SCHOTT
glass made of ideas

CompRite™ Compressor Terminals

Precision, expertise, and custom-design

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Pioneering. Responsibly. Together. These attributes have characterized SCHOTT, manufacturer of special glass, glass-ceramics and other innovative materials, for over 130 years. As #glasslovers and inventor of special glass, we are reliable partners for high-tech industries to enable new market launches and applications.

Precision, expertise and custom design: With more than 50 years of experience, CompRite™ Compressor Terminals have proven to reliably perform under the toughest conditions. A dedicated and experienced R&D team continuously works on improving the design of our glass-to-metal sealed compressor terminals to raise their performance in line with increasing pressure or temperature demands. Adaptability of designs to customer requirements is at the heart of our product development efforts.

SCHOTT – glass made of ideas

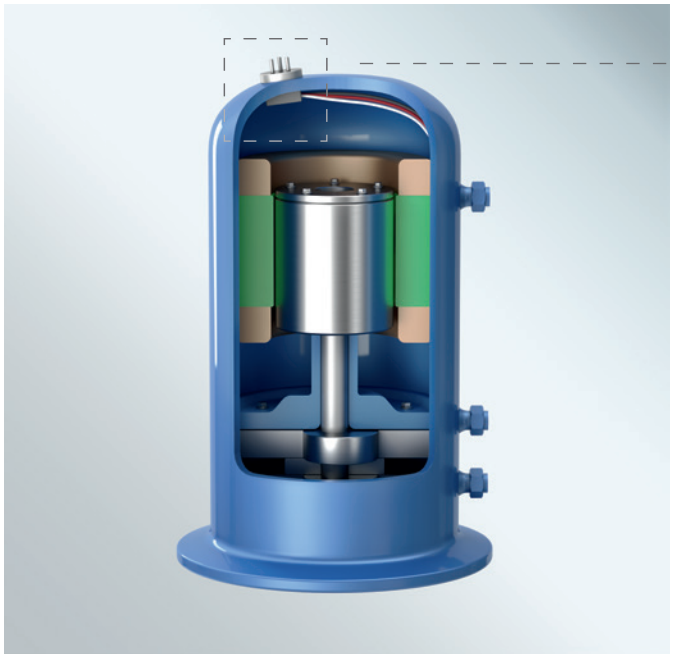
Founded in 1884, SCHOTT has repeatedly set new standards in glass and glass-to-metal sealing technology. Above all, our customers provide our desire to innovate. By working with our customers, SCHOTT has become a leading world manufacturer of specialty glass. With production and sales offices in 34 countries, we are guided by our core values of “competence, creativity and customer orientation”.

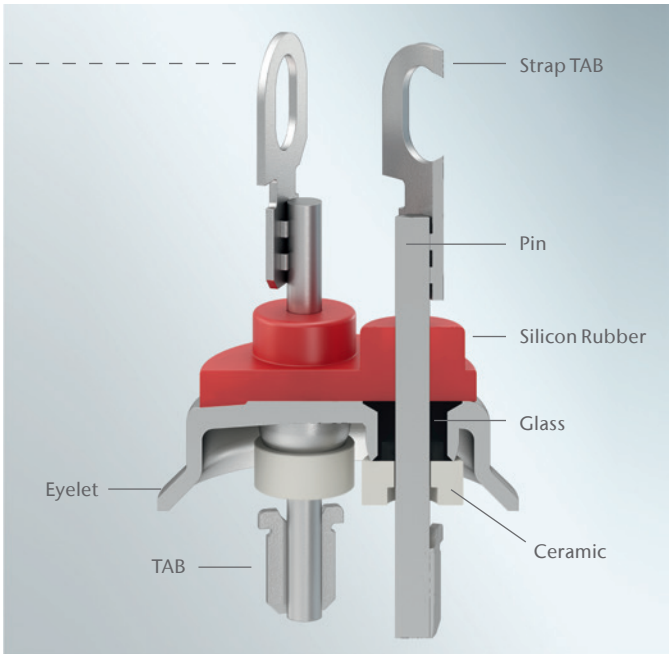
SCHOTT Electronic Packaging Business Unit

Since the 1939, SCHOTT has been delivering glass-to-metal sealing solutions, including hermetic sealing of glass and metal tubes. Today, our product line includes everything from glass for semi-conductors, glass-to-metal seals (GTMS) and most recently even glass sealing of solid oxide fuel cells. Our customers include the world’s leading manufacturers in these fields. SCHOTT’s Electronic Packaging Business Unit stands out by offering complete know-how – and this includes the crucial glass formulations for GTMS products. SCHOTT designs and creates its own original glass components for GTMS products – they are specifically manufactured for different applications. It is this level of complete precision, knowledge, and custom-design that makes our products unique.

