

Setup and Operation
for the Hardinge
DD300 Direct-Drive Rotary Table
Original U.S.A. Instructions

Thank you for purchasing a Hardinge DD300 Direct-Drive Rotary Table! This User's Manual is provided to assist you with setup procedures and to familiarize you with the features, specifications and maintenance recommendations of your unit.

The mechanical head can be maintained by the customer with proper cleaning and maintenance. Any necessary repairs required during the warranty period will be made at Hardinge Inc., or by a factory authorized representative.

For best workholding results with this rotary table, Hardinge recommends Hardinge brand collets, I6C workholding products, step chucks, and expanding collets.

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Safety Recommendations

READ COMPLETE INSTRUCTIONS CAREFULLY BEFORE OPERATING THIS UNIT. Note: Equipment refers to the Rotary Table and/or machine it is used with.

When this instruction book was printed, the information given was current. However, since we are constantly improving the design of our products, it is possible that the illustrations and descriptions may vary from the current unit.

- WARNING -

Occupational Safety and Health Administration (OSHA) Hazard Communication Standard 1910.1200, effective May 25, 1986, and various state "employee right-to-know laws" require that information regarding chemicals used with this equipment be supplied to you. Refer to the applicable section of the Material Safety Data Sheets supplied with your unit when handling, storing or disposing of chemicals.

HARDINGE SAFETY RECOMMENDATIONS

Your Hardinge® machine is designed and built for maximum ease and safety of operation. However, some previously accepted shop practices may not reflect current safety regulations and procedures, and should be re-examined to insure compliance with the current safety and health standards.

Hardinge Inc. recommends that all shop supervisors, maintenance personnel and machine tool operators be advised of the importance of safe maintenance, setup and operation of Hardinge-built equipment. Our recommendations are described below.

READ THESE SAFETY RECOMMENDATIONS BEFORE PROCEEDING ANY FURTHER.

ANYONE HAVING ACTIVE IMPLANTS (pacemakers) or having any other ferromagnetic prosthesis is not qualified to work with these kinds of devices, or to approach them. Keep at a safe distance from the motor.

READ THE APPROPRIATE MANUAL OR INSTRUCTIONS before attempting operation or maintenance of the equipment. Make certain that you understand all instructions.

DO NOT ALLOW the operation or repair of equipment by untrained personnel.

CONSULT YOUR SUPERVISOR when in doubt as to the correct way to do a job.

WEAR SAFETY GLASSES AND PROPER FOOT PROTECTION at all times. When necessary, wear respirator, helmet, gloves and ear muffs or plugs.

DON'T OPERATE EQUIPMENT unless proper maintenance has been regularly performed and the equipment is known to be in good working order.

WARNING or INSTRUCTION TAGS are mounted on the unit for your safety and information. Do not remove them or damage them.

DO NOT ALTER THE EQUIPMENT to bypass any interlock, overload, disconnect or other safety device.

DO NOT OPERATE EQUIPMENT if unusual or excessive heat, noise, smoke, or vibration occurs. Report any excessive or unusual vibration, sounds, smoke or heat as well as any damaged parts.

LIFTING AND HANDLING OF THE UNIT should be done with full knowledge of the unit weight and using proper procedures.

MAKE CERTAIN that the equipment is properly grounded. Consult National Electric Code and all local codes.

REMOVE POWER from the unit by unplugging the power cord before attempting repair or maintenance. (Where Applicable).

DON'T OPEN THE CONTROL BOX without consulting with Hardinge. (Where Applicable)

DON'T TOUCH ELECTRICAL EQUIPMENT when hands are wet or when standing on a wet surface. (Where Applicable)

REPLACE BLOWN FUSES with fuses of the same size and type as originally furnished. (Where Applicable)

ASCERTAIN AND CORRECT the cause of a shutdown caused by overload heaters before restarting the machine. (Where Applicable)

Safety Recommendations

KEEP THE AREA AROUND THE MACHINE well lit and dry.

KEEP CHEMICAL AND FLAMMABLE MATERIAL away from electrical or operating equipment.

HAVE THE CORRECT TYPE OF FIRE EXTINGUISHER handy when machining combustible material and keep chips clear of the work area.

DON'T USE a toxic or flammable substance as a solvent cleaner or coolant.

MAKE CERTAIN THAT PROPER GUARDING is in place and that all doors to the primary machine are closed and secured.

DON'T OPEN GUARD DOORS of the primary machine while any machine component is in motion.

MAKE SURE chucks, closers, fixture plates, and all other spindle-mounted workholding devices are properly mounted and secured before starting the unit or the machine.

MAKE CERTAIN all tools are securely clamped in position before starting the unit or the machine.

REMOVE ANY LOOSE PARTS OR TOOLS left on the unit or the machine or in the work area before operating the equipment. Always check the machine and work area for loose tools and parts especially after work has been completed by maintenance personnel.

REMOVE CHUCK WRENCHES before starting the unit or the machine.

BEFORE PRESSING THE CYCLE START PUSH BUTTON, make certain that proper functions are programmed and that all controls are set in the desired modes.

KNOW WHERE ALL STOP push buttons are located in case of an emergency.

MAKE CERTAIN that all guards are in good condition and are functioning properly before operating the equipment.

INSPECT ALL SAFETY DEVICES AND GUARDS to make certain that they are in good condition and are functioning properly before the cycle is started.

CHECK THE POSITION of any load/unload automation before pressing the Cycle Start push button.

CHECK SETUP, TOOLING AND SECURITY OF THE WORKPIECE if the machine has been OFF for any length of time.

DRY CYCLE a new setup to check for programming errors.

