

# Product Manual



## Bottleneck Tech

# HELI

R&D and Experimental Services

Precision Core Component

R&D and Manufacturing

Smart Downhole Tools

R&D and Manufacturing

# TECH

Smart Equipment  
R&D and Manufacturing

Geo-Engineering Integrated  
Project Management (IPM)

# HELI TECH ENERGY CO., LTD.

## TECHNOLOGY CHANGES EVERYTHING

Heli Tech Energy Co., Ltd. is a technology enterprise dedicated to resolving clients' pain points. Our business encompasses:

- R&D and Experimental Services
- Precision Core Component R&D and Manufacturing
- Smart Downhole Tools R&D and Manufacturing
- Smart Equipment R&D and Manufacturing
- Geo-Engineering Integrated Project Management (IPM)

### R&D and Experimental Services

- Undertake the R&D Projects
- Undertake Experiments of Smart, Communication, and Mechanical Products

### Precision Core Components R&D and Manufacturing

- Integrated Circuit for Motor Drive
- Sensors for Temperature, Pressure, and Flow Rate
- Precision Relief Valve, Choke Valve, and Magnetic Exchange Valve
- Micro High-pressure Oil Pump
- DC-DC Power Supply
- High-speed Carrier Wave Communication
- Non-contact Communication & Power Supply Module
- Micro-servo Electro-hydraulic Control Module

### Smart Downhole Tools R&D and Manufacturing

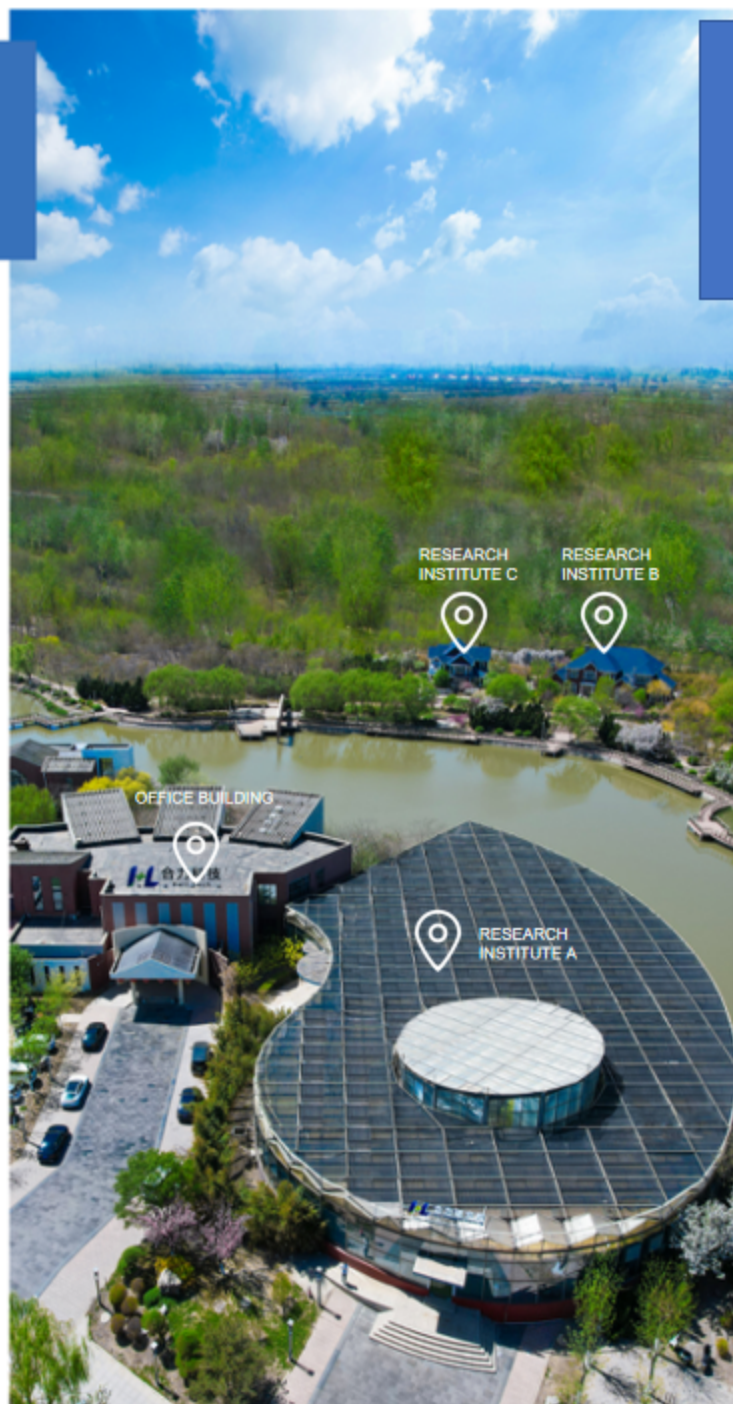
- Smart Drilling Tools
- Smart Completion Tools
- Smart Injection & Production Tools
- Smart Fracturing Tools
- Smart MWD & Steering Tools
- Smart Downhole Monitoring Tools
- Smart Well Intervention Tools
- Ultra Short Radius Residual Potential Tapping
- ROP Enhancement Tools for Drilling & Side-tracking
- Tools for Wellbore Integrity

### Smart Equipment R&D and Manufacturing

- Smart Surface Equipment
- Under-water System

### Geo-Engineering IPM

- Oil & Gas Development IPM
- Wellbore Re-entry & Stimulation IPM
- Geo-thermal Development IPM



# QUALIFICATION



Heli Tech has established a perfect quality management system and obtained a series of qualifications such as American Petroleum Institute Q1, 6A, 16A, 7-1, 5CT, etc. It has become a qualified supplier of CNPC, SINOPEC, CNOOC, ROC Oil, KOC, Schlumberger, Halliburton, Weatherford, Baker Hughes and NOV.



Heli Tech is a scientific and technological oil service enterprise focusing on technology research and development and application in the field of oil and gas development, undertaking national key R&D projects, and is a national "Specialized Precision and Characteristic" Small Giant Enterprise, National Key Small Giant Enterprise, National Science and Technology Enterprise, National Hi-tech Enterprise, and a Leading Enterprise of Strategic Emerging Industries in Tianjin, Tianjin Gazelle Enterprise, Tianjin Specialized and Specialized New Enterprises, Vice Chairman of Tianjin Offshore Industry Union, China Scientist Forum Science and Technology Innovation Demonstration Unit, and National High-end Downhole Tool Technology Center.



## R&D and Experimental Services

Undertake Experiments of  
Smart, Communication, and  
Mechanical Products

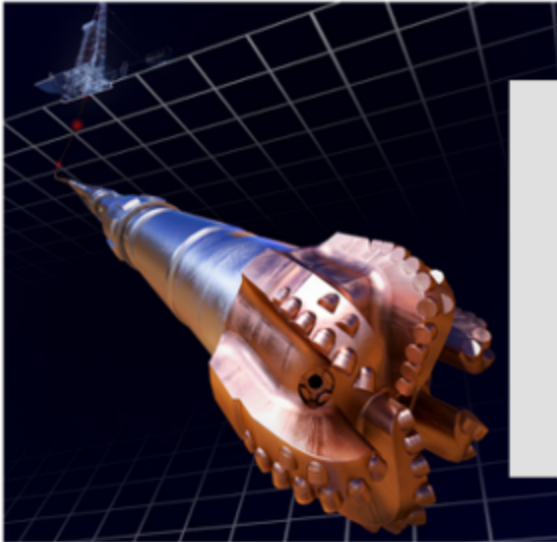
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Undertake  
R&D Projects

Technology Changes Everything

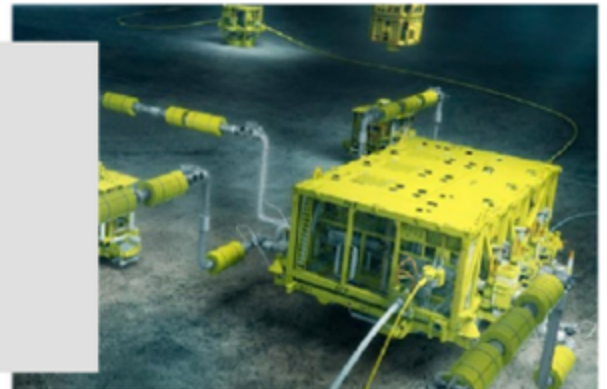


## Deep Earth Area

State Key R&D Program - In-situ Measurement Methods and Instruments for Key Geological Parameters of Reservoirs  
Downhole Smart Fracturing System  
Non-killing Smart Reservoir Isolation Device  
Hi-temp MWD System (215°C)  
Full Bore High-thrust Smart Water Injection  
Sliding Sleeve & Packer for Precision Oil Recovery  
Full Bore Wellhead Robot

## Deep Sea Area

Deep Sea Equipment Control Circuit  
Deep Sea E-hydro Servo System  
Deep Sea Long-Distance Carrier Wave Communication  
Deep Sea DC-DC Controlling Power Supply



## Deep Space Area

Development of Lunar Coring Equipment

# Heli Tech Research Institute



**Heli Tech Research Institute** is a pioneering R&D platform established by HELI TECH ENERGY CO., LTD. in collaboration with leading universities to enhance comprehensive innovation capabilities. The laboratory is equipped with 59 state-of-the-art medium-to-large-scale instruments and equipment valued at nearly 14 million USD.

The R&D team of Heli Energy Research Institute consists of senior experts, technical specialists, and young backbones. Its technical fields cover disciplines such as machinery, Electric engineering, intelligent control, communications, and the Internet of Things. Among the team members, 70% hold a master's degree or above, and 60% have intermediate or senior professional titles.

## Experiments

- ①Material Properties and Dimensional Inspection Tests  
Tensile, compressive, impact, hardness, precision dimensional inspection
- ②Intelligent & Communication Tests  
Motor performance, drive performance, communication controller performance, sensor calibration
- ③Environment Tests  
Vibration, Shock, Response Spectrum, High Temperature Tests, etc.
- ④Downhole Tools Performance Tests  
Tensile & compression, bending and twisting, tool performance, etc.

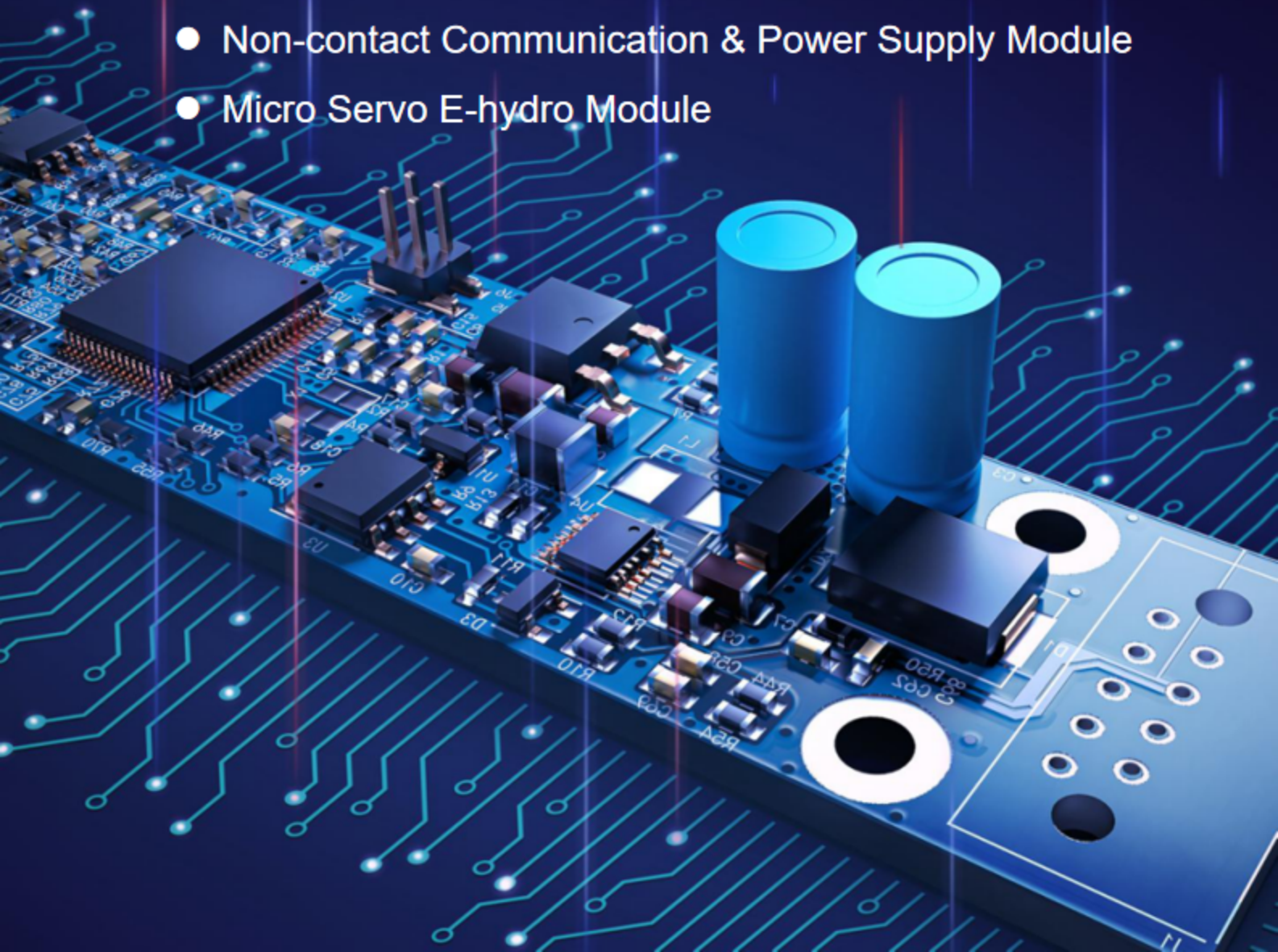
# Heli

## Focus on Key Technology



# Precision Core Components R&D and Manufacturing

- Motor Driver ICs
- Sensors for Temperature, Pressure, and Flow Rate
- Precision Relief Valves, Choke Valves, Solenoid Valve, and Directional Valve
- Micro High-pressure Oil Pump
- DC-DC Power Supply
- High-speed Carrier Wave Communication
- Non-contact Communication & Power Supply Module
- Micro Servo E-hydro Module



