

FROM TIP TO TAIL 2015 Horizontal Directional Drill Specs

By Sharon M. Bueno

When shopping for a drill rig, there are many, many options out there. Big or small, the HDD industry has a rig for you. Custom-made or one off the assembly line, not a problem. We want to help you start your buying process by introducing you to what is available. Many contractors have brand favorites but we wanted to give you a well-rounded view of the rigs on the market.

As with every *Horizontal Directional Drilling Guide*, we have include our annual HDD rig catalog. We reached out to the HDD rig manufacturers to share with our readers their product fleet that includes compact, midsize and maxi rigs. The information provided in this section comes directly from the manufacturers to give you just a glimpse of what their rigs are capable of. For more specific data, you will

need to directly touch base with the manufacturer.

All the information comes directly from the rig manufacturers. No direct comparisons between equipment or manufacturers are implied. We also asked that the manufacturers offer some tips on purchasing and maintenance.

Sharon M. Bueno is managing editor of *Trenchless Technology*.

AMERICAN AUGERS

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HISTORY

The American Augers line of underground construction equipment consists of: auger boring machines, maxi rig and mid-size directional drills, mud pump and cleaning systems and tooling and accessories. The products are manufactured at the company's 241,000-sq ft facility in West Salem, Ohio. Since the founding of American Augers in 1970, there has never been a change in the company's core value: having products developed by a can-do work force that focuses on mechanical, technological and customer-based design improvements. American Augers was the first HDD manufacturer to use a rack-and-pinion carriage design, which is now the industry standard.

PRODUCTS LINEUP

DD-110 / DD-110S
DD-155T
DD-220T
DD-440T
DD-660RS
DD-1100RS

PRODUCTS SUMMARY

American Augers produces the highest quality mid-size and maxi



horizontal directional drills in the industry. The smallest has a push/pull of 110,000 lbs and is a great size for those contractors that are now progressing out of the utility installation and into gas pipeline work. The DD-110 can easily be used for both those applications. Off-board cabins on the mid-size DD-155T and DD-220T increases the visibility for the driller, reduces fatigue due to vibration and allows room for the steering operator. Off-board mud pumps ensure the rig's engine power goes straight downhole instead of to the pump. The best-selling maxi-rig in the industry is the DD-440T. Durable, mobile and most of all, powerful enough for the tough jobs, the DD-440T is the go-to drill rig for contractors around the world because of its versatility and strength. Rapid Set-Up horizontal directional drills are unique to American Augers. The DD-660RS and DD-1100RS allow the driller to pull the rig into position, then rapidly rises to the desired drilling angle. Both are micro-processor controlled and have incredible torque.

Co/ Model	Thrust/ Pullback (lbs)	Spindle Speed (rpm)	Torque (ft-lb)	Pilot Bore OD	Maximum Backream (in.)	Maximum Bore (ft)	Drill Pipe (ft)	Engine HP	Maximum Fluid Pressure (psi)	Flow Rate (gpm)
DD-110	110,000	150	14,000	6	varies	varies	20	260	1,100	200
DD-110S	110,000	150	14,000	6	varies	varies	15	260	1,100	200
DD-155T	155,000	100	30,000	9	varies	varies	20	275	1,500	450
DD-220T	220,000	95	30,000	9	varies	varies	34	365	1,500	650
DD-440T	440,000	80	60,000	9	varies	varies	34	600	1,500	1000
DD-660RS	660,000	90	80,000	13	varies	varies	34	600	1,500	1000
DD-1100RS	1,100,000	75	100,000	13	varies	varies	34	765	1,500	1000



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COMPANY HISTORY

Barbco has been manufacturing directional drills since the mid-1990s. Since then, we have become known as a manufacturer that “really puts the horsepower behind the specifications.” Our directional drills will exceed your expectations on how a drill should perform. We start with quality components that have stronger duty cycles and couple them to a higher flywheel horsepower thus creating unmatched performance that the operator can actually feel when on a tough pull. Barbco’s machines are used throughout the world on a daily basis with a proven track record of long durability in the field for performance, reliability, better quality construction and a simple design for easy maintenance and operation. When service is required, Barbco once again meets or exceeds our customer’s expectations. We have a vast knowledge in field experience both in private, military and government projects and can be of assistance on any project that the equipment is used.

PRODUCT LINEUP:

BD40HP, BD60HP, BD80HP, BD100HP, BD120HP, BD160HP, BD200HP, BD250HP and BD380.

PRODUCT SUMMARY

Barbco custom builds HDDs to suit the needs of its clients. This process has provided Barbco with a vast knowledge of how today’s HDD’s need to perform. In addition to performance related issues, the design process involves several other topics of discussion. The main topics are: Safety Features, Skeletal Integrity, User-Friendly Controls, Strategic Sensor Development and Placement, Trailering-Transporting, System Diagnostic Reporting, Sensor Overriding and Manual Operating Controls. Combined these topics of discussion are used to design the Rig and ultimately determine the scope of work for the project. Barbco has also created a standard line of HDDs. This product line is designed and built using the systems that Barbco has built into its custom rigs. These rigs are built today to accommodate a smaller job site footprint and as a result create maxi size

drills that utilize 20-ft drill stems. The controls are equipped with automated drilling modes and a unique customizable drillers interface. Other features include cabs with room for surveyors and the use of programmable controllers that provide a flexible, expandable and cost-effective total machine management system.