MAKE CERTAIN that you are clear of any "pinch point" created by moving slides before starting the machine.

DON'T OPERATE any equipment while any part of the body is in the proximity of a potentially hazardous area.

DON'T REMOVE CHIPS with hands. Use a hook or similar device and make certain that all machine movements have ceased.

BE CAREFUL of sharp edges when handling a newly machined workpiece.

DON'T REMOVE OR LOAD a workpiece while any part of the equipment is in motion.

DON'T OPERATE ANY EQUIPMENT while wearing rings, watches, jewelry, loose clothing, neckties or long hair not contained by a net or shop cap.

DON'T ADJUST tooling or coolant hoses while the equipment is running.

DON'T LEAVE tools, workpieces or other loose items where they can come in contact with a moving component of the equipment.

DON'T CHECK finishes or dimensions of workpiece near running spindle or moving slides.

DON'T JOG SPINDLE in either direction when checking threads with a thread gage.

DON'T ATTEMPT to brake or slow the equipment with hands or any makeshift device.

ANY ATTACHMENT, TOOL OR MACHINE MODIFICATION not obtained from Hardinge Inc. must be reviewed by a qualified safety engineer before installation.

Safety Recommendations

USE CAUTION around exposed mechanisms and tooling especially when setting up. Be careful of sharp edges on tools.

DON'T USE worn or defective hand tools. Use the proper size and type for the job being performed.

USE ONLY a soft-faced hammer on tooling and fixtures.

DON'T USE worn or broken tooling on machine.

MAKE CERTAIN that all tool mounting surfaces are clean before mounting tools.

INSPECT ALL CHUCKING DEVICES daily to make certain that they are in good operating condition. Replace any defective chuck before operating the machine.

USE MAXIMUM ALLOWABLE gripping pressure on the chuck. Consider weight, shape, and balance of the workpiece.

DON'T EXCEED the rated capacity of the equipment.

DON'T LEAVE the equipment unattended while it is operating.

DON'T CLEAN the equipment with an air hose.

KEEP TOTE PANS a safe distance from the machine. Don't overfill the tote pans.

DON'T LET STOCK project past the back end of the collet closer or equipment spindle without being adequately covered and properly supported.

UNLESS OTHERWISE NOTED, all operating and maintenance procedures are to be performed by one person.

To avoid injury to yourself and others, be sure that all personnel are clear of the equipment when opening or closing the coolant guard door and any access covers.

FOR YOUR PROTECTION - WORK SAFELY

DON'T OPERATE THE EQUIPMENT with damaged or worn electrical cables.

VERIFY that the electrical cables are not restrained or pinched during full travel movement of the machine.

I. Introduction

I.1 Basic Description

The Hardinge® DD300 Rotary Table is ideal for rapid and accurate positioning of large parts in machining operations such as milling, drilling, tapping, contouring and spiral milling.

The Hardinge DD300 Rotary Table is a rigid, high accuracy, programmable rotary positioning device. The mechanical head holds the workpiece and is controlled by a machine control as a true 4th axis. Positioning of the workpiece is accomplished by using the appropriate position, preparatory feedrate and "M" codes just like a regular axis. The DD300 can only be used integrated as an axis to a machine. It is not available with a standalone servo control. It can be mounted in the horizontal position or in some cases vertically for face- and end-working applications. The Rotary Table also has a spindle clamp to help assist the motor for off axis drilling and milling applications while maintaining a fixed position.

Advantages of the 16C DD300 Rotary Table:

- No Backlash
- High-Resolution Encoder Directly Mounted to Spindle
- Long Life with Low Maintenance
- Optimal repeatability and positioning accuracy

The DD300 is offered with a 200 or 400 volt frameless wraparound rare-earth permanent magnet torque motor and meets the most rigorous industry codes. It has a horizontal spindle centerline of 7.00"/177.8mm and has increased clearance for a large capacity of part sizes. Cable connectors meet the IP 65 splash code that states that they can be sprayed with coolant. Please note that the system cannot be submerged. The spindle is hardened and ground for accuracy and has a special rigid crossed-roller bearing coupled with a rigid, cylindrical roller bearing to support heavy cutting forces. The system is designed with a series of appropriate sealing systems including a bearing seal to provide a longer bearing life and a front cap seal with air purge. Positioning of the spindle is accomplished through a wrap-around rare-earth permanent magnet torque motor that requires no mechanical gears. This type of motor requires no maintenance and will provide many years of smooth operating performance with zero backlash. The system is fitted with a means of external liquid cooling of the motor to increase the continuous torque. The high-resolution encoder is mounted directly to the DD300 spindle to insure the highest available accuracy. The main spindle encoder ring has 16,384 lines, which times 4 gives a native resolution of 65,536 counts per rev. This can be further interpolated in the subsequent electronics. Dependant upon the control system used the DD300 system encoder can yield a resolution of up to 16,777,216 counts per revolution.

I.2 Standard Spindle Clamp

The Rotary Table comes with a spindle clamp that is standard from the factory. This clamp allows the spindle to handle cutting forces equal to 275 ft-lb/373 Nm, allowing for greater cutting forces in the fixed-position mode of operation. The unit contains an air sensor that will prevent indexing in the event that air pressure drops below 85 psi to the clamp so that damage is prevented. Air is supplied to the clamp through the cable conduit and is connected to the machine air supply in the machine canopy wire way. In this manner, the single cable provides all utility requirements including air as mentioned. Using the standard M-codes provided on the Bridgeport machines, the clamp ON/ OFF functions are fully controlled. There is a potential for a drop in air pressure if the air line supplying the Rotary Table with air is also supplying something else like a tool changer with air. If you receive a pressure switch alarm, the first thing you should check is the air pressure supplied to the Rotary Table. Please note that even a momentary drop in air pressure can create an alarm situation.

