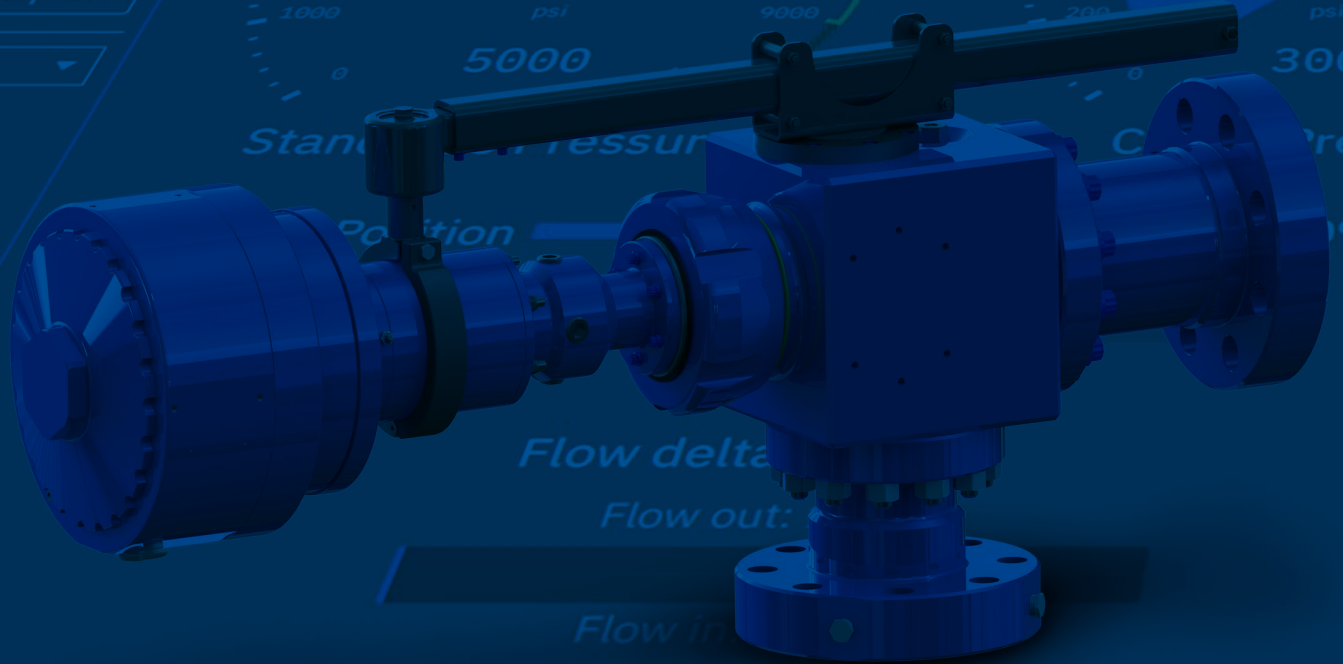


RCD/MPD Solutions



Choke A

Position

Current position

57.0%

<<

<

57

>

>>

Full Close

Full Open

Choke B

Position

0.0%

Standpipe