ADVICE TO BUYERS

When purchasing your next Rig, take the time to choose your equipment wisely. Be sure to review the specifications before the price and pay close attention to the components your Manufacturer has chosen to use. It could be that your machine was engineered for high parts sales. **BEWARE OF THIS AND BUY SMART!**

MAINTENANCE TIP

Stay on top of replacing air, fuel and oil filters. Using service indicator gauges is an easy way to know when it’s time to change a filter. Grease all moving parts and change air and oil filters regularly.

Co/ Model	Thrust/ Pullback (lbs)	Spindle Speed (rpm)	Torque (ft-lb)	Pilot Bore OD	Maximum Backream (in.)	Maximum Bore (ft)	Drill Pipe (ft)	Engine HP	Maximum Fluid Pressure (psi)	Flow Rate (gpm)	Fluid Tank (gal)
Barbco BD40HP	40,000	250	6,600	--	--	--	10	201	1,000	70	--
Barbco BD60HP	60,000	220	12,500	--	--	--	15	225	1,000	130	--
Barbco BD80HP	80,000	170	15,000	--	--	--	20	250	1,000	200	--
Barbco BD100HP	100,000	170	15,000	--	--	--	20	300	1,000	275	--
Barbco BD120HP	120,000	125	20,000	--	--	--	20	440	1,000	275	--
Barbco BD160HP	160,000	135	30,000	--	--	--	20	*540	1,200	*325	--
Barbco BD200HP	200,000	110	35,000	--	--	--	20	*600	1,200	*450	--
Barbco BD250HP	250,000	120	45,000	--	--	--	20	*630	1,200	*450	--
Barbco BD380	380,000	100	60,000	--	--	--	35 (random)	700	--	--	--

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Hunting engineers and manufactures drill stem and downhole tooling to fit all popular HDD brands including Ditch Witch®, Vermeer®, Universal HDD™, American Augers™, Toro® and others.



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DITCH WITCH

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HISTORY

Since its founding in 1949, the Ditch Witch organization has grown from inventing the first mechanized, compact service-line trencher to being a one-stop source for underground construction equipment. With a complete range of equipment for installing utilities underground, the Ditch Witch product line includes trenchers, vibratory plows, backhoes, horizontal directional drilling systems, drill pipe, downhole tools, chain, teeth and sprockets, vacuum excavation systems and mini skid steers. All of these products are recognized around the world for their advanced design, rugged construction, long-term durability, ease of use and reliability. In addition to its line of quality equipment, the Ditch Witch name is trusted for assisting with financial needs. Ditch Witch Financial Services (DWFS) is a full-service provider, offering a wide variety of finance and lease options to meet individual requirements.

PRODUCTS LINEUP

JT5, JT9, JT20, JT25, JT30, JT30 All Terrain, JT60, JT60 All Terrain, JT100 Mach 1, JT100 All Terrain

PRODUCTS SUMMARY

Customers can choose from 10 different Ditch Witch rigs for terrains and conditions ranging from sandy and soft soil to medium and hard soil to soft and hard rock — and the industry's widest range of downhole tooling options come from Ditch Witch to help battle HDD in rocks, mud, tree roots and dense ground. Each HDD model has advanced with customer feedback. Options range from the JT5 with 5,000 lbs of pullback to the JT100 Mach 1 with 100,000 lbs of pullback, and customers can withstand some of the widest ranges of ground conditions with the series of Ditch Witch All Terrain drills (JT30 AT, JT60 AT and JT100 AT). This patented, dual-pipe system has the industry's most advanced inner-rod design, enabling the machine to drill in the widest range of ground conditions, from mixed hard soil to solid rock. The JT5 HDD was modified to meet the specific challenges of shallow installation projects deploying utility lines up to 150 ft. Because the site is often a residential area, the compact JT5 is designed not to disturb driveways, sensitive landscaping and other surface obstacles. Ditch Witch developed the JT25 HDD rig with the utility contractor in mind. The

rig combines 27,000 lbs of thrust and pullback with an exclusive rotational drive, which results in a smoother operation and greater uptime on utility backbone installations. The JT100 Mach 1 is the most powerful rig in the our lineup, featuring 70,000 lbs of thrust and 100,000 lbs of pullback, perfect for the long bores used in installations like river crossings. The exclusive dual-pivot drill frame provides outstanding stability and operator comfort.

ADVICE TO BUYERS

When in the planning stages, jobsite variability is the most important thing to consider. Factors to consider include the size of a work area, the type of work being done, the size of bore needed and the type of soil the crew will encounter on the jobsite. Directional drills are used in various applications from burying cable from the curb to a house, to installing a larger-diameter product over several thousand feet.

MAINTENANCE TIP

Maximize your jobsite uptime by performing daily and scheduled maintenance checks because if any part of a rig prematurely wears down, it will affect the overall efficiency of your project.

