Sensor solutions
传感解决方案

BizLink

advintec® TCP

Calculation and calibration of robotic tools and fixtures

机器人工具与夹具的
计算与校准

advintec® 6D

Laser measurement
激光测量

工厂自动化与机械

Sensor solutions
传感解决方案

Overview | 概览

Our product range in the field of sensor solutions comprises calibration and calculation systems for robotic tools and fixtures in up to six dimensions as well as systems for 6D laser measurement that are used for unracking, gripper measurement and part location applications.

These systems feature
- **independence of robot types**
- **standardisation**
- **scalability**
- **ease of use**

在传感解决方案领域，我们的产品涵盖用于机器人工具和夹具的校准和计算系统（多达 6 个维度），以及 6D 激光测量系统，这些系统适用于拆装、夹具测量以及零件定位应用。

这些系统具有如下特点：
- **适用于所有机器人类型**
- **标准化**
- **可扩展性**
- **操作简单**

› **Problem definition of customer**

› 客户问题定义

› **Selection of calibration system, sensors, actuators**

› 校准系统、传感器、执行器的选择

› **Implementation at customers process / application**

› 在客户过程/应用中实施

› **Situational assessment**
› **Measurement / recognition concept**

› 情况评估
› 测量/识别概念

› **Solution by means of custom interfaces**
› **Independent of equipment manufacturer**

› 自定义接口解决方案
› 独立于设备制造商
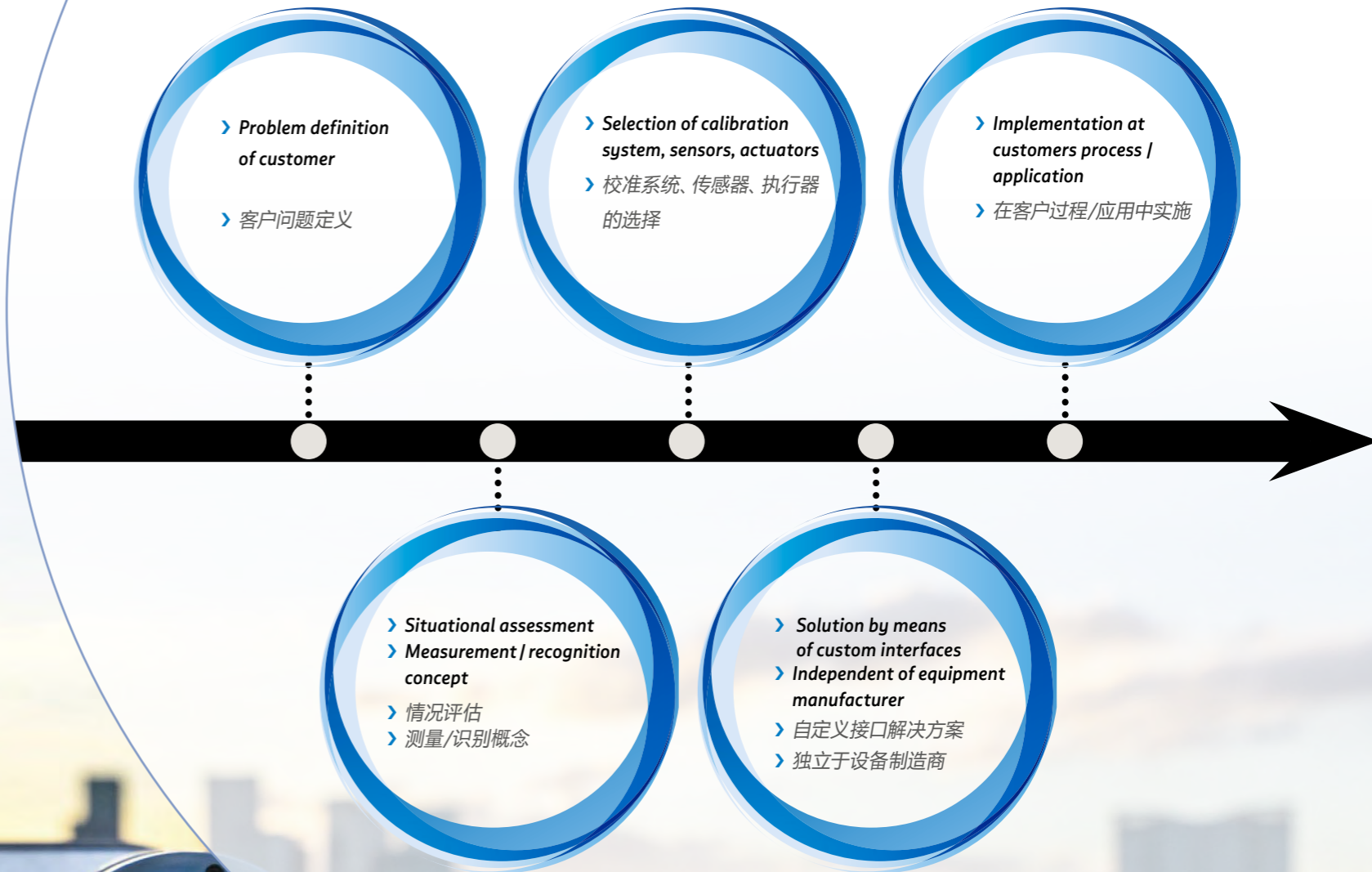
Automatic absolute calculation
自动绝对计算系统

of robotic tools and fixtures / 适用于机器人工具和夹具

To avoid time-consuming program modifications during plant extension or new tool setup work, we offer absolute initial calibration as part of an automated process.

This keeps follow-up teach-ins to a minimum. The process involves the tool being moved to the centre of the photo-electric barrier, so as to generate the tool data. Only the tolerance zone (in which the tool is permitted to move) and the starting point of the calibration need to be taught-in to the system. Once complete, the robot moves the tool within the defined tolerance zone and calibrates itself automatically with the aid of the supplied program.

为避免在工厂扩建或新工具安装工作期间修改程序耗时耗力, 我们提供绝对初始校准服务, 作为自动化过程的一部分。

这样就可以将后续调教需求降至最低。该过程包括将工具移动到光电屏障的中心, 以生成工具数据。此系统只需要调教公差范围 (允许工具移动的区间) 和校准的起点。完成上述操作后, 机器人将在定义的公差范围内移动工具, 并借助提供的程序自动校准。

Flexible, mobile calibration for unknown tools and fixtures is now also possible with our mobile calibration case. Ideal for use when setting up new production lines.

