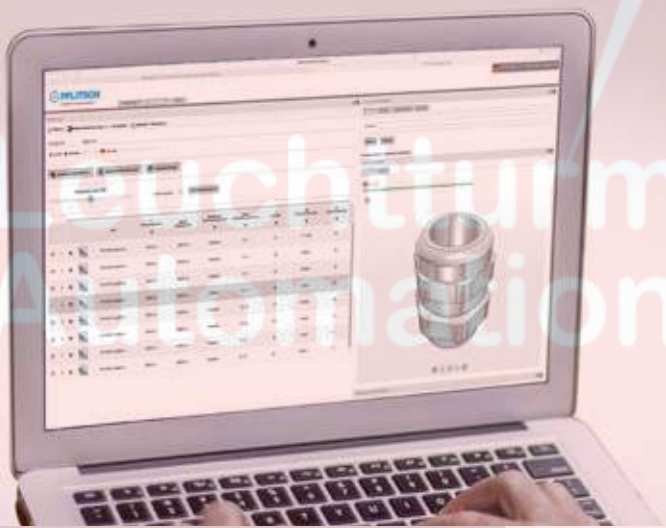


2

服务 + 解决方案
Service + solutions



从咨询到个性化解方案
*From consulting to
customised solutions*

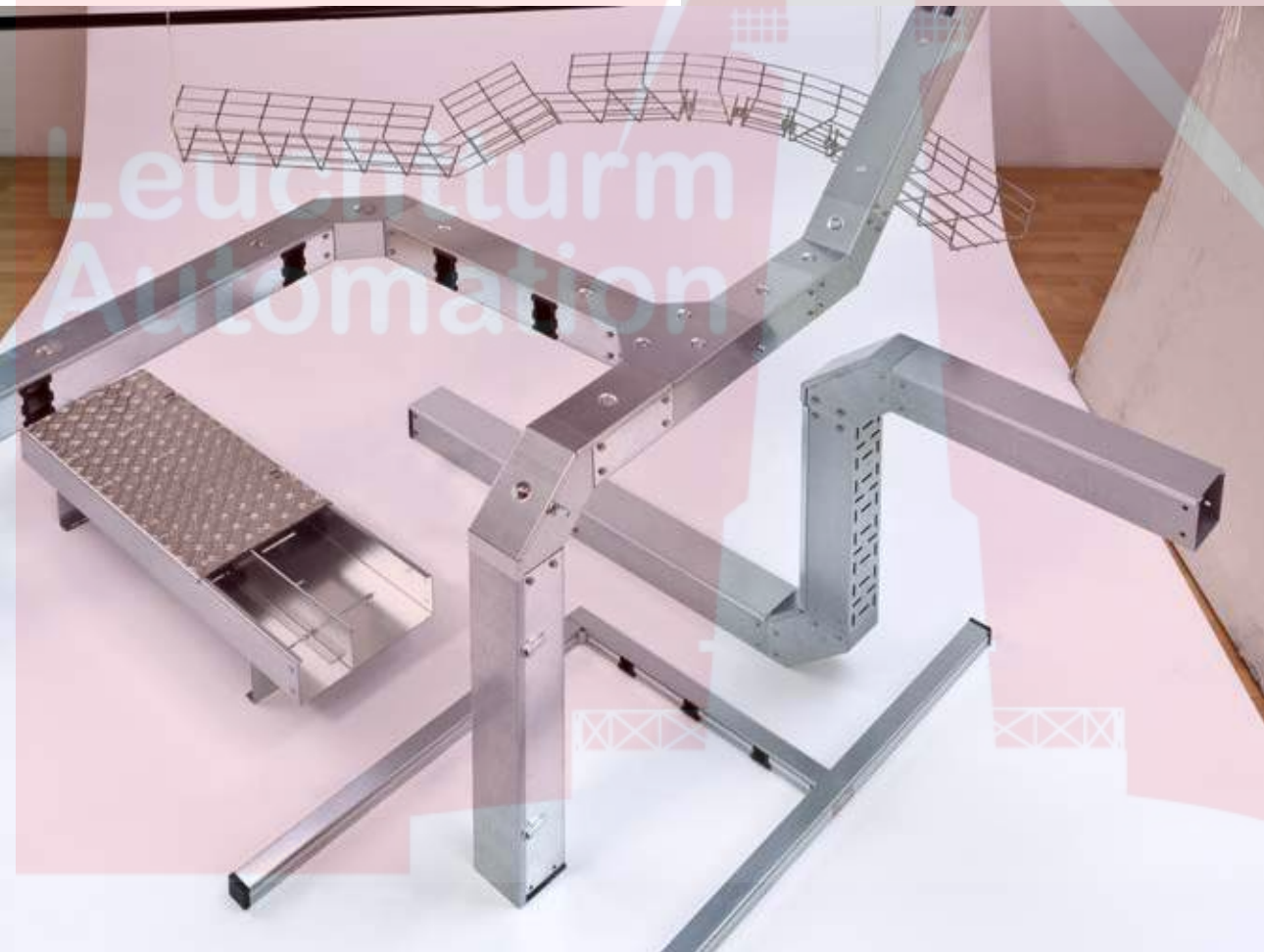


图 1 –
Fig. 1 – Safe protection and routing of cables with individual
PFLITSCH-cable routing systems

经实践证明的产品走向世界市场

PFLITSCH 不断通过以客户和市场为导向的问题解决方案树立着标准。为了能够使想法和要求更快地转化为完美的量产产品，从现场获知要求的客户技术咨询人员与装配、工具制造、样件生产、测试实验室和工厂人员携手合作，当然一切均按照国际质量标准 and 客户规范。数十年来，PFLITSCH 和国际标准化委员会共同工作，当前的研发是按照未来的需求而定。

用于成长型行业的部件

PFLITSCH 着眼于重要的目标市场。属于这些行业的包括：铁路业、化工业、石油和燃气工业、电气技术、能源技术、食品工业、制药业、机械和设备制造、机器人和自动化以及电信业。PFLITSCH 已开发了不同行业的解决方案。例如用于铁路上的电缆接头已获得新防火标准认证或者用于食品技术业的首次将卫生要求与电磁兼容性相结合的 blueglobe® TRI CLEAN Plus。通过 UNI Split Gland® 可实现完全分体式的电缆接头，无需拆卸电缆，即可对已安装的系统上损坏的电缆接头进行更换。最大至 M120 的接头可安全接入粗大的电缆。最小的 M4 UNI Dicht® 电缆接头凭借其紧凑的尺寸和较小的密封区主要满足了传感器技术领域对电缆和导线布线的要求。

为客户和市场需求而制定的智慧方案解决方案

PFLITSCH 实现了满足不同行业要求的定制化产品。进行开发工作时，最重要的着眼点在于高密封性、容易安装和使用寿命长。在接下来的几页，您将看到一些有意思的案例。

Proven products for the global market

PFLITSCH continues to set standards with its customer and market driven solutions. To ensure that a perfect serial product can quickly be developed from ideas and requirements, technical customer advisors – who analyse the requirements on-site – work hand in hand with the design, tooling and prototyping, test laboratory and production departments. All work is of course carried out in accordance with international quality and customer standards. PFLITSCH has been cooperating with international standardisation committees for decades, which means that future needs are already flowing into current developments.

Components for growth industries

PFLITSCH has the key technology sectors in its sights. The railway, chemical, gas and oil industry, electrical industry, energy, food industry and pharma, machinery and equipment, robotics and automation as well as telecommunication. PFLITSCH has developed a wide and varied range of industrial solutions. These include cable glands certified in accordance with the new fire safety standard for trains. So does the blueglobe® TRI CLEAN Plus for use in food process engineering and that for the first time combines hygiene and EMC requirements into one solution. The fully splittable UNI Split Gland® provides a method of replacing defective cable glands on installed systems for instance – without needing to remove the cable. Cable glands of up to M120 provide a secure method of cable entry for the thick cables used by the energy sector. And our smallest cable gland, the UNI Dicht® size M4, is particularly suitable for cable and pipeline routing in the sensor sector because of its small size and narrow sealing ranges.

Intelligent solutions for customers and markets

PFLITSCH manufactures tailor-made products that meet the requirements of the respective industry. During development, aspects such as effective sealing, ease of fitting and long life cycle are the primary considerations. On the following pages are some examples.