The Most Economical
and Accurate
Set-Point Pressure
Control for Your Well

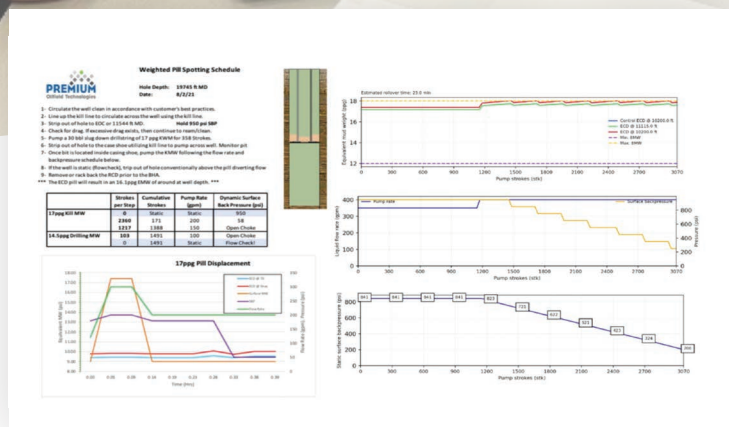
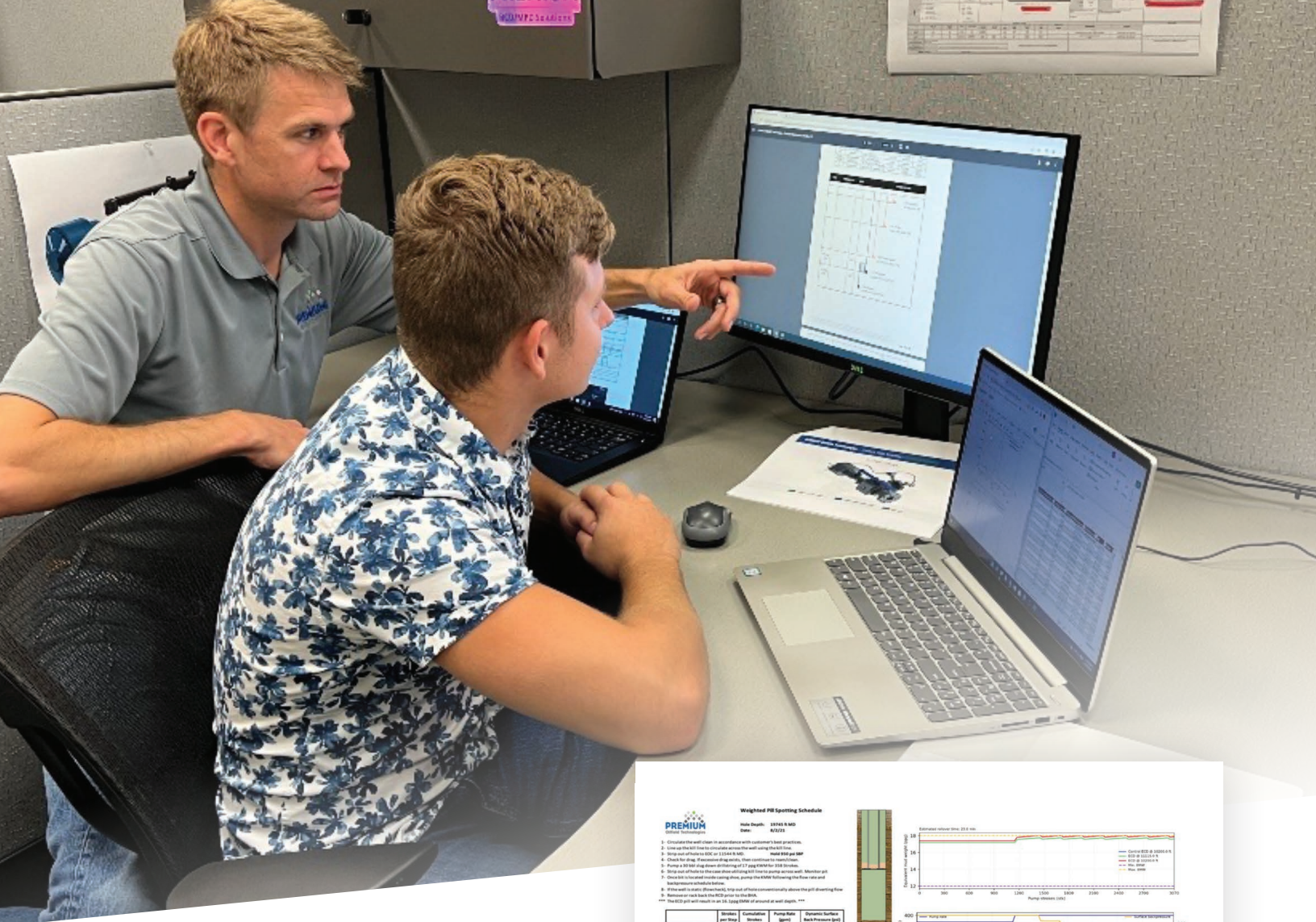
Tru-Flow™ MPD Systems

