Neuronics AG
CH-8005 Zürich

Neuronics Inc.

Company and Product

Sales, Neuronics Inc.
Applied AI Systems, Inc.

Neuronics

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About Neuronics Inc.

- Spin off from the Artificial Intellingence Laboratory of University of Zürich
- Moved to Technopark Zürich in 1999
- Founded Neuronics Inc. in 2001
- Presently about 20 employees
- Concluded sales agency contract with Applied AI Systems, Inc. and AAI Japan, Co. Ltd. in 2004

Specialization:
Highly flexible arms, stand alone or on a mobile robot and gripper, designed for Human and Environmental interraction

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Harmonic Arm: Flexible Automation in the Smallest Space

- 3-5 kg Weight
- Gripper with 16 sensors
- Distributed Processing power
- Simple to operate
- Capable of learning
- Repetition accuracy 0.1 mm
- Maximum payload 0.5 kg
- Integrated power electronics
- Usable without fencing

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Different models

- 5-6 Motors/Axels
- Different mountings for the gripper
- Gripper with various angles
- Sensor fingers
- Vacuum gripper
- Axels with various lengths

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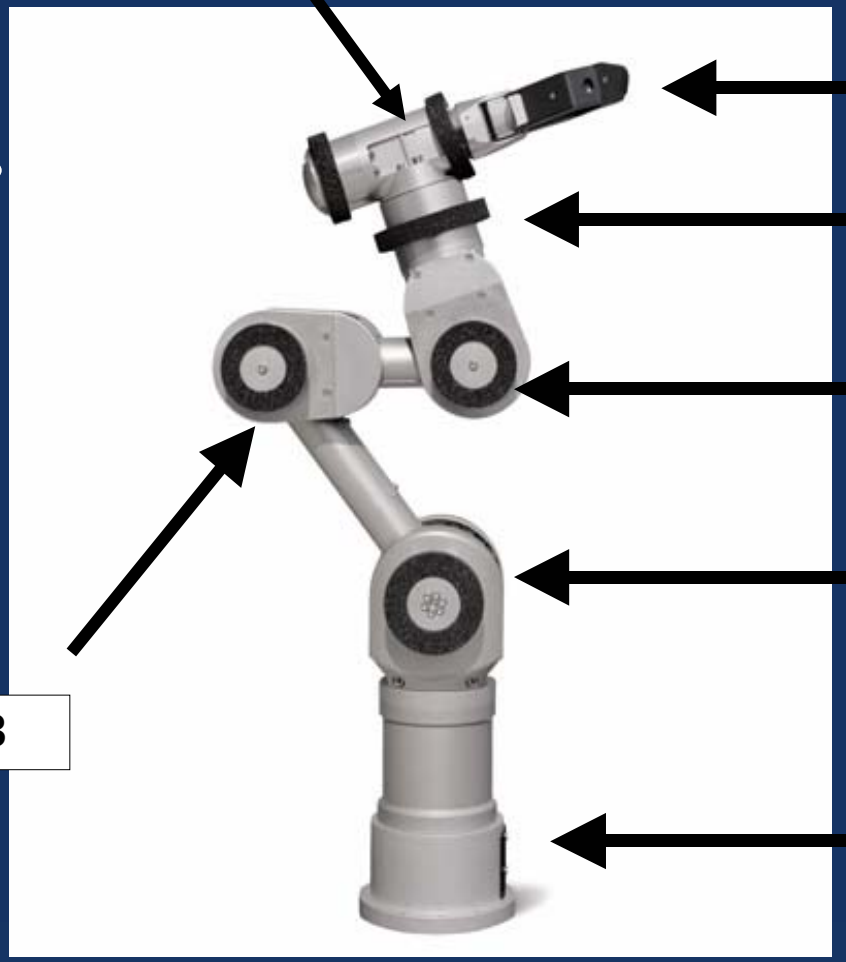
Drive components

- DC-Motors with integrated encorders
- About 90‘000 pulse /360 °



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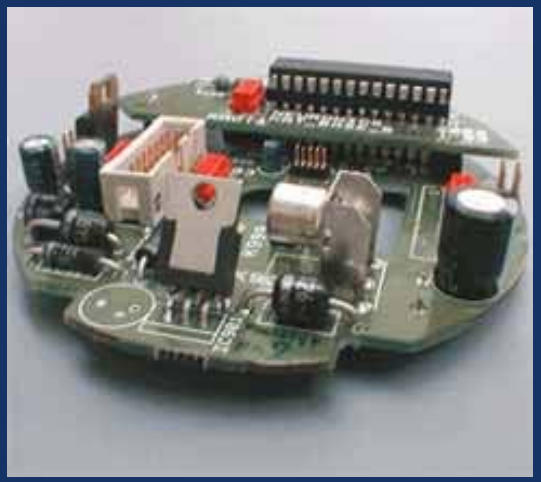
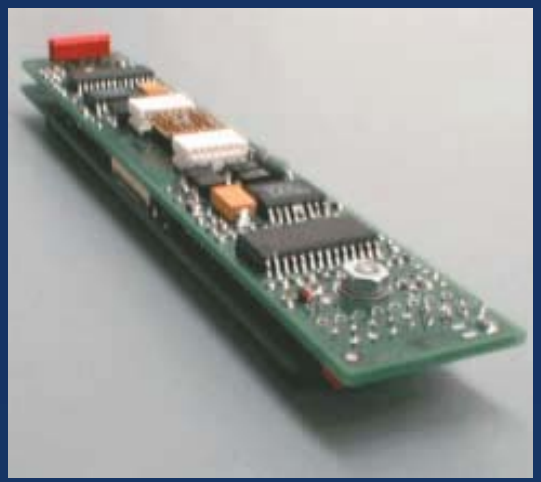
Control Components

