ALPINE METAL TECH

SHROUD MANIPULATOR

Continuous casting



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Safe and reliable handling of ladle shrouds



SHROUD MANIPULATOR

Continuous casting

Alpine Metal Tech Shroud Manipiulators are the first choice for safe and reliable shroud handling – since more than 30 years.
Continuous casting using ladle shrouds offers significant advantages compared to open-stream casting. No re-oxidation of liquid steel, combined with a low number of macro-inclusions like slag patches, are the key to production of slabs, blooms and billets of utmost quality. In simple words, a shroud is protecting and transferring liquid steel from ladle to tundish.

Depending on the boundaries of available space and degree of automation, three versions are available:
» Auto Ladle Shroud Manipulator
» Remote Ladle Shroud Manipulator
» Semi-Auto Ladle Shroud Manipulator

It is the task of the manipulator to support all required maneuvers during the entire casting process:
» Pick-up of shroud from magazine
» Shroud pre-heating (optional)
» Positioning and docking on slide gate nozzle
» Casting with constant press-on force, following all movements of ladle
» Undocking and oxygen cleaning during ladle exchange or at end of casting
» Return to shroud magazine or disposal of shroud

All Alpine Metal Tech shroud manipulators are featuring an internal safety system to retain the press-on force even in case of power outages and therefore fully comply with safety equipment performance level d/cat. 3 according to EN 14753.

YOUR ADVANTAGES

» Low maintenance and long lasting design

Alpine Metal Tech shroud manipulators are built to last in heavy industry environment. Selected components are the key for unprecedented reliability. Th anks to the rugged design also the maintenance effort is reasonable.

» Operational safety raised to the next level

Safe shroud handling in regular and exceptional situations. Minimize wear and tear of shrouds and slide gate nozzles by proper handling. Manipulator cannot collapse during casting. Complies with common strategies for emergency moves of ladle. Keep operators out of hazardous areas by use of automatic or remote controlled manipulators. Safety equipment PL d/cat. 3 according to requirements of EN 14753

» Enables casting of high quality steel

Fast shroud cleaning and docking combined with full argon flushing functionality and capability of submerged casting guarantee a proper return of investment.

SEMI-AUTO LADLE SHROUD MANIPULATOR

The entry-level machine for reliable handling of ladle shrouds. It enables the local operator to perform all required shroud movements during the casting process.

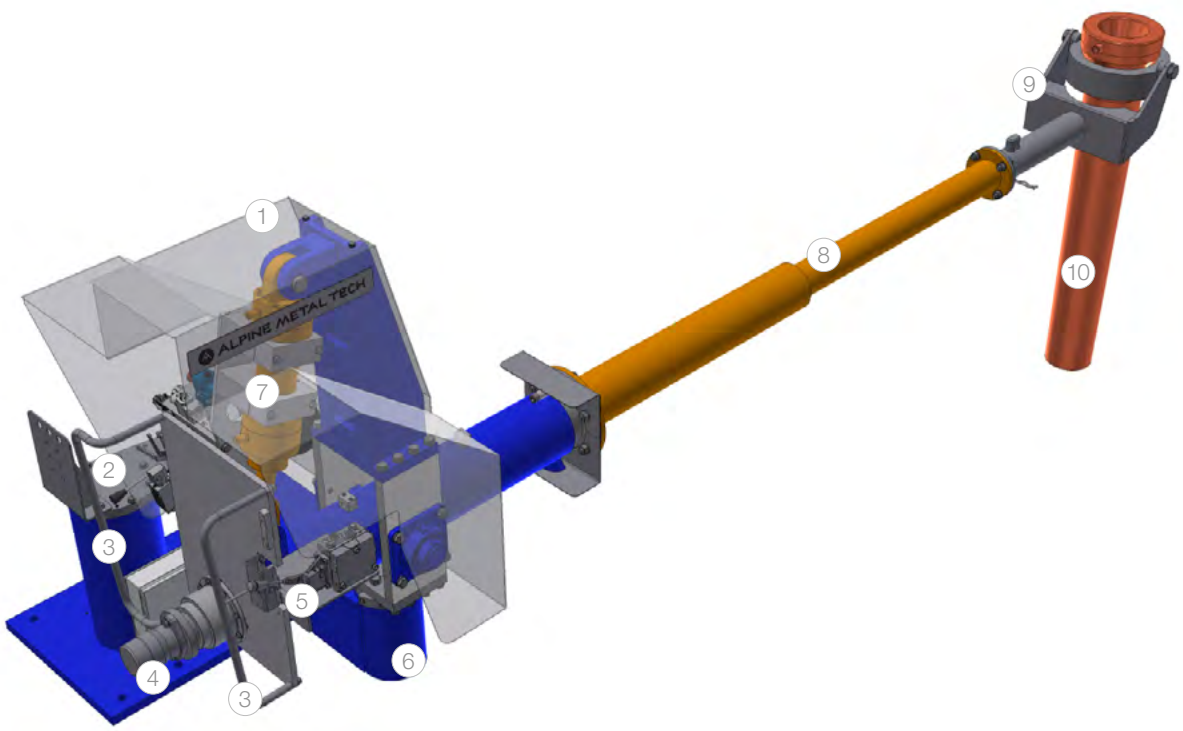
Easy handling guaranteed due to hydraulically assisted lifting/lowering and turning of shrouds. After docking, the manipulator retains a constant press-on force between shroud and slide gate nozzle and it freely follows typical movements of the ladle. A unique safety feature inherent in all Alpine Metal Tech shroud manipulators is the always constant press-on force, even in case of power outages. Optionally an automatic lowering function can be implemented which is triggered in case of an emergency movement of the ladle.

