FRANK OPTIC PRODUCTS®
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FRANK OPTIC PRODUCTS®
optische Technologien

We enhance the performance of your lasers

High-Power Laser Cables For All Lasers

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There is always a solution; all you have to do is see it!

We Set Standards In Terms Of Quality, Performance. Safety And Service

Fibre optics: customer specific, individual and innovative service

It has become a matter of course for laser light to be used as an innovative tool in industrial production. However, the ever-increasing complexity of the technical requirements, which laser applications must meet at an affordable price, poses constant new challenges.

As the only independent manufacturer of laser cables and fibre-optic systems for all types of applications right up into the 10 kW range in the world, we are regarded as specialists and as OEM partner to manufacturers and developers of laser machines and those who use them. We face up to the respective challenges of our customers and their applications ever day anew.

A strong partner
Competitive service

Our fibre-optic beam delivery systems are mainly used in materials processing, sensor technology, medical technology and in spectroscopy. Frank Optic Products® develops and manufactures the latest generation of innovative, customer-specific, fibre-optic beam delivery systems and high power laser cables which are compatible with all LLK and laser machines currently on the market.

All of our laser cable systems can be manufactured with various different optional safety devices:

- Fibre breakage identification (FPS)
- Temperature watchdog (CCS)
- Plug watchdog (FCS)
- Protection by reflexion (SHR)
- Active cooling system (CoolConnect®)
- Fibre identification system via RFID (FRFID)
- Electrical isolation

All of these can be combined and adjusted individually according to the customer's wishes and the respective application.

Repair service

In addition to developing and manufacturing laser cables we also have a comprehensive and fast worldwide repair and conversion service for all types of laser cables from different providers. As specialists we offer combinations of many different plug-in connector systems for complementary usage.

Applications

Laser material processing, laser welding, laser marking, laser soldering, sensor technology, spectroscopy, beam delivery, process control/ monitoring,
Laser surgery, dentistry, therapy, diagnostics, ophthalmology, hair removal.

Everything from a single source!
Laser technology components and technical optics

Benefit from our many years of experience and skills in the manufacture of precision optical components and systems for laser and medical technology, sensor technology, astro-photonics and industrial optics. Our knowledge, experience and skills guarantee the implementation of individual optical components, construction elements and optoelectronic and optomechanical modules and systems.

e.g. Flow plates, flow tubes, laser-protective windows, laser mirrors, laser reflectors, laser rods, laser crystals, optical lenses, CO_2 lenses, prisms, resonators, light sources, mechanical mounts.

Frank Optic Products® is one of the leading OEM key suppliers and innovation providers for laser and medical technology in Europe.

The Latest Generation Of 10 kW-High Power Laser Cables: HPLD*automotive*

Compatible with all LLK available on the market

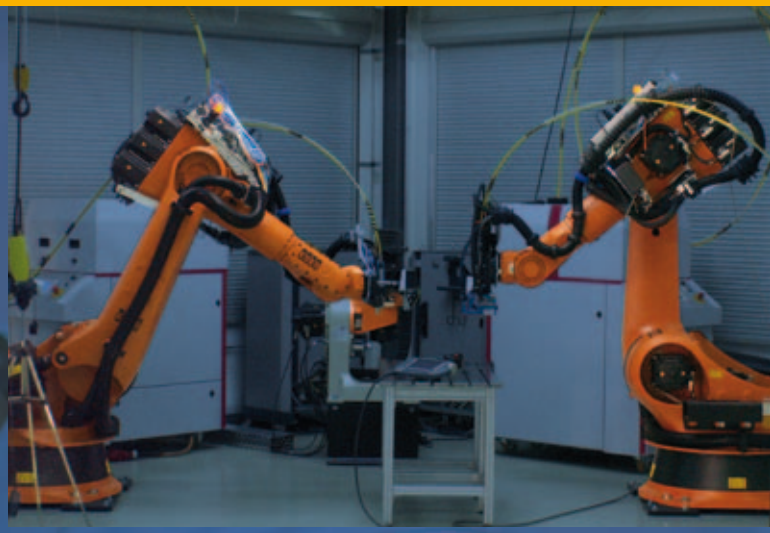
Frank Optic Products® offers state-of-the-art innovative high power laser cables in the high end range of the 10-kW class for laser material processing. The high power HPLDautomotive laser cable makes it possible to meet an enormous variety of requirements for applications in laser material processing economically and efficiently via fibre-optic beam delivery systems. As with all fibre systems from Frank Optic Products® here, too, the laser machine engineer, developer and laser user can always tune them individually to match his laser and his application. With this system it is also possible to combine it with other plug-in connector systems. Connection and utilisation of all laser sources commonly to be found on the market is guaranteed. The user alone determines performance and safety.

