

**ROBOT**

**(V)KR 6, (V)KR 16 L6 arc**

**Technical Data**

**Manipulator**

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We have checked the content of this documentation for conformity with the hardware and software described. Nevertheless, discrepancies cannot be precluded, for which reason we are not able to guarantee total conformity. The information in this documentation is checked on a regular basis, however, and necessary corrections will be incorporated in subsequent editions.

Subject to technical alterations without an effect on the function.

PD Interleaf

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## Technical Data

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Valid for (V)KR 6 arc  
(V)KR 16 L6 arc

## 1 General

The robots of series KR 6 arc and KR 16 L6 arc are six-axis industrial robots for installation on the floor or the ceiling. They are suitable for all point-to-point and continuous-path controlled tasks. The main areas of application are

- Handling
- Assembly
- Application of adhesives, sealants and preservatives
- Machining
- MIG/MAG welding
- YAG laser beam welding

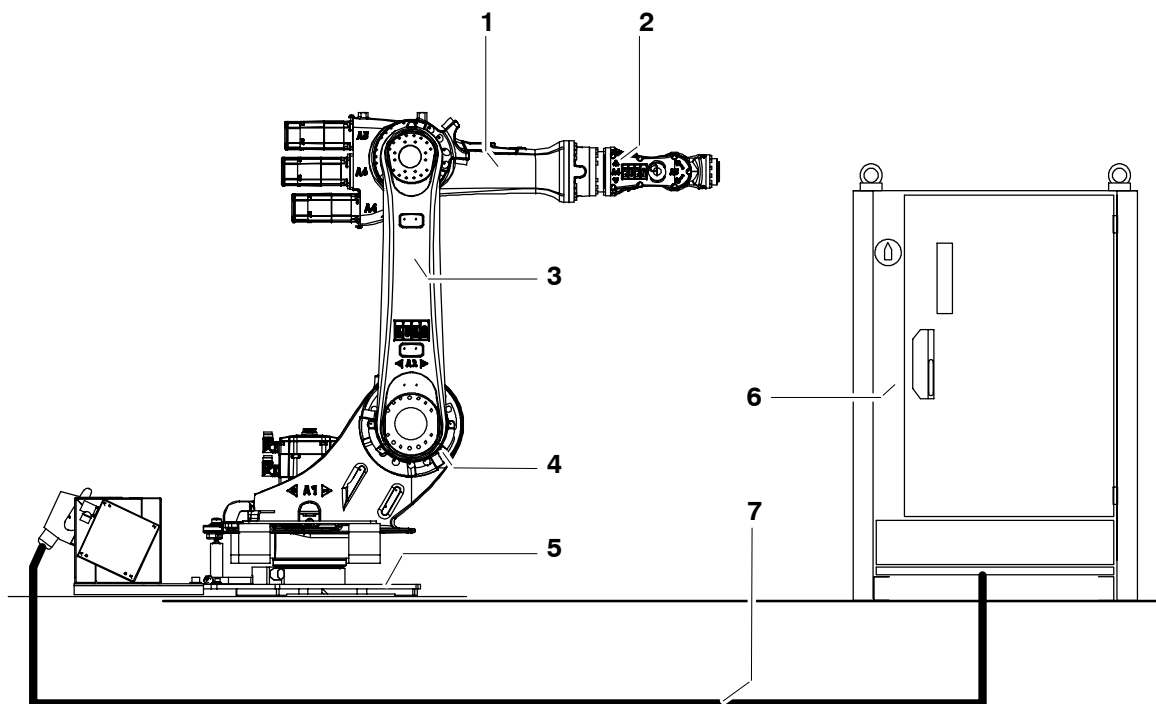


**Using the robot for purposes other than those mentioned above is considered contrary to its designated use (see Doc. Module “Safety, General”).**

**Figure 1** shows the robot system, comprising the manipulator (= robot), control cabinet and connecting cables.

The following data apply, unless otherwise indicated, to both floor-mounted and ceiling-mounted robots.

This description applies analogously to all of the robots listed above, regardless of the type of robot depicted.



- |   |                 |   |  |
|---|-----------------|---|--|
| 1 | Arm             | 5 | Base frame                                   |
| 2 | In-line wrist   | 6 | Control cabinet (see separate documentation) |
| 3 | Link arm        | 7 | Connecting cables                            |
| 4 | Rotating column |   |  |