Features:

» Adapters for all common shroud types available
» Lean solution for replacement of simple hand manipulators




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1. Heat protection cover
2. Control for shroud lifting/lowering
3. Handles for manual pre-positioning
4. Drive for shroud turning
5. Control for shroud turning
6. Swivel arm
7. Lifting/Lowering and retaining cylinder
8. Jib arm
9. Fork head with centering ring
10. Shroud

TECHNICAL DATA

Usual application	continuous cast products	casting platform tundish car
Machine type	Semi-Auto Ladle Shroud Manipulator	
Machine data	lenght of jib arm	2000 - 5500 mm
	turning of jib arm	+/- 120°
	press on force (adjustable)	up to 3 kN
	vertical stroke	1500 mm
	horizontal stroke	600 mm
	turning of manipulator	approx. 140°
Electrical data	main supply	3 x 400 V, 50 Hz (other voltages possible)
	power consumption	approx. 5 kVA
	control voltage	24 VDC
Hydraulic data	medium	mineral oil or water glycol
	pressure	min. 180 bar
	consumption	max. 30 l/min
Argon	pressure	6 bar
	consumption	approx. 150 l/min.

OPTIONS

» Shroud magazine
» Shroud oxygen cleaning station
» Shroud (pre-) heating station
» Piping for Argon flushing
» Argon media panel
» Coupling system for fast fork exchange
» Two separate pressure set points

