

Description

A High-precision Robot

Technical Field

[0001] The invention relates to the technical field of robotics, in particular to a high-precision robot.

Background of the Invention

[0002] With the continuous development of science and technology, some high-precision robots are widely used in various fields. However, the charging device for charging the robots in the prior art is single in setting mode, poor in charging connection stability and low in safety.

Brief Summary of the Invention

[0003] The invention provides a high-precision robot, so as to solve the above-mentioned technical problems.

[0004] A high-precision robot in this invention comprises a charging pile fixedly arranged on the base, and a charging end socket electrically connected to the robot by a charging line. A dust guard plate is fixedly arranged at the top of said charging pile. And a charging socket is disposed in the right end surface of said charging pile. Insertion cavities with openings facing rightwards are correspondingly arranged in the upper part and lower part of said charging socket. The front and rear end walls of insertion cavities are provided with electrical connecting sheets. A left sliding pushing cavity and a right sliding pushing cavity which are located between said two insertion cavities are arranged in said charging socket. And a motor is fixedly arranged between said left sliding pushing cavity and said right sliding pushing cavity. The outer side of said motor is provided with a mitigation device which comprises damping plates and heat absorbing sheets. The upper part and lower part of the end wall of the insertion

cavities, adjacent to the left sliding cavity, are correspondingly provided with first sliding grooves with openings face towards the insertion cavities. The right half sections of said first sliding pushing grooves are communicated with said left sliding pushing cavity. A left sliding pushing plate which can move left and right is installed in said left sliding pushing cavity. A left stud extending leftwards and rightwards is installed in the left sliding pushing plate in a matched mode. The left end of said left stud is rotatably mounted in the left end wall of said left sliding pushing cavity, and its right end is in power connection with said motor. Said first sliding pushing grooves are provided with first sliding arms that can move left and right. The right side of the end surface of said first sliding arm, facing the left sliding pushing cavity, is fixedly connected with said left sliding pushing plate. The end surface of said first sliding arms, facing said insertion cavities are provided with first gear chains extending into said insertion cavities. The upper part and lower part of said charging socket are respectively provided with a pushing slot connecting said insertion cavities and said right sliding pushing cavity. Pushing arms are movably mounted in said pushing slot. The end surfaces of said pushing arms, facing said right sliding cavity, are provided with first oblique inserting surfaces. Said right sliding pushing cavity is further provided with a right sliding pushing plate which can move left and right. And a right stud is arranged in said right sliding pushing plate in a matched mode. The left end of said right stud is in power connection with said motor. Meanwhile, its right end is rotatably mounted in the right end wall of said right sliding pushing cavity. The right end of said right sliding pushing plate, in its upper part and lower part, is respectively provided with second oblique inserting surfaces which are in a matched mode with said first oblique inserting surfaces. Second sliding pushing grooves with openings facing said insertion cavities are formed in the end wall of said insertion cavities, opposite to said first sliding pushing grooves. And said second sliding pushing grooves are located on the left side of said left sliding pushing cavity. Said second sliding pushing grooves are mounted with second sliding arms which can move left and right. The end surfaces of said second sliding arms, facing said insertion cavities are respectively provided with a second gear chain extending into said insertion

cavities. The end wall of said second sliding pushing grooves, back on to said insertion cavities are respectively provided with a dovetail slot with an opening facing said second sliding pushing grooves. Said dovetail slots are provided with two dovetail blocks which are capable of moving left and right and are in fixed connection with said second sliding arms. The end wall of said insertion cavities opposite to said first sliding pushing grooves is further provided with joint grooves located on the right sides of said second sliding pushing grooves and facing towards said insertion cavities. And the left end of said joint grooves is communicated with said second sliding pushing grooves, and the right end of said joint grooves is communicated with the outside. The upper part and lower part of the left end surface of said charging end socket are respectively provided with a insertion rod which is matched with said insertion cavities. Left through grooves which link through upside and downside and right through grooves that are matched with said pushing arm are set in said insertion rod. And third sliding pushing grooves extending up and down are correspondingly formed in the front end wall and the rear end wall of said left through grooves, and sliding tables capable of moving up and down are installed in each third sliding pushing groove, and a rotating rod is rotationally arranged between two sliding tables. Said rotating rods are fixedly provided with sprockets which are matched with said first gear chains and said second gear chains.

