TNT Motion

CNC TOOLING CATALOGUE

Precision Collets · Pull Studs · Clamping Nuts
Toolholders · Tapping Collets · Collet Adapters

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Introduction

Welcome to the TNT Motion CNC Tooling Catalogue — your complete reference for high-precision spindle interface components. Our range covers every element of the tool clamping chain for modern CNC machining centres: precision collets, pull studs, clamping nuts, toolholders, tapping collets, and straight-shank adapters.

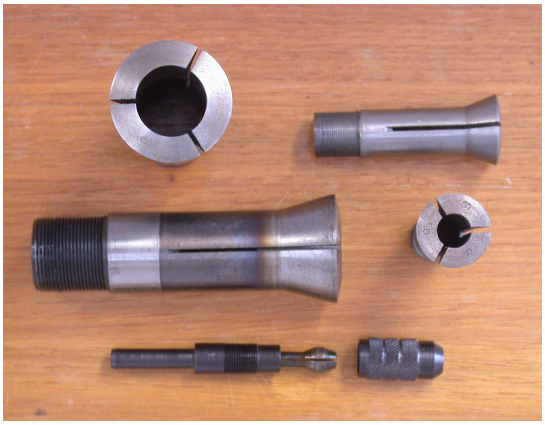
CNC tooling quality directly determines part accuracy, surface finish, and spindle life. Every micron of runout at the tool tip translates into scrap, accelerated tool wear, and lost machine time. TNT Motion sources and supplies components conforming to DIN, ISO, JIS, and ANSI standards, at competitive pricing through our optimised global supply chain.

Our engineering team collaborates closely with clients to select the right taper, collet series, clamping method, and pull stud for each machine and application. Standard and high-precision grades, coolant-through options, and dynamically balanced components for high-speed spindles are all available.

We believe correct tooling is the foundation of profitable machining. Wrong pull stud threads, under-balanced clamping nuts, or excess collet runout silently cost money in spindle repairs, tool breakage, and rework. Our goal is to eliminate these losses with the right components and unbiased technical guidance from day one.

Every production batch ships with dimensional inspection documentation on request. We offer sample orders for qualification testing, volume pricing for long-term supply agreements, and custom specifications where standard items do not meet requirements.

Contact the TNT Engineering team at **info@tntbearings.com** for a free technical consultation. We respond within 24 hours on business days.



ER, 5C, R8, and OZ collet types

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1. Precision Collets

Our precision collet range delivers exceptional clamping accuracy for CNC milling, drilling, and boring. Manufactured from premium alloy steel with precision-ground clamping surfaces, they are available in ER (ER8–ER50), 5C, R8, and OZ configurations.

The **ER collet system** (DIN 6499 / ISO 15488) is the world's most widely adopted standard in CNC machining: large clamping range per collet size, reliable repeatability, and interchangeability across toolholder brands.

Full ER collet set in presentation rack

Single ER collet — precision-ground clamping surface

Key specifications

- Runout: 0.008 mm at 4×D (standard) / 0.005 mm (HP grade)
- Spring steel — consistent clamping force over millions of cycles
- Full diameter coverage within each series
- Sealed and coolant-through (liquid-tight) versions available
- DIN 6499 / ISO 15488 — 100% interchangeable between brands
- MOQ: 10 pcs per size · HP grade available from ER8 to ER40

Other collet types

- **5C collets** — clamping range 0–1.25″; common on lathes and indexing fixtures
- **R8 collets** — Bridgeport-style knee mills; 7/16″ bore shank
- **OZ collets** — compact ER alternative for smaller machines

ER Series — Dimensional Reference

Series	Clamping Range	Max Tool Ø	Runout (Std)	Runout (HP)	Thread
ER8	0.5–5 mm	5 mm	0.008 mm	0.005 mm	M10×0.75
ER11	0.5–7 mm	7 mm	0.008 mm	0.005 mm	M13×0.75
ER16	1–10 mm	10 mm	0.008 mm	0.005 mm	M19×1.0
ER20	1–13 mm	13 mm	0.008 mm	0.005 mm	M24×1.0
ER25	1–16 mm	16 mm	0.008 mm	0.005 mm	M30×1.5
ER32	2–20 mm	20 mm	0.008 mm	0.005 mm	M38×1.5
ER40	3–26 mm	26 mm	0.008 mm	0.005 mm	M45×1.5
ER50	4–34 mm	34 mm	0.010 mm	—	M55×1.5