SCHOTT Japan Corporation

In the electronic components field, which includes glass-to-metal seals, thermal links and specialty glasses, we’ve combined global expertise and advanced production technologies to provide products and services that satisfy our customers’ requirements.





CompRite™ Compressor Terminals – the heart of a Compression System

Refrigerators, Air Conditioners, Automobiles, and Vending Machines: These are just a few of the products that require a compressor system. Certain items, like refrigerators, require hermetically-sealed compressors – this means the compressor and its connection seals must be completely air-tight for the liquid-gas-liquid transformation process to occur. Hermetically-sealed compressors cannot be repaired, so every piece of the compressor – and especially the compressor seals – must be of the highest quality.

Today, changing products and technologies mean the need is greater than ever for the high quality, reliable compressor seals. Let's consider again the example of refrigerators. Modern refrigerators have switched increasingly to energy-saving refrigerants such as carbon dioxide (CO_2). In order for carbon dioxide refrigerants to function, they must be compressed at extremely high pressure. Ordinary compressor seals – made of polymers (macro-molecules of synthetic or organic materials) – are not able to withstand such pressures.

What is needed is a carefully engineered, glass to metal seal (GTMS), custom-made for the compressor. This seal must be able to withstand extremely high pressure over the product's lifetime. This is where SCHOTT comes in. As designers and manufacturers of compressor seals, SCHOTT selects the highest quality materials.

Precision, Expertise, and Custom-Design

Glass-to-metal sealing is the preferred technology for compressor terminals

How does hermetic glass-to-metal sealing work?
Glasses have a compressive strength that is ten to twenty times higher than its tensile strength. This compressive force can be leveraged to improve the feedthrough strength by selecting metals for the housing with a coefficient of thermal expansion that is much higher than the value of the glass and interior conductor. Due to this higher thermal expansion, the metal housing shrinks firmly onto the glass during cooling to create a hermetic seal. In fact, compressive loading of the glass and conductor occur to such a high degree that the metal remains firmly on the glass, even if mechanical pressure is applied or the temperature changes dramatically. The result is a Glass-To-Metal-Seal: A vaccum-tight seal that is mechanically strong, impervious to gases, and a good electrical insulator.

Preferred technology for tough applications
Since glass-to-metal sealing forms a strong and resistive bond, even in harsh environments, it is the preferred technology for many demanding applications. Glass-to-metal sealed feedthroughs are used for air-bag initiators, as connectors in Oil & Gas exploration, as subsea connectors, as electrical terminals for cryogenic pumps for Liquified Gas Vessels and as containment penetrations for nuclear power plants.

A | assembly
B | sealing
C | welding/molding
D | finished product

Our Product Portfolio at a Glance

Every component in CompRite™ compressor terminals gives SCHOTT customers an advantage. CompRite™compressor terminals are custom-designed and manufactured specifically or each compressor system, precisely created to provide long-term reliability.

This is essential for the operation of compressors in demanding applications such as air conditioners, CO_2 heat pumps and industrial compressors.

