



ROTARY TABLES
INDEXERS
AND TRUNNIONS

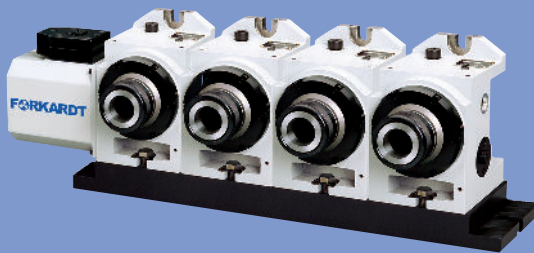
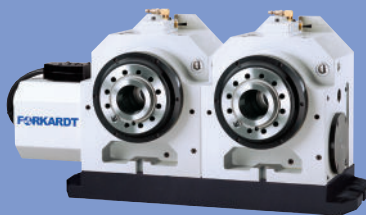


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Forkardt next-generation 5C² mechanically outmaneuvers the competition.

1. HOUSING

Machined and bored on a precision CNC jig boring machine for close tolerance finish dimensions. Foundry castings (made in the USA) provide vibration damping.

2. SPINDLE

Spindle is finish ground on a high-precision CNC universal grinding machine. All surfaces where bearings and gears are installed are ground in the same setup for maximum accuracy.

3. BEARINGS

High-load, tapered dual roller bearings are used to support heavy radial and axial loads and to provide a longer spindle life.

4. DOUBLE ECCENTRICS

Double eccentrics (not single) provide the finest gear mesh adjustment. Forkardt has lowered the backlash range and improved accuracy overall. Customers can perform future gear wear compensation for extended life and improved accuracy over time.

5. WORM DRIVE SHAFT

Hardened and ground steel worm drive shaft is standard. The process begins on a CNC lathe and the threads are finish ground on a precision thread grinder. Grind quality of AGMA class 13 is verified on a CNC gear inspection machine.

INSPECTION

Final inspection of every unit is performed using an encoder mounted directly on the spindle nose to assure final positioning accuracy and repeatability. Printout of accuracy is shipped with each unit.

6. ALUMINUM BRONZE WORM GEAR

A high quality worm gear system with 60:1 gear ratio allows for an efficient forward driving capability while at the same time preventing backdriving from occurring. The process begins on a high precision CNC lathe, then hobbled on a hobber.

SEALING

Forkardt has an extremely thorough seal system designed to keep coolant and contaminants out in harsh machining environments.

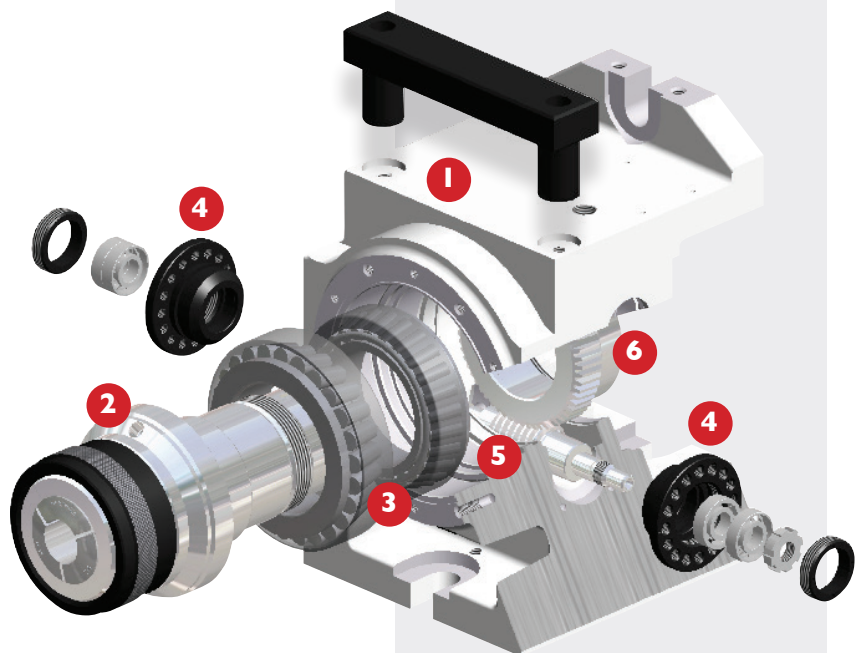
MULTIPLE PART SETUPS

Choose from dual, triple and quad units for processing multiple parts to increase output. All spindles are synchronized for aligned part orientation within .0002" (.005mm).

Curved front casting and removable handle for increased spindle clearance and better tool access.

- ± 5 arc-sec repeatability
- ± 30 arc-sec accuracy
- .0002" max. runout (.005mm TIR)

Robust, dual-bearing spindle for heavier radial and axial loads. 50-lb (23kg) part weight and 1000-lb (4448N) tailstock thrust per spindle is not a problem – even on a quad unit with tailstocks!



INTERFACING OPTIONS

INTERFACE OPTION

4th Axis Integration



- Rotary programming lies in the machine controls acting as a 4th axis along with X,Y and Z
- Servo motor & cable must be compatible with machine
- 4th axis option & servo amplifier install available for:
 - FANUC
 - Heidenhain
 - Milltronics
 - Siemens
 - Okuma

INTERFACE OPTION

M-Code Only Connection



CNC Interface Cable (M-Code)

- Rotary programming lies in the indexer controls
- Indexer controls communicate with rotary through M-code cable
- M-code cable provided with connector for indexer controls and wire terminations for machine

INTERFACE OPTION

RS-232 and M-Code Connection



CNC Interface Cable (M-Code)

RS-232 Communication Cable

- Rotary programming lies in the machine controls* & is sent to the indexer controls via RS-232 cable**
- Indexer controls communicate with rotary through M-code cable

- M-code cable provided with connector for indexer controls & wire terminations for machine

* FANUC controls fully supported; others considered upon request
 ** RS-232 cable provided by customer; machine must communicate directly with RS-232 port



5C² INDEXERS

STANDARD FEATURES

- Curved front casting and removable handle for increased spindle clearance and better tool access
- Rapid indexing speed up to 360° per second
- ±5 arc-sec Repeatability
- ±30 arc sec Accuracy
- .0002" (.005mm) maximum runout (TIR)
- Robust, dual-bearing spindle accommodates heavy axial and radial loads with the ability to run a triple or quad unit with tailstocks
- Brushless motor
- Industry compatible – same spindle centerline, foot print and tool clearance as previous Forkardt products and other US-made brands for direct replacement
- Single, dual, triple and quad spindle configurations
- Operate with the Forkardt all-digital indexer control or interface to your machine
- Uses standard 5C collets, Sure-Grip® expanding collets, step chucks and manual jaw chucks

OPTIONS

- Collet closers – manual, pneumatic fail-safe through-hole and pneumatic high-force
- Tailstocks and plate trunnions
- Quill Switch for Bridgeport knee mill to automate the indexing process
- Manual drawbar for each spindle for multi-spindle units
- Preset tailstock and indexer combinations – self-contained units mounted on a subplate for easy placement on and off the machine table to maintain factory tolerances
- Complete array of Forkardt spindle tooling

Preset Tailstock & Rotary Combinations

SINGLE: Pneumatic Tailstock with valve, Pneumatic Rotary Unit, Double Mounting Plate and Servo Control

DUAL: Two Pneumatic Tailstocks with valving, Dual-unit Pneumatic Rotary Unit, Double Mounting Plate and Indexer Control

INDEXER CONTROL PROGRAMMING

Indexer Control Model	Standard Indexer Control
Storage - Number of programs/steps	9999/500
RS-232 Interface	YES
LCD Display	multiple lines
USB 2.0 Upload/Download	YES
Baud Rate Capacity	19.2 BPS

SPINDLE

Runout Maximum (TIR)	0.0002" (.005)
Backlash	40 arc-sec
Speed - single	0.001 to 360° per sec
- multi	0.001 to 180° per sec
Maximum RPM Rapid ^{Min-1} - single	60
- multi	30
Load Support – max. part weight	Dual Bearing 50 lb / 23 kg
Spindle Type	2 ³ / ₁₆ – 10 threaded nose
Collets	Standard 5C
Spindle center to base	4.000" ± 0.001 (101.6 ± 0.254)

POSITIONING

Accuracy (arc-sec)	±30 arc-sec
Repeatability	±5 arc-sec
Resolution (degree)	0.001
Max Rotation/Step (degree) ¹	9999.99
Gear Diameter	2.8" (71.1)

MOTOR

Type (DC servo)	0.78hp / 0.58KW
Torque at Spindle	54 ft-lb / 73 Nm
Duty Cycle	90% at full speed

OPERATING SPECIFICATIONS

Gear Ratio (worm & gear)	60:1
Operating Temp. (maximum ambient)	120°F / 49°C
Power Requirements (VAC)	115 +/- 5% @ 10 amps
Max Air Pressure using High-Force Collet Closer	120 psi / 8.3 bar
Max Air Pressure using Fail-Safe Collet Closer	85 psi / 5.8 bar

WEIGHT

Single Indexer	55 lb / 25 kg
Dual Indexer	119 lb / 54 kg
Triple Indexer	179 lb / 81 kg
Quad Indexer	240 lb / 109 kg
Control	10 lb / 4.5 kg

