
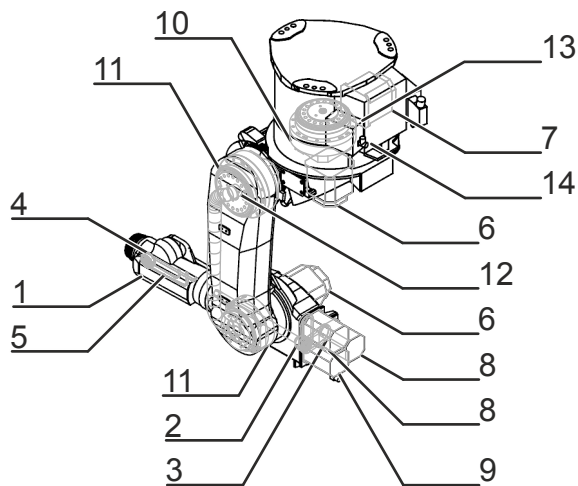


KUKA | Xpert

Identification number: AR6235

| | |
|------|--|
| 货号 | 0000-137-664 |
| 材料状态 | 10 - 批准预生产 |
| 制造商 | KUKA Roboter |
| 产品图片 |  |

Spare parts



Spare parts graphic KR 60 L45 HA-C , schematic representation

| Pos. | Article number | Designation | Component |
|------|----------------|---|----------------------|
| 1 | 0000-253-375 | SPP IW 30/45/60 III | In-line wrist |
| 2 | 0000-118-245 | Set of shafts KR60L45/2 | Connecting shaft |
| 3 | 0063-122-169 | Toothed belt | Toothed belt A4 |
| 4 | 0071-053-329 | Toothed belt Synchrofl. 10 AT 5/780-5/8 | Toothed belt A5 |
| 5 | 0071-053-328 | Toothed belt Synchrofl. 12 AT 5/920-5/8 | Toothed belt A6 |
| 6 | 0000-117-606 | ME 180 180 40 S0 | Motor A1 Motor A3 |
| 7 | 0000-119-768 | ME 250 180 37 S0 | Motor A2 |
| 8 | 0000-117-746 | Wrist axis drive TYPE-D0/1FK7060 | Motor A4 Motor A5 |
| 9 | 0000-115-926 | ME 60 110 30 S0 | Motor A6 |
| 10 | 0071-050-782 | Gear unit RV-320EL-184 | Gear A1 |
| 11 | 0000-264-429 | Preassembly of gear unit RV-320E-185 | Gear A2 Gear A3 |

| Pos. | Article number | Designation | Component |
|------|----------------|-------------------------------------|-----------|
| 12 | 0000-183-748 | KRC4 robot cable set assy KR30/60-3 | Cable set |
| 13 | 0000-246-872 | Resolver Digital Converter RDC | RDC |
| 14 | 0000-172-903 | Electronic Data Storage EDS | EDS |

Export to Excel 

Maintenance information

Gear oil

⚠ CAUTION The quantity of oil drained depends on the draining time and the oil temperature. The refilling quantity is the quantity of oil that was drained from the gear unit at the correct operating temperature and with the correct draining time. This oil quantity must be determined. Only this quantity of oil may be used when refilling.

If less than 70 % of the specified oil quantity flows out, flush the gear unit with the determined quantity of drained oil once, then pour in the amount of oil that was drained. If less than 50% of the specified oil quantity flows out (e.g. inclined installation), the flushing operation must be repeated twice. During the flushing procedure, move the axis at jog velocity throughout the entire axis range.

The oil quantities specified in the table correspond to the oil quantities in the gear unit at first filling.

| Gear oil new filling quantity | |
|-------------------------------|--------|
| A1 | 3.30 l |
| A2 | 2.70 l |
| A3 | 1.00 l |
| A4 | 0.55 l |
| A5 / A6 | 0.75 l |
| Gear oil refilling quantity | |
| A1 | 1.70 l |
| A2 | 2.50 l |
| A3 | 0.90 l |
| A4 | 0.55 l |
| A5 / A6 | 0.75 l |

Toothed belt tension

| Toothed belt tension motor | |
|-----------------------------------|------------|
| A4 | 95 ± 2 Hz |
| A5 | 95 ± 2 Hz |
| A6 | - |
| Toothed belt tension inline wrist | |
| A5 | 130 ± 5 Hz |
| A6 | 185 ± 5 Hz |