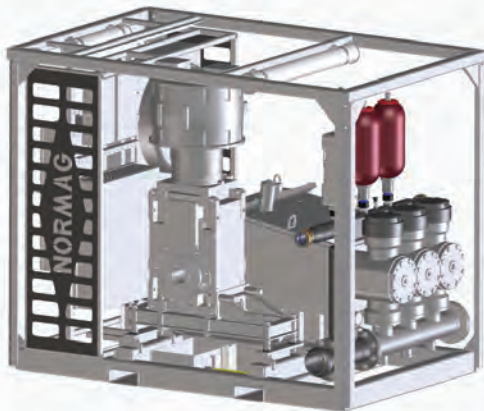
Co/ Model	Thrust/ Pullback (lbs)	Spindle Speed (rpm)	Torque (ft-lb)	Pilot Bore OD	Maximum Backream (in.)	Maximum Bore (ft)	Drill Pipe (ft)	Engine HP	Maximum Fluid Pressure (psi)	Flow Rate (gpm)	Fluid Tank (gal)
JT5	4,100/5,000	195	550	2.5	4.5	150	4'9"	24.8	750	5	N/A
JT9	9,000/9,000	186	1,100	3	variable	--	6'	66	750	16	N/A
JT20	17,000/20,000	225	2,200	4	variable	--	10'	74.5	1,500	25	N/A
JT25	27,000/27,000	220	4,000	4.02	variable	--	9'8"	130	1,200	50	N/A
JT30	24,800/30,000	225	4,000	4.21	variable	--	9'8"	160	1,500	50	N/A
JT30 All Terrain	24,800/30,000	400	4,000	4.75	variable	--	9'8"	148	1,500	50	N/A
					(w/Rockmaster 822), 5.5 (w/Rockmaster 86)						
JT60	60,000/60,000	240	9,000	5	variable	--	15	T4i/200 - T3/190	1,300	150	N/A
JT60 All Terrain	60,000/60,000	240	9,000	6.25	variable	--	15	T4i/200 - T3/190	1,300	150	N/A
JT100 Mach 1	70,000/100,000	210	12,000	6	variable	--	14'8"	260	1,000	230	N/A
JT100 All Terrain	70,000/100,000	210	12,000	6.25	variable	--	14'1"	260	1,000	230	N/A

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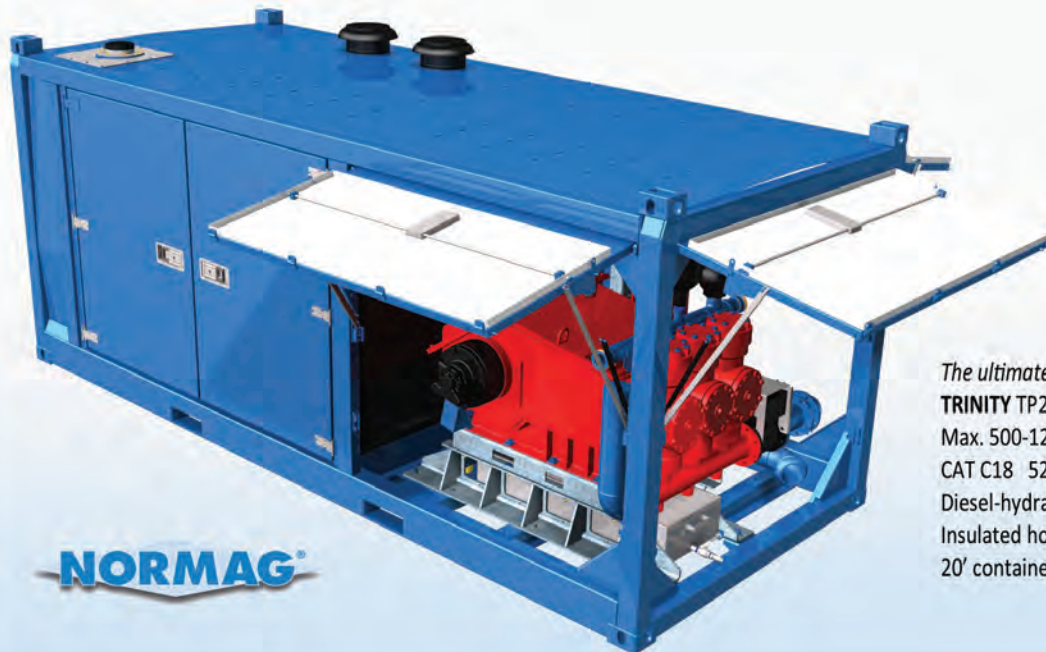


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HISTORY

Martin Herrenknecht founded the Herrenknecht GmbH (limited liability company) in 1977, which became a joint stock company (AG) in 1998. Today, Herrenknecht delivers cutting-edge tunnel boring machines for all ground conditions and in all diameters — ranging from 0.10 to 19 m — and technical solutions to sink vertical shafts, as well as to excavate sloping shafts. In 2013, the Herrenknecht Group achieved a total operating performance of 1,027 million Euro. It employs approximately 5,000 members of staff worldwide including about 200 trainees. In the area of modern trenchless technology, Herrenknecht can look back on almost 30 years of experience on projects worldwide. In addition to HDD, Herrenknecht is continuously developing new technologies for the pipeline industry, e.g. Pipe Thruster, Direct Pipe and Pipe Express.

