HC Hydraulic Expansion Chucks

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Technical Information – Hydraulic Chucks

Kennametal hydraulic chucks provide optimum performance for clamping of full-cylindrical straight shanks such as solid carbide drills and end mills. Activation of the chuck is achieved by turning the piston screw, which pressurizes the hydraulic fluid and exerts high pressure on a thin-walled membrane running the length of the clamping bore. This highly concentric clamping force not only holds the tool shank more securely, but produces a dampening effect that reduces vibration and helps eliminate "micro-cracking" of cutting edges. A unique safety stop prevents over-tightening damage to the chuck with or without the cutting tool in place. Another unique feature is the special spiral wiper groove in the chuck's clamping bore that permits secure gripping of oily tool shanks. All Kennametal hydraulic chucks utilize a range of sealed cutting-tool reducing sleeves to maximize chuck versatility. Reducing sleeves also can be used for converting from inch to metric bores and metric to inch bores.

Standard Line

Our proven "Standard Line" hydraulic chucks have an external adjustment screw for radial adjustment (up to 3/8") of the cutting-tool length. This feature eliminates the need to remove the cutting tool or retention knob to make fine adjustments. These chucks are pre-balanced. Please see toolholder sections of this catalog for balancing quality. SEFAS chamfering rings can also be used on this chuck design.

Trend Line

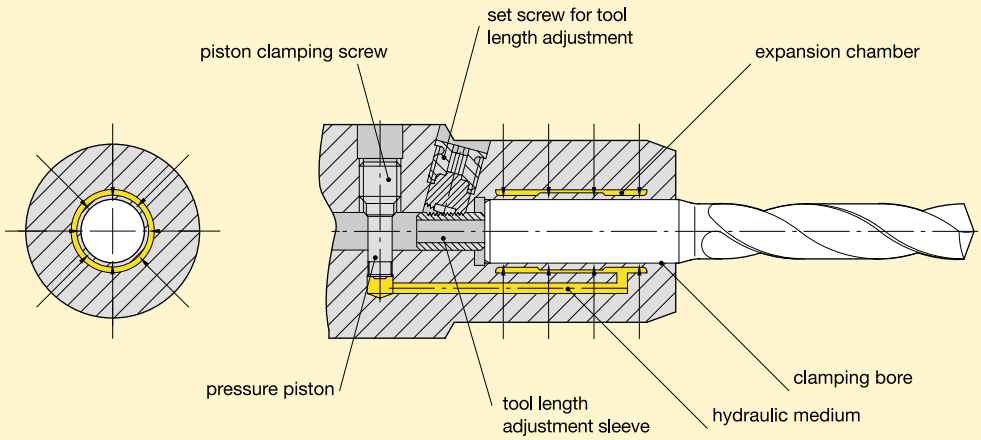
Our new "Trend Line" hydraulic chucks offer maximum precision at an attractive price. The Trend Line system provides the same accuracy specifications as the Standard Line. The primary difference between the two systems is the 3/8" radial adjustment of the cutting tool length that is achieved with an axial back-up screw through the chuck bore. SEFAS chamfering rings also can be used with our Trend Line chucks.

Basic Line

"Basic Line" hydraulic chucks have the same high-quality runout specification of .0001. Basic Line chucks are balanced-by-design for speeds up to 10,000 rpm. The simple axial back-up screw adjustment of 3/8" is achieved through the chuck bore the same way as the Trend Line. Larger body diameters give this chuck higher stability along with higher torque transmission (grip) of 220 ft-lb. Please note that the standard SEFAS chamfering ring cannot be used on this chuck design.

Technical Information – Hydraulic Chucks

General Design



Function

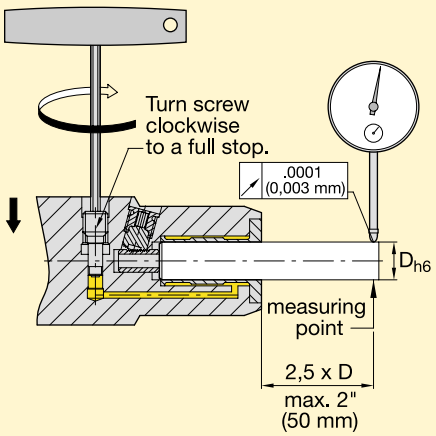
Tightening the piston clamping screw exerts force on the pressure piston, which in turn pressurizes the hydraulic fluid. The pressurized hydraulic fluid, in turn, exerts high pressure on the thin-walled expansion sleeve. This pressure causes the sleeve to compress around the tool shank, creating a highly concentric clamping force.

Effect

The hydraulic clamping system has a dampening effect. Micro-cracking of the insert cutting edge, usually caused by vibration in a mechanical clamping system, is prevented by the hydraulic expansion chuck. Result…higher production quality and up to four times better tool life.

Accuracy

- Accuracy shown is based on a round shank (no flats) with h6 tolerance and no bushing.