CAUTION: Never attempt to defeat the clamp protection logic as this may result in an opportunity for the system to rotate when the clamp is engaged. This will cause an overload fault and repeated attempts to operate in this manner may damage the clamp. The machine system has been setup to post a message if rotation is attempted when the clamp is engaged. The clamp requires a minimum of 85 psi and maximum of 100 psi OF DRY FILTERED AIR to fully release the spindle and must be supplied to the unit even if the clamp is not going to be used.

1.3 High Stiffness Overall System

The DD300 is inherently stiff due to its construction with the robust housing and crossed roller bearing design. Furthermore, the direct-drive motor offers a level of servo stiffness for the spindle that is superior to geared systems due to the elimination of gear backlash and other system compliances. The high servo gains supported by the high encoder resolution make a powerful combination for heavy contouring applications.

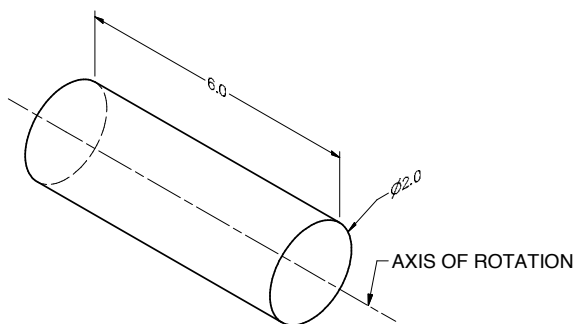
1.4 Machinable Part Size

The DD300 system is designed with a I6C spindle seat similar to the lathe spindle that Hardinge is noted for. The DD300 has been designed for those parts that can be conveniently gripped in any of the I6C gripping systems that Hardinge is also noted for. Typical parts are in the range of approximately 2"/50.8mm in diameter and generally not longer than 6"/152.4mm without the use of a tailstock. It is typical to speak in terms of the L/D ratio, which is the length divided by the part diameter. A 2"/50.8mm diameter part 6"/152.4mm long has an L/D ratio of 3:1. Part pieces with larger L/D ratios should be used with a tailstock up to a typical L/D ratio of 6:1.

Larger part sizes than those described above can be handled with additional support (i.e. Tailstock, Trunnion, etc.). When talking about machinable part size, inertia and torque play an important role and any part and fixture combination should not exceed the maximum inertia of 1.695 kg.m². This inertia should be calculated about the center of rotation of the DD300 because when a part's mass gets further from the center of rotation, its inertia increases. An unbalanced part should also not require a torque that exceeds the allowable torque of the motor shown in section 1.7 of this document. A part weighing 5 lbs at a distance of 6 inches from the center of the spindle would require 30 in-lbs or 2.5 ft-lbs of torque to rotate. See examples below for light parts that have high inertia.

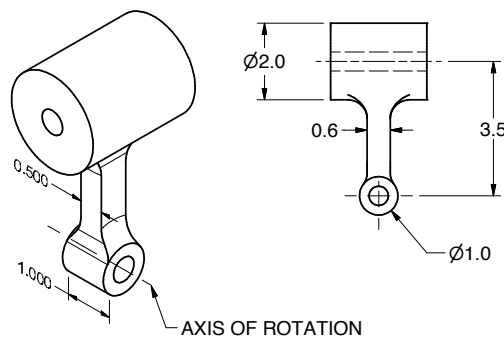
Note: Larger inertial loads may require changing a few motor parameters to get the unit to run properly. If assistance is needed in calculating inertia, torque, or changing parameters, please contact your local Hardinge representative.

Inertia vs. Weight vs. Required Torque to Spin Part



Example A

Material: Steel
 Weight: 5.3 lbs/2.4 kg
 Inertia about axis of Rotation: 2.7 lb-in²
 /0.0008 kg-m²
 Torque required to hold Balanced Part in position:
 N/A (Balanced)



Example B

Material: Steel
 Weight: 2.5 lbs/1.1 kg
 Inertia about axis of Rotation: 17.8 lb-in²
 /0.008 kg-m²
 Torque required to hold Unbalanced Part
 in position: 7.5 in-lbs/0.85 Nm

Example A is a balanced part which is approximately twice as heavy as Example B, which is an unbalanced part. Notice that since Example A is balanced, the torque required to hold the part in position is negligible and its moment of inertia is very low. Since Example B is unbalanced, its moment of inertia is about 10 times larger than Example A even though it weighs about half as much. Note that torque is required to hold Example B in position.

1.5 Features

RIGID DESIGN

A large, precision crossed-roller bearing coupled with a tapered-bore cylindrical roller bearing will support heavy cutting forces on medium to large parts.

HARDENED AND GROUND SPINDLE

Typical of the accurate long-life of Hardinge lathe spindles

WRAPAROUND RARE-EARTH PERMANENT MAGNET TORQUE MOTOR

For very precise high-speed indexing with no backlash and high repeatability

RESOLUTION

Standard resolution of .001 degrees

VARIABLE FEED RATES

Variable from .001 deg./sec. to 1500 deg/sec

ONE-YEAR WARRANTY

The Hardinge DD300 Rotary Table is provided with a one-year warranty against any defects in material and workmanship

1.6 Motor Thermostat

The motor is equipped with a thermostat that monitors the internal temperature in the motor windings. The thermostat is set to open at 85 degrees C. This is done to protect the electrical components located inside the unit. The thermostat is wired into the machine control so that operation above the set temperature will cause an over temperature fault to occur.