2. Pull Studs & Retention Knobs

Pull studs (retention knobs) secure the tool holder into the machine spindle via the automatic tool changer (ATC) drawbar. TNT Motion supplies Kintek-OEM pull studs machined in NiCrMo steel (SCM435 / S45C), case-hardened and precision-ground for long-term clamping force retention. Available individually or in 10-piece sets (suffix SET).

MATERIAL & QUALITY SPECIFICATIONS			
Material	NiCrMo steel — SCM435 / S45C (Chrome-Moly)	**Hardness**	HRC 58 ± 2
Case hardening	0.4–0.5 mm depth (induction hardened)	**Tensile strength**	800–1000 N/mm²
Thread runout	≤0.005 mm (ISO 7388-3)	**Surface finish**	Black oxidized, precision ground

DIN 69872 / ISO 7388-3 Configuration Types

Pull studs are classified by their coolant bore and O-ring configurations. Select the correct form to match your spindle and coolant system requirements.

Form	Coolant Bore	O-Ring Groove	Typical Application
Standard	No	No	Dry or external coolant — most common general purpose
Form A	Yes	No	Through-spindle coolant (TSC) — coolant bore through stud axis
Form F	No	Yes	Coolant-sealed spindle — O-ring prevents coolant entry into drawbar
Form A+F	Yes	Yes	TSC + sealed spindle — highest spec, used in HSC machining centres

Thread Size & Pull Force Reference

Taper	Standard	Thread Size	Pull Force (ATC)	Typical Machines
BT30	MAS403 JIS B6339	M12 x 1.75	~1,200 N	Compact VMC, CNC lathes
BT40	MAS403 JIS B6339	M16 x 2.0	~3,000 N	Standard VMC/HMC (most common)
BT50	MAS403 JIS B6339	M24 x 3.0	~8,000 N	Heavy-duty VMC/HMC
ISO40	DIN69872 / ISO7388-2	M16 x 2.0	~3,000 N	European VMC, Heckert, Deckel-Maho
ISO50	DIN69872 / ISO7388-2	M24 x 3.0	~8,000 N	Large European VMC/HMC

BT Series - MAS403 / JIS B6339

Japanese standard. Pull angle: 30 deg (standard) or 45 deg (high-speed). BT30 for compact CNC lathes; BT40/50 for full-size VMC/HMC.

Part No.	Taper	Angle	Coolant	O-Ring	Notes
217-21508	BT30	30 deg	No	No	Standard BT30
217-21507SET	BT30	45 deg	No	No	10-piece set, 45 deg
217-21508SET	BT30	30 deg	No	No	10-piece set
217-21402	BT40	45 deg	No	Yes	MAS403, single unit
217-21403	BT40	90 deg	No	Yes	MAS403, 90 deg pull angle
217-21402SET	BT40	45 deg	No	Yes	10-piece set
217-21403SET	BT40	90 deg	No	Yes	10-piece set
217-22207SET	BT40	45 deg	Yes	No	10-piece set, with coolant bore
217-22317SET	BT40	45 deg	Yes	Yes	10-piece set, coolant + O-ring
217-22323SET	BT40	45 deg	Yes	Yes	DIN69871/MAS403 dual-standard
217-21412	BT50	45 deg	Yes	2x	2x O-rings, coolant bore
217-22210	BT50	45 deg	Yes	No	MAS403

217-22320	BT50	45 deg	Yes	Yes	MAS403, coolant + O-ring
217-22209SET	BT50	30 deg	Yes	No	10-piece set

ISO Series - DIN69872 / ISO7388-2B / JIS B6339

European standard. ISO40/50 for Heckert, Deckel-Maho, and other European VMC/HMC. Also compatible with selected JIS B6339 machines.

