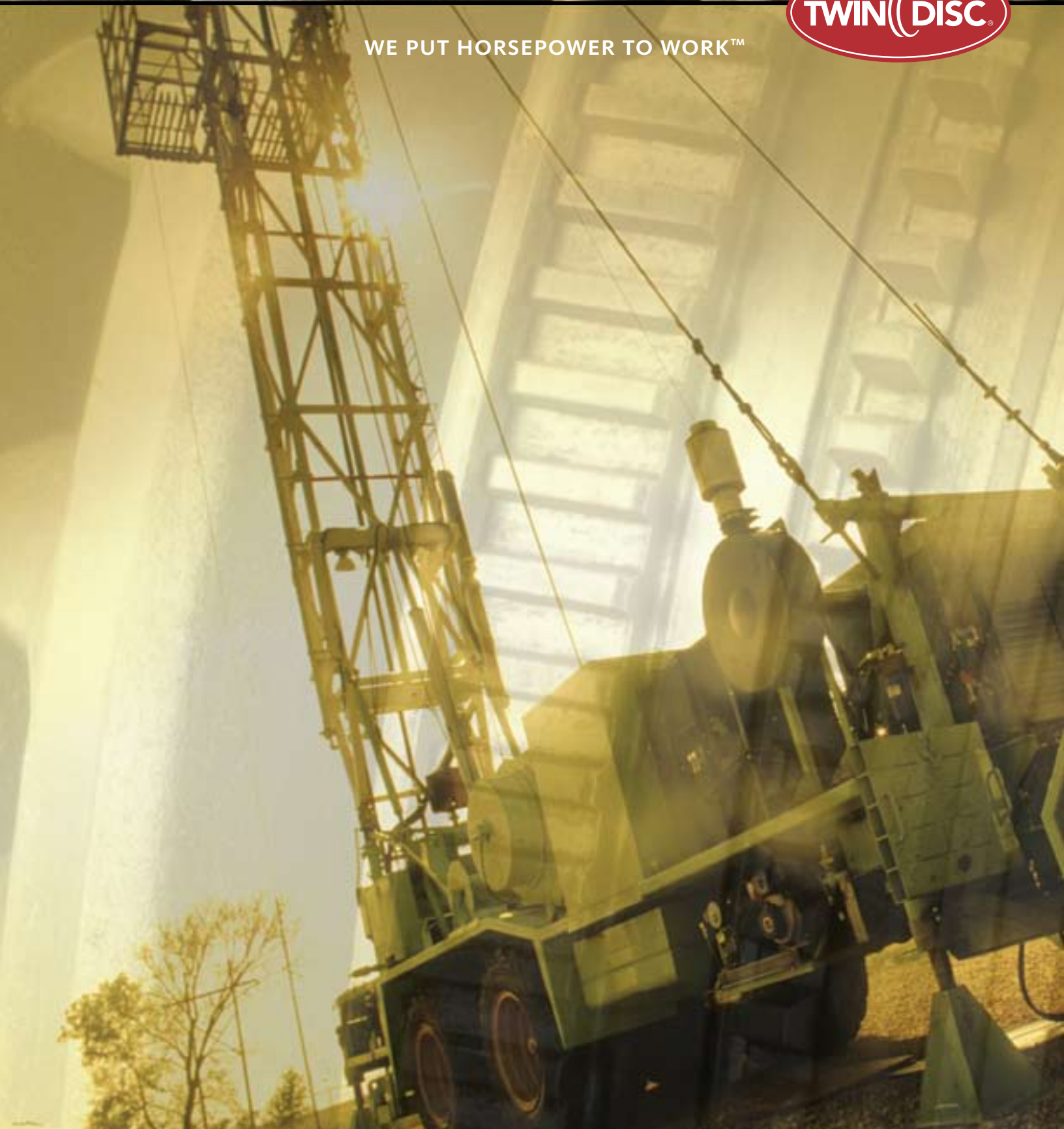


PRODUCTS FOR THE GAS AND OIL INDUSTRY



WE PUT HORSEPOWER TO WORK™





MEETING **YOUR** NEEDS

Since 1918, one of the keys to our success has been developing advanced technology that provides products for the effective transmission of horsepower. By accepting engineering challenges, Twin Disc has become a leader in solving the most difficult power transmission problems. We take great pride in offering innovative products that meet the specific requirements of our customers. Twin Disc works hand-in-hand with our customers in the development of new concepts. Our engineers utilize leading edge technology, advanced research and development techniques as well as their vast application experience.