Model		CEDM014T150DC12A0			
Temp. (°C)	-40~150	Short Circuit Current (A)	2.0	Modulation	Six-step commutation
Service Hours (Hrs)	1000	PWM Frequency (Hz)	16k	Temp. Detect	NTC
Rated Voltage (VDC)	12(10~16)	Motor Type	DC Brushless	Monitor	Voltage, current, RPM, Temp, etc.
Rated Current (Amp)	1.0	Position Feedback	Hall	Communication Interface	RS485
Max Transient Voltage (V)	20.0	Control Loop	Voltage open/ RPM closed	Host Computer Software	Available

Model		CEDM002T150DC48C0			
Temp. (°C)	-40~150	Short Circuit Current (A)	8.0	Modulation	Six-step commutation /Customized FOC
Service Hours (Hrs)	1000	PWM Frequency (Hz)	16k	Temp. Detect	NTC
Rated Voltage (VDC)	20~48	Motor Type	DC Brushless	Monitor	Voltage, current, RPM, Temp, etc.
Rated Current (Amp)	3.0	Position Feedback	Hall / Counter emf	Communication Interface	RS485 / CAN
Max Transient Voltage (V)	55.0	Control Loop	Voltage open/ RPM closed	Host Computer Software	Available

Model		CEDM015T150DC90A0			
Temp. (°C)	-40~150	Short Circuit Current (A)	5.0	Modulation	Six-step commutation /Customized FOC
Service Hours (Hrs)	1000	PWM Frequency (Hz)	16k	Temp. Detect	NTC
Rated Voltage (VDC)	90(60~120)	Motor Type	DC Brushless	Monitor	Voltage, current, RPM, Temp, etc.
Rated Current (Amp)	3.0	Position Feedback	Hall	Communication Interface	RS485
Max Transient Voltage (V)	140.0	Control Loop	Voltage open/ RPM closed	Host Computer Software	Available

Model		CEDM008T150DC170A0			
Temp. (°C)	-40~150	Short Circuit Current (A)	3.0	Modulation	Six-step commutation
Service Hours (Hrs)	1000	PWM Frequency (Hz)	12k	Temp. Detect	NTC
Rated Voltage (VDC)	170 (110~350)	Motor Type	DC Brushless	Monitor	Voltage, current, RPM, Temp, etc.
Rated Current (Amp)	1.6	Position Feedback	Hall	Communication Interface	RS485
Max Transient Voltage (V)	500	Control Loop	Voltage open/ RPM closed	Host Computer Software	Available



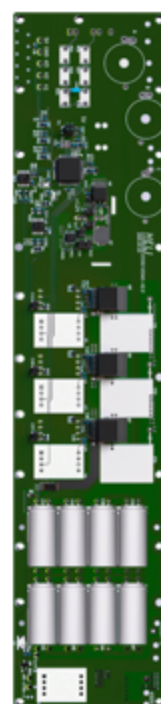


Model		CEDM009T150DC450A0			
Temp. (°C)	-40~150	Short Circuit Current (A)	5.0	Modulation	Six-step commutation
Service Hours (Hrs)	1000	Modulation Frequency (Hz)	14K	Temp. Detect	NTC
Rated Voltage (VDC)	450 (240~550)	Motor Type	DC Brushless	Monitor	Voltage, current, RPM, Temp, etc.
Rated Current (Amp)	3.0	Position Feedback	Hall	Communication Interface	RS485
Max Transient Voltage (V)	650.0	Control Loop	Voltage open/ RPM closed	Host Computer Software	Available

Model		CEDM013T150DC500A0			
Temp. (°C)	-40~150	Short Circuit Current (A)	5.0	Modulation	Six-step commutation
Service Hours (Hrs)	1000	PWM Frequency (Hz)	14k	Temp. Detect	NTC
Rated Voltage (VDC)	450 (240~550)	Motor Type	DC Brushless	Monitor	Voltage, current, RPM, Temp, etc.
Rated Current (Amp)	3.0	Position Feedback	Hall	Communication Interface	RS485
Max Transient Voltage (V)	650	Control Loop	Voltage open/ RPM closed	Host Computer Software	Available

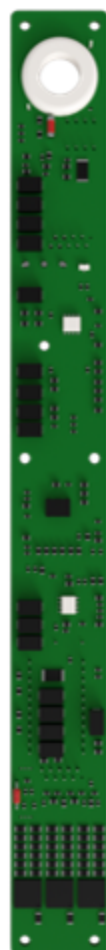
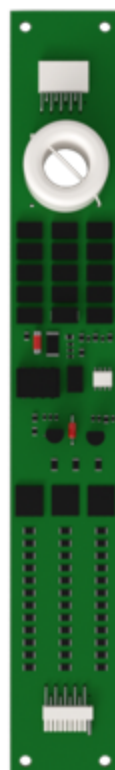
Model		CEDM004T150DC48A0		Extended Function	1000h Logging Storage
Temp. (°C)	-40~150	Short Circuit Current (A)	8.0	Modulation	Six-step commutation
Service Hours (Hrs)	1000	PWM Frequency (Hz)	16k	Temp. Detect	NTC
Rated Voltage (VDC)	28(24~48)	Motor Type	DC Brushless	Monitor	Voltage, current, RPM, Temp, etc.
Rated Current (Amp)	3.0	Position Feedback	Hall	Communication Interface	RS485
Max Transient Voltage (V)	55.0	Control Loop	Position Control	Host Computer Software	Available

Model		CEDM017T150DC28A0		Extended Function	1000h Logging Storage
Temp. (°C)	-40~150	Short Circuit Current (A)	8.0	Modulation	Six-step commutation
Service Hours (Hrs)	1000	PWM Frequency (Hz)	16k	Temp. Detect	NTC
Rated Voltage (VDC)	28(24~48)	Motor Type	DC Brushless	Monitor	Voltage, current, RPM, Temp, etc.
Rated Current (Amp)	3.0	Position Feedback	Hall	Communication Interface	RS485
Max Transient Voltage (V)	55.0	Control Loop	Position Control	Host Computer Software	Available



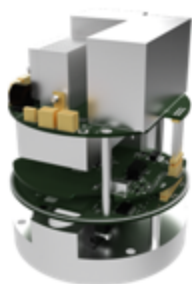
Model		CEDM018T150DC28A0		Extended Function	500-hour log storage
Temp. (°C)	-40~175	Short Circuit Current (A)	8.0	Modulation	Six-step commutation
Service Hours (Hrs)	1000	PWM Frequency (Hz)	16K	Temp. Detect	NTC
Rated Voltage (VDC)	28(24~48)	Motor Type	DC Brushless	Monitor	Voltage, current, RPM, Temp, etc.
Rated Current (Amp)	3.0	Position Feedback	Hall	Communication Interface	RS485
Max Transient Voltage (V)	55.0	Control Loop	Position Control	Host Computer Software	Available

Model		CEDM006T200DC48B0		Extended Function	200-hour log storage
Temp. (°C)	-40~200	Short Circuit Current (A)	8.0	Modulation	Six-step commutation
Service Hours (Hrs)	1000	PWM Frequency (Hz)	16k	Temp. Detect	NTC
Rated Voltage (VDC)	28(24~48)	Motor Type	DC Brushless	Monitor	Voltage, current, RPM, Temp, etc.
Rated Current (Amp)	3.0	Position Feedback	Hall	Communication Interface	RS485
Max Transient Voltage (V)	55.0	Control Loop	Position Control	Host Computer Software	Available





Model		CEDM016T150DC48A0			
Temp. (°C)	-40~85	PWM Frequency (Hz)	12k	Temp. Detect	NTC
Rated Voltage (VDC)	24~48	Motor Type	DC Brushless	Monitor	Voltage, current, RPM, Temp, etc.
Rated Current (Amp)	20.0	Position Feedback	Hall	Communication Interface	RS485/CAN
Max Transient Voltage (V)	60.0	Control Loop	Voltage open/ speed closed	Host Computer Software	Available
Short Circuit Current (A)	30.0	Modulation	6-step reversal		
Model		CEDM010T085DC300A0			
Temp. (°C)	-40~85	PWM Frequency (Hz)	12k	Temp. Detect	NTC
Rated Voltage (VDC)	150~300	Motor Type	DC Brushless	Monitor	Voltage, current, RPM, Temp, etc.
Rated Current (Amp)	10.0	Position Feedback	Hall	Communication Interface	RS485/CAN
Max Transient Voltage (V)	400.0	Control Loop	Voltage open Current close speed closed	Host Computer Software	Available
Short Circuit Current (A)	15.0	Modulation	Six-step commutation /FOC		
Model		CEDM011T085DC350A0			
Temp. (°C)	-40~85	PWM Frequency (Hz)	12k	Temp. Detect	NTC
Rated Voltage (VDC)	350 (200~450)	Motor Type	DC Brushless	Monitor	Voltage, current, RPM, Temp, etc.
Rated Current (Amp)	25.0	Position Feedback	Hall	Communication Interface	CAN
Max Transient Voltage (V)	550.0	Control Loop	Voltage open Current close speed closed	Host Computer Software	Available
Short Circuit Current (A)	35.0	Modulation	Six-step commutation /FOC		
Model		CEDM01T100DC48A0			
Temp. (°C)	-40~85	PWM Frequency (Hz)	12k	Temp. Detect	NTC
Rated Voltage (VDC)	48(24~48)	Motor Type	DC Brushless	Monitor	Voltage, current, RPM, Temp, etc.
Rated Current (Amp)	0.8	Position Feedback	Hall	Communication Interface	EtherCat
Max Transient Voltage (V)	88.0	Control Loop	Voltage open Current close speed closed	Host Computer Software	Available
Short Circuit Current (A)	2.0	Modulation	FOC		



Model	E201240		Temp (°C)	150/175/200	
Rated Voltage (V)	12	Rated RPM	3000	Rated Torque (N·m)	0.012
Rated Current (A)	0.67	No-load RPM	3500	Rated Efficiency (%)	58.3
No-load Current (A)	0.25	Rated Power (W)	3.8	Interphase Resistivity (Ω)	3.142

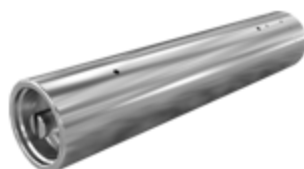
Model	E2248545 Sensorless		Temp (°C)	150/175/200	
Rated Voltage (V)	30	Rated RPM	4100	Rated Torque (N·m)	0.055
Rated Current (A)	1.30	No-load RPM	5600	Rated Efficiency (%)	65.9
No-load Current (A)	0.20	Rated Power (W)	23.6	Interphase Resistivity (Ω)	5.570

Model	E2248545 Sensor-based		Temp (°C)	150/175/200	
Rated Voltage (V)	48	Rated RPM	7500	Rated Torque (N·m)	0.06
Rated Current (A)	1.40	No-load RPM	9500	Rated Efficiency (%)	70.8
No-load Current (A)	0.35	Rated Power (W)	47.1	Interphase Resistivity (Ω)	5.570

Model	E252415		Temp (°C)	150/175/200	
Rated Voltage (V)	24	Rated RPM	5500	Rated Torque (N·m)	0.03
Rated Current (A)	1.20	No-load RPM	7300	Rated Efficiency (%)	61.3
No-load Current (A)	0.40	Rated Power (W)	17.3	Interphase Resistivity (Ω)	4.603

Model	E282848		Temp (°C)	150/175/200	
Rated Voltage (V)	28	Rated RPM	4600	Rated Torque (N·m)	0.07
Rated Current (A)	1.75	No-load RPM	5400	Rated Efficiency (%)	69.3
No-load Current (A)	0.35	Rated Power (W)	33.7	Interphase Resistivity (Ω)	1.887

Model	E3228525		Temp (°C)	150/175/200	
Rated Voltage (V)	28	Rated RPM	3600	Rated Torque (N·m)	0.018
Rated Current (A)	3.30	No-load RPM	4600	Rated Efficiency (%)	75
No-load Current (A)	0.35	Rated Power (W)	67.9	Interphase Resistivity (Ω)	1.208





Model	E3228525 sensorless		Temp(°C)	150/175/200	
Rated Voltage (V)	28	Rated RPM	3600	Rated Torque(N-M)	0.018
Rated Current (A)	3.30	No-load RPM	4600	Rated Efficiency(%)	75
No-load Current (A)	0.35	Rated Power (W)	67.9	Interphase Resistivity(Ω)	1.208

Model	E362830		Temp(°C)	150/175/200	
Rated Voltage (V)	28	Rated RPM	4900	Rated Torque(N-m)	0.07
Rated Current (A)	1.80	No-load RPM	5400	Rated Efficiency(%)	74.0
No-load Current (A)	0.40	Rated Power (W)	35.9	Interphase Resistivity(Ω)	1.113



Model	E362860		Temp(°C)	150/175/200	
Rated Voltage (V)	28	Rated RPM	4200	Rated Torque(N-m)	0.20
Rated Current (A)	4.30	No-load RPM	5500	Rated Efficiency(%)	78.0
No-load Current (A)	0.80	Rated Power (W)	87.9	Interphase Resistivity(Ω)	0.476