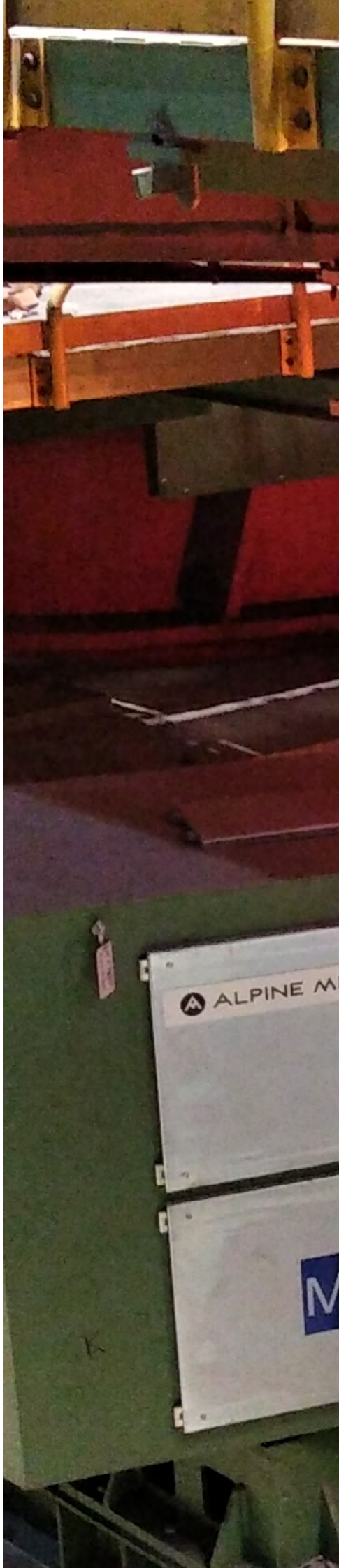
REMOTE-LADLE SHROUD MANIPULATOR

The advanced machine that features full remote control of all required ladle shroud movements.

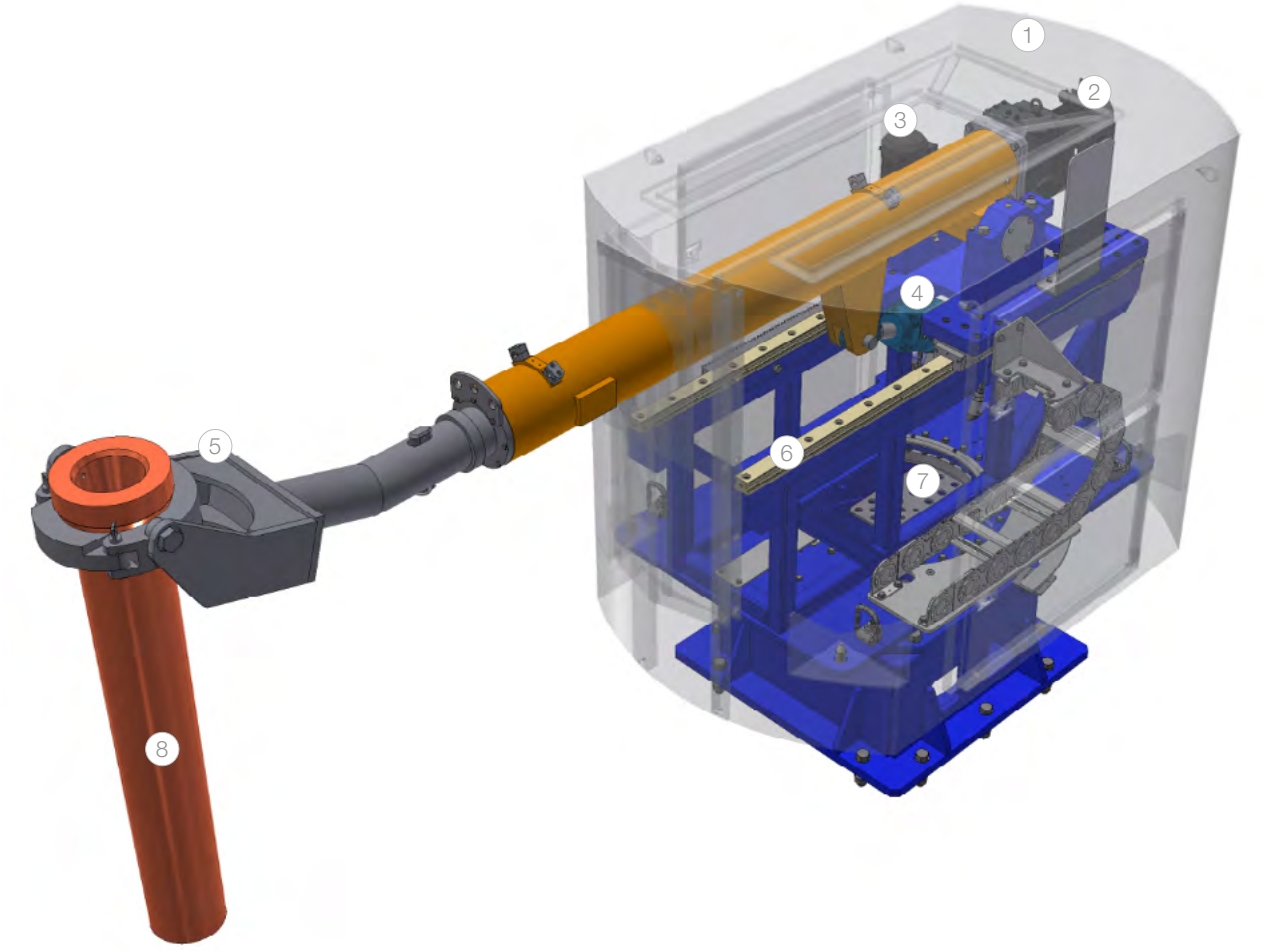
Allows the operator to work from a safe distance to the hazardous area. The manipulator is equipped with a robust, industry-standard radio remote control. Extended press-on forces up to 10 kN enable submerged casting operation. After docking, the manipulator retains a constant press-on force between shroud and slide gate nozzle and it freely follows typical movements of the ladle. A unique safety feature inherent in all Alpine Metal Tech shroud manipulators is the always constant press-on force, even in case of power outages. It also enables automatic lowering in case of an emergency movement of the ladle. Includes piping for Argon flushing.