1.7 Specifications

Spindle:

Clamping Torque (ft-lb/Nm)	275/373
Runout Max. (TIR)	0.0002"
Backlash (arc/sec)	0
Maximum RPM	250 with a 40 amp Fanuc Drive/Amplifier
Rotational Speed (degrees/sec)	0.001 to 1500
Spindle Nose	A2-5, 16C
Collets	Standard 16C
Spindle Center-to-Base (inch/mm)	7.000" \pm 0.001/177.8 \pm 0.0254

Indexing:

Accuracy (arc/sec)	± 3
Repeatability (arc/sec)	± 2
Resolution (arc/sec)	+/- .077
Max Rotation/Step 4th-axis (degree)	99999.999

Motor:

Rare-Earth Permanent Magnet Torque Motor	
Maximum Peak Torque (ft-lb/Nm)	400/542 ²
Continuous Torque Air-Cooled ¹ (ft-lb/Nm)	68/93 ²
Continuous Torque Water-Cooled ¹ (ft-lb/Nm)	131/177 ²

Operating Specifications:

Duty Cycle	100% at full speed
Operating Temperature (max. ambient)	104°F/40°C
Power Rating	Varies ³
Oil Requirements	No Oil
Collet Closer Air Requirements (psi/bar)	100/6.9 maximum
Clamp Air Requirements (psi/bar)	85min-100max/5.9min-6.9max

Weight:

Rotary Table (lb/kg)	300/136
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Workholding:

Collets-round (max. capacity) in/mm	1 5/8"/41.27
Collets-Hex (max. capacity) in/mm	1 13/32"/35.71
Collets-Square (max. capacity) in/mm	1 9/64"/28.97
Step Chucks (max. capacity) in/mm	up to 6"/152.4
3-Jaw Chucks (diameter)	5", 6", 8" and 10"
Sure-Grip® Expanding Collets in/mm	1/8"-4"/3.17-101.60
Fixture Plate-Collet Style (diameter)	6 3/8"/161.92
Fixture Plate-Spindle Mount (diameter)	5 1/2"/139.7, 8 7/8"/225.42
Slotted Face Plate (diameter)	8 7/8"/225.42, 10"/254.00, 12"/305
Collet Stops (part positioning)	YES

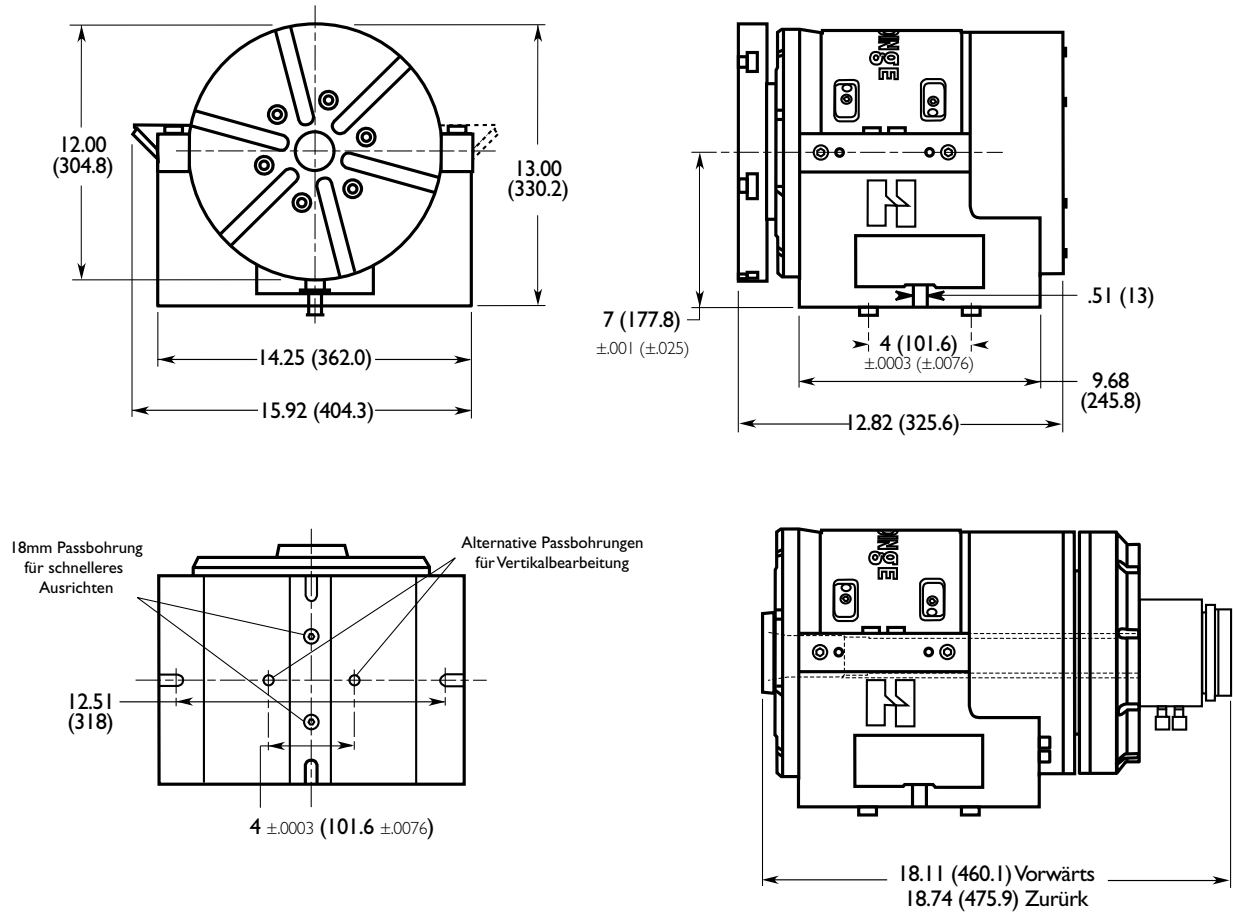
1 - continuous torque available 24/7, 365 days, 2 - from standard GE Fanuc H104 amplifier

