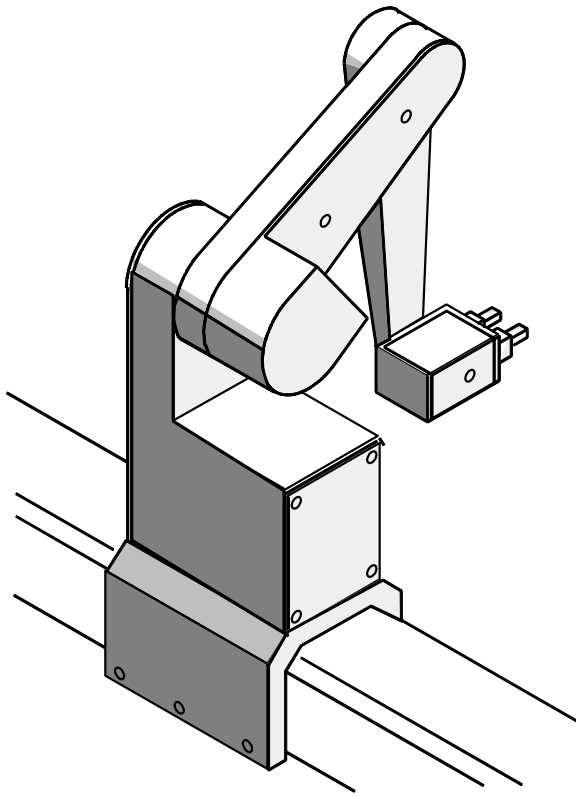
Optimized Robot for Chemical Analysis

ORCA Service Manual



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SAGIAN, Incorporated
Indianapolis, Indiana

Safety Information

The Sagian ORCA Laboratory Robotic System has been designed and tested in accordance with IEC Publication 348, "Safety Requirements for Electronic Measuring Apparatus" as a safety class 1 instrument and CSA C22.2 No. 151–M1986, "Laboratory Equipment." The manuals supplied contain information and warnings that must be followed by the user to ensure safe operation and maintain the robot in safe condition.

The Sagian ORCA Laboratory Robotic System meets the RIA R15.06 Robotic Guideline with the following exceptions:

4.3.2 Status indication for teach pendant

4.4.3 Actuating controls function labels on teach pendant

4.5.2 Integrated emergency stop device for keyboard control

The Sagian ORCA Laboratory Robotic Arm meets the VDI Guideline 2853 with the following exceptions:

3.1.2.6.1 Integrated emergency stop device for keyboard control.

3.2 Design of work systems

The robot has been designed for indoor use. It may be shipped and stored for brief intervals at temperatures between -40°C and +70°C without degradation of its safety.

Whenever the safety protection of the Sagian ORCA Laboratory Robotic System has been compromised, disconnect the unit from all power sources and secure the unit against unintended operation.

When working with the robot system, *do not* write or otherwise work within the robot's working envelope. The robot arm can move at any time and could cause serious bodily injury or instrument damage.

The main plug shall only be inserted in a socket outlet provided with a protective earth ground. The protective circuit must not be negated by the use of an extension cord without a protective conductor.

When the apparatus is connected to its supply, terminals may be live, and the opening of covers or removal of parts (except those to which access can be gained by hand) is likely to expose live parts. The apparatus shall be disconnected from all voltage sources before it is opened for any adjustment, replacement, maintenance, or repair.

Any adjustment, maintenance, and repair of the opened apparatus under voltage shall be avoided as far as possible and, if inevitable, shall be carried out only by a skilled person who is aware of the hazard involved.

Make sure that only fuses with the required rated current and of the specified type are used for replacement. The use of makeshift fuses and the short-circuiting of fuse holders are prohibited.

Electrical Shock Hazard

Do not remove system covers. To avoid electrical shock, use only supplied power cords and connect only to properly grounded (three-hole) wall outlets. Do not use multi-plug power strips.

Any interruption of the protective conductor inside or outside the apparatus or disconnection of the protective earth terminal is likely to make the apparatus dangerous. Intentional interruption is prohibited.

Warning Symbols Used in this Manual

This manual contains safety information that should be followed by the user to ensure safe operation.

Caution

A Caution calls attention to a condition or possible situation that could damage or destroy the product or the user's work.

Warning

A Warning calls attention to a condition or possible situation that could cause injury to the user.

Warning labels placed on the robot system are illustrated and listed at the end of this section.

Environmental Testing

Environmental tests were performed on this product to evaluate the operating and non-operating conditions and limitations of the product. Test guidelines were based in part on international guidelines.

