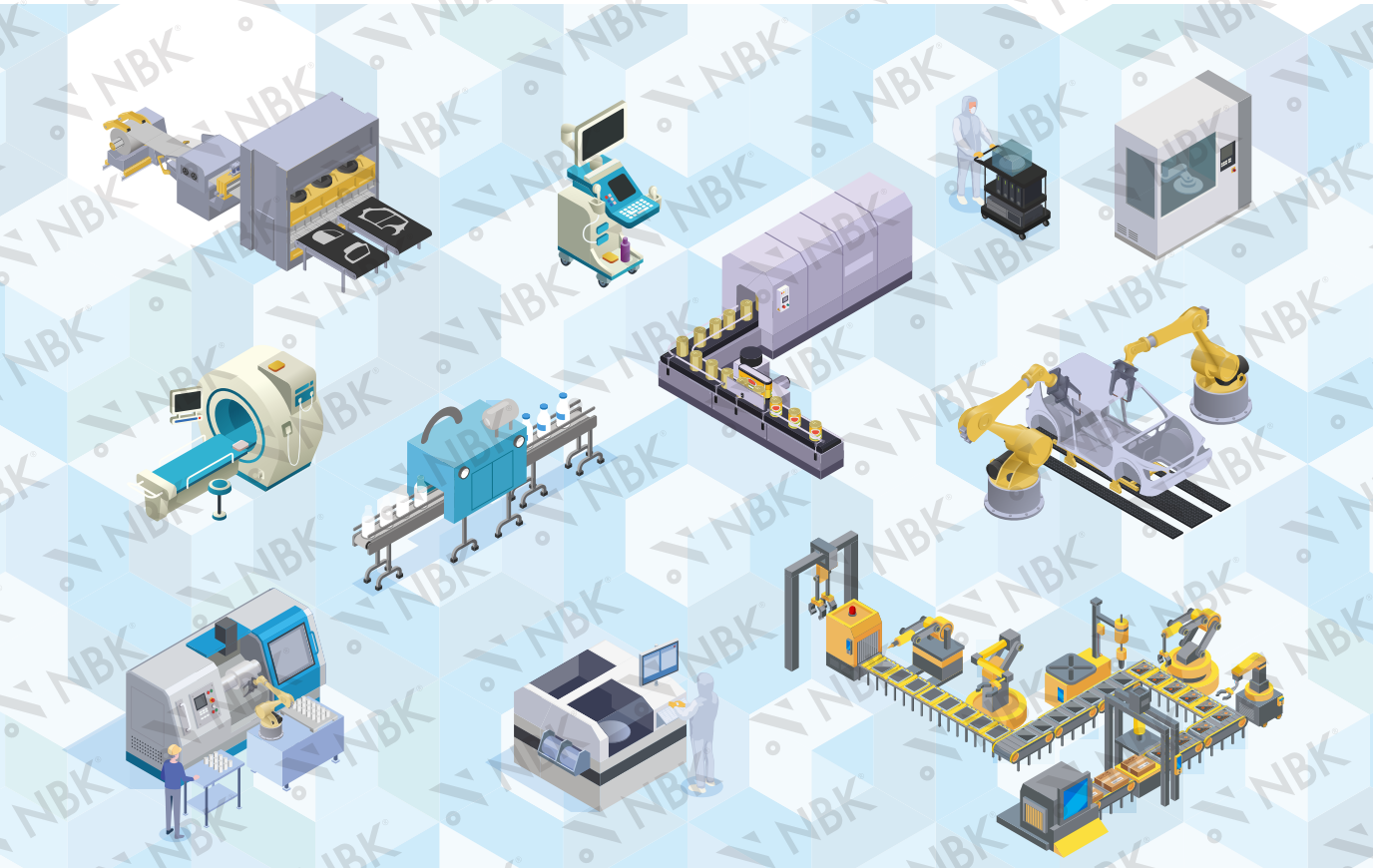
NBK®

Solutions and Case Studies

for Mechanical Designers



Semiconductor Manufacturing Equipment

Food & Packaging | **Medical Equipment**

and many more cases...

Helpful Hints for Designers

Issue Solutions
Case Studies

This booklet offers plentiful case studies
to help you resolve any struggles you may have.
Contact us if you still require additional support.
We are happy to help solve any problems.