**Fig. 1 Principal robot components (KR 6 arc depicted)**

## 2 Principal data

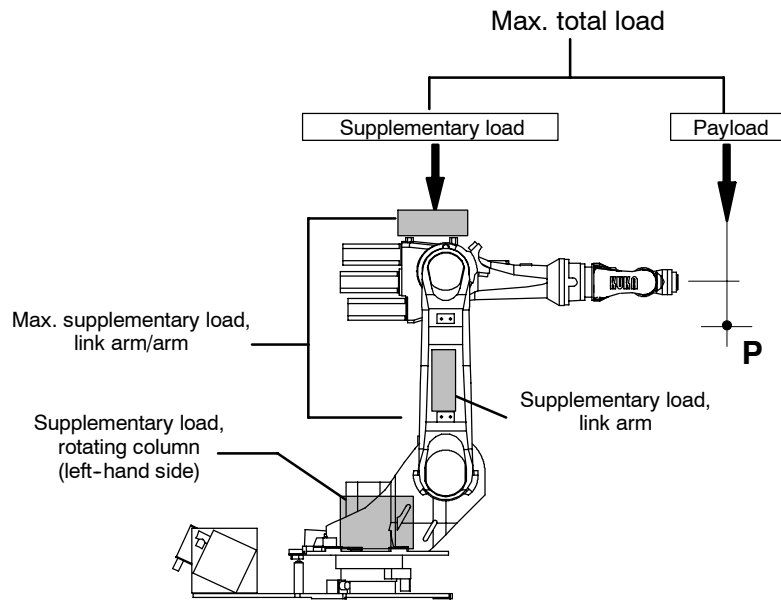
**Types** KR 6 arc  
KR 16 L6 arc

**Number of axes** 6 (Fig. 3)

**Load limits** see following table and Fig. 2

Robot type	<b>KR 6 arc</b>
In-line wrist [kg]	IW 6
Rated payload [kg]	6
Suppl. load, arm [kg]	10
Suppl. load, link arm [kg]	variable
Suppl. load, rotating column [kg]	20
Max. total load [kg]	36

Robot type	<b>KR 16 L6 arc</b>
In-line wrist [kg]	IW 6
Rated payload [kg]	6
Suppl. load, arm [kg]	10
Suppl. load, link arm [kg]	variable
Suppl. load, rotating column [kg]	20
Max. total load [kg]	36



**Fig. 2 Load distribution (example KR 16 L6 arc)**

**Axis data**

All specifications in the “Range of motion” column refer to the **electrical** zero of the robot axis concerned.

**KR 6 arc**

- In-line wrist, rated payload 6 kg

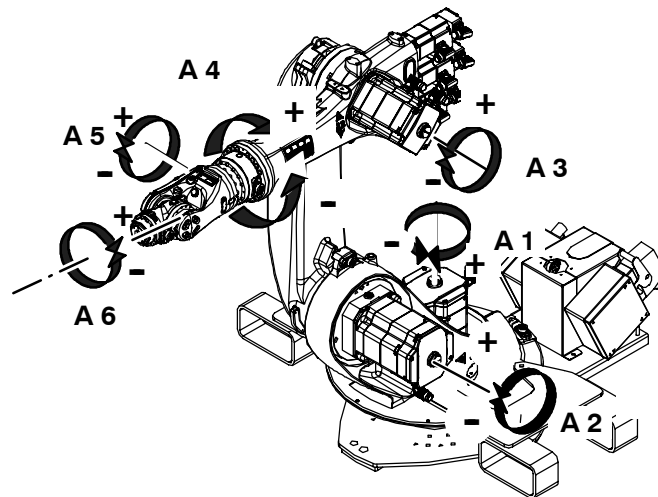
Axis	Range of motion software-limited	Speed with rated payload 6 kg
1	±114°	156 °/s
2	+35° to -155°	156 °/s
3	+154° to -130°	156 °/s
4	±350°	343 °/s
5	±130°	362 °/s
6	±350°	659 °/s



**KR 16 L6 arc**

- In-line wrist, rated payload 6 kg

Axis	Range of motion software-limited	Speed with rated payload 6 kg
1	$\pm 114^\circ$	156 °/s
2	+35° to -155°	156 °/s
3	+154° to -130°	156 °/s
4	$\pm 350^\circ$	335 °/s
5	$\pm 130^\circ$	355 °/s
6	$\pm 350^\circ$	647 °/s



**Fig. 3 Robot axes and their possible motions**

**Repeatability**  $\pm 0.10$  mm

**Mounting position** floor or ceiling

**Principal dimensions** see Fig. 5 and Fig. 6

**Working envelope** The shape and dimensions of the working envelope may be noted from Fig. 5 and Fig. 6.

**Volume of working envelope**

KR 6 arc	9.30 m <sup>3</sup>
KR 16 L6 arc	15.20 m <sup>3</sup>

The reference point is the intersection of axes 4 and 5.



**Load center of gravity P**

see Fig. 4

For all rated payloads, the horizontal distance of the load center of gravity P from the face of the mounting flange is 120 mm; the vertical distance from rotational axis 6 is 100 mm (nominal distance in each case).

**Mounting flange**

DIN/ISO<sup>1)</sup> mounting flange (Fig. 9).

The mounting flange is depicted with axes 4 and 6 in the zero position. The symbol † indicates the position of the locating element (bushing). M6 screws of grade 10.9 are to be used for attaching payloads. The grip length of the screws in the flange must be at least 1.5 x nominal diameter.

Depth of engagement:   min. 6 mm  
  max. 9 mm

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1) DIN/ISO 9409-1-A40

**Weight**

KR 6 arc	approx. 235 kg
KR 16 L6 arc	approx. 240 kg

**Principal dynamic loads**

see Fig. 10

**Drive system**

Electromechanical, with transistor-controlled AC servomotors

**Installed motor capacity**

KR 6 arc	approx. 8.8 kW
KR 16 L6 arc	approx. 8.8 kW

**Protection classification of the robot**

IP 65  
Ready for operation, with connecting cables plugged in (according to EN 60529)

**Protection classification of the in-line wrist**

IP 65 (according to EN 60529)

**Ambient temperature**

During operation:  
278 K to 328 K (+5 °C to +55 °C),  
in the temperature range from 278 K (+5 °C) to 283 K (+10 °C),  
the robot must be warmed up before normal operation.  
During storage/transportation:  
233 K to 333 K (-40 °C to +60 °C).  
Other temperature limits available on request.

<b>Sound level</b>	< 75 dB (A) outside the working envelope
<b>Zero adjustment</b>	For zero adjustment with the electronic probe (accessory) when the tool is mounted, the latter must be designed to allow sufficient space for installation and removal of the probe (Fig. 11).
<b>Color</b>	<b>Robot</b> Base (stationary): black (RAL 9005) Moving parts: orange (RAL 2003).
<b>Plates</b>	see Fig. 12 to Fig. 20.