针对高要求市场的定制决方案

Customised solutions for demanding markets

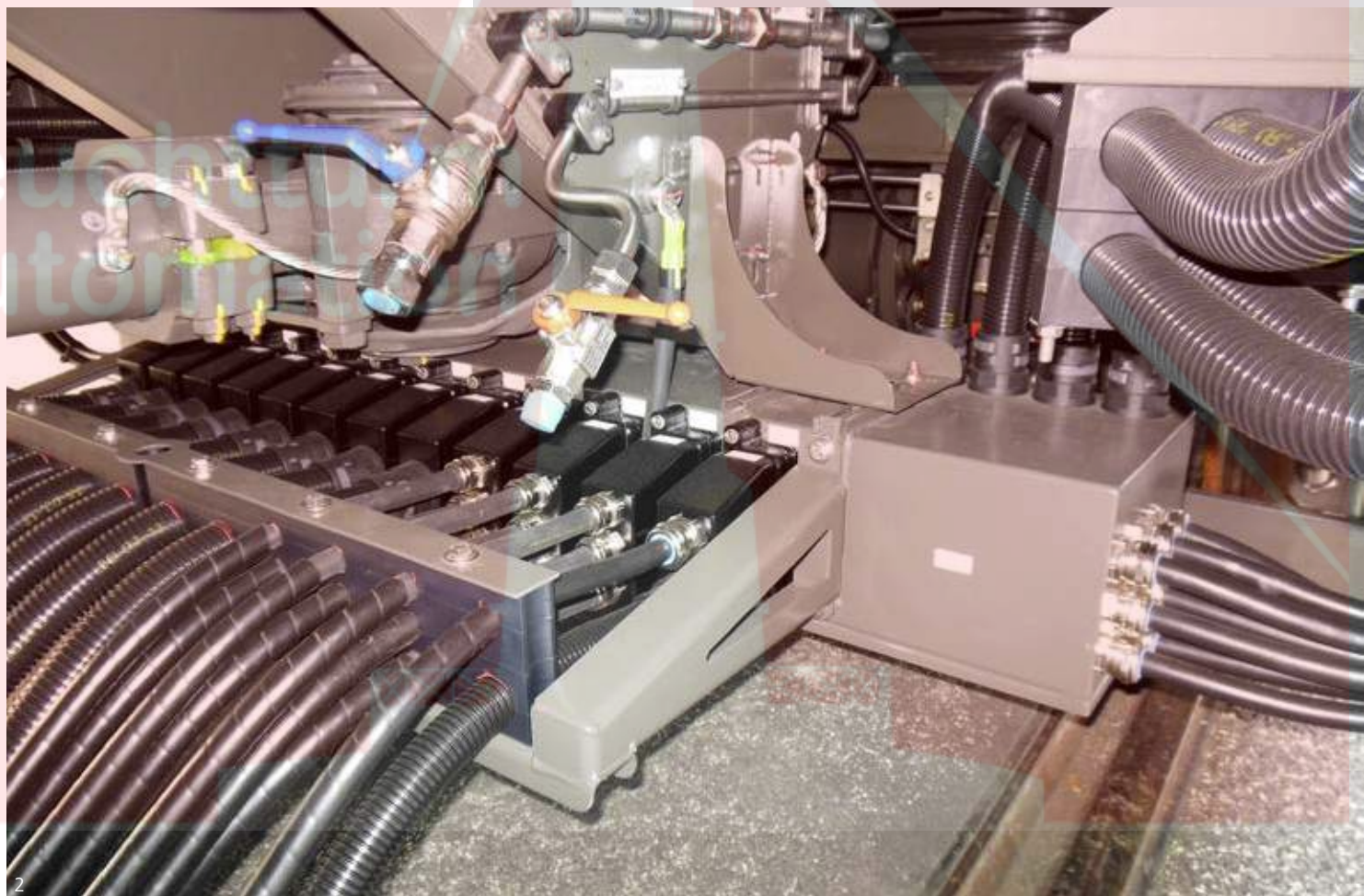


图 1 - 食品工业中电机上的 blueglobe CLEAN Plus®
Fig. 1 - blueglobe CLEAN Plus® installed on an engine in the food industry

图 2 - 列车地板下方区域的 UNI Dicht® 电缆接头
Fig. 2 - UNI Dicht® cable glands in the underfloor area of the train