DIMENSIONS

Workholding Capacities

Collets – Round (max. capacity)	1 1/16" (26.98)
Collets – Hex (max. capacity)	29/32" (23.01)
Collets – Square (max. capacity)	3/4" (19.05)
Step Chucks – Regular Depth	up to 6" (152.4)
Step Chucks – Extra Depth	up to 6" (152.4)
3-Jaw Chuck	5" (127)
3-Jaw Chuck	6" (152.4)
Sure-Grip® Expanding Collets	1/8" - 3" (3.17 - 76.2)
Fixture Plate – Spindle Mount	3" (76.2)
Fixture Plate – Spindle Mount	5" (127)
Fixture Plate – Collet Style	3 3/8" (85.72)
Fixture Plate – Collet Style	4 3/8" (111.12)
Slotted Face Plate (diameter)	7" (178)
Collet Stops for part positioning	YES

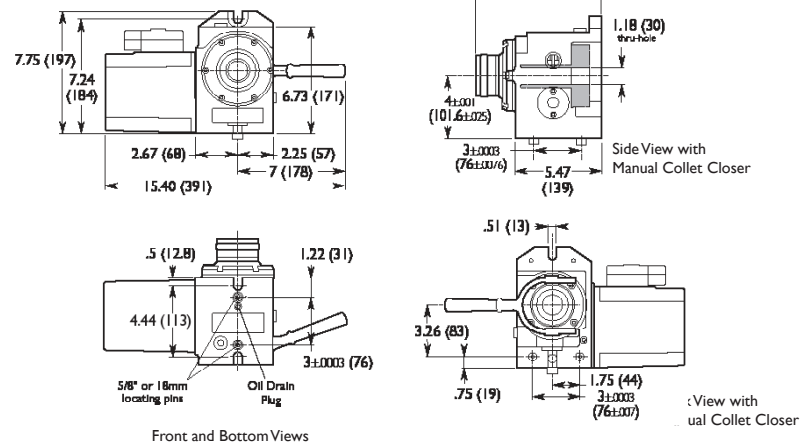
Slotted face plates can be used for "light duty" off-center work only.

Bridgeport Knee Mill Remote Quill Switch

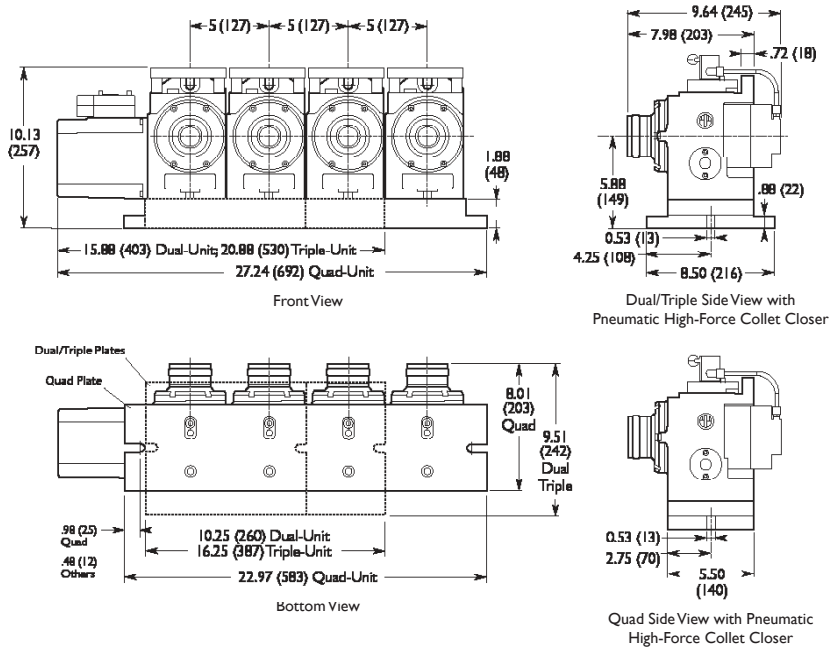
A remote quill switch is available for use with manual Bridgeport mills. When the quill handle is retracted, it touches a micro switch for automatic indexing, eliminating the need to push the start button on the servo control. Bracket and interface cable are included.



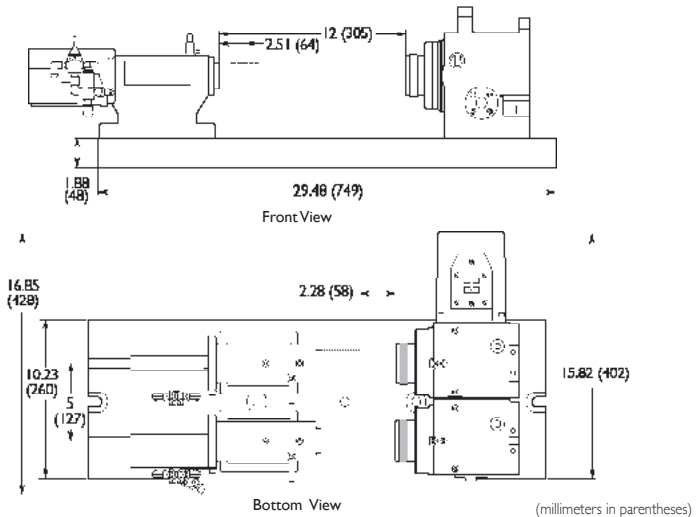
GD5C2



GD5C2 02, 03 and 04



Preset Tailstock and Indexer



(millimeters in parentheses)



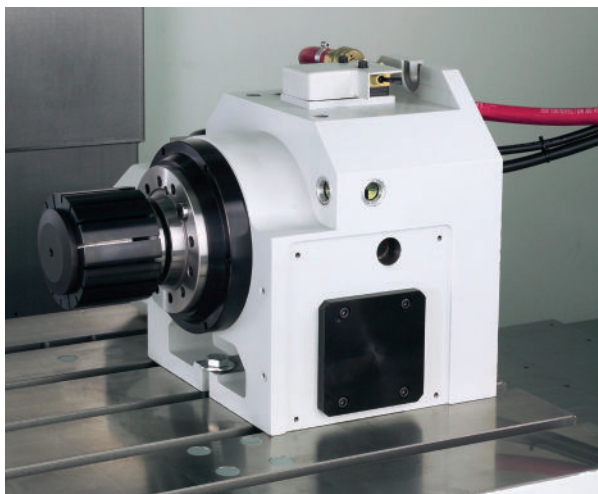
16C2 AND 3J2 INDEXERS

STANDARD FEATURES

- A2-5 16C or 3J spindle accepts standard collets, Sure-Grip® expanding collets, step chucks, fixture plates and power chucks
- Typical part handling of 5 x 7" (127 x 178) parts
- Rapid indexing speed up to 300° per second
- ±5 arc-sec repeatability
- ±15 arc sec accuracy
- .0002" (.005mm) maximum runout (TIR)
- Robust, dual-bearing spindle accommodates heavy axial and radial loads with the ability to run a dual or triple unit with tailstocks
- Spindle clamp eliminates slippage when performing heavy off-center drilling
- Pneumatic collet closer provides 2792-pound (1266kg) draw bar pull at 70psi
- 6" (152.4) centerline to base
- .55" (13.97) total drawbar travel suitable for 3-jaw power chucks
- Through-hole: 16C2 - 1.624" (41.25), 3J2 - 1.75" (44.5)
- Performs spiral, arc and linear milling as well as standard indexing operations
- Single, dual and triple spindle configurations

OPTIONS

- 5C adapter available for small part processing – Order part no. CJ 00002835CA
- Tailstocks, plate and cube trunnions
- Complete array of Forkardt spindle tooling



INDEXER CONTROL PROGRAMMING

Indexer Control Model	Enhanced Indexer Control
Storage - Number of programs/steps	9999/500
RS-232 Interface	YES
Text Display	multiple lines
USB 2.0 Upload/Download	YES
Baud Rate Capacity	19.2 BPS

SPINDLE

Runout Maximum (TIR)	0.0002" (.005)
Backlash	40 arc-sec
Speed - single	0.001 to 300° per sec
Maximum RPM Rapid ^{Min-1} - single	50
Load Support – max. part weight	Dual Bearing/Contact Bearing 150 lb / 68 kg
Spindle Type	A2-5
Collets	Standard 16C/Standard 3J
Spindle center to base	6.000" ± 0.001 (152.4 ± .0254)

POSITIONING

Accuracy (arc-sec)	±15 arc-sec
Repeatability	±5 arc-sec
Resolution (degree)	0.001
Max Rotation/Step (degree) ¹	9999.99
Gear Diameter	6.2" (71.1)

MOTOR

Type (DC servo)	0.78hp / 0.58KW
Clamping Torque ²	175 ft-lb / 237 Nm
Torque at Spindle	70 ft-lb / 95 Nm
Duty Cycle	90% at full speed

OPERATING SPECIFICATIONS

Gear Ratio (worm & gear)	60:1
Operating Temp. (maximum ambient)	120°F / 49°C
Power Requirements (VAC)	115 +/- 5% @ 10 amps
Min Air Pressure	90 psi / 5.8 bar
Max Air Pressure	120 psi / 6.9 bar (100 psi recommended)

WEIGHT

Single Indexer	200 lb / 90.7 kg
Dual Indexer	520 lb / 235.8 kg
Triple Indexer	680 lb / 308.4 kg
Control	9.54 lb / 4.34 kg