Set-Point Pressure Control

- Either choke or quarter-turn valve can automatically maintain set-point pressure input by user, thus automatically holding back-pressure
- Easy to operate software, no on-site engineer required
- Create custom ramp schedules to adjust for changing flow rates
- Smaller footprint – requires just choke, HMI, and cables
- Very accurate control of surface back pressure
- Competitive pricing, even compared to non-automated systems

Purpose Built for MPD

- **Cost:** Competitive pricing, designed for drill crew operation, reduced POB, less equipment
- **Safety:** Closed loop system, eliminate ballooning, maintain constant BHP, mitigate and control influxes
- **Efficiency:** Reduced NPT, lighter mud weights, increased ROP, eliminate casing strings
- **Control:** Drill through narrow drilling windows, depleted formations, & HPHT environments, maintain wellbore stability, reduced ECD systems



Tailored Engineered Solutions

Planning

- Premium Oilfield Technologies can provide a tailored engineered solution, utilizing experienced engineering professionals to provide the customer with advice on the successful deployment and utilization of MPD on their well.
- Premium can assist in the selection and provision of a tailored equipment solution as well as advice on the optimal form of MPD designed to meet the customer's specific needs.
- Training is key to the successful implementation of MPD. Premium offers offsite and onsite training to familiarize field and office staff with the equipment, processes and procedures to successfully operate MPD on any well.

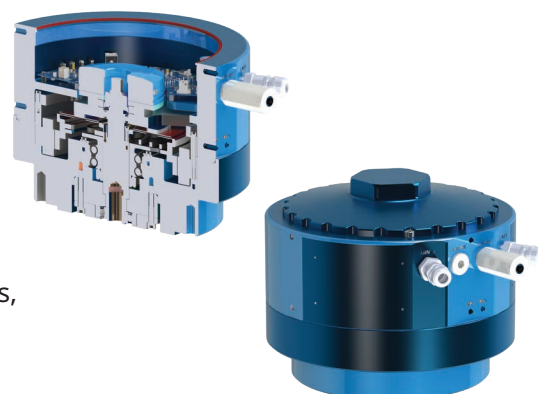
Operational Assistance

- Premium can provide onsite technicians and supervisors to assist with the MPD operation as well as detailed procedures on how to operate the system in a safe and effective manner.
- Premium offers both onsite and offsite engineering assistance with tasks such as drilling, ramp schedules, spotting pills, displacing pills, stripping under pressure and MPD cementing operations.

Sur-Tork EX Actuators

Sur-Tork EX Actuator

- Utilizes a high torque and fully integrated servo drive system to achieve the most precise movement in the industry
- Autonomous internal system provides unmatched resolution and control through its integrated pressure control algorithm that analyzes active torque data
- Acts as a brain for multiple devices and offers optional connections, eliminating the need for additional power, communications and encoders



Power supply	90-240V <10 Amps @ 120V	Angular resolution	10 Arc seconds
EX rating	C-UL: CL,I, DIV 1, GP. C & D, T4 EN/IEC 60079-0: Ex d IIB T4	Temp range	-40 to 150°F
Connection	ISO F25/0.750" coupling	Communication protocols	Ethernet
Torque	20Nm continuous, 60Nm peak	Analog communication	Qty 4: 4-20mA analog loops for local connectivity to transmitters and instruments
Speed	Up to 320 RPM – Continuous Duty Cycle		