现在, 我们的便携式校准箱也可以对未知工具和夹具进行灵活的移动校准。非常适合在安装新生产线时使用。

Advantages
- **high level of precision**
- **automated, standardised and reproducible procedure, which is able to eliminate the kinds of human errors** (may occur with conventional manual calibration)
- **the initial calibration is both rapid & cost-effective**

优点
- **高精度**
- **自动化、标准化以及程序可复制性, 这些优点能够消除各种人为错误** (可能发生在传统的手动校准中)
- **初始校准既快捷又经济实惠**

Calibration case content *	校准箱材料清单 *	Order no. / 订单号
• Precision laser sensor 120 mm x 120 mm • Infrared sensor 240 mm x 240 mm • TCP controller • Cable set • Power supply unit • Tripod for secure placement of the mobile sensors • Data interface to robot control • Software package • Commissioning documentation	• 精密激光传感器 120 mm x 120 mm • 红外线传感器 240 mm x 240 mm • TCP 控制器 • 电缆组件 • 电源 • 用于牢固放置移动传感器的三脚架 • 机器人控制端的数据接口 • 软件包 • 调试文件	TCP0035

* the exact calibration case content is available on request
可根据要求提供确切的校准箱材料清单

Mobile calibration case for the initial calibration of unknown tools and fixtures (TCP & Base)
用于未知工具和夹具 (TCP 和底座) 初始校准的便携式校准箱

3D-/5D-/6D *calibration*

Applicable for all robot brands

advintec® Controller Facelift
› Illustration of more than 3 corrected values
› Direct display of field bus status

advintec® 新型控制器
› 显示超过3个校正值
› 直接显示现场总线状态

Power supply 24 V DC
电源 24 V DC

Fieldbus / 现场总线

Robot controller
机器人 控制器

Fieldbus / 现场总线

Power supply 24 V DC
电源 24 V DC

Digital / 下载

Digital / 下载

advintec® TCP

Highest flexibility for upgrades and activation of various applications in up to 6D

可灵活升级/激活以应对
各种应用, 最高可达6D

advintec® TCP XS

Simple solution for 2D and 3D applications

简易解决方案 适用于 2D/3D 应用

3D-/5D-/6D 校准系统

适用于所有机器人品牌

Our calibration system – everything from one source

我们的校准系统
——
一站式服务

The challenge

Continually securing the correct operating position for fixtures and robotic tools such as welding torches and milling tools.

挑战

持续确保夹具和机器人工具 (例如焊枪和铣刀) 的操作位置正确。

The solution

The advintec® TCP tool calibration system calibrates the tool or fixture electronically in up to six dimensions. The processing position is automatically corrected by the measured variations and ensures that the tool always operates at the correct position. advintec® TCP is a high-precision calibration system that can be used for all robot types and most robotic tools, making it independent of specific manufacturers.

Correction takes place directly & automatically in the ongoing production process!

advintec® TCP – Calculation and calibration of robotic tools and fixtures in up to 6 dimensions.
Our measuring devices for machines and robots ensure that each production step is executed exactly in the way it was intended. Nothing is left to chance during production. Measuring devices will, if necessary, correct the control program to ensure that each part leaves the production line as planned.

Advantages

- Automatic absolute calculation of robotic tools and fixtures
- Auto-commissioning and ease of use
- Simplified Integration in the production line due to small footprint
- Robust sensor available in three sizes
- Multi-sensor-system (connection of additional sensors possible)
- Connection of the calibration system to the robot controller, i.e. the calibration procedure takes place in an evaluation unit and transfers correction values to the robot controller
  › High process reliability
  › No additional PC's required
  › Logging of calibration data
  › Data evaluation possible at all times
- Automatic correction of the trajectory due to wear and tear or tool-replacement and no failures caused by positioning factors
  › 100 % quality assurance
- Reduction of costs
  › Prevents the production of defective parts
  › Reduces scrap and rework
  › Short setup times

解决方案

advintec® TCP 校准系统可在多达 6 个维度上电动校准工具或夹具。
加工位置根据测得的变化自动校正, 并确保工具始终在正确的位置运行。advintec® TCP 是一款高精度校准系统, 可用于各种机器人和大多数机器人工具, 它在特定制造商中的产品一枝独秀。

在正在进行的生产过程中 **直接自动**校正!

advintec® TCP ——可在多达 6 个维度上计算和校准机器人工具和夹具

我们用于机器人和机器人的测量设备确保每个生产步骤都按照预期的方式准确执行。在生产过程中不存在例外情况。如有必要, 测量设备将纠正控制程序, 以确保每个零件按计划流出生产线。

优点

- 自动化工具和夹具的自动绝对计算
- 自动调试, 操作简单
- 由于体积小可以直接集成到生产线上
- 坚实的传感器, 三种尺寸可选
- 多传感器系统 (可连接额外传感器)
- 将校准系统与机器人控制器的相连, 例如, 即校准程序出现在计算单元中, 并将校准值传输至机器人控制器
  › 工艺可靠性高
  › 无需额外配置电脑
  › 记录校准数据
  › 可随时评估数据
- 自动校正因磨损或工具替换影响的运动轨迹, 不会因定位因素造成故障
  › 100% 质量保证
- 降低成本
  › 预防产生缺陷产品
  › 减少报废率和返工时间
  › 较短的集成时间

advintec® *TCP calibration system /* 校准系统

Multi sensor system
➜ *up to 3 sensors*
can be connected to one controller

多传感系统
➜ 一个控制器最多可连接
3个传感器

Integration of advintec® TCP in the production process
- **uncomplicated**
- **reduction of robot programming to a minimum**
- **speedy installation**
- **easy set-up**
- **logging of calibration-data: regular data evaluation possible at any time**
- **no additional PCs required**

在生产过程中集成 advintec® TCP
- 操作简单
- 将机器人编程减少到最低限度
- 快速安装
- 易于设置
- 校准数据记录: 可随时做定期数据评估
- 无需额外的电脑

advintec® TCP sensors / 传感器

advintec® TCP sensors
available in three sizes
(inner dimensions)
- **Order no. TCP0008** ❯ 120 mm x 120 mm
- **Order no. TCP1008** ❯ 240 mm x 240 mm
- **Order no. TCP2008** ❯ 320 mm round

advintec® TCP 传感器
三种尺寸可用
(内尺寸)
- 订购号 **TCP0008** ❯ 120 mm x 120 mm
- 订购号 **TCP1008** ❯ 240 mm x 240 mm
- 订购号 **TCP2008** ❯ 320 mm 圆形

advintec® TCP precision laser sensors
available in two sizes
(inner dimensions)
- **Order no. TCP3008** ❯ 120 mm x 120 mm
- **Order no. TCP4008** ❯ 320 mm round

advintec® TCP 精密激光传感器
两种尺寸可用
(内尺寸)
- 订购号 **TCP3008** ❯ 120 mm x 120 mm
- 订购号 **TCP4008** ❯ 320 mm 圆形

Dimensions / 尺寸
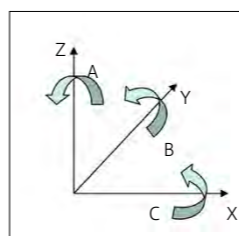
Six dimensions / 六维
A = Rotation around Z axis / 绕 Z 轴旋转
B = Rotation around Y axis / 绕 Y 轴旋转
C = Rotation around X axis / 绕 X 轴旋转

	3D	5D	6D
Calibration time	**3 sec.** complete 2D calibration **6 sec.** complete 3D calibration	**9 sec.** complete 5D calibration	**15 sec.** complete 6D calibration
Dimensions	2 or 3 translations	5 (3 translations, 2 rotations)	6 (3 translations, 3 rotations)
Fields of application (applicable for all robot brands)	Arc welding, stud welding, spot welding, laser welding, tig welding, gluing, milling, blade measurement		Gripper calibration, fixture calibration, power train applications, high precision applications