Notes: 1 – continuous rotation available

2 – maximum torque applied before slipping occurs

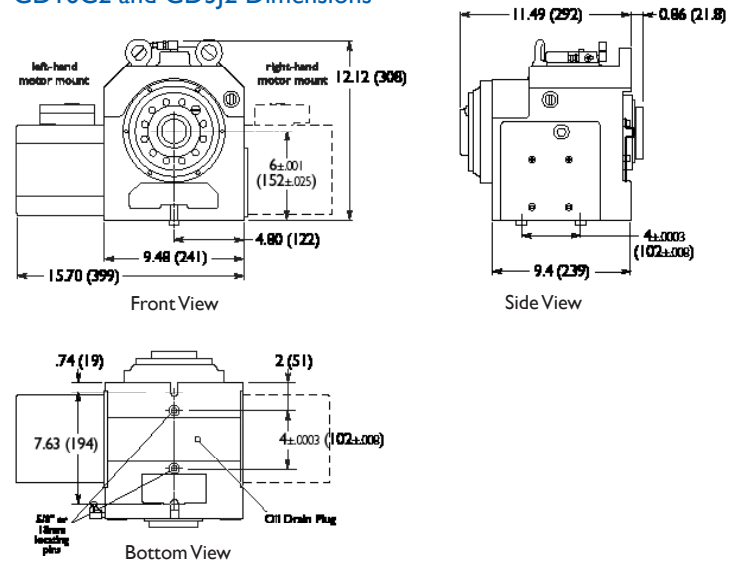
DIMENSIONS



GDI6C2 and GD3J2 Dimensions

Workholding Capacities 16C²

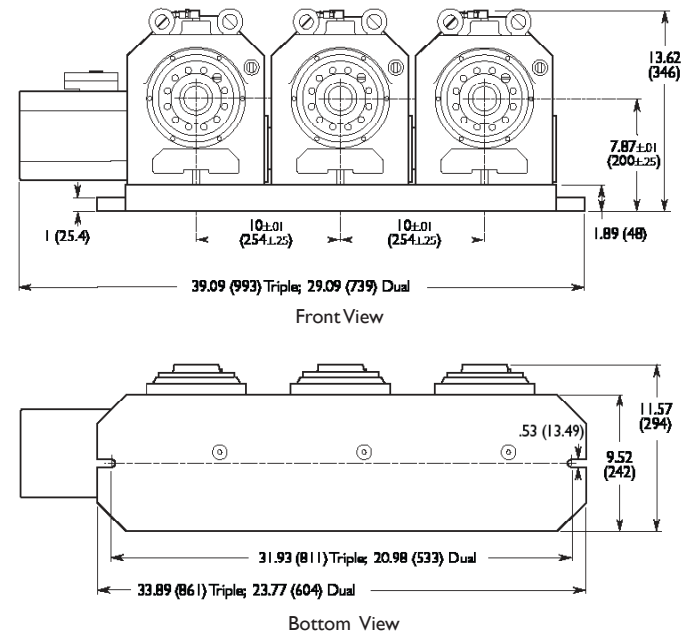
Collets – Round (max. capacity)	1 5/8" (41.27)
Collets – Hex (max. capacity)	1 13/32" (35.71)
Collets – Square (max. capacity)	19/64" (28.97)
Step Chucks – Regular Depth	up to 6" (152.4)
Step Chucks – Extra Depth	up to 6" (152.4)
FlexC Collet Systems	29/16" (65.00)
3-Jaw Chucks (diameter)	5", 6", 8"
Sure-Grip® Expanding Collets	
Collet Style	1/2" - 4" (12.70 - 101.6)
Spindle Style	1/8" - 4" (3.17 - 101.6)
Fixture Plates	
Spindle Mount	5 1/2" (139.70)
Spindle Mount	8 7/8" (225.42)
Collet Style	6 3/8" (161.92)
Slotted Face Plate	8.85" (225)
Slotted Face Plate	10" (254)
Collet Stops for part positioning	YES



GDI6C2 02, 03, GD3J2 02 and 03

Workholding Capacities 3J²

Collets – Round (max. capacity)	1 3/4" (44.45)
Collets – Hex (max. capacity)	1 17/32" (38.89)
Collets – Square (max. capacity)	1 1/4" (31.75)
Step Chucks – Regular Depth	up to 6" (152.4)
FlexC Collet Systems	29/16" (65.00)
3-Jaw Chucks	5", 6"
Sure-Grip® Expanding Collets	
Collet Style	1/2" - 4" (12.70 - 101.6)
Spindle Style	1/8" - 4" (3.17 - 101.6)
Fixture Plates	
Spindle Mount	5 1/2" (139.70)
Spindle Mount	8 7/8" (225.42)
Slotted Face Plate	8.85" (225)
Slotted Face Plate	10" (254)
Collet Stops for part positioning	YES



Top view of 16C² Rotary Indexer – Configure for either left or right-hand application.

LP160 AND LP210 INDEXERS



Face plate included

STANDARD FEATURES

- 160 and 210mm slotted face plates are precision ground on a grinding machine
- A2-4 (GD160LP) and A2-5 (GD210LP) extended-nose spindles accept collets, expanding collets, step chucks, manual chucks, power chucks and slotted face plates
- Built-in clamp to handle off-center drilling, cross-axis milling and other high-force cutting applications
- Fast clamp and release in milliseconds for increased parts-per-hour
- Hardened steel worm and hardened steel worm gear for long life and continued accuracy
- Double eccentric design for finest possible factory gear mesh
- Left- or right-hand motor mount
- Use with all-digital indexer control on most brands of machines, or as 4th-axis (FANUC, Siemens, Haas, Heidenhain)
- Extended-nose spindle design provides optimum clearance

OPTIONS

- Pneumatic Collet Closer
(draw bar force at 70 psi)
GD160LP – 1825 lb / 828 kg
GD210LP – 2792 lb / 1266 kg
- GD210LP available with or without collet-ready spindle
- Tailstocks, plate and cube trunnions (GD160LP plate trunnion only)
- Complete array of Forkardt spindle tooling

	GD160LP	GD210LP
Indexer Control Model	Standard Indexer Control	
Storage - Number of programs/steps	9999/500	
RS-232 Interface	YES	
Text Display	multiple lines	
USB 2.0 Upload/Download	YES	
Baud Rate Capacity	19.2 BPS	
SPINDLE		
Runout Max (TIR)	0.0002" (.005)	
Backlash	40 arc-sec	
Speed	0.001 to 240° per sec	
Maximum RPM Rapid Min ⁻¹	40	
Load Support max part weight	Dual Bearing 100 lb / 45 kg	Dual Bearing 220 lb / 100kg
Spindle Type	A2-4	A2-5
Table Diameter	6.299" (160)	8.267" (210)
Thru Diameter Face Plate (max)	1" or 25mm choice	2" or 50mm choice
Thru Dia. Opt. Collet Closer (max)	1.08" (27.4)	1.62" (41.27)
Width of T-slot	.44" (11.2)	.57" (14.4)
Collets	Standard 5C	Standard 16C
Spindle center to base	5.000" ± 0.001 (127 ±.0254)	6.000" ± 0.001 (152.4 ±.0254)
POSITIONING		
Accuracy	±20 arc-sec	±15 arc-sec
Repeatability	±5 arc-sec	
Resolution (degree)	0.001	
Max Rotation/Step (degree) ¹	9999.99	
Gear Diameter (inch/mm)	3.7 (94)	6.2 (157)
MOTOR		
Type (DC servo)	0.78 hp / 0.58kW	2.0 hp / 1.50 kW
Clamping Torque ² (pneumatic)	150 ft-lb / 203 Nm	275 ft-lb / 373 Nm
Torque at Spindle	73 ft-lb / 99 Nm	90 ft-lb / 122 Nm
Duty Cycle	90% at full speed	
OPERATING SPECIFICATIONS		
Gear Ratio (worm, gear & timing belt)	90:1	
Operating Temp. (maximum ambient)	120°F/49°C	
Power Requirements (VAC)	115 +/- 5% @ 10 amps	
Min Air Pressure	90 psi / 5.8 bar	
Max Air Pressure	120 psi / 6.9 bar (100 psi recommended)	
WEIGHT		
Rotary Table	120 lb / 57 kg	200 lb / 90.7 kg
Control	9.54 lb / 4.34 kg	

Notes: 1 – continuous rotation available

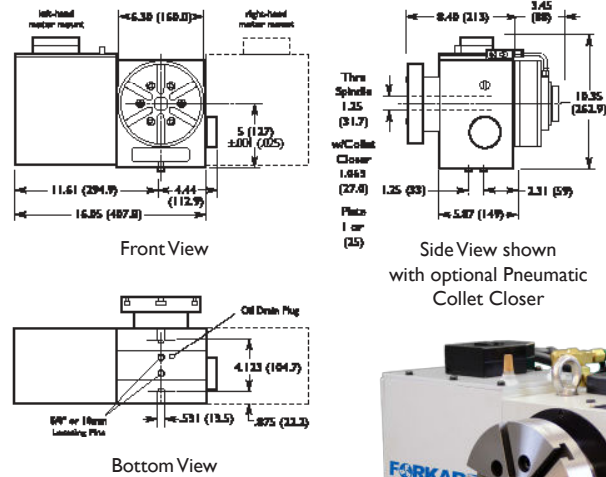
2 – maximum torque applied before slipping occurs