Detailed information on our products can be retrieved from the product number on the NBK website. The QR codes in each section can also be used.

Start here if you have specific difficulties or issues!

HINT 1

Search Issue Solutions and Case Studies by problem

» P.2

Search based on your problem for actual issue solutions submitted by manufacturing equipment designers!

Discover points of interest based on equipment and processes!

HINT 2

Search Issue Solutions and Case Studies by industry

» P.16

Problems and solution examples specific to each industry presented by equipment and process!

HINT 3

Solving manufacturing industry issues!

NBK Product Introduction

» P.48

Presenting NBK products
which provide hints on design and development!

HINT

Search Issue Solutions and Case Studies by problem

Search based on your problem for actual issue solutions submitted by manufacturing equipment designers!

Increased productivity

01 Increased productivity

Direct drive motor vibration must be suppressed

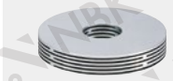
Equipment example: Index positioning equipment

Vibration may occur with high-speed index positioning using a direct drive motor. Vibration can be suppressed by the deflection of slitted parts, enabling accurate positioning to be performed at high speeds.

HINT **Freely designable slit-machined parts are effective**

Recommended product

Multi-functional spring component "Flexus®"

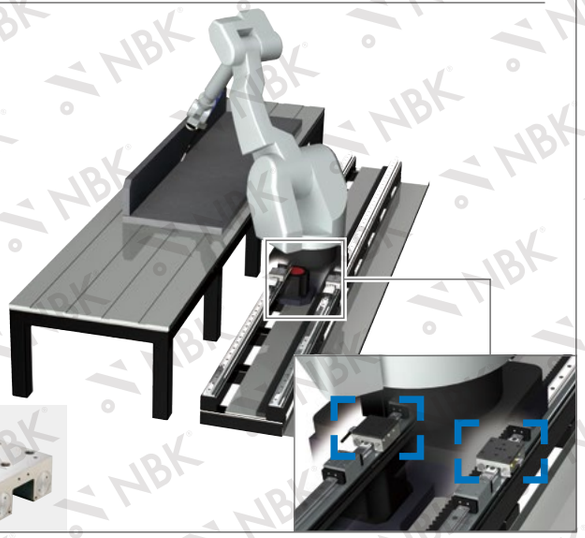


02 Increased productivity

Arm vibration prevention is required while robot is operating

Equipment example: Mobile multi-joint robot

By mounting a clamp mechanism at the feet of the mobile multi-joint robot, the backlash when the rack & pinion mechanism stops can be suppressed. Reducing the vibration settling time improves takt time.



HINT **Suppressing backlash at stop with a clamp mechanism is effective**

Recommended product

Clamp Mechanism for Linear Guide

UBPS

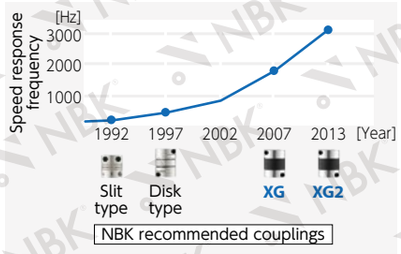
Increased productivity / Energy-saving/reduced work-hours

03 Increased productivity

Long actuator hunting must be suppressed

The speed response frequency of servomotors has evolved dramatically, while the need for long actuators has increased, making the suppression of hunting a challenge. High-gain rubber couplings can be used to suppress hunting and enable highly responsive transport.

■ Changes in servomotor speed response frequency and coupling evolution



HINT Couplings with excellent damping performance are effective

Recommended product

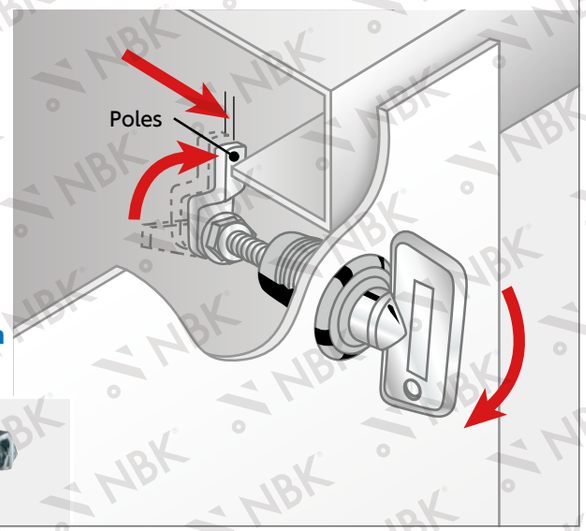
High-gain Rubber Couplings

XGT2

04 Energy-saving/reduced work-hours

Latching and tightening must be done by just turning the knob

Latches enabling open/close and door inset with a single knob rotation action are available. Suitable for use in highly airtight locations or locations where play due to vibration must be prevented.



