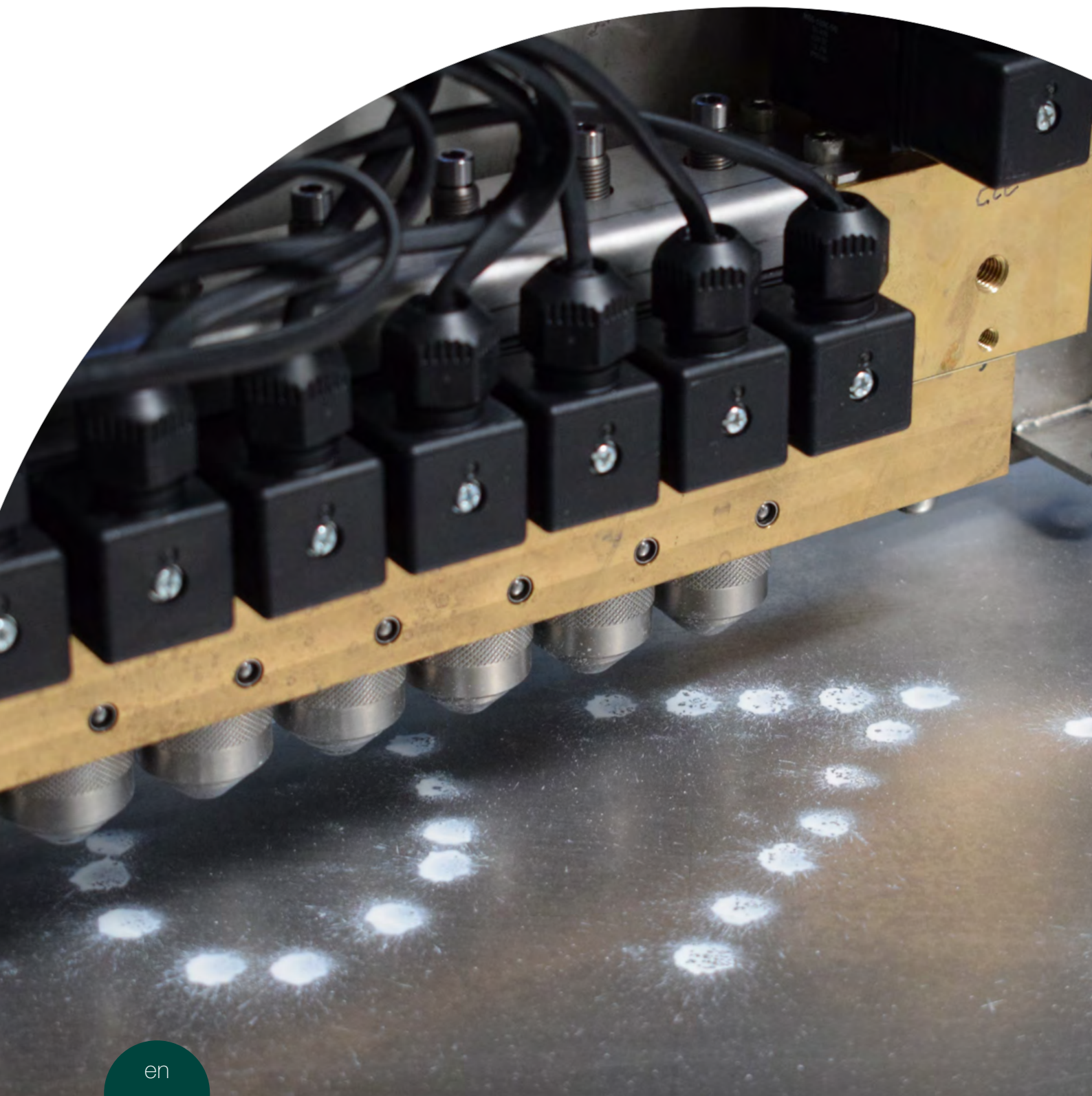# ALPINE METAL TECH
A COMPANY OF MONTANA TECH COMPONENTS AG

MARKING TECHNOLOGY

Plate production

en

Alpine Metal Tech offers high resolution marking systems for applying logos, names, codes, and symbols on plates to enable easy recognition of the steel supplier.

MARKING TECHNOLOGY

Plate production

Alpine Metal Tech offers a range of high-quality permanent and contrast marking technologies for the plate production area.

Alpine Metal Tech machines are designed to operate in harsh industrial environments, providing consistent and reliable performance even in extreme conditions. Single or technology combined marking machines ensure reliable, accurate, permanent and high-resolution identification of steel products with optional add-on features such as ID reading systems. The marking machines are available in different versions - floor, bridge, or robot type - and are customizable to meet individual customer needs, making them suitable for a wide range of applications. Alpine Metal Tech is a strong and experienced partner for our customers throughout the product and plant lifecycle. Our expertise in consulting and engineering, commissioning and service is the key to sustainable project success.

TECHNOLOGIES

» CombiJet Paint Marking (CJ)

» Electric Punch Marking (EP)

» Pneumatic Punch Marking (PP)

» InkJet Marking (IJ)

» Dot Paint Marking (DP)

» Label Marking (LB)

» PaintJet Marking (PJ)

» Laser Marking (LM)

» Colour Coding and Colour Coatings (CC)

» Combined Marking

» Smart Identification
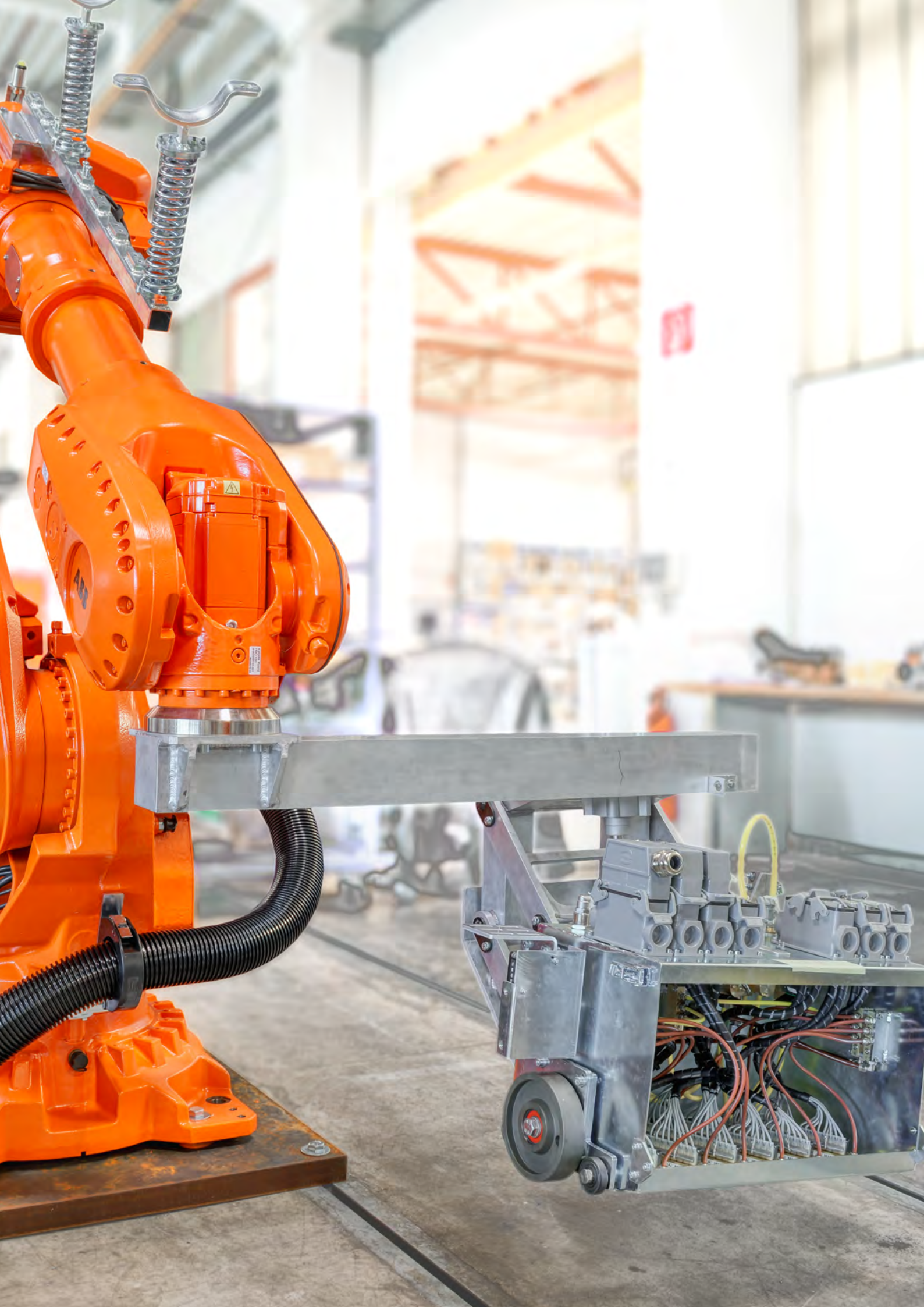
COMBI JET

CJ Paint Marking

The CombiJet Paint Marking was developed to apply clearly visible dot paint markings in high resolution. The machine technology is available in different designs to mark various product shapes and temperatures up to 400°C in harsh industrial environments.

The advanced CombiJet technology enables markings for limited space which are readable by automatic identification systems (Data Matrix codes). Also large-area markings in form of corporate logos, 2D codes, cut marks, plain text in different character sizes and styles or customized combination can be realized.

The CombiJet Marking is available as robot type, to be flexible to individual coil sizes and to fit individual requirements.

YOUR ADVANTAGES

» ## Low running costs
30 % less air consumption and 10-15 % less paint consumption compared to conventional paint marking

» ## Reduced cycle time
Up to 1.5 m/s even during conveyance of the product without stops

» ## Excellent marking quality
Higher resolution, lower drying times and less over spray compared to conventional marking technology

» ## Easy maintenance
Fully automated by-pass and cleaning sequences reduce maintenance requirements. Plug and play solution for marking section replacement without any nozzle adjustments

FUNCTION

The CombiJet technology is based on an intelligent combination of marking sections with several paint nozzles and a marking control unit. The control unit MCU200 like the CombiJet marking sections, is a proven development of Alpine Metal Tech. The interaction between the control unit and marking section provide an excellent marking quality during standstill as well as at high speed conveyance of the product. Furthermore, low maintenance needs and low running costs due to automated cleaning cycles and improvements on air and paint consumption is given.

