



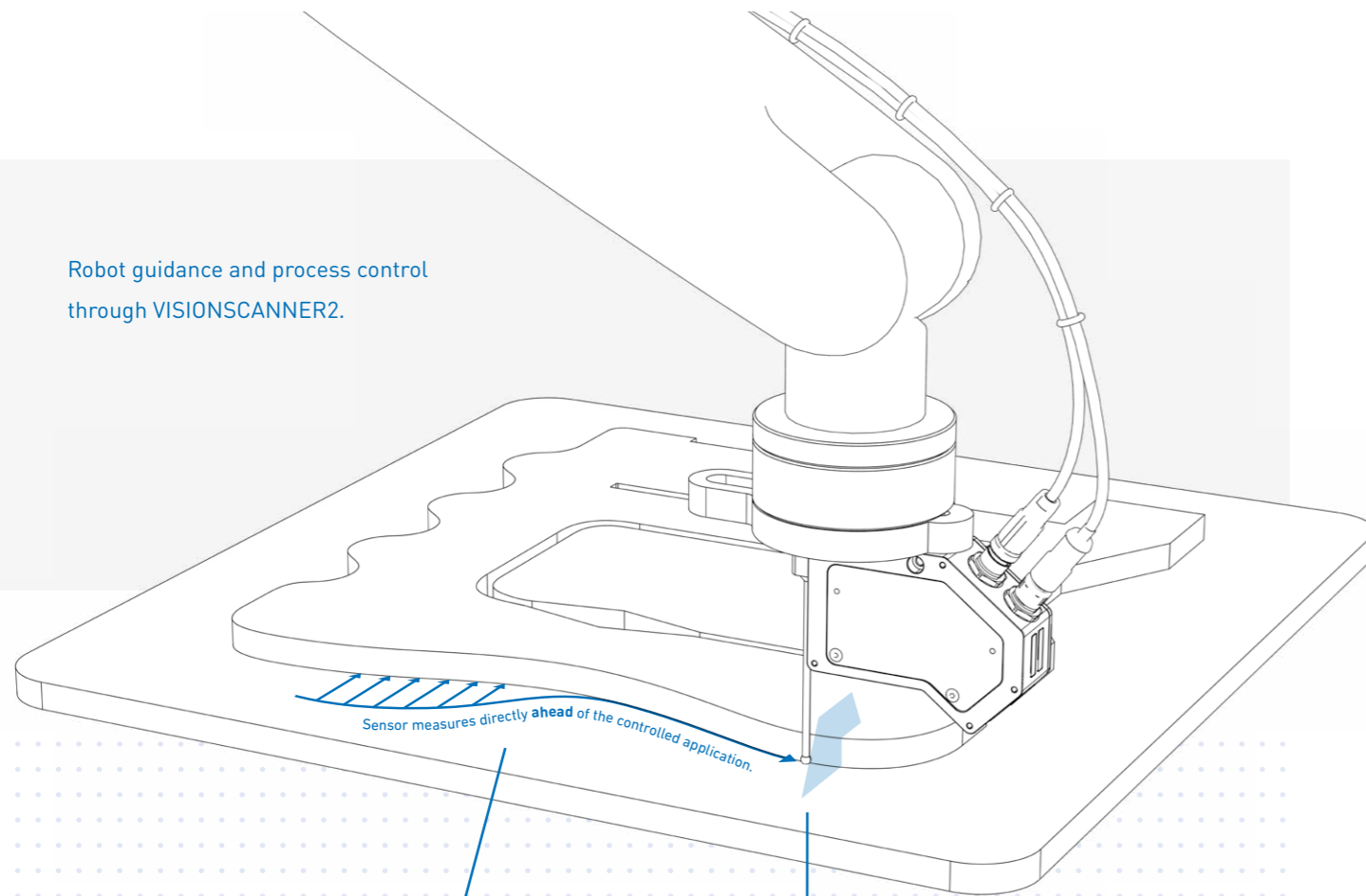
INLINE PROCESS CONTROL

.....
Robot Vision Systems

AI 

Simple by Design

Robot guidance and process control through VISIONSCANNER2.