3 - will vary according to motor requirements of the 4th-axis interface

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I.8 Dimensions

DD300 Rotary Table

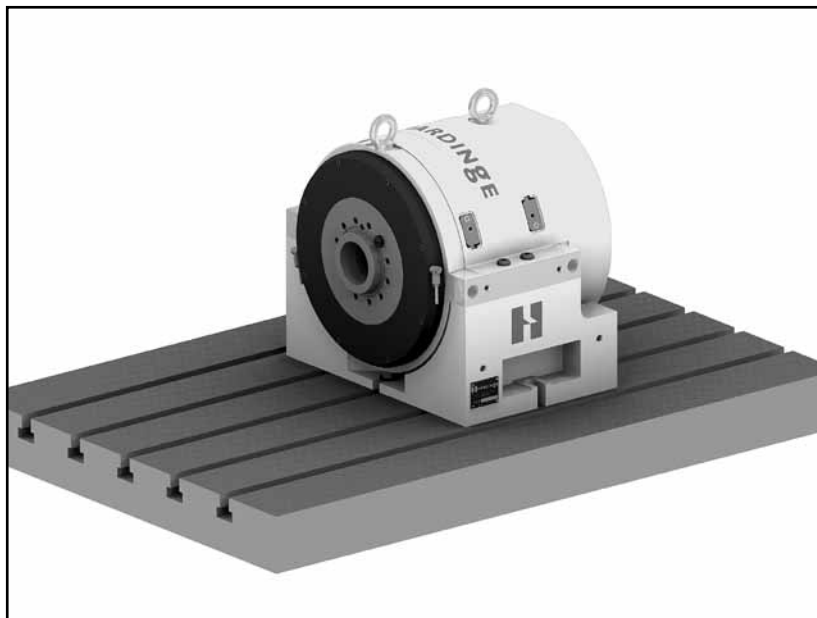


2. Setting Up

2.1 General Setup

1. Fill out the warranty information by visiting "www.hardinge.com/rotarywarranty" on the internet.
2. Place the Rotary Table on the machine. Route the cable from the head so that it avoids tool changers and table edges. Cable slack must be provided for your machine's movements. If the cable is cut, the motor or feed back system could fail prematurely. Replace a damaged cable immediately. Secure the Rotary Table to the machine's T-slot table as shown below (upright or on its back). A special mounting plate will be needed to mount the unit on its back. T-nut packages are available for purchase for various T-slot tables. Kit includes (2) T-nuts, (2) bolts, and (2) flat washers. Check to verify that all clearances are satisfied in full machine axis' movements, and that there is no possibility of a collision.

NOTE: End user is responsible for properly routing cable. Hardinge accepts no responsibility for damages in cabling resulting from improper installation.



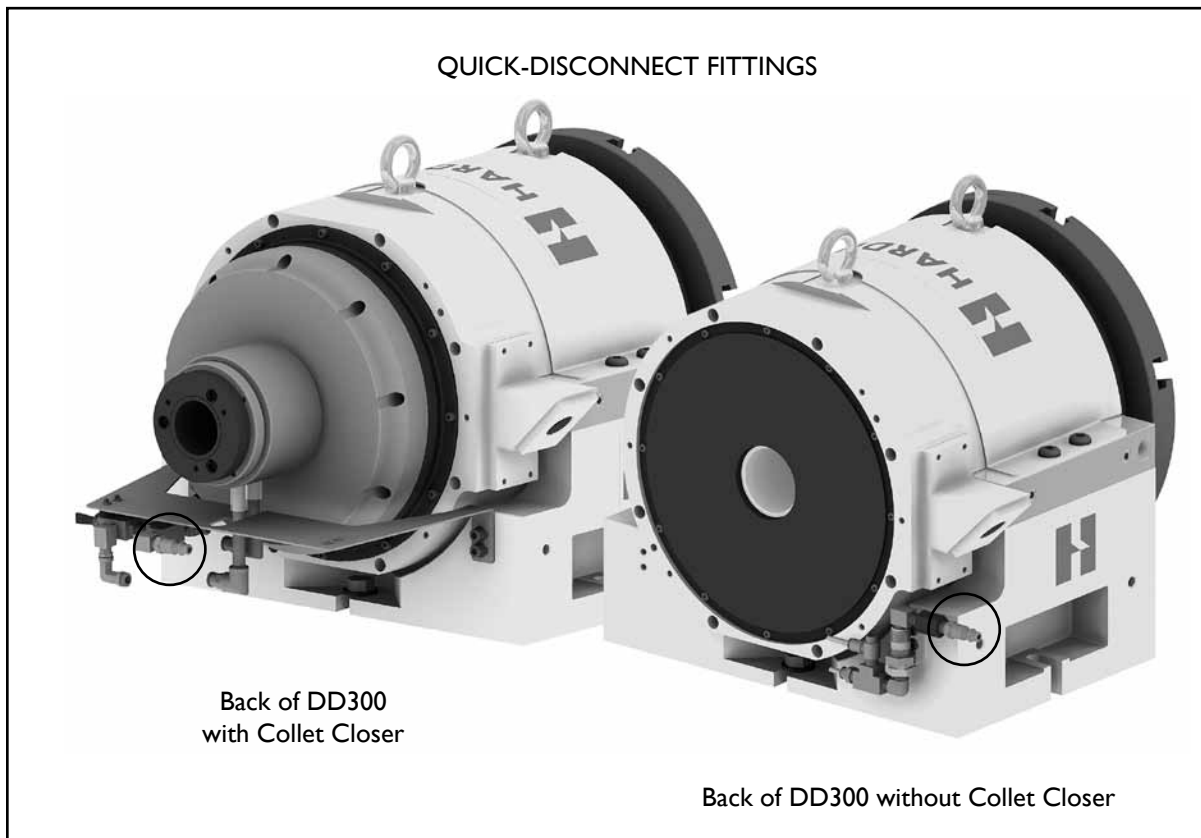
3. Place the DD300 in an area free from chips and coolant where air can circulate freely. Do not let chips pile up over the unit, as this would prevent proper cooling.
4. Connect the DD300 to the machine by making the appropriate connections in the machine canopy wire way in accordance to the 4th-axis manual supplied with the mechanical unit.