DIMENSIONS

Workholding Capacities GD160LP

Collets – Round (max. capacity)	1 1/16" (26.98)
Collets – Hex (max. capacity)	29/32" (23.01)
Collets – Square (max. capacity)	3/4" (19.05)
Step Chucks – Regular Depth	up to 4" (101.6)
Step Chucks – Extra Depth	up to 4" (101.6)
Sure-Grip® Expanding Collets	1/8" - 3" (3.17 - 76.2)
3-Jaw Manual Chuck	5" (127)
3-Jaw Manual Chuck	6" (152.4)
3-Jaw Sure-Grip® Power Chuck	4" (101.6)
Fixture Plate – Collet Style	33/8" (85.72)
Fixture Plate – Collet Style	43/8" (111.12)
Slotted Face Plate (diameter)	6.3" (160)
Collet Stops for part positioning	YES

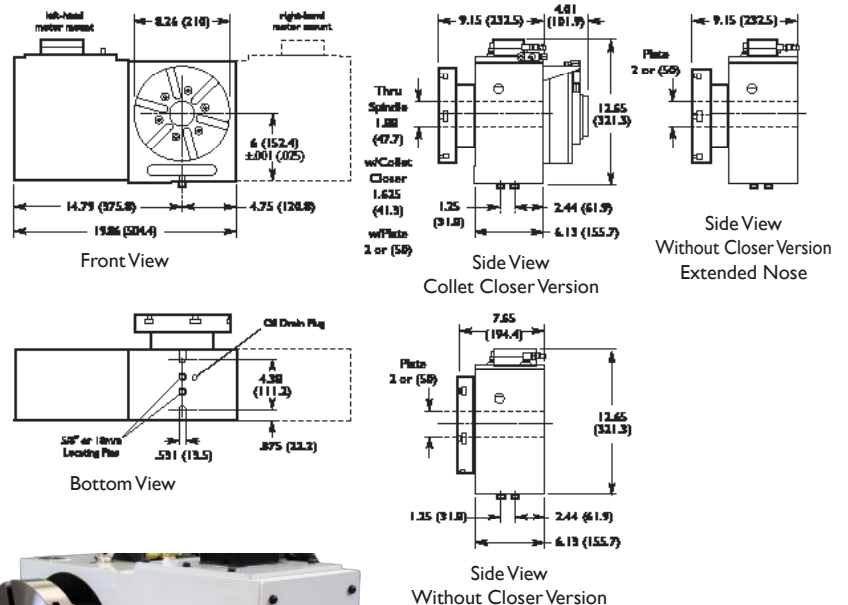
GD160LP



Workholding Capacities GD210LP

Collets – Round (max. capacity)	1 5/8" (41.27)
Collets – Hex (max. capacity)	1 13/32" (35.71)
Collets – Square (max. capacity)	19/64" (28.97)
Step Chucks – Regular Depth	up to 6" (152.4)
Step Chucks – Extra Depth	up to 6" (152.4)
FlexC Collet Systems	29/16" (65.00)
3-Jaw Chucks (diameter)	5", 6", 8"
Sure-Grip® Expanding Collets	
Collet Style	1/2" - 4" (12.70 - 101.6)
Spindle Style	1/8" - 4" (3.17 - 101.6)
Fixture Plates	
Spindle Mount	5 1/2" (139.70)
Spindle Mount	8 7/8" (225.42)
Collet Style	6 3/8" (161.92)
Slotted Face Plate	8.26" (210)
Slotted Face Plate	8 7/8" (225.42)
Slotted Face Plate	10" (254)
Collet Stops for part positioning	YES

GD210LP



(millimeters in parentheses)

DUAL-AXIS 5C² SYSTEMS



STANDARD FEATURES

Single-Spindle

- 5th-axis base unit has a total 360° tilt (±180° from the 12-o'clock position)
- Units are precision aligned to the spindle center
- Two units in one – quick release for separate use of indexers (do not disassemble multiple-spindle models)

Multi-Spindle Configurations

- Robust dual-bearing trunnion support
- Dual pneumatic clamp system for increased rigidity
- 5" (127) spindle center-to-center
- Pneumatic collet closers
- Overall Trunnion length:
dual – 32.24" (819)
triple – 37.24" (946)
quad – 42.25" (1073)

All Configurations

- 5C threaded-nose spindle accepts standard collets, step chucks, expanding collets and jaw chucks
- Operate with indexer control boxes – GDX5C2 will also operate as 4th-axis connection, tilt only
- Single, dual, triple and quad spindle configurations

OPTIONAL FEATURES

Multi-Spindle Configurations

- Adjustable hardware limit switches to limit travel to reduce risk of possible crash
- Two individual indexer controls can be used for operation
- Control box and 4th axis can be used for operation
- 4th and 5th axis can be used for operation
- Manual drawbar turns by hand for reduced-cost option

INDEXER CONTROL PROGRAMMING	4th-Axis 5C Spindles		Tilting 5th-Axis
Indexer Control Model	Standard Indexer Control		
Storage - Number of programs/steps	9999/500		
RS-232 Interface	YES		
Text Display	multiple lines		
USB 2.0 Upload/Download	YES		
Baud Rate Capacity	19.2 BPS		
SPINDLE			
Runout Maximum (TIR)	0.0002" (.005)		
Backlash	40 arc-sec		
Maximum RPM Rapid Min ⁻¹	30	10	
Load Support – max. part weight	Dual Bearing 17.6 lb / 8 kg	Dual Bearing	
Spindle Type	2 ³ / ₁₆ – 10 threaded nose	A2-5	
Collets	Standard 5C	—	
Table Height at Collet Nose	12.62" (320.5)	—	
Spindle center to base	7.25" ± 0.001 (184.2 ±.0254) (90°)	7.25" ± 0.001 (184.2±.0254)	
POSITIONING			
Tilting Range	—	-180° to +180°	
Accuracy	(single) ±30 arc-sec (multi) ±60 arc-sec	±30	
Repeatability	±5 arc-sec		
Max Rotation/Step (degree)	9999.99 ¹	±180.00	
Minimum Increment	.001		
Gear Diameter	2.8" (71.1)	6.2" (157.0)	
MOTOR			
Clamping System	—	Pneumatic	
Clamping Torque ²	—	(single) 275 ft-lb /373 Nm (multi) 550 ft-lb / 745 Nm	
Min Air Pressure	90 psi / 5.8 bar		
Max Air Pressure	120 psi / 6.9 bar (100 psi recommended)		
Working Torque at Spindle	(single) 54 ft-lb / 73 Nm (multi) 34 ft-lb / 46 Nm	(210LP) 90 ft-lb / 122 Nm	
Duty Cycle	90% at full speed		
OPERATING SPECIFICATIONS			
Speed Reduction Ratio	60:1	90:1	
Operating Temp. (max ambient)	104°F / 40°C		
Power Requirements (VAC)	115 +/- 5% @ 10 amps		
WEIGHT			
Single Spindle	265 lb / 120 kg		
Dual Spindle	460 lb / 208 kg		
Triple Spindle	525 lb / 238 kg		
Quad Spindle	590 lb / 268 kg		
Control – standard or enhanced	9.54 lb / 4.34 kg		