PRODUCTS LINEUP

Frame Rig, Trailer Rig, Crawler Rig, Modular Rig, Toolings, Tailor-made Solutions

PRODUCTS SUMMARY

The maxi and mega rigs developed and manufactured by Herrenknecht exert pulling forces of between 120 000 and 1 349 000 lbs (600 and 6,000 kN) and achieve a maximum torque of between 35,000 and 110,000 ft-lb, depending on the model. All Herrenknecht HDD rigs have their own diesel-powered energy supply housed in sound-proofed 20-ft containers. The capacity of these power packs, as we call them, can vary from 300 to more than 1,300 hp, depending on the application. These rigs are remarkable not only for their performance capacity but also for their construction design. We offer frame, trailer, crawler and modular rigs. Herrenknecht has collaborated with recognized HDD specialists to develop innovative downhole tools. With these, crossings can be carried out more quickly and economically. We are also specialized in manufacturing tailor made HDD rigs according to customers specification.

like Pipe Thruster, High-Pressure Mud Pumps, Mobile Breakout Units etc., can be rented. This enables the client also to test the equipment seriously before buying. Part of the paid rental rates will be considered in the purchase price if the equipment is taken over after a rental contract.

MAINTENANCE TIP

Through our worldwide service network Herrenknecht provides service wherever you are drilling.

ADVICE TO BUYERS

Within the Herrenknecht rental fleet, HDD rigs and other HDD equipment,

Co/ Model	Thrust/ Pullback (lbs)	Spindle Speed (rpm)	Torque (ft-lb)	Pilot Bore OD	Maximum Backream (in.)	Maximum Bore (ft)	Drill Pipe (ft)	Engine HP	Maximum Fluid Pressure (psi)	Flow Rate (gpm)	Fluid Tank (gal)
HK100C	220,000	80	44,250	8 1/2	48	4,000	31.5	443	1,500	600	
HK150C	330 000	72	51,650	9 7/8	48	6,000	31.5	590	1,500	760	
HK150T	330,000	72	51,650	9 7/8	48	6,000	31.5	590	1,500	760	
HK250C	551,000	72	66,400	12 1/4	72	8,000	31.5	644	1,500	1,000	
HK250T	551,000	72	66,400	12 1/4	72	8,000	31.5	644	1,500	1,000	
HK300T	661,000	72	66,400	12 1/4	72	9,000	31.5	644	1,500	1,000	
HK400C	881,000	60	88,500	15	80	12,000	31.5	1,288	1,500	1,200	
HK400T	881,000	60	88,500	15	80	12,000	31.5	1,288	1,500	1,200	
HK400M	881,000	60	88,500	15	80	12,000	31.5	1,288	1,500	1,200	
HK500T	1, 102,000	60	103,300	17 1/2	80	15,000	31.5	1,288	1,500	1,200	
HK600T	1,349,000	60	109,200	20	80	15,000	31.5	1,288	1,500	1,200	

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HISTORY

Since 1985, McCloskey International has been bringing durable, high production equipment to customers worldwide. In 2014, McCloskey entered the trenchless market with the D15 HDD drill rig as it continued to develop and deliver products that boost productivity and profit for customers. The drilling business was a natural fit. Since 2014, the D15 has undergone extensive design enhancements, resulting from field testing and has evolved into the second generation of the products. Notable in the newest models are the steel shrouds, replacing fiberglass for 2015. Extensive testing revealed that the steel shroud is more durable across a variety of environmental and site conditions. Also available in the new models are stainless steel anti-freeze tanks, which under rigorous testing were better suited to worldwide climate differentials better than plastic. Extensive field testing has resulted in a number of improvements to the operator's station, including enhanced sightlines for the control panel, joysticks angled for comfort, and the placement of the grease bucket on the mast for easier access. Understanding that particularly in urban centers a drill with a small footprint is not only preferred but necessary, the D15 also has re-configured augers to allow greater maneuverability when accessing small spaces. The operator's station has also been streamlined and re-configured to allow for the

smaller dimensions, without sacrificing any of the functionality of the drill.

PRODUCTS LINEUP

The D15 has completed field testing and has commenced shipping to dealers in the Middle East, Australia, Europe and North America.

PRODUCTS SUMMARY

Currently the D15 is the latest model in production. The newly re-designed McCloskey D15 Horizontal Drill Rig sets a new standard in HDD with the most torque and horsepower in the smallest footprint in its class. An advanced electric hydraulic system delivers more horsepower to the ground, better fuel efficiency and guarantees 15,000 lbs of thrust/pullback while simultaneously delivering 1,600 ft-lbs of rotation. McCloskey's Hydraulic Compound Cylinder delivers smoother operational control, high performance and less maintenance. Featuring long life seals and brass wipers for protection from the elements, the D15 requires less maintenance and wear part replacements than other companies' rack-and-pinion design, which can be more at risk for drive motor breaks. The D15 can be started from two locations, with a key start in the back of the rig, and a push button start in the front. An additional feature on the D15 is the open top vise, providing excellent visibility to monitor connections and breakouts. From a safety perspective, the D15 has a number of enhance-

ments to ensure the safe and efficient operation of the rig. Of note, there are three emergency stop, or E-Stop, buttons rather than a limit switch. By moving to a stop vs. limit system, risk is limited that the machine might re-start during rod changes. On the newest version of the D15, sensors have been added to front and back to enhance operator safety, and also to prevent damage. New guards have also been re-designed to cover the augers completely.