Sur-Tork EX Quarter Turn Valve

- World's first and only quarter-turn valve capable of set-point pressure control, with the industry's fastest and most precise control.
- Rugged design and high-torque output ensure continuous duty and provide the user with optional connections, eliminating the need for multiple boxes and devices
- Paired with a quarter turn ball valve, the Sur-Tork EX operator is a simple and elegant solution for maintaining back pressure when connected directly to the RCD outlet



Torque	6000 ft/lbs. peak, 2000 ft/lbs. continuous modulating	Power supply	90-240V <10 amps @ 120V
Backlash	<1 Arc minute	EX rating	C-UL: CL,I, DIV 1, GP. C & D, T4 EN/IEC 60079-0: Ex d IIB T4
Speed	Open-close time = 12 sec. @120V or 6 sec. @ 240V	Temp range	-40 to 150°F
Bolting patterns	ISO 5211 sizes F16 and F25	Communication protocols	Ethernet
Shaft size	Up to 3.75" dia., 4.5" long	Analog communication	Qty 4: 4-20mA analog loops for local connectivity to transmitters and instruments

Tru-Flow™ Products

Tru-Flow™ MPD/RCD Assembly

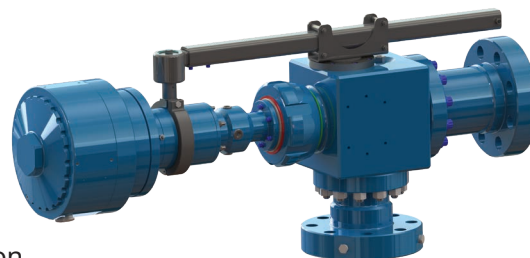
- Purpose built for MPD, allowing for fast and safe installation directly to the rig's BOP stack
- Integrated RCD and MPD system features a single choke leg for simple MPD operation
- Easily add a Sur-Tork Quarter Turn valve for redundancy while eliminating additional ground connections and saving space



RCD assembly	Intermediate pressure RCD with choke and isolation valves installed	Debris passage	1.75" maximum
RCD rating	2000 psi static, 1500 psi dynamic	Temp range	-40 to 150°F
Choke leg	4" 3000 psi rated assembled with electric choke and 2x isolation valves	Actuator	Electric - Class I Div 1 fully integrated Servo Motor, drive, encoder, torque sensor, pressure transmitter, 10 Arc sec resolution, 90-240V AC single phase 10A, ethernet connectivity
Choke trim size	3.00" maximum		
Choke trim travel	3.00" maximum	Actuator speed	Open-close time = 3 sec

Tru-Flow MPD Choke

- Designed specifically for MPD applications offering the finest control in the modern oilfield
- Small footprint design allows for easier handling while the connection options provide maximum flexibility
- Best-in-class trim design ensuring precise control and allowing for the passing of large cuttings while in operation
- Sur-Tork EX precision electric servo actuators come standard on all Tru-Flow chokes, giving the user additional connection options for valves and sensors

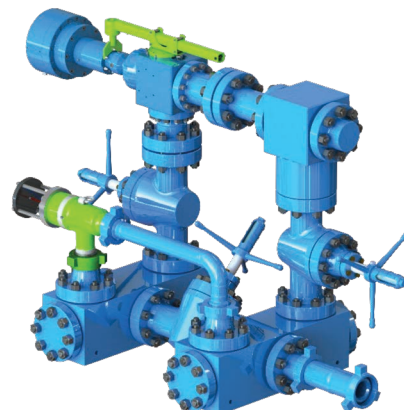


Inlet	4-1/16" 5K	Debris passage	1.75" maximum
Pressure rating	3000 psi	Temp range	-40 to 150°F
Outlet	4-1/16" 5K	Actuator	Electric – Class I Div 1 fully integrated Servo Motor, drive, encoder, torque sensor, pressure transmitter, 10 Arc sec resolution, 90-240V AC single phase 10A, ethernet connectivity
Trim size	3.00" maximum		
Travel	3.00" maximum	Actuator speed	Open-close time = 3 Sec