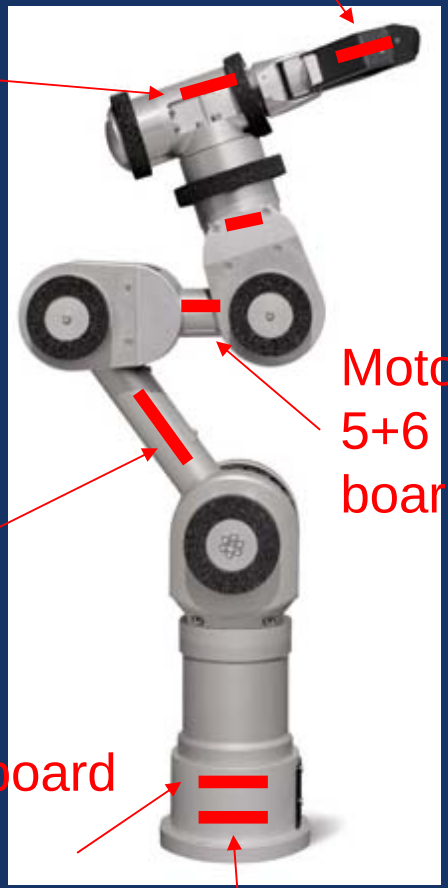
- Electronic Boards



Master controller board



Slave Controller board
with 4 Micro-controllers
for motors 2-4
(1 spare)



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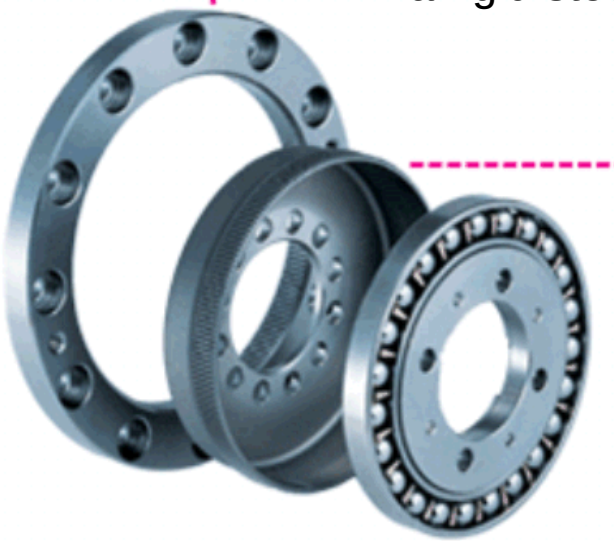
Drive System

Harmonic Drive (0 play)



Circular Spline

a rigid steel ring with internal teeth

Flexspline

a thin cup-shaped metal rim component with external teeth.

Wave Generator

a component having small ball bearings built into the outer circumference of the elliptical cam

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Harmonic Arm can...

…. *pick and place*

Metal stamp parts
die cast parts
groceries etc.

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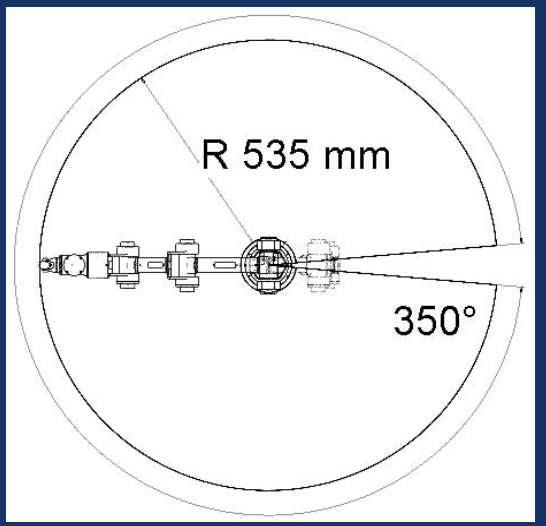
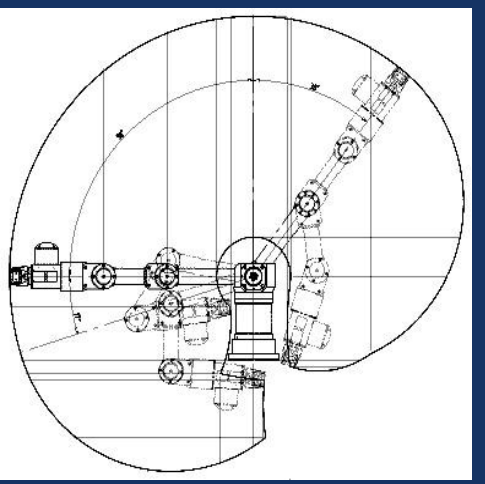
Action space





Action space of Harmonic Arm 6M
from the above (left) and the side (right)

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Applications

- Pick & Place-tasks with metal working machinery
- Pick-up tasks with die cast object
- Handling parts in test / control area
- Packing industry
- Service-robotic
- Automating manual tasks
- Research and Education
- Small parts assembly

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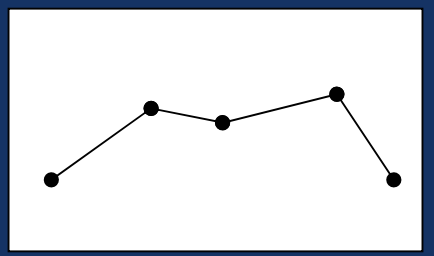
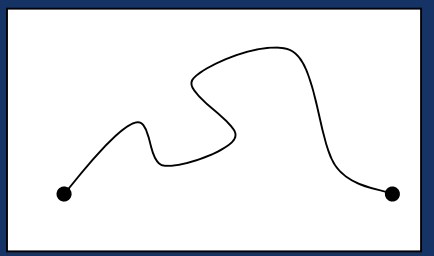
The Harmonic Arm can….