ADVICE TO BUYERS

Buyers should look at the operating cost of the rig, and ensure that they are purchasing the best equipment for their application and needs. Buying a rig that is too large to get at small access jobs drives the cost up due to improper application. Request ongoing maintenance information and schedules from the manufacturer to ensure that the rig can be kept in top operating condition. This will ensure the cost of operation is maintained at an optimal level, and the rig stays in the field, not in the shop.

MAINTENANCE TIP

Always walk around the rig prior to start up to make sure all is in working order, especially the e-stop switch. Keeping on track with regularly scheduled maintenance allows the product a longer life span and less downtime. If the machine is being operated in cold climates, it is recommended that the rig be warmed up prior to operation for enhanced performance.

Co/Model	Thrust/Pullback (lbs)	Spindle Speed (rpm)	Torque (ft-lb)	Pilot Bore OD	Maximum Backream (in.)	Maximum Bore (ft)	Drill Pipe (ft)	Engine HP	Maximum Fluid Pressure (psi)	Flow Rate (gpm)	Fluid Tank (gal)
McCloskey D15	15,000 lbs (6803 kg)	130 rpm	1600 ft lb (2200 Nm)	2.5 in/ 63.5 mm	NP	NP	6	59 Hp (44 kW)	1000 PSI/ 69 Bar	25 GPM (95 LPM)	NP

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MCLAUGHLIN

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HISTORY

For more than 90 years, McLaughlin has been an active leader in the underground construction industry. McLaughlin has developed a reputation for designing and building dependable, low maintenance trenchless construction equipment solutions for the power, gas, telecom, water, sewer and oil markets. McLaughlin is focused on developing innovative products that provide contractors safe and productive methods for the identification and installation of underground utilities. McLaughlin offers a full line of utility locators and vacuum excavators for safely finding and exposing existing infrastructure, as well as a number of other trenchless installation products. McLaughlin manufactures Hole Hammer pneumatic piercing tools, Mighty Moles and pit launch directional drills for trenchless installation of conduit, cable and HDPE pipes. In addition, McLaughlin has a full line up of auger boring machines and 360-degree On-Target steering systems for installation of steel casing. Since 1921, McLaughlin takes pride in providing workable solutions for its customers. From planning to installation, McLaughlin offers contractors a complete package for trenchless construction needs.

PRODUCTS LINEUP

McL-10H pit-launched directional drills — 5-ft and 7-ft models

PRODUCTS SUMMARY

McLaughlin offers two pit launch drills: 5-ft and 7-ft models. The 5-ft model is ideal for limited access jobsites and smaller entry pits. This model is very popular in Europe and for use in downtown areas that cannot be accessed with traditional surface-launch directional drills. The 7-ft model is best suited for projects with more access. This model offers enhanced productivity because there is less making and breaking of rods. Both models have 1,030 ft-lbs of torque and 13,250 lbs of pullback. They use a standard locator-transmitter beacon, HDD drill head and HDD tooling. Mud mixing system and hydraulic power pack accessories are also available. Pit-launched directional drills are frequently used by non-traditional HDD contractors. They are straight-hydraulic machines that are simple to operate and very reliable. Like with any piece of equipment, it's important that operators receive proper training and follow standard HDD practices and OSHA regulations for pit set up.

ADVICE TO BUYERS

Before you purchase any piece of equipment, make sure it is appropriate for the application. A pit-launched drill provides a good solution to setback and easement issues but can be more time-consuming to set up than a traditional surface-launched drill. Make sure you understand proper pit excava-



tion, leveling and shoring procedures. Because many users are non-traditional HDD operators, it's also important that they receive proper HDD training to ensure safe and productive operation.

MAINTENANCE TIP

Pit-launched drills are low maintenance machines. Like any drill, it is important to keep the firestick rods greased and to use proper torque procedures to prevent over-torquing the drill rods. Operators should rotate, or cycle, the rods. This prevents some of the rods from wearing prematurely. Prior to operation, check that the vise dies are in good condition to prevent any slipping during the rod make up or break out process.

Co/ Model	Thrust/ Pullback (lbs)	Spindle Speed (rpm)	Torque (ft-lb)	Pilot Bore OD	Maximum Backream (in.)	Maximum Bore (ft)	Drill Pipe (ft)	Engine HP	Maximum Fluid Pressure (psi)	Flow Rate (gpm)	Fluid Tank (gal)
McLaughlin McL-10H (5 ft.)	17,670/ 13,250 lbs	0 to 125 RPM	1,030 ft-lb	3	12	180 ft	2.4 ft	Hydraulic	1,000 psi	6 gpm	230 gal
McLaughlin McL-10H (7 ft.)	17,670/ 13,250 lbs	0 to 125 RPM	1,030 ft-lb	3	12	180 ft	4 ft	Hydraulic	1,000 psi	6 gpm	230 gal

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HISTORY

Prime Drilling is a global leader in the design, development and production of advanced horizontal directional drilling rigs and allied equipment located in Wenden, Germany since 1999. We understand that a successful crossing is particularly dependent on the reliability of the equipment involved. For this reason, it is not enough for us to focus on superior technical characteristics. We are driven to delivery robust, low-maintenance drill rigs that bring top performance in the most demanding environments. Our products and services are backed by a highly qualified team with decades of experience in the field of horizontal directional drilling technologies.