[0005] Furthermore, the right end wall of said dovetail slots is fixedly mounted with power connectors connected to mains supply. The right end surfaces of said dovetail blocks are fixedly mounted with first power transmission chips, the upper part and lower part of the left end wall of said left sliding pushing cavity are respectively arranged with second power transmission chips, and the upper part and lower part of the left end wall of said left sliding pushing plate are respectively arranged with third power transmission chips. Said second power transmission chips are in power connection with said first power transmission chips, and said third power transmission chips are in power connection with said electrical connecting sheets. Said power connectors and said first power transmission chips are located on the same

horizontal line, and said second power transmission chips and said third power transmission chips are located on the same horizontal line.

[0006] Furthermore, the left end wall of said dovetail slots is fixedly mounted with first elastic sheets which are in fixed connection with said dovetail blocks.

[0007] Furthermore, guide grooves are correspondingly formed in the left end wall and the right end wall of said pushing slot, and guide blocks fixedly connected with said pushing arm are movably arranged in said guide grooves. The end wall of said guide grooves, close to said insertion cavities is fixedly mounted with second elastic sheets which are fixedly connected with said guide blocks.

[0008] Furthermore, said third sliding pushing grooves are further arranged with third elastic sheets which are fixedly connected to said sliding tables.

[0009] Furthermore, the distance from the front end face to the rear end face of said insertion rods is equal to the distance from the front end wall to the rear end wall of said insertion cavities.

[0010] Furthermore, the distance from said pushing slot to the right end surface of said charging socket is equal to the distance from said right through grooves to the left end surface of said charging end socket.

[0011] Furthermore, said damping plates are arranged at the upper end and the lower end of said motor and are fixedly connected with it. Said heat absorbing sheets are arranged at the front end and the rear end of said motor and are fixedly connected with the shell of said motor. The upper end and the lower end of said heat absorbing sheets are both fixedly connected with said damping plates. And more than two heat absorbing sheets are arranged at the front end and the rear end of said motor respectively.

Brief Description of the Drawings

[0012] FIG. 1 is a schematic structural diagram of the charging pile in this invention.

[0013] FIG. 2 is a schematic structural diagram of the charging socket in this invention.

[0014] FIG. 3 is a schematic structural diagram of the charging end socket in this invention.

[0015] FIG. 4 is a schematic structural diagram of the left through groove of FIG. 3 without sprockets;

[0016] FIG. 5 is a schematic view of an external structure of the motor of FIG. 2.

Detailed Description of the Invention

[0017] Referring to FIG. 1 to FIG. 5, a high-precision robot in this invention comprises a charging pile 50 fixedly arranged on the base 51, and a charging end socket 40 electrically connected with the robot by a charging line. A dust guard plate 52 is fixedly arranged at the top of said charging pile 50. And a charging socket 10 is disposed in the right end surface of said charging pile 50. Insertion cavities 12 with openings facing rightwards are correspondingly arranged in the upper part and lower part of said charging socket 10. The front and rear end walls of insertion cavities 12 are provided with electrical connecting sheets 38. A left sliding pushing cavity 23 and a right sliding pushing cavity 17 which are located between said two insertion cavities 12 are arranged in said charging socket 10. And a motor 37 is fixedly arranged between said left sliding pushing cavity 23 and said right sliding pushing cavity 17. The outer side of said motor 37 is provided with a mitigation device which comprises damping plates 371 and heat absorbing sheets 372. The upper part and lower part of the end wall of the insertion cavities 12, adjacent to the left sliding cavity 23, are correspondingly provided with first sliding grooves 25 with openings face towards the insertion cavities 12. The right half sections of said first sliding pushing grooves 25 are communicated with said left sliding pushing cavity 23. A left sliding pushing plate 21 which can move left and right is installed in said left sliding pushing cavity 23. A left stud 22 extending leftwards and rightwards is installed in the left sliding pushing plate 21 in a matched mode. The left end of said left stud 22 is rotatably mounted in