Tru-Flow™ Products

Tru-Flow™ MPD Single Leg Choke Manifold

- Small footprint manifold designed for simple rig integration
- Single choke leg upgradeable to a second choke and Coriolis meter
- EX Rated – Class I, Div 1, 90-240 VAC low amp power supply
- Functionalities include static position, pressure or ramp schedule mode (automated connection schedule)
- Integrated pop-off for overpressure protection



Skid dimensions	8' long x 4' wide x 6' tall	Debris passage	1.75" maximum
Pressure rating	3000 psi	Temp range	-40 – 150°F
Inlet/outlet Flanges	4" Fig' 602	Actuator	Electric – Class I Div 1 Fully integrated servo motor, drive, encoder, torque sensor, pressure transmitter, 10 Arc sec resolution. 90-240V AC single phase 10A, ethernet connectivity
Choke trim size	3.00" maximum	Actuation speed	Open – close = 3 sec (220V)
Choke Leg	3" 3000 psi MPD chokes with electric actuation	PRV	Integrated pop off valve included for overpressure protection

Tru-Flow MPD Dual Leg MPD Manifold

- Small footprint manifold designed for simple rig integration
- Dual choke leg manifold for redundancy with option for Coriolis meter
- EX Rated – Class I, Div 1, 90-240 VAC low amp power supply
- Functionalities include static position, pressure or ramp schedule mode (automated connection schedule)
- Second choke can be operated as a pressure relief valve for overpressure protection



Skid dimensions	8' long x 4' wide x 6' tall	Debris passage	1.75" maximum
Pressure rating	3000 psi	Temp range	-40 – 150°F
Inlet/outlet flanges	4" Fig' 602	Actuator	Electric – Class I Div 1 fully integrated servo motor, drive, encoder, torque sensor, pressure transmitter, 10 arc sec resolution. 90-240V AC single phase 10A, ethernet connectivity
Choke trim size	3.00" maximum	Actuation speed	Open – Close = 3 Sec (220V)
Choke Leg	3" 3000 psi MPD chokes with electric actuation	PRV	Second choke leg can be configured as a pressure relief choke

RCD Products

RCD Model T-3000

- Low profile RCD measuring 43" tall with bearing assembly installed
- High pressure – 3000 psi static / 1800 psi @ 100 rpm
- Hands-free bearing latch system – no HPU required
- Self-lubricated – sealed bearing assemblies with oil level inspection port
- 9" pass through for up to 6-5/8" drillpipe
- Rated for up to 220 RPM
- Quick change sealing element system



Dimensions	Low profile – 43" OAL with bearing assembly	Latching mechanism	Fail safe closed - hydraulic latch (no HPU required)
Pressure Rating	3000 psi static, 1800 psi dynamic	Bottom flange	13-5/8" 5K or 11" 5K
RPM Rating	220 rpm max	Outlet flanges	(2) 4-1/16" 5K, 7-1/16" 3K, 9" 3K
Bearing Lubrication	Self lubricated bearing – integrated reservoir	Sealing elements	Single or dual elements – nitrile, polyurethane – slip on style

RCD Model T-2000

- Low profile RCD measuring 33.25" tall with bearing assembly installed
- High pressure – 2000 psi static / 1200 psi @ 100 rpm
- Hands-free bearing latch system – no HPU required
- Self-lubricated – sealed-bearing assemblies with oil level inspection port
- 9" pass through for up to 6-5/8" drillpipe
- Rated for up to 220 rpm
- Quick change sealing element system



Dimensions	Lowest profile – 33.25" OAL with bearing assembly	Latching mechanism	Fail safe closed - hydraulic latch (no HPU required)
Pressure rating	2000 psi static, 1200 psi dynamic	Bottom flange	13-5/8" 5K
RPM rating	220 rpm max	Outlet flanges	4-1/16" 5K, 9" 2K
Bearing lubrication	Self lubricated bearing – integrated reservoir	Sealing elements	Single element – nitrile, polyurethane – slip on style

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