Application

The hydraulic expansion chuck works best when clamping these style shanks:

- shanks to DIN-6535–forms HA, HB, and HE
- shanks to DIN-1835–forms A and B (with shank tolerance h6 and Ra minimum of 0,3 µm)
- forms HA and A – plain cylindrical shank, 6 to 32 mm diameter
- forms HB and B – Weldon shank, 6 to 20 mm maximum diameter
- form HE – Whistle Notch shank, 6 to 20 mm maximum diameter (Kennametal suggests the use of a reducer collet)
- inch straight shanks
  - 1/4" to 5/8" (.0004 under nominal diameter maximum)
  - 3/4" to 1 1/4" (.0005 under nominal diameter maximum)

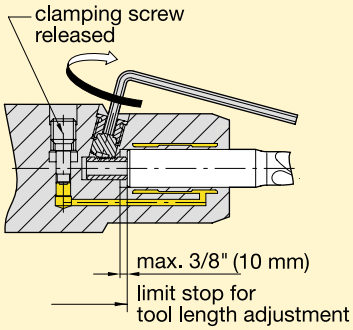
Weldon shanks can be gripped without reducer collets, 3/4" (20 mm) maximum diameter. However, Kennametal recommends the use of reducer collets for all flatted shanks. Highest accuracy is obtained with plain, cylindrical shanks.

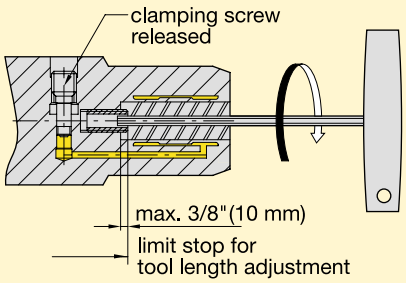
Features

- Tool length axial adjustment is accomplished by turning the external set screw. No need to remove the cutting tool or coolant supply unit for standard design.
- Maintaining contact with the tool length adjusting sleeve ensures that a safe clamping length is held. Ten millimeters of adjustment is provided.
- A sealed bore, and a large hole through the tool length adjusting screw, permit maximum coolant flow through all coolant-fed cutting tools.
- A unique design of the piston clamping screw prevents damage to the chuck from overtightening or by actuating the hydraulic mechanism without a tool in the chuck.
- High-performance balanced chucks can be converted to balanceable chucks by adding a set of Kennametal balance rings to compensate for cutter imbalance to optimize performance.
- Wiper grooves inside the bore permit safe gripping of oily shanks. The sealed bore eliminates contamination from chips, dirt, or coolant.
- SEFAS chamfering rings can be added to chucks, reducing the need for step drills and secondary chamfering operations.
- A wide assortment of reducer sleeves is available to increase the application range of the hydraulic chucks. When using a bushing, the runout could be up to twice that shown.

Technical Information – Hydraulic Chucks

Setting Up Your New Hydraulic Chuck:





1). Remove all grease from the hydraulic chuck before using.

2). Insert the cutting tool into the clamping bore as far as the stop pin /stop screw will allow.

3). Adjust the cutting tool length with a hex wrench.

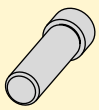
4). Always tighten the clamping screw with a hex wrench as far as the limit stop, by hand tightening. **Never** try to adjust the stop pin when the hydraulic chuck is in the clamped position.

5). The tool is now clamped and ready for use.

Accessories:

Reducing sleeves -
please see page S256

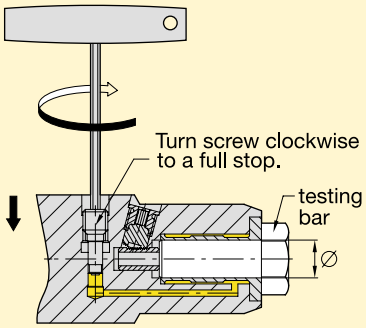
Cleaning brushes -
please see page S300



Test pins -
please see page S300

Maintenance:

Kennametal hydraulic chucks are maintenance-free and deliver a long service life. It's important that the clamping function be checked with a test pin on a regular basis. Test pins are shown on page S300. Any dirt in the clamping bore can be removed with the nylon cleaning brush referenced on page S300.



- The clamping function can be tested quickly and easily using the test pin.
- Insert the test pin into the clamping bore as far as the stop pin /stop screw allow.
- Tighten the clamping screw with a hex wrench as far as the limit stop, by hand tightening.
- The chuck is functioning correctly if the test pin cannot be moved by normal hand pressure.

IMPORTANT: Never tamper with the oil-loading orifice, sealed with a cap, as this could destroy the clamping ability of the hydraulic chuck and will need to be sent back to Kennametal for servicing.

In the event of small tool crashes or misuse of the chuck, please contact Kennametal's Service and Repair Department to have your Kennametal hydraulic chuck serviced or repaired by qualified Kennametal service technicians.

Phone: 800-999-6385

Fax: 724-539-6881

Ship / Mail:

Kennametal Service & Repair Dept.