Household Refrigerator

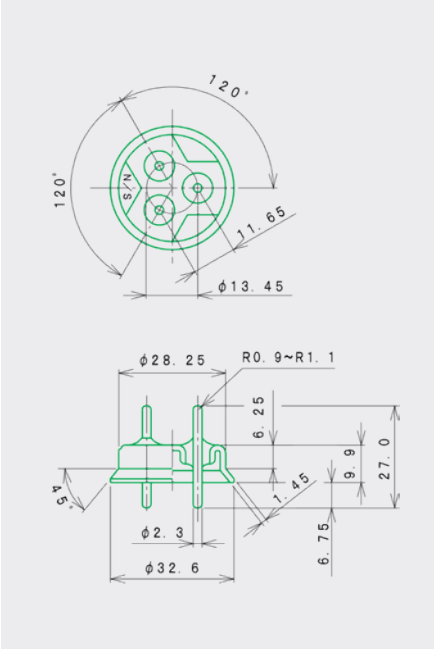
Household Air Conditioner

Commercial Refrigerator

CO_2 Heat Pumps

Semi-Hermetic Compressors

HEV/EV Air Conditioning



Refrigerator Compressor Terminals

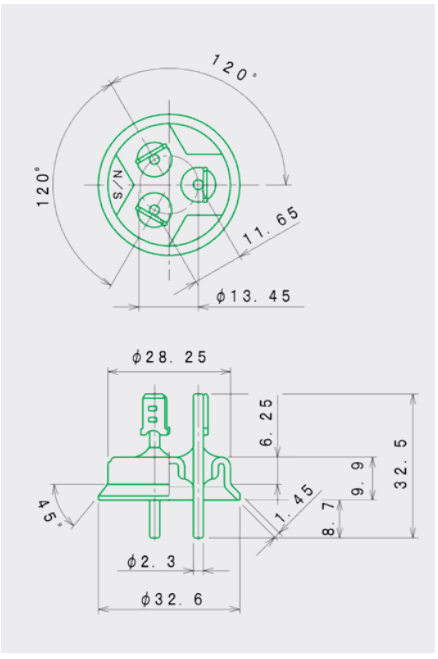
Hermetically sealed compressor systems are used in all household refrigerators. These systems have to withstand high pressure and high electrical loads. The level of design precision is why customers turn to SCHOTT Refrigeration Compressor Terminals.

Product Information

A GTMS compressor terminal can be found in any household refrigerator compressor. This trusted seal is designed precisely by our experts to be absolutely air-tight (hermetic) – these seals are a standard yet state-of-the art solution for household refrigerators of all sizes.

Specification

Part No.	Pin Material	Terminations		Pin Dia. (mm)	Pin Length (mm)	Insulation Resistance	Withstand Voltage	Current Capacity	Minimum Spacing (mm)				Top of Pin (mm)
									Oversurface		Through Air		
		Outside	Inside						Outside	Inside	Outside	Inside	
W109N	Fe-Cr	Pin	Pin	2.3	27.0	1000MΩ/ DC500V	AC2000V/ sec.	15A	3.2	2.4	3.2	1.6	Barrel R
W3A Series	Fe-Cr	Pin	Pin	2.3	27.0			15A	3.2	2.4	3.2	1.6	R0.8~1.3



Air Conditioning Compressor Terminals

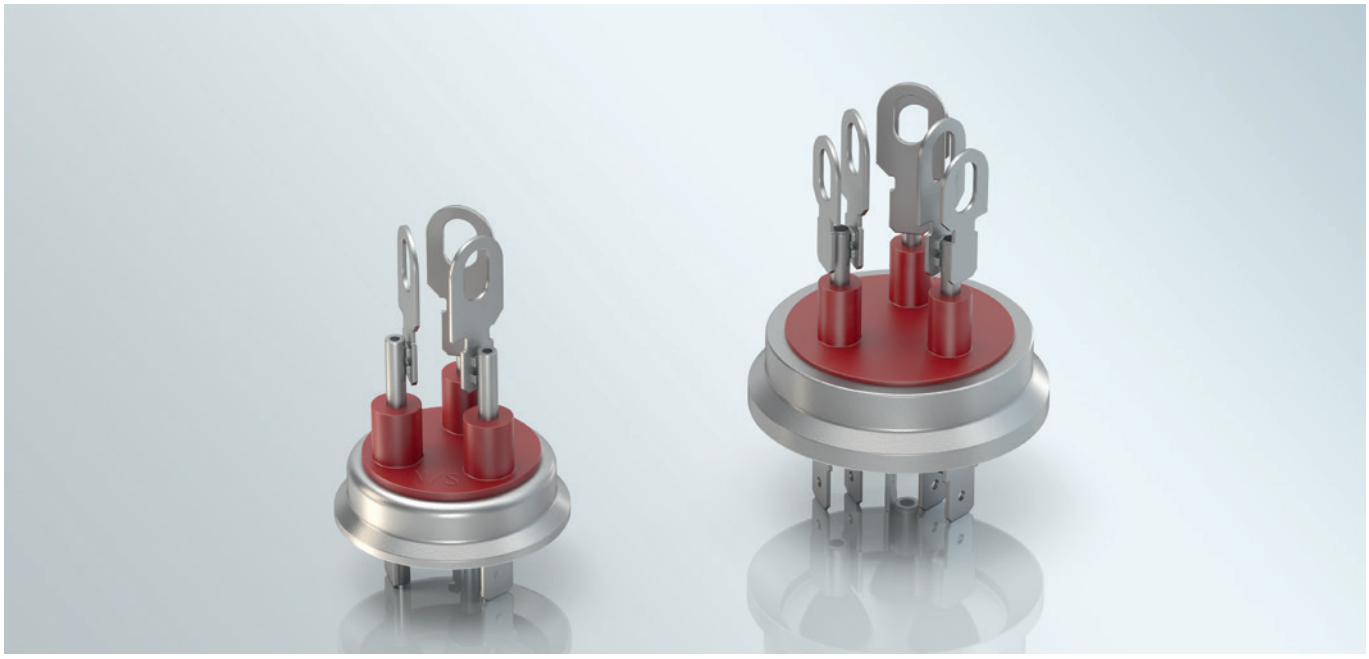
Imagine the force exerted when an air-conditioner has to cool large rooms. If you want consistent, long-term cooling, your air conditioning compressor seals need to be highly durable. Manufactured only in our ISO 9001/14001 certified plant, our Air Conditioning Compressor Seals are of the highest quality.