COMPENSATION OF PRODUCTION PART TOLERANCES AND POSITION

Guide your robot and attached tool with preceding VISIONSCANNER2. Position and tolerances of the production part are compensated in real time.

CONTROL YOUR PROCESS OR PATH APPLICATION

Whether adhesive application, brazing or welding: Control your application tailored to your needs. Therefore use the arbitrary process parameters (e.g. effective gap area or width of the gap) to control the volume of adhesive or filler metal.



Guide and control your path application process through the assist of **INLINE PROCESS CONTROL** by AI. Whether adhesive application, brazing process or welding application, **VISIONSCANNER2** identifies precisely any correction and process data and communicates those real time to the robot.

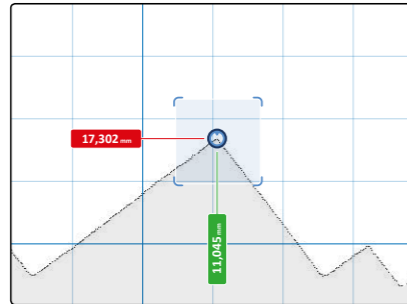
- 6D correction through continuous recording of the predetermined geometry for guidance.
- Real time correction through continuous generation of measuring data every 12 ms.
- Compensation of part position and tolerances.
- Additionally integrated process control system through configurable process parameters (e.g. area between gaps)
- Control system for avoidance of swing up.
- Orthogonal orientation of tool to application path.
- Compensation of application indolence through predetermined distance of sensor to application and accurate adjustment per parameter of software.
- Low maintenance: In case of a defect sensor, a simple exchange (see "commissioning and maintenance") is required.

INLINE PROCESS CONTROL

AI° VISIONSCANNER2 is being delivered with multiple measuring tools. Thereby it solves most of your measuring tasks already.

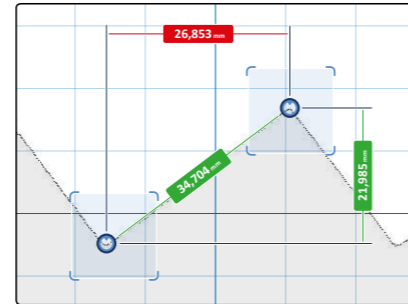
POSITION

E.g. increase the positioning accuracy of your production process.



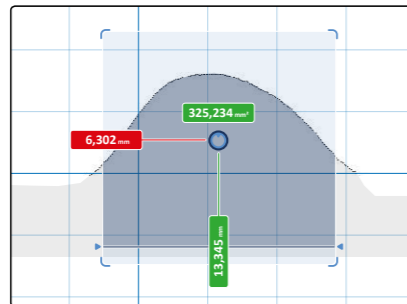
RELATION TWO POINTS

100 % checks of important dimensions of your product.



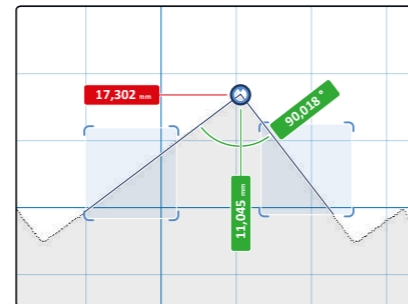
AREA

E.g. regulation of adhesive load during application.



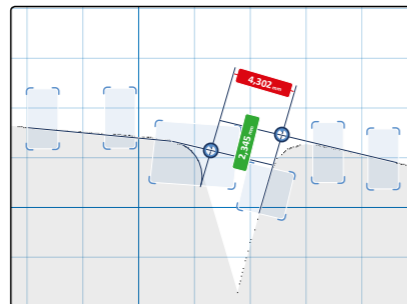
ANGLE

Secure e.g. the quality of your bending process.



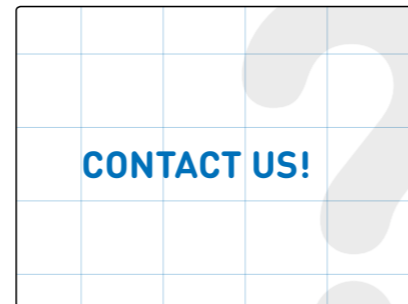
GAP

Track e.g. the accuracy of assembling automotive closures into a car body.