1600 Technology Way

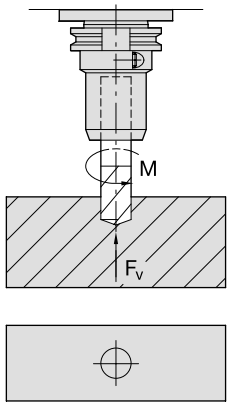
Latrobe, PA 15650

Technical Information – Hydraulic Chucks

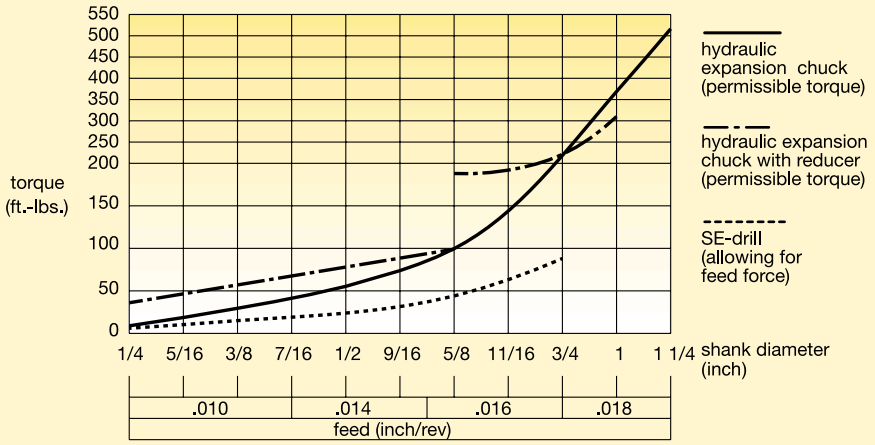
Drilling with the SE-Drill

Machining tempered steels of strength 800 N/mm^2 (116,030 psi)

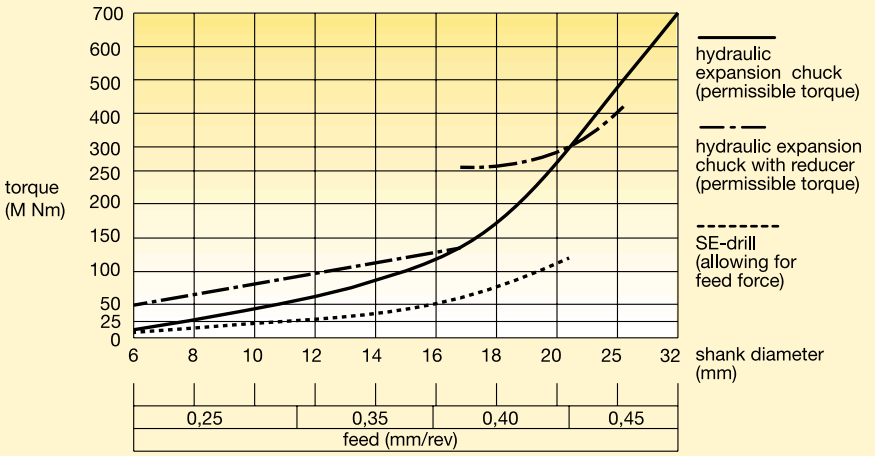
Cutting speed: 60-80 m/min (197-262 ft/min)



Drilling (inch)



Drilling (mm)

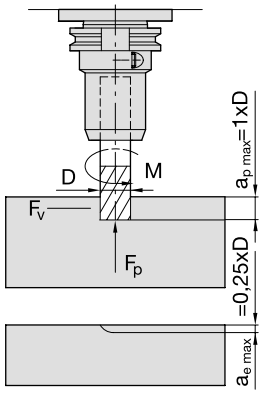


Technical Information – Hydraulic Chucks

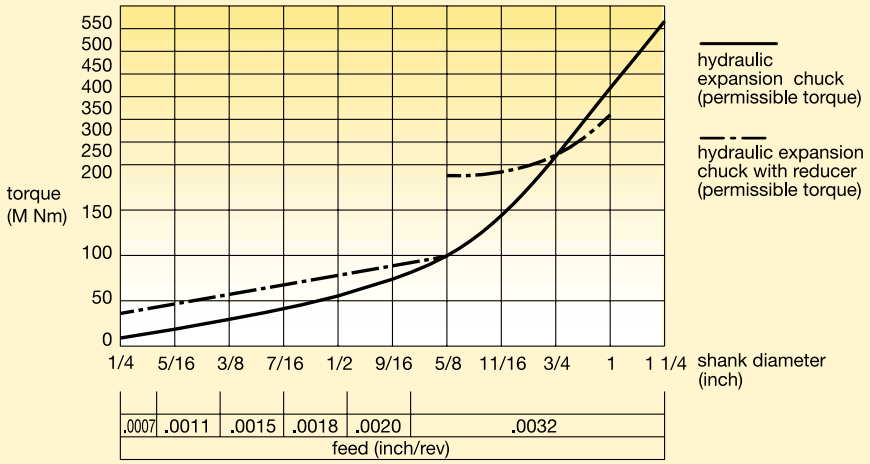
Milling with Solid Carbide Milling Cutters

Machining tempered steels of strength 750 N/mm² (108,778 psi)

Cutting speed: 65-85 m/min (213-279 ft./min.)



Milling (inch)



Milling (mm)