Model	E382823		Temp(°C)	150/175/200	
Rated Voltage (V)	28	Rated RPM	2600	Rated Torque(N-m)	0.07
Rated Current (A)	1.10	No-load RPM	3600	Rated Efficiency(%)	78
No-load Current (A)	0.20	Rated Power (W)	19.1	Interphase Resistivity(Ω)	2.505

Model	E382830		Temp(°C)	150/175/200	
Rated Voltage (V)	28	Rated RPM	4200	Rated Torque(N-m)	0.07
Rated Current (A)	1.5	No-load RPM	4700	Rated Efficiency(%)	78
No-load Current (A)	0.4	Rated Power (W)	30.8	Interphase Resistivity(Ω)	1.141



Model	E382860		Temp(°C)	150/175/200	
Rated Voltage (V)	28	Rated RPM	4000	Rated Torque(N-m)	0.20
Rated Current (A)	3.80	No-load RPM	4900	Rated Efficiency(%)	80
No-load Current (A)	0.70	Rated Power (W)	83.8	Interphase Resistivity(Ω)	0.465

Model	E3850080		Temp (°C)	150/175/200	
Rated Voltage(V)	500	Rated RPM	8000	Rated Torque (N-m)	0.5
Rated Current(A)	1.20	No-load RPM	9400	Rated Efficiency (%)	73
No-load Current	0.15	Rated Power(W)	418.8	Interphase Resistivity (Ω)	16.689

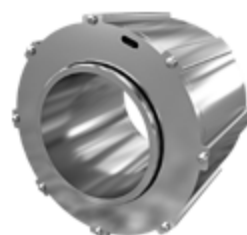
Model	E6024556		Temp (°C)	150/175/200	
Rated Voltage(V)	340	Rated RPM	3600	Rated Torque (N-m)	0.74
Rated Current(A)	1.10	No-load RPM	4100	Rated Efficiency (%)	80
No-load Current	0.20	Rated Power(W)	280	Interphase Resistivity (Ω)	21.046



Model	E60450150		Temp (°C)	150/175/200	
Rated Voltage(V)	450	Rated RPM	4200	Rated Torque (N-m)	2.3
Rated Current(A)	3.00	No-load RPM	5100	Rated Efficiency (%)	75
No-load Current(A)	0.80	Rated Power(W)	1012	Interphase Resistivity (Ω)	8.577

Model	E70450110		Temp (°C)	150/175/200	
Rated Voltage(V)	450	Rated RPM	3000	Rated Torque (N-m)	1.8
Rated Current(A)	1.60	No-load RPM	4800	Rated Efficiency (%)	84
No-load Current(A)	0.40	Rated Power	565W	Interphase Resistivity (Ω)	10.467

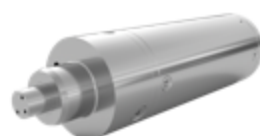
Model	E984815		Temp (°C)	150/175/200	
Rated Voltage(V)	48	Rated RPM	900	Rated Torque (N-m)	0.35
Rated Current(A)	0.90	No-load RPM	1200	Rated Efficiency (%)	75
No-load Current(A)	0.30	Rated Power(W)	33	Interphase Resistivity (Ω)	8.152



Model	E128170100		Temp (°C)	150/175/200	
Rated Voltage(V)	170	Rated RPM	260	Rated Torque (N-m)	3.5
Rated Current(A)	0.90	No-load RPM	230	Rated Efficiency (%)	72
No-load Current(A)	0.15	Rated Power(W)	95.3	Interphase Resistivity (Ω)	17.547

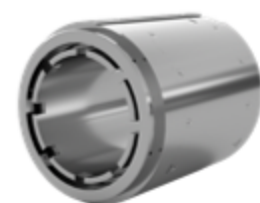
Model	E3850080 sensorless		Temp (°C)	150/175/200	
Rated Voltage(V)	28	Rated RPM	2500	Rated Torque (N·m)	0.16
Rated Current(A)	3.1	No-load RPM	6300	Rated Efficiency (%)	50
No-load Current	0.3	Rated Power(W)	4.8	Interphase Resistivity (Ω)	2.19

Model	E5250065		Temp (°C)	150/175/200	
Rated Voltage(V)	500	Rated RPM	5100	Rated Torque (N·m)	0.8
Rated Current(A)	1.2	No-load RPM	5700	Rated Efficiency (%)	76
No-load Current	0.3	Rated Power(W)	428	Interphase Resistivity (Ω)	15.9



Model	E10311050		Temp (°C)	150/175/200	
Rated Voltage(V)	110	Rated RPM	150	Rated Torque (N·m)	2.5
Rated Current(A)	0.7	No-load RPM	180	Rated Efficiency (%)	62
No-load Current(A)	0.2	Rated Power(W)	39	Interphase Resistivity (Ω)	50

Model	E15117050		Temp (°C)	150/175/200	
Rated Voltage(V)	170	Rated RPM	3000	Rated Torque (N·m)	3.8
Rated Current(A)	1.60	No-load RPM	4800	Rated Efficiency (%)	70
No-load Current(A)	0.40	Rated Power(W)	126	Interphase Resistivity (Ω)	14.7



Model	E83511060		Temp (°C)	150/175/200	
Rated Voltage(V)	110	Rated RPM	150	Rated Torque (N·m)	2
Rated Current(A)	0.58	No-load RPM	290	Rated Efficiency (%)	53
No-load Current(A)	0.11	Rated Power(W)	32	Interphase Resistivity (Ω)	53



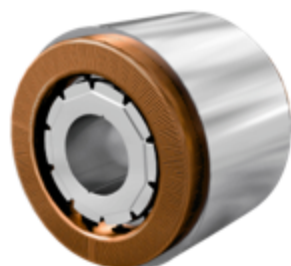
Model			E4530041 / Frameless		
Rated Voltage (V)	300	Rated RPM	14000	Rated Torque (N-m)	0.63
Rated Current (A)	3.40	No-load RPM	17000	Rated Efficiency (%)	75
No-load Current (A)	0.80	Rated Power (W)	923	Interphase Resistivity ( $\Omega$ )	1.577

Model			E6050039 / Frameless		
Rated Voltage (V)	500	Rated RPM	9000	Rated Torque (N-m)	2.60
Rated Current (A)	5.70	No-load RPM	11000	Rated Efficiency (%)	78
No-load Current (A)	1	Rated Power (W)	2450	Interphase Resistivity ( $\Omega$ )	2.643

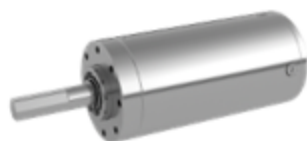
Model			E734822 / Frameless		
Rated Voltage (V)	48	Rated RPM	2300	Rated Torque (N-m)	3.32
Rated Current (A)	21	No-load RPM	3500	Rated Efficiency (%)	72
No-load Current (A)	1.60	Rated Power (W)	800	Interphase Resistivity ( $\Omega$ )	0.164

Model			E834840 / Frameless		
Rated Voltage (V)	48	Rated RPM	2600	Rated Torque (N-m)	5.50
Rated Current (A)	40	No-load RPM	3800	Rated Efficiency (%)	75
No-load Current (A)	2	Rated Power (W)	1500	Interphase Resistivity ( $\Omega$ )	0.051

Model			E130350110 / Frameless		
Rated Voltage (V)	350	Rated RPM	1310	Rated Torque (N-m)	75
Rated Current (A)	39.5	No-load RPM	1800	Rated Efficiency (%)	87.2
No-load Current (A)	0.5	Rated Power (W)	10290	Interphase Resistivity ( $\Omega$ )	0.394



Model		HL28-136	
OD (mm)	28	Efficiency (%)	65-70
Rated Input RPM	4600	Rated Output Torque (N·m)	0.07
Temp. (°C)	≤175	Reduction Ratio	136
Stages	4	Working Environment	Oil



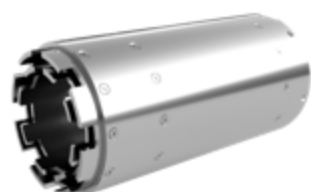
Model		HL38-130	
OD (mm)	38	Efficiency (%)	70-75
Rated Input RPM	2700	Rated Output Torque (N·m)	0.1
Temp. (°C)	≤175	Reduction Ratio	130
Stages	3	Working Environment	Oil

Model		HL32-130	
OD (mm)	32	Efficiency (%)	70-75
Rated Input RPM	2700	Rated Output Torque (N·m)	0.1
Temp. (°C)	≤175	Reduction Ratio	130
Stages	3	Working Environment	Oil



Model		HL38-690	
OD (mm)	38	Efficiency (%)	65-70
Rated Input RPM	3600	Rated Output Torque (N·m)	0.18
Temp. (°C)	≤175	Reduction Ratio	690
Stages	4	Working Environment	Oil

Model		HL83.5-198	
OD (mm)	83.5	Efficiency (%)	65-70
Rated Input RPM	165	Rated Output Torque (N·m)	0.07
Temp. (°C)	≤175	Reduction Ratio	198
Stages	6	Working Environment	Air
Special		Hollow	



Model		HL103-322	
OD (mm)	103	Efficiency (%)	50-60
Rated Input RPM	150	Rated Output Torque (N·m)	1.5
Temp. (°C)	≤175	Reduction Ratio	322
Stages	7	Working Environment	Air
Special structure		Hollow	

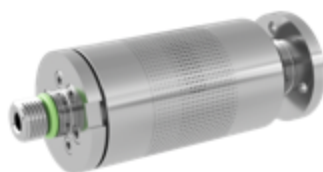
Model		HL151-299	
OD (mm)	151	Efficiency (%)	50-60
Rated Input RPM	327	Rated Output Torque (N·m)	3.8
Temp. (°C)	≤175	Reduction Ratio	299
Stages	7	Working Environment	Air
Special structure		Hollow	



Model		HL90-96	
OD (mm)	90	Efficiency (%)	70-75
Rated Input RPM	4000	Rated Output Torque (N·m)	3.6
Temp. (°C)	≤120	Reduction Ratio	96
Stages	3	Working Environment	Air



Model	HPFO-30-12-300V01		Max Temp.(°C)		150
OD(mm)	30	Continuous Max RPM	5000	Peak Pressure (MPa)	35
Length(mm)	82.5	Max RPM	6000	Weight(g)	312
Displacement (cm³/r)	0.012	Continuous Max Pressure (MPa)		30	



Model	HPFO-20-12-300V01		Max Temp.(°C)		150
OD(mm)	20	Continuous Max RPM	5000	Peak Pressure (MPa)	35
Length(mm)	66	Max RPM	6000	Weight(g)	128
Displacement (cm³/r)	0.012	Continuous Max Pressure (MPa)		30	



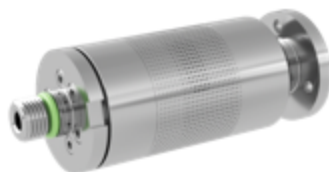
Model	HPFO-16-12-300V01		Max Temp.(°C)		150
OD(mm)	16	Continuous Max RPM	5000	Peak Pressure (MPa)	35
Length(mm)	69	Max RPM	6000	Weight(g)	100
Displacement (cm³/r)	0.012	Continuous Max Pressure (MPa)		30	



Model	HPFO-30-45-300V01		Max Temp.(°C)		150
OD(mm)	30	Continuous Max RPM	5000	Peak Pressure (MPa)	35
Length(mm)	81.9	Max RPM	6000	Weight(g)	500
Displacement (cm³/r)	0.045	Continuous Max Pressure (MPa)		30	



Model	HPFO-30-16-300V01		Max Temp.(°C)		150
OD(mm)	30	Continuous Max RPM	5000	Peak Pressure (MPa)	35
Length(mm)	82.5	Max RPM	6000	Weight(g)	312
Displacement (cm³/r)	0.016	Continuous Max Pressure (MPa)		30	



Model	HPFO-43-500-300V01		Max Temp.(°C)		150
OD(mm)	43	Continuous Max RPM	5000	Peak Pressure (MPa)	35
Length(mm)	72	Max RPM	6000	Weight(g)	128
Displacement (cm³/r)	0.5	Continuous Max Pressure (MPa)		30	



Model	HPFO-50-100-300V01		Max Temp.(°C)		150
OD(mm)	50	Continuous Max RPM	5000	Peak Pressure (MPa)	35
Length(mm)	95	Max RPM	6000	Weight(g)	100
Displacement (cm³/r)	0.012 2	Continuous Max Pressure (MPa)		30	



Model	HPFO-50-300-300V01		Max Temp.(°C)		150
OD(mm)	50	Continuous Max RPM	5000	Peak Pressure (MPa)	35
Length(mm)	95	Max RPM	6000	Weight(g)	100
Displacement (cm³/r)	0.045	Continuous Max Pressure (MPa)		30	

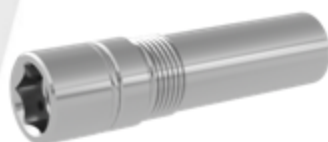


## Micro Overflow Valve: HVRE-7.1-317-01/HVRE-7.8-317-01

Model	HVRE-7.1-317-01	Weight (g)	5
Max Temp. (°C)	150	OD(mm)	7.1
Length (mm)	27	Working Pressure (MPa)	30
Peak Pressure (MPa)	35	Flow Rate (L/min)	1



Model	HVRE-7.8-317-01	Weight (g)	5
Max Temp. (°C)	150	OD(mm)	7.8
Length (mm)	29.2	Working Pressure (MPa)	30
Peak Pressure (MPa)	35	Flow Rate (L/min)	1