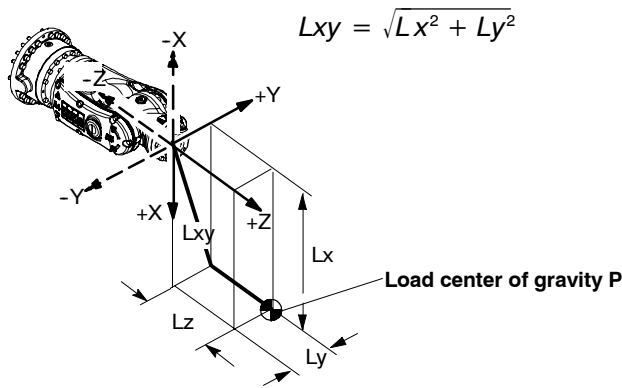


These loading curves correspond to the **maximum** load capacity. Both values (payload and principal moment of inertia) must be checked in all cases. Exceeding this capacity will reduce the service life of the robot and generally overload the motors and the gears; in any such case KUKA must be consulted beforehand.



The values determined here are necessary for planning the robot application. For commissioning the robot, additional input data are required in accordance with the KUKA software documentation.

Robot flange coordinate system



Permissible mass inertia at the design point  
 ( $L_{xy} = 100 \text{ mm}$ ,  
 $L_z = 120 \text{ mm}$ )  
 $0.18 \text{ kgm}^2$ .

**CAUTION:** The mass inertia must be verified using KUKA Load. It is imperative for the load data to be entered in the controller!

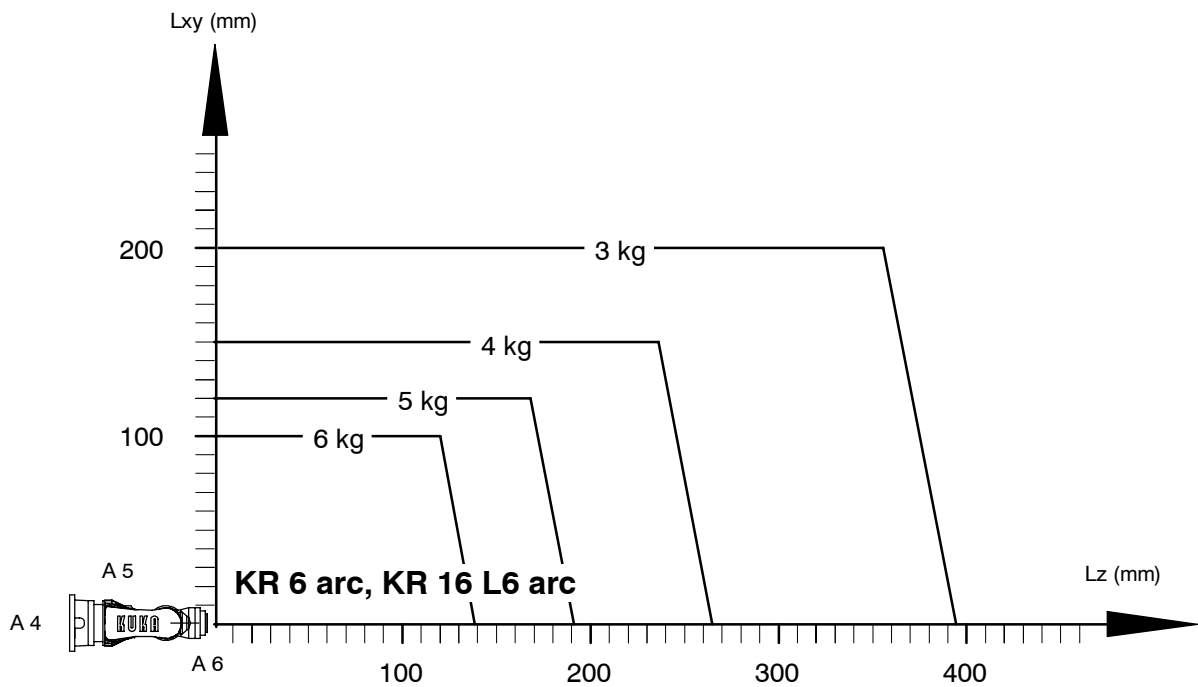
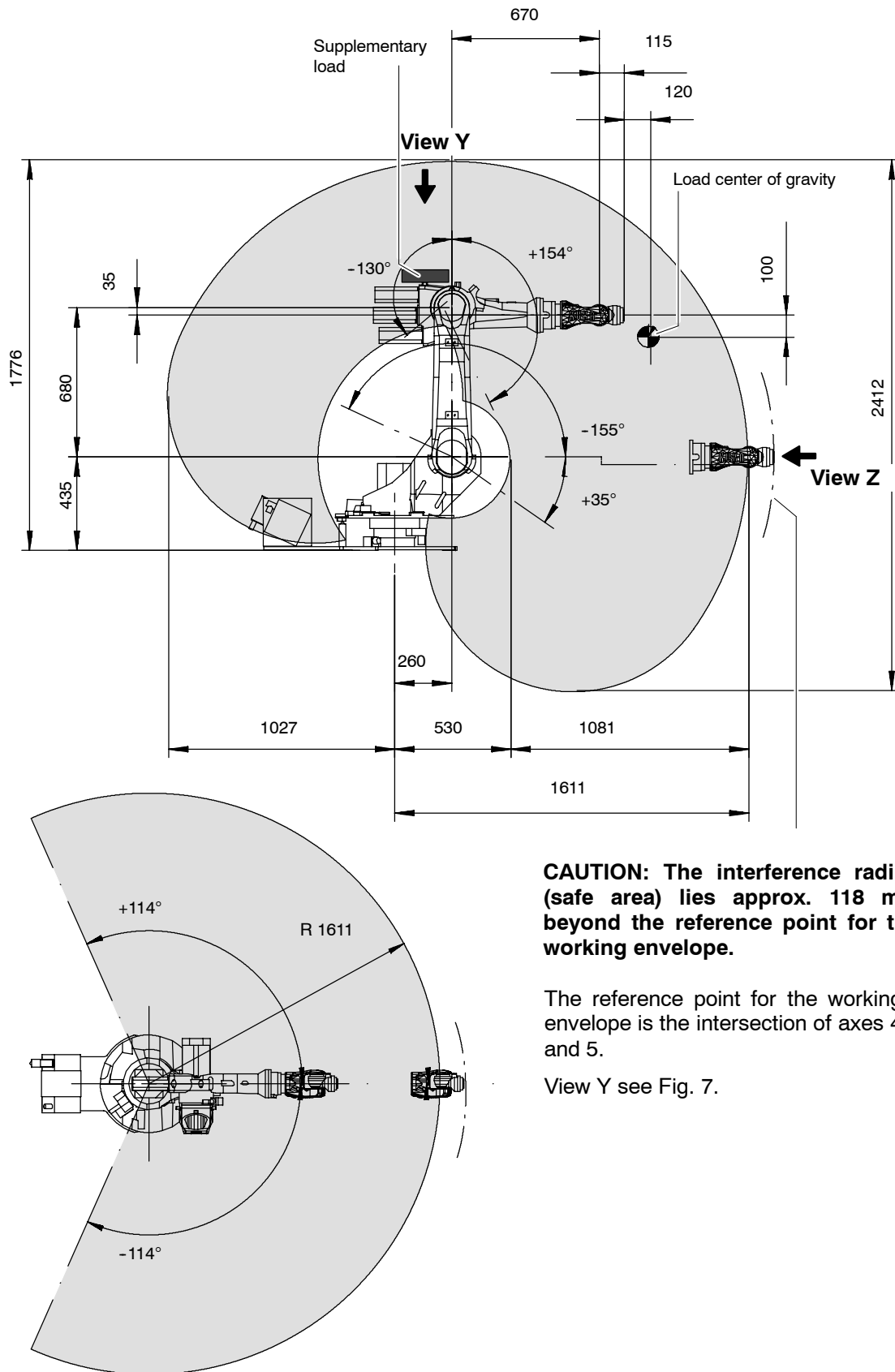