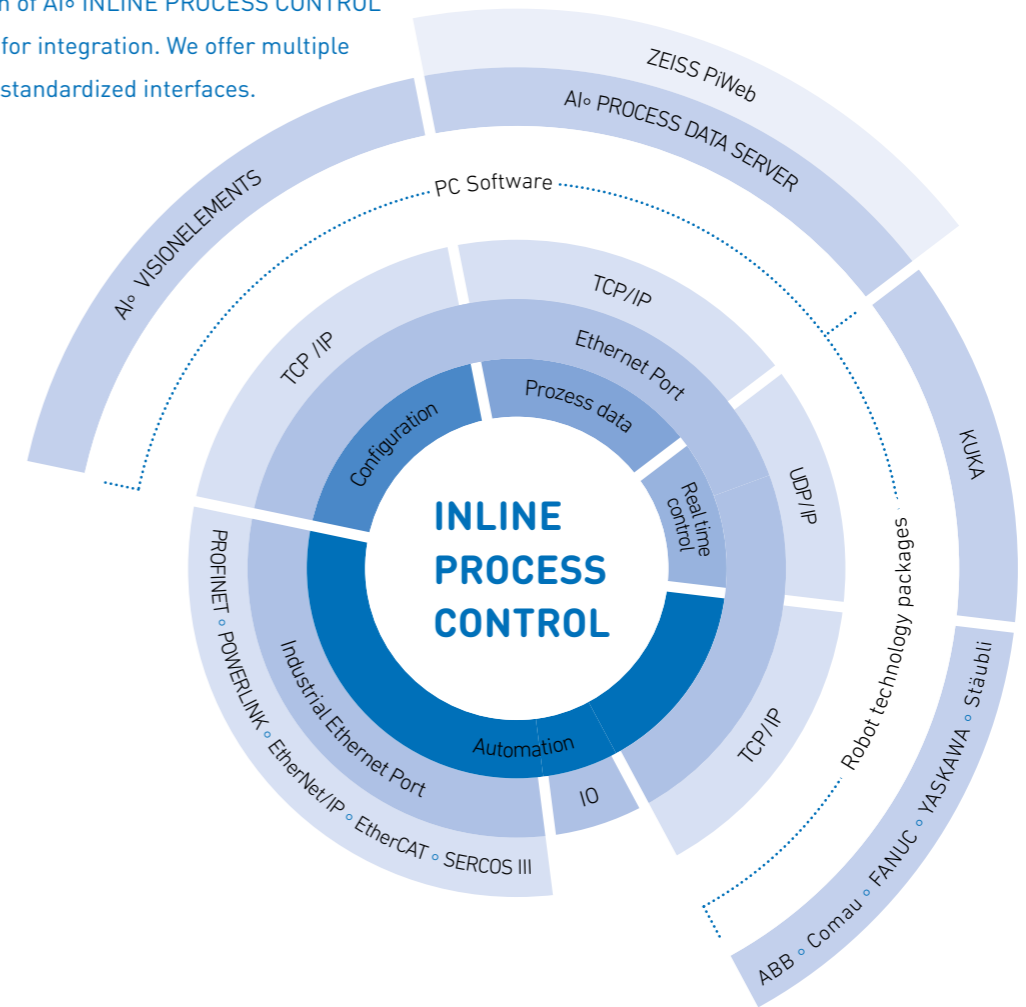


YOUR TASK

We develop customized solutions for your needs.



The strength of AI° INLINE PROCESS CONTROL is its ability for integration. We offer multiple industrially standardized interfaces.



The IPC requires the technology option KUKA.RobotSensorInterface (RSI) for real time control of the process.

..... Software products or software options which need to be installed on a robot or PC.