Features:

» No operator in hazardous area due to full remote control
» Extended press-on force for submerged casting
» Adapters for all common shroud types available




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1. Heat protection cover
2. Drive for shroud turning
3. Drive for shroud forward/backward movement
4. Lifting/Lowering and retaining cylinder
5. Fork head with centering ring
6. Linear guides for shroud forward/backward movement
7. Slew ring and drive for manipulator turning
8. Shroud

TECHNICAL DATA

Usual application	continuous cast products	casting platform tundish car
Machine type	remote-Ladle Shroud manipulator	
Machine data	lenght of jib arm:	2000 - 5500 mm
	turning of jib arm:	+/- 120°
	press on force (adjustable):	up to 10 kN
	vertical stroke:	approx. 1500 mm
	horizontal stroke:	650 mm
	turning of manipulator:	approx. 140°
Electrical data	main supply:	3 x 400 V, 50 Hz (other voltages possible)
	power consumption:	approx. 5 kVA
	control voltage:	24 VDC
Hydraulic data	medium:	mineral oil or water glycol
	pressure:	min. 180 bar
	consumption:	max. 30 l/min
Argon	pressure:	6 bar
	consumption:	approx. 150 l/min

OPTIONS

» Shroud magazine

» Shroud oxygen cleaning station

» Shroud (pre-) heating station

» Industrial wireless or wired remote control of all movements

» Argon media panel

» Coupling system for fast fork exchange

AUTO-LADLE SHROUD MANIPULATOR

Automation on the casting floor at its best. Looking for a machine that combines all advantages of the remote controlled manipulator with the flexibility of a robot?