…. *Drive along a line*

for glueing, mounting, welding, ornamenting





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Components

- Trace accuracy: +/- 0.7 mm

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The Harmonic Arm can….

…… ***Feel***

with Pressure sensors
Infrared sensors
Resistance sensors

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Universal Sensor-Gripper

(IR= Infrared Sensors, FS = Force Sensors)

No.	Kind	Location	Position
0	IR reflex	Right finger	Inner middle part
1	IR reflex	Right finger	Inner front part
2	*Reserve*	Right finger	--
3	Conductivity	Both fingers	User specific
4	IR reflex	Right finger	Outer side
5	IR reflex	Right finger	Front bottom
6	Force	Right finger	Rear
7	Force	Right finger	Front
8	IR reflex	Left finger	Inner middle part
9	IR reflex	Left finger	Inner front part
10	*Reserve*	Left finger	--
11	IR reflex	Gripper main body	Center
12	IR reflex	Left finger	Outer side
13	IR reflex	Left finger	Front bottom
14	Force	Left finger	Rear
15	Force	Left finger	Front

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The Harmonic Arm can…

….*be simply programmed manually*

teach- in

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The Harmonic Arm can….

…..***Injure nobody!***

Harmonic Arm is safe (EU certificate), and can directly interact with humans

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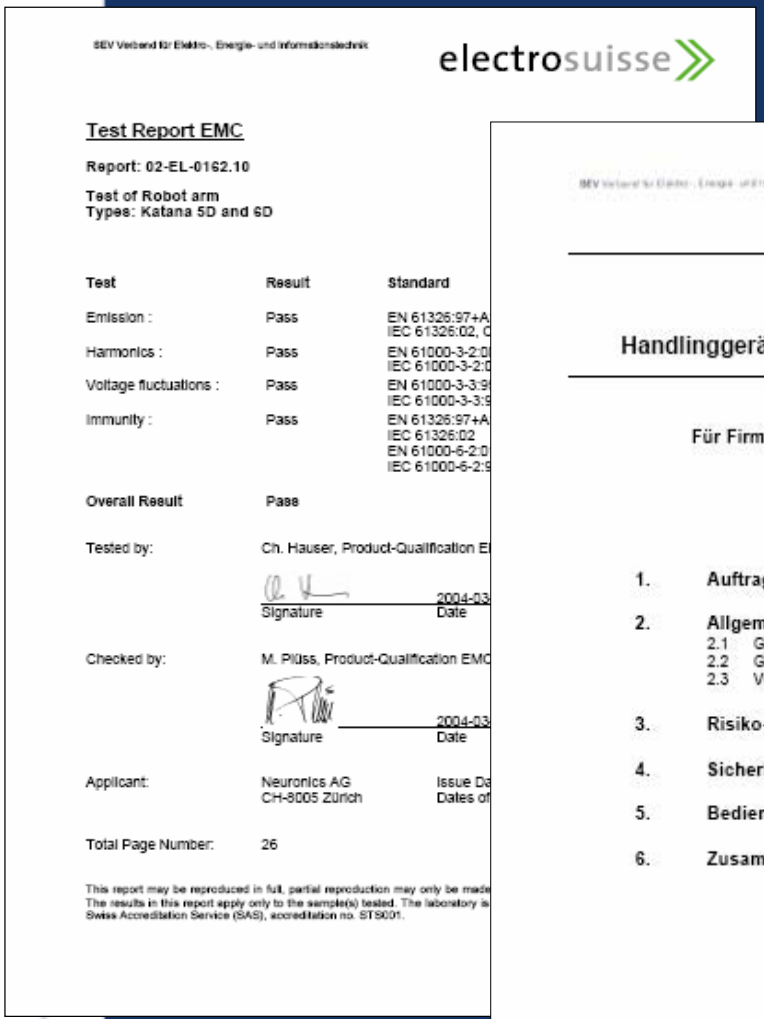
The Harmonic Arm is certified to be safe!