Notes: 1 – continuous rotation available

2 – maximum torque applied before slipping occurs

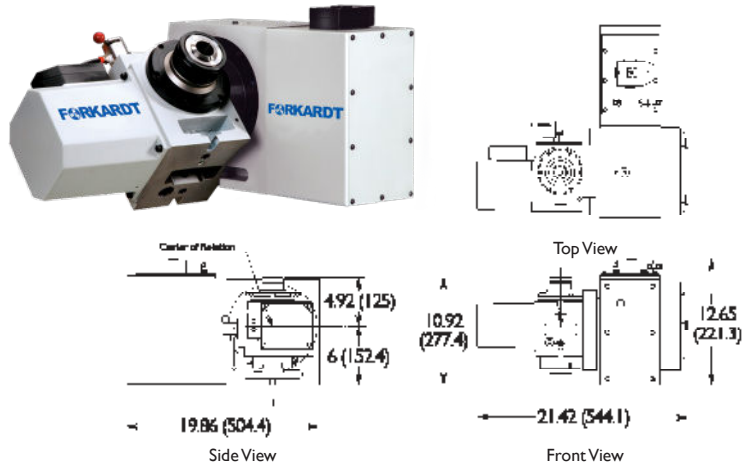
DIMENSIONS

Workholding Capacities

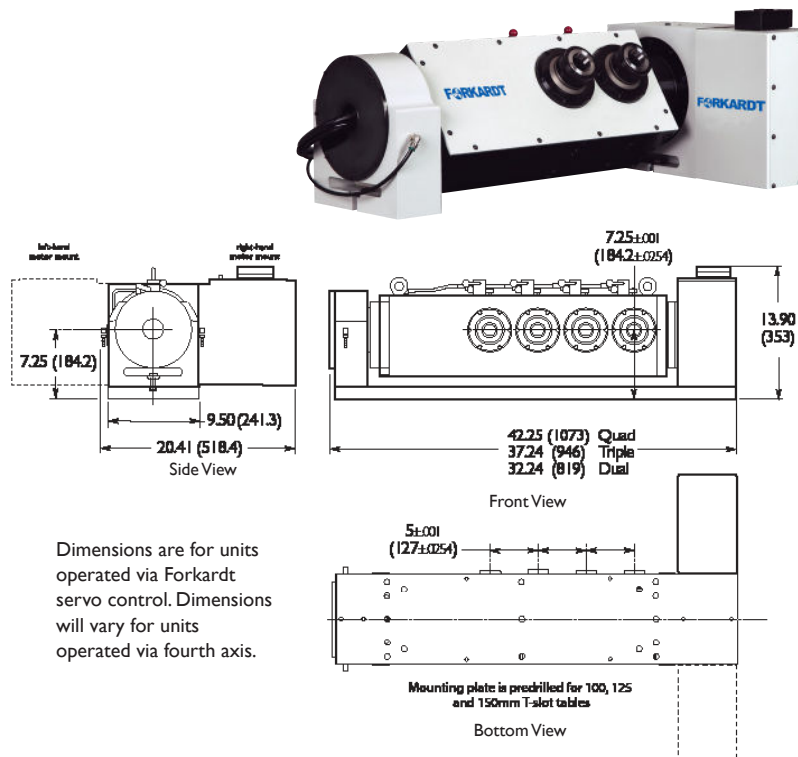
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Collets – Square (max. capacity)	3/4" (19.05)
Step Chucks – Regular Depth	up to 6" (152.4)
Step Chucks – Extra Depth	up to 6" (152.4)
3-jaw Chuck	5" (127)
3-jaw Chuck	6" (152.4)
Sure-Grip® Expanding Collets	1/8" - 3" (3.17 - 76.2)
Fixture Plate – Spindle Mount	3" (76.2)
Fixture Plate – Spindle Mount	5" (127)
Fixture Plate – Collet Style	33/8" (85.72)
Fixture Plate – Collet Style	43/8" (111.12)
Collet Stops for part positioning	YES

(Multi-spindle units limited by 5" (127) spindle-to-spindle centers)

LPX5C2-01CC with Collet Closers (no limit switch kit)



LPX5C2 02, 03, and 04



ALL-DIGITAL INDEXER CONTROL

The Forkardt all-digital indexer controls are current generation, easy to use and will support either brushless indexers. A multi-line display reduces scrolling and user manual dependency. Connect via a standard interface cable or use the RS-232 port. Upload and download your programs via a USB 2.0 compatible memory device.



Indexer Control

- Used with GD5C2, GD16C2, GD3J2, GD160LP and GD210LP Indexers
- Advanced G-code programming supports hardware and software limit switches and clamping
- Three additional inputs and outputs support external 24V accessories
- 120 or 240vac operation
- A nonvolatile memory retains your program even when power is turned off
- Program to rotate the spindle clockwise or counter-clockwise with step sizes from .001 to 9999.99 degrees



Optional Handwheel

- Compact Size: 5.60 x 3.25 x 1.53"
- Detented hand wheel positions
- Two handed safe operation
- Eight foot connector cable
- Handle design for hanging
- Anti-skid rubber feet

INDEXER CONTROL PROGRAMMING FEATURES

Automatic Circle Division	You can program a step that automatically divides a circle into any number of equal parts between 2 and 999
Continuous Rotation Capable	Continuous rotation with no limit to the number of revolutions through G-code function. Speed of rotation is dependent upon duty cycle.
Stop	You can use the CYCLE STOP to feed-hold spindle movement without losing position on restart
Fast Set-Ups	All connectors are "quick-disconnect", ensuring fast and easy set-ups
Interfacing	Most CNC mills can be interfaced quickly and easily by using a spare M function which provides a switch-closer as a signal between your mill and the control
Linear & Spiral Milling	For semi fourth-axis capability
Memory	A nonvolatile memory retains your program even when power is turned off
Program Storage	Store and recall from 1 up to 9999 different programs
Programmable Parameters	You can alter many of the basic features by performing your own basic programming
Programming	Program to rotate the spindle clockwise or counter-clockwise with step sizes from .001 to 9999.99 degrees
Absolute or Incremental Programming	Up to 500 different steps can be stored in memory and each step can be repeated (looped) 999 times
RS-232 Interface	For computer control of sending and receiving programs and running RS-232 commands from machine
Resolution	Standard resolution of .001 degrees
Simple Editing	Edit a program by simply writing over existing steps, or inserting or deleting a line (or several lines) between steps, with automatic program line renumbering
Subroutines	Allows you to repeat sequences up to 999 times saving programming time and memory space
Variable Feed Rates	Variable from .001 deg/sec to 2150 deg/sec (limited by indexer model)
Zero Return	An "automatic home" position can be programmed to return the spindle to its original starting position from any point

DIMENSIONS

STANDARD FEATURES

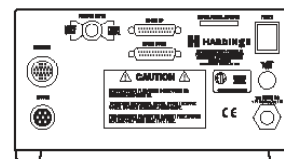
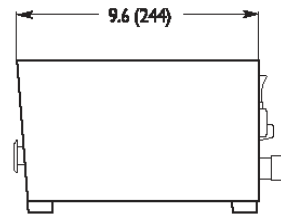
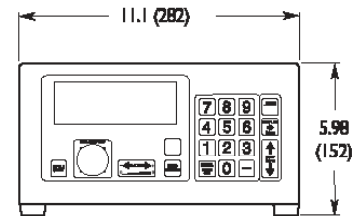
- Supports brushless motor indexers made by Forkardt and other rotary system manufacturers
- Store up to 9999 programs with up to 500 steps in each program
- Multiple line LCD display will allow you to view the program number, step number, loop count and preparatory g-code without scrolling
- Intelligent power module (drive electronics) to bring the best possible system to your machining center or knee mill
- Parameter number as well as its definition can be viewed in logical English with Parameter Help for some entries.
- Error and fault messages will be displayed to help diagnose problems
- Expanded diagnostic capabilities allow faster troubleshooting and part program debugging.
- External RS232 communication rates to 19.2bps supporting the latest speeds for sending and receiving data
- Communication parameters can be adjusted to support stop bits, data bits and different baud rates to work with different machine tool brands
- Memory is nonvolatile so that the program content is fully captured and will be maintained after power off conditions

CABLE MANAGEMENT OPTIONS

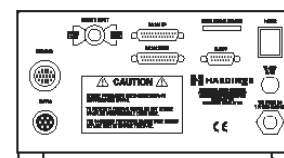
- Cable Retractor Kits are available for use with the standard 9-foot main cable(s) that attaches the rotary table to the connectors in the roof of the machining compartment - for fully integrated rotary tables only:
 - For Gear Driven Systems – Part No. CI 000301 ICSRK
 - For Direct-Drive Systems – Part No. RT 000301 ICSRK
- Rectangular wall mount Cable Frame Kit is used to route cabling out through the sheet metal of the machine - for indexers operated via indexer control only:
 - Part No. CI 001208205
- Quick-Connect CNC Cable for use with Bridgeport GX machines that have a wired rotary connection located in the power case - for indexers operated via indexer control only: Part No. CI 000301 IICQC



Standard and Enhanced Servo Control



Standard Back Panel



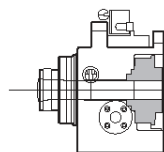
Enhanced Back Panel

COLLET CLOSER & TAILSTOCK OPTIONS

GD5C2

Fail-Safe Collet Closers

- Spring-close, air-to-open for fail-safe operation (85psi max)
- Part remains clamped even if loss of air should occur
- Non-adjustable grip force

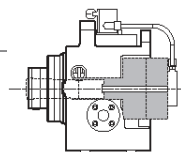


GD5C2
pneumatic
fail-safe
collet closer

GD5C2

High-Force Collet Closers¹

- Dual cylinder for greater resulting force
- Set force according to levels below the maximum allowed for the workholding system

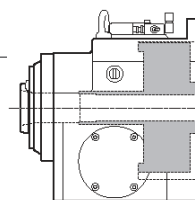


GD5C2
pneumatic
high-force
collet closer¹

GD16C2, GD3J2 Pneumatic

Collet Closers

- Dual cylinder
- Set force according to levels below the maximum allowed for the workholding system
- Accepts power chucks

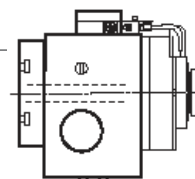


GD16C2
and GD3J2
pneumatic
collet closer

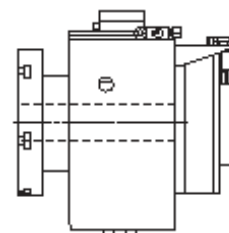
GD160LP and GD210LP

Pneumatic Collet Closer

- Air open and air close actuation
- Enough stroke for power chuck use



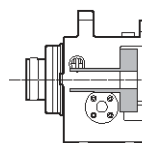
GD160LP
pneumatic
collet closer



GD210LP
pneumatic
collet closer

GD5C2 Manual Collet Closer

- Manual lever open and close



GD5C2
manual
collet closer



for multi-spindle
5C² units

Manual Drawbar

- Individual drawbar turns in by hand for low-cost option

All collet closers have a through-hole to accommodate through coolant, while some can accommodate long parts. Valving is included with pneumatic collet closers when purchased with indexer.