Instrument Operating Environment

Temperature Range

5 to 38° C (41 to 100° F)

Humidity

Up to 95% RH at 40° C (104° F)

Altitude Range

Sea level to 2300 m (7500 ft)

Vibration

Random vibration power spectral density

PSD .0001 g@/Hz from 0 to 350 Hz & -6 dB/octave

PSD .00005 g@/Hz from 350 to 500 Hz

At 0.21 Grms

Acoustics

The Sagian Laboratory Robotic System produces 5.15 bels when idle and 7.57 bels when operating at maximum rail acceleration.

Radiated Emission Levels

30 MHz to 230 MHz

50 MHz to 1000 MHz

Conducted Susceptibility Levels

30 to 50 KHz at 3 V_{rms}

50 KHz to 400 MHz at 1 V_{rms}

Radiated Suseptibility Levels

14 KHz to 1000 MHz at 3 V_{rms}/m

Instrument Non-Operating Environment

Storage Temperature

-40° C to 70° C (-40 to 158° F)

After cold storage of the instrument for more than one hour at temperatures below 0° C or above 56° C, the instrument must be allowed to equilibrate at room temperature for at least one hour before operating.

Storage Humidity

Up to 90% RH at 65° C (149° F)

Altitude

For unpressurized cargo air shipping: 15,300m (50,000 ft) max.

Non–Operating Vibration

Random power spectral density (PSD)
0.015 g^2/Hz at 5 to 100 Hz & -6 dB/octave from 100 to 137 Hz
0.0080 g^2/Hz at 137 to 350 Hz & -6 dB/octave from 350 to 500 Hz
0.0039 g^2/Hz at 350 to 500 Hz
At 2.09 G_{rms}
Swept sine 5 to 500 Hz at 1 octave/min and 0.5 G (0 to peak)

Shock

Shock intensity 30 Gs at change of velocity 427 cm/sec (168 in/sec)

Sound Emission Certification for Federal Republic of Germany

Manufacturer's Declaration

Sound Emission: This information is provided to comply with the requirements of the German Sound Emission Directive dated January 18, 1991.

- Sound Pressure Lp < 70 dB(A)
- At Operator Position
- Normal Position
- According to ISO 7779 (Type Test)

RFI: This is to certify that the equipment G1203A is in accordance with the Radio Interference Requirements of Directive FTZ 1046/1984. The German Bundespost was notified that this equipemnt was put into circulation, and the right to check the series for comoliance with the rueqirements was granted.

Herstellerbescheinigung

Schallemission: Diese Information steht im Zusammenhang mit den Anforderungen der maschinenlarminformationsverordnung vom 18 Januar 1991.

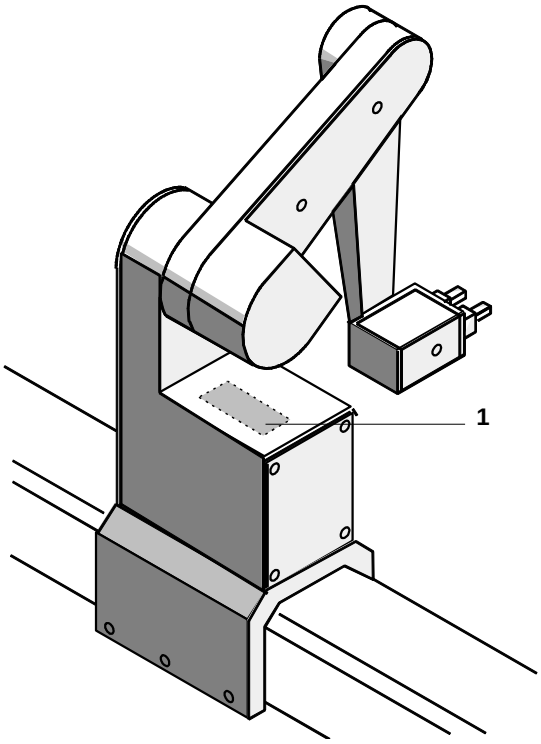
- Schalldruckpegel Lp < 70 dB (A)
- Am Arbeitsplatz
- Normaler Betrieb
- Nach DIN 45635 T. 19 (Typprufüng)

Funkenstoerung: Hiermit wird bescheinigt, daβ das Gerät/System G1203A in Übereinstimmung mit den Bestimmungen von Postverfügung 1046/84 funkentstört ist.

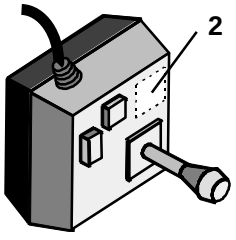
Der Deutchen Bundespost wurde das Inverkehrbringen dieses Gerät/Systems angezeigt und die Berechtigung zur Uberprüfung der Serie auf Einhaltung der Bestimmungen eingeraumt.