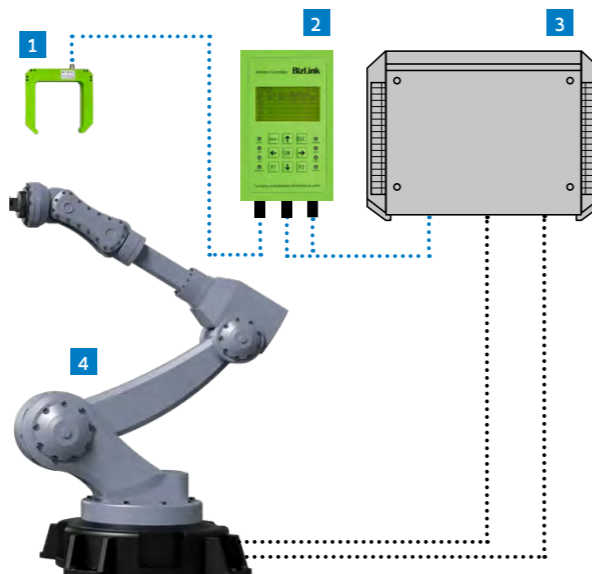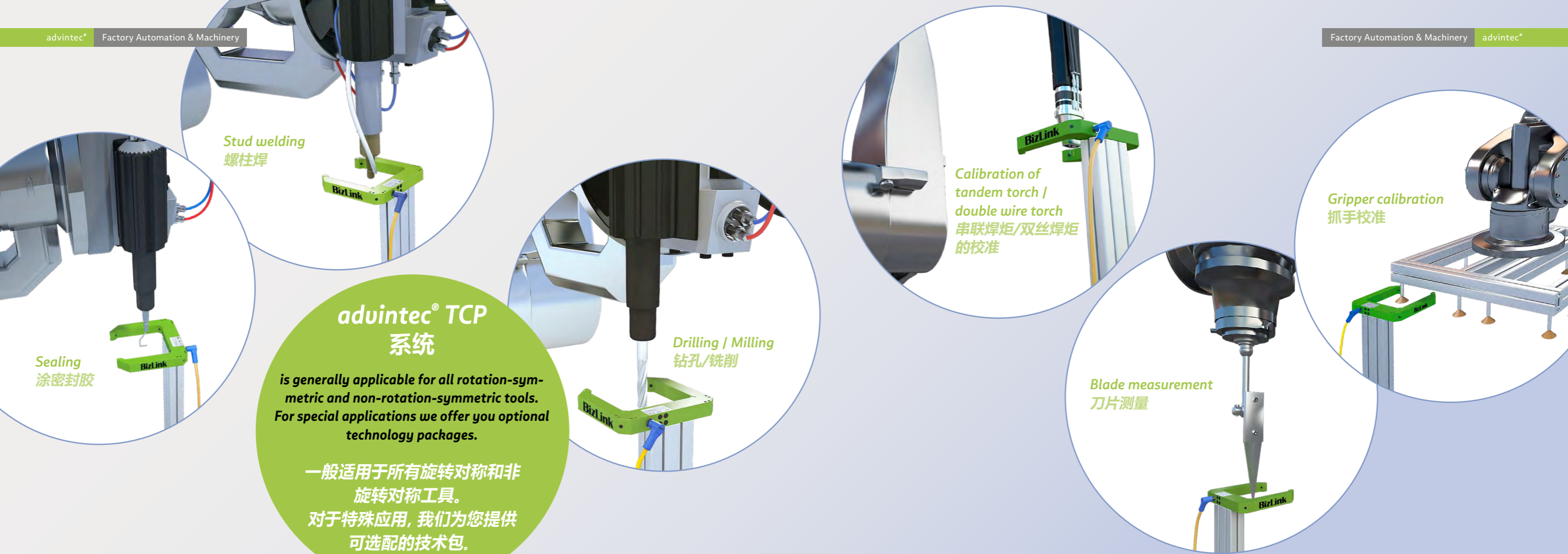| 校准时间	**3 秒** 完成 2D 校准 **6 秒** 完成 3D 校准	**9 秒** 完成 5D 校准	**15 秒** 完成 6D 校准
维度	2 或 3 次平移	5 (3 次平移, 2 次旋转)	6 (3 次平移, 3 次旋转)
应用领域 (适用于所有机器人品牌)	弧焊、螺柱焊、点焊、激光焊、氩弧焊、胶合、铣削、刀片测量		抓手校准、夹具校准、动力传动系统应用、高精度应用

Integration / 集成

Scope of supply / 供应范围
1 TCP sensor / TCP 传感器
2 TCP controller / TCP 控制器
❯ Cable set (5 m): power cable, sensor cable, bus cable set
电缆组件 (5 m): 电源线、传感器电缆、总线电缆组
❯ Robot program examples
机器人程序示例
❯ Dokumentation via web download
通过网络下载文档

Not included / 不包括
3 Robot controller / 机器人控制器
4 Robot / 机器人

Stud welding
螺柱焊

Sealing
涂密封胶

Calibration of tandem torch / double wire torch
串联焊炬/双丝焊炬的校准

Gripper calibration
抓手校准

Drilling / Milling
钻孔/铣削

Blade measurement
刀片测量

aduintec® TCP 系统

is generally applicable for all rotation-symmetric and non-rotation-symmetric tools. For special applications we offer you optional technology packages.

一般适用于所有旋转对称和非旋转对称工具。对于特殊应用，我们为您提供可选配的技术包。

TCP software sealant nozzle (hook nozzle) TCP 软件 密封剂喷嘴	TCP software stud welding TCP 软件 螺柱焊	TCP software milling / drilling TCP 软件 铣削/钻孔	TCP software tandem torch TCP 软件 串联焊炬	TCP software cutting tools / blades TCP-软件 切割工具/刀片	TCP software gripper / fixtures TCP 软件 抓手/夹具
This software add-on was developed specifically for the calibration of sealant nozzles with special geometries (hook nozzles) for hem sealing. Very precise determination of position and orientation of TCP incl. supervision of nozzle geometry / material build-up at the nozzle.	This software add-on was developed specifically for the calibration of stud welding tools with a foot. Automated calibration of stud welding head. Exact determination of tool axis along the linear side (5D calibration of TCP). Automatic differentiation between stud retainer and support leg.	Automated calibration of milling tools and drill bits including tool breakage detection and diameter supervision. Ideal for use with spindles with automatic tool changers. Stores the dimensions of multiple tools and verifies whether the correct tool is loaded in the tool changer.	Both welding wires can be calibrated simultaneously.	Enables a 6D calibration of cutting blades such as deburring knives and ultrasonic knives. Exact calibration of the TCP position, orientation and cutting direction.	Automated 6D calibration of robot gripper. Ideal for exchangeable grippers and high-precision applications such as engine and gearbox assembly. Compensation of temperature drift.
该软件插件专为下摆密封的具有特殊几何形状的密封剂喷嘴（钩形喷嘴）的校准而开发。非常精准地确定 TCP 的位置和方向，包括监控喷嘴几何形状/喷嘴处的材料堆积。	该软件插件是专为用脚校准螺柱焊工具而开发的。螺柱焊头的自动校准。沿直线侧精确确定刀具轴（TCP 的 5D 校准）。螺柱垫圈和支撑腿之间的自动区分。	铣刀和钻头的自动校准，包括刀具破损检测和直径监控。非常适合与带有自动换刀装置的主轴一起使用。存储多把刀具的尺寸并验证刀具更换器中是否装载了正确的刀具。	两条焊丝可以同时校准。	可对倒角刀和超声刀等切割刀片进行 6D 校准。TCP 位置、方向和切割方向的精确校准。	机器人抓手的自动 6D 校准。非常适合可更换抓手和高精度应用，例如发动机和变速箱总成。温度漂移补偿。

advintec® *TCP* sensors & precision laser sensors
Technical data

advintec® TCP 传感器与精密激光传感器
技术数据

advintec® TCP sensors

at 20 °C / 24 V DC	
Sensor type	2 channel infrared 880 nm, pulsed at 2kHz
Calibration accuracy	0.02 mm
Protection class	IP67
Smallest detectable object	0.7 mm
Dirty surroundings	Yes
Casing	Aluminium
Automatic correction of tool data	Yes, via controller
CE mark	Yes
Operating voltage	10 – 34 V DC
Connections	IBS connector, 5 pin, PE advance conn.