HINT Latches with full single-action operation are available

Recommended product

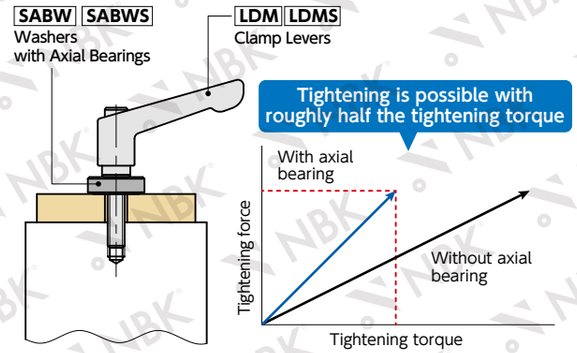
Vise Action Latch

Workability/maintenance

05 Workability/maintenance

Need to reduce the burden of repetitive mounting/ removal work and enable secure tightening by anyone

These clamp levers have built-in axial bearings which reduce seating surface friction, enabling the same tightening force with roughly half the normal tightening torque. Clamp lever rotating radius and knob can be made more compact.
Additionally, washers with axial bearings are also available for use in combination with existing levers and knobs.



HINT Products that can be tightened with roughly half the normal force are effective

Recommended product

Power Clamp Levers
Power Star Knobs
Washers with Axial Bearings

LDBM LDBF

KJB

SABWS SABW

06 Workability/maintenance

LCD monitors/tablets must be fixed to equipment

High-strength display mounting components, mountable to equipment panels, aluminum frames and round pipes, are available in forms specialized for production sites. The display angle can be adjusted and fixed, while the devices also contribute to paperless/ IT-enhanced factory reforms.

HINT Display mounting components are available in forms specialized for production sites

Recommended product

Display Device Mounting Systems

HINT 2

Search by industry!

Issue Solutions and Case Studies

The types of issues faced by different industries can be wide-ranging. We introduce hints that help solve examples of the various problems faced by each industry.

Issue Solutions and Case Studies for Factory Automation (FA)

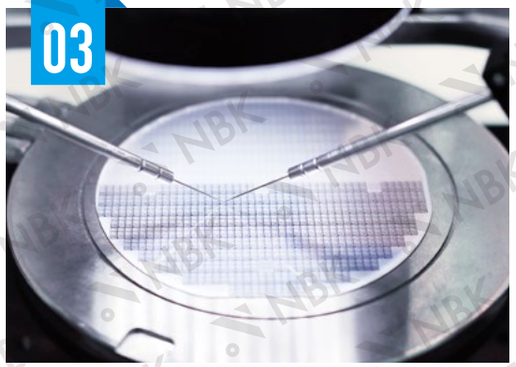
Introducing plentiful automation examples for production lines, electrical substations, transport processes, etc.

» P.18

Issue Solutions and Case Studies for Machine Tools

Full of hints for improved machining accuracy and productivity in lathes, machining centers, etc.

» P.20



Issue Solutions and Case Studies for semiconductor manufacturing equipment

Explanations of how to handle special environments such as vacuum, high temperatures, and chemical adherence, sorted by equipment and processes

» P.26

Issue Solutions and Case Studies for Food Machinery

Both hygiene and workability have to be improved... From various equipment case studies to an explanation of hygienic design

» P.38

Issue Solutions and Case Studies for Medical Equipment

Introducing hints for ensuring cleanliness and safety in biochemical analysis equipment, MRIs, etc.

» P.44

Packed with case studies for people on the spot!

Issue Solutions and Case Studies for Factory Automation (FA)

01 Handle work needs to be done safely in locations at risk of accidents

Equipment automating handle work in spaces at risk of accidents is available (rotating manual handles in narrow gaps between machines or in high locations requiring stepladders, etc.).
Replacing "manual positioning work" with "automated operation" does away with the need to enter hazardous locations during positioning, supporting safety measures.