## Micro Plug: HVPL-7.1-110-01/HVPL-7-110-01

Model	HVPL-7.1-110-01	HVPL-7-110-01
Max Temp. (°C)	150	150
OD (mm)	7.1	7
Length (mm)	9	11.3
Peak Pressure (MPa)	100	100
Weight (g)	2	2



## Micro 3-position 4-way solenoid directional valves: HVDC-14-300-01

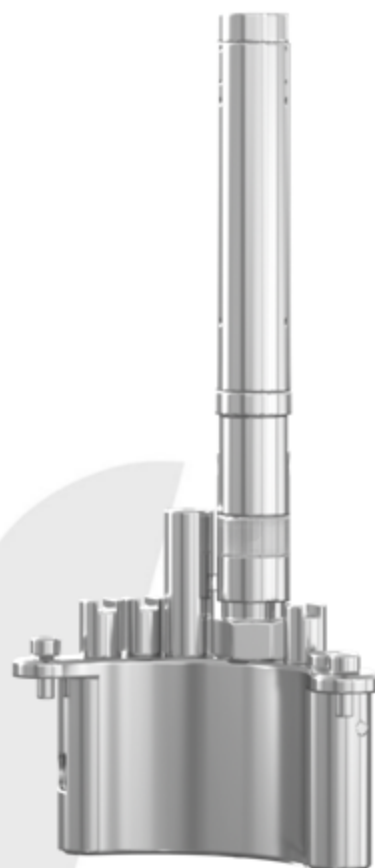
Max Temp. (°C)	150	OD (mm)	14
Length (mm)	83.5	Working Pressure (MPa)	30
Peak Pressure (MPa)	35	Flow Rate (L/min)	1
Weight (g)	63	Working Voltage (V)	24
Median Function	J type, H type	Median Leak @30MPa (mL/min)	2





## Micro HPU-122x90-300V01

Model	HPU-122x90-300V01
Max Working Temp. (°C)	150
Dimension (mm)	R62.5xR44
Length (mm)	238.5
Working Pressure (MPa)	30
Peak Pressure (MPa)	35
Flow Rate(L/min)	0.06
Weight (g)	900



## Micro HPU-55x71-300V01

Model	HPU-32x32-300V01
Max Working Temp. (°C)	150
Dimension (mm)	51x55
Length (mm)	228.5
Working Pressure (MPa)	30
Peak Pressure (MPa)	35
Flow Rate(L/min)	0.06
Weight (g)	900

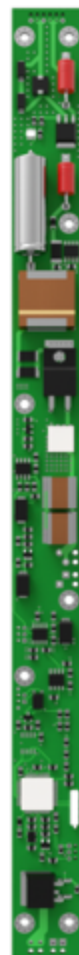


Model		HTPW01T150AD150B0			
Working Temp. (°C)	-40-150	Output Power (W)	160	Sub-circuits	3
Nominal Voltage	AC90-200	Static Power Consumption (W)	—	Efficiency (%)	>85
Output Voltage (V)	32 (Adjustable)	Output Current(A)	5	Ripple Voltage	<200mV
Dimension (mm)	—	Support	Output voltage regulation, over-current protection, over-voltage and under-voltage protection, generator over-speed braking, overheating protection		

Model		HTPW00T200DD048B0			
Working Temp.(°C)	-40-200	Output Power (W)	6.8	Sub circuits	1
Nominal Voltage (V)	DC24-48	Static Power Consumption (W)	—	Efficiency (%)	—
Output Voltage (V)	12	Output Current (A)	0.2	Ripple Voltage (mV)	<100
	-12		0.2		<100
	5		0.2		<100
	-5		0.2		<100
Dimension (mm)	120×30×7	Support	Over current protection		

Model		HTPW02T175DD150A0			
Working Temp.(°C)	40-175	Output Power (W)	18	Sub circuits	1
Nominal Voltage (V)	DC120-160	Static Power Consumption (W)	—	Efficiency (%)	—
Output Voltage (V)	24	Output Current (A)	0.5	Ripple Voltage (mV)	<100
	12		0.3		<100
	-12		0.1		<100
Dimension (mm)	60×28.6×1 1.5	Support	Input under-voltage / over-current / short circuit protection		

Model		HTPW03T175DD150A0			
Working Temp.(℃)	-40-175	Output Power (W)	72	Sub circuits	1
Nominal Voltage (V)	DC120-160	Static Power Consumption (W)	—	Efficiency (%)	—
Output Voltage (V)	48	Output Current (A)	1	Ripple Voltage (mV)	<200
	24		1		<500
Dimension (mm)	120×28×2 0.5	Support	Input under-voltage / over-current / short circuit protection		



Model		HTPW04T150DD150A0			
Working Temp. (°C)	150	Output Power (W)	80	Sub circuits	1
Nominal Voltage (V)	DC90-230	Static Power Consumption (W)	—	Efficiency (%)	—
Output Voltage (V)	48	Output Current (A)	1	Ripple Voltage (V)	<1%
	15		1		<1%
	5		1		<1%
Dimension (mm)	180×40×20	Support	Over-current / short circuit protection		

Model		HTPW05T150DD150A0			
Working Temp. (°C)	150	Output Power (W)	150	Sub circuits	1
Nominal Voltage (V)	DC90-230	Static Power Consumption (W)	—	Efficiency (%)	—
Output Voltage (V)	48	Output Current (A)	3	Ripple Voltage (V)	<1%
Dimension (mm)	180×40×20	Support	Over-current / short circuit protection		

Model		HTPW06T125DD120A0			
Working Temp. (°C)	125	Output Power (W)	78	Sub circuits	1
Nominal Voltage (V)	DC120	Static Power Consumption (W)	<0.5	Efficiency (%)	75~85
Output Voltage (V)	50	Output Current (A)	1	Ripple Voltage (V)	—
	12		1		—
Dimension (mm)	200×22×8	Support	Over-current / short circuit protection		

Model		HTPW07T150DD100A0			
Working Temp. (°C)	-40-150	Output Power (W)	25	Sub circuits	1
Nominal Voltage (V)	DC90-110	Static Power Consumption (W)	<0.5	Efficiency (%)	75~85
Output Voltage (V)	36	Output Current (A)	0.5	Ripple Voltage (V)	<1%
	12		0.2		<1%
Dimension (mm)	200×22×8	Support	Input under-voltage / over-current / short circuit protection		





## Introduction

HL12-170S12-G can work under the shell temperature of  $-40\sim+125^{\circ}\text{C}$ . The special package makes it still work stably in the environment of continuous shock, high temperature and high humidity; thus, it is widely used in the power supply system of downhole tools. Adopting fly-back pulse width modulation principal design, optocoupler isolation, voltage and current double closed-loop control, the product output is stable, with small output temperature drift and fast dynamic response

## Benefits and Features

- Fully isolated between input and output, wide voltage input range, output is single circuit
- Input under-voltage output short circuit and protection

## Specification

Items	Range	Remarks
Temp. ( $^{\circ}\text{C}$ )	$-40 \sim +150$	At full current output
Rated Input Voltage (VDC)	170	Recommend (DC100~DC350V)
Rated Output Voltage (VDC)	12	Single Output, Leaded
Rated Input Current (A)	1	
Rated Output Power (W)	12	Max 18W
Output Ripples (mv)	$<200$	
Conversion Efficiency (%)	$70 \sim 80$	
Working Frequency (KHz)	200	



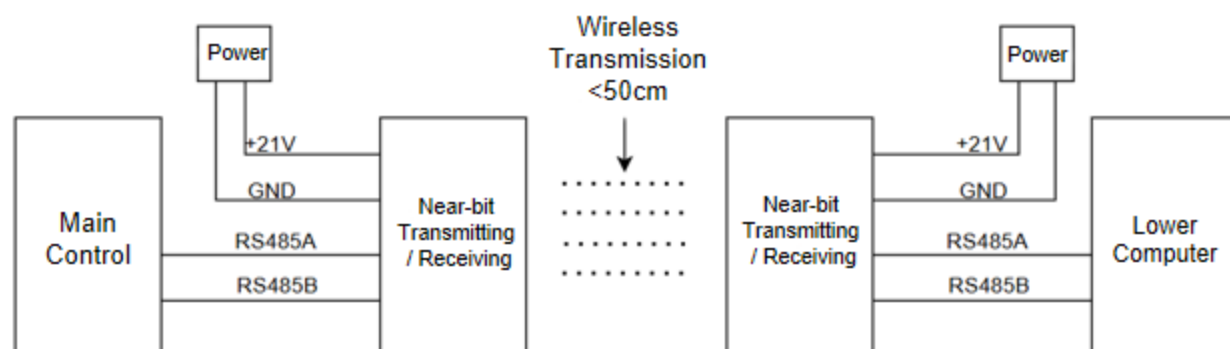
## Introduction

The near bit short transmission module is designed for a temperature of 150°C and realizes a data transmission rate of 40b/s. RS485 communication between the circuit module and the main control is used to realize the communication between the two near drill modules

## Specification

Working Voltage (VDC)	18 ~ 30
Working Temp. (°C)	0~150
Serial Port Communication	RS485,57600,N,8,1
Communication Rate (b/s)	40
Communication Distance	Antennae version 50cm, sub version 9m

Module Interface Definition			
PIN	TYPE	DESCRIPTION	
J3-PIN1	RS485A	RS485A	
J3-PIN2	RS485B	RS485B	
J3-PIN3	GND	Power Ground	
J3-PIN4	POWER	the operating voltage determines the antenna's transmitting power, the higher the voltage, the greater the transmitting power	
J2-PIN1	SEND1	Connect Transmitting Antenna	
J2-PIN2	SEND2	Connect Transmitting Antenna	
J2-PIN3	REC	Connect Receiving Antenna	
J2-PIN4	GND	Connect Receiving Antenna	



## Introduction

LWD is always a combination of several tools, such as natural gamma and resistivity, azimuthal resistivity, sonic, formation pressure tester and several other tools. Currently these tools are connected to the mud pulser through 485, CAN, and other communication methods, with the mud pulser as the master node summarizing the transmission to the surface. Each tool also draws power from the mud pulser separately, and the distance between each tool and the mud pulser varies from tens of meters to more than a hundred meters, so the wiring of these tools would be confusing and wasteful of resources

The power supply and communication solution based on DC carrier technology is designed to solve the problem of power supply and communication of these drilling tools by connecting all the drilling tools through a single core bus, which can be used for both communication and power supply

## Function

This product provides a solution for subsystems (nodes) to share common communications and power supply by connecting all down-hole tools to the bus as modular tools using standard connecting rings to form the system. A single core bus powers and communicates with each node in the system

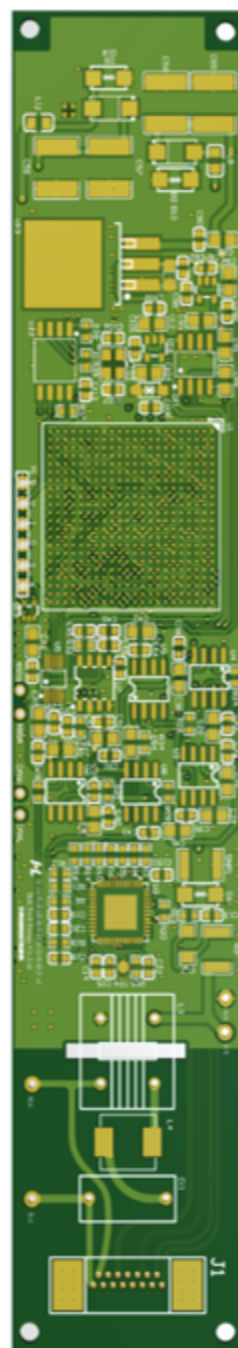
Modular tools feature the ability to add or remove nodes by simply making and breaking connections. Modular tools provide standard mechanical and Electric connections. The signal and power connectors are Electrically isolated contact rings that are mounted in the recesses of the drill collar connections, and the pins and junction boxes of the modular header have identical contact rings. These contact rings have slightly protruding surfaces to ensure reliable contact at the connections

Based on the commonality of the power supply of downhole tools, the product bus voltage is 33 V, which can be varied.