Product Information

Air conditioning compressors often receive higher pressure and electrical loads than a household refrigerator compressor. Therefore, our air conditioning compressor seals are designed for optional functioning under these special conditions. Room air conditioners require precisely designed compressor seals that are optimized to fit the pressure and power loads for different cooling capacities.

Specification

Part No.	Pin Material	Terminations		Pin Dia. (mm)	Pin Length (mm)	Insulation Resistance	Withstand Voltage	Current Capacity	Minimum Spacing (mm)				Thickness (mm)
									Oversurface		Through Air		
		Outside	Inside						Outside	Inside	Outside	Inside	
W3A Series	Fe-Cr	Pin/Tab	Pin	2.3	32.5	1000MΩ/DC500V	AC2000V/sec.	15A	3.2	2.4	3.2	1.6	1.45 / 1.75
	Cu Core	Tab	Pin					35A					
W3B Series	Fe-Cr	Tab	Pin/Tab	3.2	36.5	1000MΩ/DC500V	AC3000V/sec.	30A	6.4	4.8	6.4	3.2	1.45 / 1.75
	Cu Core	Tab						50A					



Power Compressor Seals for Commercial Refrigeration

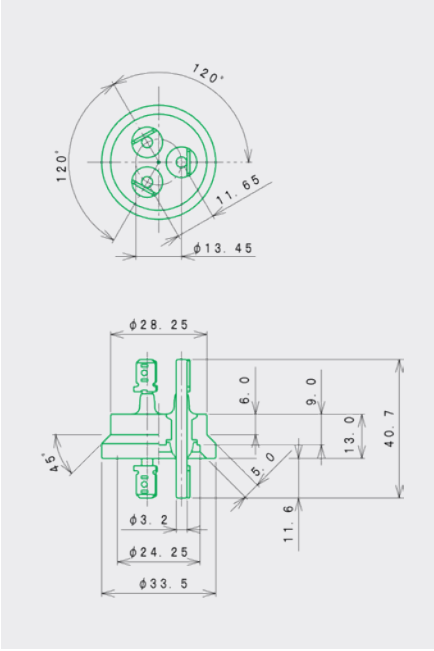
Think of the cooling strength that display cases of perishable items in major supermarkets and warehouses need: compressor devices in these environments receive thousands of times the pressure that a standard compressor would.