韦伯机械制造 (Weber Maschinenbau) — 食品加工的安全性

来自米特黑森 (Mittelhessen) 的韦伯机械制造 (Weber Maschinenbau) 是一家专门针对高品质肉类加工的高新技术企业。提供去皮机和高性能切割机 (切片机)。加工肉类和香肠时, 卫生是最关键因素, 因此韦伯选择了 PFLITSCH。使用了不锈钢制 blueglobe CLEAN Plus®。韦伯看重的是: 该电缆接头的材料符合食品工业要求。在装配方面严禁有凹处、缝隙和露出的螺纹。此外, blueglobe CLEAN Plus® 还通过了高要求的 EHEDG 标准和 BGN 规范认证, 这也为其赢得了加分。对于注重质量的机械制造商最重要的考量点。

阿尔斯通 (Alstom) 看重 PFLITSCH 电缆接头的防火性。

像阿尔斯通这样的列车制造商必须保证在其列车内只使用不燃、阻燃和自熄材料。使用的电缆接头也是如此。因此, 阿尔斯通采用了根据最新防火标准获得认证的 blueglobe® 和 UNI Dicht® 电缆接头。新的欧盟标准规定电缆布线必须能耐火和烟至少 15 分钟。PFLITSCH 是德国首家电缆接头通过 EN 45545-2 标准认证的制造商。为了满足标准, PFLITSCH 改变了密封嵌件 TPE 材质 — 可通过黑色识别。此外, PFLITSCH 电缆接头还凭借其他的产品特点如 IP 68 和 IP 69K 的高防水防尘保护等级、极佳的抗拉力和抗振动性获得了阿尔斯通的认可。

Weber Maschinenbau – playing it safe in the field of food processing

Weber Maschinenbau from the mid-Hesse region is a high-tech company specialising in the high-quality meat processing sector. Its products include skinners and slicers. Hygiene is the be all and end all when it comes to processing raw and cooked meats. Consequently Weber decided to use PFLITSCH products, in particular the blueglobe CLEAN Plus® in stainless steel. Important for Weber: the cable gland material is food-compatible. Cavities, gaps and open threads were taboo in the design of the cable gland. Moreover, blueglobe CLEAN Plus® also offers the advantage of being certified to the demanding EHEDG standard and BGN requirements, criteria that are crucial for the quality-conscious machine manufacturing specialist.

Alstom opts for cable glands from PFLITSCH with fire protection in mind

Train manufacturers such as Alstom have to ensure that only incombustible, fire-retarding and self-extinguishing materials are built into their vehicles. This also applies to the cable glands they use. Alstom therefore relies on PFLITSCH's blueglobe® and UNI Dicht® cable glands, both of which are certified to the latest fire protection standard. The new EU standard specifies that cable penetrations must retain their seal against fire and smoke for at least 15 minutes. PFLITSCH was the first manufacturer in Germany to have cable glands certified in accordance with EN 45545-2. In order to comply with the standard, PFLITSCH modified the TPE material used for the sealing inserts, which are a distinctive black colour. Alstom was also impressed by the other product characteristics of PFLITSCH cable glands, such as the high ingress protection types IP 68 and IP 69K, good strain relief and vibration resistance.



图 1 – 食品工业设备上的 blueglobe CLEAN Plus®
Fig. 1 – blueglobe CLEAN Plus® in combination with compressed-air tube on a machine in the field of food processing

图 2 – 自动化的韦伯设施采用传感器监测。
Fig. 2 – PFLITSCH cable gland complying with hygienic design installed on a food slicer

图 3 – PFLITSCH 防火电缆接头带多孔密封嵌件
Fig. 3 – PFLITSCH fire protection cable gland with multiple sealing insert

图 4 – PFLITSCH 防火电缆接头用于列车中使用
Fig. 4 – PFLITSCH fire protection cable glands for using in railway vehicles