The power supply and communication system based on DC carrier technology can realize a transmission distance of 150m, a transmission speed of 10kbps

## Specification

Serial Port Communication	RS485,38400,N,8,1
Bus Voltage (VDC)	33 (adjustable)
Transmission Distance (m)	150
Bit Rate (kbps)	10
Carrier Frequency (Hz)	60k





## Introduction

Single-core cable high-rate telecommunication system consists of telecommunication system between downhole equipment and surface control center, in which the performance of telecommunication system determines the performance of the whole downhole data transmission system. The function of the telecommunication system is to transmit the downhole data collected by the logging acquisition system to the surface control center through the cable, and at the same time to transmit the commands from the surface control center to the logging acquisition system. The telecommunication system not only solves the problem of data communication, but also transmits power from the surface control center to the well for the use of downhole equipment. It realizes the simultaneous transmission of power and data by single-core cable

## Benefits and Features

- High anti-interference performance, in the case of simultaneous transmission of high voltage and high current, can ensure the reliable transmission of signals
- Transmission rate fully meets the requirement of underground data transmission
- Advanced equalization and pre-emphasis technology compensates for cable attenuation, restores distorted signals and reduces inter-code crosstalk

## Specification

Working Temp. (°C)	-40~80
Short Circuit Current (Arms)	3
Demodulation	FSK
Carrier Wave Frequency (Hz)	60k
Transmission Rate (kbps)	8
Environment Temp. Detection	NTC
Rated Voltage (VDC)	13 (12~15)
Condition Monitor	Temperature
Rated Current (marms)	200
Communication Interface	RS485、CAN
Maximum Transient voltage (VDC)	16
Power Transmission Input Voltage	DC(VDC) 15~800 AC(VAC) 110~1000
Power Transmission input current(Arms)	0~5
Cable Length (km)	0~7
Upper Computer	Compatible with general-purpose serial debugging tools, compatible with general-purpose CAN debugging tools



## Introduction

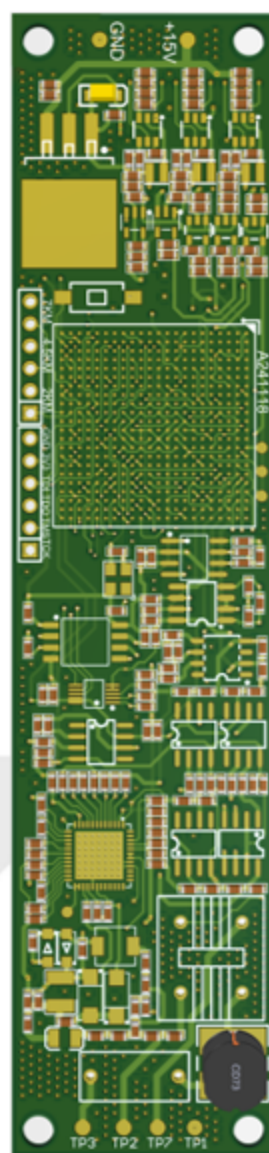
Single-core cable high-rate telecommunication system consists of telecommunication system between downhole equipment and surface control center, in which the performance of telecommunication system determines the performance of the whole downhole data transmission system. The function of the telecommunication system is to transmit the downhole data collected by the data acquisition system to the surface control center through the cable, and at the same time to transmit the commands from the surface control center to the logging acquisition system. The single-core cable high speed telecommunication system not only solves the problem of data communication, but also transmits power from the surface control center to the well for the use of downhole equipment. Simultaneous transmission of power and data by single-core cable is realized

## Benefits and Features

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- Bit rate fully meets the requirement of downhole data transmission
- Advanced equalization and pre-emphasis technology compensates for cable attenuation, restores distorted signals and reduces inter-code crosstalk

## Specification

Dimension (mm)	130x30x12	
Working Temp. (°C)	-40~125	
Short Circuit Current (Arms)	3	
Demodulation	FSK	
Carrier Wave Frequency (Hz)	60k	
Transmission Rate (kbps)	8	
Environment Temperature Detection	NTC	
Rated Voltage (VDC)	13 (12~15)	
Condition Monitor	Temperature	
Rated Current (marms)	200	
Communication Interface	RS485, CAN	
Maximum Transient voltage (VDC)	16	
Power Transmission Input Voltage	DC(VDC) 15~800	AC(VAC) 110~1000
Power Transmission input current(Arms)	0~5	
Cable Length (km)	0~7	
Upper Computer	Compatible with general-purpose serial debugging tools, compatible with general-purpose CAN debugging tools	



## Introduction

Single-core cable high-rate telecommunication system consists of telecommunication system between downhole equipment and surface control center, in which the performance of telecommunication system determines the performance of the whole downhole data transmission system. The function of the telecommunication system is to transmit the downhole data collected by the data acquisition system to the surface control center through the cable, and at the same time to transmit the commands from the surface control center to the logging acquisition system. The single-core cable high speed telecommunication system not only solves the problem of data communication, but also transmits power from the surface control center to the well for the use of downhole equipment. Simultaneous transmission of power and data by single-core cable is realized

## Benefits and Features

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- Bit rate fully meets the requirement of downhole data transmission
- Advanced equalization and pre-emphasis technology compensates for cable attenuation, restores distorted signals and reduces inter-code crosstalk

## Specification

Dimension (mm)	170x18x12	
Working Temp. (°C)	-40~125	
Short Circuit Current (Arms)	3	
Demodulation	FSK	
Carrier Wave Frequency (Hz)	60k	
Transmission Rate (kbps)	6	
Environment Temperature Detection	NTC	
Rated Voltage (VDC)	13 (12~15)	
Condition Monitor	Temperature	
Rated Current (marms)	200	
Communication Interface	RS485, CAN	
Maximum Transient voltage (VDC)	16	
Power Transmission Input Voltage	DC(VDC) 15~800	AC(VAC) 110~1000
Power Transmission input current(Arms)	0~5	
Cable Length (km)	0~7	
Upper Computer	Compatible with general-purpose serial debugging tools, compatible with general-purpose CAN debugging tools	



## Introduction

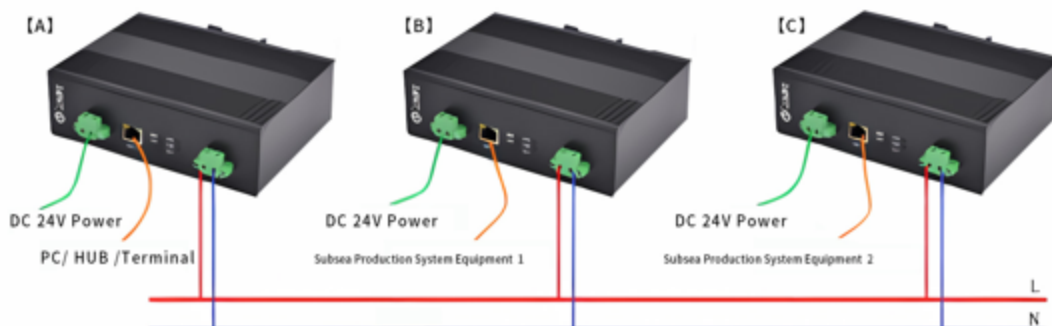
The underwater carrier specially designed for offshore development, with industrial grade design, meets the need of stable and high-performance communication of underwater production system. Through the medium and low voltage distribution line, all the user equipment connected with the underwater carrier can be constructed into a data network, supporting the realization of data transmission and network communication between the control room of the offshore platform and the equipment of the underwater production system, which can be widely used in the automation control of offshore intelligent equipment and the underwater production system

## Benefits and Features

- High transmission rate
- Long transmission distance
- FSK signal transmission system based on all-digital phase-locked loop ensures reliable signal transmission
- Long service life

## Specification

Working Temp. (°C)	-40~85
Short Circuit Current (Arms)	3
Demodulation	FSK, BPSK,QPSK,OFDM
Carrier Wave Frequency (Hz)	60k
Transmission Rate (kbps)	20
Environment Temperature Detection	NTC
Rated Voltage (VDC)	24±4
Condition Monitor	Temperature
Rated Current (marms)	800
Communication Interface	CAN
Maximum Transient voltage (VDC)	30
Power Transmission Input Voltage	AC(VAC) 110~1000
Power Transmission input current(Arms)	0~100
Cable Length (km)	35
Upper Computer	compatible with general-purpose CAN debugging tools





## Introduction

The non-contact power transmission system is used to transmit power and signals between two relatively rotating parts of an downhole tool. The system is based on the principle of electromagnetic induction to realize non-contact power and signal coupling transmission, which can replace the wireline electric connection and slip ring connection in the harsh environment of downhole, providing unparalleled reliability. The system transmits DC power from the primary to the secondary through non-contact electromagnetic coupling to provide power to other equipment connected to the secondary, and at the same time provides half-duplex serial data communication to control equipment connected to both the primary and secondary

## Benefits and Features

- Eliminates safety hazards associated with physical connections
- Utilizes the principle of electromagnetic induction for power transmission
- Fully digital phase-locked loop based FSK signal transmission system ensures reliable signal transmission
- Long product life

## Specification

Working Temp. (°C)	-40~150
Short Circuit Current (Arms)	3
Demodulation	FSK
Carrier Wave Frequency (Hz)	1800K
Transmission Rate (kbps)	10
Environment Temperature Detection	NTC
Rated Voltage (VDC)	33 (31~35)
Condition Monitor	Temperature
Rated Current (marms)	200
Communication Interface	RS485, CAN
Maximum Transient voltage (VDC)	35
Power Transmission Input Voltage	33
Power Transmission input current(Arms)	0~2.5
Cable Length (km)	2
Upper Computer	Compatible with general-purpose serial debugging tools, compatible with general-purpose CAN debugging tools



## Introduction

Ultrasonic flowmeter composed of the transducer, the main control board, the excitation board and the power supply board, is used to measure the liquid flow in the pipeline. Both counter-reflective or V-type reflective installation can be adopted, and the excitation drive voltage can be adjusted. It can be used in the well high temperature and high-pressure environment and other harsh conditions

## Benefits and Features

- Wide voltage input, digital communication compatible with a variety of downhole tools
- Adjustable drive voltage, can adapt to different installation forms of echo amplitude
- Temperature resistance up to 125 degrees Celsius, good stability and adaptability

## Specification

Rated Frequency (Mhz)	1
Max Working Temp. (°C)	125
Pressure Tolerance (MPa)	50
Rated Current (mA)	50
Communication Interface	RS485
Short Circuit Protection	Yes
Over-current Protection	Yes



Ultrasonic  
Transducer



Main Control  
Board



Motivation Board



Power Supply  
Board

## Introduction

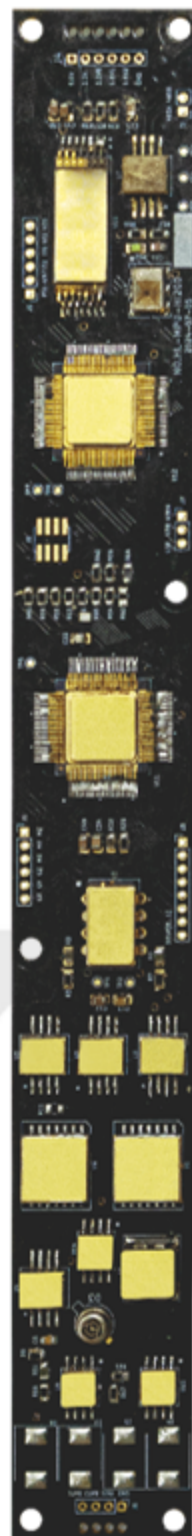
The main control board is to process accelerometer signals, fluxgate signals and digital communication, is to measure the azimuth, tool surface and other important information. The main control board can withstand temperature up to 200 degrees, supporting 6-channels ADC signal acquisition. The main control board is made of high-temperature-resistant material PCB board production, meeting the qualification requirements with hi-temp. load test. It has wide voltage range and can be used in a variety of instruments, with RS485 communication function

## Benefits and Features

- Wide voltage input, digital communication compatible with a variety of downhole tools
- Anti-reverse connection protection, power-down data preservation
- Temperature resistance up to 200 degrees Celsius, applicable to high temperature environment downhole

## Specification

Max Working Temp. (°C)	200
Working Current (A)	0.02~0.30
Communication Interface	RS485
Over-current Protection	Yes
Short Circuit Protection	Yes
Support Signal	RS485, 4 x IO, 6 x ADC input, Onboard Temperature Sensor



Model		YTJXGW.125.B.24.120	
Measure Type	Gauge Pressure	Measuring medium	Gas, fluid
Liquid-accessible materials	17-4PH, 316L	Measuring Scale	20kPa~70MPa
Voltage (V)	5	Output Signal	0.5~4.5V, 4~20mA
Working Temp. (°C)	-40~125	Accuracy	<0.2%/0.5%F·S
Nonlinearity	0.2%F·S	Repeatability	0.05%F·S
Lagging	0.05%F·S	Long-term Stability	≤0.2 %F·S/year
Allowable Overload	Double	Response Time	≤1ms(10%~90%) Typical Value
Electric Interface		Voltage output: 3 lines; current output: 2 lines	



Model		YTJXGW.125.B.18.110	
Measure Type	Gauge Pressure	Measuring medium	Gas, fluid
Liquid-accessible materials	17-4PH, 316L	Measuring Scale	20kPa~70MPa
Voltage (V)	5	Output Signal	0.5~4.5V, 4~20mA
Working Temp. (°C)	-40~125	Accuracy	<0.2%/0.5%F·S
Nonlinearity	0.2%F·S	Repeatability	0.05%F·S
Lagging	0.05%F·S	Long-term Stability	≤0.2 %F·S/year
Allowable Overload	Double	Response Time	≤1ms(10%~90%) Typical Value
Electric Interface		Voltage output: 3 lines; current output: 2 lines	



Model		YTJXGW.150.B.12.21	
Measure Type	Gauge Pressure	Measuring medium	Gas, fluid
Liquid-accessible materials	17-4PH	Measuring Scale	500kPa~160MPa
Voltage (V)	5	Output Signal	0.5~4.5V, 4~20mA
Working Temp. (°C)	-40~150	Accuracy	<0.2%/0.5%F·S
Nonlinearity	0.1%F·S	Repeatability	0.05%F·S
Lagging	0.05%F·S	Long-term Stability	≤0.1 %F·S/year
Allowable Overload	Double	Response Time	≤1ms(10%~90%) Typical Value
Electric Interface		Voltage output: 3 lines; current output: 2 lines	



Model		YTJXGW.150.C.12.67	
Measure Type	Gauge Pressure, Pressure Difference	Measuring medium	Gas, fluid
Liquid-accessible materials	17-4PH, 316L	Measuring Scale	500kPa~160MPa
Voltage (V)	5	Output Signal	0.5~4.5V, 4~20mA
Working Temp. (°C)	-40~150	Accuracy	<0.2%/0.5%F·S
Nonlinearity	0.1%F·S	Repeatability	0.05%F·S
Lagging	0.05%F·S	Long-term Stability	≤0.1 %F·S/year
Allowable Overload	Double	Response Time	≤1ms(10%~90%) Typical Value
Electric Interface		Voltage output: 3 lines; current output: 2 lines	