ROTARY	COLLET CLOSER	DRAWBAR FORCE @70 PSI / 4.8 BAR	THRU HOLE	STROKE	MOUNTING PLATE I
GD5C2	Manual (lever-operated)	950 lb / 431 kg	1.18" (30.00)	.125" (3.1)	N/A
GD5C2	Pneumatic Fail-Safe 2	1760 lb / 798 kg	1.08" (27.43)	.060" (1.5)	N/A
GD5C2	Pneumatic High Force	1950 lb / 885 kg	.311" (7.90)	.060" (1.5)	required
GD16C2	Pneumatic	2792 lb / 1266 kg	1.62" (41.275)	.55" (13.9)	N/A
GD3J2	Pneumatic	2792 lb / 1266 kg	1.75" (44.450)	.55" (13.9)	N/A
GD160LP	Pneumatic	1825 lb / 828 kg	1.08" (27.432)	.375" (9.5)	N/A
GD210LP	Pneumatic	2792 lb / 1266 kg	1.625" (41.30)	.55" (13.9)	N/A

Notes: 1— mounting plate required for using the rotary unit in a vertical on-end position
2— 85 psi / 5.8 bar maximum drawbar force for fail-safe collet closers

DIMENSIONS

Forkardt tailstocks are designed to be used where extra support is needed for either workpiece or fixture holding. Workpieces that have a length-to-diameter ratio of greater than 3 to 1 are candidates for a tailstock support. This is especially true when attempting to achieve high accuracy levels. Choose from manually or pneumatically-operated tailstocks.



Manual Tailstock

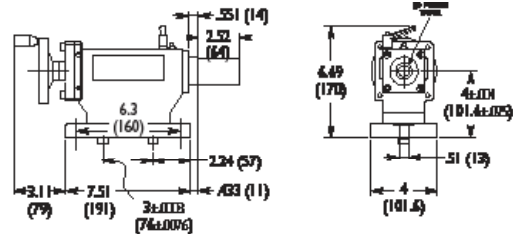
- Manually-operated quill-type tailstock with convenient hand wheel – 1/4-turn quill lock
- #3 Morse taper spindle
- Only live centers are recommended for use
- Base locating pins to reference and configure with any Forkardt Rotary System
- Riser plate is supplied for all rotary devices with spindle centerline above 4" (101.6)



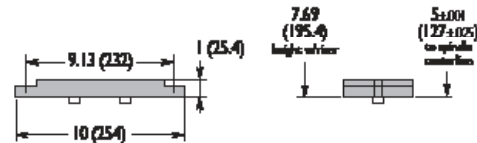
Pneumatic Tailstock

- Allows greater level of cell automation and reduces operator fatigue
- #3 Morse taper spindle
- Only live centers are recommended for use
- May be operated from a host CNC machine tool via M-code or by the operation of a convenient hand valve
- Large actuator diameter produces higher forces than competitor's brands
- Riser plate is supplied for all rotary devices with spindle centerline above 4" (101.6)
- Pneumatic valving included

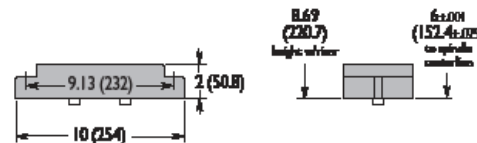
Manual Tailstock for GD5C2



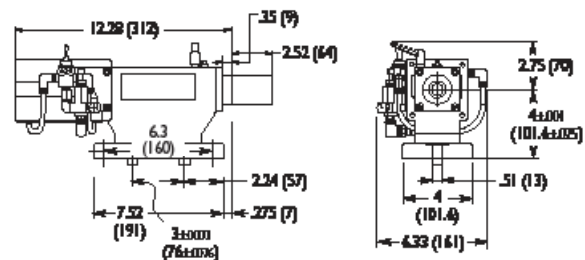
1" Tailstock Riser included for GD160LP



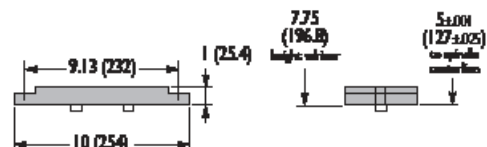
2" Tailstock Riser included for GD16C2, GD3J2, GD210LP,



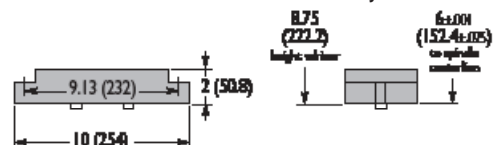
Pneumatic Tailstock for GD5C2



1" Tailstock Riser included for GD160LP



2" Tailstock Riser included for GD16C2, GD3J2, GD210LP

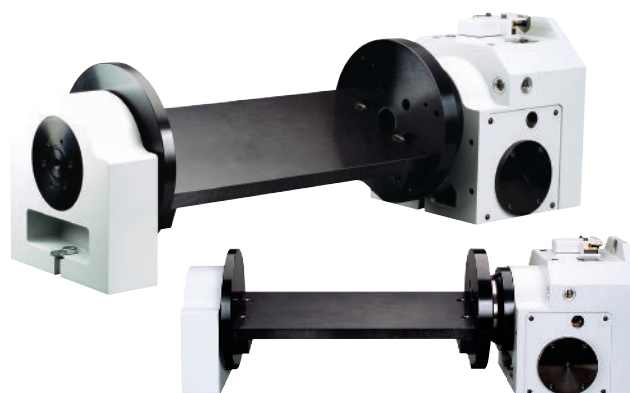


(millimeters in parentheses)

PLATE & CUBE TRUNNIONS

STANDARD FEATURES

- Bearing pillow block assures rigid, accurate positioning and will accommodate heavy loads
- Multiple part fixturing for increased output
- Load up a second plate to maximize cutting time
- All parts can be machined efficiently with the same tool before going to the next tool
- Plates provide two sides for fixturing, while the cube provides four sides
- 360° revolution depending on part clearance required
- Can be field installed to existing rotary units
- Plates are of blackened steel and the cube is of solid aluminum for ease of drilling and slotting according to the application requirements, either by Forkardt or by the customer
- Custom manufacturing available



Custom manufacturing available

OPTIONAL FEATURES

- Pillow block clamp available on PTA25 and CTA25 models with clamping torque of 275 ft-lb / 373 Nm
- Rotary union in pillow block for pneumatic fixturing on the cube trunnion – part number CJ 0002483CTA
- Complete line of collet blocks available for gripping round, hex, square and odd-shaped parts using collet sizes from 1/8" up to 3/4"



Collet Blocks

ROTARY DEVICE COM-PATIBILITY	PT5C 5C PLATE	PTA24 A2-4 PLATE	PTA25 A2-5 PLATE	CTA25 A2-5 CUBE
GD5C2	YES			
Centerline	4" (101.6)	NO		
Overall Length	23.80" (607)			NO
GD160LP	YES	YES		NO
Centerline	5" (127.0)	5" (127.0)		NO
Overall Length	23.48 (596)	23.3 (591.8)		NO
GD16C2	NO		YES	
Centerline		NO	6" (152.4)	6" (152.4)
Overall Length		NO	37.54" (954)	37.48" (952)
GD210LP		NO	YES	YES
Centerline		NO	6" (152.4)	6" (152.4)
Overall Length		NO	31.04" (788.3)	32.07" (814.7)

DIMENSIONS



Plate Trunnion PT5C2

- 4 x 10" (101.6 x 254) machineable area on two surfaces
- Adjustable centerline to accommodate various part heights
- Collet-style face plate draws in to the 5C spindle nose of the rotary product

Plate Trunnion PTA24

- 4 x 10" (101.6 x 254) machineable area on two surfaces
- Adjustable centerline to accommodate various part heights
- Face plate bolts on to the A2-4 spindle nose of the rotary product
- 1" riser required for GDI60LP

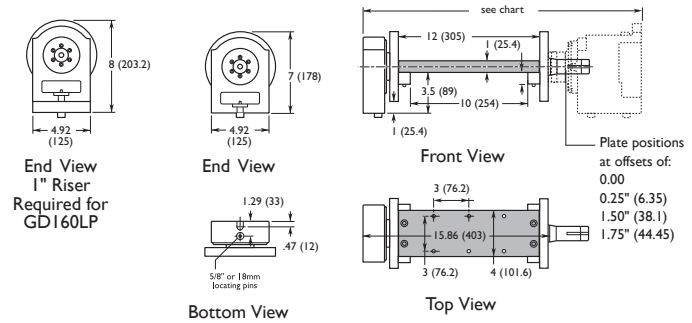
Plate Trunnion PTA25

- 7 x 16.73" (177.8 x 425) machineable area on two surfaces
- Adjustable centerline to accommodate various part heights
- Face plate bolts on to the A2-5 spindle nose of the rotary product

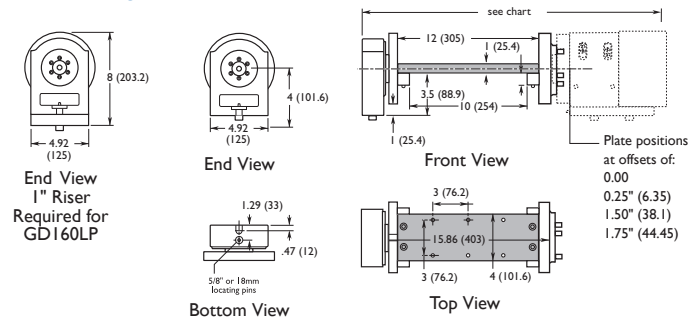
Cube Trunnion CTA25

- 18" (457mm) long solid aluminum block for four-sided machining applications
- Available in 4" and 6" cubes
- 1/8" NPT ports to accommodate air-actuated workholding
- Face plate bolts on to the A2-5 spindle nose of the rotary product
- Can easily be configured for highly productive 2D work