SEV Verband für Elektro-, Energie- und Informationstechnik

electrosuisse

Test Report EMC

Report: 02-EL-0162.10

Test of Robot arm
Types: Katana 5D and 6D

Test	Result	Standard
Emission :	Pass	EN 61326:97+A IEC 61326:02, C
Harmonics :	Pass	EN 61000-3-2:0 IEC 61000-3-2:0
Voltage fluctuations :	Pass	EN 61000-3-3:9 IEC 61000-3-3:9
Immunity :	Pass	EN 61326:97+A IEC 61326:02 EN 61000-6-2:0 IEC 61000-6-2:9
Overall Result	Pass	

Tested by: Ch. Hauser, Product-Qualification El

Signature 2004-03- Date

Checked by: M. Plüss, Product-Qualification EMC

Signature 2004-03- Date

Applicant: Neuronics AG
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Issue Da
Dates of

Total Page Number: 26

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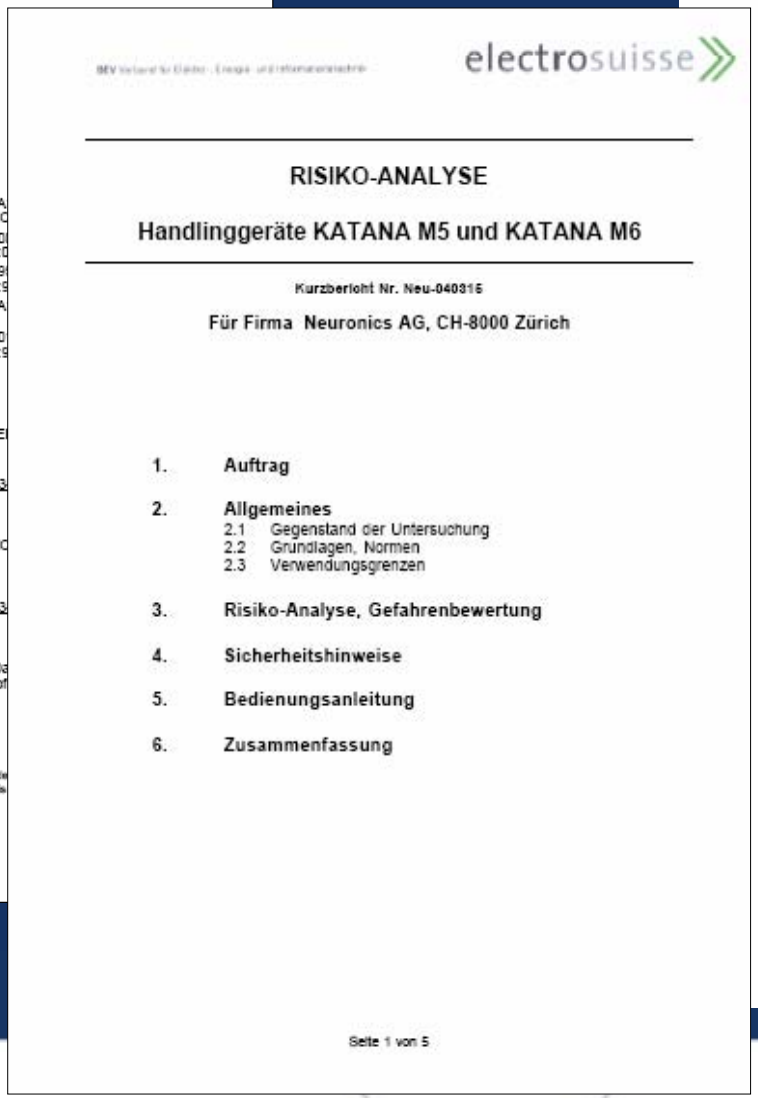
Swiss Accreditation Service (SAS), accreditation no. STS001.