CAUTION: Never connect or disconnect these cables with the power on. Instant failure will result.

5. Connect a minimum of 85psi and maximum of 100psi of dry filtered air to the fitting in the machine wireway. This will supply air to the spindle clamp.

CAUTION! Never attempt to operate the DD300 without the minimum of 85psi and maximum of 100psi of dry filtered air connected to the air fitting or mechanical damage will occur!

6. Connect air to the quick-disconnect fitting on the back of the rotary table if unit is equipped with a pneumatic collet closer.



7. Connect air to the quick-disconnect fitting on the cable side of the Rotary Table if unit is not equipped with a pneumatic collet closer.
8. Save the packing materials in case you need to ship the unit.
9. At the end of the workday or shift, it is important to clean the Rotary Table. The unit should be free of any chips or grime. Clean with a chip brush and apply a coat of rust preventative.

CAUTION! Do not use an air gun around the front or rear seals. Chips may damage the seal if blown in with an air gun.

NOTE: Prior to powering on the unit, read and understand the entire 4th-axis manual.

10. Initialization and homing of the unit is explained in the 4th-axis manuals.

2.2 Use of Collets, Sure-Grip® Expanding Collets, Sure Grip® 3-Jaw Power Chucks and Face Plates

The unit accepts standard Hardinge® I6C collets, step chucks, ID gripping collets, chucks and face plates. When inserting the collet, align the keyway on the collet with the key inside the spindle. Push the collet in and turn the collet closer drawbar clockwise until proper collet tightness is obtained.

Chucks and face plates utilize the A2-5 spindle nose on the rotary table. Always make sure that the spindle and chuck or face plate are free of dirt and chips. Align the chuck draw tube keyway with the spindle collet key and slide the chuck onto the spindle. Turn the collet closer drawtube to engage the chuck. Push the chuck tight to the spindle and tighten the chuck mounting bolts to the proper torque indicated in your chuck installation manual. Use the collet closer drawtube to adjust the chuck for proper stroke required for ID and OD gripping. Since the A2-5 spindle nose is such a tight tapered fit, a face plate or 3-jaw chuck may be difficult to remove from the spindle even after the bolts are removed. If this happens, support the face plate or 3-jaw chuck with a hoist and lightly strike the outside diameter of the face plate or 3-jaw chuck with a piece of brass, a plastic hammer or a rubber hammer so that nothing is damaged.

NOTE: A hoist may be required to mount a 3-jaw chuck depending on the size of the chuck.

2.3 DD300 Collet Closer (Optional)

The DD300 collet closer has a 1.687"/42.8mm through-hole design with pneumatic open and close. The through-hole can be used for through-spindle coolant or for holding long parts. The pneumatic closer has .625"/15.87mm of stroke which allows the use of power chucks. With the collet closer installed, the unit cannot be mounted in the vertical position. The air pressure can be adjusted to achieve different drawbar forces out of the collet closer as shown in the chart.