Part No.	Taper	Standard	Coolant	O-Ring	Notes
217-21307	ISO40	DIN69872/A	No	Yes (x2)	H20, 2x O-rings
217-21302	ISO50	DIN69872	No	Yes	Standard ISO50
217-21601	ISO40	ISO7388/2B	Yes	No	45 deg, with coolant
217-21608	ISO40	ISO7388/2B	No	No	45 deg, no coolant
217-21611	ISO40	ISO7388/2B	No	Yes	With O-ring
217-21621	ISO40	ISO7388/2B	Yes	Yes	Coolant + O-ring, 45 deg
217-21201SET	ISO40	DIN69872	Yes	No	10-piece set
217-21207SET	ISO40	DIN69872	No	No	10-piece set, no coolant
217-21208SET	ISO50	DIN69872	No	No	10-piece set
217-21301SET	ISO40	DIN69872	No	Yes	10-piece set, O-ring
217-21305SET	ISO40	DIN69872	Yes	Yes	10-piece set, coolant + O-ring
217-21306SET	ISO50	DIN69872	Yes	Yes	10-piece set, coolant + O-ring
217-21601SET	ISO40	ISO7388/2B	Yes	No	10-piece set
217-21611SET	ISO40	ISO7388/2B	No	Yes	10-piece set
217-21621SET	ISO40	ISO7388/2B	Yes	Yes	10-piece set
217-22090SET	ISO40	DIN69871/MAS403	No	No	Dual-standard, 45 deg
217-22134	ISO40	JIS B6339	Yes	No	D7 coolant bore
217-22327SET	ISO40	JIS B6339	Yes	Yes	D7 bore + O-ring, 10-pcs
217-22328SET	ISO50	JIS B6339	Yes	Yes	Coolant + O-ring, 10-pcs

Machine-Specific Pull Studs

Custom geometry for spindles where standard pull studs do not fit. Dimensions verified against OEM drawings.

Part No.	Taper	Machine	Key Dimension	Coolant	Notes
217-22003	ISO40	Mazak	L=41.25 mm	No	Machine-specific geometry
217-22047	ISO40	Mazak	L=44.1 mm	No	Mazak variant
217-22047SET	ISO40	Mazak	L=44.1 mm	No	10-piece set
217-22314	ISO40	Mazak	M16 thread	Yes	Coolant + O-ring
217-22314SET	ISO40	Mazak	M16 thread	Yes	10-piece set
217-22358	ISO50	Mazak	M24 thread	Yes	Special, coolant + O-ring
217-22010	ISO40	Cincinnati	L=39.4 mm	Yes	USA market spec
217-22017	ISO40	CB Ferrari	-	No	Italian spindle spec
217-22051	ISO40	FAMUP	L=27 mm	No	Short-shank variant
217-22025SET	TC40	OTT System	-	No	10-piece set, OTT coupling

How to order: *Quote the 7-digit part number (e.g. 217-21402) or the SET suffix for 10-piece packs. Material certificate and dimension report available on request. Min. order: 1 pc (single) or 1 set (x10).*

3. Clamping Nuts

The clamping nut is the final component in the collet chuck assembly. It generates and maintains the axial clamping force that seats the collet — and therefore directly controls the runout and repeatability of the cutting tool.

A worn or low-quality nut produces uneven collet seating, increased runout, and premature tool wear. Our clamping nuts are precision-ground to match ER collet thread tolerances and are available in standard, mini-nut, coolant-sealed, and bearing-style variants.

ER40 precision clamping nut — black oxide finish

Product variants

- **Standard nut** — general purpose; all ER sizes
- **Mini-nut (MN)** — reduced outer diameter for tight tool clearance in deep pockets
- **Coolant-sealed nut** — lip seal for through-tool coolant delivery; prevents contamination
- **Bearing nut (BN)** — integral thrust bearing allows low-torque tightening; reduces collet wear
- Dynamic balancing certified for spindle speeds up to 30,000 RPM
- Precision-ground threads — no measurable play against ER collet
- Heat-treated steel with black oxide or bright finish
- Available for all ER sizes (ER8 through ER50)

4. CNC Toolholders

The toolholder is the mechanical backbone of the machining process — it interfaces the machine spindle with the cutting tool and must deliver rigidity, balance, and low runout simultaneously. We supply a complete range of toolholders for all major CNC spindle standards.

