1 Design and Assembly

Laser marking station

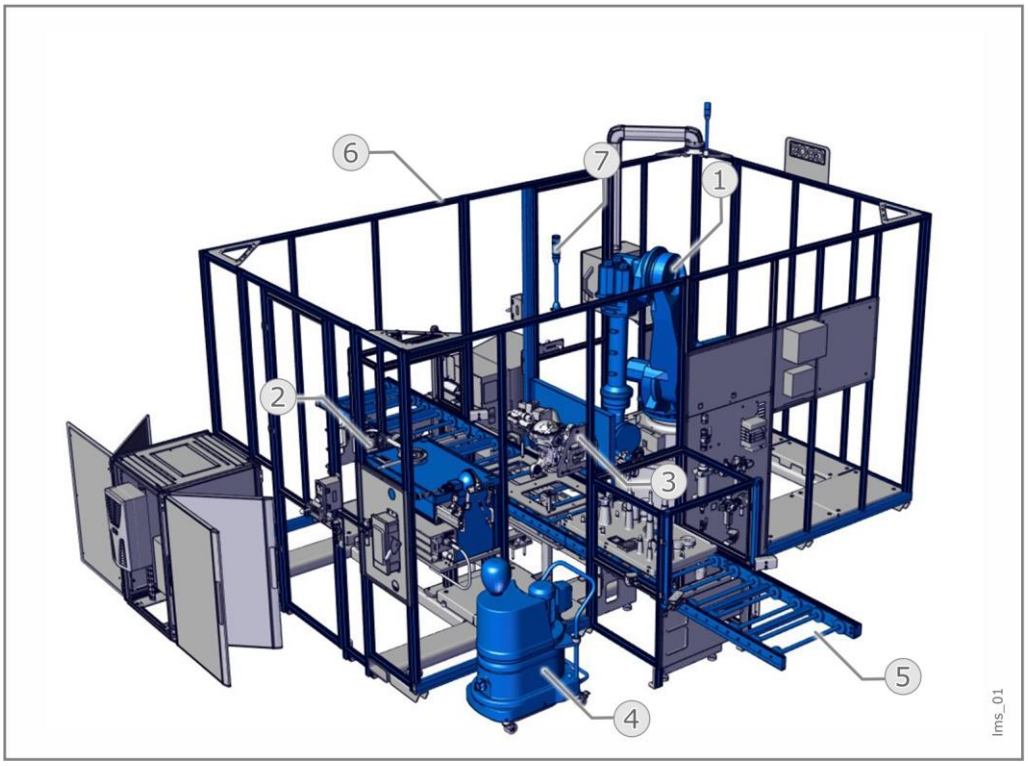


Fig. 1: Overview Laser Marking Station

1 Robot
2 Marking unit
3 Gripper
4 Extraction unit
5 Infeed and outfeed conveyor
6 Safety enclosure
7 Stacklight

Function

The laser marking station fully automatically marks and labels front axle gears with a data matrix code, and a readable number code.

Description

An infeed conveyor (5) transports the front axle gear through the laser marking station. A robot (1) lifts the gear with the help of the gripper (3) and places it in the marking unit (2). Afterwards, the robot puts the gear back on the outfeed conveyor (5). Fumes created in the marking process are extracted with the extraction unit (4). The extraction unit is connected to the marking unit. The safety enclosure (6) separates the machining area from the operator. A stacklight (7) indicates the different operating states of the marking unit.