Higher performance and greater safety – a new cable concept and new materials

By using fibre materials recently developed especially for the high performance range it is possible to transport 10 kW laser power. For this purpose the fibre was equipped with a multi-cladding structure and the concentricity of the fibre core was substantially improved. This makes it possible to optimise coupling-in of the laser beam and to carry higher energies in the cladding. Besides the fibre material, new metal materials are used for the HPLD*automotive* laser cable in respect of the alloy, hardening and chemical resistance. Optimal heat removal is guaranteed thank to active cooling, which takes place close to the hot spots. The active cooling takes place without requiring maintenance and is especially suitable for Di water. With a compressive strength of up to 10 bars it can be connected to any of the existing laser cooling systems.

Especially suitable for use in robots

Thanks to electrical isolation and integrated electrical and optical shielding, the new cable safety concept with the hybrid protective cladding is much safer in operative use – particularly when used in robots with their short, abrupt movements. The new safety concept has an improved fuse plug and fibre breakage watchdog, which significantly reduce the trigger force or path. The cladding, which contains all the individual electronic and optical wires in the form of a hybrid cladding demonstrates significantly better stability, torsion, tensile strength and stability than the other LLK systems on the market.



Efficient, reliable and economical thanks to compatibility and individuality

High compatibility of plug-in connectors of the same system enables the connection and utilisation of all laser sources commonly to be found on the market. The HPLD*automotive* high power laser cable is compatible with all LLK systems for Nd:YAG lasers, diode lasers and fibre lasers. Existing and new laser systems can continue to be use or be used in parallel with the HPLD*automotive*.

Technical data of the HPLD*automotive* LLK system (standard)

Plug type: Conical connector FOP-KSA
Fibre type: fused silicia fibres, multi mode
Multi cladding, NA 0.22
Fibre core diameter: between Ø 200 and Ø1500 µm
Length: 2 - 50 m , Fibre loss amounts to < 3 %
Hybrid protective tubing
3-pole plug-in watchdog
For use up to 10-kW diode laser, 10 kW Nd:YAG laser
Can be configured on one side, depending on the type of laser: with FOP-D15, HPLK-FD80 plug-in connectors
Optional: Receiver flange with cooling system

Applications

Laser marking and laser material processing
Especially suitable for flexible and compact design, robot and portal use

HPLD-D15 And HPLN-D15

Customer-specific, fibre-optic cable systems for high performance lasers

The HPLD an HPLN standard high power laser cables are used as fibre-optic beam delivery systems for diode lasers, Nd:YAG lasers and fibre lasers. These proven LLK systems are available with a variety of options. This system makes combination with other plug-in connector systems possible. Connection and utilisation of all commercially available laser sources are also guaranteed in this case.

No more compromises: we produce custom-made high performance laser cables !

Frank Optic Products® provides the opportunity to manufacture high performance LLK according to specific requirements at an affordable price. Building on our basic cable, we develop and manufacture fibre-optic laser cable systems to comply with your specific requirements. Hence, with the cable systems from Frank Optic Products® you no longer have to make expensive compromises.

This high power LLK is a cable of extremely stable design, stable for up to 7 kW laser output. All beam delivery systems have a special prealignment of the glass fibres and are protected against misalignment. They can be supplied with a customer-specific laser connection flange.

The standard equipment of the systems is:

- Fibre breakage identification (FPS)
- Temperature watchdog (CCS)
- Plug watchdog (FCS)
- Protection by reflexion (LBP)

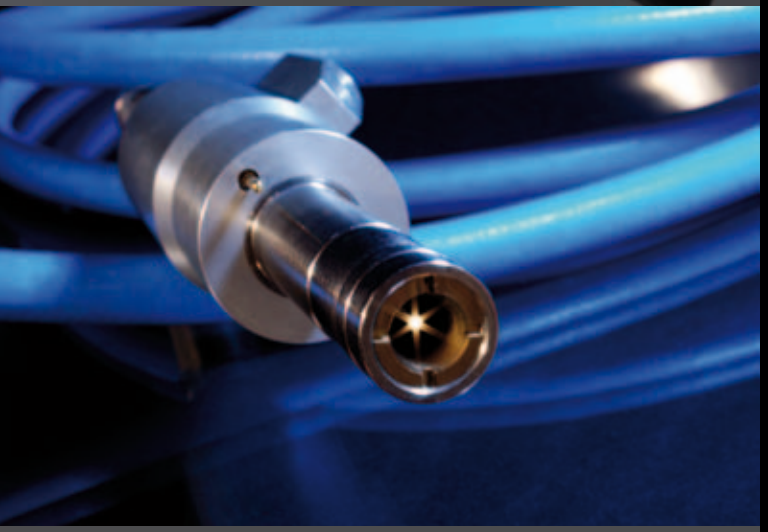
and can be set up with diverse other options as well as individual customer-specific components and further safety equipment (please refer also to the table, HPLD/HPLN overview).