针对未来行业的耐用产品
*Long-living products for
forward-looking industries*

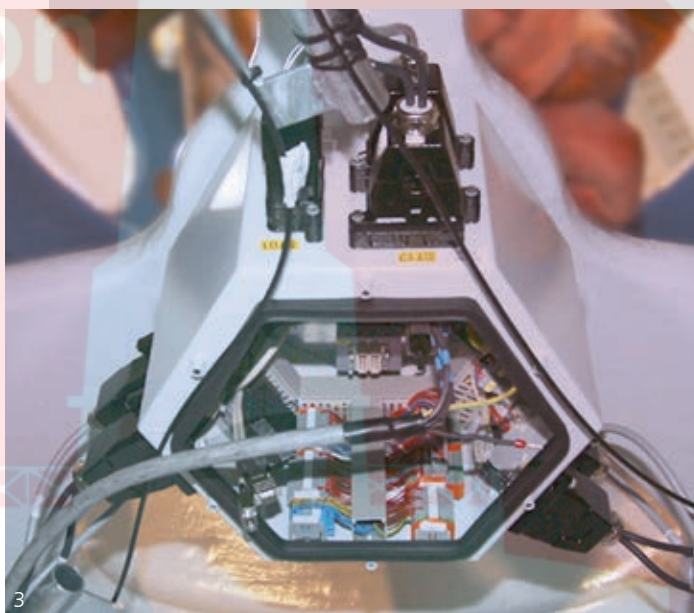
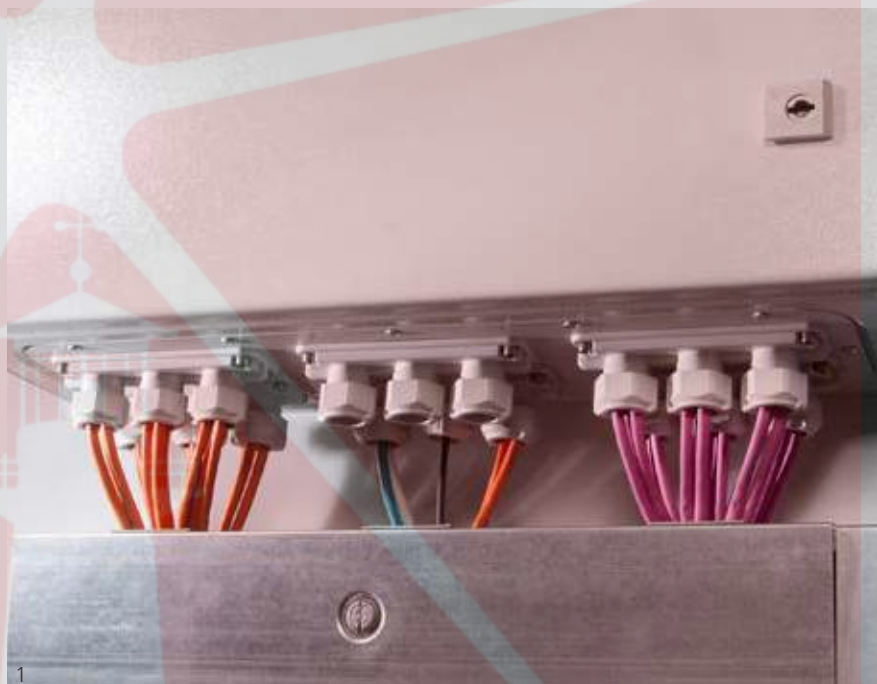


图 1 - 开关柜上的 UNI FLANSCH
Fig. 1 - UNI Flange® on a control cabinet

图 2 - 变桨系统上的 blueglobE® 电缆接头
Fig. 2 - blueglobE® cable glands installed on a pitch system

图 3 - 转子轮毂中的 UNI 多孔接头
Fig. 3 - UNI Multiple in the rotor hub

用于风力发电机的电缆接头

可再生能源具有巨大的成长潜力。先进的风力发电机在耐用性、抗腐蚀性和抗振动性方面具有极高的要求。在不同的气候条件以及温度强烈变化的条件下，仍要求风机在陆上和海上可靠运行 20至 25年。同时，该行业还对对易于维护的地方提出严格要求。因此，开关柜和部件壳体上的电缆接线端口具有重要意义。作为技术的生命线，电缆将传感器和执行器与控制计算机、主控制器与轮毂内的部件、发电机与变压器、风机与公共电网连接在了一起，这只是列出了几个使用领域。