BT40 ER collet chuck toolholders

Taper standards

- **BT (JIS B6339)** — dual-contact and standard; BT30, BT40, BT50. Dominant in Japan and Asia.
- **CAT (ANSI B5.50)** — V-flange; CAT40, CAT50. North American machining centres.
- **HSK (ISO 12164)** — hollow taper, simultaneous flange contact; HSK-A32 to A100. Best for high-speed and 5-axis.
- **ISO (7388-1)** — steep taper ISO30/40/50. European standard; also called SK or DIN 2080.

HSK hollow-shank collet assembly

Clamping types available

- **ER Collet Chuck** — universal; accepts full round-shank range
- **End Mill Holder (Weldon)** — set-screw drive for high-torque milling
- **Shell Mill Arbor** — for face mill and shell mill bodies
- **Hydraulic Chuck** — 0.003 mm runout; no collet needed
- **Shrink Fit** — highest rigidity; 0.003 mm runout; requires induction heater

- Balance grade G2.5 or G6.3 at 25,000 RPM available on request
- MOQ: 5 pcs per type

Clamping Method Selection Guide

Clamping Method	Runout	Torque Capacity	Best Application
ER Collet Chuck	0.008 mm	Medium–High	General milling, drilling, reaming
Weldon End Mill Holder	0.010 mm	Very High	Heavy interrupted milling
Hydraulic Chuck	0.003 mm	High	Finishing, boring, precision reaming
Shrink Fit	0.003 mm	Very High	High-speed machining, 5-axis
Shell Mill Arbor	N/A	Very High	Face milling, shell mill bodies
Morse Taper Adapter	0.015 mm	Medium	Drills, reamers, older machines

HSK Toolholder Technology

The HSK (Hohlschaftkegel — hollow shank taper) system, standardised as ISO 12164, represents the most advanced toolholder interface for high-speed and high-precision CNC machining. Unlike steep-taper systems (BT/CAT/ISO) which contact only the taper surface, HSK achieves **simultaneous taper and face contact**, eliminating the axial float that degrades positional accuracy at high spindle speeds.

Advantages over steep-taper systems

- Simultaneous 2-point contact (taper + face) → zero axial runout under load
- Centrifugal force increases — not decreases — clamping as speed rises
- Shorter projection, higher stiffness → better surface finish at depth
- Repeatable positioning to ±0.001 mm axially and radially
- Suitable for spindle speeds up to 60,000 RPM

HSK types we supply

- **HSK-A** — general purpose; drive via internal keyway; most common
- **HSK-E** — high-speed; no keyway (balanced); for symmetrical tools
- **HSK-F** — no keyway, face keys; for face-contact tools like shell mills

HSK-A toolholder family (HSK-A32 to A100)

5. Tapping Collets

GT12 JIS standard tapping collets for CNC and pneumatic tapping machines. Available in two configurations — choose based on machine type and tap protection requirements.

Rigid (without clutch)

Direct-drive collets for CNC rigid tapping where the machine controller synchronises spindle speed and Z-axis feed precisely. No axial float — maximum thread positional accuracy.

- Best for: machining centres with rigid tapping G-code
- Zero backlash — thread pitch is controlled by the CNC
- Simpler, lower-cost, longer life than clutch versions

Rigid

With torque-limiting clutch

Clutch mechanism slips at a preset torque threshold, preventing tap breakage when the tap bottoms out in a blind hole or encounters hard material. Essential for pneumatic tapping machines.

