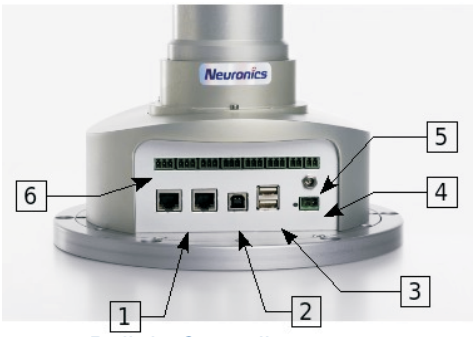
Harmonic Arm 6M

Flexible and robust robotic solutions for diverse applications

Harmonic Arm 6M with built-in Controller

- DC-Motors with integrated encoders
- Manipulators with various sensors
- Intelligent control
- Stand-alone or on a mobile robot
- Precision: +/-0.1mm repeatability
- Drive System: Harmonic Drive
- Velocity : 90° per sec. (Concurrent motion of all axes possible)
- Degree of freedom 5 to 6 (6 Motors)
- External or built-in Controller
- Interfaces: Serial and SPI
- Construction: anodized aluminum
- Power: Max. 100W (24V, 4.17A)
- Weight: 4.3kg

External Controller



Built-in Controller

Harmonic Arm 6M Controller (Embedded LINUX)

1 Ethernet
Accessible through the two RJ45 connectors

2 USB Device
It serves as an alternative to Ethernet port for communication purposes. Provides a point-to-point connection to a robot while still using the TCP/IP protocol.

3 USB Host
Accessible through two USB connectors. Used for the connection of the remote control, for user specific Interfaces to peripherals, for storing program for stand-alone mode and for updating the firmware.

4 Industrial Power Supply
24VDC, 4.17A, Max.100W

5 AC Power Supply

6 Digital I/Os
6(A-F) inputs, and 2(A,B) outputs, total 8 digital I/Os. Of the 6 inputs, In E is assigned to Soft Stop, and In F to Power Fail.

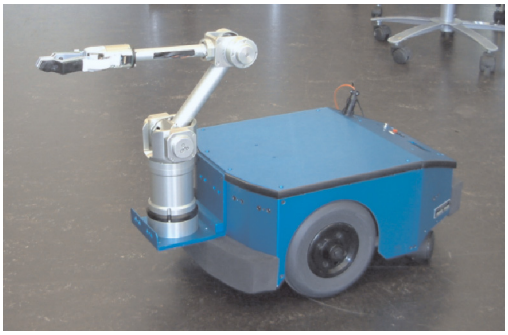
Harmonic Arm expands the possibilities of your research and experiments. Built-in or an external controller allow advanced programming without PC. Customized grippers can be designed and mounted according to the requirements of the application.

Applications

- R&D, Education
- Handling of objects up to a weight of 500g in industrial environments

Environment

(1) Stand-alone, on a linear axis, or on a mobile robot
(2) Movement direct control with a USB or a serial output
(3) Under embedded LINUX control
(4) Control from a mobile robot



Harmonic Arm on LABO-3 Mobile Robot

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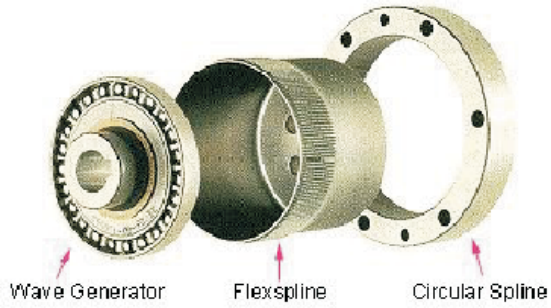
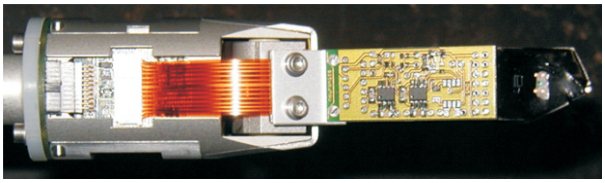
Harmonic Drive

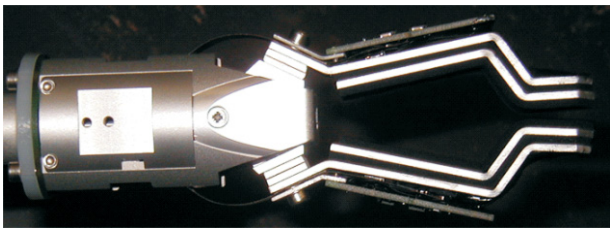
Harmonic Drives are mounted to ensure a precise positioning with minimal play per axis. They allow precise movements without slackness and high repeatability of up to 0.1mm.



Custom-made solutions can be tailored

The 6M version offers the most flexibility: with its six motors, it provides up to six degrees of freedom. It's easy to mount on varied places like rails, mobile robots,etc. In addition to the wide range of standard gripper solutions (integrated or external), Harmonic Arm features an adapter plate to easily accommodate virtually any customer-specific gripper configuration. It is perfect for both industrial applications and R&D.





Gripper

Finger Gripper

A two-fingered gripper is part of the standard configuration. The fingers can be dismantled easily if the gripper needs to be replaced for a different handling application.

Finger Gripper, Passive Joint

If your objects need to be handled in a perpendicular orientation, this can be realized by means of a pendular gripper whose chucks are mounted on ball bearings attached to the gripper fingers. The swinging chucks are adjusted by gravity and remain in a perpendicular position.

Sensor Gripper S03.02

This two-fingered gripper comes equipped with several different sensors:

- Infrared reflex sensors inside and outside the fingers for object detection
- Pressure sensors on the inside of the fingers
- Optional electrical conductivity measurement
- Dedicated Microcontroller for the sensors

Gripper for special applications

- Universal gripper with application specific shaped fingers, with or without sensors.
- Grippers made to specifications for user specific Tasks, also with additional joints.
- Gripper with rhomboid mechanics
- Single tool, turnable by the fifth motor, without sensors

Compatible with 3rd party gripper

Grippers from several manufactures can be used

- Two-finger gripper MPG 25 from Schunk, Lauffen (D)
- Magnetic Gripper (i.e. Micro gripper MC-GE 005, Schunk)
- Lightweight vacuum gripper from different manufacturers can be attached to the gripper flange

Interface between Arm and Gripper

- Coupling for force transmission from the last motor to the gripper or extension.
- Power supply and data bus.
- Independent two-stranded line to the base of the robot, for example for video signals from a mini camera mounted on the gripper.

Controller Specifications

	Harmonic Arm 6M
Structure	Integrated communication and motor control
MMI	Any computer device(Laptop, Desktop, Ind. PC, PLC,...)
Control Method	Distributed controllers
Driving Method	DC brush motors with high precision digital encoders
Language	C++, Java, 4th Demension, LabView, PLC IEC 61131
Teaching Method	Pointing device or manual movement of the robot
Learnig ability	Integrated Neural Network module
Input Signals	2 digital/4 analog
Output Signals	2 digital
Communications	RS232 / CAN bus / K- Net
Time Settings	Programmable
Self-Diagnosis	Self-Calibration

Specifications are subject to change without notice.