高密封性和耐用、抗拉力和振动稳固性使 PFLITSCH 电缆接头能胜任于该使用领域。接头本体使用的材质 — 黄铜、不锈钢和尼龙以及密封嵌件的材质 — TPE 和 TPE-V 能够用于从 -40 °C 到 +130 °C 的使用温度，硅胶材质甚至达到 -60 °C 到 +200 °C。这些材质具有长期稳定性、耐臭氧和紫外线以及多种化学材料如齿轮油。针对塔筒内从上到下的电缆布线，使用了 UNI Dicht® Wire Mesh，它的抗拉力是标准电缆接头的 9 倍。当电缆受到拉力时，金属丝编织层大面积地紧缚住电缆，使其保持在自己的位置上。

法兰接入生产设备

UNI FLANSCH 使预先安装的电缆系统的安装变得十分简单，并且和常见产品相比，具有显著提高的保护等级和抗拉力。带三个集成式 UNI Dicht® 电缆接头的完全分体式单元能够兼容普通的 24 级工业连接器的切口。UNI Dicht® 目录内超过一百种不同的开缝密封嵌件可供使用。

高品质 PA 塑料材质的两件式框架板被装入和固定在相应切口中，接触保护符合保护等级 2 (DIN EN 61140, VDE 0140-1)。分体式框架板和接头上盖使预制电缆能够轻松接入开关柜或壳体。由此使用者可以使用预先安装和测试过的标准电缆。

Cable glands for wind turbines

Renewable energies have large growth potential. The demands placed on modern wind turbines are extremely high with respect to a long service life and resistance to both corrosion and vibration. Ultimately, onshore and offshore wind turbines are expected to operate reliably for between 20 and 25 years under wildly fluctuating weather conditions and a wide range of temperatures. At the same time, the industry also places stringent demands on ease of maintenance. In this respect, cable entries for control cabinets and component enclosures are of great significance. Cables can be considered the „lifelines of technology“ because they connect sensors and actuators with the control computers, the master control system with the components inside the rotor hub, the generator with the converter technology and the wind turbine itself with the public electricity transmission grid – to name just a few areas of use.

The extremely tight and durable seal combined with strain relief and vibration resistance make PFLITSCH cable glands predestined for these fields of application. The materials used – including brass, stainless steel and polyamide for the cable gland body and TPE as well as TPE-V for the sealing inserts – allow for an operating temperature range of -40 °C to +130 °C, with the silicone variant even achieving -60 °C to +200 °C. These materials are stable over the long-term and resistant to ozone, UV rays and many chemical substances such as transmission oils. UNI Dicht® Wire Mesh is available for routing cables down the tower. This cable gland is characterised by its high level of strain relief – up to 9 times that of standard cable glands. If a tensile force is applied to the cable, the wire mesh braiding positively locks around the cable – acting over a large area – holding it securely in position.

Flange entry for production machines

The UNI Flange® allows the simple assembly of systems with preassembled cables and provides a significantly improved protection rating and strain relief compared with other commercially available products. The fully splittable unit with three integrated UNI Dicht® cable glands is compatible with standard cut-outs for 24-pole industrial connectors. Over 100 different slotted sealing inserts from the UNI Dicht® range can be inserted.

The two-part splittable frame plate manufactured from high quality PA plastic is simply placed into appropriate cutouts and screwed in place, thereby achieving contact protection to class 2 (DIN EN 61140, VDE 0140-1). The splittable frame plate and splittable pressure screw allow preassembled cables to be easily and securely routed into control cabinets or housings, enabling the use of preassembled and tested cables.