Twin Disc has been a trusted supplier to the oil field since our first “twin disc” clutch was applied to a draw works over 70 years ago. Today, Twin Disc products are found in oil field applications around the world. That’s why we have a worldwide sales and service network — 129 distributors in 77 countries — to supply and support our products wherever they are used. Twin Disc is dedicated to achieving and maintaining optimum results for those who specify and use our products.

Hydraulic torque converters for mud pumps and draw works

Power-shift transmissions for work over, servicing and fracturing rigs

Clutches for drum hoists and disconnects

Power take-offs for compressor service

Marine propulsion systems for crew boats and offshore supply vessels

WE PUT HORSEPOWER TO WORK™

Systems Engineering

People, products and market responsiveness have contributed to Twin Disc's success, but the most significant element has been our commitment to systems engineering: the science and technology of power, its conversion, transfer and utilization.

Systems engineering involves providing the solution to any power transmission requirement regardless of its complexity. Often the solution is as simple as a single standard component. Occasionally, an existing design can be modified to meet a unique problem. Frequently, a totally new concept or system must be developed to meet a special need. As a result of Twin Disc's broad and flexible product offering, coupled with the capability, willingness and responsiveness to the customers' or markets' needs, Twin Disc is able to serve original equipment manufacturers and thousands of end users. Complete transmission systems for internal combustion engines as well as electric motors and gas turbines are available from fractional to 2300 kW (3000 hp).

Twin Disc developed the systems engineering approach out of our unique availability of essential components that can serve as building blocks for virtually any power transmission system. Manual, hydraulic and pneumatically actuated clutches, single-stage, Type 4 and three-stage hydraulic torque converters, power-shift transmissions and control systems.

Research and Development

Since our beginnings, Twin Disc has been committed to research and development, which continues to be a high priority. We believe that constantly working to improve existing product lines and develop new products is the lifeblood of our company.

Customer Support

Genuine Twin Disc Renewal Parts and expert service are offered through our extensive worldwide network of Authorized Distributors and Authorized Service Dealers. This assures Twin Disc Approved Renewal Parts are readily available wherever the application is located. Our network allows customers to operate their business with fewer trained mechanics, a reduced investment in shop equipment and reduction in job-site parts inventories.

Warranty

Twin Disc backs all of our products with a warranty against defects in materials and workmanship. All systems and components are thoroughly inspected and tested prior to leaving our facilities to assure long life and dependable service.

Renewal Parts

Twin Disc Approved Renewal Parts enable you to repair or overhaul all your Twin Disc components while maintaining original quality and dependability. In addition, Twin Disc has several Renewal Parts kits that offer the convenience of having all parts needed to renew certain Twin Disc units.

POWER TAKE-OFFS

Standard

Easy-to-mount unit features clutch assembly with shaft and bearings in rigid cast iron housing. Designed for manual operation on all internal combustion engines with standard SAE flywheel housing from No. 6 to No. 00.

- Single-plate 165 to 356 mm (6.5 to 14 in)
- Double-plate 292 to 457 mm (11.5 to 18 in)
- Triple-plate 356 to 533 mm (14 to 21 in)
- Capacities to 1454 kW (1950 hp), torque to 11,389 Nm (8400 lb-ft)



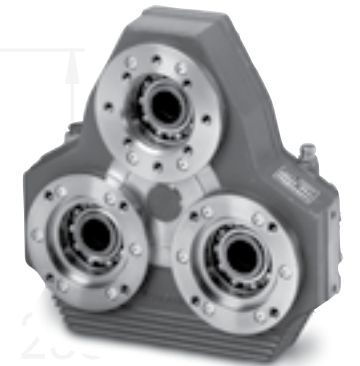
Limited Attendance

To meet the oil field pumping requirement for a power take-off that can operate continuously for six months without additional lubrication, Twin Disc offers a line of Limited Attendance PTOs. These units cover a range of 21 to 195 kW (28 to 261 hp).



Pump Drives

Twin Disc offers a complete line of one pad to eight pad Pump Drive units for applications requiring total maximum input torque to 3346 Nm (2468 lb-ft). Maximum input power is up to 876 kW (1175 hp) @ 2000 rpm depending on ratio. Pads through SAE "F" can be provided. Input options include clutches, rubber block drives, flex-plates and independent types. Output options include special "live" output clutch PTO units and independent shafts. Depending on the unit, a wide variety of both reduction and increasing ratios are available.