Marking unit

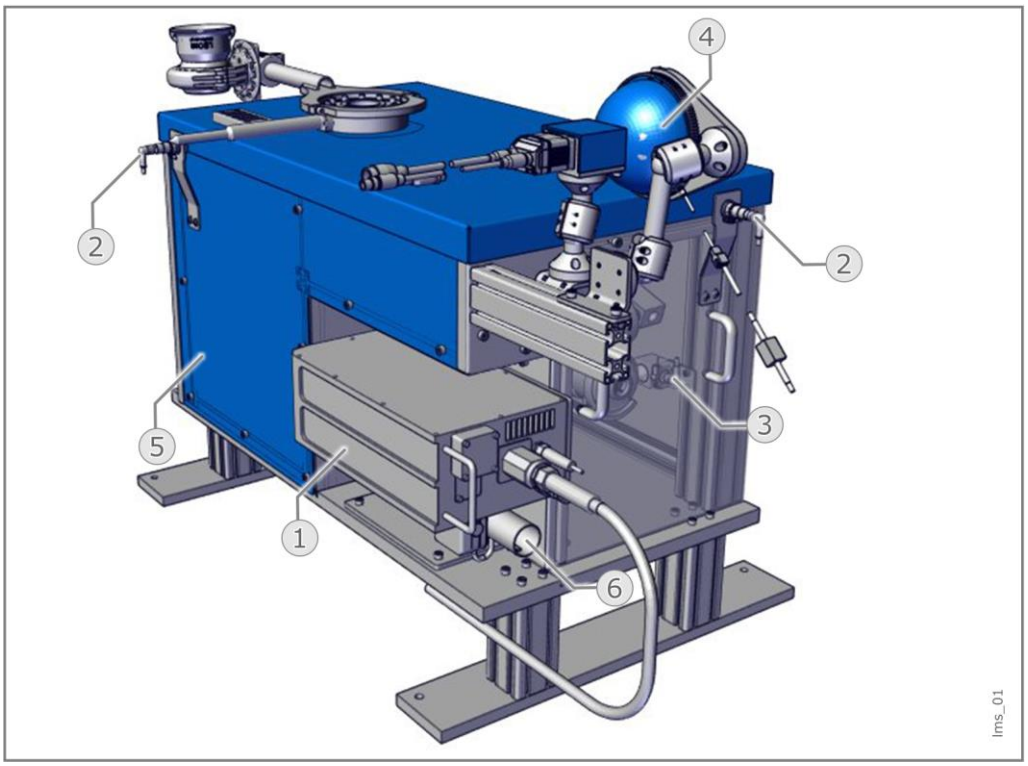


Fig. 2: Overview marking unit

1	Laser marking head	4	Test unit
2	Safety interlock switch	5	Protective enclosure
3	Inductive proximity switch	6	Connector for extraction unit

Funktion

Within the marking unit, front axle gears are marked with a data matrix code and a readable number code. The marking unit is the central component of the laser marking station.

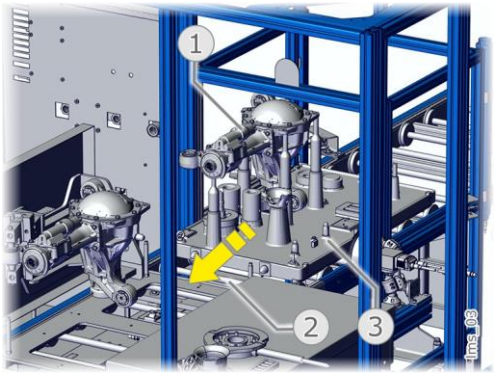
Beschreibung

The laser marking head (1) labels the surface of the gear housing with a data matrix code and a readable number code. Two safety interlock switches (2) check whether the marking unit is closed. An inductive proximity switch (3) checks whether a workpiece is present. Both safety interlock switches and the inductive proximity switch are connected to the laser control. The marking process can only be started if both safety interlock switches and the inductive proximity switch are activated. The test unit (4) verifies the readability and quality of the data matrix code. The marking process takes place within the protective enclosure (5). The protective enclosure shields the surroundings from laser emission. To extract laser fume created in the marking process, an extraction unit is connected to the connector (6).

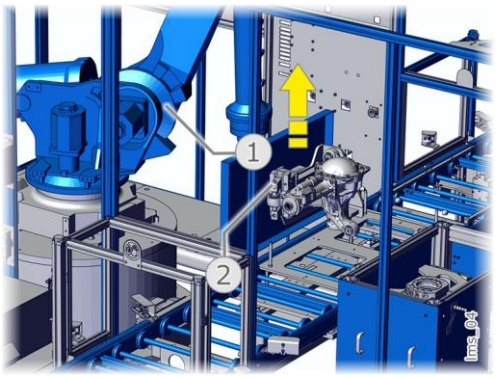
2 Description of the procedure

Procedure

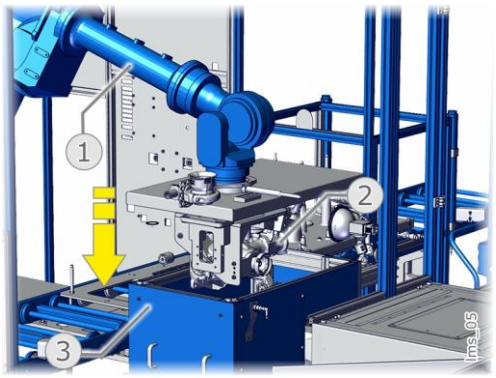
1. The front axle gear (1) is transported into the laser marking station with the infeed conveyor (2) on a pallet (3).



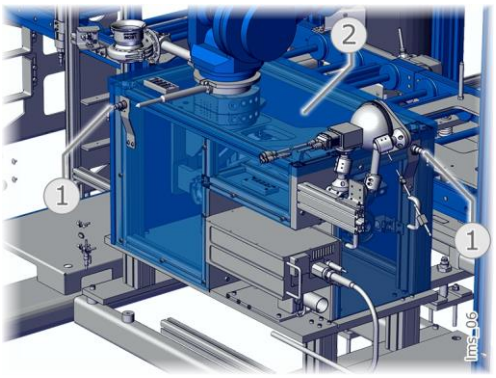
2. The robot (1) picks up the gear with the help of the gripper (2).