图 1 – UNI FLANSCH 各部件
Fig. 1 – UNI Flange® individual components

图 2 – UNI FLANSCH 组装中
Fig. 2 – UNI Flange® during assembly

针对特殊要求的
创新解决方案

*Innovative products for
special demands*

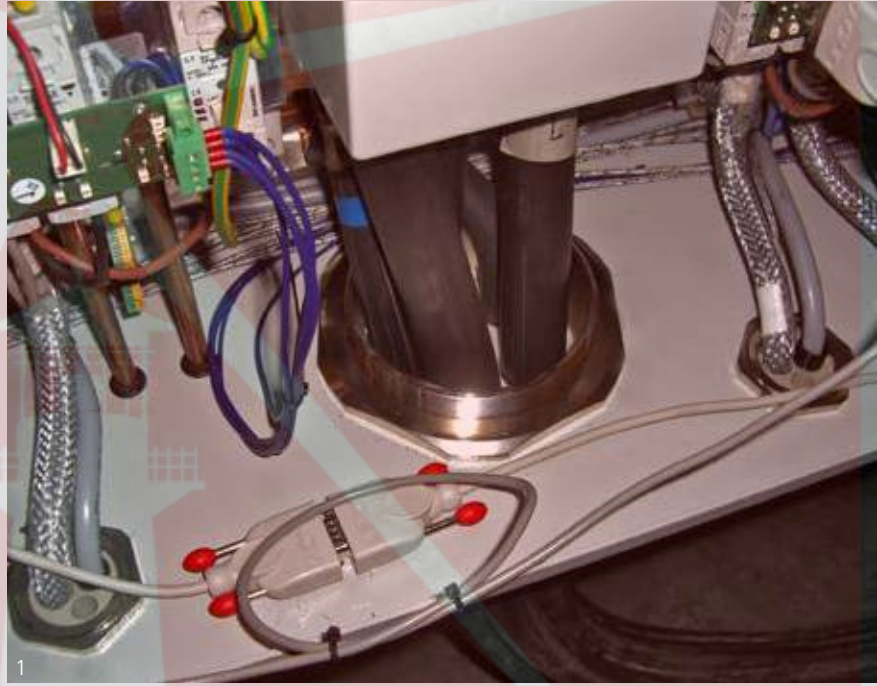


图 1 - 开关柜中的 M120 电缆接头
Fig. 1 - M120 cable gland in a cabinet

图 2 - 不同线段上的半接头
Fig. 2 - Half cable gland on various connectors

用于圆形连接器的适配器

除了连接器内电导线的安全连接，电缆布线对于质量和运行安全性也有重要意义。在实际中，对于这个接口有很多要求，例如抗拉力、电磁兼容方案或者连接软管。由于一般情况下，单靠一个连接器是不够的，通常需要一个额外的电缆接头配合，这个电缆接头通过适配器与连接器相连。例如 PFLITSCH 基于 UNI Dicht® 目录为圆形连接器开发了一个适配器，降低了结构尺寸和减少了部件，从而提高了系统安全性。由此使用者获得了运行安全性高的个性化的可配置的解决方案。

用于模块化设备方案的带多孔内塞的 M120

在特殊机械制造领域，设备通常会根据客户的个性化要求进行更改。为了更有效地组织流程，设备的全部力学部件都采用模块化。可以在发货之前就对单个部件进行测试，以便在现场能够迅速顺利地安装。通过去中心化方案，客户可以将电缆数量从 35 根减少到只有 5 根 — 2 根截面 120 mm² 的电缆和 3 根截面 240 mm² 的电缆。

全部 5 根芯线 L1、L2、L3、N 和 PE 穿过一个带多孔内塞的 M120 大电缆接头，通过一个 120 毫米的孔接入到开关柜中。这样不但节省了空间，而且由于将电缆周围的磁场降低到了最小而减小了发热。通过拧紧 M120 接头，使 5 根电缆的安装、密封和抗拉力一步完成。

Adapters for circular connectors

In addition to the secure connection of electrical conductors inside plug connectors, the routing of cables is great significance to quality and operational reliability. In practice, this interface is subject to a large number of requirements – such as strain relief, incorporation into EMC concepts and connection to hoses. Because a plug connector alone is normally unable to meet these requirements, it is usually necessary to use an additional cable gland. This is connected to the plug connector with an adapter. PFLITSCH has for example, developed an adapter for circular connectors that is based on the UNI Dicht® range and which reduces the installed dimensions and the number of components, thereby increasing system reliability. This offers the user an individually configurable solution that delivers a high level of operational reliability.

M120 with multiple sealing insert for modular plant designs

As a rule, in specialist mechanical engineering applications, plant and machinery are adapted to suit the requirements of individual customers. To make this process as efficient as possible, the complete system mechanics are manufactured in modules. This way, the individual components can be tested before dispatch allowing the plant to be rapidly and smoothly assembled on-site. The decentralised approach allowed the customer to reduce the number of cables from 35 down to only five – two cables of 120 mm² and three cables of 240 mm² cross sectional area..

Now, all five conductors L1, L2, L3, N and PE are fed into the control cabinet using a single large M120 cable gland with a multiple sealing insert – through a 120 millimetre hole. This saves time and reduces heat generation because it is possible to minimise the magnetic field around the cable. Furthermore, tightening the M120 cable gland simultaneously installs, seals and achieves the strain relief on all five conductors in a single operation.



