information can be found
at www.riedel-cooling.com

RIEDEL Cooling Concepts Systems at a Glance

SIEMENS Gantry

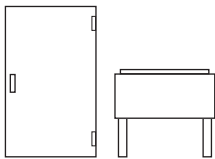


SOMATOM Sensation

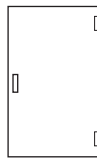


**SOMATOM Definition
SOMATOM Definition AS**

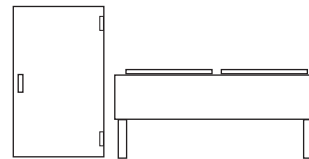
Active RIEDEL cooling systems Customer has no chilled water available



Sensation Water/Air Split
SIEMENS Part Number 8905320

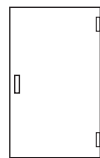


Sensation Water/Air
SIEMENS Part Number 7393320

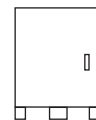


Definition Water/Air Split
SIEMENS Part Number 7741437

Passive RIEDEL cooling systems Customer has chilled water available



Sensation Water/Water
SIEMENS Part Number 7393338



Interface Heat Exchanger
RIEDEL Part Number 2NK6 747 (optional)

Accepting responsibility

RIEDEL[®]
PRECISION IN COOLING

Without efficient cooling, almost no electrically operated device or industrial production process would work today. As a result, RIEDEL cooling solutions are frequently given a key position, and we are well aware of this.

In order to ensure the highest possible reliability, we assemble our devices exclusively with high-quality components from well-known manufacturers. The constant monitoring and checks during production are an important component of our quality demands.

With regard to all technical and economic requirements, RIEDEL always takes ecological aspects into consideration, because we want to have functioning devices and processes in a functioning world. This responsibility couldn't be any greater.

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