advintec® TCP 传感器

温度 20 °C / 电压 24 V	
传感器类型	2 通道红外 880 nm, 脉冲频率为 2kHz
校准精度	0.02 mm
防护等级	IP67
最小可检测的对象	0.7 mm
污浊环境下工作	是
套管	铝
自动修正刀具数据	是，通过控制器
CE 标志	是
工作电压	10 – 34 V DC
连接	IBS 连接器, 5 针, PE 提前连接。

advintec® TCP precision laser sensors

	120 x 120 mm	320 mm round
Sensor type	2 channel red light laser pulsed at 3kHz, laser class 1 (IEC 60825-1)	2 channel red light laser pulsed at 3kHz, laser class 1 (IEC 60825-1)
Calibration accuracy	0.02 mm	0.02 mm
Smallest detectable object	0.2 mm	0.2 mm
Protection class	IP67	IP67
Dirty surroundings	Yes	Yes
Casing	Aluminium	Aluminium
Automatic correction of tool data	Yes, via controller	Yes, via controller
CE mark	Yes	Yes
Operating voltage	10 – 34 V DC	10 – 34 V DC
Connections	IBS connector, 5-pin, PE advance conn.	IBS connector, 5-pin, PE advance conn.

advintec® TCP 精密激光传感器

	120 x 120 mm	320 mm 圆形
传感器类型	2 通道红光激光, 脉冲频率为 3kHz, 激光等级 1 (IEC 60825-1)	2 通道红光激光, 脉冲频率为 3kHz, 激光等级 1 (IEC 60825-1)
校准精度	0.02 mm	0.02 mm
最小可检测的对象	0.2 mm	0.2 mm
防护等级	IP67	IP67
污浊环境下工作	是	是
套管	铝	铝
自动修正刀具数据	是，通过控制器	是，通过控制器
CE 标志	是	是
工作电压	10 – 34 V DC	10 – 34 V DC
连接	IBS 连接器, 5 针, PE 提前连接。	IBS 连接器, 5 针, PE 提前连接。

advintec® *TCP* system

Overview

advintec® *TCP* 系统

概览

advintec® TCP system

Controller / bus system		Order no.
Complete set incl.	DeviceNet™	TCP0002
	EtherNet/IP™	TCP0006
	PROFIBUS	TCP0003
• controller	PROFINET	TCP0005
• sensor TCP-3D 120 x 120 mm	Ethernet TCP/ IP	TCP0030
• 3D software	EtherCAT	TCP0031
• cable (5 m)	CANopen	on request
	Modbus	TCP0036
	Serial RS232/422	on request

System – options		Order no.
	5D	TCP0009
	6D	TCP0010
	Initial calibration	TCP0033
Software	Milling / drilling	TCP0011
	Stud welding ext. x-y-mode	TCP0012
	Hook nozzle ext. z-mode	TCP0013
	Cutting tools / blades	TCP0034
	Sensor TCP-3D 120 x 120 mm	TCP0008
	Sensor Laser 120 x 120 mm	TCP3008
Sensors	Sensor TCP-3D 240 x 240 mm	TCP1008
	Sensor circular 320 mm	TCP2008
	Sensor laser circular 320 mm	TCP4008

Accessories / spare parts		Order no.
	Sensor cable 5 m	TCP0016
	Power supply cable 5 m	TCP0015
	Bus DeviceNet™ plug 5 m	TCP0017
Cable	Bus DeviceNet™ socket 5 m	TCP0018
	Bus PROFIBUS plug 5 m	TCP0019
	Bus PROFIBUS socket 5 m	TCP0020
	Bus PROFINET 2Port / EtherNet/IP™ 5 m	TCP0023
Stand	Aluminum	TCP0028
Termination resistor	DeviceNet™	TCP0025
	PROFIBUS	TCP0026
Mobile calibration case	Exact equipment on request	TCP0035

advintec® TCP 系统

控制器/总线系统		订购号
全套 包括:	DeviceNet™	TCP0002
	EtherNet/IP™	TCP0006
	PROFIBUS	TCP0003
• 控制器	PROFINET 2Port	TCP0005
• 传感器 TCP-3D 120 x 120 mm	Ethernet TCP/ IP	TCP0030
• 3D 软件	EtherCAT	TCP0031
• 电缆 (5 m)	CANopen	根据要求
	Modbus	TCP0036
	串口 RS232/422	根据要求

系统选项		订购号
	5D	TCP0009
	6D	TCP0010
	初始校准	TCP0033
软件	铣削/钻孔	TCP0011
	螺柱焊接外接 x-y-模式	TCP0012
	挂钩喷嘴外接 z 模式	TCP0013
	切割工具/刀片	TCP0034
	传感器 TCP-3D 120 x 120 mm	TCP0008
	激光传感器 120 x 120 mm	TCP3008
传感器	传感器 TCP-3D 240 x 240 mm	TCP1008
	圆形传感器 320 mm	TCP2008
	圆形激光传感器 320 mm	TCP4008

| 配件/备件		订购号
	传感器电缆 5 m	TCP0016
	电源线 5 m	TCP0015
	总线 DeviceNet™ 插头 5 m	TCP0017
电缆	总线 DeviceNet™ 插座 5 m	TCP0018
	总线 PROFIBUS 插头 5 m	TCP0019
	总线 PROFIBUS 插座 5 m	TCP0020
	总线 PROFINET 2Port / EtherNet/IP™ 5 m	TCP0023
支架	铝	TCP0028
终端电阻	DeviceNet™	TCP0025
	PROFIBUS	TCP0026
便携式校准箱	根据要求提供精确设备	TCP0035

advintec TCP-6D

Types of installation

Inline and permanent or temporary

Aside from stationary installation the TCP sensors can be robot guided. This enables a permanent calibration of fixtures (bases). In addition, we offer you a mobile system, which is delivered in a case and can be used for mobile calibration needs – everywhere and any time.