图 1 – M120 电缆接头多孔密封嵌件
Fig. 1 – M120 cable gland with a multiple sealing insert

耐酸测试

Put to the acid test



图 1 - CNC 自动测量装置
Fig. 1 - CNC measurement system

图 2 - PFLITSCH 检测实验室
Fig. 2 - PFLITSCH test laboratory

以质量和安全为目的的检测实验室

为了各种不同的应用领域，PFLITSCH 产品拥有 VDE、UL 和 CSA 许可。还符合欧洲的电磁兼容性和 ATEX 指令，例如新用于轨道交通技术的高要求防火标准 EN 45545。

在 PFLITSCH 自主实验室中对新型和改造式产品进行全面测试。为此，有用于抗拉力和密封性测试的不同设备可供使用，例如环境试验舱。或者专门的电磁兼容性测量设备，以便对 5 Ghz 范围的电缆接头进行可靠的测试。当然，也有受客户委托进行的测试。PFLITSCH 实验室得到了 VDE、PTB 和 UL 检测机构的批准，并通过定期监测试验重复验证。根据国际标准 EN 62444、ATEX、IECEX 和 CSA 进行的测试得到了相关机构的认可。PFLITSCH 产品还通过了 GL 测试并获得了 EAC 许可。对于俄罗斯市场，Gost 认证代替 EAC 许可。

KoKeT® – 精确测量屏蔽效果

为了精确测量电缆接头的屏蔽效果，PFLITSCH 自主开发了一种名为 KoKeT® (同轴开尔文管) 的测量方法。这种方法的特别之处在于：电缆不影响测量结果。此外还有良好的可再现性 (≤ 3 dB)。可以测量最大至 M85 的电缆接头。

随着像 UL、CSA、VDE 和 PTB 等国际检测机构提高着要求，以及市场和行业对质量的要求也在提高，PFLITSCH 也在扩展检测能力。

作为服务，PFLITSCH 也接受在著名检测机构如 PTB (Physikalisch Technische Bundesanstalt) 进行的客户部件的认证。针对使用中可能出现的问题情况进行模拟，以尽可能发现弱点。当然 PFLITSCH 会根据国际质量保证体系对所有检测和试验进行记录。

Test laboratory for quality and safety

For the highly diverse fields of application PFLITSCH products are certified to VDE, UL and CSA standards among others. The European EMC and ATEX Directives are also fulfilled with ease, as is the new fire protection standard EN 45545 for railway traffic engineering.

New and modified products are rigorously and thoroughly tested at the PFLITSCH in-house test laboratory. A wide range of equipment is available for strain-relief and sealing tests, together with climate chambers. Or special EMC measuring devices that are used for reliably testing cable glands in the 5 GHz range. We also carry out testing on behalf of clients. The PFLITSCH laboratory is approved by the VDE, PTB and UL testing institutes and is subject to revalidation through regular verification audits. Tests to the international standards EN 62444, ATEX, IECEX and CSA are recognised by the relevant competent authorities. PFLITSCH products have also successfully passed the GL tests and are approved in accordance with the EAC. The EAC approval replaces the Gost standards for the Russian market.

KoKeT® – precise measurement of shielding effect

PFLITSCH has developed its own test method for the precise determination of the shielding effect of cable glands. It is called KoKeT® (Koaxial Kelvin Tube). The special features of this method: the cable has no influence on the measured results. Reproducibility is good (≤ 3 dB). Cable glands up to M85 can be tested.

PFLITSCH is constantly expanding its testing facilities in order to meet the rising demands of global testing institutes such as UL, CSA, VDE and PTB, bringing them in line with the growing quality requirements demanded by the markets and industrial customers.

PFLITSCH also offers a certification service for customer's components in cooperation with testing institutions such as the PTB (Physikalisch Technische Bundesanstalt). Application-specific problem cases are also reproduced in the laboratory in order to identify potential weak spots. PFLITSCH documents all inspections and tests in accordance with international QA standards as a matter of course.



图 1 – KoKeT® – 符合 IEC 62153-4-10 标准的测量法
Fig. 1 – KoKeT® – measuring process referred to IEC 62153-4-10

Leuchtturm Automation