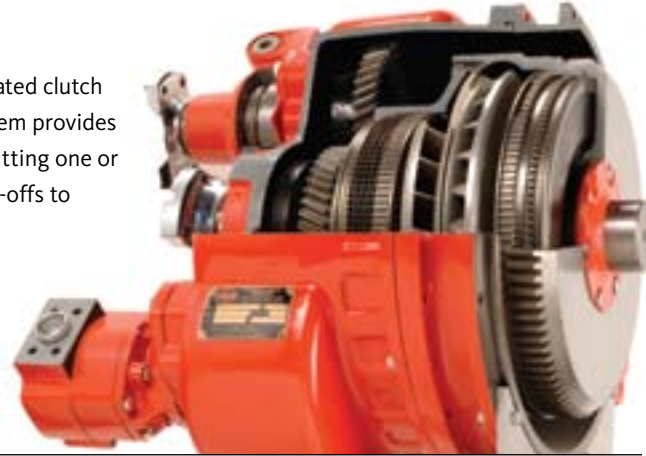


HYDRAULIC PRODUCTS

Type Four Hydraulic Torque Converters

Designed specifically for the oil and gas industries, these units transfer power from diesel engines and electric motors up to 2610 kW (3500 hp). Offered in model series by circuit size, the converters provide higher torque multiplication and utilize prime mover power over a greater operating range than previous torque converters used in oil field applications.

The Twin Disc Omega Drive® system combines an oil-actuated clutch and a hydraulic torque converter in one package. This system provides variable output shaft speed while, at the same time, permitting one or more other engine-driven, converter-mounted power take-offs to operate at a constant speed. The Omega Drive mounts up to four engine-driven power take-offs transmitting 50-70% of full engine power. Modifications can be engineered to match 56 to 1491 kW (75 to 2000 hp) requirements. Type 4 circuits are available in 406, 508 and 559 mm (16, 20 and 22 in).



Single-Stage Hydraulic Torque Converters

Twin Disc builds a complete line of single-stage rotation housing hydraulic torque converters, including the 1100, 1300, 1400, 1450, 1500, 1600, 1700, 1750, 1800, 1850, 2100 and 2500 Series models (the first two digits in the series number indicate the approximate circuit size in inches). Power ranges from 30 to 1529 kW (40 to 2050 hp). The 381 mm (15 in) size is designed for industrial service, meaning that it is capable of a chain drive off the output shaft. All other sizes are limited to in-line drives only and are used primarily for vehicle applications.



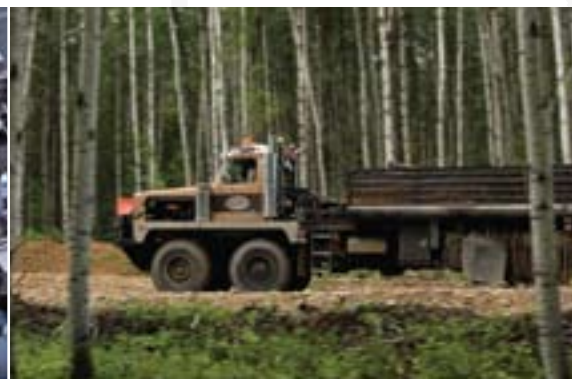
Three-Stage Hydraulic Torque Converters

Twin Disc offers three models of three-stage hydraulic torque converters with 30 distinct capacities. The 10,000 Series three-stage converter is rated for applications up to 250 kW (335 hp) @ 2400 rpm; the Standard-Duty 11,500 Series to 313 kW (420 hp) @ 2200 rpm; and the Heavy-Duty 11,500 Series to 436 kW (585 hp).



Optional Combinations

A variety of output combinations are available with some three-stage hydraulic torque converters. Types B and F are chain housings; both types are available with the 10,000 and the Standard-Duty 11,500 Series. Type C-1 output is a straight shaft for direct connect to the driven load. Type C-2 is a flanged shaft for universal joint connection. Type C-3 is similar to Type C-1 with extra heavy bearings for side loads. The Heavy-Duty 11,500 Series converters are offered with Type C-3 output, making this series exceptionally adaptable to all applications required to withstand heavy side-pull loads. Optional accessories available for Three-Stage Hydraulic Torque Converters include freewheels, tailshaft governor take-offs, Rubber Block Drives, air-to-oil radiators and a variety of driving rings.