安装类型

在线固定或临时方案

除了固定安装外，TCP 传感器还可以由机器人引导。这可以对夹具（底座）进行永久校准。此外，我们还为您提供了一个便携式系统，该系统装在一个箱子中，可随时随地满足移动校准的需求。

Calibration – inline and permanent / 校准——在线固定
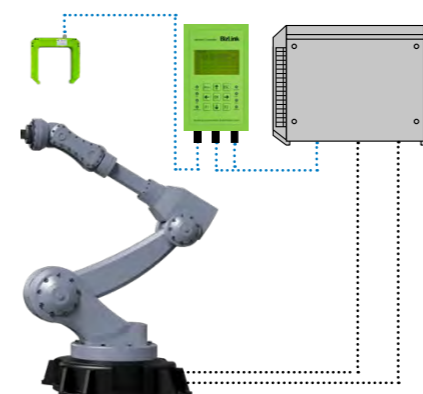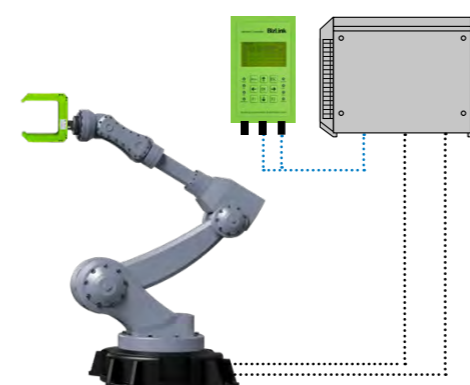

Stationarily mounted TCP sensor

Exemplary set-up for calibration of robotic tools

固定安装的 TCP 传感器

用于校准机器人工具的示例性安装

Robot guided TCP sensor

Exemplary set-up for calibration of fixtuers

机器人引导的 TCP 传感器

用于校准夹具的示例性安装

Calibration – temporary / 校准——临时

With mobile TCP sensor

Exemplary set-up for calibration of robotic tools and fixtures

配置移动 TCP 传感器

用于校准机器人工具和夹具的示例性安装

advintec® **6D** *laser measurement* / 激光测量

Calibrates grippers, fixtures and locates parts in robotic applications inline

在机器人应用中在线校准抓手、夹具和定位零件

It can also be used as crash recovery system in order to re-calibrate tools and fixtures after collisions.

During gripper measurement it ensures the precise calibration of grippers or gripped parts for precision handling, e. g. for power-train applications, such as engine and transmission parts. Precisions laser sensors secure that changes in the gripper or in the part location are detected at an early stage and are corrected inline.

此传感器也可以用作故障恢复系统, 以便在系统故障后重新校准工具和夹具。

在抓手测量期间, 它确保了抓手或被抓取部件的精确校准, 以实现精确处理, 例如, 用于发动机和传动部件等动力总成应用。精密激光传感器可确保在早期阶段检测到抓手或零件位置的变化并进行在线校正。

Due to the modular set-up the calibration system can be adapted to the corresponding application.

It consists of

- **advintec controller**
- **sensor interface**
- **sensors** (laser point, laser line or infared sensor ...)
- **cable set**

As a standard we use laser triangulation sensors. The system is expandable, i.e. multi sensor capable.

由于模块化设置, 校准系统可以适应相应的应用。

该系统包括:

- **advintec 控制器**
- **传感器接口**
- **传感器** (激光点、激光线或红外传感器......)
- **电缆组件**

标准情况下, 我们使用激光三角测量传感器。该系统是可扩展的, 即支持多传感器。

Advantages

- High precision 6D laser measurement without technical aids oder reference parts
- Corrections of processing position take place directly and automatically within ongoing production process
- Eliminates manual program corrections
- Scalability and standardisation
- Simple to integrate and use
- Simple commissioning via supplied robot program
- High tolerance to ambient light
- Measurement time starting from 3 sec. (depending on configuration and application)
- Increase of plant availability and quality assurance of products
- Cost savings compared to conventional mechanical systems

优点

- 高精度 6D 激光测量, 无需技术辅助或参考零件
- 在正在进行的生产过程中直接对加工位置进行自动校正
- 消除手动程序修正需要
- 可扩展性和标准化
- 易于集成和使用
- 通过提供的机器人程序进行简单调试
- 对环境光线耐受性高
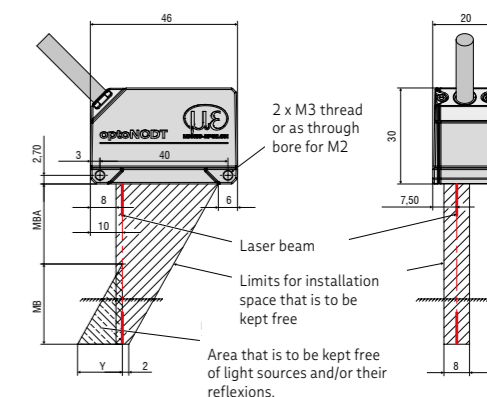- 测量时间从 3 秒开始 (取决于配置和应用)
- 提高工厂适用性和产品质量保证
- 相较于传统机械系统节省成本

System components / 系统组件

Robot controller / 机器人控制器 — Fieldbus / 现场总线 — Power supply 24 V DC / 电源 24 V DC — Single or multiple sensors / 单个或多个传感器 — advintec® 6D laser measurement 激光测量

以太网 / RS485

Triangulation sensor / 三角测量传感器

The standard laser sensor is available for different ranges
标准激光传感器可用于不同的范围

	Measuring range			
	50 mm	100 mm	200 mm	500 mm
Type of measurement	Laser optic triangulation			
Start of measuring range	35 mm	50 mm	60 mm	100 mm
End of measuring range	85 mm	150 mm	260 mm	600 mm
Reproducibility	2 μm	4 μm	8 μm	20–40 μm
Laser protection class	Class 2 acc. to DIN EN 60825-1: 2008-05			
Protection class	IP65			
Weight (3 m cable incl.)	approx. 145 g			
Weight (pigtail incl.)	approx. 60 g			

2 x M3 thread or as through bore for M2 — Laser beam — Limits for installation space that is to be kept free — Area that is to be kept free of light sources and/or their reflexions.

	测量范围			
	50 mm	100 mm	200 mm	500 mm
测量类型	激光光学三角测量			
测量范围开始	35 mm	50 mm	60 mm	100 mm
测量范围结束	85 mm	150 mm	260 mm	600 mm
重复性	2 μm	4 μm	8 μm	20–40 μm
激光防护等级	符合 DIN EN 60825-1 的 2 类标准: 2008-05			
防护等级	IP65			
重量 (含 3 m 电缆)	大约 145 g			
重量 (包括尾纤)	大约 60 g			

2x M3 螺纹或用于 M2 的通孔 — 激光束 — 应保留的安装空间限度 — 应保持无光源和/或其反射的区域
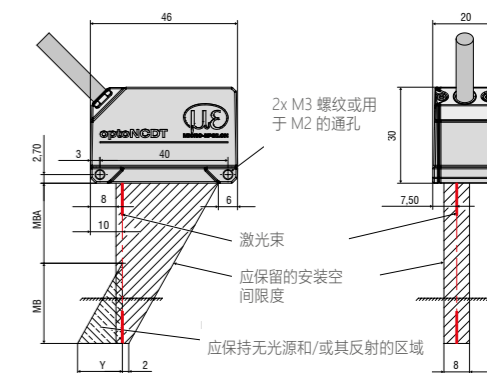
Unracking / 下料

The challenge

In modern production plants it is often necessary to extract parts (body side panels, roofs, hoods and similar parts) that are then delivered in bins for further pro-cessing in a fully automated fashion. To this end, industrial robots are mostly used. If the part is not exactly located where expected, the robot cannot continue its operating cycle.