An intelligent linking of several marking sections via one controller facilitates gapless marking images throughout all CombiJet nozzles. This allows various marking lines in different character sizes and styles (e.g. bold, italic, upside down) together with special characters (e.g. Chinese, Cyrillic, Japanese, Farsi, certification marks,...). corporate logos, 2D codes and cut markings in one area.

A selection of paint and solvent types as also the paint supply units developed for different requirements completes a smooth running machine for your demand.

Marking examples
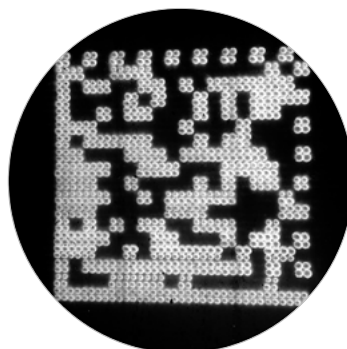
TECHNICAL DATA

|		
Machine type		floor
		bridge
		robot
Machine data	temperature range	product temperature: -10°C - 400°C
		ambiente temperature: -10°C - 50°C
	marking types	alphanumeric, logos, classification symbols, cyrillic, farsi,
		datamatrix codes (ECC200)
Marking data	character size	from 35 mm (according to individual requirements)
	dot size	5 mm
	marking head	16-96 nozzles
	number of lines	depending on number of nozzles (full flexible matrix)
	marking speed	up to 1.5 m/s
Media data	compressed air	filtered and drained
	pressure	min. 5 bar
	consumption	max. 7.5 Nm³/min
Consumables		different paint and solvent types according to field of application
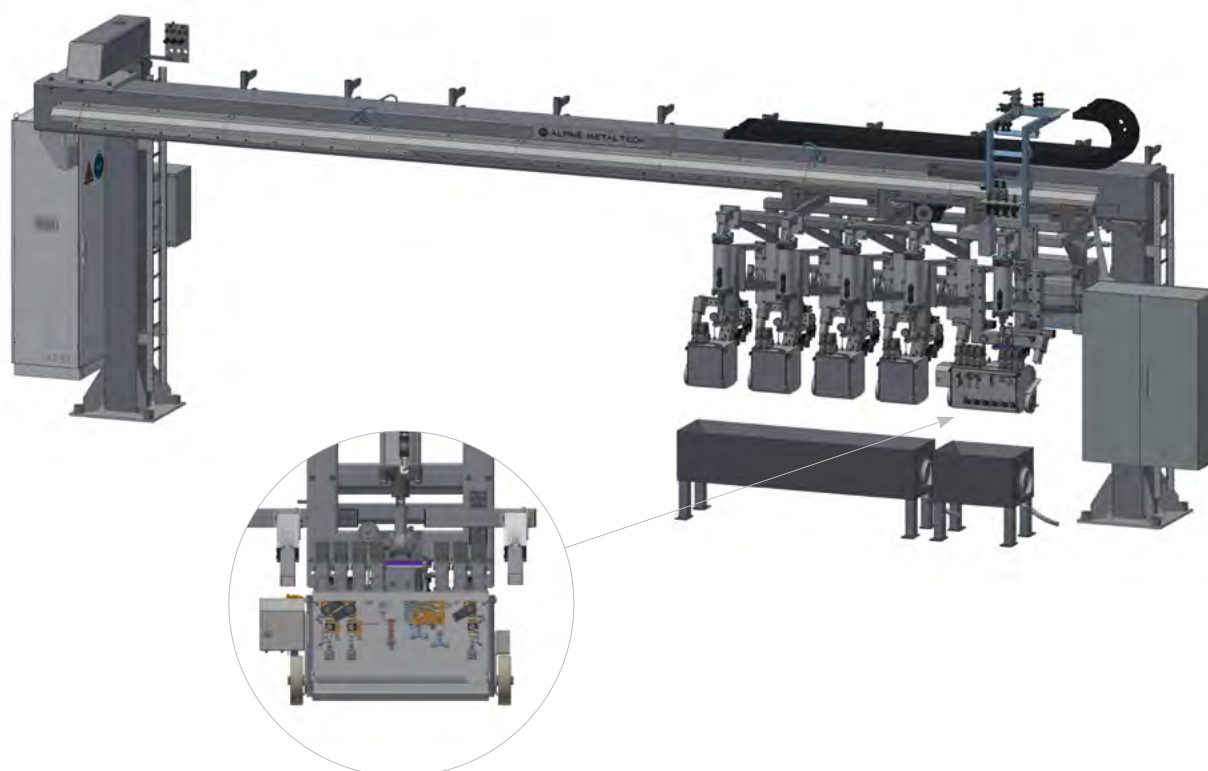
PNEUMATIC/ELECTRIC

PP/EP Punch Marking

The punch marking machines were developed for products which need to have reliable permanent markings. The adjustable punch force of these machine type allows to punch plates with different steel grades in consistent penetration depth. The punch marking can even mark hot products with up to 1100°C.

YOUR ADVANTAGES

» ## Low running costs
Punch pins can be multiply resharpened by maintenance staff

» ## Time saving
High resolution with up to 4 lines during one linear movement

» ## Permanent
Permanent marking even for steel grades with higher levels

» ## Easy maintenance
Punch pins can be easily exchanged during short stops
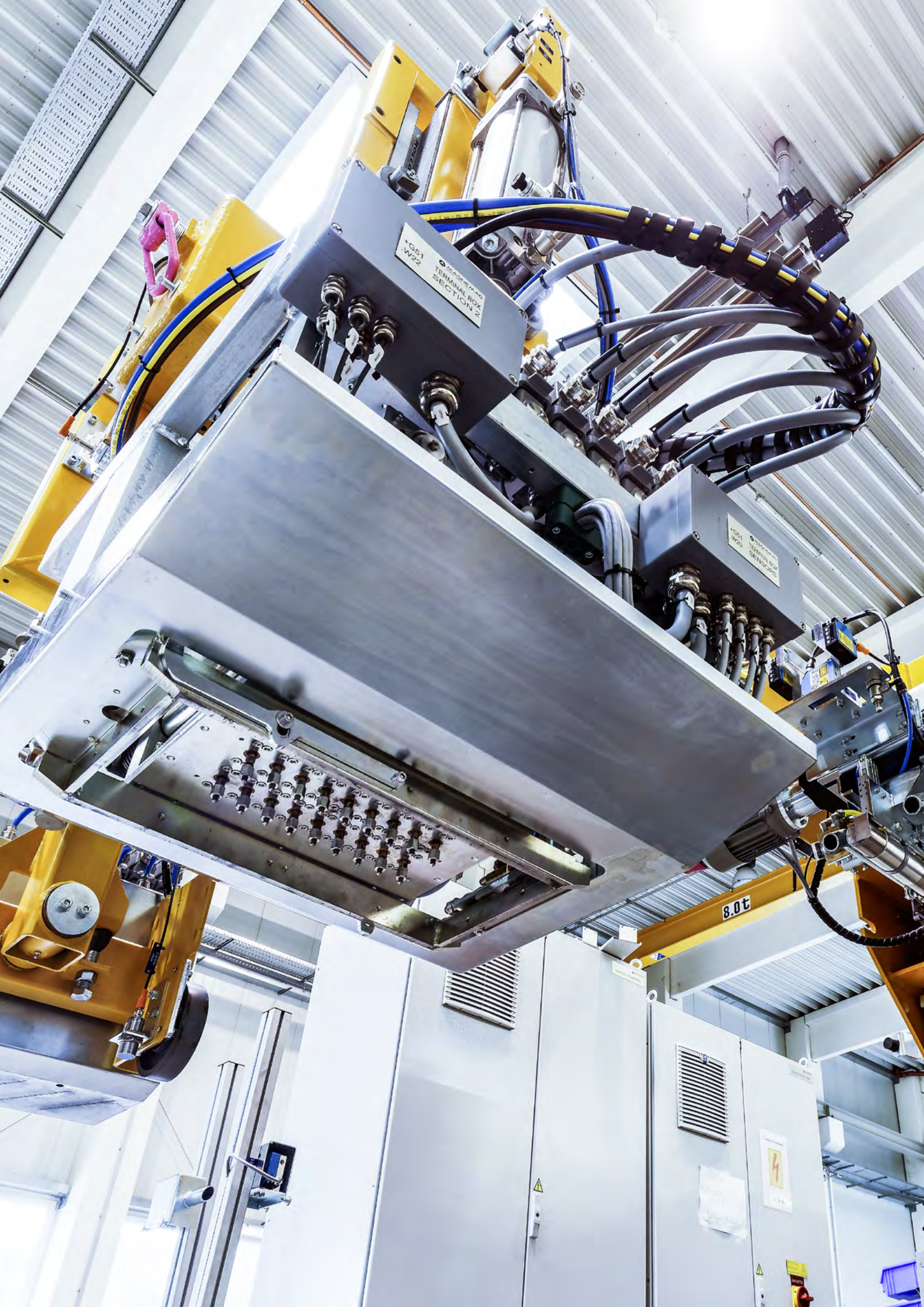
FUNCTION

Pneumatic Punch Single Needle

A single needle marking head is designed for markings at positions with little space.

The PP Pneumatic Punch Marking is used to mark uneven surfaces which require a multi-directional movement of the punch needle during the marking process. The single punch marking head is manipulated by a robot wrist to realize the character writing movement.

Pneumatic Punch Needle Section

The needle section for the Pneumatic Punch Marking is available with 9, 23 or 32 needles. A marking image with up to 3 lines and gapless logos, 2D codes or special signs in height with up to 32 dots can be realized. The whole marking image is carried out during one linear stroke only. This decreases cycle times even further.

As the exhaust air of the marking head is used for internal cooling of the marking head, an additional cooling is not required. Not even for markings on hot products up to 1100° C.