PRODUCTS LINEUP

HDD rigs with pull force from 25 up to 600 tons, pipe pusher, bentonite pumps, mixing units, recycling units, drill rods, reaming tools, measurement equipment and all necessary accessories.

PRODUCTS SUMMARY

We are not only selling “standard” HDD rigs with its components like pumping, mixing or recycling units and reaming tools, drill rods or anything you need for a successful bore. For example, Prime drilling offers also compact rigs. The special feature of our compact rig is the “on board” pump. The PD-X.1.000-C manufactured by our affiliated company Prime-GPT, the specialist for pumps and related spare parts, impresses with its robust and low-wear design. This saves

space during transport and onsite and also offers greater flexibility. Another highlight is the Prime Pipe Pusher. The Prime Pipe Pusher mainly serves for additional push or pull force with pipe pullback, but also offers the perfect solution for application combined with tunnel boring machines.

ADVICE TO BUYERS

All our drilling rigs are tailor made to customer’s specification: whatever color, equipment or size of the drill pipes you require — any preference will be considered. We are available for our customers at any time: any problems on the jobsite, questions relating to our products or urgent spares requirements — we guarantee 24/7-service.

Co/ Model	Thrust/ Pullback (lbs)	Spindle Speed (rpm)	Torque (ft-lb)	Pilot Bore OD	Maximum Backream (in.)	Maximum Bore (ft)	Drill Pipe (ft)	Engine HP	Maximum Fluid Pressure (psi)	Flow Rate (gpm)	Fluid Tank (gal)
PD 30/18 RP	67,500	43	13,000					190			
PD 45/18 RP	101,000	40	13,000					246			
PD 60/33 RP	135,000	57	24,000					246			
PD 80/50 RP	180,000	38	37,000					326			
PD 100/50 RP	225,000	59	37,000					450			
PD 150/70 RP	337,000	41	52,000					450			
PD 200/70 RP	450,000	41	52,000					640			
PD 250/90 RP	562,000	24	66,000					640			
PD 300/90 RP	674,000	39	66,000					640			
PD 350/120 RP	787,000	30	89,000					775			
PD 400/120 RP	899,000	30	89,000					775			
PD 450/150 RP	1,012,000	46	109,000					775			
PD 500/180 RP	1,125,000	30	133,000					1196			
PD 600/180 RP	1,349,000	30	133,000					1196			
PD 30/18 CU	67,500		13,000					300			
PD 40/22 CU	88,200		16,250					300			
PD 50/30 CU	110,250		22,500					300			
PD 60/30 CU	135,000		22,500					300			
PD 80/45 CU	180,000		33,300					300			

Horizontal Directional Drilling Guide

THE TORO CO.

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HISTORY

Celebrating our first 100 years in 2014, The Toro Co. continues to strengthen its position as a leading worldwide provider of innovative solutions for professional contractors, golf courses, agricultural growers, rental companies, utility companies, government and education institutions and homeowners. Through constant innovation and caring relationships built on trust and integrity, Toro has built a legacy of excellence by helping customers achieve their goals. Toro continues to build upon this legacy by expanding its products and services into new markets. In 2013, Toro launched its new line-up of horizontal directional drills and riding trenchers. Toro's horizontal directional drill and every product that carries the Toro name also carries our commitment to quality and product excellence. Today, contractors around the world count on Toro products to help them their job more effectively.

PRODUCTS LINEUP

DD4045 and DD2024

PRODUCTS SUMMARY

The Toro DD2024 horizontal directional drill packs a powerful 20,000 lbs of pullback force and 2,400 ft-lbs of rotary torque into a compact package. The Toro DD4045 horizontal directional drill combines best-in-class 40,000 lbs of thrust and pullback, and 4,500 ft-lbs of rotary torque with a small footprint (only 85 in. wide). That, along with max-

imum drilling fluid flow of 70 gpm and tool rotation speed of 225 rpm, gives the DD4045 the versatility to perform a wide range of installations projects. Both the DD2024 and the DD4045 utilize a quad rack-and-pinion carriage design that spreads carriage load evenly and ensures smooth and efficient carriage travel. Additionally, the gear track is welded to both sides of the thrust frame for added reliability. Unique to the DD2024 and the DD4045, the track is propelled by forward-mounted track drive motors with planetary gears, which deliver superior traction in all types of ground conditions. Both the DD4045 and the DD2024 are equipped with a multi-function color LCD display that provides a clear view of machine functions and performance indicators. The operator also has the ability to select single- or dual-joystick operation on either the DD2024 or the DD4045, and can change between the two versions depending on the conditions. Additionally, both units have incorporated heavy-duty, open-top vice wrench designs, which provide excellent visibility of the tool joint from the operator's position. These features all combine to allow the operator to be more productive.

ADVICE TO BUYERS

When determining what size drill to purchase, first consider your business goals. Is the type of installation you expect to be doing in the future different or similar to the installations you're doing today? Plan accordingly — you may

want to consider a machine that provides you with the added capabilities to do larger diameter or longer bores if you expect to pursue this type of work in the future. If you're adding drills to your fleet, and adding new operators, also consider features that will help new operators become highly productive — such as the ability to operate a drill using single or dual joystick modes depending on the conditions.