HINT **The introduction of automated equipment is effective in reducing work in hazardous locations**

Recommended product

Auto-Positioning Units

EPU-220

Learn More ➡ P.58

02 Handle work in inaccessible locations needs to be automated

When using handle rotation for width adjustment on production lines, etc., machine automation is effective.
Replacing positioning work at inaccessible locations on production lines (under belt conveyors, blocked by electrical wiring, etc.) with machine automation improves work efficiency and reduces physical strain.

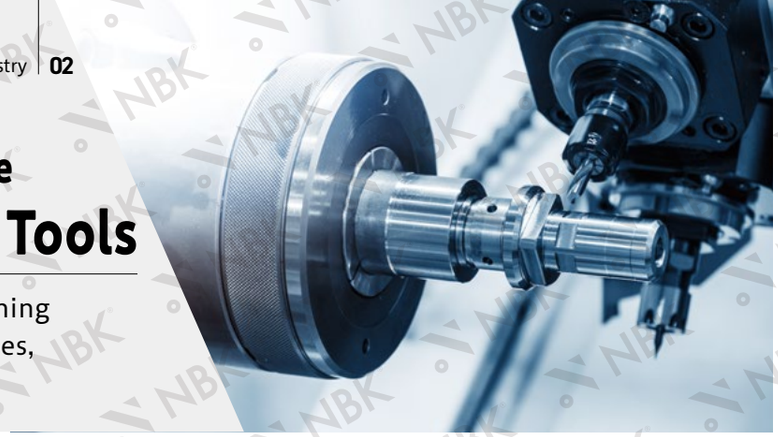
HINT **Automating manual work is effective**