Electric Punch marking

In difference to the pneumatic puncher the control is done by electromagnetic force which activates the high power stroke of the punch pins.

The marking head is available with up to three punch sections which can be equipped with 3-9 pins each row. The marking sections move in X and Y direction within a fixed marking window, where every single pin can care for a marking field of 3.5 characters. During one marking cycle a maximum of 30 characters in up to three lines can be applied.

During marking, electrical signals are sent to the punchers of the marking head, the high timing accuracy and the high penetration force ensures consistent high quality marking. An internal cooling air arrangement takes care to prevent an overheating of the punch coils.

Marking examples

TECHNICAL DATA

|		
Machine types		floor
		bridge
		robot
Machine data	temperature range	product temperature: -30°C - 1100°C
		ambiente temperature: -10°C - 50°C
	marking types	MX1 (1 pin), MX9 (9 pins), and MX23 (23 pins)
		alphanumeric, logos, classification symbols
Marking data	character size	4 - 45 mm
	penetration	0.2 - 0.4 mm up to 700 HB
	dot size	1 mm
	marking head	9, 23, 32 nozzles, needle marking head
	number of lines	1, 2 or 3
	marking speed	up to 50 mm/s
Media data	compressed air	filtered and drained
	pressure	min. 7 bar
	consumption	max. 0.4 Nm³/min
Option		paint location dots or frames
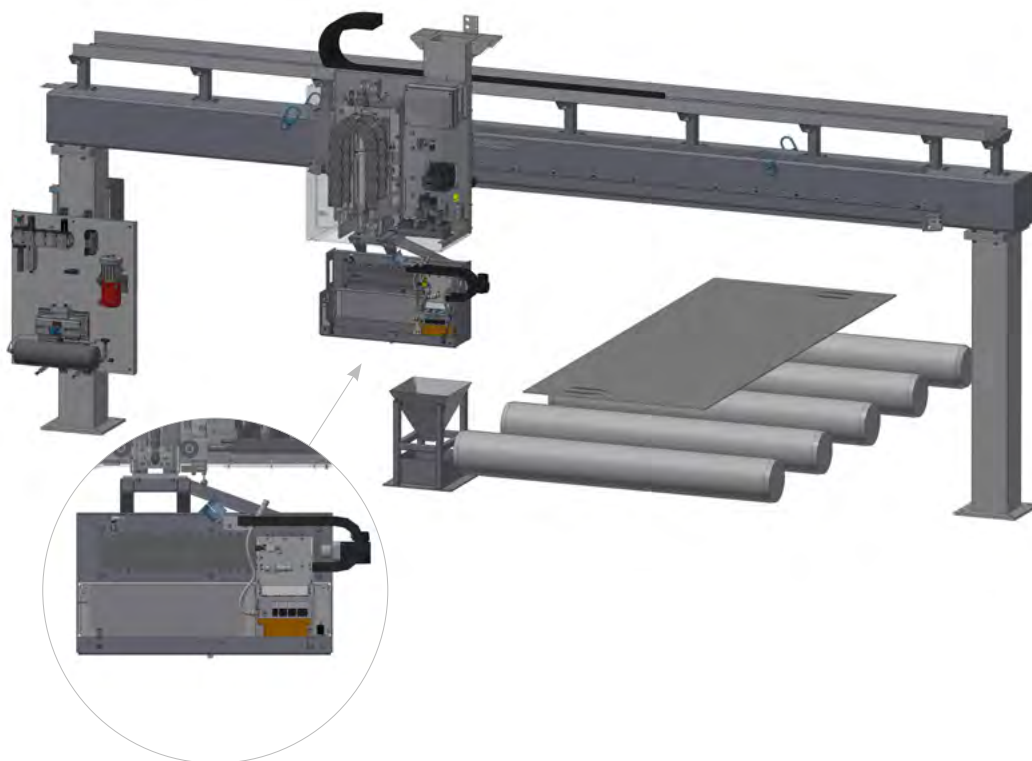
INK JET
IJ Marking

The development of the InkJet Marking enables a small sized marking option for areas with limited space. Due to the the need of high resolution marking or machine readable code markings, the InkJet marking technology is based on a printing head and its control unit which executes the marking application.

YOUR ADVANTAGES

» ## High quality on high speed
Small character sizes in perfect definition even during high speed movements

» ## Clean handling and stable ink system
Ink and solvent cartridges with automated adjustment of ink viscosity, prevents continuous ink system observation

» ## Easy maintenance
Preventive maintenance functions, on-device support videos and ink cartridge system
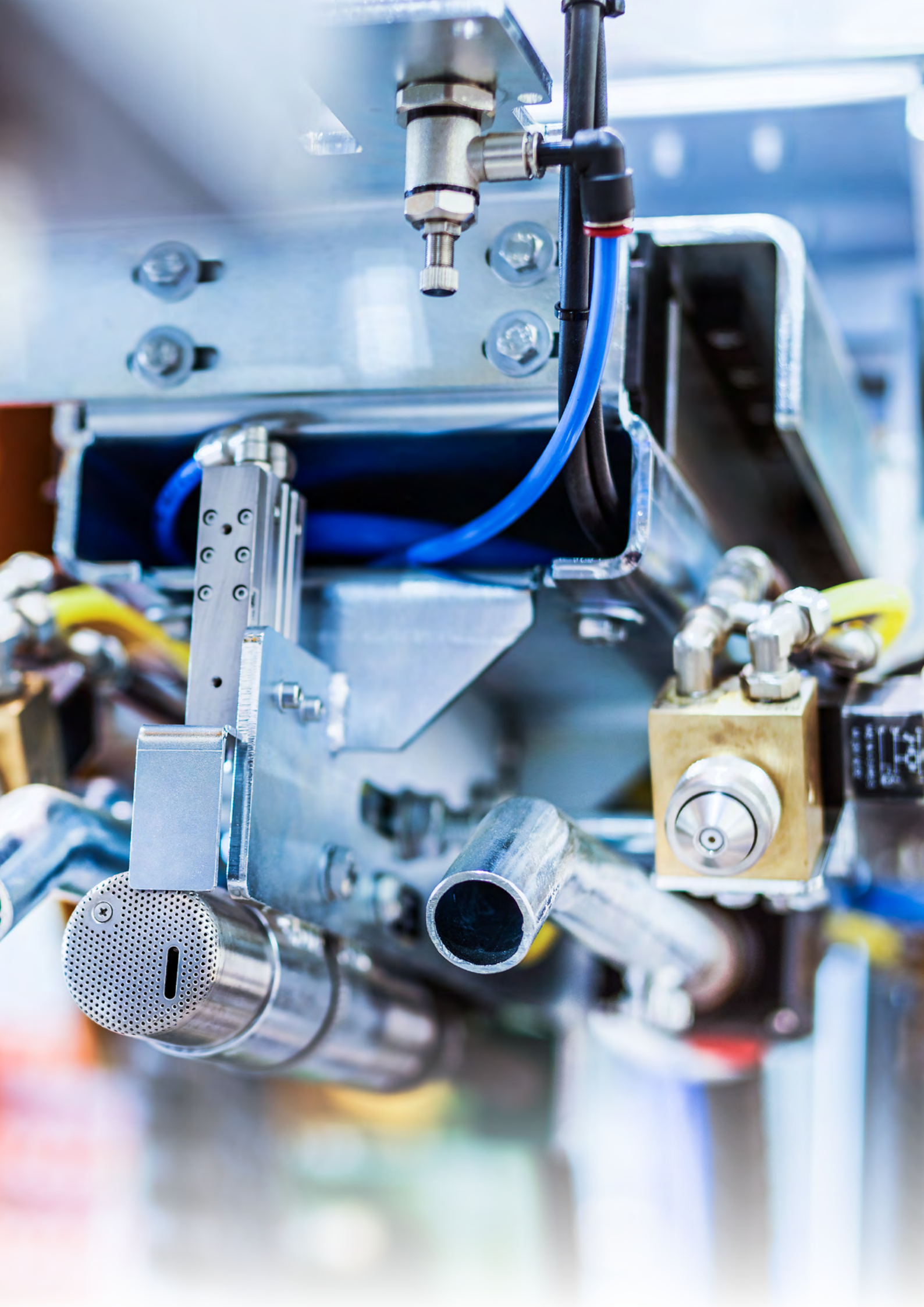
FUNCTION

The controller of the unit brings a lot of integrated functions:

- » automatic adaption of ink viscosity
- » preventive maintenance functions
- » colour display (accessible via webserver for control, setup or diagnostic needs)
- » easily accessible service modules

The ink and its solvent are located in cartridges are plugged into the controller unit. In order to change the cartridges, no contact with the consumables itselves is necessary. Clean and harmless handling is guaranteed.

To ensure a high visibility on any subsurface, a paint ribbon layer can be applied in any RAL colour. The drying time of the ribbon layer is automatically reduced by the included heating fan system. Depending on the plate temperature and layer thickness, the amount of drying sequences is adjustable to ensure an excellent marking. If requested, the marking can be varnished to secure a sea worthy of the ink marking.