Fig. 4 Load center of gravity P and loading curves for KR 6 arc and KR 16 L6 arc

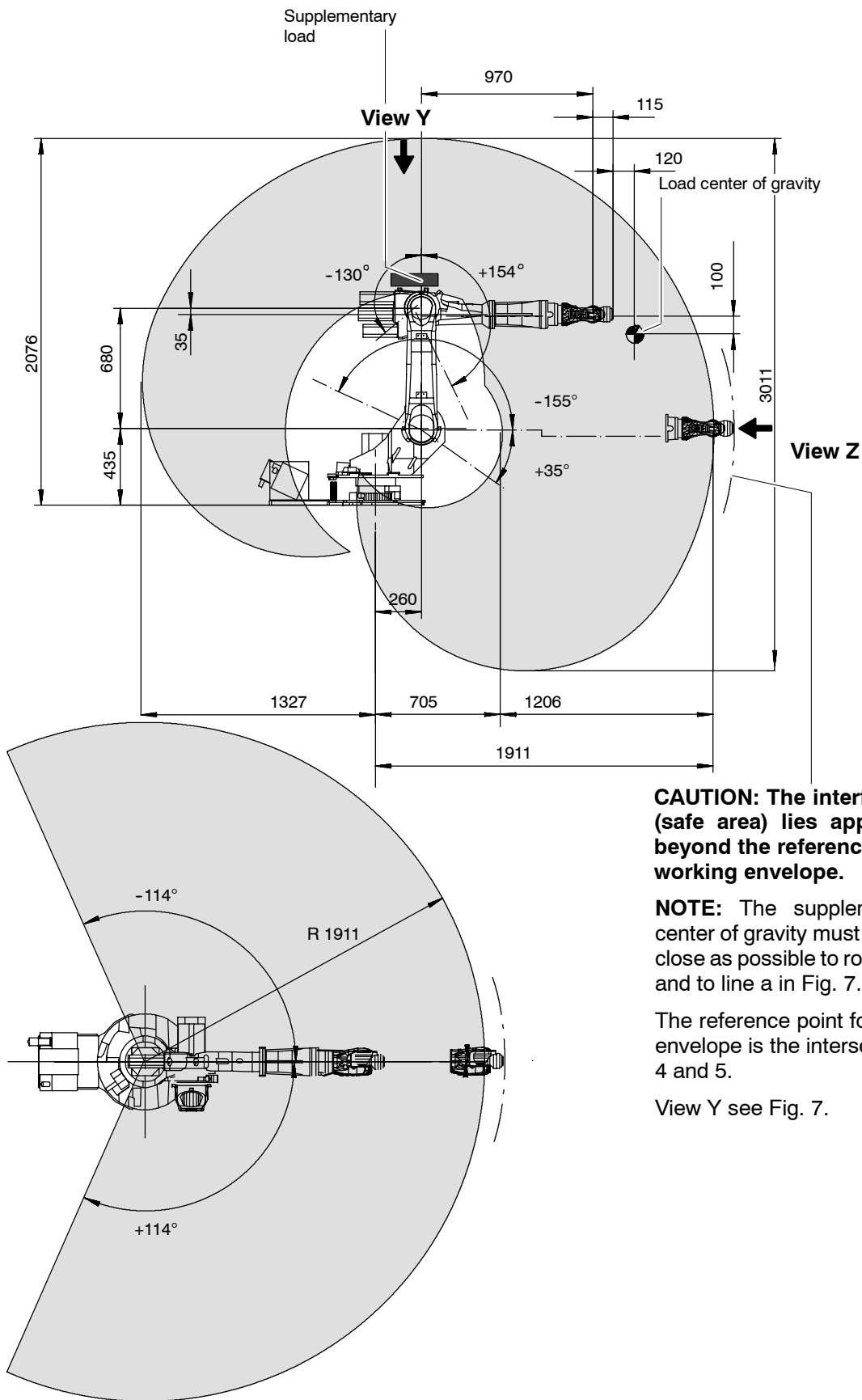


**CAUTION:** The interference radius (safe area) lies approx. 118 mm beyond the reference point for the working envelope.

The reference point for the working envelope is the intersection of axes 4 and 5.

View Y see Fig. 7.

**Fig. 5 Principal dimensions and working envelope for KR 6 arc (software values)**



**CAUTION:** The interference radius (safe area) lies approx. 118 mm beyond the reference point for the working envelope.

**NOTE:** The supplementary load center of gravity must be located as close as possible to rotational axis 3 and to line a in Fig. 7.

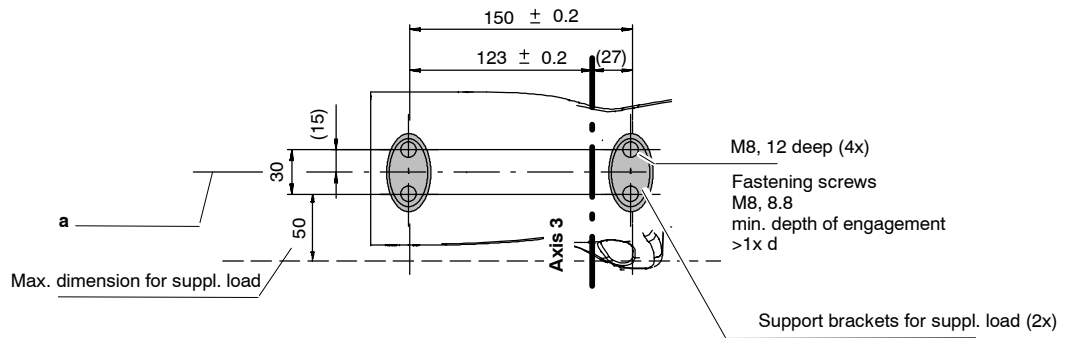
The reference point for the working envelope is the intersection of axes 4 and 5.

View Y see Fig. 7.

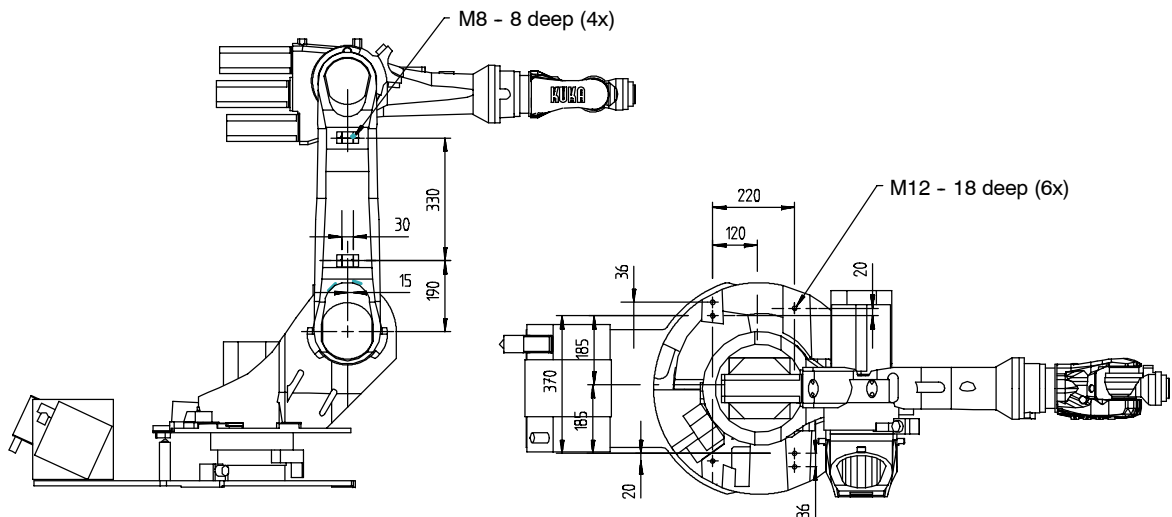
**Fig. 6 Principal dimensions and working envelope for KR 16 L6 arc (software values)**

**View Y from Fig. 5 and Fig. 6**

**NOTE:** The supplementary load center of gravity must be located as close as possible to rotational axis 3 and to line **a**.