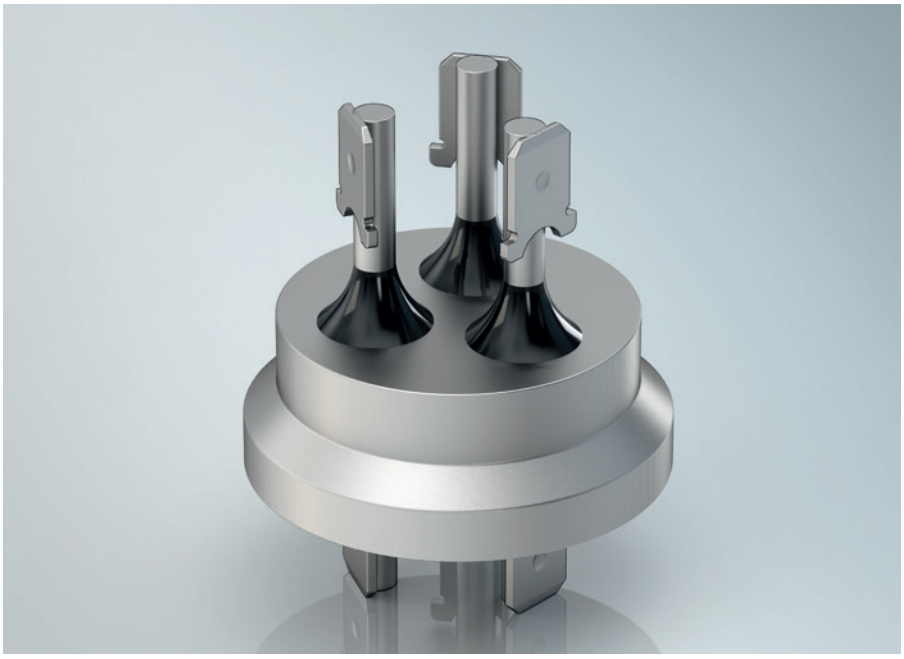
Product Information

Power Compression seals are needed in commercial air conditioning and industrial air conditioning compressors: these GTMS have strong power and provide long insulation. While Power Compressors use the same refrigerant as room air conditioning compressors, the energy required is much higher for commercial and industrial air conditioning, so the electrical load applied to the terminal is much bigger and the environmental conditions are difficult. Power Compression Seals are carefully insulated to withstand high currents. As well, special designs are used to enclose the raw material pin, TAB and insulation material.

Specification

Part No.	Pin Material	Terminations		Pin Dia. (mm)	Pin Length (mm)	Insulation Resistance	Withstand Voltage	Current Capacity	Minimum Spacing (mm)				Body Dia. (mm)
		Out-side	In-side						Oversurface		Through Air		
									Outside	Inside	Outside	Inside	
W3R Series	Fe-Cr	Tab	Pin/ Tab	3.2	36.5	1000MΩ/ DC500V	AC3000V/ sec.	30A	9.5	4.8	6.4	3.2	32.6
	Cu Core	Tab	Pin/ Tab					50A					
	Cu Core	Strap	Tab					50A					
WD3R Series	Fe-Cr	Tab	Pin	3.2	43.7			30A	12.7	6.4	9.5	4.8	37.6
	Cu Core	Strap	Tab					50A					
W3F Series	Fe-Cr	Tab	Tab	3.2	38.0			30A	9.5	4.8	6.4	3.2	32.6
	Cu Core	Strap						50A					
WD3F Series	Cu Core	Strap	Tab	3.2	43.7			50A	12.7	6.4	9.5	4.8	37.6
UE3R Series	Cu Core	Strap ×2	Tab x2	4.75	41.8			80~100A	9.5	4.8	6.4	3.2	48.77