AUTOMATION INTERFACE TCP/IP • INTERFACE

Robot Manufacturer	Supported Controllers	Mandatory Options
KUKA	KRC2, KRC4, VKRC2, VKRC4	KUKA.Ethernet KRL XML
Stäubli	S7	-
FANUC	RJ3iB, R30iA, R30iB	SKMG Socket Messaging, R648 User Socket Messaging
ABB	IRC5	PC-Interface Option 616-1
YASKAWA	DX200	MotoPlus
Comau	C5G	PDL2 Read/Write on TCP/IP

ROBOT INTERFACE • INTERFACE

Robot Manufacturer	Supported Controllers	Mandatory Options
KUKA	KRC4, VKRC4	KUKA.RobotSensorInterface

Put your measuring, control or robot guidance task in effect within shortest time. Therefore a fully integrated, graphical user interface is at your disposal. Programming skills are not required. Keep the system under control and use data from a previous period for analysis.

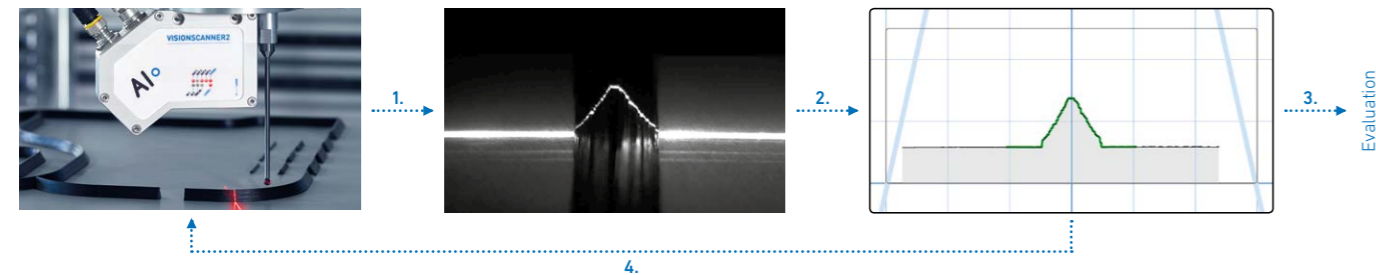
LIVE VIEW
Configure your measuring tasks online based on live data.

GRAPHICAL PARAMETER SETTING
Fast and precise system configuration through intuitive graphical setting of parameters.

DATABASE OF DEFECT CHARACTERISTICS
Control and optimize your measuring tasks offline based on saved measuring data.

MEASURING AND CONTROL DATA
The graphical visualization offers a simple overview over measuring and control data.

AI° VISIONSCANNER2 uses multiple mechanisms to ensure a robust profile reading. Thereby it is perfectly applicable also to difficult measuring tasks in today's production environments.



- 1. BANDPASS FILTER**
Reduction of system errors incidence of extraneous light.
- 2. ROBUST EXTRACTION OF LASER LINE**
Automatic resolution of ambiguity by reflection or scattered light. Extraction of the laser line simultaneously between light and dark lines.
- 3. PREPROCESSING OF PROFILES**
Morphological filter for elimination of flaw.
- 4. DYNAMIC ADJUSTMENT OF LIGHT EXPOSURE**
Verification of line intensity in a defined area of the measuring location. Adjustment to optimal illumination also for scanning processes.

Within only few steps AI° VISIONSCANNER2 is fully integrated into the automation environment. Next to simple mechanical and electrical setting, the development has been carried out specifically in regards to network configuration and creation of measuring programs.

1. MECHANICAL INTEGRATION
For repeatedly accurate mounting, VISIONSCANNER2 is positioned through two centered bushes.

2. NETWORK CABLE
VISIONSCANNER2 is being configured through network interface, but also connected to the superordinate controls system (PLC) or a robot.

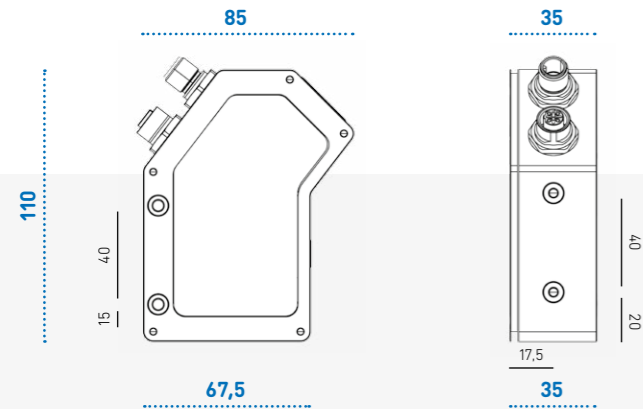
3. CONTROL CABLE
The sensor is being powered through a control cable. The digital input and output plugs ensure a very simple integration into the automation environment and the trigger inputs and outputs allow for a synchronized set up with multiple sensors.