Model		YTJXGW.125.B.22.87	
Measure Type	Gauge Pressure	Measuring medium	Gas, fluid
Liquid-accessible materials	17-4PH, 316L	Measuring Scale	20kPa~70MPa
Voltage (V)	5	Output Signal	0.5~4.5V, 4~20mA
Working Temp. (°C)	-40~125	Accuracy	<0.2%/0.5%F·S
Nonlinearity	0.1%F·S	Repeatability	0.05%F·S
Lagging	0.05%F·S	Long-term Stability	≤0.2 %F·S/year
Allowable Overload	Double	Response Time	≤1ms(10%~90%) Typical Value
Electric Interface		Voltage output: 3 lines; current output: 2 lines	



Model		YTJXGW.125.B.22.100	
Measure Type	Gauge Pressure	Measuring medium	Gas, fluid
Liquid-accessible materials	17-4PH, 316L	Measuring Scale	20kPa~70MPa
Voltage (V)	5	Output Signal	0.5~4.5V, 4~20mA
Working Temp. (°C)	-40~125	Accuracy	<0.2%/0.5%F·S
Nonlinearity	0.2%F·S	Repeatability	0.05%F·S
Lagging	0.05%F·S	Long-term Stability	≤0.2 %F·S/year
Allowable Overload	Double	Response Time	≤1ms(10%~90%) Typical Value
Electric Interface		Voltage output: 3 lines; current output: 2 lines	



Model		YTJXGW.150.B.14.121	
Measure Type	Gauge Pressure, Pressure Difference	Measuring medium	Gas, fluid
Liquid-accessible materials	17-4PH, 316L	Measuring Scale	500kPa~160MPa
Voltage (V)	5	Output Signal	0.5~4.5V, 4~20mA
Working Temp. (°C)	-40~150	Accuracy	<0.2%/0.5%F·S
Nonlinearity	0.1%F·S	Repeatability	0.05%F·S
Lagging	0.05%F·S	Long-term Stability	≤0.1 %F·S/year
Allowable Overload	Double	Response Time	≤1ms(10%~90%) Typical Value
Electric Interface		Voltage output: 3 lines; current output: 2 lines	



Model		1502. Union	
Measure Type	Gauge Pressure, Pressure Difference	Measuring medium	Gas, fluid
Liquid-accessible materials	Inconel@x-750 Or 316L, 17-4PH	Measuring Scale	500kPa~160MPa
Voltage (V)	10~32	Output Signal	0.5~4.5V, 4~20mA
Working Temp. (°C)	-40~150	Accuracy	<0.2%/0.5%F·S
Nonlinearity	0.1%F·S	Repeatability	0.05%F·S
Lagging	0.05%F·S	Long-term Stability	≤0.1 %F·S/year
Allowable Overload	Double	Response Time	≤1ms(10%~90%) Typical Value
Electric Interface		Voltage output: 3 lines; current output: 2 lines	



## Introduction

It adopts the innovative design concept, through the relay load power inductor simulation and real valve interface dual-mode compatible architecture, the switch between the solenoid valve function of digital simulation and physical application can be realized. Equipped with RS485/RS422/CAN three-mode intelligent communication protocol, it can be seamlessly connected to various industrial control systems. The core configuration of 36-channel high-precision constant current source module supports 4-20mA current signal precision control and dynamic range setting, with each channel realizing milli-amperes precision adjustment and independent on-off control through the host computer software. The specially configured industrial grade cement resistor load network and real valve interface docking station can meet the diversified needs from laboratory simulation test to industrial field application, which is an efficient solution for fluid control system development and equipment commissioning

## Application

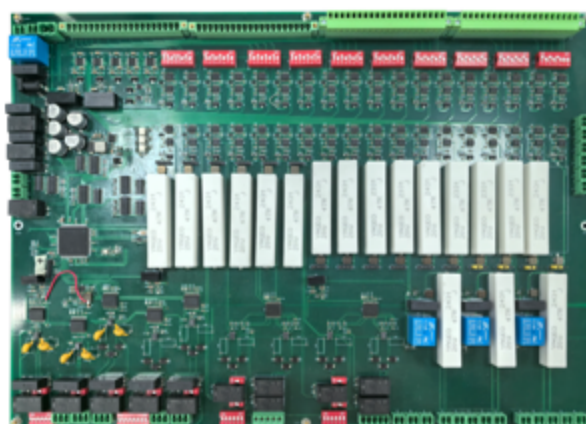
Submersible HIPPS system, submersible production system

## Benefits and Features


- To simulate solenoid valve
- Real solenoid valve interface available
- Support RS485, RS422, CAN communication mode
- Stable output of 36-channel adjustable 4-20MA current

## Function List

Power	Voltage (VDC)	24
	Function	Isolated DC power output; external power solution interface available
Communication	Type	Support RS485, RS422 and CAN
Interface	Analog Output	output 36-channels 4-20mA current; 20-channels 24V12W solenoid valve drive; short-circuit fault indicator on all channels
	Digital	2-channels CAN; 2-channels RS422; 2-channels RS485
Upper Computer	Upper Computer	Configuration of the upper computer
Function	Function	Analog solenoid valve opening and closing function, leaving the real solenoid valve interface; support the output of 36-channel adjustable 4-20MA current, through the host computer can adjust the output of 4-20MA in the fixed value of the current or the range of currents, support the use of the host computer to regulate the opening and closing of the 36-channels







# Smart Downhole Tools R&D and Manufacturing

- Smart Drilling Tools
- Smart Completion Tools
- Smart Injection & Production Tools
- Smart Fracturing Tools
- Smart Steering Tools
- Smart Monitoring Tools
- Smart Well Intervention Tools
- Ultra Short Radius Remaining Oil Potential  
Tapping Tools
- ROP Enhancement for Drilling & Sidetracking
- Wellbore Integrity Tools

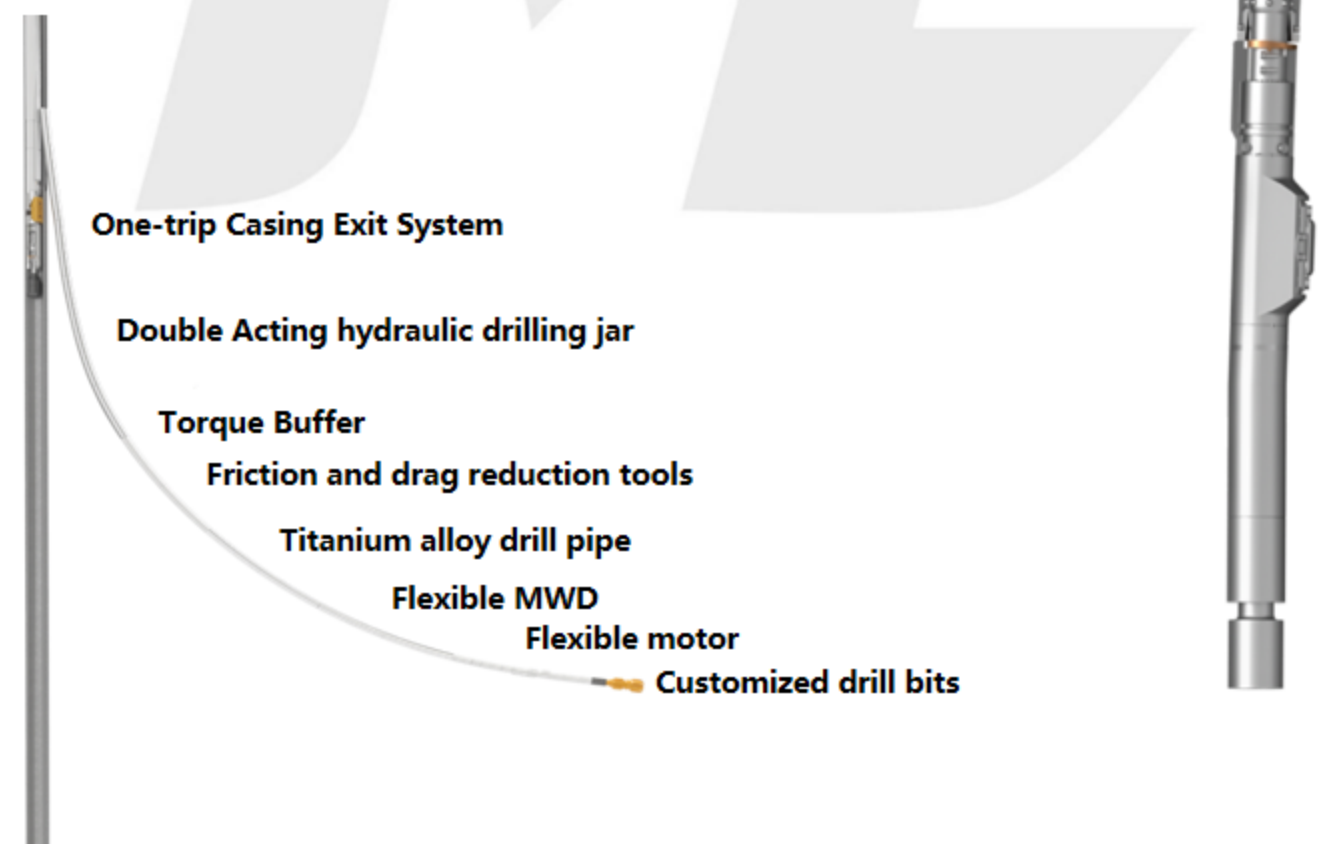
## Introduction

Ultra-short radius drilling technology is one of the main engineering and technical means to tap the potential of remaining oil, especially when the sand body near the fault is poorly utilized and it is difficult to tap the potential of remaining oil by relying on water injection adjustment. It has a series of advantages such as small curvature radius and short target front distance

## Advantages and features

The HELI ultra-short radius drilling system is an integrated integration of a sidetracking system and a series of downhole tools, including customized drill bits, flexible motors, flexible MWD, Torque Buffer, friction and drag reduction tools, titanium alloy drill pipes, double acting hydraulic drilling jars, etc.

- Customized drill bits: The drill bits are specially designed to meet the needs of small wellbore guidance and cutting
- Flexible motors: The multi-angle flexible motors controlled by drilling pressure can meet the curvature radius of 7-15m
- Flexible MWD: It can meet 108°/30m dogleg and azimuth gamma monitoring
- Titanium alloy drill pipe: The weight is half of that of ordinary drill pipe and the strength is twice that of ordinary drill pipe
- Friction and drag reduction tools: Improve drilling pressure transmission
- Torque Buffer: Reduce drilling tool stick-slip





## Introduction

The Heli one-trip casing exit system consists of a high-efficiency milling shoe assembly (window opening shoe, window repair shoe, etc.), connection bolts, whipstock, hydraulic line and anchor. When pump on, the piston is pushed to cut the anchor shear nails under the action of the pump pressure, thereby pushing the slip out and lower the string. Cut off the bolts connecting the mill shoe and the whipstock, and continue to push the string with a certain pressure to make the anchor firm. The whip-stock can be retrieved using specially made hook

## Advantages and features

- Drilling, window opening and window repair are completed in one trip
- Specially designed window opening milling shoes combined with imported carbide can quickly open windows (2~4 hours)
- Anchored anti-rotation slips ensure efficient milling and drilling
- Anchor and whipstock are retrievable
- It can meet the window opening requirements of ultra-short radius drilling

## Specification

Applicable casing	OD (mm)	Length (m)	Bolt shearing Force (T)	Mills OD (mm)	Mills Connection
5-1/2" 14~17#	114	3.2	5.5~6.5	8~10	2-3/8REGxNC31 BOX
5-1/2" 20#	108	2.9	5.5~6.5	8~10	2-7/8REGxNC31 BOX
7" 23~26#	140	4.2	12~14	18~20	3-1/2REGxNC38 BOX
9-5/8" 43.5~47#	203	5.9	18~20	24~26	4-1/2REGxNC50 BOX
13-5/8" ≤72#	292	8.6	20~24	30~32	6-5/8REGx6-5/8REG BOX

Specifications not listed in the table can be customized according to customer needs



## Introduction

The Cutting Bed Cleaner has developed patented hole cleaning technology to maximize hole cleaning efficiencies while drilling, save rig time and reduce drilling costs. The structure of Cutting Bed Cleaner produces a number of hydro-mechanical effects resulting in safer and faster drilling with less time spent on cleanups. The tool is designed in the form of a joint of pipe to drill large and highly deviated holes. It is a new generation drill pipe designed to address ECD and annular pressure issues in horizontal and ERD wells. The tool provides full and immediate degradation of cutting beds while keeping more cuttings moving on the high side of hole where fluid velocities are highest. The hole cleaning functions are achieved through three effects:

Scooping: Cutting deposited on the low side of the hole are mechanically eroded and lifted from the bottom of hole; Recirculation: Once lifted, cuttings are circulated on the high side of the hole, where fluid velocities are the highest; Transportation: Regardless of energy input on the cuttings during the recirculation stage and cuttings will eventually resettle to the low side of the hole due to gravity. The conveyor belt effect is established to continuously transport of cuttings to the surface

## Features & Benefits

- Reduce total circulating time and wiper trips
- Reduce or eliminate reaming and sweeps
- Reduce torque and drag and increase ROP
- Mitigate drilling risks and smooth casing runs
- Extend service life of the drill string

## Specification

OD	Connection	OD (mm)	Joint OD (mm)	ID (mm)	Length (m)	Tensile (KN)	Torsion (KN·m)
3-1/2"	NC38	88.9	121	60	9.65±0.1	2200	45
4"	NC40	101.6	127	65	9.65±0.1	2600	63
5"	NC50	127.0	168.3	76.2	9.65±0.1	4200	100
5-1/2"	DSHT55	139.7	178	76.2	9.65±0.1	3980	124
5-7/8"	DSHT5-7/8	149.2	178	76.2	9.65±0.1	4270	138