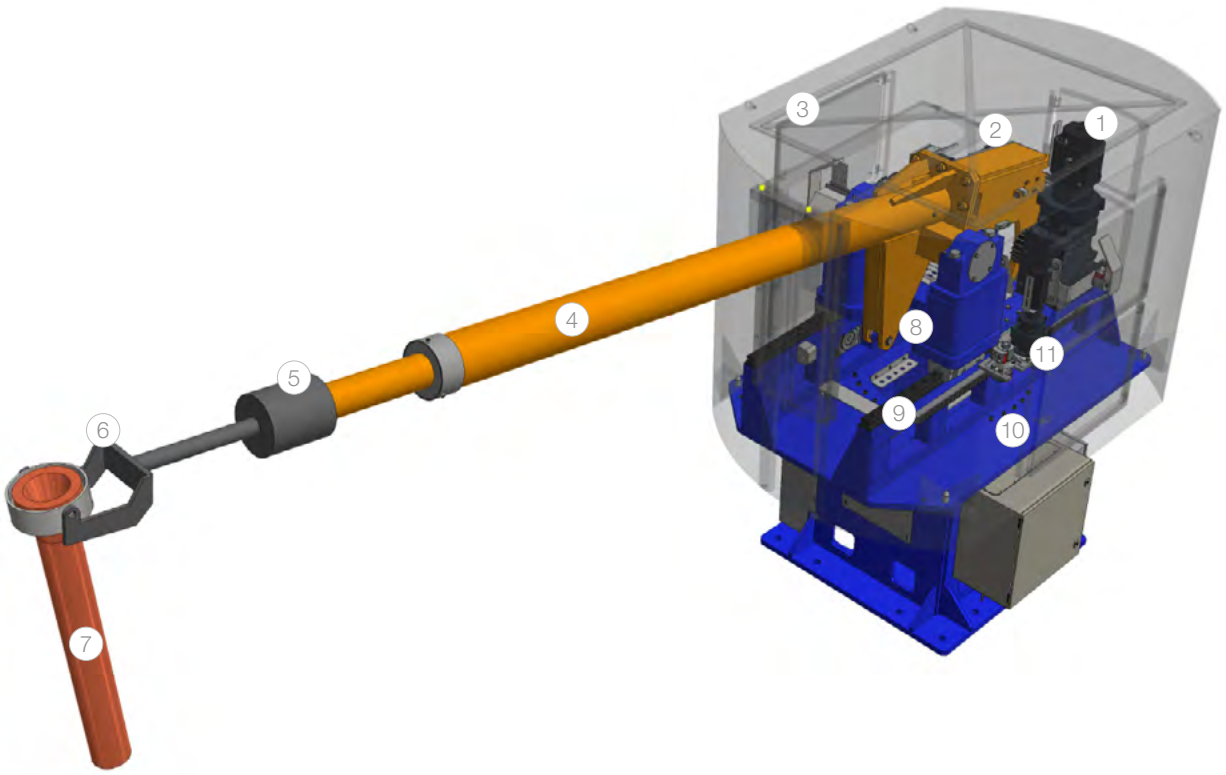
Then the fully automatic shroud manipulator is the first choice. Featuring an industrial motion controller the machine allows teaching of all required ladle shroud maneuvers and executing them triggered by the caster control system. Due to the continuous path control, all movements are executed and completed in the shortest possible time. Extended press-on forces up to 10 kN enable submerged casting operation. After docking, the manipulator retains a constant press-on force between shroud and slide gate nozzle and it freely follows typical movements of the ladle. A unique safety feature inherent in all Alpine Metal Tech shroud manipulators is the always-constant press-on force, even in case of power outages. It also enables automatic lowering in case of an emergency movement of the ladle. Includes piping for Argon flushing.

Features:

» Shortest possible ladle changing time
» Extended press-on force for submerged casting
» Automated picking-up of shrouds from magazine and shroud cleaning




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1. Drive for shroud lifting/lowering
2. Drive for shroud turning
3. Heat protection cover
4. Jib arm
5. Automated coupling for fast shroud exchange
6. Fork head with centering ring
7. Shroud
8. Retaining cylinder
9. Linear guides for shroud forward/backward movement
10. Slew ring and drive for manipulator turning (not visible)
11. Drive for shroud forward/backward movement

TECHNICAL DATA

Usual application	continuous cast products	casting platform tundish car
Machine types	Auto Ladle Shroud Manipulator	
Machine data	lenght of jib arm: turning of jib arm: press on force (adjustable): vertical stroke: horizontal stroke: turning of manipulator:	2000 - 5500 mm +/- 120° up to 10 kN approx. 1500 mm 650 mm max. 220°
Electrical data	main supply: power consumption: control voltage:	3 x 400 V, 50 Hz (other voltages possible) 8 kVA 24 VDC
Hydraulic data	medium: pressure: consumption:	mineral oil or water glycol 180 – 210 bar max. 30 l/min
Argon	pressure: consumption:	6 bar approx. 150 l/min

OPTIONS

» Magazine for automated shroud exchange

» Slide gate nozzle detection for accurate pre-positioning

» Shroud oxygen cleaning station

» Shroud (pre-) heating station

» Argon media panel

CASTING ROBOT

The robotics solution on the casting platform by Alpine Metal Tech enables optimization of the casting processes as well as precise, efficient, and seamless execution of sampling, measuring, and oxygen lancing of the ladle nozzle.