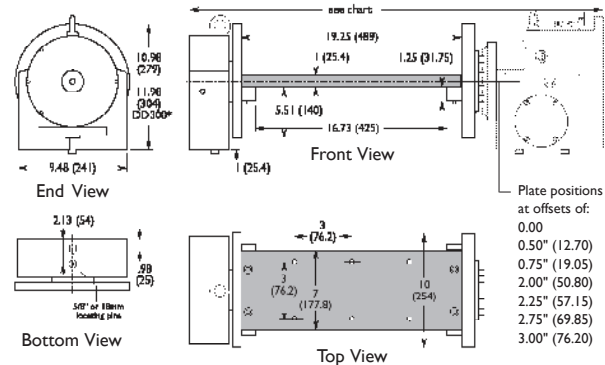
PT5C2 Tilting Plate Trunnion for GD5C2 and GDI60LP



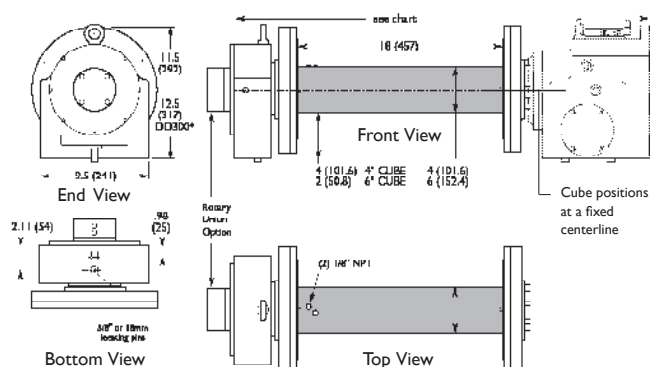
PTA24 Tilting Plate Trunnion for GDI60LP



PTA25 Tilting Plate Trunnion for GDI6C2, GD3J2 and GD2I0LP



CTA25-4IN and CTA25-6IN Tilting Cube Trunnions for GDI6C2, GD3J2 and GD2I0LP



(millimeters in parentheses)



Hardened and Ground Collets

- Manufactured to exacting standards from special alloy steel
- Threads are heat treated and body is spring tempered to assure accuracy and durability at low cost
- Wide range of standard sizes and shapes (and some not so standard) "off-the-shelf"
- Round, hex, rectangular, square and emergency collets (ready to bore)
- 5C, 16C and 3J



Sure-Grip® Expanding Collet Systems

- Mount directly into the collet seat of the spindle
- Solid, one-piece body and arbor combination with a minimum of parts required to expand the collet
- Expanding arbor instantly locates on center; unlike other designs
- Quick collet changeover
- Wide gripping range for each collet
- True parallel gripping with a high gripping force
- 5C, 16C and 3J



Step Chucks

- Accurately hold work up to, or larger than, 6" (152.4) diameter
- Castings, moldings, stampings and machined parts are held rigidly and accurately
- Tubing can be held without crushing or distortion
- Regular-Depth Step Chucks are 3/8" larger in diameter than the rated size so the full capacity may be readily applied to a depth of 1/2"
- Extra-Depth Step Chucks are made so the full rated capacity may be applied to a depth of 1 1/4"
- Small closing angles available on step chucks for non-rotating use
- A step chuck closer is required for all rotating spindle applications – mounts directly on the spindle nose
- An inside taper corresponding to that on the step chuck places the closing pressure over the stepped area of the chuck, resulting in greater gripping power and accuracy
- Emergency Step Chucks are supplied with pin holes and pins in place for precision machining
- 5C, 16C and 3J

WORKHOLDING OPTIONS

I6C-to-5C Spindle Adapter

- Mounts on A2-5 spindle
Part No. CJ 00002835CA

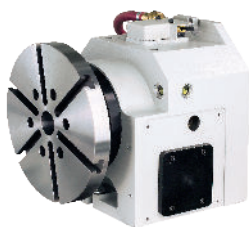


Fixture Plates

- Used to mount parts which cannot be held with a collet or jaw chuck
- Clamping method to be designed, manufactured and balanced by the customer
- Collet and spindle-mount styles available

Slotted Face Plates

- Precision ground in sizes to fit all rotary units



SEE PAGE

21
FOR CHART



FlexC™ Vulcanized Collet Systems

- A2-5 Spindle mount style
- .0004" (.010mm) concentricity
- Round, hex, square and emergency styles
- ± 0.020 (.5mm) gripping range will accommodate stock variation
- 1/4 to 29/16" 65mm capacity
- 7/32 to 15/8" 42mm capacity



Forkardt Power Chucks

- A wide variety of ID/OD grip power chucks are available to meet your workholding needs
- Contact your sales representative for selection



Manual Jaw Chucks

- 5" / 6" 3-jaw and 4-jaw, 8" and 10" 3-jaw styles
- 5C threaded-nose style for GD5C2 indexer
- A2-5 spindle mount styles
- 3-jaw universal and 4-jaw independent

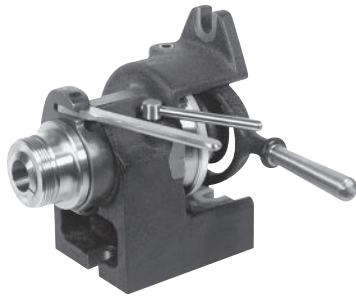
* Linkup and/or adapter required – please specify indexer model. ** Riser Plate recommended

WORKHOLDING OPTIONS

Product Description	GD5C2	GD16C2	GD3J2	GD160LP	GD210LP
Spindle	5C threaded-nose	A2-5 I6C	A2-5 3J	A2-4	A2-5
42mm FlexC Collet System (Style A)	—	V42-5A01000*	V42-5A01000*	—	V42-5A01000*
42mm FlexC Collet System (Style D)	—	V42-5D00300*	V42-5D00300*	—	V42-5D00300*
42mm FlexC Collet System (Style DL)	—	V42-5DL05400*	V42-5DL05400*	—	V42-5DL05400*
65mm FlexC Collet System (Style A)	—	V65-5A01200*	V65-5A01200*	—	V65-5A01200*
65mm FlexC Collet System (Style D)	—	V65-5D00500*	V65-5D00500*	—	V65-5D00500*
65mm FlexC Collet System (Style DL)	—	V65-5DL05700*	V65-5DL05700*	—	V65-5DL05700*
4" Power Chuck	—	—	—	SCA-2000304-A24H	—
5" Power Chuck	—	SCA-2000305-A25H	SCA-2200305-A25C*	—	SCA-2000305-A25H
6" Power Chuck	—	SCA-2000306-A25H	SCA-2300306-A25C*	—	SCA-2000306-A25H
8" Power Chuck	—	SCA-2000308-A25H	O/A	—	SCA-2000308-A25H
10" Power Chuck	—	O/A	O/A	—	O/A
5"3-Jaw Universal Manual Chuck	53B-5405-HB D	53B-5405-BCA5	53B-5405-BCA5	53B-5405-BCA4	53B-5405-BCA5
5" 4-Jaw Independent Manual Chuck	54B-5405-HB D	—	—	—	—
6"3-Jaw Universal Manual Chuck	63B-5405-HB D	63B-5405-BCA5	63B-5405-BCA5	63B-5405-BCA4	63B-5405-BCA5
6"4-Jaw Independent Manual Chuck	64B-5405-HB D	64B-5405-BCA5	64B-5405-BCA5	64B-5405-BCA4	64B-5405-BCA5
8"3-Jaw A2-5 Manual Chuck	—	83A-5405-A25	83A-5405-A25	—	83A-5405-A25
10" 3-Jaw A2-5 Manual Chuck	—	13A-5405-A25	13A-5405-A25	—	13A-5405-A25
3" Spindle-mount Fixture Plate	53A-0008750-D	—	—	—	—
5" Spindle-mount Fixture Plate	55A-0008750-D	—	—	—	—
5 1/2" Spindle-mount Fixture Plate	—	A2-0008750-05	A2-0008750-05	—	A2-0008750-05
8 7/8" Spindle-mount Fixture Plate	—	A2-0008750-08	A2-0008750-08	—	A2-0008750-08
33/8" Collet-style Fixture Plate	1397-00-00	—	—	1397-00-00	—
43/8" Collet-style Fixture Plate	1399-00-00	—	—	1399-00-00	—
63/8" Collet-style Fixture Plate	—	1785-00-00	—	—	1785-00-00
210mm Slotted Face Plate (50mm thru)	—	CJ 1990200M	CJ 1990200M	—	CJ 1990200M
8.26" Slotted Face Plate (2" thru hole)	—	CJ 1990200E	CJ 1990200E	—	CJ 1990200E
170mm Slotted Face Plate (19mm thru)	—	—	—	RT 0007214A4	—
160mm Slotted Face Plate (25mm thru)	—	—	—	LI 0001990160M	—
6.229" Slotted Face Plate (1" thru hole)	—	—	—	LI 0001990160E	—
7" Slotted Face Plate (.437mm thru)	57A-0000692-D	—	—	—	—
8 7/8" Slotted Face Plate (.437mm thru)	—	A2 0000692-A9	A2 0000692-A9	—	A2 0000692-A9
10" Slotted Face Plate (1.5" thru hole)	—	CJ 000199020	CJ 000199020	—	CJ 000199020
12" Slotted Face Plate (2" thru hole)	—	RT 000690009**	RT 000690009	—	RT 000690009**
Spindle Adapter I6C-to-5C	—	CJ 00002835CA	—	—	CJ 00002835CA

MANUAL INDEX & INSPECTION FIXTURES

Manual index fixtures are used in both production and toolroom environments as a low cost, quick and accurate means of holding a workpiece and performing indexing operations. The tapered or threaded-nose spindles are hardened and ground. They accept all standard 5C collets, step chucks with closers, expanding collets, Dead-Length® collets and manual jaw chucks.