POWER-SHIFT TRANSMISSIONS

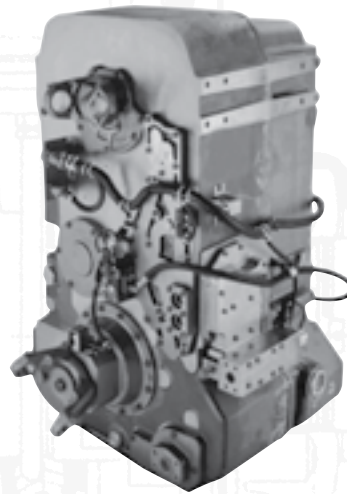
FEATURES AND BENEFITS

- Increased performance: efficient gear train combined with electronic controls tailored to the needs of the specific application to optimize machine performance.
- Ease of operation: available automatic shifting or manual power-shift combined with shift inhibits and interlocks simplify the operator's job and allows for concentration on the job rather than the powertrain.
- Reduced downtime: durable heavy-duty components combined with electronic controls which prevent overspeed, shift shocks and reduce the effects of operator's error, result in increased machine availability and less wear and tear on other machine components.
- Safety: the control system looks after the transmission so the operator can focus on the operation of the machine. Speeds and interlocks can be programmed to meet the needs of the specific machine.

2619 AWD Series

The 2619 AWD Series transmission system features an engine-mounted 17.5" or 18.5" Type 8 torque converter, a 6-speed power-shift transmission and an advanced electronic control system.

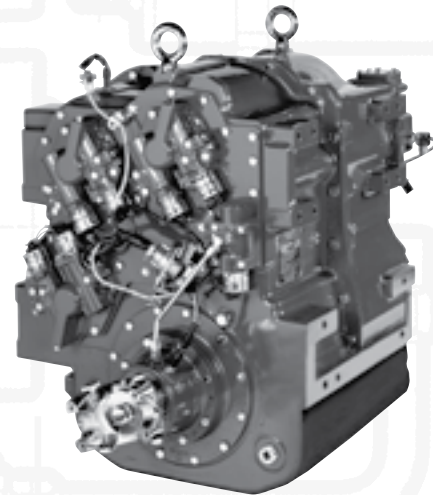
- Full time all-wheel drive with shift on the fly differential lock for high-performance in off-road conditions
- Advanced electronic controls provide ease of operation and maximum flexibility to tailor performance for the specific application
- Durable heavy-duty components combined with electronic controls, which prevent over-speed, shift shocks and reduce the effects of operator error, result in reduced downtime, less wear and tear on other machine components and increased machine availability



1180 AWD Series

The 1180 AWD Series transmission system features an engine mounted 17.5" or 18.5" Type 8 torque converter, a 6-speed power-shift transmission and an advanced electronic control system.

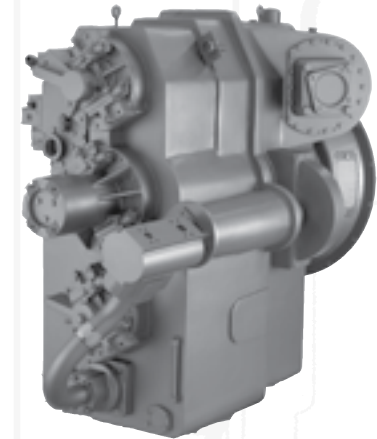
- Full time all-wheel drive with shift on the fly differential lock for high-performance in off-road conditions
- Advanced electronic controls provide ease of operation and maximum flexibility to tailor performance for the specific application
- Durable heavy-duty components combined with electronic controls, which prevent over-speed, shift shocks and reduce the effects of operator error, result in reduced downtime, less wear and tear on other machine components and increased machine availability



7500 Series

The new 7500 Series transmission system features lightweight yet durable aluminum housings to reduce overall vehicle weight, assisting the vehicle in meeting over-the-road requirements, and does not require a torque converter, further contributing to overall weight savings. Its compact size enables it to fit between a vehicle's frame rail for a lower center of gravity.

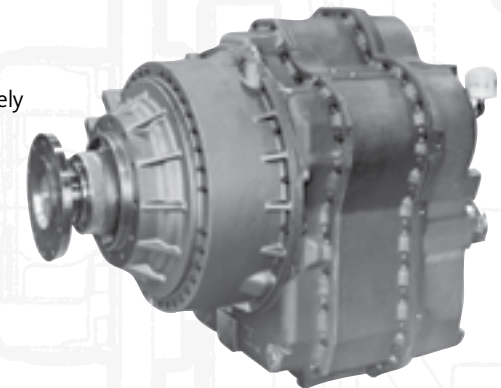
- Up to 1938 kW (2600 hp) maximum speed to 1900 rpm
- Designed to match engine life
- Capable of handling PTOs up to 200 horsepower
- Less complicated plumbing makes it easier to fit into the cramped quarters of a frac rig
- Smaller gear ratio steps match engine horsepower curves better than competitive units
- Offers greater flexibility of PTO options



8500 Series

This Co-Axial design series power-shift transmission has 9 speeds forward and 0 reverse. The converter is engine-mounted and transmission is remotely mounted to provide design flexibility and simple installation. Automatic lock-up and automatic electronic range selector system are standard on this series.