CO_2 Compressor Terminals

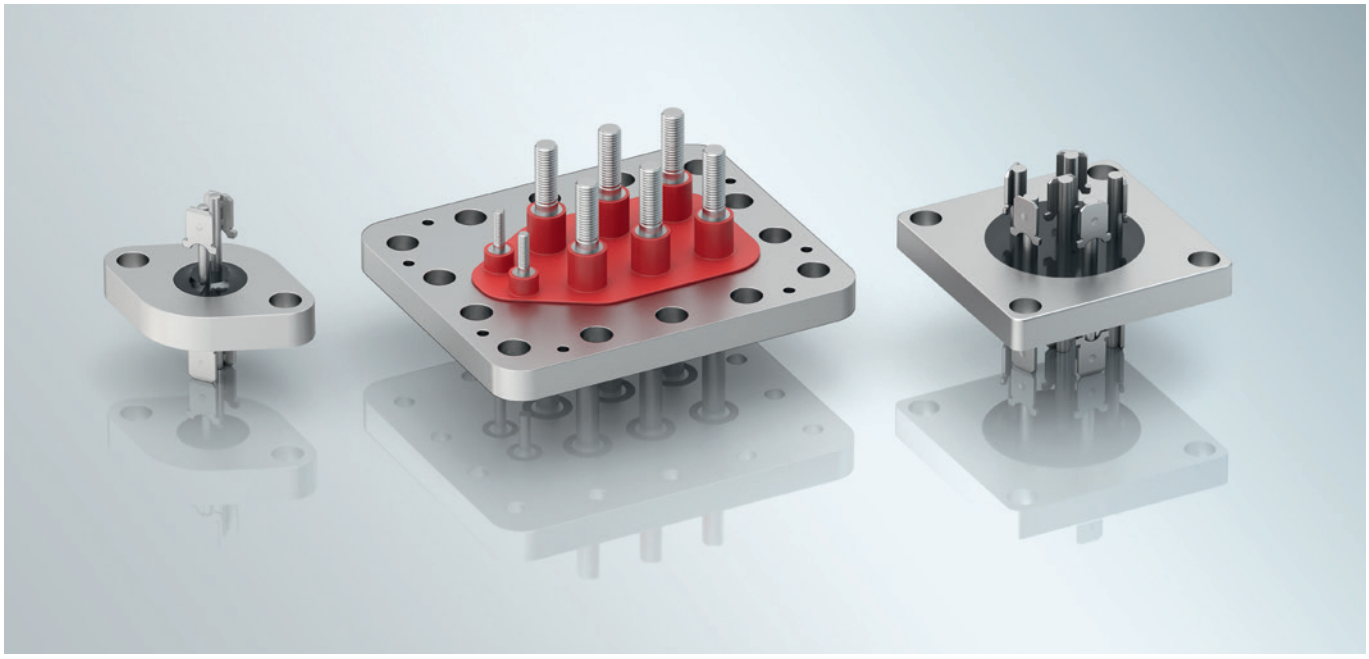
Increasingly, modern refrigeration systems use carbon dioxide (CO_2)-based compressors. CO_2 is used as a refrigerant in modern heat pumps for air conditioning systems (Eco - cute) and other applications including vending machines. The challenge: CO_2 requires extremely high pressure to work as a refrigerant. SCHOTT's CO_2 Compressor Seals provide precise, long-lasting support.

Product Information

Due to high internal pressure in CO_2 compressors, CO_2 compressor seals are designed to withstand high pressure. Stringent environmental and production requirements are met by increasing the thickness of the terminal body.

Specification

Part No.	Pin Material	Terminations		Pin Dia. (mm)	Pin Length (mm)	Insulation Resistance	Withstand Voltage	Current Capacity	最小絶縁距離 (mm)				Body Dia. (mm)
									Oversurface		Through Air		
		Out-side	In-side						Outside	Inside	Outside	Inside	
U3A Series	Fe-Cr	Pin	Pin	2.3	36.5	1000MΩ/ DC500V	AC2000V/ sec.	15A	3.2	2.4	3.2	2.0	33.5
U3B Series	Fe-Cr	Tab	Pin/ Tab	3.2	40.7	1000MΩ/ DC500V	AC3000V/ sec.	30A	6.4	4.8	6.4	3.2	33.5
	Cu Core	Strap	Tab		48.1			50A	12.7	6.4	9.5	4.8	37.6



Terminals for Semi-Hermetic Compressors

Semi-hermetic reciprocating compressors as well as screw compressors are large compressor types typically used in commercial and industrial applications. These compressors are required to have a large capacity and can continuously supply high energy. Thus the corresponding compressor terminals must be able to transfer high power in a continuous and stable manner over long periods of time.