Information and Warning Labels

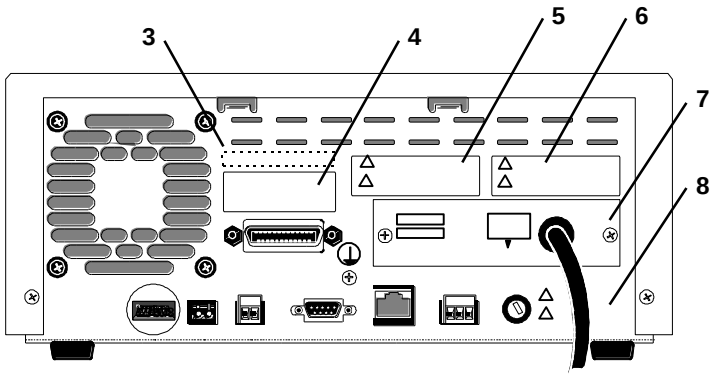
Robot Label Location

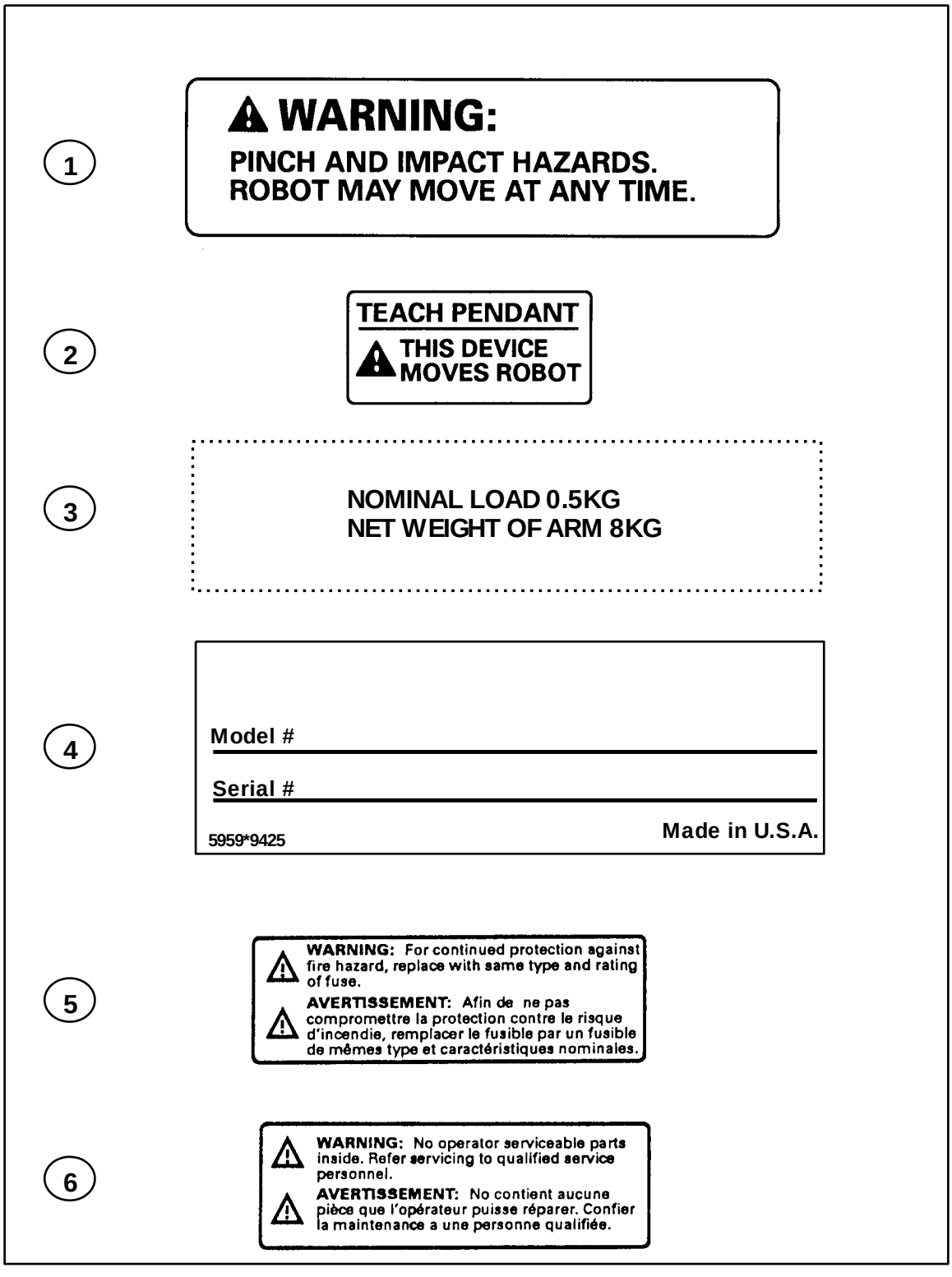


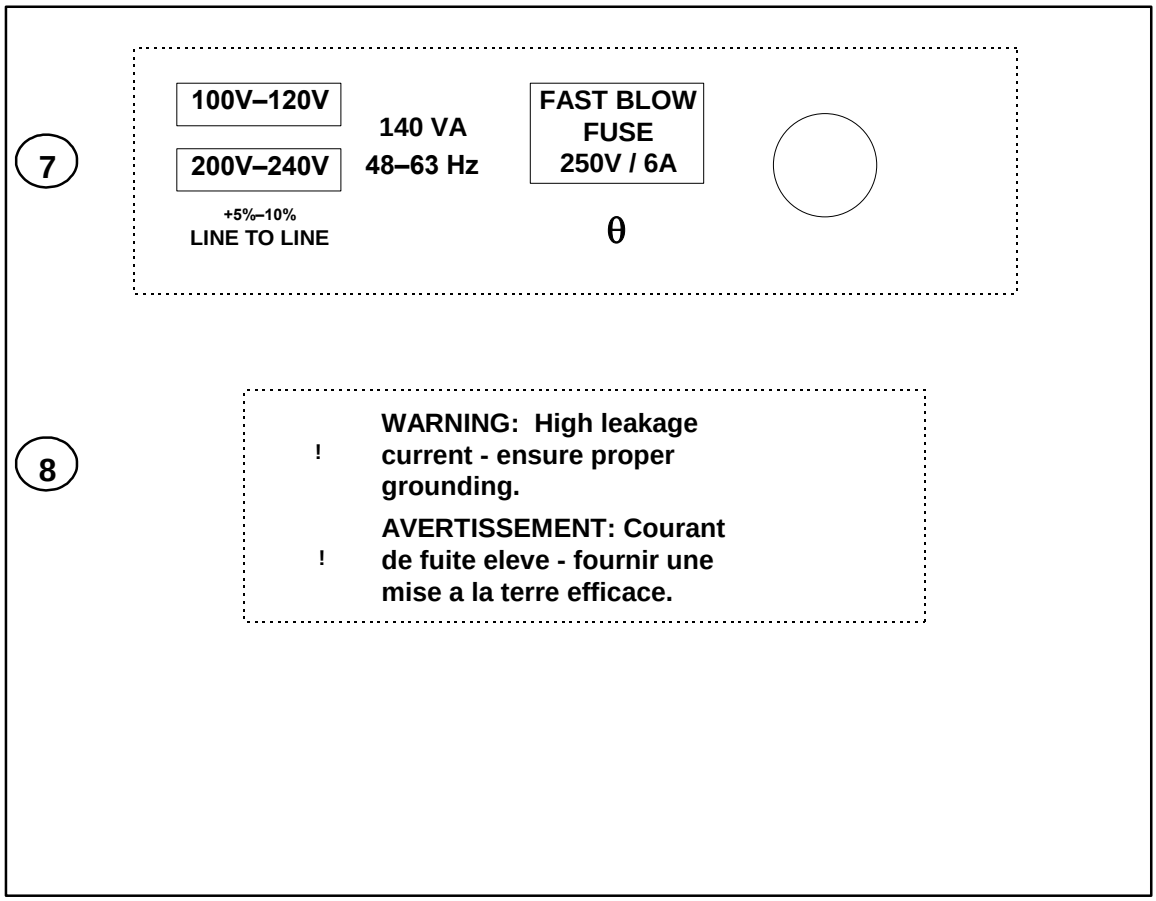
Teach Pendant Label Location



Robot Controller Label Locations




1
⚠ WARNING:
PINCH AND IMPACT HAZARDS.
ROBOT MAY MOVE AT ANY TIME.
2
TEACH PENDANT
⚠ THIS DEVICE
MOVES ROBOT
3
NOMINAL LOAD 0.5KG
NET WEIGHT OF ARM 8KG
4
Model #
Serial #
5959*9425
Made in U.S.A.
5
⚠ WARNING: For continued protection against fire hazard, replace with same type and rating of fuse.
⚠ AVERTISSEMENT: Afin de ne pas compromettre la protection contre le risque d'incendie, remplacer le fusible par un fusible de mêmes type et caractéristiques nominales.
6
⚠ WARNING: No operator serviceable parts inside. Refer servicing to qualified service personnel.
⚠ AVERTISSEMENT: No contient aucune pièce que l'opérateur puisse réparer. Confier la maintenance a une personne qualifiée.


7
100V–120V
200V–240V
+5%–10%
LINE TO LINE
140 VA
48–63 Hz
FAST BLOW
FUSE
250V / 6A
θ
8
!
WARNING: High leakage current - ensure proper grounding.
!
AVERTISSEMENT: Courant de fuite eleve - fournir une mise a la terre efficace.

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