技术数据

基本数据

| | KR 60 L45 HA-C |
|-----------------------|---|
| 轴数 | 6 |
| 可控制的轴数 | 6 |
| 工作空间体积 | 36.9 m ³ |
| 位姿重复精度 (ISO 9283) | ± 0.05 mm |
| 重量 | 约 671 kg |
| 额定负荷 | 45 kg |
| 最大负载能力 | - |
| 最大运动范围 | 2230 mm |
| 防护等级 (IEC 60529) | IP64 |
| 机器人腕部防护等级 (IEC 60529) | IP65 |
| 噪声等级 | < 75 dB (A) |
| 安装位置 | 屋顶 |
| 占地面积 | 660 mm x 660 mm |
| 运动系统安装面布孔图 | - |
| 允许倾角 | - |
| 标准色 | 底座： 黑色 (RAL 9005); 活动部件： 库卡橙色 2567 |
| 控制系统 | KR C4 |
| 变压器名称 | KR C2: KR60L45_3 C2 CLG ZH02; KR C4: KR60L45_3 C4 CLG ZH02 |

环境条件

| | |
|-----------------------|--------------------------------|
| 湿度等级 (EN 60204) | - |
| 环境条件分类 (EN 60721-3-3) | 3K3 |
| 环境温度 | |
| 运行时 | 10 °C 至 55 °C (283 K 至 328 K) |
| 仓储和运输时 | -40 °C 至 60 °C (233 K 至 333 K) |

轴数据

| | |
|----------|----------------|
| 运动范围 | |
| A1 | ±185 ° |
| A2 | -135 ° / 35 ° |
| A3 | -120 ° / 158 ° |
| A4 | ±350 ° |
| A5 | ±119 ° |
| A6 | ±350 ° |
| 额定负载时的速度 | |
| A1 | 128 °/s |
| A2 | 102 °/s |
| A3 | 128 °/s |
| A4 | 260 °/s |
| A5 | 245 °/s |
| A6 | 322 °/s |

负载能力

| | |
|----------------------------------|-----------------------|
| 额定负荷 | 45 kg |
| 最大负载能力 | - |
| 法兰 I_x 额定质量转动惯量 | 13.5 kgm ² |
| 法兰 I_y 额定质量转动惯量 | 13.5 kgm ² |
| 法兰 I_z 额定质量转动惯量 | 13.5 kgm ² |
| 底座的额定附加负载 | 0 kg |
| 底座的最大附加负载 | - |
| 转盘的额定附加负载 | 0 kg |
| 旋转机构的最大附加负载 | 0 kg |
| 大臂的额定附加负载 | 0 kg |
| 大臂的最大附加负载 | 0 kg |
| 小臂的额定附加负载 | 35 kg |
| 小臂的最大附加负载 | 35 kg |
| 负载重心额定距离 | |
| L_{xy} | 180 mm |
| L_z | 150 mm |

地基负载

| | |
|--------------------|----------|
| 纵向动力 F(v) | |
| F(v 正常) | 9000 N |
| F(vmax) | 13600 N |
| 横向动力 F(h) | |
| F(h 正常) | 6950 N |
| F(hmax) | 12300 N |
| 倾覆力矩 M(k) | |
| M(k 正常) | 11900 Nm |
| M(kmax) | 21600 Nm |
| 轴 2 转矩 M(r) | |
| M(r 正常) | 6850 Nm |
| M(rmax) | 18400 Nm |

垂直力 $F(v)$ 、水平力 $F(h)$ 、倾斜力矩 $M(k)$ 、轴 1 的转矩 $M(r)$

Process forces

Process forces are forces that are exerted on the robot in a defined manner by an external influence. Causes include pressing processes and machining tasks carried out by the robot. The process forces that the robot can withstand depend to a very great degree on the robot position, payload, direction and duration of action. For this reason, it is not possible for a simple limit value to be specified for permissible process forces.

Permissible process torques are therefore specified for all axes of the robot. These values indicate the torque that each robot axis can withstand on a sustained basis as a result of external forces.

The following load torques must not be exceeded:

| | |
|-----------|--------|
| A1 | - |
| A2 | - |
| A3 | - |
| A4 | 270 Nm |
| A5 | 260 Nm |
| A6 | 200 Nm |

Flange loads

Flange loads

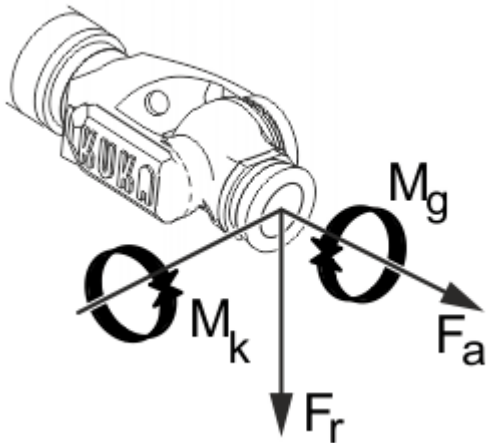
Due to the motion of the payload (e.g. tool) mounted on the robot, forces and torques act on the mounting flange. These forces and torques depend on the motion profile as well as the mass, load center of gravity and mass moment of inertia of the payload.