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RISIKO-ANALYSE

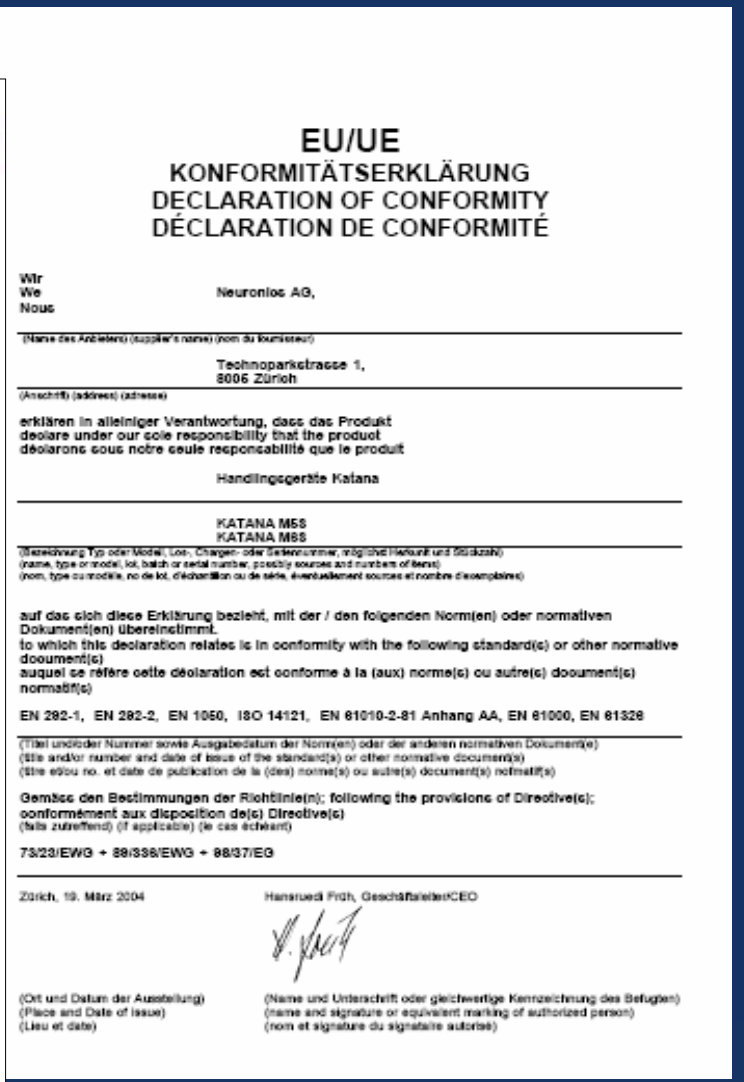
Handlinggeräte KATANA M5 und KATANA M6

Kurzbericht Nr. Neu-040315

Für Firma Neuronics AG, CH-8000 Zürich

1. Auftrag
2. Allgemeines
   - 2.1 Gegenstand der Untersuchung
   - 2.2 Grundlagen, Normen
   - 2.3 Verwendungsgrenzen
3. Risiko-Analyse, Gefahrenbewertung
4. Sicherheitshinweise
5. Bedienungsanleitung
6. Zusammenfassung

Seite 1 von 5



EU/UE
KONFORMITÄTSERKLÄRUNG
DECLARATION OF CONFORMITY
DÉCLARATION DE CONFORMITÉ

Wir / We / Nous: Neuronics AG,

(Name des Anbieters) (supplier's name) (nom du fournisseur)

Technoparkstrasse 1,
8005 Zürich

(Anschrift) (address) (adresse)

erklären in alleiniger Verantwortung, dass das Produkt
declare under our sole responsibility that the product
déclarons sous notre seule responsabilité que le produit

Handlingsgeräte Katana

KATANA M5S
KATANA M6S

(Bezeichnung Typ oder Modell, Los-, Chargen- oder Seriennummer, möglicher Herkunft und Stückzahl)
(name, type or model, lot, batch or serial number, possibly sources and numbers of items)
(nom, type ou modèle, no de lot, d'échantillon ou de série, éventuellement sources et nombre d'exemplaires)

auf das sich diese Erklärung bezieht, mit der / den folgenden Norm(en) oder normativen Dokument(en) übereinstimmt.
to which this declaration relates is in conformity with the following standard(s) or other normative document(s)
auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou autre(s) document(s) normatif(s)

EN 282-1, EN 282-2, EN 1050, ISO 14121, EN 61010-2-81 Anhang AA, EN 61000, EN 61326

(Titel und/oder Nummer sowie Ausgabedatum der Norm(en) oder der anderen normativen Dokument(e))
(title and/or number and date of issue of the standard(s) or other normative document(s))
(titre et/ou no. et date de publication de la (des) norme(s) ou autre(s) document(s) normatif(s))

Gemäss den Bestimmungen der Richtlinie(n); following the provisions of Direktive(s);
conformément aux dispositions de(s) Directive(s)
(falls zutreffend) (if applicable) (le cas échéant)

73/23/EWG + 89/336/EWG + 98/37/EG

Zürich, 19. März 2004

Hansruedi Früh, Geschäftsleiter/CEO

(Ort und Datum der Ausstellung)
(Place and Date of Issue)
(Lieu et date)

(Name und Unterschrift oder gleichwertige Kennzeichnung des Befugten)
(name and signature or equivalent marking of authorized person)
(nom et signature du signataire autorisé)

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Fundamentally Safe

For the last few years, Neuronics Inc. has developed Harmonic Arm, a lightweight gripper-arm, under consideration of the required safety aspects, which can be labelled as ***safe in principle***.

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EU-Conformity Description

Neuronics AG, Technoparkstrasse 1, 8005 Zürich,

explain in sole responsibility that the product

Item: Harmonic Arm

Harmonic Arm 5M S

Harmonic Arm 6M S

Under the regulations of the guidelines 73/23/EWG + 89/336/EWG + 98/37/EG

with the following standards and norms

EN 292-1, EN 292-2, EN 1050, ISO 14121, EN 61010-2-81 appendix AA, EN 61000, EN 61326.

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Filled Norms

- **EN 292-1**
  Safety of machinery – Basic concepts, general principles for design part 1: Basic terminology, methodology
- **EN 292-2**
  Safety of machinery – Basic concepts, general principles for design part 2: Technical principles and specifications
- **EN 1050**
  Safety of machinery - Principles for risk assessment
- **ISO 14121**
  Safety of machinery – Principles of risk assessment
- **EN 61010-2-81** appendix AA
  Safety requirements for electrical equipment, control, and laboratory use
- **EN 61000**
  Electromagnetic compatibility
- **EN 61326**
  Standards for Measurement, Control and Laboratory Equipments

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The Harmonic Arm can….

…..be battery operated

Power	Max. 60 Watt
Voltage:	12V
Current:	5 A

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Keller Ltd. (Switzerland)

Measuring Pressure on Welding Machines

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Curamik Electronics, Inc. (Germany)

Handling products in the test area

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Griesser Inc. (Switzerland)

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In the process of a small scale mass production