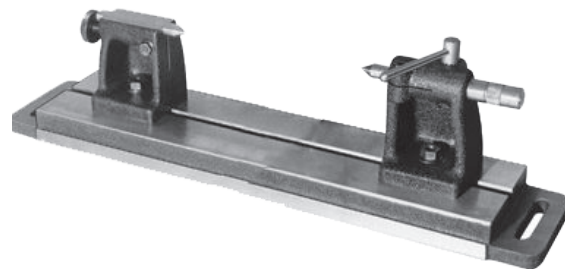
MANUAL INDEXER	PART NUMBER	FIGURE PAGE 26
HV-4 ^A with Plain Spindle and 24-Hole Index Plate	HV-0000002-P4	1
HV-4N ^A with Threaded-Nose Spindle and 24-Hole Index Plate	HV-0000002-D4	1
HV-4NX ^A with Taper-Nose Spindle and 24-Hole Index Plate	HV-0000002-T4	1
H-4 ^B with 24-Hole Index Plate	HF-0000002-24	2
INDEX PLATES	PART NUMBER	FIGURE PAGE 27
Blank Index Plate for HV Models	HV-9004138	3
20-Hole Index Plate for HV Models	HV-0004138-2A	4
24-Hole Index Plate for HV Models	HV-0004138-4A	5
Blank Index Plate for H-4 Model	HF-9004138	6
20-Hole Index Plate for H-4 Model	HF-0004138-20	7
24-Hole Index Plate for H-4 Model	HF-0004138-24	8

A - Used in horizontal or vertical positions.

B - Used in horizontal position only.

Tailstocks and Inspection Fixtures

- The SB-4 Sub-Base with the tailstocks can be used as a bench center
- The L-4 Tailstock has a hardened and ground spindle which is lever-operated with a rack and pinion
 - Spindle is spring loaded to hold the center against the workpiece
 - Position lock is provided
- The hardened and ground spindle on the T-4 Tailstock is screw fed and can be locked in any position with a hexagon clamp bolt
 - Removable keys permit the tailstocks to be applied directly to any machine table
- SB-4 Sub-Base accepts various combinations of fixtures such as the HV and H-4 series of indexing fixtures



TAILSTOCKS AND SUB-BASE	PART NUMBER	FIGURE PAGE 26
L-4 Tailstock with Rapid Movement Lever	HV-0000056	9
T-4 Tailstock with Screw Adjustment	HF-0000056	10
SB-4 Sub-Base	HV-0001996-A	11

Manual Indexer

Standard Features

- Choice of spindle nose
 - HV-4 plain
 - HV-4N threaded nose
 - HV-4NX taper nose
 - H-4 24-hole index plate only
- Includes 24-hole index plate
- HV models can be used horizontal or vertical

OPTIONAL FEATURES

- Blank index plates
- 20-hole index plates
- 24-hole replacement index plates

Workholding Capacities

(threaded and taper nose indexers only)

Collets – Round (max. capacity)	1 1/16" (26.98)
Collets – Hex (max. capacity)	29/32" (23.01)
Collets – Square (max. capacity)	3/4" (19.05)
Step Chucks – Regular Depth	up to 6" (152.4)
Step Chucks – Extra Depth	up to 6" (152.4)
3-jaw Chuck	5" (127)
3-jaw Chuck	6" (152.4)
Sure-Grip® Expanding Collets	1/8" - 3" (3.17 - 76.2)
Fixture Plate – Spindle Mount	3" (76.2)
Fixture Plate – Spindle Mount	5" (127)
Fixture Plate – Collet Style	33/8" (85.72)
Fixture Plate – Collet Style	43/8" (111.12)
Slotted Face Plate (diameter)	7" (178)
Collet Stops for part positioning	YES

Figure 1: HV-4, HV-4N, HV-4NX

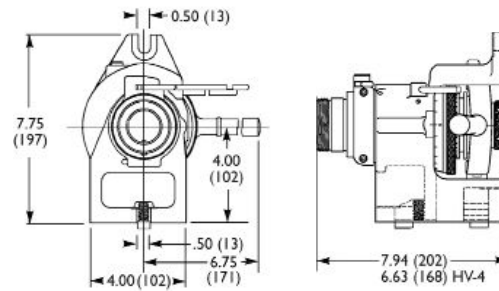
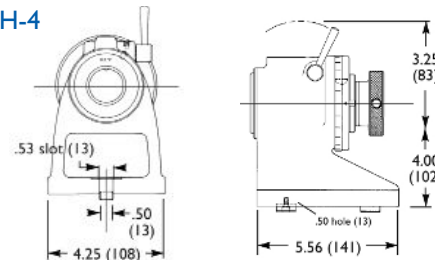


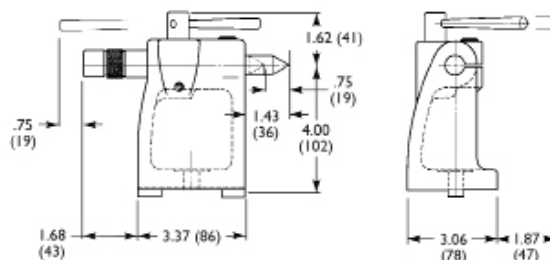
Figure 2: H-4



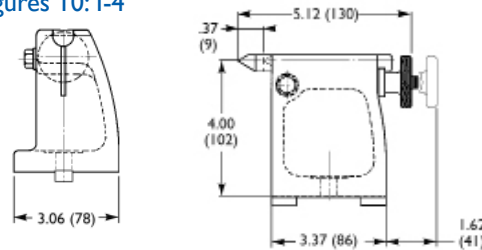
Figures 3 - 8 Indexer Plate Configurations



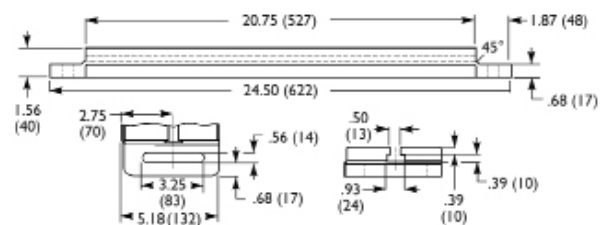
Figures 9: L-4



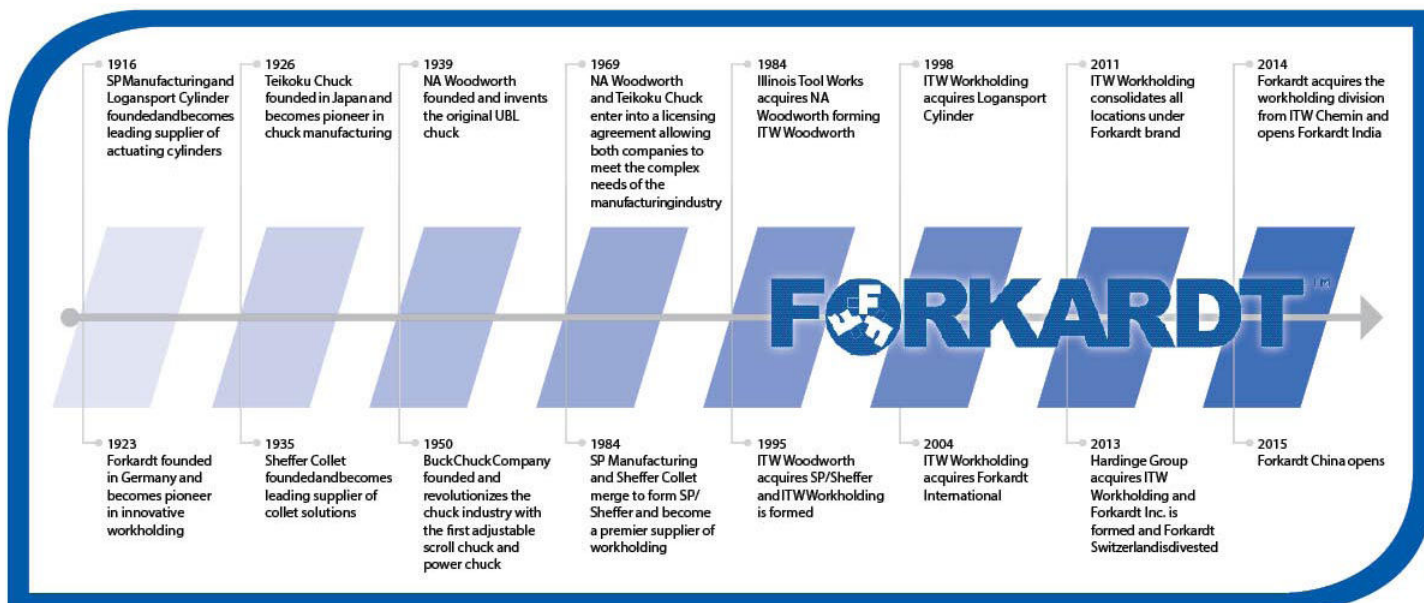
Figures 10: T-4



Figures 11: SB-4



(millimeters in parentheses)



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