- Best for: pneumatic tapping arms, older CNC without rigid tapping
- Protects taps in blind holes and interrupted cuts
- Adjustable slip torque on some models

With Clutch

Common specifications

- Sizes: M3, M4, M5, M6, M8, M10, M12, M14, M16
- Material: 65Mn spring steel body, hardened & precision-ground
- Standard: JIS GT12 — fits all GT12-compatible tapping chucks
- MOQ: 10 pcs per size

Size	Tap Ø	Pitch	Shank Ø (GT12)	Note
M3	2.5 mm	0.5 mm	4.5 mm	—
M4	3.3 mm	0.7 mm	5.5 mm	—
M5	4.2 mm	0.8 mm	7.0 mm	—
M6	5.0 mm	1.0 mm	8.0 mm	—
M8	6.8 mm	1.25 mm	10.0 mm	—
M10	8.5 mm	1.5 mm	12.0 mm	—
M12	10.2 mm	1.75 mm	14.0 mm	—
M14	12.0 mm	2.0 mm	16.0 mm	—
M16	14.0 mm	2.0 mm	18.0 mm	—

6. Collet Chuck Adapters

Straight shank and Morse taper collet chuck adapters allow ER collets to be mounted directly in drill presses, conventional milling machines, lathes, and any equipment with a straight bore or Morse taper spindle — without a dedicated CNC toolholder. This is the most cost-effective route to adding precision ER clamping capability to conventional machinery. The adapter sits in the machine spindle; the ER collet and nut then clamp the cutting tool in the normal way.

Key features:

- Hardened and ground — TIR < 0.01 mm (DIN 6499 standard)
- Compatible with all standard ER clamping nuts and collets
- Available: ER16, ER20, ER25, ER32, ER40
- MOQ: 10 pcs per type

Straight Shank Adapters

Clamped in machine bore by set screw (Weldon flat) or friction fit. Use for drill presses, milling machines, and manual lathes.

Shank Ø (mm)	ER Size	Collet Range (mm)	Typical Length (mm)	Notes
8	ER16	1–10	60	Compact, drill press
10	ER16	1–10	60	Standard shank
12	ER20	1–13	65	Common milling
12.5	ER20	1–13	65	Metric/imperial crossover
16	ER25	1–16	70	Medium machining
20	ER32	2–20	75	Heavy-duty milling
25	ER32	2–20	80	Large bore machines
32	ER40	3–26	90	Max clamping range

Morse Taper Adapters

Seated directly in the machine spindle taper. Retained by drawbar (with internal thread) or drift-removed. Ideal for drill presses and conventional lathes.

Taper	ER Size	Collet Range (mm)	L (mm)	Notes
MT1	ER16	1–10	80	Small lathe/drill press
MT2	ER16	1–10	85	Standard drill press
MT2	ER20	1–13	90	Most common combination
MT3	ER25	1–16	95	Heavy-duty drill press
MT3	ER32	2–20	100	Max capacity MT3
MT4	ER32	2–20	110	Large machine spindle
MT4	ER40	3–26	115	Full-capacity MT4

AM Compensated Tapping Adapters (Gait / Kintek-Gait)

AM = *Adattamento Maschiatura* (tapping compensation). These adapters incorporate a floating axial mechanism that eliminates pitch error between spindle feed rate and tap lead — critical for rigid tapping on CNC machining centres without tapping cycles.

How it works: The tap is held via ER collet in the floating body, which can travel ±3.5 mm axially inside the housing. When spindle feed and tap pitch are slightly mismatched, the compensation prevents broken taps and stripped threads.

Compatible with ISO metric threads M1–M20, UNC, UNF, BSW, and Gas threads. Product family: Kintek-Gait (Bologna, Italy).

ER AM Series — Dimensions & Capacity

Standard ER collet geometry with internal floating compensation mechanism. D and L match standard ER body dimensions for compatibility with existing spindle noses.

Model	Article Code	D (mm)	L (mm)	T Compensation	Clamp Range
ER16 AM	0364 AM	17.0	27.0	7.0 mm	2.0 – 6.0 mm
ER20 AM	0787 AM	21.0	31.0	7.0 mm	2.5 – 7.0 mm
ER25 AM	—	26.0	35.0	~7.5 mm	2.0 – 14.0 mm (est.)
ER32 AM	—	33.0	40.0	~8.0 mm	2.0 – 20.0 mm (est.)