**Fig. 7 Attachment holes for supplementary load on arm**



**Fig. 8 Attachment holes for supplementary load on rotating column and link arm (KR 6 arc shown)**

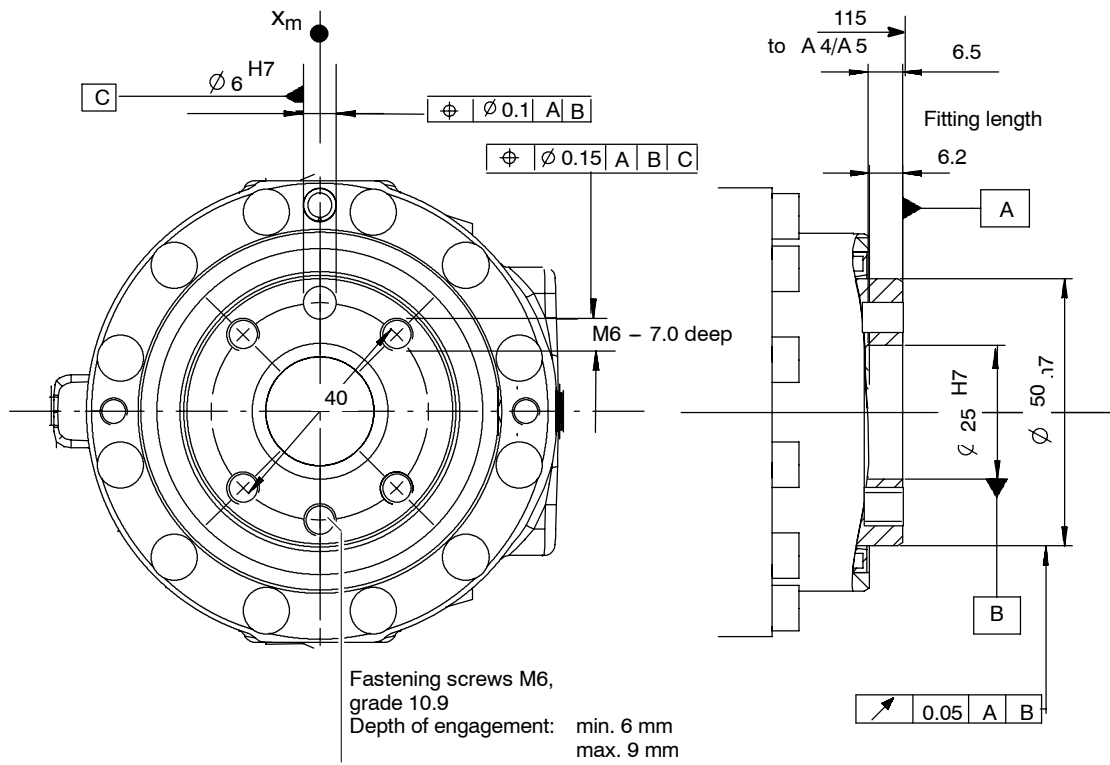
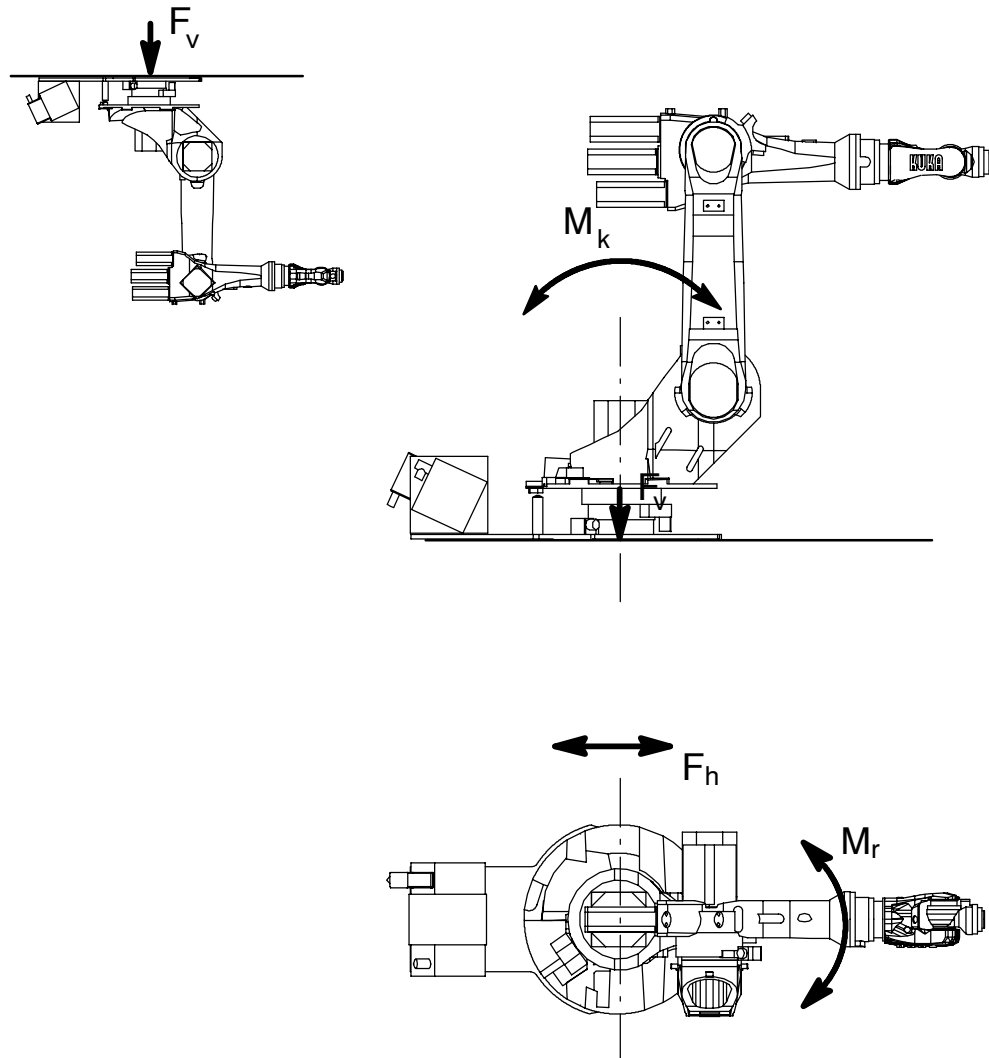


Fig. 9 DIN/ISO mounting flange for in-line wrist 6 kg



The specified forces and moments already include the payload and the inertia force (weight) of the robot.