the left end wall of said left sliding pushing cavity 23, and its right end is in power connection with said motor 37. Said first sliding pushing grooves 25 are provided with first sliding arms 26 that can move left and right. The right side of the end surface of said first sliding arm 26, facing the left sliding pushing cavity 23, is fixedly connected with said left sliding pushing plate 21. The end surface of said first sliding arms 26, facing said insertion cavities 12 are provided with first gear chains 35 extending into said insertion cavities 12. The upper part and lower part of said charging socket 10 are respectively provided with a pushing slot connecting said insertion cavities 12 and said right sliding pushing cavity 17. Pushing arms 39 are movably mounted in said pushing slot. The end surfaces of said pushing arms 39 facing said right sliding cavity 17, are provided with first oblique inserting surfaces 16. Said right sliding pushing cavity 17 is further provided with a right sliding pushing plate 19 which can move left and right. And a right stud 18 is arranged in said right sliding pushing plate 19 in a matched mode. The left end of said right stud 18 is in power connection with said motor 37. Meanwhile, its right end is rotatably mounted in the right end wall of said right sliding pushing cavity 17. The right end of said right sliding pushing plate 19, in its upper part and lower part, is respectively provided with second oblique inserting surfaces 20 which are in a matched mode with said first oblique inserting surfaces 16. Second sliding pushing grooves 34 with openings facing said insertion cavities 12 are formed in the end wall of said insertion cavities 12, opposite to said first sliding pushing grooves 25. And said second sliding pushing grooves 34 are located on the left side of said left sliding pushing cavity 23. Said second sliding pushing grooves 34 are mounted with second sliding arms 28 which can move left and right. The end surfaces of said second sliding arms 28, facing said insertion cavities 12 are respectively provided with a second gear chain 27 extending into said insertion cavities 12. The end wall of said second sliding pushing grooves 34, back on to said insertion cavities 12 are respectively provided with a dovetail slot 32 with an opening facing said second sliding pushing grooves 34. Said dovetail slots 32 are provided with two dovetail blocks 30 which are capable of moving left and right and are in fixed connection with said second sliding arms 28. The end wall of said

insertion cavities 12 opposite to said first sliding pushing grooves 25 is further provided with joint grooves 11 located on the right sides of said second sliding pushing grooves 34 and face towards said insertion cavities 12. And the left end of said joint grooves 11 is communicated with said second sliding pushing grooves 34, and the right end of said joint grooves 11 is communicated with the outside. The upper part and lower part of the left end surface of said charging end socket 40 are respectively provided with a insertion rod 41 which is matched with said insertion cavities 12. Left through grooves 42 which link through upside and downside and right through grooves 45 that are matched with said pushing arm 39 are set in said insertion rod 41. And third sliding pushing grooves 48 extending up and down are correspondingly formed in the front end wall and the rear end wall of said left through grooves 42, and sliding tables 46 capable of moving up and down are installed in each third sliding pushing groove 48, and a rotating rod 44 is rotationally arranged between two sliding tables 46. Said rotating rods 44 are fixedly provided with sprockets 43 which are matched with said first gear chains 35 and said second gear chains 27.

[0018] Advantageously, or in an exemplary aspect, wherein the right end wall of said dovetail slots 32 is fixedly mounted with power connectors 33 connected to mains supply. The right end surfaces of said dovetail blocks 30 are fixedly mounted with first power transmission chips 31, the upper part and lower part of the left end wall of said left sliding pushing cavity 23 are respectively arranged with second power transmission chips 24, and the upper part and lower part of the left end wall of said left sliding pushing plate 21 are respectively arranged with third power transmission chips 36. Said second power transmission chips 24 are in power connection with said first power transmission chips 31, and said third power transmission chips 36 is in power connection with said electrical connecting sheets 38. Said power connectors 33 and said first power transmission chips 31 are located on the same horizontal line, and said second power transmission chips 24 and said third power transmission chips 36 are located on the same horizontal line.

[0019] Advantageously, or in an exemplary aspect, wherein the left end wall of said dovetail slots 32 is fixedly mounted with first elastic sheets 29 which are in fixed connection with said dovetail blocks 30. Said first elastic sheets 29 are used for pulling the dovetail blocks 32 leftwards to enable said second sliding arms 28 to abut against the left end wall of said second sliding pushing groove 34.

[0020] Advantageously, or in an exemplary aspect, wherein guide grooves 13 are correspondingly formed in the left end wall and the right end wall of said pushing slot, and guide blocks 15 fixedly connected with said pushing arm 39 are movably arranged in said guide grooves 13. The end wall of said guide grooves 13, close to said insertion cavities 12 is fixedly mounted with second elastic sheets 14 which are fixedly connected with said guide blocks 15. Said second elastic sheets 14 are used for pulling said guide blocks 15 towards said right sliding pushing cavity 17 so as to enable said first oblique inserting surfaces 16 to extend into said right sliding pushing cavity 17, and enable the end surfaces of said pushing arms 39 which face towards said inserting cavities 12 to be contracted in said pushing slot .