Available Bore Sizes (ER16 AM / ER20 AM)

ER16 AM code	Bore (mm)	ER20 AM code	Bore (mm)	ER20 AM code	Bore (mm)
0364AM020	2.0	0787AM0250	2.5	0787AM0500	5.0
0364AM025	2.5	0787AM0280	2.8	0787AM0550	5.5
0364AM028	2.8	0787AM0300	3.0	0787AM0560	5.6
0364AM030	3.0	0787AM0350	3.5	0787AM0600	6.0
0364AM035	3.5	0787AM0400	4.0	0787AM0630	6.3
—	—	0787AM0450	4.5	0787AM0700	7.0

Concentricity Reference (DIN 6499 / ISO 15488)

TIR measured at 3× collet clamping diameter from nut face.

Bore Ø (mm)	Meas. Length (mm)	Max Runout (mm)	Standard
0.5 – 3	3 – 10	0.015 – 0.020	DIN 6499
3 – 10	16 – 25	0.020	DIN 6499
10 – 20	40 – 50	0.030	DIN 6499
20 – 30	60	0.030	DIN 6499

How to order: *Specify ER size (ER16/20/25/32), shank type (straight / MT1-MT4 / AM), and bore diameter. Quote Gait article codes for AM adapters (e.g. 0364AM025). Material certificates and dimension reports available on request.*

7. Tooling Selection Guide

Step 1 — Identify your machine spindle taper

If your machine has…	Choose this taper
Japanese or Asian machining centre (Fanuc, Mazak, Okuma, Doosan)	BT30, BT40, or BT50
North American machining centre (Haas, Cincinnati, Fadal)	CAT40 or CAT50
European machining centre (DMG, Hermle, Mikron)	ISO40/50 or HSK-A63
High-speed spindle > 20,000 RPM or 5-axis machining	HSK-A (any size)
Conventional knee mill (Bridgeport type)	R8 collet or R8 adapter
Drill press or lathe tailstock	Morse taper adapter (MT2–MT4)

Step 2 — Choose the right collet and clamping nut

Requirement	Recommended product
General milling, drilling, reaming (runout < 0.01 mm)	ER Standard collet + standard nut
Precision finishing (runout < 0.006 mm)	ER HP collet + bearing nut
High-speed > 15,000 RPM (balance critical)	ER HP collet + dynamically balanced nut
Through-spindle coolant delivery	ER sealed collet + coolant nut
Tight bore / low clearance setup	ER standard collet + mini-nut (MN)
Tapping on CNC with rigid tapping G-code	GT12 rigid tapping collet
Tapping on pneumatic arm or non-rigid CNC	GT12 tapping collet with torque clutch

8. Standards & Specifications Reference

Standard	Scope	Applies to
DIN 6499 / ISO 15488	ER collet dimensions and tolerances	All ER collets (ER8–ER50)
JIS B6339	BT toolholder tapers and pull stud threads	BT30, BT40, BT50
MAS 403	Pull stud geometry for BT spindles	BT pull studs
ANSI B5.50 / MAS 404	CAT V-flange toolholders	CAT40, CAT50
ISO 7388-1	ISO steep-taper toolholders (SK/DIN 2080)	ISO30, ISO40, ISO50
ISO 7388/2B	Pull stud geometry for ISO spindles	ISO pull studs
DIN 69872	Pull stud / retention knob dimensions	BT and ISO pull studs
ISO 12164 (HSK)	Hollow shank taper interface dimensions	HSK-A, E, F (all sizes)
JIS GT12	Tapping collet shank geometry	GT12 tapping collets
ISO 1947	Toolholder balance grading (G6.3, G2.5)	Balanced toolholders

Runout & Precision Grades

Grade	Runout at 4×D	Typical use
Standard ER	≤ 0.008 mm	General machining, drilling, rough milling
High Precision (HP) ER	≤ 0.005 mm	Finishing, reaming, precision boring
Hydraulic chuck	≤ 0.003 mm	Fine boring, carbide reaming, mirror finish
Shrink fit	≤ 0.003 mm	High-speed machining, 5-axis, HSM
Weldon end mill holder	≤ 0.010 mm	Heavy milling, high-torque roughing

9. Contact Information

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Our Services

- Free technical consultation on tooling selection
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- European and Asian standard coverage

We respond to all enquiries within 24 hours on business days. For urgent technical questions, please call directly.