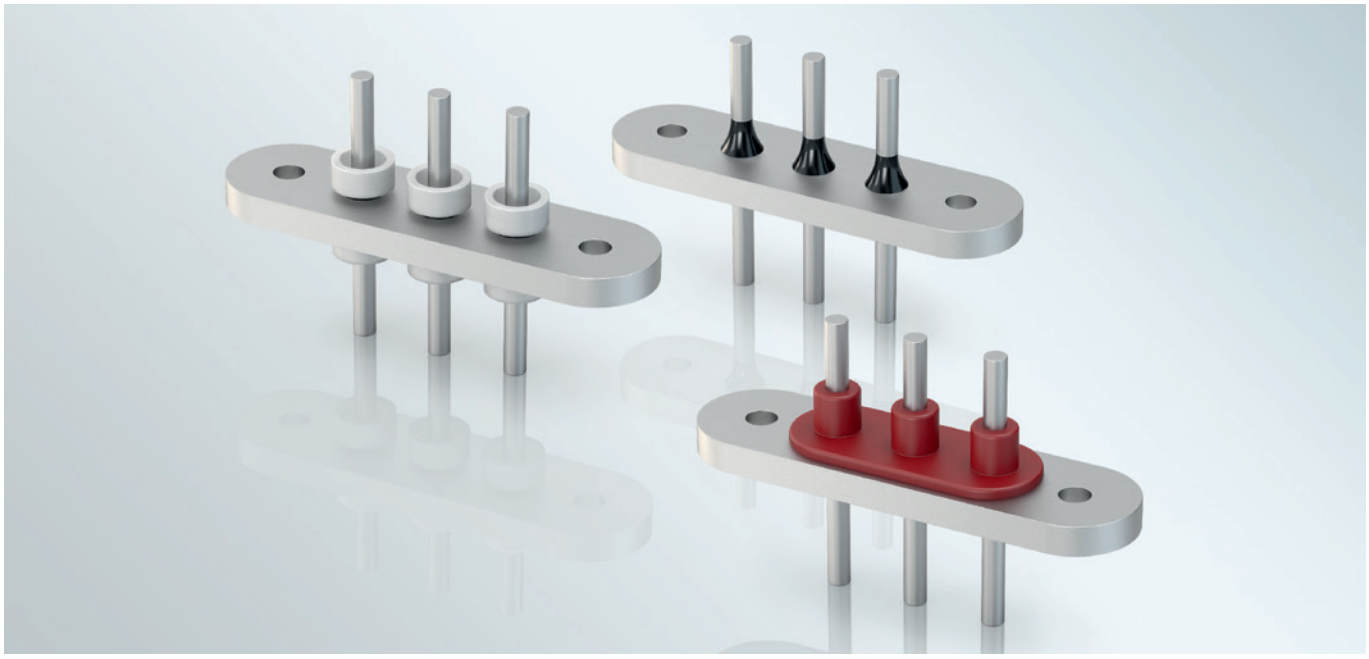
A typical application for semi-hermetic compressors is industrial refrigeration: In a supermarket, for example, the doors of a cooled display case are constantly opened and closed. Thus, semi-hermetic compressors enable highly-calibrated refrigeration in environments where the temperatures may change frequently.

Product Information

Semi-Hermetic compressors and their terminals will be used when higher pressure is not typically required. In a semi-hermetic compressor, the compressor terminal is connected by screws; this is a different design from other refrigeration and air conditioning compressor seals. Types of semi-hermetic compressors and corresponding compressor terminals are designed to vary by size and current allowance.

Material	Information
Pin	Fe-Cr, Fe-Ni, Copper cored, Fe-Cr, Cr-Cu
Eyelet	Fe, stainless steel
Glass	Soda barium
Insulation Material	Silicon rubber, Phenol resin block
Others	Tab

Technical	Information
Air Tightness	~1.0 × 10^{-9} Pa m^3/sec.
Insulation Resistance	1000 MΩ min. at DC500V
Withstand Voltage	AC2500V – 1 min. (Leak current: 1mA)
Withstanding Pressure (water)	3.1 MPa – 1 min. (Thickness: 15mm) 6.3 MPa – 3 min. (Thickness: 25mm)