## 挑战

在现代化生产工厂中，通常需要拆取零件 (车身侧板、车顶、引擎盖和类似零件)，然后将其放入箱中以全自动方式进行下一步加工处理。为此，工厂多采用工业机器人来完成。如果零件未准确定位在预期位置，机器人将无法继续其操作循环。

The solution

- guidance of the robot via an electronic part calibration system
- 6D calibration of the part position (translation and rotation) by means of laser or infrared sensors integrated within the gripper – direct connection with robot controller via field bus
- automated adjustment of pick position – online
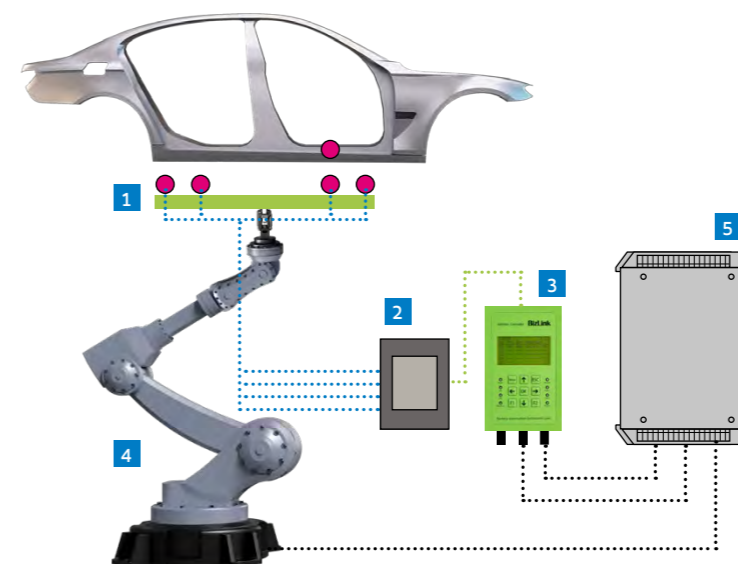
解决方案

- 通过电子零件校准系统引导机器人
- 通过集成在夹具中的激光或红外传感器对零件位置 (平移和旋转) 进行 6D 校准——即通过现场总线与机器人控制器直接连接
- 自动在线调整拾取位置
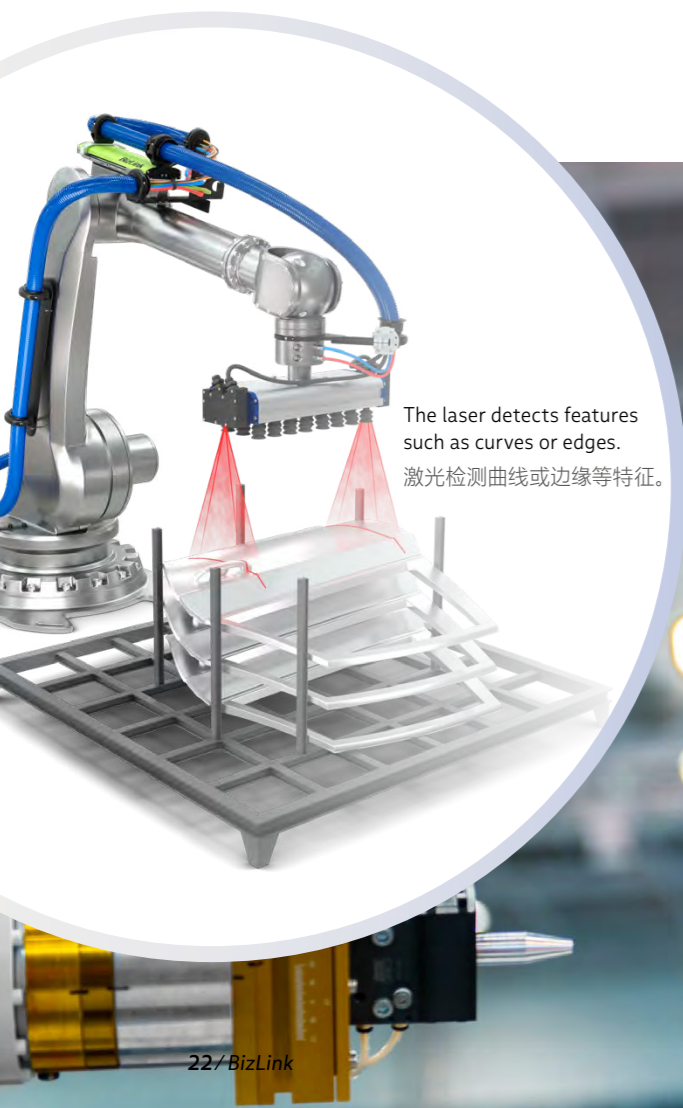
The laser detects features such as curves or edges.
激光检测曲线或边缘等特征。

Integration / 集成

Scope of supply / 供应范围：

1 Sensors installed in gripper
安装在抓手中的传感器

2 Sensor interface
传感器接口

3 advintec controller / 控制器

› Cable set (5 m):
power cable, sensor cable, bus cable set
电缆组件 (5 m):
电源线、传感器电缆、总线电缆组

› Robot program for calibration
用于校准的机器人程序

› Commissioning and training
调试和培训

Not included / 不包括

4 Robot / 机器人

5 Robot controller / 机器人控制器

BizLink unracking solution (technical data)

Sensor type	Laser + ultrasonic
Interface	Field bus (DeviceNet, Profibus, Profinet, etc.)
Calibration accuracy	0.1 mm
Protection class	IP65/67
Dirty surroundings	Yes
Dimensions	6 (3 translations + 3 rotations)
Automatic correction	Yes

下料解决方案 (技术数据)

传感器类型	激光+超声波
接口	现场总线 (DeviceNet、Profibus、Profinet 等)
校准精度	0.1 mm
防护等级	IP65/67
污浊环境下工作	是
维度	6 (3 次平移+3 次旋转)
自动校正	是

Fields of application

Unracking of side panels, roofs, bonnets (hoods) or similar parts

应用领域

侧板、车顶、发动机罩 (引擎盖) 或类似零件的下料

Gripper measurement / 抓手测量

The challenge
To measure grippers or gripped parts for precision handling, e. g. for power-train applications, such as engine and transmission parts. Also applicable as crash recovery system.

挑战
要测量抓手或抓取部件以实现精确处理，例如，用于发动机和传动部件等动力总成应用。同时，还要适用于故障恢复系统。

The laser detects geometrical features of the gripper.
激光检测夹具的几何特征。

The solution
• 6D laser measurement of grippers / gripped parts using stationary sensors
• Changes in the gripper / part position are detected early and corrected online. This avoids collisions and optimises precision positioning.

解决方案
• 使用固定传感器对抓手/抓取部件进行 6D 激光测量
• 尽早检测抓手/零件位置的变化并在线校正。此举避免了系统冲突并优化了定位精确度。

Part location / 零件位置

The challenge
To ensure the correct processing position of parts for precision applications such as handling, welding, sealing, milling etc.

挑战
要确保零件在搬运、焊接、涂胶、铣削等精密应用中的加工位置正确。

The laser detects features such as holes, edges, curves or surfaces.
激光检测孔、边缘、曲线或表面等特征。

The solution
• 6D laser measurement of the position of parts and fixtures
• The robot path is automatically corrected according to part position to ensure processing always takes place in the correct location

解决方案
• 6D 激光测量零件和夹具的位置
• 机器人路径根据零件位置自动校正，以确保始终在正确的位置进行加工。

advintec® 6D laser measurement / 激光测量

	Controller / bus system 控制器/总线系统	Order no. 订购号
Controller incl. cables 包括电缆在内的控制器	DeviceNet™	LAM0001
	EtherNet/IP™	LAM0002
	Ethernet TCP/IP	LAM0003
	EtherCAT	LAM0004
	PROFIBUS	LAM0005
	PROFINET 2 端口	LAM0006
Sensor 传感器	Scan sensor 扫描传感器	LAM0007

Services
服务

We analyse the process conditions and work with the customer to develop an application-specific solution model to ensure optimum measurement, in the form of a feasibility study.