4. SERIAL NUMBER
At set up or exchange of the sensor, just select the sensor with its dedicated serial number. The network configuration of the specific sensor is automatically adjusted to preset configuration.

5. CONFIGURATION
After mechanical and electrical commissioning of the automation environment, measurement tasks can be created. The integrated automation interface can be configured. Now, measuring tasks can be triggered by the superordinate system and measuring and control data can be drawn. Extended feature is the process data interface, which allows for control of the measuring process and specifically the quality of the product being measured.

6. REFERENCING
One important step during commissioning and exchange of the VISIONSCANNER2 is the referencing of the system. Thus, inaccuracy is equalized through this process. Referencing is mandatory, if VISIONSCANNER2 is set up to measure the position of an object or if multiple sensors are used for one coherent measuring system.

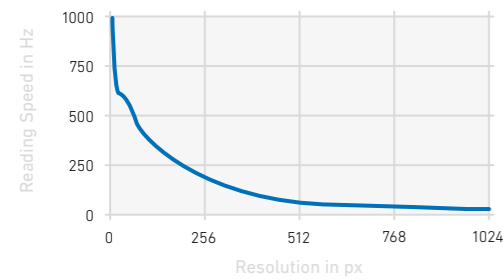
Production line network
Digital input
Trigger input
Digital output
Trigger output
Power supply



Sensor Technology	CMOS Sensor
Reading speed	up to 500 Hz
Measuring accuracy	± 0,2% of measuring field, depending on feature and surface property
Laser	Laser Class 1 at 660 nm
Lifetime laser	40,000 h (independent from cycle of operation)
Interface	Fast Ethernet 10/100 Mbit, Half-/Full duplex, Auto negotiation
Power supply	24 V DC, max. 400 mA

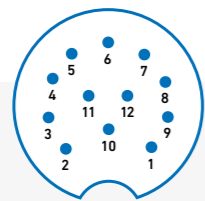
Size	110 x 85 x 35 mm
Weight	ca. 400 g
Protection class	IP64
Housing	Aluminium, eloxated
Environmental conditions for warehousing	-20 up to 60 °C, humidity max. 90 %
Environmental conditions during operation	0 up to 55 °C, humidity max. 80 %
Registrations	CE, UL

READING SPEED • TECHNICAL DATA

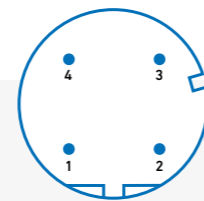


Resolution in px	Reading Speed in Hz
1280 x 64	588
1280 x 128	336
1280 x 256	181
1280 x 512	93
1280 x 768	63
1280 x 1024	50

CONNECTIONS • TECHNICAL DATA



Pin-No.	Signal	Comment	Pin-No.	Signal	Comment
1	OUT 2	Digital output 2	8	IN 1	Digital input 1
2	TRIG IN	Trigger input	9	+24 V DC	Power supply
3	OUT 1	Digital output 1	10	TRIG OUT	Trigger output
4	OUT 3	Digital output 3	11	+24 V DC	Power supply
5	IN 2	Digital input 2	12	+24 V DC	Power supply
6	OUT 4	Digital output 4			
7	GND, 0V	Ground, 0V power supply	shield		Pin 7 = ground connected



Pin-No.	Signal	Comment
1	Tx+	Output data Ethernet +
2	Rx+	Input data Ethernet +
3	Tx-	Output data Ethernet -
4	Rx-	Input data Ethernet -