## Introduction

The Dual-way Hydraulic Drilling Jars are capable of delivering (an extra heavy) with (the maximum Impact/ Impulse values) when a BHA becomes stuck. The Jars can easily be racked as part of a stand of drill collars because it is similar in length and diameter, and has compatible connections and slip setting areas. In the drilling mode, the jarring mechanism is disengaged and is not affected by normal drilling conditions or torque

## Features & Benefits

- High over-pull capability, long free stroke and high impact capability
- High tensile strength for higher impact service capability
- Straight push and pull operation for easy jar operation
- Large through bore for passage of instruments
- Negligible pressure drop through Jar
- Redundant dynamic packing to prevent washouts and provide long down-hole service.
- Jar can be placed in the BHA per customer request using a Jar placement program

## Specification

OD (in)	ID (in)	Tensile (klbs)	Torsion (kft.lbs)	Up stroke (in)	Down stroke (in)
3-3/8	1-1/2	236	6.8	7	7
4-3/4	2-1/4	492	19	8	7
6-1/2	2-3/4	964	55	8	7
8	3	1621	98	8	7



## Introduction

The Torque Buffer consists of a set of mechanical-hydraulic structure placed in the lower part of the drill string. Under normal, stable conditions, the tool will transfer torque and weight to the bit as a passive part of the Bottom Hole Assembly. However, if the bit becomes unstable, the torque buffer will intervene to regulate the forces and the depth of cut. In practical terms, this means that the momentary response / closed-loop function of the torque buffer prevents the escalation of local instabilities into destructive vibrations. The tool functions continuously, and no reset is required

## Features & Benefits

- Control drilling dynamics by eliminating damaging torsional oscillations generated from the bit and/or an under-reamer
- Improve drilling efficiency, increase ROP and reduce cost per foot. The tool adjusts the depth of cut dynamically to maintain a constant torque on the bit. This permits the use of sharper more aggressive cutting structures to maximize ROP
- Protects BHA components & bits from shock related failures
- To reduce operation risk, particularly in high-cost operations

## Specification

Max OD (in)	4-3/4	6-3/4	8
Min ID (in)	1-1/2	2-7/16	2-7/8
Max WOB (klbs)	33	66	100
Max Torque (kft.lbs)	9	30	35
Max Flow Rate (gpm)	630	800	1270
Max Travel (mm)	295	220	254





## Introduction

The tool is designed for coiled tubing applications in which a high-torque downhole rotation of the lower string is required—e.g., CT drilling, or hook-wall overshoot use for fishing below the tail pipe. The tool is operated by flow activation. By increasing the flow rate, a pressure is achieved at the tool whereupon a piston will stroke downward. This downward movement rotates a drive shoe by means of a helical driveshaft, converting linear motion into torque. The torque is transmitted to lower BHA through a special clutch system. The degree of orientation imparted is dependent on the distance the piston moves. The drive shoe will normally rotate 30° in a single cycle. To repeat the cycle, the flow rate is reduced back to normal circulation, the piston will automatically return to start position so that the tool is reset. The cycle can now be repeated as before.

## Features & Benefits

- Stepless clockwise orientation
- Maximum high-torque capability
- Simple and robust orientation mechanism
- Precise rotational control
- Locking at any new position by reducing fluid volume

## Specification

OD (in)	2-1/4	2-7/8	3-1/8	4
ID (in)	0.40	0.75	1.00	1.26
Connection	1-1/2AMMT	2-3/8 PAC	2-3/8 PAC	N31
Recommended Choking Pressure (psi)	800-1500	800-1500	800-1500	800-1500
Tensile (lbs)	200	350	420	500



## Introduction

Ultrashaker creates axial oscillation using hydraulic energy while drilling to reduce the static friction between wellbore and drill string, thus the ROP can be increased dramatically. Such reduction of static friction produces two direct results: to reduce weight stacking, and to reduce stick-slip. All benefits brought by Ultrashaker are based on these two results: reduction of weight stacking helps to improve WOB delivery, to control tool face, to protect bit, to save runs, to reduce compression of drilling string, and to reduce the risk of getting stuck; reduction of stick-slip helps to protect bit and drill string, to reduce torque fluctuation

## Features & Benefits

- To enhance ROP especially in sliding mode
- To protect motor and drill bit
- To better control tool face
- To reduce the risk of pipe stuck
- No interference to MWD signal
- Optimized piston assembly design to decrease the pressure drop
- Optimized spring configuration to create more stable oscillation

## Specification

OD (in)	8	6-3/4	4-3/4	3-3/4
Flow Rate (gpm)	500~1000	400~600	150~300	80~160
Frequency (Hz)	9-18	13-19	11-20	11-20
Pressure Drop (psi)	400-550	300-550	300-550	300-550
Tensile (klbs)	670	570	260	190
Temp. (°C)	≤180	≤180	≤180	≤180
Circulating Hours	400	400	400	400



## Introduction

Oscillating PDM incorporates high-efficiency PDM and pulse generating sub. The pulse generating sub converts the rotational movement of rotor into mud pulse. The pulse act inside the tool, creating radial and axial high-frequency oscillation, improving ROP and reducing the risk of pipe stuck

## Features & Benefits

- The PDM directly provides power to pulse generating sub. In this way the total length of tool can be shorten, the pressure drop can be reduced, and the maintenance cost can be better controlled
- Multi-dimensional drag reduction
- The near-bit oscillation helps to improve the efficiency of rock breaking
- No impact to MWD signal
- Compatible with both PDC drill bit and tri-cone bit

## Specification

OD (in)	5	6-3/4	9-5/8
Force (lbs)	900-1800	1120-3370	2700-4000
Frequency (Hz)	10-25	10-25	10-25
Temp. (°C)	180	180	180
Bit Size (in)	5-7/8 - 7-7/8	8-3/8 - 9-1/2	12-1/4 - 17
Flow Rate (gpm)	200-400	300-600	570-1200
Max Torque (ft.lbs)	2500	14000	22000
Pressure Drop (psi)	580	700	650

Other specification can be customized



## Introduction

HELI efficient Coiled Tubing PDM has been widely used in a variety of downhole conditions, including milling, sidetracking and cutting. High precision mud lubricated bearings machined from premium tool steel provide uniform and stable load distribution and greater WOB resistance with easy disassembly and lower maintenance costs. Using high-performance rubber for greater power and torque output, the rubber has better elastic-hardness balance, and is more resistant to high temperature and corrosion, resulting in longer service life.

## Specification

OD (in)	1-11/16	2-1/8	2-7/8	2-7/8	3-1/8	3-1/2
Stator/Rotor	5: 6	5: 6	5: 6	5: 6	5: 6	5: 6
Stages	4.0	4.0	3.0	4.0	4.0	4.0
Flow Rate (Rpm/L)	4.0	1.95	1.09	1.09	1.09	0.42
Min Flow Rate (lpm)	57	150	162	162	162	255
Max Flow Rate (lpm)	170	300	578	578	578	766
Max Torque (Nm)	79	130	650	870	1125	1550
Max Pressure Drop (MPa)	4.5	4.5	4.5	8	8	5.6





## Introduction

The Hydraulic Impacting PDM uses a newly designed energy distribution system to increase drilling performance in areas where it is a challenge to maintain ROP. The tool combines the torque and rotational speed from a mud motor power section with a high-frequency axial oscillation directly in the BHA. The Hydraulic Impacting PDM allows for application-specific setups and is compatible with both fixed cutter and roller cone bits. This 100% mechanical system maintains contact with the formation and reduces weight stacking from friction on the BHA, all while amplifying the cutting interaction of the bit, enhancing its rock-failing properties

## Features & Benefits

- Increases ROP - Combines axial movement with rotational torque and speed to improve bit efficiency
- Reduces friction - High-frequency axial motion configured specifically for specific application
- Improves weight transfer - Oscillates the BHA up to 12 times/s
- Prevents bit damage - Activated with weight on bit, and disengages when off bottom
- Innovative engineering - Oil-seal allows for 100% flow to bit
- Compatible with most common power section configurations

## Specification

OD (in)	5	6-3/4	8	9-5/8
Max WOB (lbs)	30000	4400	55000	80000
Weight (lbs)	1350	2400	3900	6900
Borehole size(in)	6~6-7/8	7-7/8~9-1/2	9-1/2~12-1/4	12-1/4~16



## Introduction

Shock Tools are typically placed in close proximity to the drill bit. This will extend the functional life of the bit by reducing bit bounce and minimizing the dynamic impact loads on the bearings and/or cutters, in turn increasing the rate of penetration (ROP)

Shock Tools can also be placed directly below the LWD and MWD directional drilling tools to prevent the severe cyclic loads from damaging the equipment. Including a Shock Tool in the BHA will reduce the stresses created in drilling and dramatically improve overall operational success

## Features & Benefits

- Absorbs and reduces vibration induced drill string failures
- Disk springs greatly minimize impact on drill bit and increase ROP
- Pressure compensated to effectively decrease excessive pump open effect

## Specification

OD (in)	12	9-1/2	8	6-3/4
ID (in)	2-13/15	2-13/15	2-3/4	2-1/4
Tensile (kN)	5950	5370	3870	2640
Torsion (kN-m)	330	148	100	73
Axial load @ Max Compress (kN)	445	445	445	445
Up Travel (mm)	64	84	44	44
Down Travel (mm)	178	102	102	102
Length (m)	3.4	4.1	4.1	3.2
Weight (kg)	1600	1000	730	490



## Introduction

Multi-activation Bypass Tool is a drilling tool for pumping LCM material and hole cleaning. Multiple times of activation and de-activation can be realized by dropping multiple groups of balls

## Features & Benefits

- To enable the aggressive pumping of different types of LCM material
- Multiple times of activation and de-activation
- length of ball catcher can be adjusted for more times of mode switch



OD (in)	4-3/4	6-1/2/6-3/4	8
ID (mm)	40	50	60
Temp. (°C)	200	200	200
OD of Circ. Hole (mm)	23	28	38
Qty. of Circ. Hole	2	2	2
OD of Act. Ball (mm)	40	57	70
OD of Closed Ball (mm)	30	35	45
Shear Pressure of Act. Ball (MPa)	5-7	7-10	9-12
Switching Times	≥6	≥6	≥6
Connection	NC38	NC50	6-5/8REG



## Introduction

The Hydraulic Drilling Reamer is widely used in different types of drilling condition. Reliable hydraulic actuation is provided by the Z-Drive reamer cutter block deployment system. When activated from an activation ball dropped at surface, the Z-Drive system pushes the cutter blocks upward and radially outward to the fully open position, facilitating rapid cutout and ensuring a full-gauge, concentric borehole. When pumping stops, the cutter blocks retract. Dependable retraction of the cutter blocks helps avoid stuck BHAs. Integrated jet nozzles and flow paths improve evacuation of cuttings while drilling. The reamer enables full flow through the BHA in both open and closed positions

## Features & Benefits

- Improve drilling performance
- Provides on-demand wellbore enlargement
- Ensures full-gauge concentric wellbores
- Unlimited activations regardless of wellbore inclination
- Full-flow capability in reaming and non-reaming modes
- Effective cleaning of borehole with integrated jet nozzle & flow paths

## Specification

OD (in)	Enlarge Size (in)	Min Lead Hole Size (in)	Max Flow Rate (gpm)
5 5/8	6.5~7	5 7/8	350
6 1/8	7~7.5	6 3/8	350
8	9~10.25	8 1/4	750
9 1/4	10.25~11.75	9 1/2	750
10	11~12.25	10 1/2	1200
11 5/8	13~15	12 1/8	1700
14 1/4	15.5~18.25	13 1/2	1700
16	17.5~20	16 1/2	1700





## Introduction

The Infinite Acting Drilling Reamer, hydraulic actuated on demand, enables fast activation and effective hole enlargement, delivering improved casing running and cement clearance. A track-type flow activation system, combining two series of tracks, is utilized to switch between two operation modes on demand by changing flow rate on surface. The reamer is effective in a variety of formations where simultaneous drilling and hole-enlargement reliability are required. The reamer's one-piece & balanced design increases the load and torque carrying capability while reducing drilling-generated vibration

## Features & Benefits

- Unlimited activation regardless of wellbore inclination
- Full flow capacity in reaming and non-reaming modes
- Deployment and retraction of PDC block in minutes
- Effective cleaning of borehole with optimized flow paths
- Ensure full-gauge concentric wellbore

## Specification

OD (in)	8	9-1/4
ID (in)	2	2
Enlargement Size (in)	9 ~ 10-1/4	10-1/4 ~ 11-3/4
Min Lead Hole Size (in)	8-1/4	9-1/2
Max Flow Rate (gpm)	750	750



## Introduction

The software-calculation guarantee the compatibility of milling tools and the target to be milled, including the best hydraulic to balance cuttings carrying & cooling and to balance the efficiency & duration. The dynamic balance simulation is also performed to avoid the whirling motion caused by interference of rotation & revolution, reducing the possibility of downhole risk. The 4-axis CNC is utilized for machining mill body to guarantee the strength and hydraulic performance of the mill. The advanced temp.-controlled welding technology is utilized to melt inserts & body, minimizing the possibility of over-heat & under-heat. The high power ultrasonic is utilized to eliminate residual stress, further improving the integrity of mills