Depending on the level of complexity – or at the customer's request – an on-site test installation then follows, whose results we discuss with the customer. Findings from the test installation are analysed by our experienced team and accounted for appropriately in the final measurement concept.

我们以可行性研究的形式分析工艺条件并与客户合作开发特定应用的解决方案模型，以确保最佳测量。

根据复杂程度——或根据客户的要求——随后进行现场测试安装，我们与客户讨论其结果。我们经验丰富的团队对测试安装的结果进行分析，并在最终的测量概念中做出适当的解释。

Installation

To ensure that the final system runs as smoothly as possible, it is especially important that customers can rely on professional installation services. We install our sensor technology as required, either on stationary systems or robotic tools or grippers, and we also handle all of the cabling work. If special attachment components are needed, then we manufacture these for our customers.

Commissioning

During standard commissioning, our team of specialists performs commissioning of measurement functionality based on the documentation. This includes verifying settings while also ensuring the optimum level of system functionality. If required, we can also integrate our measurement system into customer PLCs (i.e. plant logic). The controller is integrated into the respective fieldbus and our software package is interfaced with the customer's robot code – i.e. our software is modified to suit customer-side programming standards.

Product training

Our product training sessions are conducted by experienced Service Technicians with extensive expertise in production processes. We also offer customer-specific training tailored to plant operators, maintenance staff and commissioning personnel.

System integration

We offer our customers a complete package of services for system integration: from the preparation of the measurement model and installation to commissioning and subsequent product training, we are responsible for every step of system integration.

安装

为确保最终系统尽可能顺利运行，客户可以使用专业的安装服务尤为重要。我们根据需要在固定系统或自动化工具或抓手上安装传感器技术，并处理所有布线工作。如果需要特殊的零件，那么我们负责为客户制造。

调试

在标准调试期间，我们的专家团队会根据文档对测量功能进行调试。这包括验证设置，同时确保系统功能处于最佳水平。如果需要，我们还可以将测量系统集成到客户 PLC （即工厂逻辑）中。控制器集成到相应的现场总线中，与此同时，软件包与客户的机器人代码接口——即我们的软件经过修改以适应客户编程标准。
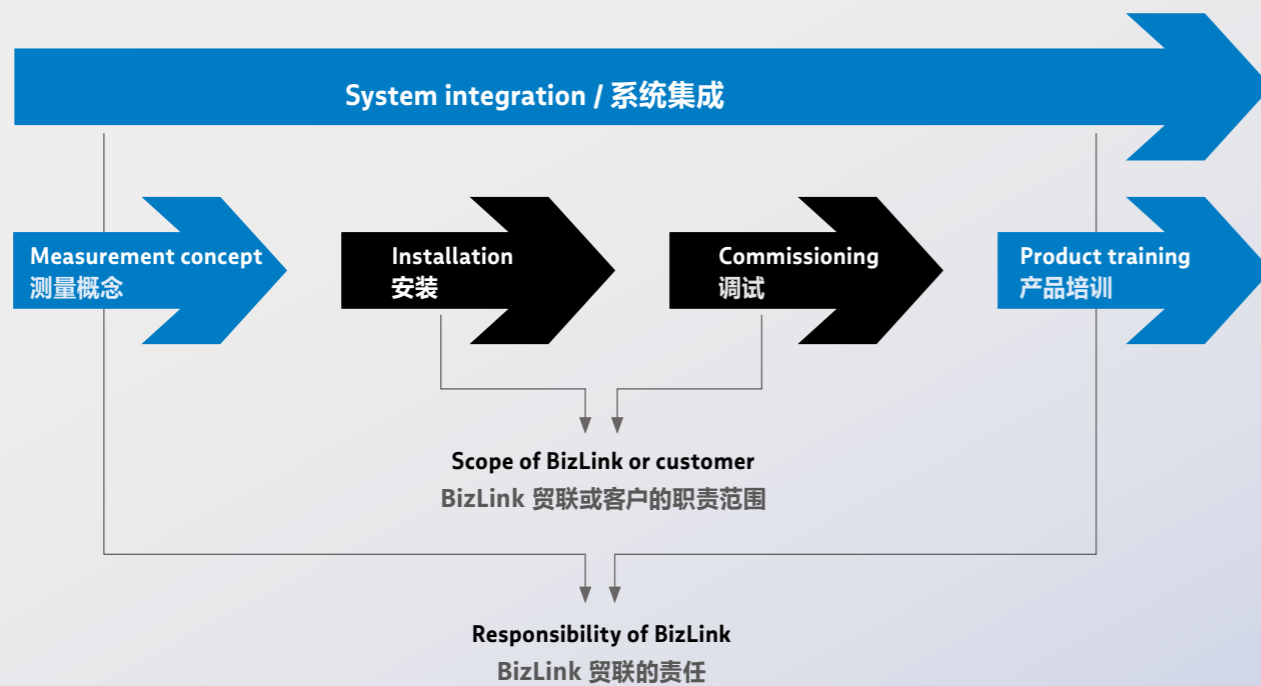
产品培训

我们的产品培训课程由经验丰富的服务技术人员进行，他们在生产过程方面拥有丰富的专业知识。我们还提供针对工厂操作员、维护人员和调试人员的客户特定培训。

系统集成

我们为客户提供一整套系统集成服务：从准备测量模型和安装到调试以及后续的产品培训，系统集成的每一步我们都负责到底。

Measurement concept / 测量概念

System integration / 系统集成

Measurement concept
测量概念

Installation
安装

Commissioning
调试

Product training
产品培训

Scope of BizLink or customer
BizLink 贸联或客户的职责范围

Responsibility of BizLink
BizLink 贸联的责任

Our market area in all its diversity

FACTORY AUTOMATION & MACHINERY

With innovative solutions for intelligent energy and data management in automated production processes, BizLink has been a preferred supplier to numerous automotive, factory automation, and machinery customers worldwide for years.

工厂自动化与机械——产品的多样性

BizLink 贸联致力于为自动化生产过程提供智慧能源与数据管理的创新型解决方案，多年来深受众多汽车、工厂自动化及机械行业客户的信赖。

At our international competence centers, BizLink leads the development and manufacturing of bus cables, industrial Ethernet, and motion control cables. We also offer comprehensive cable systems and services. Our product range is further enhanced by connector development and production, along with the provision of assembled drag chains. As an active member of various associations and user organizations, BizLink stays at the forefront of industry activities, actively contributing to the advancement of industrial communication.

In addition, BizLink provides robotic cables and assemblies, hoses and tubes, dresspack systems, integration-ready robots, robot programming, and automation systems training - instructor-led or online. In response to the growing trend of digitalization, BizLink also offers integrated and intelligent sensor-based measurement solutions.

Moreover, BizLink develops customized special cables and assemblies, as well as complex cable systems. Whether it involves meeting specific requirements for mechanical durability, resistance to radiation and media, electrical transmission properties, or compliance with industry standards and norms, BizLink meets the demanding needs of various industrial applications.

BizLink has demonstrated its industrial expertise to machine builders, line and plant operators, as well as robot and measuring device manufacturers around the world. Whether your organization is a global OEM or a tier supplier, BizLink is ready to help you solve your most challenging industrial design and equipment needs.

Our strong focus on service and expanding product diversification drives us to continue developing these markets. With our broad product range, BizLink addresses market challenges through ongoing collaboration with technology leaders and user organizations, actively developing products and services to meet future trends, particularly in response to increasing digitalization.