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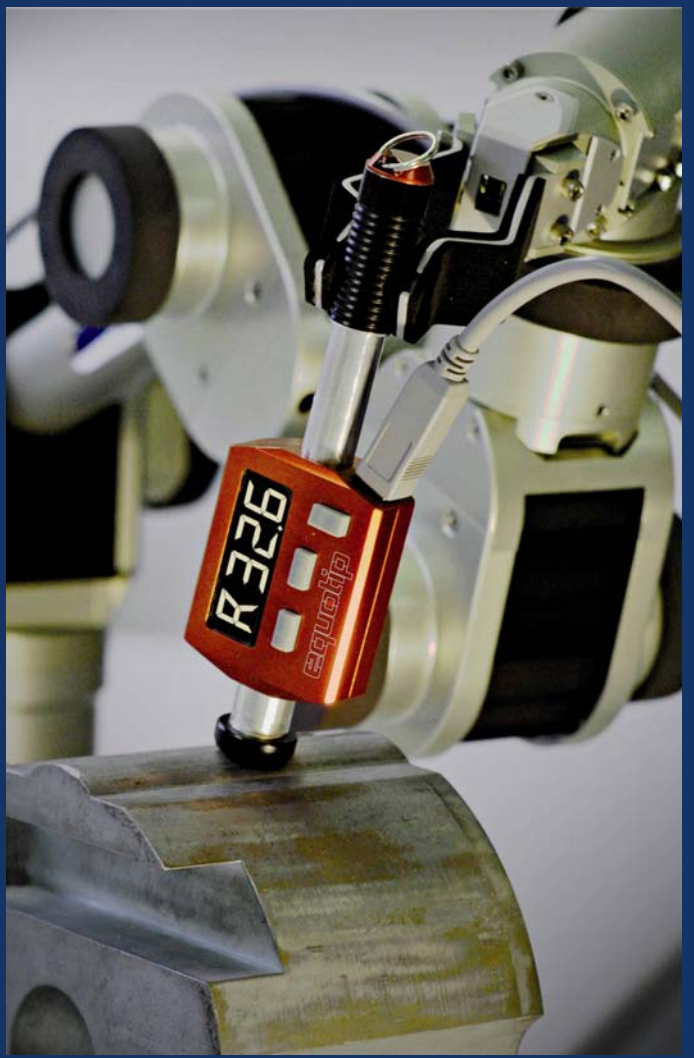

Hardness-Measuring

www.proceq.com

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Proceq Inc. (Germany)

Hardness Testing

Manual task

Automated with
Harmonic Arm

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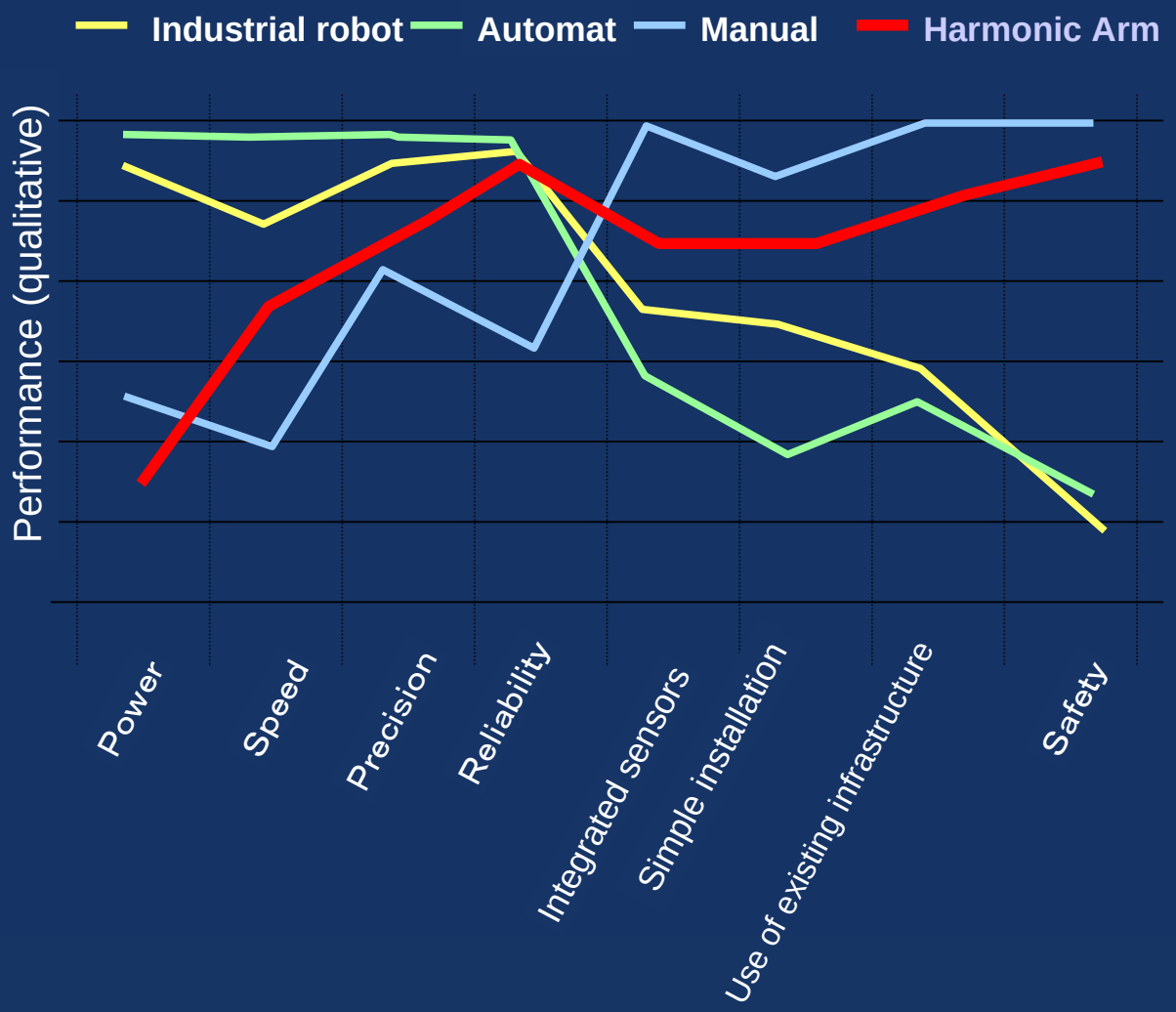
Criterion-Comparison