Marking examples

TECHNICAL DATA

Machine types		floor
		bridge
		robot
Machine data	temperature range	product temperature: 0°C - 200°C
		ambiente temperature: -5°C - 50°C
	marking types	alphanumeric, cyrillic, farsi, chinese, logos, barcode, datamatrix code (ECC200), QR-Code
Marking data	character size	2 - 10 mm
	marking head	continuous InkJet
	marking speed	up to 4.5 m/s
Media data	compressed air	filtered and drained
	pressure	min. 4 bar
	consumption	max. 1 Nm³/min
Consumables		ink / solvent, paint for background, varnish
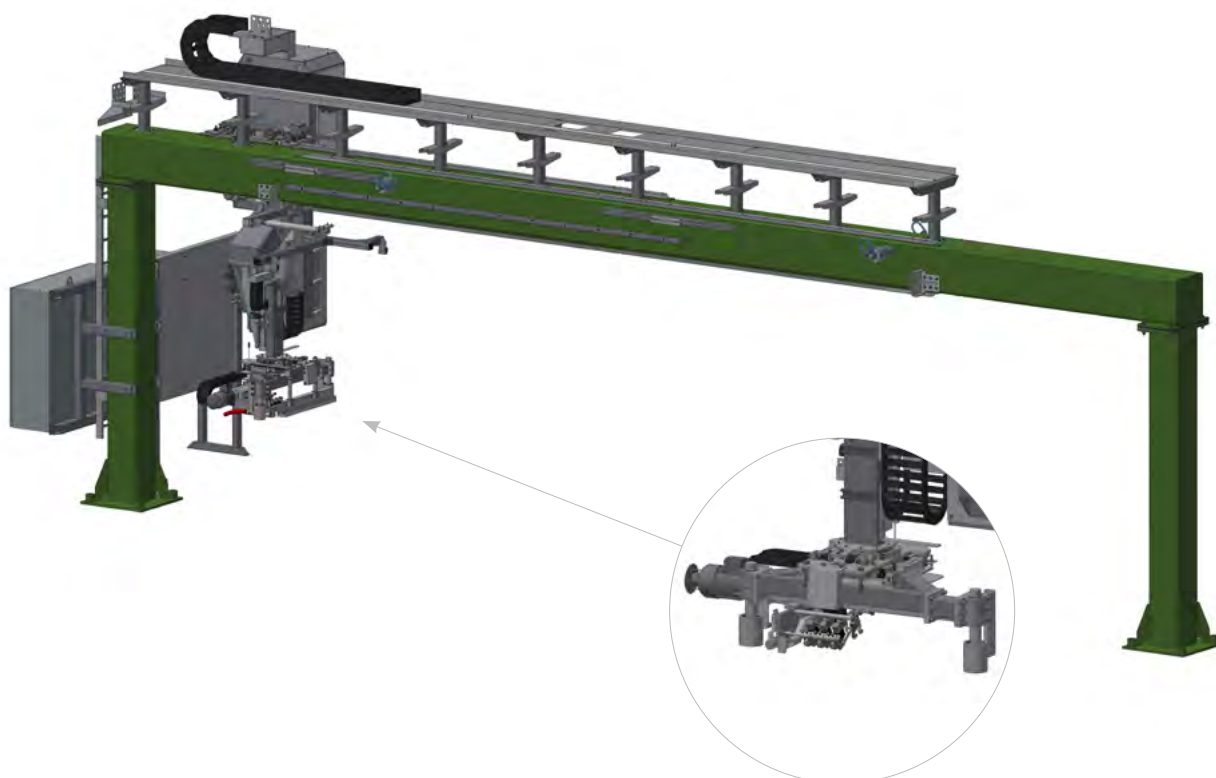
DOT PAINT

DP Marking

The Dot Paint marking machine is one of the earliest paint marking developments that has undergone numerous advancements over the years. This advanced technology is capable of marking on products, even at very high surface temperatures, and at high product moving speeds.

YOUR ADVANTAGES

» Reduced cycle time

The high marking speed enables markings with up to 1,5m/s even during conveyance of the product without stops

» Easy maintenance

Fully automated paint circulation and cleaning sequences reduce maintenance requirements.

» Fits for any demand

Useable with a variety of Alpine Metal Tech paint and solvent types for a range of temperatures up to 1000°C and customized to needs.
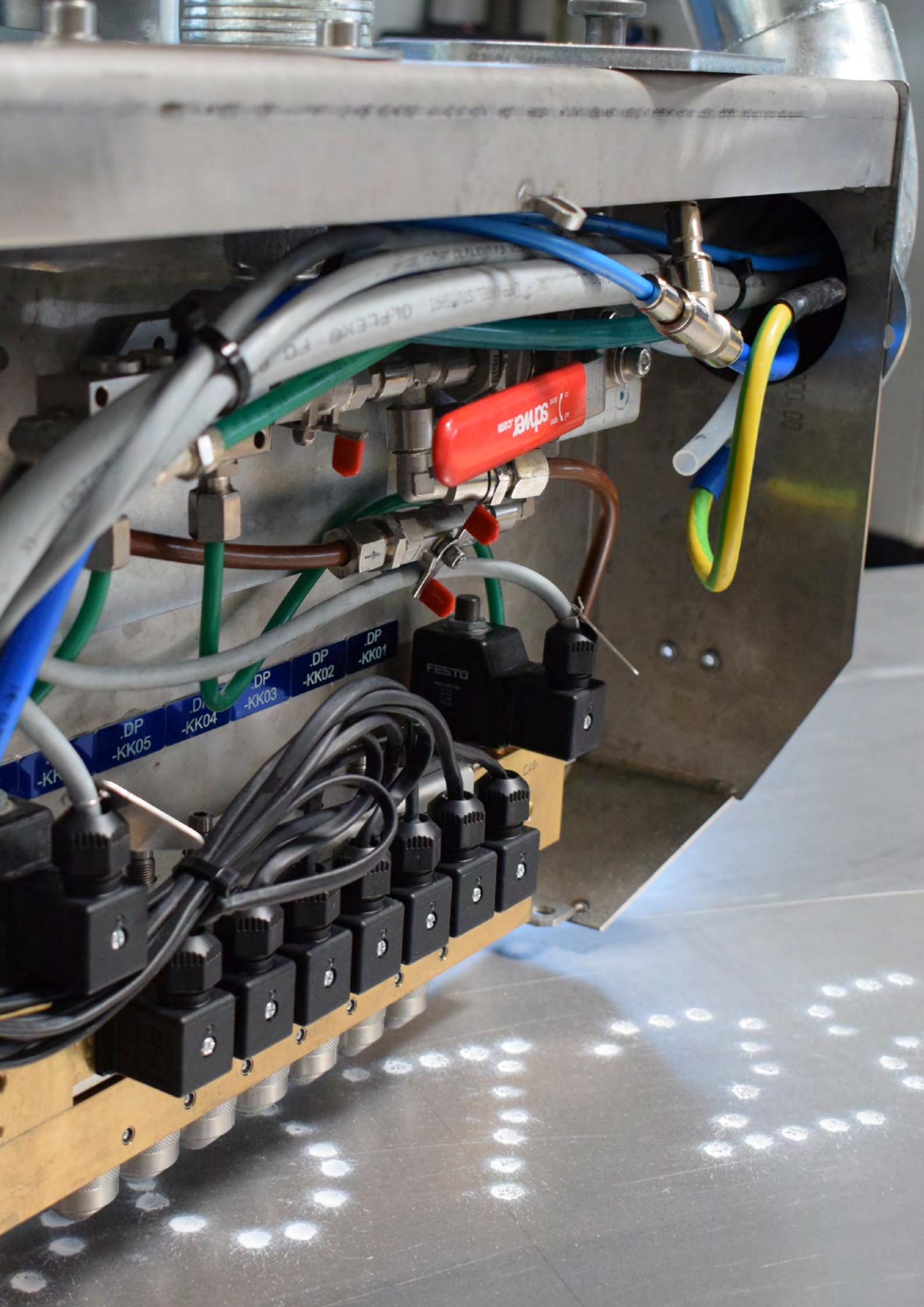
FUNCTION

The marking section is available in two different sizes equipped with 7 or 9 paint nozzles. The equipment is specialized for product markings with a request for low cycle times. The marking can be applied up to 1,5m/s during conveyance and provide a marking content of standard and special characters, logos, 2D codes and cut markings.

The marking nozzles mounted in the sections provide paint dots with an adjustable diameter of 8-12 mm.

One of the latest developments is the integration of Alpine Metal Tech's new marking control unit MCU200 which delivers a complete electric redesign of the control unit and its output cards to increase marking functionality. New communication interfaces and automated cleaning and by-pass functionalities to reduce and simplify maintenance requirements.
The development of Alpine Metal Tech's various paint and solvent types and their supply units completes the marking machine to fit to the environmental and process operational requirements.

(1)	Paint pressure indicator	(6)	Paint circulation mode
(2)	Drain	(7)	Cleaning valve
(3)	Atomizing air valve	(8)	Marking control block
(4)	Water distribution	(9)	Marking section
(5)	Paint forward	(10)	Paint nozzle
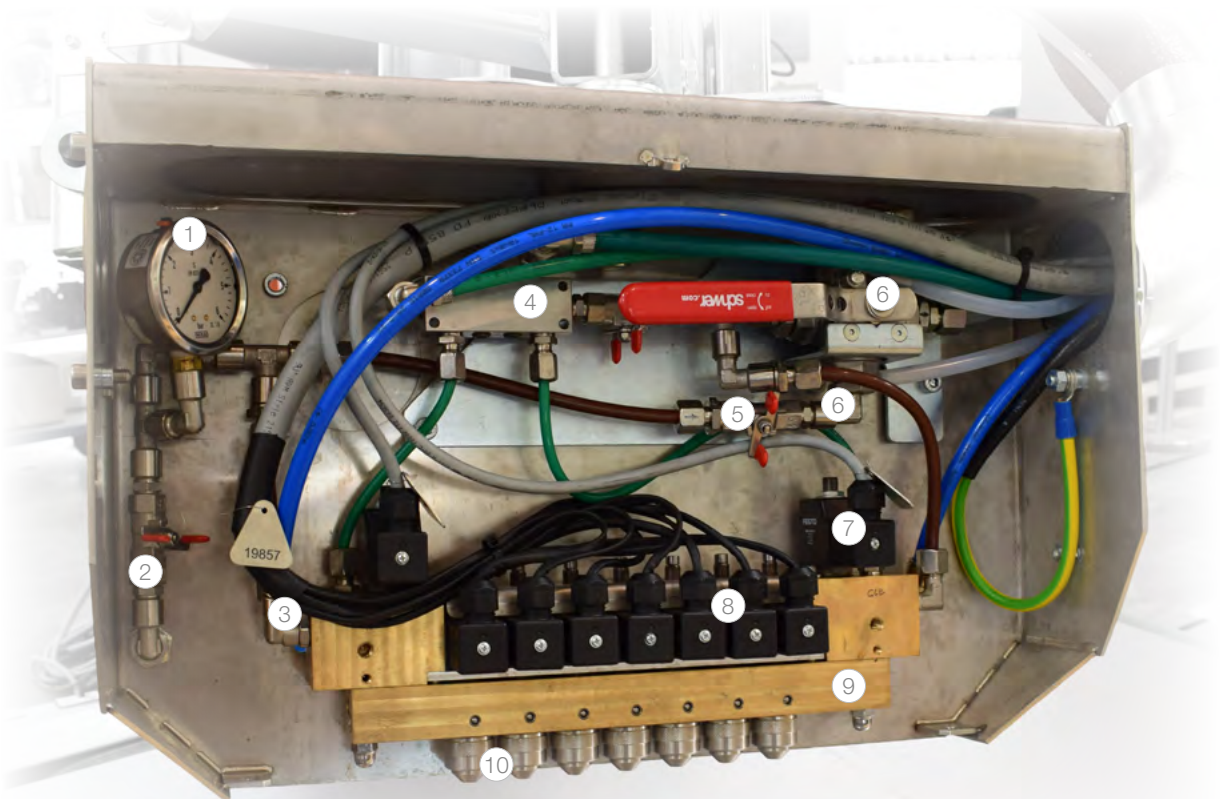
TECHNICAL DATA