$F_v$	=	Vertical force	$F_{vmax}$	=	4,600 N
$F_h$	=	Horizontal force	$F_{hmax}$	=	5,000 N
$M_k$	=	Tilting moment	$M_{kmax}$	=	5,200 Nm
$M_r$	=	Turning moment about axis 1	$M_{rmax}$	=	4,200 Nm

Total mass	=	robot	+	total load	for type
		235 kg	+	36 kg	KR 6 arc
		240 kg	+	36 kg	KR 16 L6 arc

**Fig. 10 Principal loads acting on the mounting base due to robot and total load for floor- and ceiling-mounted robots**

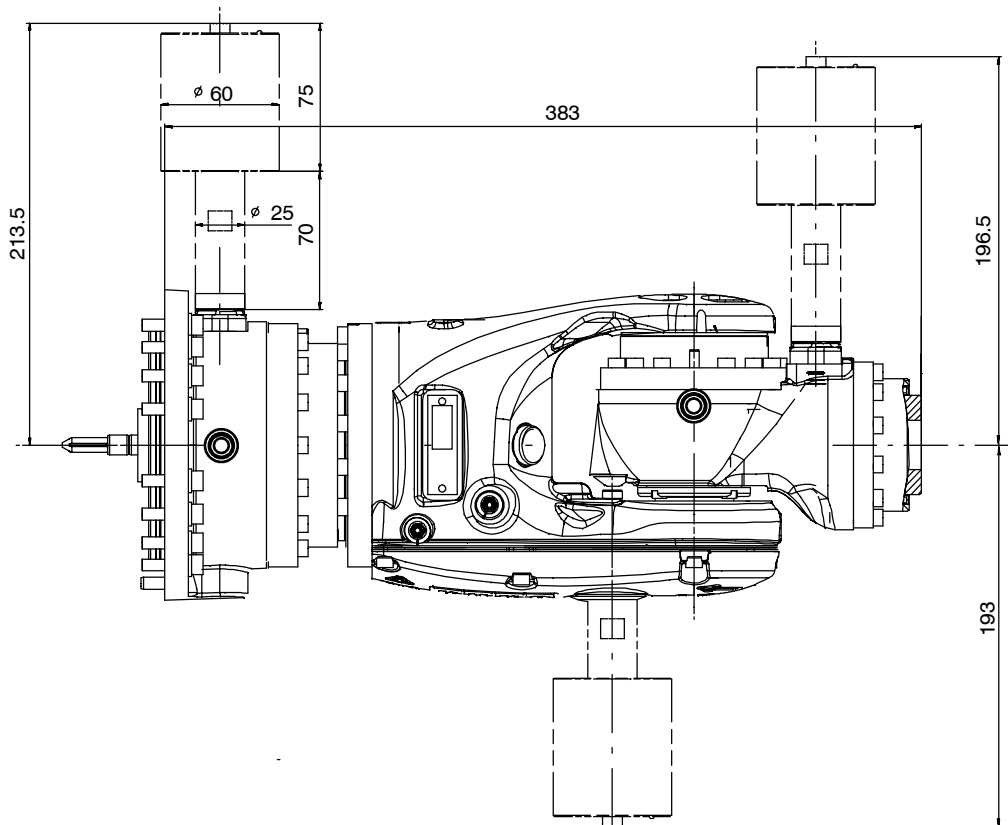


Fig. 11 Electronic probe, in-line wrist 6 kg, installation on A 4, A 5 and A 6

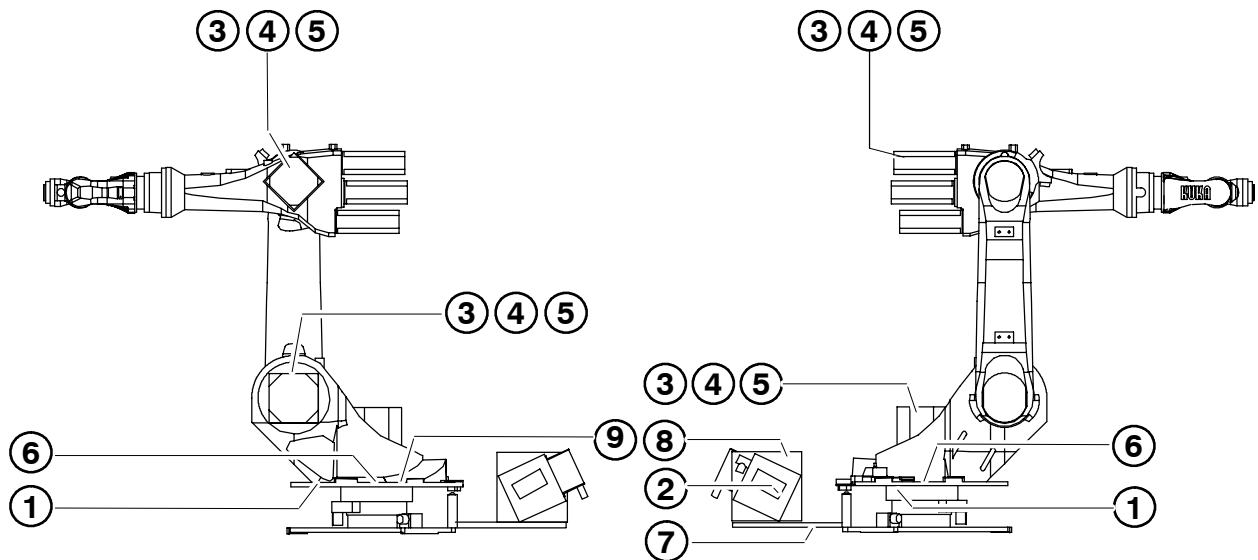
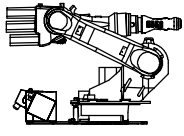