[0021] Advantageously, or in an exemplary aspect, wherein said third sliding pushing grooves 48 are further arranged with third elastic sheets 47 which are fixedly connected to said sliding tables 46. Said third elastic sheets 47 are used for jacking the upper sprocket 43 and the lower sprocket 43 to be closed to each other.

[0022] Advantageously, or in an exemplary aspect, wherein the distance from the front end face to the rear end face of said insertion rods 41 is equal to the distance from the front end wall to the rear end wall of said insertion cavities 12. And the distance from the upper end surface to the lower end surface of said insertion rods 41 is smaller than the root diameter of said sprocket 43, so that said insertion rods 41 will not interfere with said first gear chains 35 and said second gear chains 27 when matching with the insertion cavities 12.

[0023] Advantageously, or in an exemplary aspect, wherein the distance from said pushing slot to the right end surface of said charging socket 10 is equal to the distance from said right through grooves 45 to the left end surface of said charging end socket 40, so that when the left end surface of said charging end socket 40 abuts

against the right end surface of said charging socket 10, said pushing arm 39 is aligned with said right through grooves 45.

[0024] Advantageously, or in an exemplary aspect, wherein said damping plates 371 are arranged at the upper end and the lower end of said motor 37 and are fixedly connected with it. Said heat absorbing sheets 372 are arranged at the front end and the rear end of said motor 37 and are fixedly connected with the shell of said motor 37. The upper end and the lower end of said heat absorbing sheets 372 are both fixedly connected with said damping plates 371. And more than two heat absorbing sheets 372 are arranged at the front end and the rear end of said motor 37 respectively, for absorbing and dissipating heat generated by said motor 37. And said damping plates 371 are used for reducing the vibration generated by said motor 37 during operation, in case the normal operation of the device is influenced due to the fact that the vibration force is too large.

[0025] The benefits of the invention are as follows: the device in present invention is simple in structure, easy and convenient to operate and capable of improving safety and stability during charging of the robot.

[0026] The above shows and illustrates the basic principles, main features, and advantages of the present invention. Persons skilled in the art should understand that, the invention is not subject to restrictions of the embodiments above. The embodiments and descriptions stated above only describe the principle of the present invention. The invention will be subject to modification and improvement based on its intention and extent, which will also fall into the claimed protection extent of this invention. The claimed protection extent of the invention shall be determined with reference to the appended claims and any equivalents thereof.

Claims

1. A high-precision robot comprises
a charging pile fixedly arranged on the base and a charging end socket electrically connected to the robot by a charging line;
a dust guard plate fixedly arranged at the top of said charging pile;
a charging socket disposed in the right end surface of said charging pile;
insertion cavities with openings facing rightwards correspondingly arranged in the upper part and lower part of said charging socket,
wherein said insertion cavities are provided with electrical connecting sheets in the front and rear end walls;
wherein a left sliding pushing cavity and a right sliding pushing cavity which are located between said two insertion cavities are arranged in said charging socket;
a motor fixedly arranged between said left sliding pushing cavity and said right sliding pushing cavity,
wherein the outer side of said motor is provided with a mitigation device which comprises damping plates and heat absorbing sheets;
wherein the upper part and lower part of the end wall of the insertion cavities, adjacent to the left sliding cavity, are respectively provided with a first sliding pushing groove whose opening faces towards said insertion cavities,
wherein the right half sections of said first sliding pushing grooves are communicated with said left sliding pushing cavity;
a left sliding pushing plate which can move left and right installed in said left sliding pushing cavity;
a left stud extending leftwards and rightwards installed in the left sliding pushing plate in a matched mode,
wherein the left end of said left stud is rotatably mounted in the left end wall of said left sliding pushing cavity, and its right end is in power connection with said motor;
first sliding arms that can move left and right arranged in said first sliding pushing grooves,

wherein the right side of the end surface of said first sliding arm, facing the left sliding pushing cavity, is fixedly connected with said left sliding pushing plate and the end surface of said first sliding arms, facing said insertion cavities are provided with first gear chains extending into said insertion cavities;

wherein the upper part and lower part of said charging socket are respectively provided with a pushing slot connecting said insertion cavities and said right sliding pushing cavity;