HPLD-D15-LLK systems technical data (standard)

Plug type: FOP-D15
Plug ferrules: Ø 15mm, length 59mm
Fibre type: fused silicia fibres, multi mode
NA 0.22
Fibre core diameter: between Ø 200 and Ø 1500 µm
Length: 2 - 200 m
Fibre loss amounts to < 3 %
hybrid protective tubing, 2-pole plug-in watchdog
For use up to 5-kW diode laser, 5kW Nd:YAG laser
Can be configured on one side/from one side depending on the type of laser with FOP-D15, HPLK-FD80, SMAfree plug-in connectors
Optional: Receiver flange with cooling system

Applications

Laser marking and laser material processing; especially suitable for use with flexible and compact designs and for robot and portal use



HPLD-D10 for diode lasers

HPLN-D10 for Nd:YAG lasers

HPLD-D10 And HPLN-D10 High Power Laser Cables

Customised for all laser types up to 4 kW

The high power HPLD/HPLN-D10 laser cable is used with a 15 mm ferrule as an alternative fibre-optic beam delivery system to the standard LLK for diode lasers, Nd:YAG lasers and fibre lasers. These LLK systems are in particular used when high laser output up to 4 kW is to be transported with a small laser module plug-in connection.

Ideal for guidance inside a laser system and SMA connection

The HPLD/ HPLN-D10 system is the ideal solution when using laser light sources with a pug-in connection, Ø 10 mm, length 56 mm with which the laser user must use an SMA plug-in connector and if a laser output up to 200 W is to be transferred. This means that an SMA plug-in connector on the 2nd side of the cable system can be installed as an external connection, thus enabling SMA plug-in connector systems to be used.

The systems can be equipped optionally with fibre breakage identification (FPS), temperature watchdog (CCS) and protection by reflexion (LBP).

Here too, combination with the HPLK plug-in connector system is feasible. The HPLD/ HPLN-D10 system can be set up with diverse other options as well as individual customer-specific components and further safety equipment. (refer also to the table, HPLD/ HPLN overview).

Connection and utilisation of all laser sources commonly to be found on the market is also guaranteed in this case.

Technical data

Plug type: FOP-D10
Plug ferrule: Ø 10mm, length 56 mm
Fibre type: fused silicia fibres, multimode
NA 0.22
Fibre core diameter: between Ø 200 and Ø 1500 µm
Hybrid protective tubing
Fibre loss amounts to < 3 %
Length: 1 m - 50 m
For use up to 4 kW diode laser,
4 kW Nd:YAG laser
Can be configured on one side, depending on the type of laser:
with SMA 905 plug-in connector, HPLK D80
optionally with breakage watchdog, temperature sensor, protection by reflexion and plug watchdog

Applications

Laser marking and laser material processing; especially suitable for use with flexible and compact designs and for robot and portal use

High Power Laser Cable For The Medium Output Range

HPLK high power laser cable system

Complete solutions thanks to multiple laser cable

In order to be in a position to offer economical solutions to meet the diverse applications requirements in laser material processing, Frank Optic Products® has developed a laser cable modular system, which makes it possible to use beam delivery systems in output classes between 10 to 1000 W individually, but always with the plug-in connectors from the same system.

Higher performance for all types of laser

Owing to the high degree of compatibility of the same-system plug-in connector systems, the HPLK laser cable modular system developed by Frank Optic Products® enables all laser sources commonly to be found on the market to be connected and used.

It therefore provides users and laser manufacturers with the option of continuing to use existing and new laser systems with the same fibre-optic beam delivery systems or of using them parallel to one another.

The HPLK modular system Efficient and economical thanks to compatibility and variety

The HPLK multiple high power laser cable system comprises a modular system with 5 different standard solutions and 6 standard safety devices, such as temperature watchdog, CCS, fibre breakage identification FPS, plug-in contact, protection by reflexion SHR, electrical isolation and RFID, all of which can be combined and adapted individually according to customer wishes and the respective application.
The HPLK modular system permits the user maximum freedom for designing the laser system.