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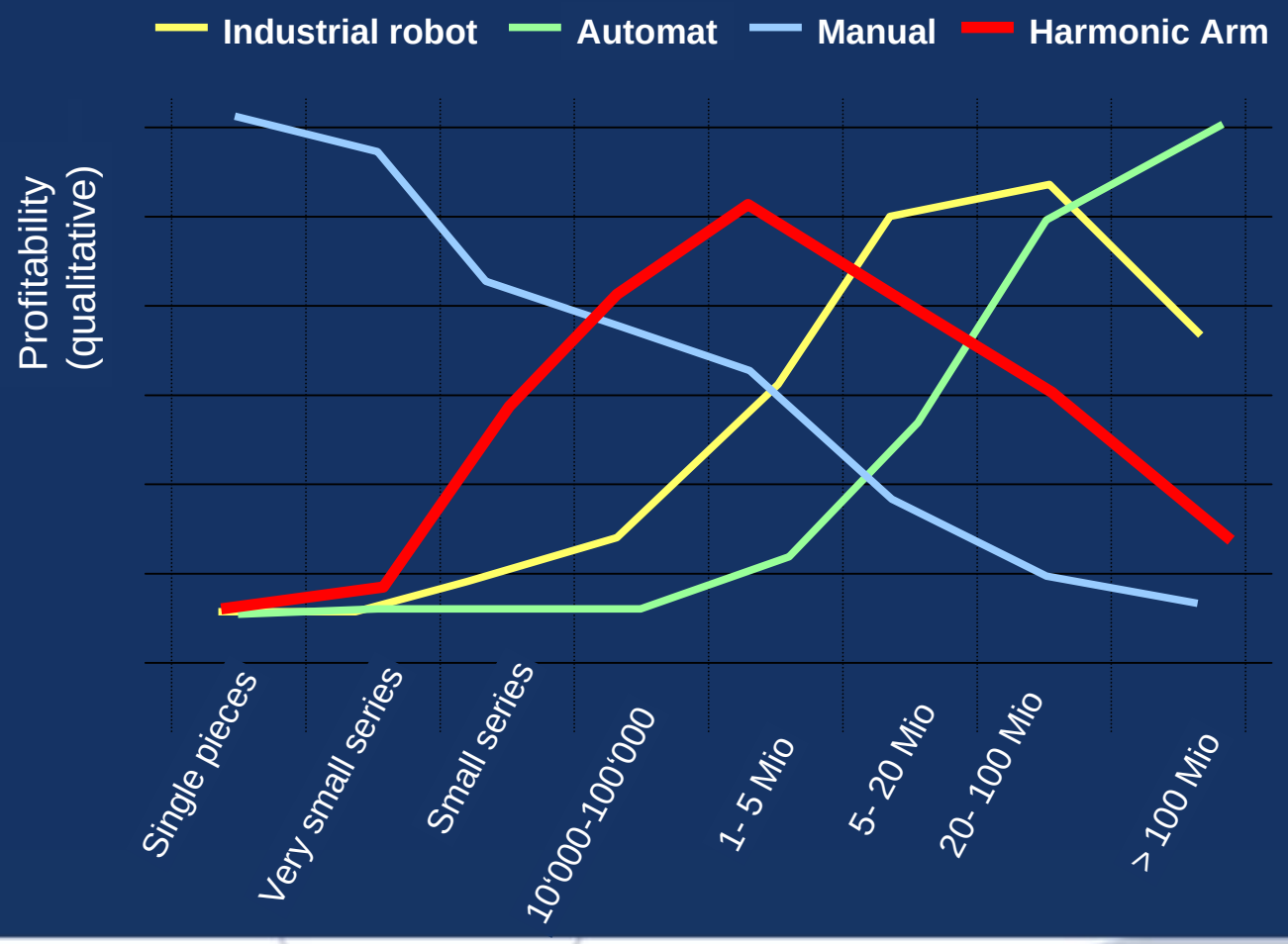
Profitability vs number of pieces / year



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Harmonic Arm 2

Application to Space Development

- Payload : 5 kg
- Repetition accuracy :0.1 mm
- Remote control with <10 ms reaction time
- Sensorimotor Feedback
- Joint development with DIEHL Inc., Germany