The specified values refer to nominal payloads at the nominal distance and do not include safety factors. It is imperative for the load data to be entered in the robot controller. The robot controller takes the payload into consideration during path planning. A reduced payload does not necessarily result in lower forces and torques.

The values are guide values determined by means of trial and simulation and refer to the most heavily loaded machine in the robot family. The actual forces and torques may differ due to internal and external influences on the mounting flange or a different point of application. It is therefore advisable to determine the exact forces and torques where necessary on site under the real conditions of the actual robot application.

The operating values may occur permanently in the normal motion profile. It is advisable to rate the tool for its fatigue strength.

The EMERGENCY STOP values may arise in the event of an Emergency Stop situation of the robot. As these should only occur very rarely during the service life of the robot, a static strength verification is usually sufficient.




Flange loads

| Flange loads during operation | |
|-------------------------------|--------|
| F(a) | 1390 N |
| F(r) | 970 N |
| M(k) | 230 Nm |

| | |
|---|--------|
| M(g) | 200 Nm |
| Flange loads in the case of EMERGENCY STOP | |
| F(a) | 1400 N |
| F(r) | 2190 N |
| M(k) | 440 Nm |
| M(g) | 330 Nm |

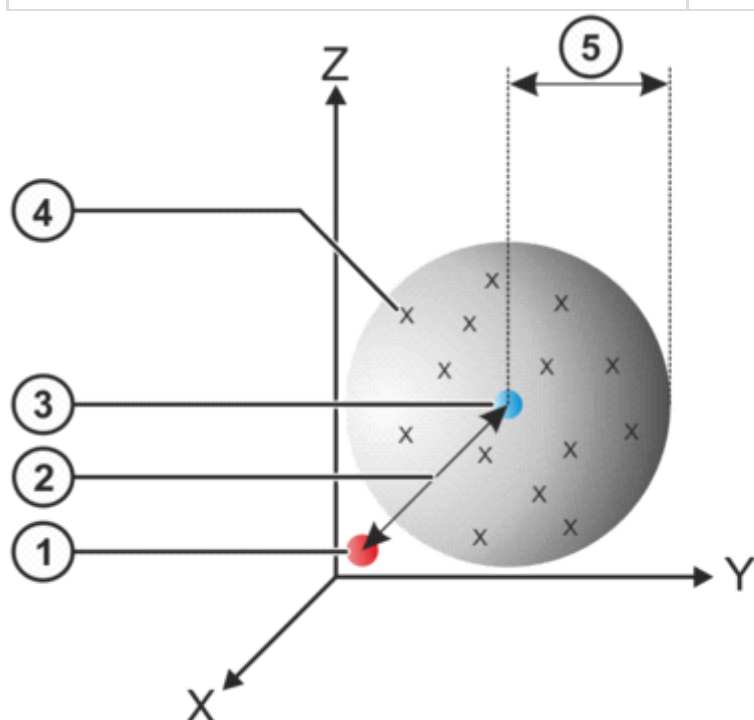
Axial force $F(a)$, radial force $F(r)$, tilting torque $M(k)$, torque about mounting flange $M(g)$

精度数据

 仅适用于带定位精确的机器人选项（用于地面或天花板安装）的机器人在地面位置测量的机器人只允许在地面位置运行。这同样适用于天花板位置的机器人。

位置精度

| | |
|-------------------|-----------------------|
| 位置绝对精度 (ISO 9283) | $\pm 0.7 \text{ mm}$ |
| 位姿重复精度 (ISO 9283) | $\pm 0.05 \text{ mm}$ |



位置精度

| | | | |
|---|----------|---|--------|
| 1 | 编程设定的位置 | 4 | 测得的位置 |
| 2 | 位置绝对精度 | 5 | 位置重复精度 |
| 3 | 测得位置的平均值 | | |

- 位置精度表示编程的机器人位置和实际占用的机器人位置之间的偏差，并用坐标测量机（CMM）在 9 个位置测量。
- 重复精度由重复 30 次测量时实际占用的机器人位置的偏差得出。
- 对于定位精确的机器人，这些值针对的是机器人基座。

轨迹精度

线性运动的轨迹精度:

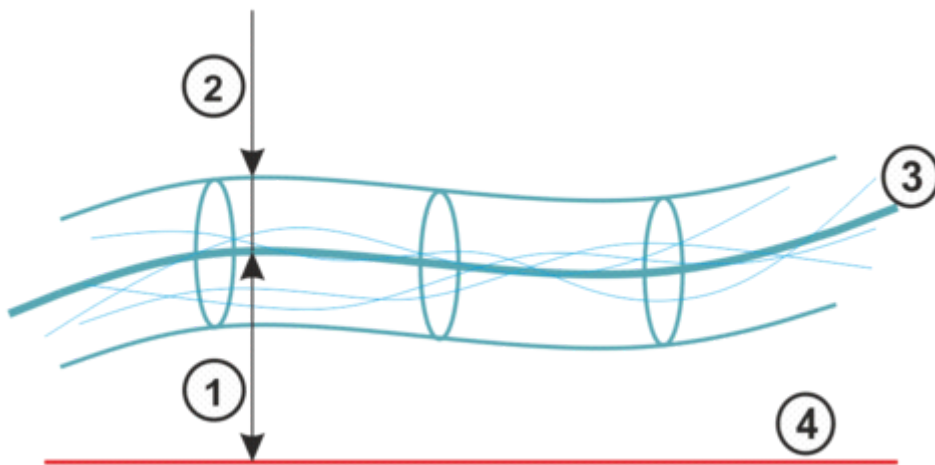
| | |
|-------------------------------|----------------------|
| LIN 轨迹绝对精度 (ISO 9283) | $\pm 0.7 \text{ mm}$ |
| SLIN 轨迹绝对精度 (ISO 9283) | - |
| 轨迹重复精度 线性 (ISO 9283) | $\pm 0.3 \text{ mm}$ |

该数据针对的是 1 m/s 的参考速度。

圆周运动的轨迹精度:

| | |
|--------------------------------|----------------------|
| CIRC 轨迹绝对精度 (ISO 9283) | $\pm 0.7 \text{ mm}$ |
| SCIRC 轨迹绝对精度 (ISO 9283) | - |
| 圆周轨道重复精度 (ISO 9283) | $\pm 0.3 \text{ mm}$ |

该数据针对的是 0.5 m/s 的参考速度。



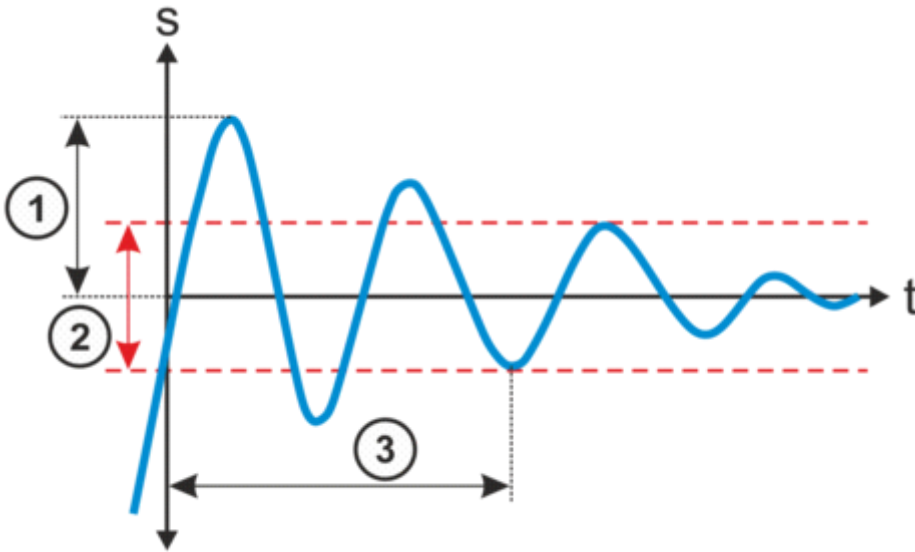
轨迹精度

| | | | |
|---|--------|---|----------|
| 1 | 轨迹绝对精度 | 3 | 运行轨迹的平均值 |
| 2 | 轨迹重复精度 | 4 | 编程的轨迹 |

- 轨迹精度表示机器人在编程的轨迹上运动的能力。
- 轨迹重复精度表示 10 个运行轨迹与运行轨迹平均值的偏差。

超调状态

| | |
|------|--------|
| 振幅 | 0.4 mm |
| 定位时间 | 0.6 s |



超调状态

| | | | |
|---|------|---|------|
| 1 | 超调振幅 | 3 | 定位时间 |
| 2 | 公差范围 | | |

- 超调振幅影响机器人在特定位置执行受控的精确暂停的能力。
- 定位时间表示机器人在特定位置上停止的速度。

更多的信息

- 给出的数据基于 ISO 9283，并使用 Krypton/Metris 的基于摄像机的系统测得。因此重复精度被定义为 3 sigma 值。
- 所有数值均以额定负载测得。

关税信息

| | |
|------|--------------|
| 统计货号 | 84795000 |
| 原产地 | DE |
| 制造商 | KUKA ROBOTER |
| 重量 | 665 kg |

- > **KR 60 L45 HA-C** 带有如下的工具 (6)
- > **KR 60 L45 HA-C** 有以下选项 (35)
- > **KR 60 L45 HA-C** 带有如下的标准组件 (4)
- > **KR 60 L45 HA-C** 需要 (22)
- > **KR 60 L45 HA-C** 带有如下的备件 (14)