在全球多个技术中心，BizLink 贸联研发生产总线电缆、工业以太网电缆和运动控制电缆以及电缆系统和服务。连接器的研发与生产以及拖链的预装配，进一步丰富了我们的产品范围。作为各种协会和用户组织的活跃成员，BizLink 贸联始终站在行业活动的最前沿，积极推动工业通信的发展。

此外，BizLink 贸联可提供一系列解决方案，包括机器人电缆以及相关组件、水气管、管线包系统、机器人预集成、机器人编程和自动化系统培训（现场授课或在线培训）。随着数字化的不断发展，BizLink 贸联还提供集成了传感器的智能测量解决方案。

与此同时，BizLink 贸联还开发定制特种电缆和组件，以及复杂的电缆系统。无论是针对机械耐久性、耐辐射和化学介质以及电气传输性能的特定需求，还是来自行业的标准和规范，BizLink 贸联都能满足各种工业应用的苛刻需求。

BizLink 贸联已向世界各地的机械制造商、线体商和工厂操作人员，以及机器人和测量设备制造商证明了其专业的工业知识和能力。无论您是全球OEM 厂商还是一级供应商，BizLink 贸联都随时准备帮您解决最具挑战的工业设计和设备需求。

我们对服务的高度重视和不断扩大的产品多样化促使我们继续开发这些市场。依靠丰富的产品系列，BizLink 贸联与技术领导者和用户组织持续合作，共同应对市场挑战。面对未来数字化的持续发展，BizLink 贸联积极研发新的产品及服务。

Find out more ❯
factory-automation-machinery.bizlinktech.com

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India 印度
Malaysia 马来西亚
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South Africa 南非
Argentinia 阿根廷

● BizLink facilities
BizLink Standorte

● BizLink partners
BizLink-Partner

Founded in 1996 and headquartered in Silicon Valley, USA, BizLink is dedicated to making transformative connections that bring visionary ideas to life.

BizLink 贸联成立于 1996 年，总部位于美国硅谷。凭借卓越的连接解决方案，将前瞻性的想法变为现实 。
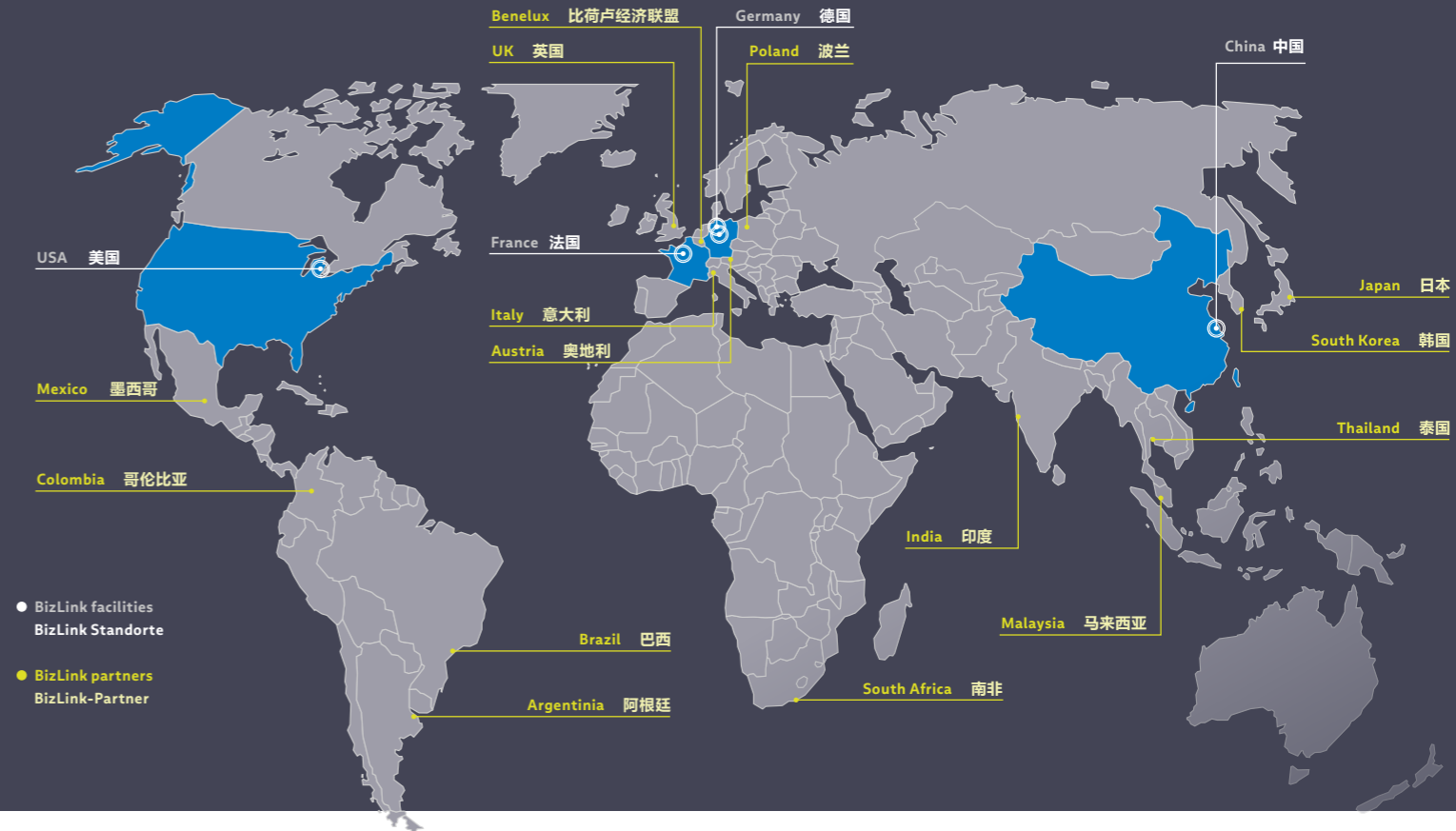
We specialize in providing essential components such as wire harnesses, connectors, and cables to a broad spectrum of industries including IT Infrastructure, Client Peripherals, Optical Fiber Communications, Telecom & Networking, Electrical Appliances, Medical Equipment, Factory Automation & Machinery, Semiconductor Technology, Healthcare, Motor Vehicles, Mobility, Marine, Industrial, and Solar Energy.

Our global presence, with flexible production resources and R&D teams across America, Europe, and Asia, allows us to proactively drive innovation and enable future possibilities.

At BizLink, our customer-centric approach and commitment to relentless advancement empower us to deliver zero-distance service and continual performance optimization, making a positive and meaningful impact worldwide. We turn possibilities into reality; furthermore, we connect possibilities to world-changing visions.

我们专注于提供创新的线束、连接器及电缆解决方案，服务于 IT 基础设施、用户端周边设备、光通讯、通讯与网络、电器、医疗、工厂自动化与机械、半导体技术、汽车产业、交通、海事、太阳能等众多行业。

我们的足迹遍布全球，拥有灵活高效的生产工厂和由美洲、欧洲和亚洲行业专家组成的全球研发团队。这赋予我们不断创新的动力和实现未来的可能性。在 BizLink 贸联，我们秉承以客户为中心的方针和不懈追求进步的承诺，为客户提供零距离的贴心服务和持续的性能优化，在全球范围内产生了积极而深远的影响。

我们将"可能"变为"现实"，与"改变世界的愿景"紧密相连。

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Where Possibilities Connect™

工厂自动化与机械

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