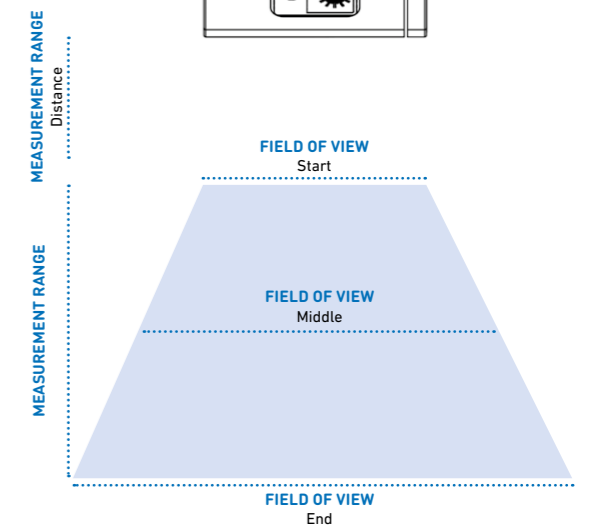
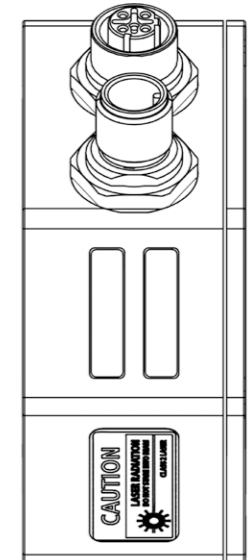
VS2-RFFAA-PPPWW-SSE



CAMERA		Code	Value
R	Resolution	L	752 x 480 px
		H	1280 x 1024 px
		U	2592 x 1944 px
F	Focal Distance	06	6 mm
		08	8 mm
		12	12 mm
		16	16 mm
A	Angle of Triangulation	30	30°
		37	37,5°
		45	45°

LASER		Code	Value
P	Power	100	100 mW
W	Wavelength	660	660 nm

INTERFACE		Code	Value
S	Control Cable	04	4-pin
		08	8-pin
		12	12-pin
E	Ethernet Cable	F	Fast Ethernet
		I	Industrial Ethernet



Camera	L0637	H0637	H1237	H1637	U1645
MEASUREMENT RANGE Distance mm	45	25	50	60	48
MEASUREMENT RANGE mm	100	250	75	50	28
FIELD OF VIEW Start mm	60	80	40	30	23
FIELD OF VIEW Middle mm	90	190	58	38	30
FIELD OF VIEW End mm	120	300	75	45	0
MEASUREMENT RANGE Resolution mm / px	0,1	0,15	0,05	0,03	0,01
FIELD OF VIEW Resolution mm / px	0,2	0,25	0,08	0,05	0,014

COMMUNICATIVE

Interface to robot or PLC through Industrial Ethernet, TCP/IP or IO

ROBUST

Automatic adjustment of illumination and reflexion compensation of the laser line for extreme conditions

SMART

No PC needed during operation

SIMPLE

Graphic configuration without programming skills

ALLROUNDER

Detection, measuring, verification and control on one device

FUNCTIONAL

User and change management, configuration and fault analysis using PC software VISIONELEMENTS.

POWERFUL

Laser triangulation is possible on almost any surface

SMALL BUT IMPRESSIVE

Suitable for industrial use, compact design

AUTOMATION INTERFACE

We know the challenges manufacturing companies have to handle complex production systems to enhance their own competitiveness. Our products offer the highest level of comfort and only need little specialist knowledge by using comfortable interfaces for various robots and control systems.

ADAPTIVE IMAGING

AI◦ stands out through optimal integration capability as well as highest user friendliness, specifically in regards to the requirements of todays complex production scenarios. The components can be integrated without special programming skills.

ARTIFICIAL INTELLIGENCE

Thanks to many years of experience in dealing with industrial robots in the automotive industry, we understand the requirements for quality and process optimization in production environments for various products. Therefore, we deliver sensors and pertaining intelligence in an integrated machine vision solution.

ALL INCLUSIVE

We offer various possibilities for our customers, from components to integrated solutions. AI◦ not only offers high value products, but also services and support for parameter setting and start up, training as well as software programming for your special requirements.

AI◦ STANDS FOR NEXT LEVEL IMAGING AND ROBOT VISION SYSTEMS OF ENGROTEC-SOLUTIONS GMBH.

AI^o

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