MAINTENANCE TIP

Consider a maintenance plan that includes time for cleaning and a machine inspection at the end of each day. Use the opportunity when applying grease after cleaning to take close look at various areas of the machine. This will allow you to easily identify and resolve maintenance issues in order to be ready for the next day's job.

Co/ Model	Thrust/ Pullback (lbs)	Spindle Speed (rpm)	Torque (ft-lb)	Pilot Bore OD	Maximum Backream (in.)	Maximum Bore (ft)	Drill Pipe (ft)	Engine HP	Maximum Fluid Pressure (psi)	Flow Rate (gpm)	Fluid Tank (gal)
Toro DD2024	20,000	200	2,400	4	NA	NA	400	74	1,500	30	500
Toro DD4045	40,000	225	4,500	4	NA	NA	520	160	1,300	70	1,000

TT TECHNOLOGIES

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COMPANY HISTORY

TT Technologies Inc., Aurora, Ill., is a manufacturer of trenchless technology equipment for the installation and replacement of water, sewer, gas and electric utilities. The equipment is field proven, logging more than 45 years of experience. With more than 200 patents worldwide, TT Technologies is a leader in trenchless applications ranging from pipe pulling, pipe ramming, pipe bursting, sliplining, and directional boring. A nationwide network of regional customer service offices and distribution locations assures products and expertise are always nearby. Comprehensive hands-on training seminars are held at the corporate offices in Aurora, Ill., as well as regional shows, seminars, and demonstrations throughout North America each year.

PRODUCT LINEUP

TT Technologies full line of trenchless equipment includes: Grundomat piercing tools, Grundodrill directional drills, Grundosteer guided piercing tools, Grundocrack pipe bursting tools, Grundoram pipe ramming tools, Grundomudd bentonite mixing and delivery systems, Grundowinch constant tension winches and Grundopit mini-directional drill rigs.

PRODUCT HIGHLIGHT

The compact Grundodrill 4X is designed for residential service, small diameter main installations and “last mile” operations, offering 9,800 lbs of thrust and pullback. Using the compact drill is less intrusive and ideal for areas where larger units are not an option. The drill features a dual hydrostatic

pump system and a four-auger stake down system that provides greater stability. The Grundodrill 4X also comes with the exclusive Smart Vice system that performs vice cycling operations automatically.

Co/Model	Thrust/Pullback (lbs)	Spindle Speed (rpm)	Torque (ft-lb)	Pilot Bore OD	Maximum Backream (in.)	Maximum Bore (ft)	Drill Pipe (ft)	Engine HP	Maximum Fluid Pressure (psi)	Flow Rate (gpm)	Fluid Tank (gal)
40/60	13,200/8,800	110	662	2.1	4	200	2	23	800	10	225
4X	9,800	230	950	2.5	10	320	5	37.5	800	10	225
15XP	33,047	180	3,262	4	20	985	32.75	142	870	40	2,000
18ACS	40,465/44,961	200	7,375	6.5	24	1,000	32.75	198	870	40	2,000

Horizontal Directional Drilling Guide

UNIVERSAL HDD

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COMPANY HISTORY

With leading position in engineering and production of custom horizontal directional drills and equipment, we are continuing our growth strategy with the new models and product lines at the new state of the art facility. The great demand from the global market of our equipment, our old Ohio facility has reached the limit of its capacity with regards to the production capacities and technological innovation. It was therefore clear that it would not be possible to continue expanding our product line in Ohio. A new production site that would meet the requirements of the brand name Universal HDD had to be found. For Universal HDD the philosophy of creating highest quality equipment and services is not enough. We must continue to push the limits of the industry.

PRODUCT LINEUP

Universal HDD remains to be the leader in design and manufacture of custom horizontal directional drills and

equipment. In 2015 we introduced new and upgraded line of rigs: UNI 36x50-15, UNI 80x100, UNI 110x120, and UNI 250x400. These drills feature the most advanced technology in the industry, while maintaining the simple design, high productivity and reliability. Today, more than ever, we are committed to using every resource, to provide the highest quality products and to push industry's standards.

PRODUCT HIGHLIGHT

Our machines have drilled all over the world and in all manner of soil and hard rock conditions. We're not afraid to get our hands dirty. We've worked alongside our customers, making crossings on nearly every continent, under the biggest, widest rivers, and under hill and dale. It is this diversity of environments that has taught us what works best in virtually every type of geology. We've taken what we've learned to design and build the best equipment we know how.

MAINTENANCE TIP

Our customers bank on our extensive knowledge and expertise when they ask us to build some of the toughest, custom designed machines. And they look to us to teach them how to use the equipment, including how to optimize its performance in the field. We assemble a team from Universal HDD and our valued component suppliers and create a training program as customized as our equipment.

ADVICE TO BUYERS

We begin with common platforms, but we engineer and construct horizontal directional drilling machines that meet the specific needs of our customers. Pound-for-pound, at Universal HDD we provide more value to our customers, both in the equipment and customer support.