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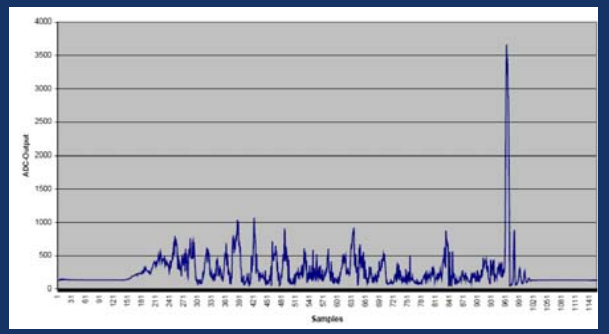
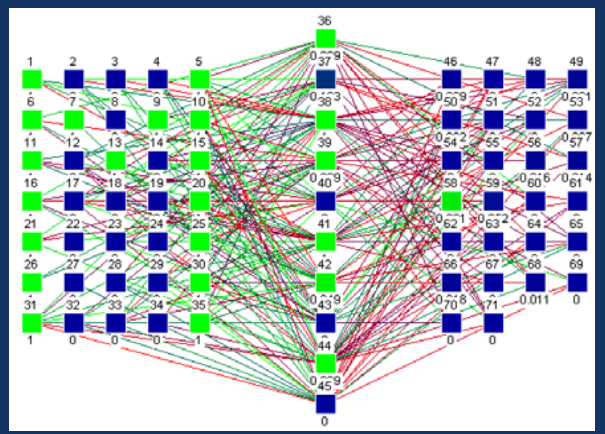
Development of a new sensor for tactile recognition

Kapazitiver Fasersensor





Neuronale Erkennung

Joint project with :

Rapperswil Technical College

Baumer Electric Inc., Switzerland

Schunk Inc., Germany

Neuronics

Neuronics AG
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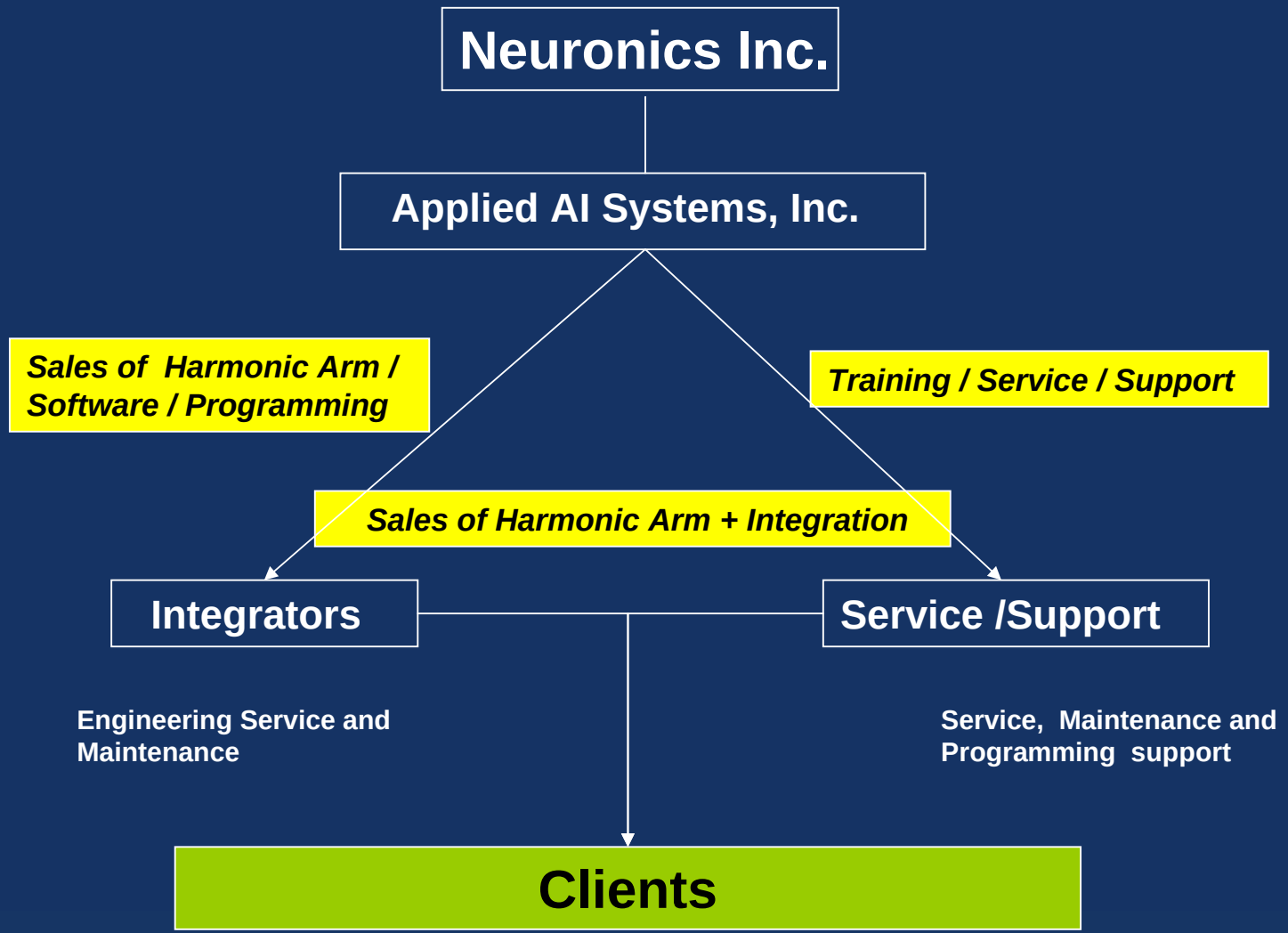
Sales and Services of Harmonic Arm



Contact

Applied AI Systems, Inc.
3232 Carp Road, Ottawa,
Ontario, Canada, K0A 1L0

Tel : +1 (613)839-6161
1-800-895-1122
Fax : +1(613)839-6616
E-mail : info@AAI.ca
URL : http://www.AAI.ca

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Thank you for your attention.

We would be glad, if we could
soon perform a project with you.

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