Machine types		floor
		bridge
		robot
Machine data	temperature range	product temperature: -5°C - 1000°C
		ambiente temperature: -10°C - 50°C
	marking types	alphanumeric, and special characters, logos within 7x5 or 9x7
		dot matrix, datamatrix codes (2D)
Marking data	character size	50 - 200 mm
	dot size	8 - 10 mm
	marking head	7 or 9 nozzles
	number of lines	numbers of characters, lines and special sizes on request
	marking speed	up to 1.5 m/s
Media data	compressed air	filtered and drained
	pressure	min. 6 bar
	consumption	max. 1.2 Nm³/min during marking process
Consumables	paint	water based for hot products (< 1000°C)
		solvent based for cold products (-5°C - ~600°C)

Marking examples

LABELING

LB Marking

The Label Marking Machine is Alpine Metal Tech's solution for applying high information content markings accurately to different product surfaces. With temperature resistance up to 900°C, our Label technology ensures markings that are readable by automatic identification systems, such as Barcodes, Data-Matrix & QR 2D codes. Additionally, the Label machine provides a safe and efficient way of applying labels without having human action close to dangerous production areas. Also markings in the form of plain text in different character sizes and styles or customized combination can be realized.

YOUR ADVANTAGES

» ## Short marking cycles
Label picked up by the applicator before the product arrives

» ## High flexibility
Flexibility to place the labels in different positions and angles

» ## High resolution marking
Thermo-transfer printed high definition label

» ## Machine readable codes
High resolution codes readable by standard equipment

FUNCTION

The Label Marking Machine is a device that combines a label printer unit with an applicator to apply labels to various product surfaces, even in harsh industrial environments. The applicator machine picks up and transports the label to the product surface with high position accuracy. The machine offers a wide range of labels suitable for different needs and is capable of labeling even hot surfaces up to 900°C.
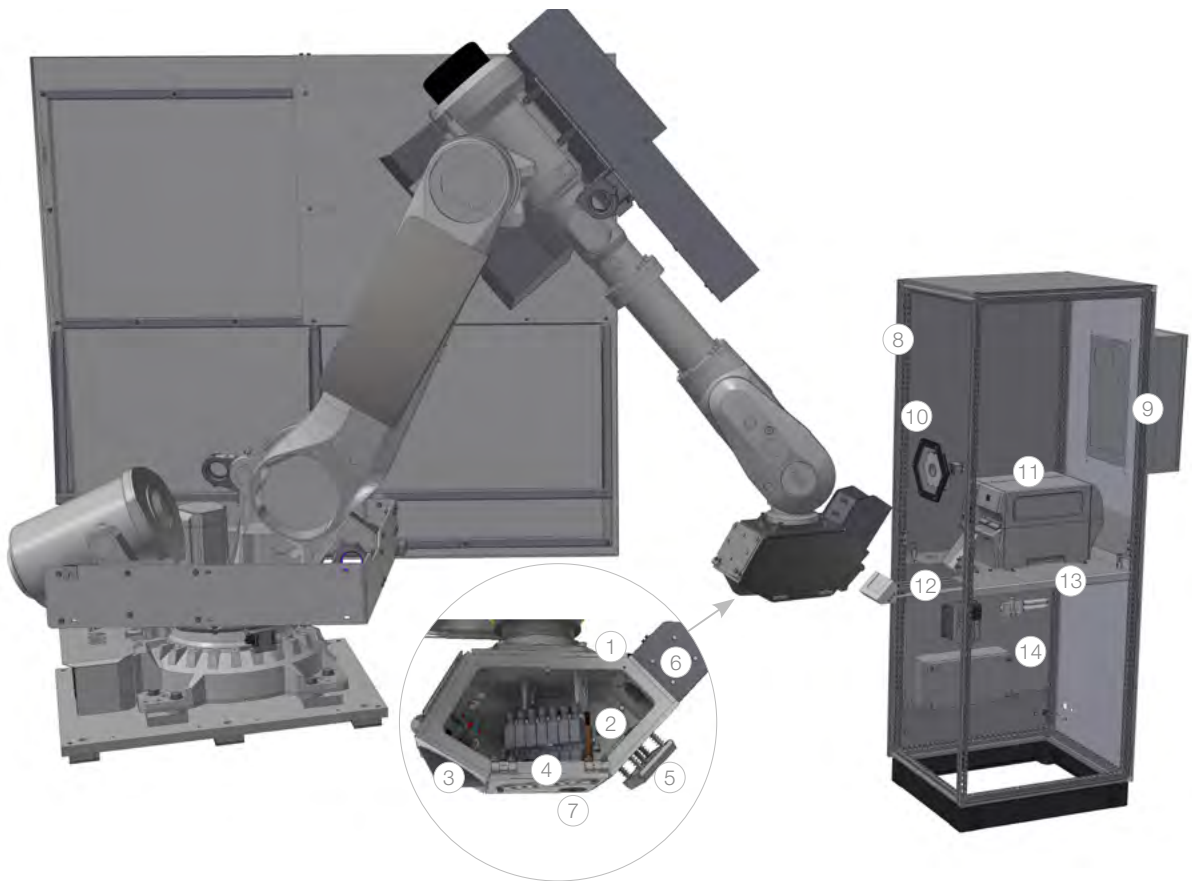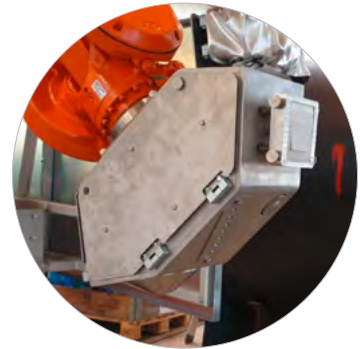
① Steel case		⑧ Printer cabinet	
② Removable cover		⑨ Cooling unit	
③ Marking nozzle - Single nozzle		⑩ Camera unit	
④ Spray nozzle - Dot Paint		⑪ Label printer	
⑤ Labeller		⑫ Vacuum generator	
⑥ Heat protection cover		⑬ Compact cylinder with guide unit	
⑦ Detection cylinder		⑭ Pneumatic panel	

TECHNICAL DATA

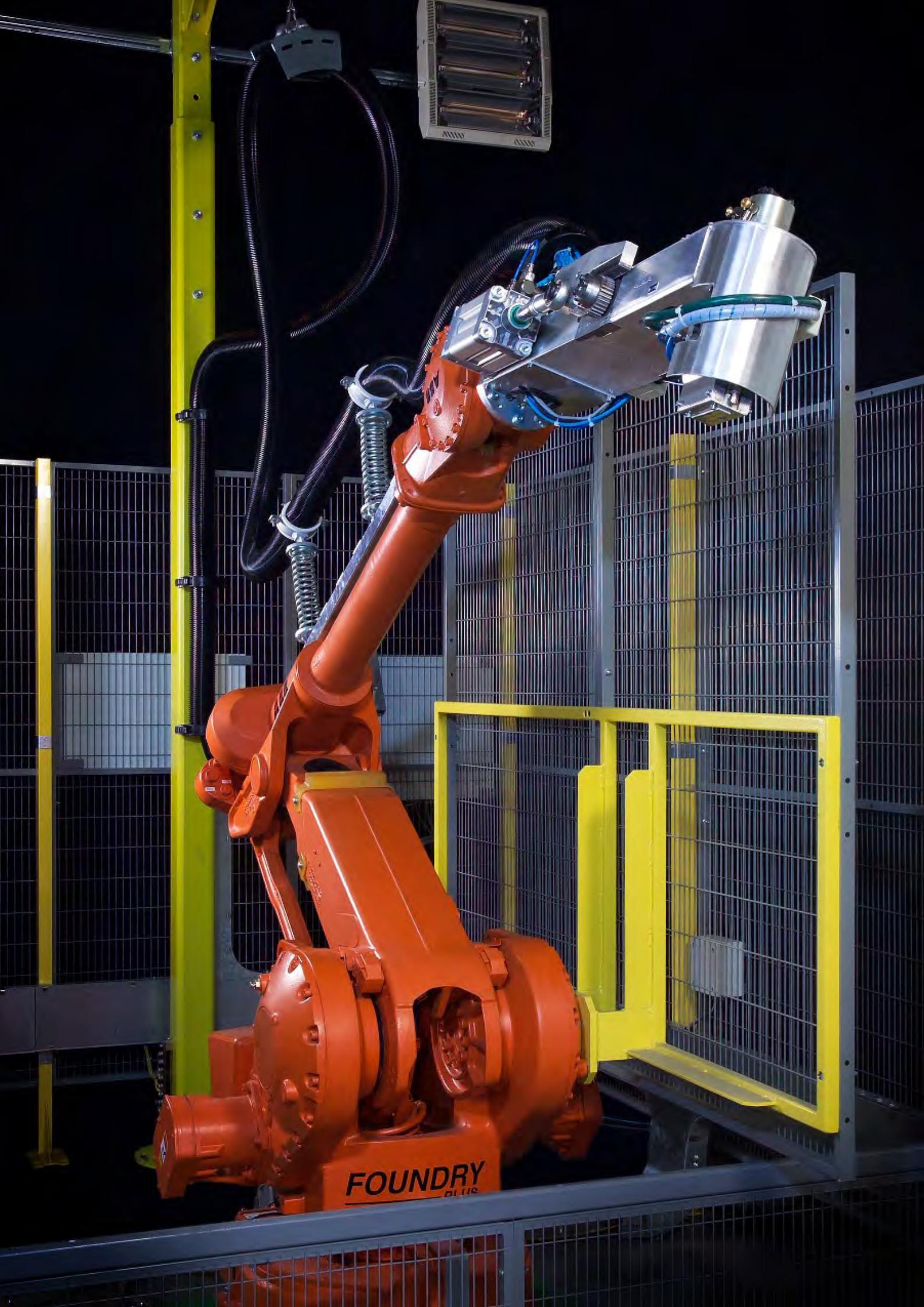|		
Machine types		robot
Machine data	temperature range	product temperature: 20°C - 900°C
		ambiente temperature: -10°C - 50°C
	marking types	printed labels with alphanumeric, and special characters, logos,
		machine readable codes (datamatrix and QR codes)
Marking data	character size	adjustable via different label printer layout templates
	marking head	vacuum label applicator
	number of lines	adjustable via different label printer layout templates
	marking speed	label is printed before the product arrives
Media data	compressed air	filtered and drained
	pressure	min. 4.5 bar
	consumption	max. 0.1 Nm³/min
Consumables		lables