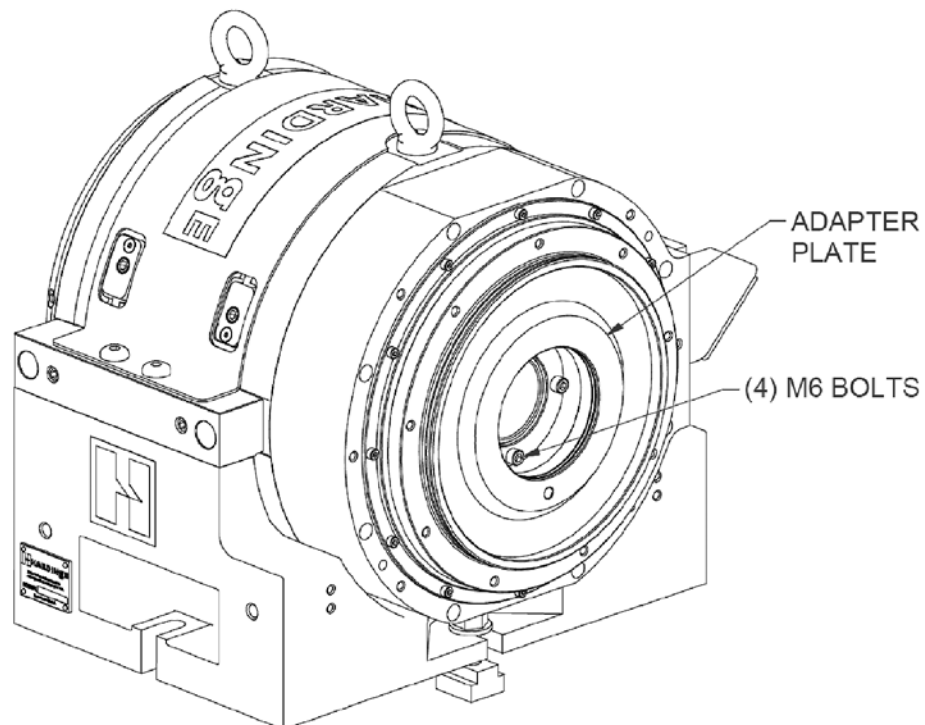
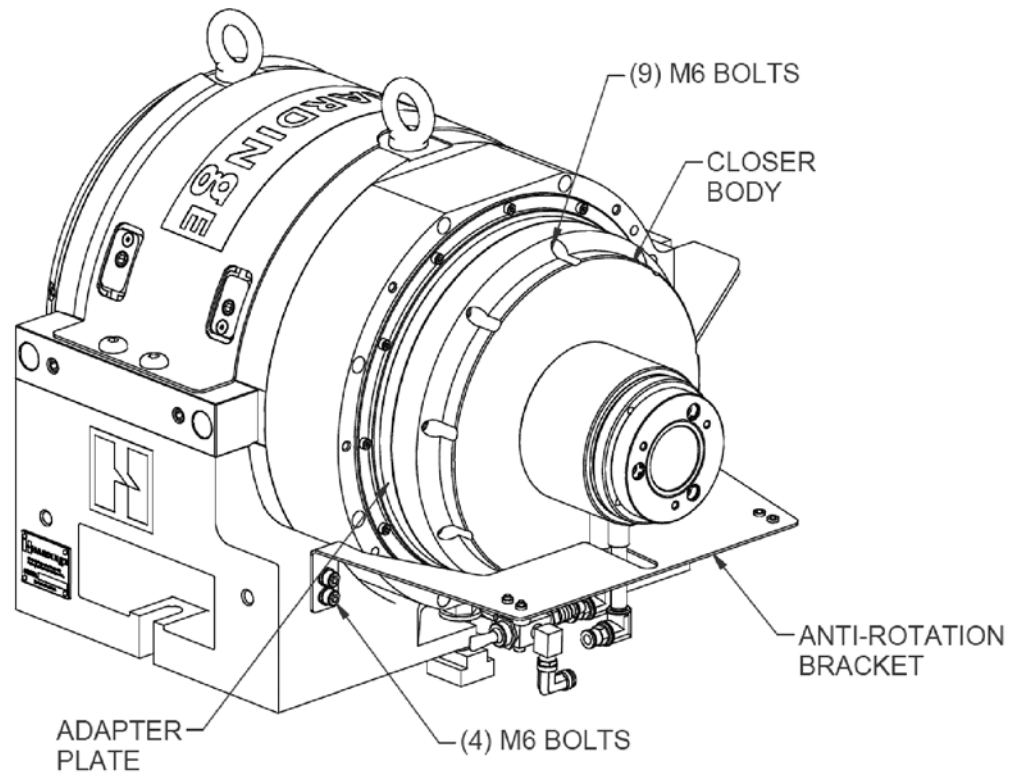
NOTE: Do not supply the collet closer with more than 100 psi of air pressure

DD300 Collet Closer FORCE CHART	
Air Pressure (psi)	Drawbar Force (lbs)
10	413
20	826
30	1239
40	1653
50	2066
60	2479
70	2892
80	3305
90	3718
100	4132

2.4 Removing the DD300 Collet Closer

Air collet closers fitted at the factory are not intended to be removed. However, if servicing is required, the following instructions can be used to remove the collet closer. First, remove all workholding from the unit spindle. Remove air from closer and activate the valve to relieve internal air pressure. Then, remove the four (M6) bolts on the back of the bolster that hold the sheet metal anti-rotation bracket in place. Remove the nine (M6) bolts that go through the collet closer body which hold the closer to the unit. Stick a brass rod down the center of the spindle from the front of the unit and locate the end of the brass rod on the end of the collet closer drawtube. Lightly tap the end of the brass rod while moving it around the face of the drawtube until the closer is fully disengaged from the adapter plate at which time it can be removed from the unit. A second person may be required to support the closer while this is being done. Once removed from the unit, the closer piston will be visible. Be sure not to allow any chips or debris to get in the piston area of the collet closer. If access to the rear of the DD300 is needed, remove the four (M6) bolts that hold the adapter plate to the spindle and carefully remove the adapter plate.

CAUTION! The DD300 Collet Closer relies on air pressure to maintain clamping force and is released upon the removal of the air pressure.