- Up to 2300 kW (3000 hp) maximum speed to 2100 rpm
- 9 speeds
- Forward ratios include 5.60 to .80



CLUTCHES

Model CL Medium Mechanical Clutches

Offered in 127, 152, 203, 254 and 279 mm (5, 6, 8, 10 and 11 in) diameter sizes with one-, two- or three-plate construction available in most sizes.

- Working power per 100 rpm ranges 1.4 to 14.4 kW (1.9 to 19.3 hp)
- Working torques range 132 to 1375 Nm (97 to 1014 lb-ft)
- Torque capacity can be increased 33% with heavy-duty driving plates on 203, 254 and 279 mm (8, 10, 11 in) sizes

Model PO Medium Air Clutches

Available in 203, 254 and 289 mm (8, 10 and 11.375 in) diameter sizes with one-, two- or three-plate construction.

- Power per 100 rpm ranges 2.75 to 25 kW (3.7 to 33.3 hp)
- Slip torque at 896 k/Pa (130 PSI) ranges 529 to 4718 Nm (390 to 3480 lb-ft)
- Torque capacity can be increased 33% by use of heavy-duty plates

Model PO Large Air Clutches

Available in 356, 457, 610, 762, 914 and 1067 mm (14, 18, 24, 30, 36, 42 and 52 in) diameters sizes with one-, two- or three-plate construction available in most sizes.

- Power per 100 rpm ranges 40 to 5644 kW (54 to 7569 hp)
- Slip torque at 896 k/Pa (130 PSI) ranges 5084 up to 718,574 Nm (3750 to 530,000 lb-ft)

Rubber Block Drives

Twin Disc offers Rubber Block Drives for internal combustion engine power transmission applications that do not require a disconnect clutch. These are excellent for installations such as pumps, compressors and single or double bearing generator drives. Standard sizes available include 279, 356, 457 and two 533 mm (11, 14, 18 and 21 in) units. One 533 mm (21 in) unit has a single row of blocks; the other 533 mm (21 in) unit contains a double row of blocks. Other sizes are available in production quantities.



MARINE EQUIPMENT

Marine Transmissions



Twin Disc offers a full line of marine transmissions for crew, supply and service vessels, and has a model matched to every high-speed marine diesel engine used in the industry today. Our comprehensive range of marine transmissions covers ratings up to 4000 hp, having all required ratios available and meeting all special operating requirements and needs.

Twin Disc marine transmissions feature the most robust design to withstand the extreme environmental conditions of the oil and gas industry. Our certified distributors and service dealers are available to you at all major ports throughout the world, to provide any required service, maintenance and genuine Twin Disc parts.

QuickShift® — You've Got To Feel It To Believe It.

No other marine transmission in the world shifts as fast and smooth as the Twin Disc QuickShift®, yet it provides amazing slow speed control at five knots or less. With its patented, completely internal and integrated clutch actuating system, QuickShift® instantly delivers cushioned torque to the driveline when shifting from neutral to anywhere from full ahead to full reverse. It eliminates driveline shock while optimizing power to the driveshaft. And all this happens literally within milliseconds. So you have a steep but smooth power curve, whether you go full out or just nudge the throttle.



Marine Electronic Propulsion Control Systems

Leading the industry in quality, style and performance, Twin Disc electronic control systems are designed to interface with all popular electronic engines and transmissions. They are versatile, rugged and easy to install. With literally one finger on one lever, the operator can control the boat's speed and direction. Multiple drivetrains and multiple control heads can easily be accommodated. And multiple electronic control stations can be placed around the boat.



EC300DP Power Commander With QuickShift® Marine Transmissions

The proven combination of Twin Disc's EC300DP, a highly efficient interface between the on board dynamic positioning system and all propulsion components, and Twin Disc's patented QuickShift® marine transmissions is superior to anything available on the market today. This Twin Disc package, meeting DP-2 requirements, offers instantaneous shifting without engagement shocks plus precise control of the propeller speed from a few rpms to full speed. These features enable any size vessel to maintain position within a tolerance of one (1) meter or less of its relative position to the oil rig, on the lowest engine speed and power level in the industry. This low engine power requirement during DP operation provides significant fuel savings when compared to conventional DP operation of a vessel.





GO WITH WHO YOU KNOW.

With our vast network of locations around the world, Twin Disc offers you unprecedented sales and service support. We can put engineering and service expertise on location virtually anywhere. We'll work with you on your particular application and product to ensure optimum results. We're more than just a name you know, Twin Disc is a name you can trust.

For more information, visit www.twindisc.com



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