pushing arms movably mounted in said pushing slot,

wherein the end surfaces of said pushing arms facing said right sliding cavity, are provided with first oblique inserting surfaces;

wherein said right sliding pushing cavity is further provided with a right sliding pushing plate which can move left and right and a right stud is arranged in said right sliding pushing plate in a matched mode,

wherein the left end of said right stud is in power connection with said motor, and its right end is rotatably mounted in the right end wall of said right sliding pushing cavity;

wherein the right end of said right sliding pushing plate, in its upper part and lower part, is respectively provided with second oblique inserting surfaces which are in a matched mode with said first oblique inserting surfaces;

second sliding pushing grooves with openings facing said insertion cavities set in the end wall of said insertion cavities, opposite to said first sliding pushing grooves,

wherein said second sliding pushing grooves are located on the left side of said left sliding pushing cavity and said second sliding pushing grooves are mounted with second sliding arms which can move left and right, the end surfaces of which, facing said insertion cavities are respectively provided with a second gear chain extending into said insertion cavities,

wherein the end wall of said second sliding pushing grooves, back on to said insertion cavities are respectively provided with a dovetail slot with an opening facing said second sliding pushing grooves, which are provided with two dovetail blocks that are capable of moving left and right and are in fixed connection with said second sliding arms;

wherein the end wall of said insertion cavities opposite to said first sliding pushing grooves is further provided with joint grooves located on the right sides of said second sliding pushing grooves and face towards said insertion cavities, and the left end of said joint grooves is communicated with said second sliding pushing grooves, while the right end of said joint grooves is communicated with the outside;

wherein the upper part and lower part of the left end surface of said charging end socket are respectively provided with a insertion rod which is matched with said insertion cavities,

wherein left through grooves which link through upside and downside and right through grooves that are matched with said pushing arm are formed in said insertion rod,

wherein third sliding pushing grooves extending up and down are correspondingly formed in the front end wall and the rear end wall of said left through grooves, and sliding tables capable of moving up and down are installed in each third sliding pushing groove, and a rotating rod is rotationally arranged between two sliding tables and rotating rods are fixedly provided with sprockets which are matched with said first gear chains and said second gear chains.

2. The high-precision robot according to claim 1, wherein the right end wall of said dovetail slots is fixedly mounted with power connectors connected to mains supply; the right end surface of said dovetail blocks is fixedly mounted with first power transmission chips; the left end wall of said left sliding pushing cavity is respectively arranged with second power transmission chips, and the upper part and lower part of the left end wall of said left sliding pushing plate is respectively arranged with third power transmission chips;

wherein said second power transmission chips is in power connection with said first power transmission chips, and said third power transmission chips is in power connection with said electrical connecting sheets;

wherein said power connectors and said first power transmission chips are located on the same horizontal line, and said second power transmission chips and said third power transmission chips are located on the same horizontal line.

3. The high-precision robot according to claim 1, wherein the left end wall of said dovetail slots is fixedly mounted with first elastic sheets which are in fixed connection with said dovetail blocks.
4. The high-precision robot according to claim 1, wherein guide grooves are correspondingly formed in the left end wall and the right end wall of said pushing slot; wherein guide blocks fixedly connected with said pushing arm are movably arranged in said guide grooves and the end wall of said guide grooves, close to said insertion cavities is fixedly mounted with second elastic sheets which are fixedly connected with said guide blocks.
5. The high-precision robot according to claim 1, wherein said third sliding pushing grooves are further arranged with third elastic sheets which are fixedly connected to said sliding tables.
6. The high-precision robot according to claim 1, wherein the distance from the front end face to the rear end face of said insertion rods is equal to the distance from the front end wall to the rear end wall of said insertion cavities and the distance from the upper end surface to the lower end surface of said insertion rods is smaller than the diameter of the root circle of said sprockets.
7. The high-precision robot according to claim 1, wherein the distance from said pushing slot to the right end surface of said charging socket is equal to the distance from said right through grooves to the left end surface of said charging end socket.
8. The high-precision robot according to claim 1, wherein said damping plates are arranged at the upper end and the lower end of said motor and are fixedly connected with it; said heat absorbing sheets are arranged at the front end and the rear end of said motor and are fixedly connected with the shell of said motor, wherein the upper end and the lower end of said heat absorbing sheets are both fixedly connected with said damping plates and more than two heat absorbing sheets are arranged at the front end and the rear end of said motor respectively.