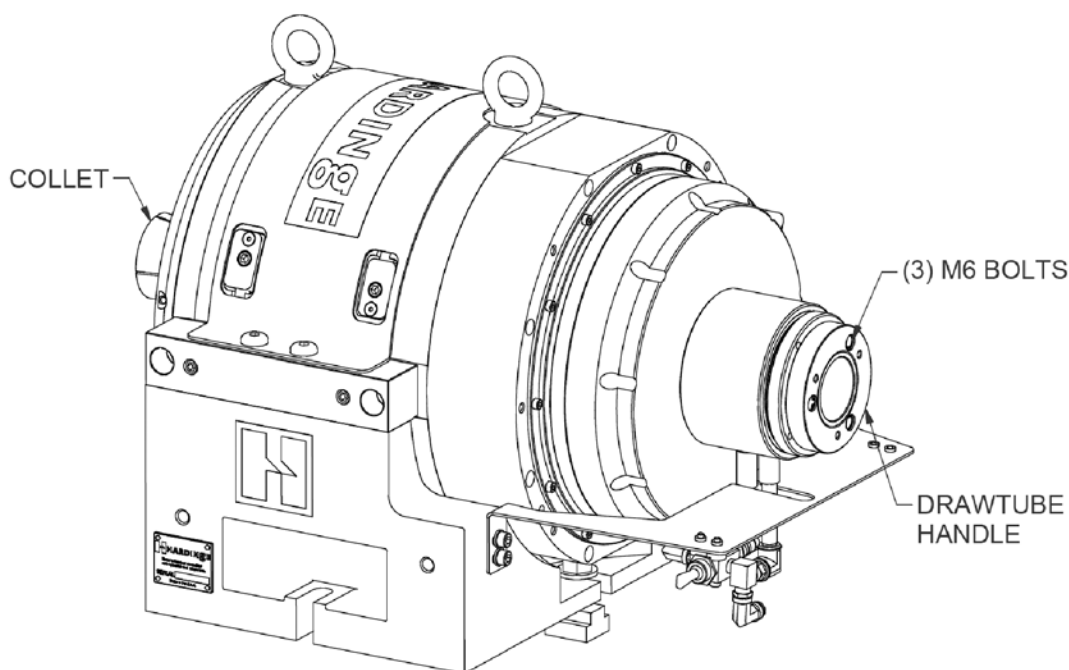


2.5 Use of Collets with the Hardinge Collet Closer

NOTE: All collets must be free from burrs and in good condition.

Collet Installation for the Collet Closer

To install a collet, first make sure that the closer is in the forward position. Loosen the three (M6) bolts on the back of the drawtube handle until they are fully disengaged from the closer piston. These bolts will not fall out of the drawtube as there is a snap ring in the counter bore of each clearance hole. Next, align the collet keyway with the spindle key and insert the collet while turning the draw tube handle to engage the collet. Turn the draw tube handle until the collet grips the part, and then back off approximately $\frac{1}{4}$ turn. This will be a good starting point for fine-tuning the grip range. The collet should be adjusted with the drawtube handle as shown in the following graphic. Once properly adjusted, tighten up the three (M6) bolts on the back of the handle to 10 ft-lbs before actuating the closer

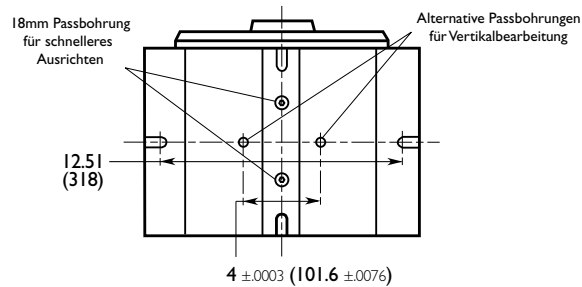


If the Collet is Sticking

NOTE: To prevent excessive wear and collet sticking, make sure collets are in good condition and free from burrs. A light coat of Molybdenum grease on the collet wear surfaces will extend the life of the spindle and/or collet and help prevent sticking, especially when operating dry. Emergency collets are soft and are not recommended for long production runs. These collets will stick after prolonged use.

2.6 Tooling Locations

The DD300 Direct-Drive Rotary Table is equipped with tooling points on the under-side of the unit in order to speed setups. One of the most time-consuming procedures in setup operations is aligning the head with the table. On the mounting surfaces there are two 0.500"/12.7mm bored holes on 4.000"/101.6mm centers. The holes on the bottom surface are parallel to the spindle within 0.001"/0.25mm per 6 inches/152.4mm. Locating buttons are bolted in the holes and used for alignment in the slots of the machine table. This will give quick parallel alignment that will be close enough for most jobs.



3. Routine Maintenance

3.1 Use of Oil- and Water-Soluble Coolants

For the use of oil- and water-soluble coolants, the following guidelines should be observed:

- **DO NOT SUBMERGE THE UNIT IN COOLANTS.** To the extent possible, direct the coolant lines to the workpiece as opposed to directly upon the spindle seal area. Avoid high pressure coolant applications where the pressure is above 200 psi. Some machining centers provide flood coolant at enormous rates so that the head is practically submerged. Throttle the flow back to appropriately match the application.
- Inspect the cables and gaskets regularly for cuts or swelling. Damage must be repaired immediately.

3.2 Clean Up

At the end of the workday or shift, it is important to clean the Rotary Table. The head should be free of any chips or grime. Clean with a chip brush and apply a coat of rust preventative. Do not use an air gun around front or rear seals. Chips may damage the seals if blown in with an air gun.

3.3 Collet Key Replacement

Remove the set screw in the collet key access hole located on the spindle and then remove the old collet key from the face of the spindle with a 3mm Allen wrench. Replace the collet key with Hardinge P/N CJ-000028416C only using pipe sealant or thread Loctite #242 when installing. Screw the collet key into the spindle until it begins to protrude into the inside diameter of the spindle and turn until flat on bottom of key is parallel to spindle centerline. Place a new Hardinge collet into the spindle to test if key depth is adequate. Remove collet and adjust key until a proper fit is achieved.

NOTE: When using collet type workholding, never run the spindle without the collet key having been properly installed. Failure to do this may cause the collet to rotate in the spindle and possibly cause some level of damage.

4. One-Year Limited Warranty

The Hardinge DD300 Rotary Table is provided with a one-year warranty against any defects in material and workmanship. Specific details of the warranty can be found in the Hardinge Terms and Conditions document associated with the purchase agreement.

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