HEV/EV Air Conditioning Compressor Terminals

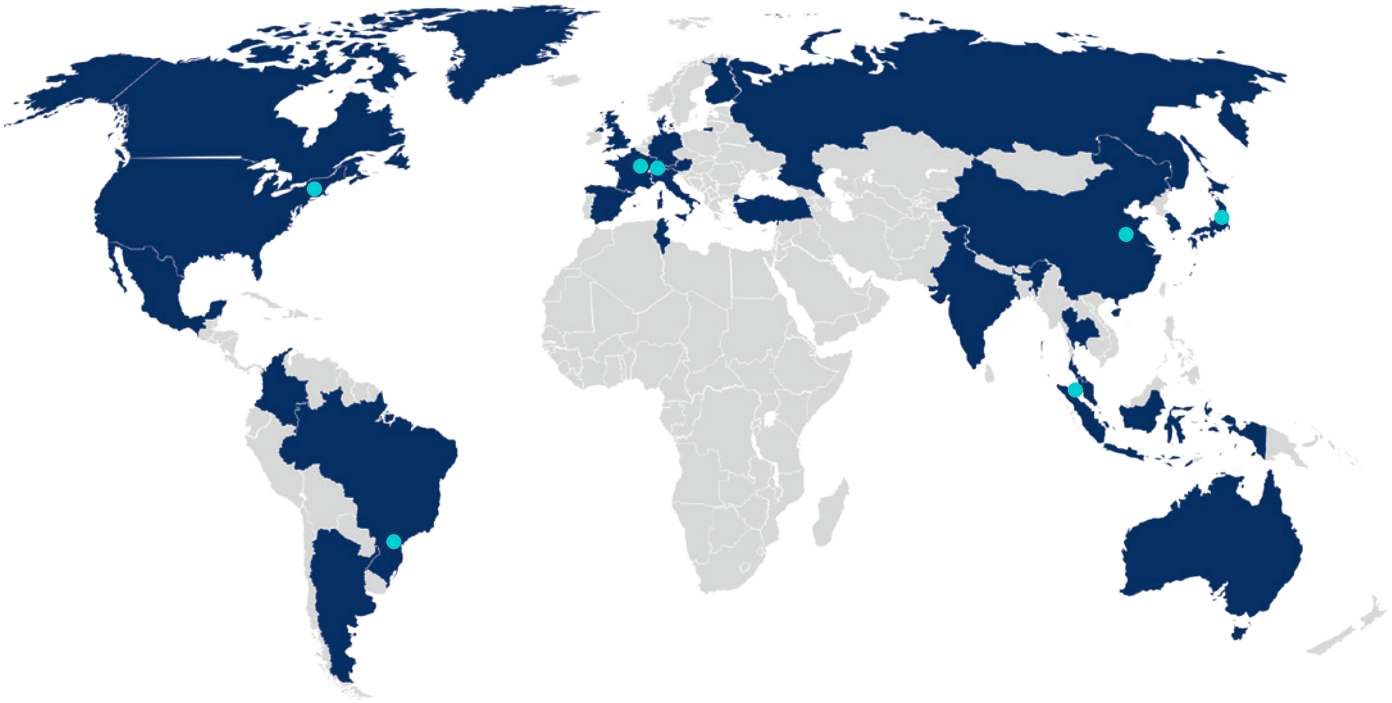
Passengers vehicles as well as cargo trucks depend on reliable cooling systems. Auto compressor terminals have to withstand nearly direct exposure to cold, heat, and rain, as well as constant vibrations. Thus, compressor terminals – whether they are used in gasoline-powered cars or HEVs and EVs – require extremely durable materials and extraordinarily careful design.

Electric compressors are widely used in vehicles such as HEVs and EVs. Normally, gasoline-fueled cars use air-conditioning compressors that are powered by the engine. The electric compressors found in HEVs and EVs, on the other hand, are hermetically sealed and function with their own motor inside, so their compressor terminals are used as power transfer terminals.

Product Information
SCHOTT offers both standard as well as custom-made compressor seals. To manage long insulation areas and challenging environmental conditions, quality insulation materials such as rubber and ceramic are standard features. Screws are sometimes used to close the compressor seals, but SCHOTT can also design these seals according to specific customer requests.

Material	Information
Pin	Fe-Cr, Cr-Cu, Cu cored Fe-Cr
Eyelet	Fe
Glass	Soda barium
Insulation Material	Rubber Glass, Ceramic

Technical	Information
Air Tightness	~1.0 × 10^{-9} Pa m^3/sec.
Insulation Resistance	1000 MΩ min. at DC500V



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The information herein is updated as of July 2022, and is subject to change without notice. Therefore it is recommended to refer to latest individual information such as drawing for mass production designing. The latest product information will also be made available on **www.schott.com** for your reference. It is prohibited to reprint or copy the contents herein without prior written agreement from SCHOTT Japan Corporation.

Please note that should any problems relevant to the industrial property of third parties occur with the use of products from SCHOTT Japan Corporation, the company would not assume any responsibility for matters other than the ones directly related to the structure or the manufacturing process of the products supplied by SCHOTT Japan Corporation.

Although continuous efforts to improve the quality and reliability of our products are in place, the possibility of defects cannot be entirely eliminated. Therefore when using our electronic component products, please ensure that sufficient safety measures are included in the design of the final application, such as redundancy, fire containment and malfunction prevention against physical injuries, fire disasters and social damages in consideration of the said defect occurrences.

Our products are classified into two groups: “Standard” and “Special”. The recommended applications of the products according to its quality level are indicated below. If you intend to use our products for applications other than “Standard” level, please consult with our sales representative in advance.

“Standard”: Computers, office equipment, communication equipment, measuring equipment, audio & visual equipment, electrical home appliances, machine tools and industrial robots etc..
“Special”: Transportation equipment (automobiles, trains, ships and others), aircrafts, aerospace equipment, medical equipment for life support etc..

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