Recommended product

Auto-Positioning Units

EPU-220

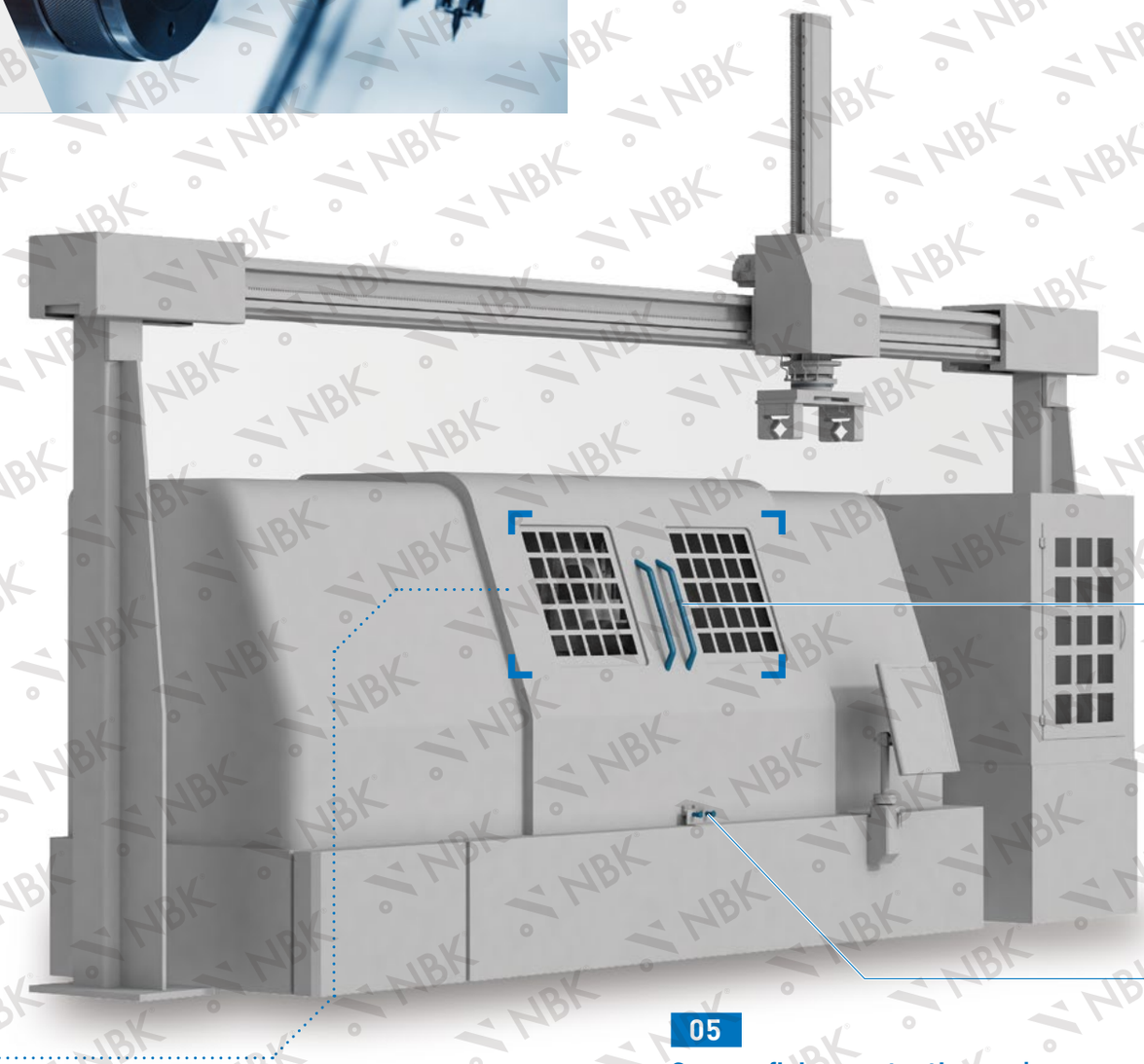
Learn More ➡ P.58



Issue Solutions and Case Studies for Machine Tools

Full of hints for improved machining accuracy and productivity in lathes, machining centers, etc.

1 Lathes/ Multi-tasking Machines



01

Improved machining accuracy is required

1. Mechanisms suppressing deviation and vibration due to tool rest external force are available

Prevention of deviation and vibration due to external force enables reduced dimensional error.

2. Prevention of deviation and vibration due to external force by fixing to a runout prevention device is effective

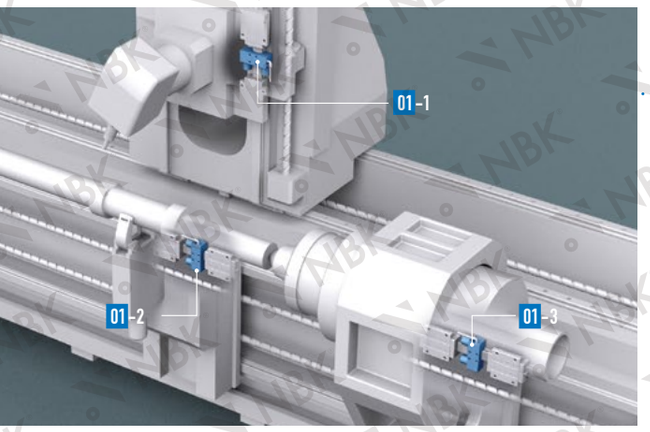
The use of a clamp mechanism is effective to prevent deviation and vibration due to external force.

3. Prevention of tailstock shifting is effective

Rail clamp mechanisms to prevent floating and flipping are available.

HINT Clamp Mechanism for Linear Guide
Q MKS

Learn more about Clamp Mechanisms for Linear Guide ➡ P.66



02

Error tolerance is required for feed shaft and ball screw shaft cores

Couplings tolerant of shaft core error (misalignment) and with high torque transmission are available.

HINT Jaw Couplings Q MJC

Learn more about couplings ➡ P.50

03

Main door and operation panel pull operability must be improved

Easily gripped, well-designed knobs are available. Customization is also available.

HINT Pulls

NEW The MM+I Series, with added intelligence in sensing, monitoring, switching, etc., is also available.

Learn more ➡ P.62

UBLF

UZBF-SW

04

Interlock safety performance must be reinforced

Indexing Plungers which can retain the pin retracted position are effective

HINT Indexing Plungers

NEW The MM+I Series, with added intelligence in sensing, monitoring, switching, etc., is also available.

Learn more ➡ P.62

PLYS

PLXS-SN

05

Screws fixing protective and maintenance covers must not fall out

Screws preventing fallout when mounting/removing covers are available

Screws designed not to fall out of covers are available. Also ideal for CE marking compatibility.

HINT Captive Screws Q SSC

Learn more about Special Screws ➡ P.54