3. The robot (1) places the gear (2) inside the marking unit (3).

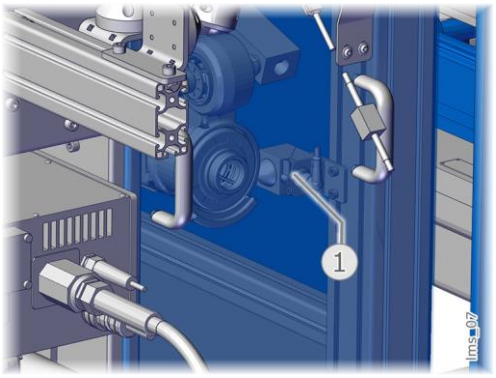


4. Two safety interlock switches (1) detect whether the enclosure lid of the gripper (2) is placed correctly on the marking unit.

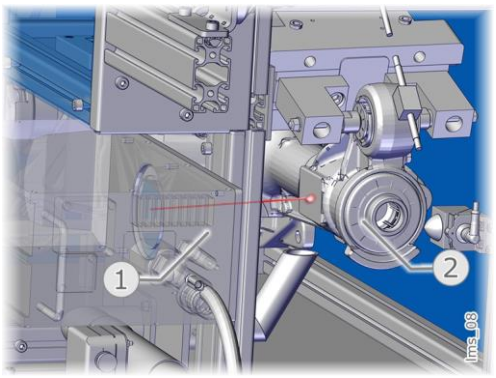


5. A proximity switch (1) within the marking unit detects whether a gear is present.

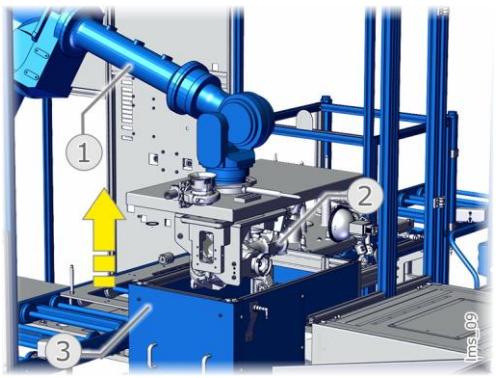
   If both of the safety interlock switches are activated together with the proximity switch, the laser can start with the marking process.



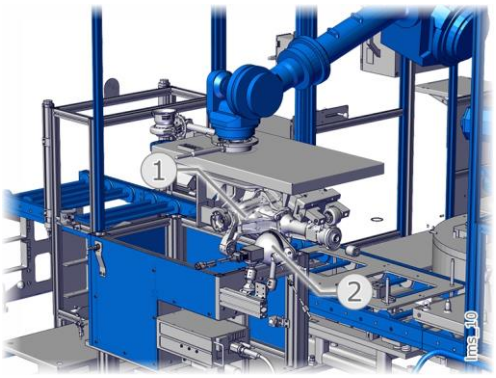
6. The laser (1) marks the gear housing (2) with a data matrix code and a readable number code.



7. After the marking process is finished, the robot (1) lifts the gear (2) out of the marking unit (3).

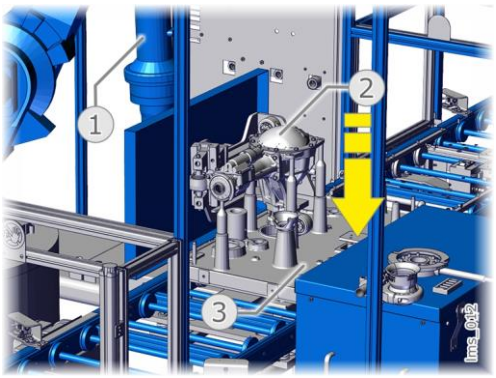


8. The gear (1) is positioned in front of the test unit (2). The test unit verifies the data matrix code.

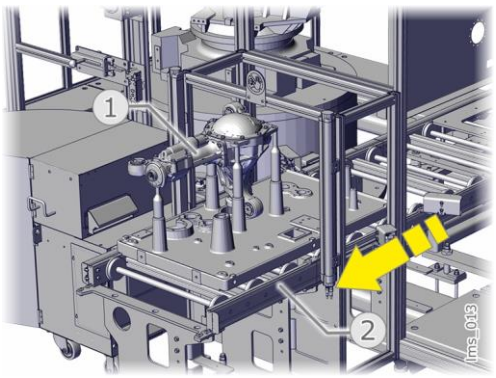


The result can be seen on the picture to the right.

9. After the marking process, the robot (1) places the gear (2) onto the pallet (3).



10. The pallet with the gear (1) leaves the laser marking station on the out-feed conveyor (2).



Normal operation takes place (fully) automatically. The user has never access to the laser during the steps 1-10.