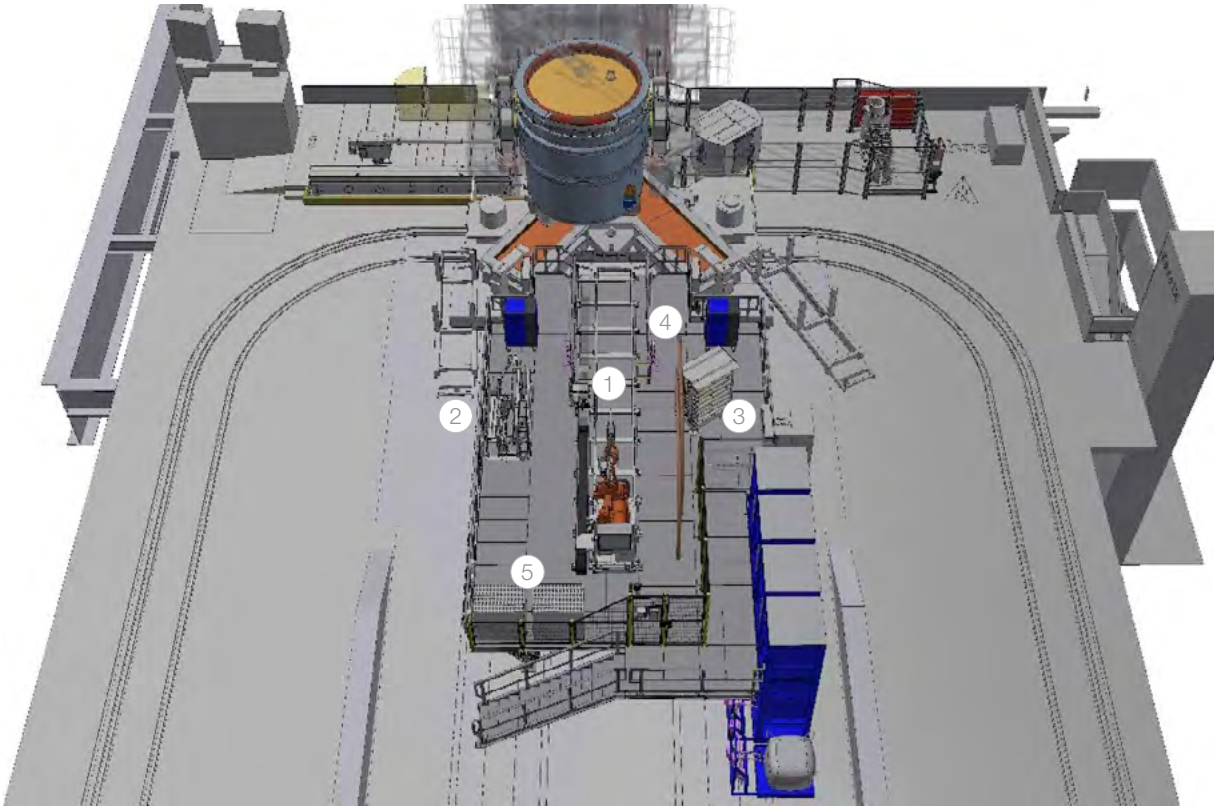
To increase the working range of the robot, Alpine Metal Tech developed a robust moveable axis on which the robot is mounted. Attached to its robotic arm is a tool changer capable of automatically accommodating various tools such as temperature and hydrogen measurement devices, sample collection tools, and lance burners. The entire system comprises a tool magazine, sample magazine, and a testing unit. In combination, this ensures an exceedingly reliable solution with concurrently low maintenance costs.

Features:

» Automatic temperature measurement and sampling collection
» Oxygen lancing of the ladle nozzle
» Decreased operator time near the liquid steel area
» Consistently high process quality due to automated measurement cycles
» Low maintenance (ABB standard robot)







1 Casting Robot

2 Tool Magazine

3 Sample Magazine

4 Manual Measuring Equipment

5 Sample Stock

TECHNICAL DATA

Usual application	tundish	casting platform
Machine types	robot	
	robot on additional axes	(floor mounted or inverse)
Machine data	oxygen lancing	
	hydrogen measuring	
	temperature measuring	
	oxygen measuring	
	sampling	
Electrical data	main supply:	3 x 400 V, 50 Hz (other voltages possible)
	power consumption:	12 kVA
Media data	compressed air:	filtered and drained
	pressure:	min. 4 bar
	oxygen:	min. 99,5% purity
	pressure:	min. 12 bar

OPTION

» Customized platform on which the robot is installed

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