Marking examples

PAINT JET

PJ Marking

The PaintJet marking technology is used for plates with a temperature of up to 100°C. The compact and light weight design allows a high quality marking even in limited space areas. The combination of its compact design and the high speed marking technology enables a high usability.

YOUR ADVANTAGES

» ## High speed
Up to 3.4 m/s marking speed

» ## Low running costs
Consumable saving due to "drop on demand" system

» ## Light and small
The weight of only 2.6 kg allows high handling performance by a robot

» ## Easy to start-up
Easy and stabilized start-up even after one week stops

FUNCTION

The PaintJet is composed of marking head, controller, pump unit and Special Tubes/Cables for components' interconnection. Marking Machine is the device which actually discharges paint from 16 nozzles to indicate characters. Its weight is only 2.6 kg, and is easy to adapt to the line facility. Connecting cables/tubes can be easily adapted and removed beside the machine case with one-touch connectors. The controller performs marking condition setting and controls marking head and pump unit in accordance with the marking data transmitted from host system (PLC). Its paint unit pressurizes and supplies paint, remover and air to the marking head.

Marking examples
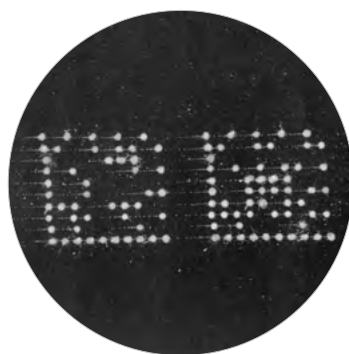
TECHNICAL DATA

| Machine type		robot
Machine data	temperature range	product temperature: -10°C - 100°C
		ambiente temperature: -10°C - 45°C
	marking types	alphanumeric, logos, datamatrix codes (ECC200), special fonts,
		16x48 dots
Marking data	character size	15-34 mm
	dot size	3 mm
	marking head	16-96 nozzles
	number of lines	1 line
	marking speed	up to 2.4 m/s
Media data	compressed air	filtered and drained
	pressure	min. 4 bar
	consumption	max. 1.0 Nm³/min
Consumables		different paint and solvent types according to field of application

LASER

LM Marking

Laser marking is an extremely versatile technology that can be used for marking of slabs, blooms, billets, plates and coils.

The technology is suitable for contrast based marking as well as engraving on hot and cold products. In many cases, marking on a previously applied paint layer provides the best results in terms of contrast and marking speed. Laser marking is unmatched in terms of marking resolution and flexibility. Apart from standard characters, which can be marked in many different fonts, it is possible to mark 1D and 2D codes as well as complex shapes and logos.
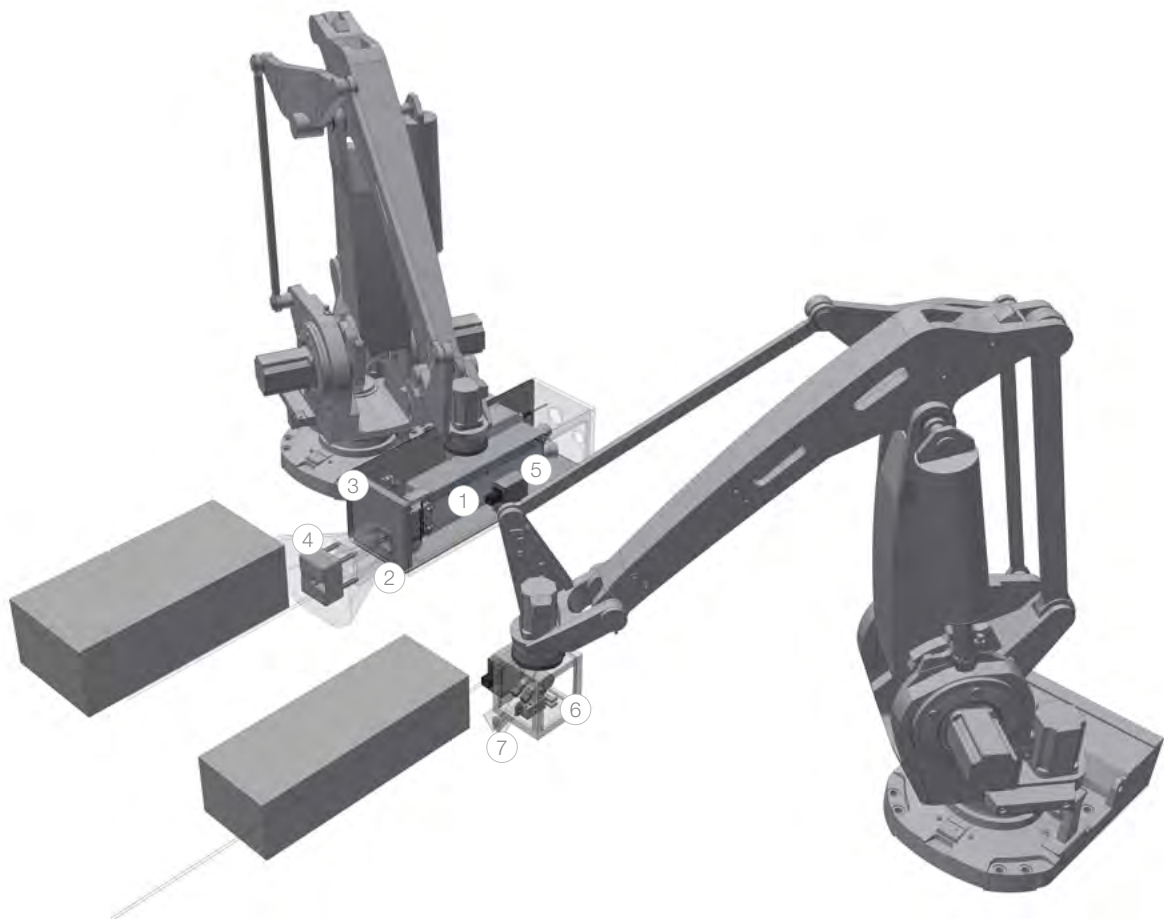
YOUR ADVANTAGES

» ## Low production costs
Laser only uses energy and has low maintenance costs

» ## High flexibility
Possibility to mark different fonts, logos as well as 1D and 2D codes

» ## Extendable
Automatic OCR reading system available
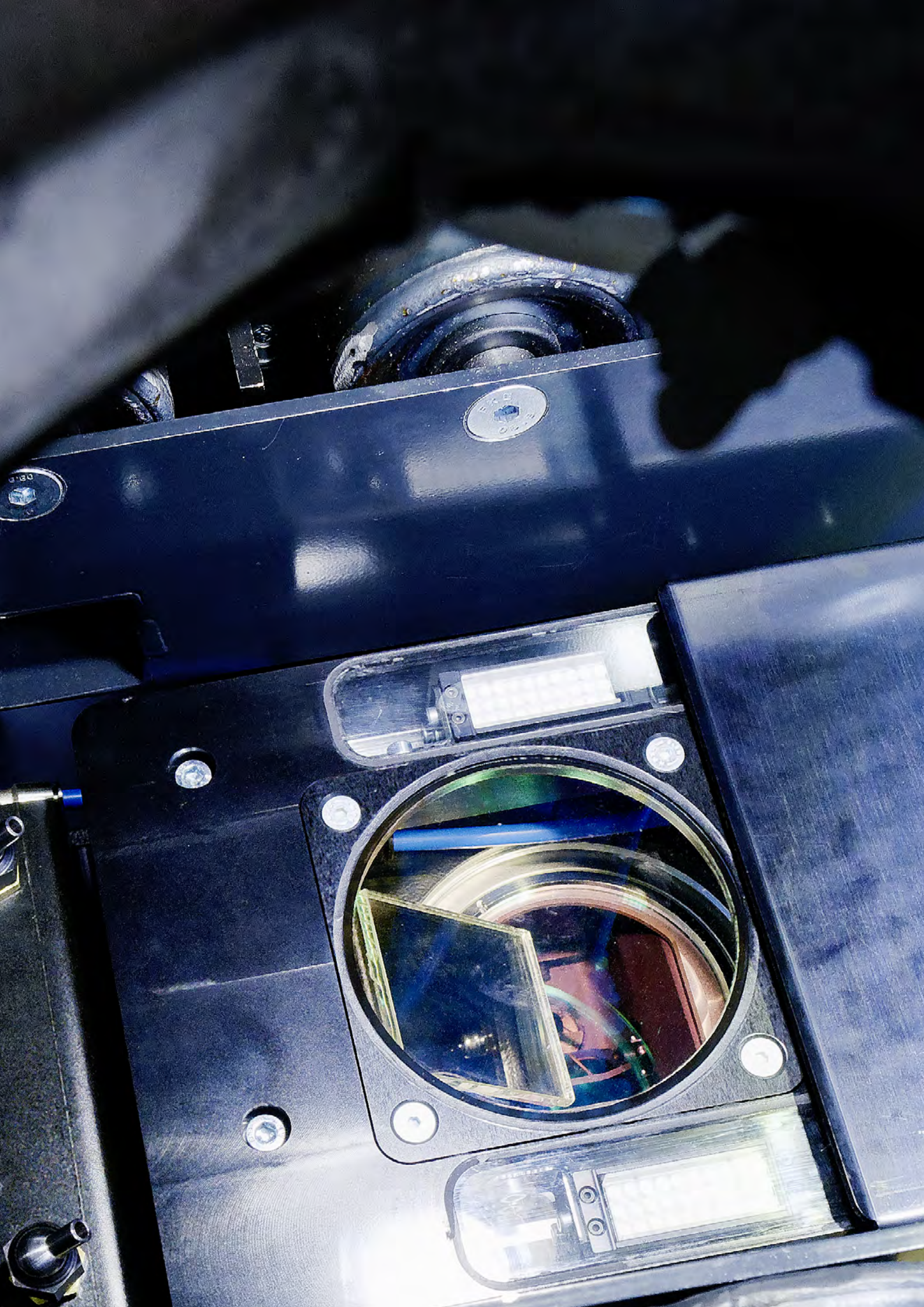
FUNCTION