Fig. 12 Plates on robot (see also Fig. 13 to Fig. 21)

Transportstellung:  
Transport position:  
Position de transport:

A1	A2	A3	A4	A5	A6
0°	-155°	+154°	0°	0°	0°



**ACHTUNG!**  
Vor dem Lösen der Fundamentbefestigungsschrauben muss der Roboter in Transportstellung gebracht werden!


**CAUTION!**  
The robot must be in the transport position before the holding-down bolts are slackened!

**ATTENTION!**  
Le robot doit être amené en position de transport avant de desserrer les boulons de fixation des fondations!

Art. no. 00-125-275

①

Fig. 13 Instructions regarding transport position for floor-mounted and ceiling-mounted robots



**ACHTUNG! CAUTION! ATTENTION!**

Vor Aufstellung, Inbetriebnahme, Montage- und Wartungsarbeiten die Betriebsanleitung und Sicherheitshinweise lesen und beachten!

Before installation, start-up, maintenance or disassembling read and follow the safety directions and operating instructions!

Avant installation, mise en service, réparation et maintenance veuillez lire les chapitres correspondants du manuel ainsi que les consignes de sécurité et les respecter!

Art. no. 00-125-275

②

Fig. 14 Reference to operating instructions

**ACHTUNG! CAUTION! ATTENTION!**

Vor Entfernen des Motors Roboterachse gegen Tippen sichern!

Only remove motor when robot-axis is secured!

Avant démontage du moteur bloquer l'axe concerné!

Art. no. 00-125-275

③

Fig. 15 Instructions for safeguarding against toppling of A 2, A 3

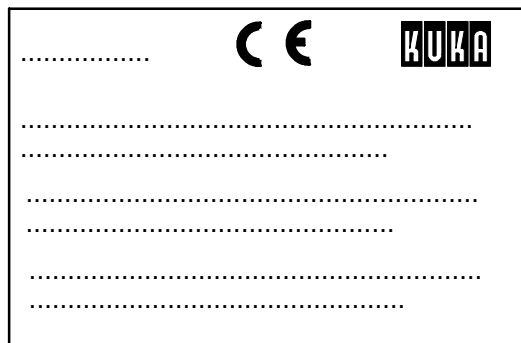


4x on each  
AC servomotor

④

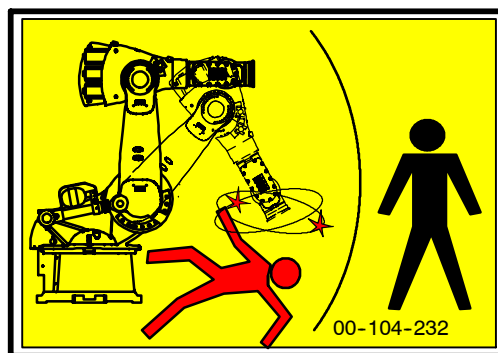
Fig. 16 Hot surface warning sign

On all motors



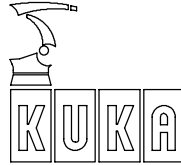
⑤

Fig. 17 Drive motor rating plate



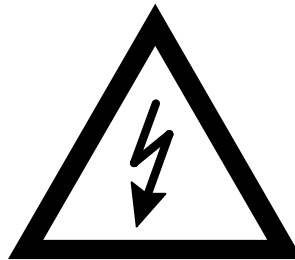
⑥  
2x

Fig. 18 Danger zone

KUKA Roboter GmbH			
Augsburg			
Germany			
Type	Type	Type	KR XXX LXXX Xx-2 K-W-F XxxXYZ
Artikel-Nr.	Article-No.	No.d'article	XXXXXXXXXX
Serie-Nr.	Serial-No.	No.Série	XXXXXX
Hergestellt	Manufactured	Fabriqué	2004-02
Gewicht	Weight	Poids	1200kg
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...MADA\			MADA15133216549846493554861

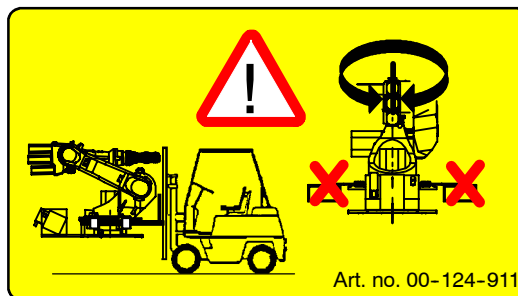
7

Fig. 19 Robot identification plate (example)



8

Fig. 20 High voltage warning sign



9

Fig. 21 Warning sign, fork slots