

Robot Flange Inertia

Sample document with complete example values. It shows the report the purchased export produces for YOUR input - it is not itself a report for any part.

Project: Sample project

Part/Position: no real part

Prepared by: Sample, not released

Overall assessment: OK - all checked datasheet limits are met.

Input

Number of masses	1
Center-of-gravity distance a	0.15 m
Allowable moment of inertia J_{allow}	0.3 kg·m ²
Allowable load moment M_{allow}	20 Nm
Allowable payload m_{allow}	10 kg

Individual Masses

Mass m [kg]	Distance r [m]	J_{own} [kg·m ²]	$J = J_{\text{own}} + m \cdot r^2$ [kg·m ²]
5	0.15	0	0.1125

Results

Mass moment of inertia at the flange J_{flange}	0.1125 kg·m ²
Payload m_{total}	5 kg
Static load moment M_{load}	7.358 Nm

Datasheet Verifications

Criterion	Value	Limit	Status
Moment of inertia $J_{\text{flange}} \leq J_{\text{allow}}$	0.112 kg·m ²	0.3 kg·m ²	● OK
Load moment $M_{\text{load}} \leq M_{\text{allow}}$	7.358 Nm	20 Nm	● OK
Payload $m_{\text{total}} \leq m_{\text{allow}}$	5 kg	10 kg	● OK

Calculation basis

The mass moment of inertia at the tool flange follows from the parallel axis theorem (Steiner's theorem): $J_{\text{flange}} = \sum (J_{\text{own}} + m_i \cdot r_i^2)$. For a point mass the self term vanishes ($J = m \cdot r^2$). The static load moment is $M_{\text{load}} = m_{\text{total}} \cdot g \cdot a$ with $g = 9.81 \text{ m/s}^2$ and the center-of-gravity distance a to the flange center; the payload is $m_{\text{total}} = \sum m_i$. The design is satisfied when $J_{\text{flange}} \leq J_{\text{allow}}$, $M_{\text{load}} \leq M_{\text{allow}}$ and $m_{\text{total}} \leq m_{\text{allow}}$ from the robot datasheet are met. A dynamic acceleration moment ($M = J_{\text{flange}} \cdot \alpha$) against the allowable axis torque is not included here.

About this sample

All values on these pages come from a freely chosen example calculation and belong to no real part. The purchased export contains the same sections with your input, your header data (project, part, prepared by) and as searchable text. Pricing and scope: maschinenbaurechner.de/en/pricing

Note: The results are design and orientation aids. They do not replace independent verification, calculation and approval by a qualified person. The terms of use at maschinenbaurechner.de apply.