Depending on the area of application, the machine can be designed as a robot version as well as a floor/bridge version. The best suited laser technology (CO_2 or solid state) and optics are individually chosen according to customer requirements and suitable protection measures are taken to protect the equipment from dust and heat. Our machines contain all additional equipment for surface preparation, such as descaling or paint layer application. Laser safety is taken very seriously and safety concepts are developed for each individual use case.

1. Laser source
2. Marking head
3. Heat protection
4. Contact flap
5. Distance laser
6. Paint layer nozzle
7. Water descaler

TECHNICAL DATA

|		
Machine types		floor
		bridge
		robot
Machine data	temperature range	product temperature: 20°C - 900°C
	marking types	alphanumeric characters, logos, 1D codes 2D codes
Marking data	character size	2mm - 300mm (limited by chosen lens)
	number of lines	no restrictions
	typical time of marking	with paint layer: 2s for 50 characters (6mm size)
Media data	compressed air	filtered and drained
	pressure	min. 5 bar
	consumption	max. 0.1 Nm^3/min during marking process
Consumables		paint for paint layer

Marking examples

# CODING & COATINGS

CC Colour Marking

Colour coding is a high effective categorization method which allows the user to recognize meanings faster than clear text. One or more stripes of colour are applied on the coil. This is done by automated spray nozzles according to requested coding position and colour selection. Colour coatings can be realized in all RAL colours, allowing individual markings. Varnish and long lasting finish is available as well.

YOUR ADVANTAGES

» ## Simple and effective
Fast recognition of categorisation for users

» ## High flexibility
Available in every RAL tone which provides unlimited colour selection.

» ## Easy Maintenance
High reliable paint units and automated cleaning functions prevent clogged.

Marking examples
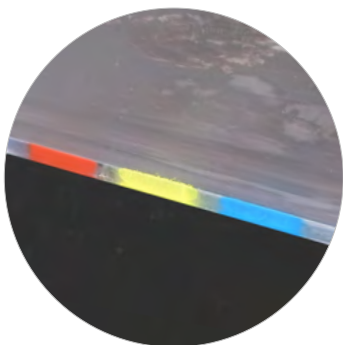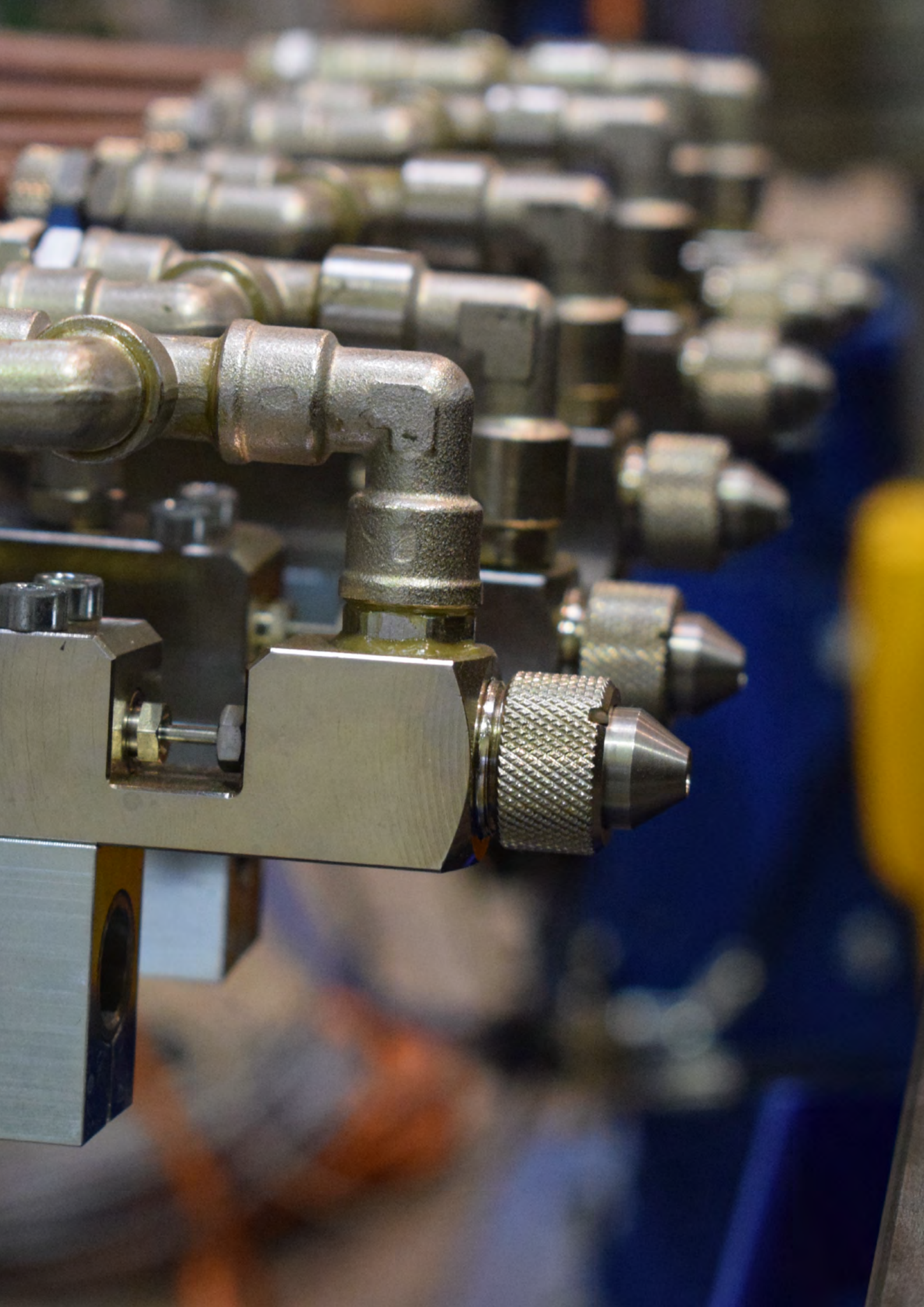
COMBINED MARKING

Combined Marking Solutions

Integrating multiple marking technologies into a single machine package offers numerous benefits, particularly when it comes to applying various marking types. By consolidating different technologies, the amount of space required is significantly reduced compared to using separate machines. Moreover, media connections and maintenance areas can all be conveniently managed at a single location, making it easier to install and maintain the machine.

To further streamline the system, interlockings and interfaces can be integrated into a master control unit for the entire machine package. This centralizes the control process and simplifies the overall system design. Overall, combining various marking technologies into one a package maximizes efficiency and productivity while minimizing the resources required.

YOUR ADVANTAGES

» ## Less space required
Variation of different marking types within one area.

» ## Various technologies - one control system
One combined power/media take over point, communication interface and diagnostic system.

» ## Optimized production flow
Less handling areas
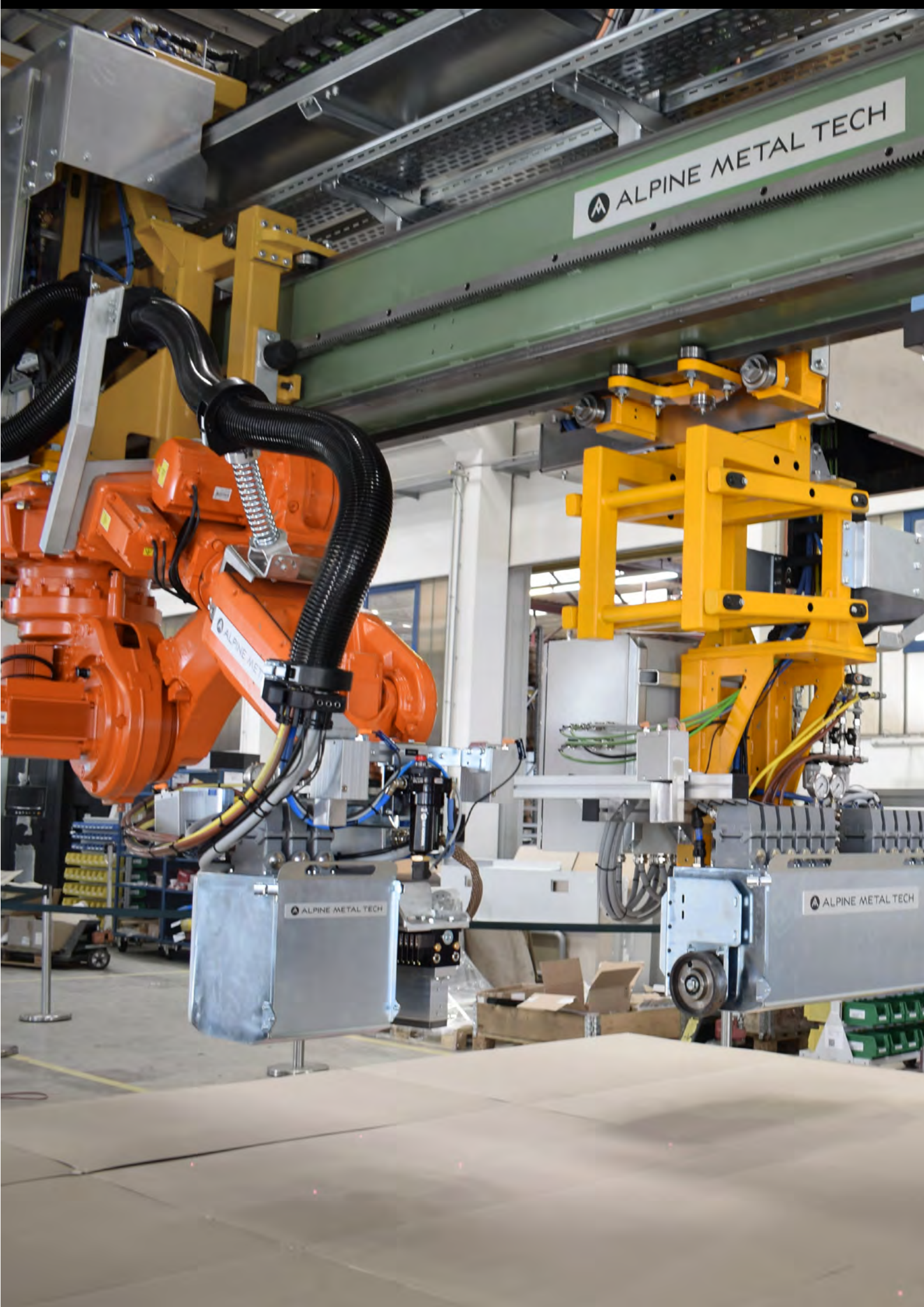
COMBINED MARKING SOLUTIONS