Co/ Model	Thrust/ Pullback (lbs)	Spindle Speed (rpm)	Torque (ft-lb)	Pilot Bore OD	Maximum Backream (in.)	Maximum Bore (ft)	Drill Pipe (ft)	Engine HP	Maximum Fluid Pressure (psi)	Flow Rate (gpm)	Fluid Tank (gal)
UNI 12x15	12,000	125/250	1,500	2.25			6	66	1,200	27	N/A
UNI 12x15L	12,000	125/250	1,500	2.25			10	66	1,200	27	N/A
UNI 22x22	22,000	160/220	2,200	3.5			10	99	1,200	27	N/A
UNI 30x40	30,000	140/280	4,000	3.5			10	140	1,000	75	N/A
UNI 36x50	36,000	100/200	5,000	3.5			10	140	1,000	75/100	N/A
UNI 36x50-15	36,000	100/200	5,000	3.5			15	140	1,000	75/100	N/A
UNI 70x90	70,000	100/200	9,000	3.5			10	200	963	188	N/A
UNI 80x100	80,000	90/180	10,000	5			15	200	963	188	N/A
UNI 110x120	110,000	70/140	12,000	5			15	275	844	228	N/A
UNI 160x240	160,000	60/120	24,000	5			20	400	844	228/250	N/A
UNI 220x240	220,000	60/120	24,000	6			20	400	844	228/250	N/A
UNI 250x400	250,000	50/100	40,000	6			20/30	450	844	228/250	N/A
UNI 320x500	320,000	50/100	50,000	6			20/30	600	1,100	250	N/A

Horizontal Directional Drilling Guide



VERMEER

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HISTORY

Founded in Pella, Iowa, with the invention of a mechanical hoist to help farmers unload grain, Vermeer today serves customers in more than 60 countries with a full line of high-quality underground construction, surface mining, landscaping, tree care, environmental and agricultural equipment. Customers are at the core of the business, and they can expect reliable, local service and support from dealers in more than 60 nations. Vermeer introduced its first hori-

zontal directional drill in 1991. By the end of the decade, the Navigator HDD lineup had become a market share leader worldwide. Today's S3 generation of drills has enhanced speed, simplicity and sound reduction. Vermeer manufactures machines that make a real impact in a progressing world, and the company's HDD line is a significant part of that mission.

PRODUCTS SUMMARY

Vermeer has 15 models of horizontal di-

rectional drills in its product line. Eight are intended for utility installation contractors and seven are manufactured for the pipeline market. They range from a 5,500-lb machine to a 1.36 million-lb maxi rig. Features like the DigiTrak Aurora screen give operators more real-time information about their drilling activity. And common control systems across different drills help reduce the learning curve for operators and allows them to be proficient on multiple machines.

Co/Model	Thrust/ Pullback (lbs)	Spindle Speed (rpm)	Torque (ft-lb)	Pilot Bore OD	Maximum Backream (in.)	Maximum Bore (ft)	Drill Pipe (ft)	Engine HP	Maximum Fluid Pressure (psi)	Flow Rate (gpm)	Fluid Tank (gal)
Vermeer D6x6	5,500/5,500	180	550	N/A	N/A	--	6	25	500	5	N/A
Vermeer D9x13 S3	9,000/9,000	190	1,300	N/A	N/A	--	6	44	750	15	N/A
Vermeer D20x22 S3	19,550/19,550	257	2,250	N/A	N/A	--	10	74	1,000	25	N/A
Vermeer D23x30 S3	24,000/24,000	219	3,000 w/ 2.38", 2600 w/ 2.06"	N/A	N/A	--	10	100	1,300	35	N/A
Vermeer D24x40 S3	28,000/28,000	253	4,200	N/A	N/A	--	10	125	1,050	50	N/A
Vermeer D36x50DR Series II	38,000/38,000	210	5,500	N/A	N/A	--	10	140	1,100	70	N/A
Vermeer D40x55 S3 10' rod	40,000/40,000	227	5,500 w/ 2.63", 5,000 w/ 2.38"	N/A	N/A	--	10	140	1,300 w/ 70, 1050 w/ 50	70 or 50	N/A
Vermeer D40x55 S3 15' rod	28,000 with 2.63", 13,000 with 2.38"/40,000	227	5,500 w/ 2.63", 5,000 w/ 2.38"	N/A	N/A	--	15	140	1,300 w/ 70, 1050 w/ 50	70 or 50	N/A
Vermeer D60x90	60,000/60,000	200	9,000	N/A	N/A	--	15	185	1,200	150	N/A
Vermeer D100x140 S3 15' rod	100,000/100,000	203	14,000	N/A	N/A	--	15	275	1,100/1,000	230/200	N/A
Vermeer D100x140 S3 20' rod	100,000/100,000	203	14,000	N/A	N/A	--	20	275	1,100/1,000	230/200	N/A
Vermeer D220x300	242,100/242,100	164	30,200	N/A	N/A	--	20	415	1,200	330	N/A
Vermeer D330x500	330,000/330,000	88	50,000	N/A	N/A	--	32	486	3,000	--	N/A
Vermeer D500x500	500,000/500,000	36	50,000	N/A	N/A	--	32	800	--	--	N/A
Vermeer D750x900	784,000/784,000	36; 54	102,500	N/A	N/A	--	32	800	--	--	N/A
Vermeer D1000x900	1,000,000/1,000,000	36;54	102,500	N/A	N/A	--	32	800	--	--	N/A
Vermeer D1320x900	1,360,000/1,360,000	36; 54	102,500	N/A	N/A	--	32	800	--	--	N/A