HPLKCoolConnect® – miniaturized in the 1-kW high power range

Standard plug-in connectors on laser cables are frequently unable to withstand the concomitant heat development. The CoolConnect® systems recently developed by Frank Optic Products® comprise, as standard, an active water cooling system for all customary laser plug-in connector systems and protection by reflexion ensures greater safety and reliability in the high performance range.

HPLK-FD80HR – low heat development on plug-in connector owing to protection by reflexion

This plug-in connector system is used by preference in order to be able to use diode lasers optimally in materials processing and for marking in the medium to high performance classes up to 600 W. Owing to the protection by reflexion integrated in the ferrule behind the behind the fibres, it is therefore possible to couple-in the critical beam profile, e.g. of diode lasers precisely and with optimal energy transfer. For this reason the FD80HR system represents a technical and economical solution for many applications in the medium performance range.

HPLK-FD80/ FD80basic the efficient, affordable standard solution

As the basis for the HPLK modular system a plug-in connector technically reduced to the bare necessities and which facilitates the transmission of laser output up to 200 W. Hence, the FD80basic system makes it possible to work economically and efficiently without foregoing the necessary precision for coupling-in.

HPLK-FD80modestrip for an improved beam geometry

The modestrip systems are designed so that the major intensity of the modes located in the cladding is already coupled-out from the fibre within the coupling-in plug.

HPLK laser cable technical data (standard)

Plug type: FOP-D80
Plug ferrule: Ø 4 mm, length 10 mm
Fibre type: fused silicia fibres, multi mode
NA 0.22, Ø 200 µm to Ø 1000 µm
Hybrid tubing, stable plastic covering
Fibre loss amounts to < 3 %
Length: 2 - 50 m
For use with up to 1-kW diode lasers,
1kW Nd:YAG lasers
Can be configured on one side, depending on the type of laser: with SMA 905 plug-in connector, FOP-D10
Optionally with breakage watchdog, temperature sensor, protection by reflexion and plug watchdog

Applications

Laser marking and laser material processing; especially suitable for use with flexible and compact designs and for robot and portal use

High Power Laser Cable For The Medium Output Range With SMA Plug-in Connector

LCS-free high power laser cable system

Precision, innovations and maximum safety

For transmitting defined laser output via fibre-optic beam delivery systems industrial and medical applications, we guarantee you maximum precision, reproducibility and care in the manufacture of our fibre-optic cables and probes. The constant exchange of knowledge and regular cooperative research with leading scientific institutions, leading institutes and clinics in the fields of laser technology and laser medicine flow directly into the development and manufacture of our ongoing production and form the basis of our innovative products.

Compatible and diverse in applications

The components and systems we manufacture are characterized primarily by the precision with which they are manufactured and the exact alignment with your applications. The LCS beam delivery system is available in a very wide range of system variants. For laser output classes up to 200 W the LCS-S05-free types and the LCS-05modestrip type are used with freestanding fibre in plug-in connectors. All LCS-S05 beam delivery systems are available with plastic and metal cladding or without cladding. Standard equipment of the systems is antikink protection, strain relief and SMA plug-in connectors; optionally, all label cables can be manufactured with a hand piece and connecting nut. In addition to SMA plugs, FC/ PC, FC/ APC, SC, ST plug-in connectors are also available.

Fluid and compressed air supply for laser medicine

For laser medicine beam delivery systems with integrated coolant and compressed air lines as well as injection cannulae with fluid or compressed air supply with SMA connection can be made available. All laser cables for medicine and dental technology are available in optional autoclavable or EtO sterilisable versions.

LCS-S05-free laser cable technical data (standard)

Plug type: FSMA-S05-free
Plug ferrule: Ø 3.175 mm, length 9.85 mm
Fibre type: fused silicia fibres, multi mode
NA 0.22, Ø 100 µm to Ø 1000 µm
plastic tubing

Length: 1 - 50 m
For use up to 200 kW diode lasers,
200 W Nd:YAG lasers
Can be configured on one side depending on the type of laser: also with FC/ PC, FC/APC, SC, ST, HPLK, HPLD-D10, optionally with RFID and plug watchdog

Applications

Industry, sensor technology, surgery, dentistry, ophthalmology, ENT, dermatology, therapy and diagnostics, especially suitable for portal use