The most versatile modular marking system, which combines high resolution paint markings with permanent punch markings and ink jet or laser markings in one single machine. The Combined Marking technologies are available in different designs for marking complex layouts on daughter plates and finished plates.
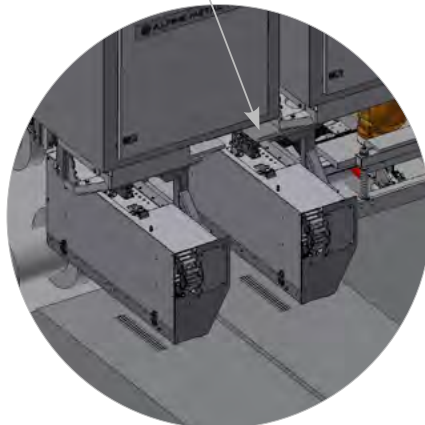
» ## One stop machine
All markings in one location

» ## Short marking cycles
Perform two or more markings simultaneously

» ## Versatile modular concept
Accommodate any individual and complex marking layout

Marking examples
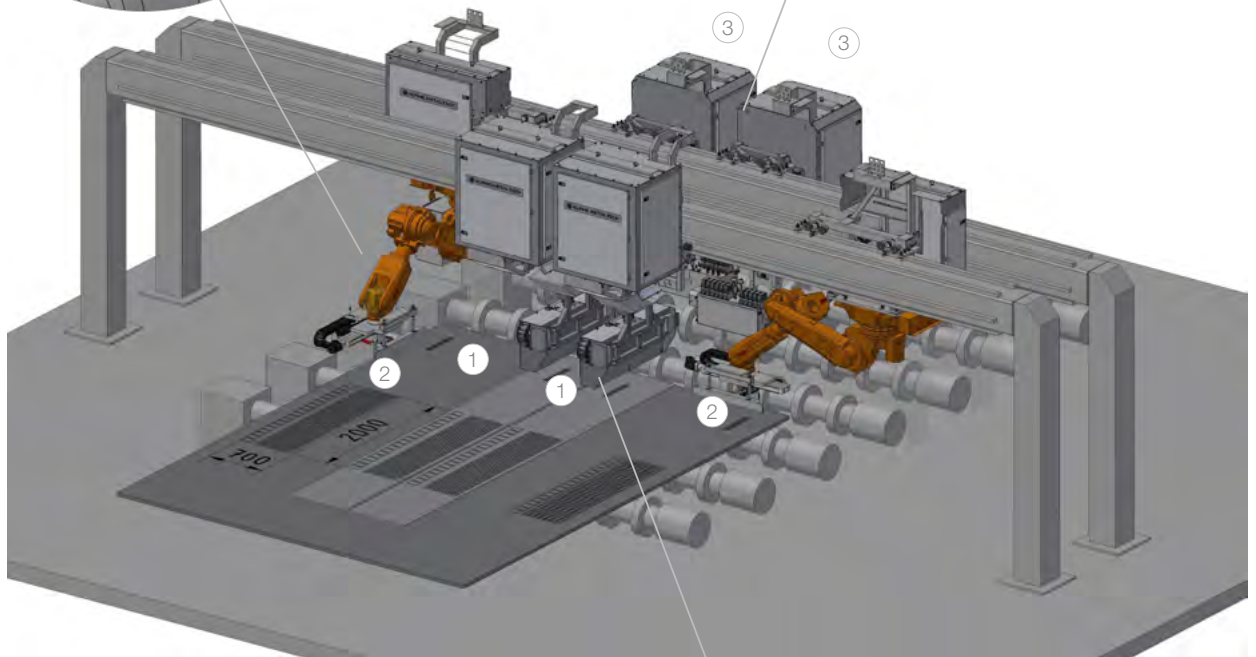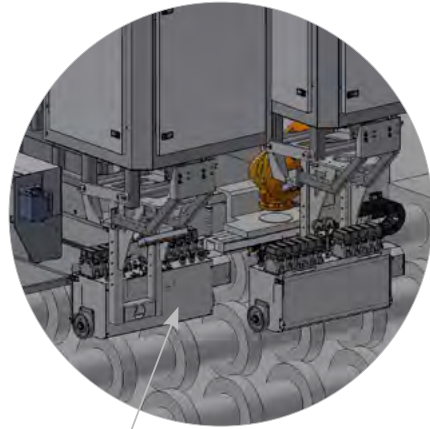
1. PP Marking units
2. IJ Marking units
3. CJ Marking units

SMART IDENTIFICATION

Alpine Metal Tech provides advanced technology for unmistakeable product identification. The symbiosis of Alpine Metal Tech marking machinery and AMTident shows unique advantages for our customers as the entire key process for product tracing along the production process (marking, verification, identification) is offered out of one hand.

```
          Alpine Metal Tech
              Marking

    AMTinspect          AMTident
  Inspection Process  Reading Process
```
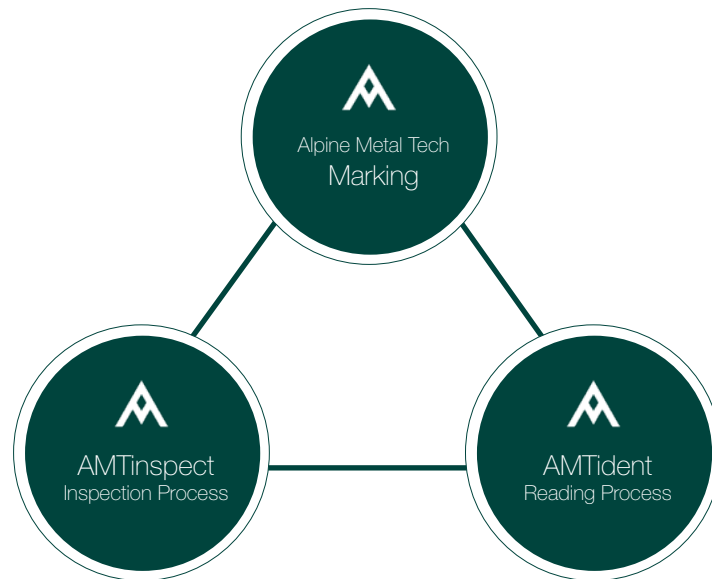
AMTinspect

AMTinspect forms the third part of Alpine Metal Tech's smart marking solutions triangle. The market demands for technology driven cycle time reduction and for a consistent product data basis for horizontal integration throughout the production line.

For coil marking machines AMTinspect is developed to provide touchless product position and dimension determination for cycle time reduction and marking flexibility increase. The robot marking head is extended with a laser scanner unit to acquire profile data which is processed by the AMTinspect application.

Scanning objectives are:

» Contactless product position and dimension determination to reduce marking cycle time (mechanical detecti on with touching cylinder as a backup system)
» Strap position detection to ensure that only the product surface is marked
» Disc profile investigation to find the best marking position on the disc in case of improper coil winding and to check for telescopes to increase machine security

AMTinspect provides result data to the marking machine Plc which adapts marking position and movements accordingly. Data, coil quality parameters and automatically generated coil evaluation reports are accessible to operators or to quality and line managers for deeper analysation, optimization purposes or logistics control.

Alpine Metal Tech took the next step towards smart marking for the overall objective to provide highest marking quality with high flexibility and at reduced cycle times.

AMTident

Option for all Alpine Metal Tech Marking Machines

AMTident is developed to meet the demand of reading product ID's independent from product, marking technology and environmental conditions. In order to provide highest identification rates, AMTident utilises a wide spectrum of industrial vision technology like CCD and infrared cameras, laser scanners and corresponding illumination equipment to ensure a stable lighting and acquisition scenery.

To achieve unequaled identification rates throughout a complex product range, diverse harsh environmental conditions and low contrast surfaces, AMTident can be delivered in three main versions, which are customized to appropriate site conditions.

AMTident VIS

Industrial cameras and high power flashes to handle challenging identification tasks

AMTident 3D

Laser based 3D depth data used for character recognition

AMTident IR

Infrared cameras used to read product IDs at hot products with low contrast markings

AMTident consists of two core elements, the sensor technology and the processing software. Alpine Metal Tech commits to full extend software concepts to provide data sovereignty for our customers from acquired data referenced to product information, through process visualisation to analysation dashboards. To close the data gap in highly automated production systems, AMTident follows a strict and modern database design to store raw and result data.

AMTident – product dashboard

AMTident – analyser dashboard

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