### **P-Type Mill**

Eccentric & Deep-V Design



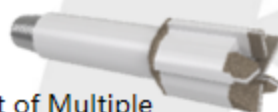
### **Concave Bladed Mill**

For Efficient Junk Removal



### **Bladed Mill**

Inclined Layout of Multiple Layers of Inserts



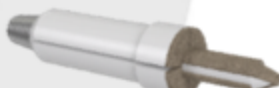
### **Flat Bladed Mill**

A Variety of Inserts Available with Optimized Hydraulics



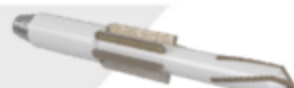
### **A Pilot Mill**

For Centralized Durable Milling



### **B Pilot Mill**

For Centralized Fast Milling



### **Taper Mill**

For Repairing Casing



### **Watermelon Mill**

For Reaming & Back Reaming



### **Guide Mill**

For Special Junk Catching



### **Wash-over Shoes**

Whole Series of Wash-over Shoes



## Introduction

The hydraulic pipe cutter reliably serves single or multiple strings of casing for fishing operation and well abandonment. Three heavy-duty cutter arms, dressed with crushed carbide, are capable of completing an interval cutout in a variety of pipe weights and grades. The hydraulic pipe cutter is available in a range of sizes that cut 2-3/8 to 60-in diameter pipe and is not dependent on pipe conditions including concentric, eccentric, cemented and non-cemented

## Features & Benefits

- Normal circulation is allowed before dropping a ball
- A ball seat and probe gives a positive pressure indication of maximum knife swing during operations
- When pressure is removed, the knives retract automatically
- The knives are designed to produce a near radial cut, taking full advantage of the available tool pressure and removing the minimum amount of steel to sever the pipe
- The knives and inserts are customized to fit different types of pipes and be manufactured with imported material

## Specification

OD (in)	Cutting Size (in)	Connection	Max Open (in)
1-11/16	2-3/8	1 AMMT	3-5/8
2-1/8	3-1/2 ~ 5-1/2	1-1/2 AMMT	6
3-1/8	5~7	2-3/8 PAC	8
4-3/8	5-1/2 ~ 9-5/8	2-7/8 REG	8-12
5-3/4	7 ~16	3-1/2REG	8-12
8-1/4	9-5/8~ 36	6-5/8REG	12-58
11-3/4	13-3/8~ 60	6-5/8REG	19-69



## Introduction

A venturi tool is used to clean up junks or debris at bottom of hole with venturi negative pressure principle. The high-velocity flow produced by nozzles create vacuum effect inside the tool, and thereby the junks at bottom of hole are sucked into the tool

## Features & Benefits

- Low pressure and low risk of lost circulation to protect reservoir
- Apply for high lost circulation well without return. The tool works once the fluid level in the wellbore higher than the depth of nozzles
- Larger negative pressure sucking force
- More sand can be caught within one trip
- Milling tools can be connected at bottom to break bonding

## Specification

OD (in)	2-3/8	2-7/8	3-1/8	4	5
Tubing / Casing Size (in)	3-1/2~4	4~4-1/2	4-1/2~5-1/2	5-1/2~6-5/8	6-5/8~7-5/8
Hole Size (in)	/	/	3-3/4~4-3/4	4-3/4~5-7/8	5-7/8~7





## Introduction

The Rotating Casing Scraper is designed for the removal of mud, cement, bullets, rust, scale, paraffin, perforation burrs and other obstructions from the inside walls of casing, helping to run different types of string smoothly and safely, e.g. packer running and sitting. The Rotating Casing Scraper is short and compact, utilizing a simple one-piece mandrel design constructed to be rugged, yet simple to operate and maintain. The scraper conditions more surface area than other tools on the market, which can be rotated and allows normal flow rate to pass through. The Blades are precision cast from high-quality wear-resistant tool steel with special heat treatment

## Features & Benefits

- The relative rotation happened between knives assembly and body, meanwhile the knives assembly is relative still to casing when rotating the drill pipes
- disc spring is utilized to provide larger elastic force with wider expansion range
- Specially designed knives scrape cleaner and smoother with the capability of self-cleaning

## Specification

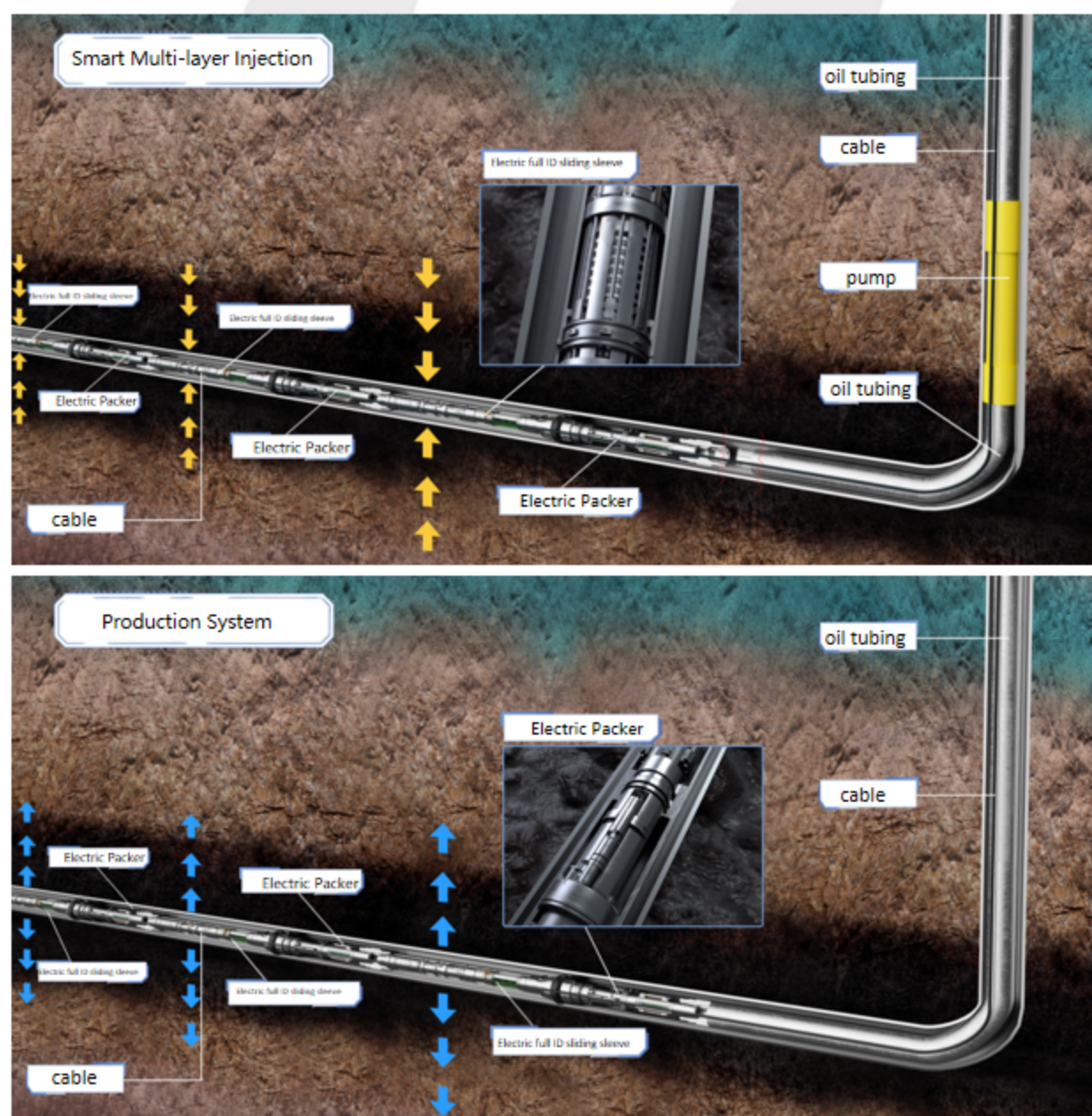
Casing Size (in)	Scraping Range (mm)	Connection
5-1/2	118~127	NC31
7	155~162	NC38
9-5/8	217~224	NC50

Other Specification can be Customized



## Introduction

Smart injection & production system includes multi-layered oil recovery and water injection sub-system, deploying downhole tools such as electric packer and electric full-pass slide sleeve in oil and gas production wells or injection wells. The electric downhole tools adopt high-temperature micro-servo-electro-hydraulic control system to solve the problem of difficulty to start the motor and reducer system, which is also easy to be stuck in downhole scenario. The tools contain monitoring sensors (e.g., temperature, pressure, flow rate, etc.), which can dynamically collect all kinds of real-time data of the downhole production system. The central control system on the surface screens, analyzes and summarizes the collected data to determine the various conditions of downhole production, and through data simulation and reservoir simulation, the best extraction or injection plan is derived, and the flow control device installed downhole is further driven from surface facility to realize the dynamic and real-time management of downhole production or injection, and to improve the water/gas injection efficiency of non-homogeneous reservoirs or multi-layer reservoirs



## Benefits and Features

- High pushing force and sand prevention design decrease the failures rate caused by downhole scale
- Large ID without eccentricity, can realize wellbore re-entry and large displacement injection
- The stepless action can continuously adjust the crossing area
- The flow meter adopts non-contact installation, which is not sensitive to the liquid inside the pipeline
- Uniform arrangement of holes around the valve nozzle circumference ensures that the valve nozzle can still work normally when there is sediment in part of it

## Specification

Electric Sliding Sleeve		
Weight (kg)	150	100
Length (mm)	3000	2685
OD (mm)	114	95
ID (mm)	55	36
Max Pushing (t)	7	5
Pressure (MPa)	60	60
Temperature (°C)	125	125





## Introduction

Cable-controlled water distributor is an intelligent downhole tool transmitted by 6.35mm or 3.2mm stainless steel single-core cable, which is suitable for a variety of well types, realizing fine water injection between different oil formations. The cable-controlled water distributor is equipped with flow test module, temperature and pressure test module and control circuit, motor and regulation module, controlling the action of the regulation module of the downhole cable-controlled water distributor from the ground through cable telecommunication technology, realizing remote real-time monitoring of the pressure and flow of each layer, as well as controlling the amount of water injected into each layer. It can also realize the pressure test of the packer, and realize the wire-free cable operation

## Benefits and Features

- The structure of water distributor adopts secondary sealing design to ensure no leakage during long-term use
- The cable adopts three-level sealing, the first level sealing is designed as double ferrule fittings, and the second and third level seals are combined seals, realizing durable sealing under hi-temp. & pressure environments
- Zirconia ceramics are used for the water nozzle, with excellent erosion resistance
- Flow test module adopts ultrasonic flowmeter for single-layer measurement with high accuracy; the flow of each layer is obtained directly, and the absolute error is not superimposed. Ultrasonic flowmeter has good stability, low start-up displacement, high accuracy, and low power consumption
- The flow test channel and water nozzle adjustment channel have been optimized by CFD simulation and verified by real test, and the maximum flow rate, differential throttle pressure, fluid characteristics of the test channel and other indexes are better than the traditional water distributor
- The structure of cable-controlled water distributor adopts modular design, and each organization is independently tested and assembled, which has high efficiency and stability

## Specification

Max OD (mm)	φ114	φ95
Min ID (mm)	φ46	φ34
Length (mm)	1450	1590
Pressure (MPa)	60	60
Temperature (°C)	125	125
Flow Test Range (m3/d)	8-800	5-500
Flow Test Accuracy (FS)	±2%	±2%
Pressure Test Range (MPa)	0-60	0-60
Pressure Test Range (FS)	±0.2%	±0.2%
Flow Rate Range (m3/d)	0-800	0-500
Choking Pressure Difference (MPa)	≤1	≤1





## Introduction

It realizes the cable-free control of water distributor, charging the battery pack through turbo generator, and the battery provides power to the Electric components, which makes the cost of the water distributor greatly reduced, and the operation more efficient. The risk of leakage of the equipment is also further reduced. The downhole tool and the surface control system adopt pressure wave as communication method. The surface system sends the pressure pulse signals to downhole tool, and the pressure sensor receives the change of the pressure pulse signals. The tool can identify, process, analyze the pressure signal and give control instructions to drive the power actuator through the embedded software and hardware systems and specific algorithms, to achieve the precise injection of water into the oil reservoir. The remote unlimited activation and shutdown can be realized

## Benefits and Features

- The cable-free control greatly reduce the cost and difficulty of operation
- The connection point between the equipment and outside is reduced, thus the risk of leakage of the equipment is decreased
- The power supply can be recharged more than 1500 times, and the charging and water filling channels are designed separately, so that the service life of the equipment is greatly extended
- The ultrasonic flow meter has high accuracy and stability
- The single-layer water injection of 10-600 m<sup>3</sup>/day can be realized with precise control
- The use of non-contact magnetic transmission for torque deliver, converting the dynamic seal to static seal, greatly improves the stability
- Pressure is up to 60MPa and temperature is up to 125°C
- Operation with pressure can be realized

## Specification

Max OD (mm)	φ116
Min ID (mm)	φ46
Length (mm)	2600
Pressure (MPa)	60
Max Temp. (°C)	125
Flow Rate Range (m <sup>3</sup> /d)	10-600
Pressure Test Range (MPa)	0-60
Pressure Test Range (FS)	±0.2%
Flow Rate Range (m <sup>3</sup> /d)	0-600



## Introduction

The electronic isolation valve is an upgraded version of the traditional isolation valve, applicable to all scenarios of the traditional isolation valve, with the advantage that it does not need to be operated by a separate running tool, which reduces operating costs and risks. The opening (closing) mode of the electronic isolation valve can be achieved by sending a specific low pressure wave code from the ground, the pressure sensor converts the pressure signal into an Electric signal, which is then converted into an opening (closing) command through the main control board, thus controlling the actuating unit, i.e. the motor + oil pump, to turn on (off). The Electric isolation valve can be switched on and off several times, and the actual state of the electric isolation valve can be judged by the feedback information and the actual fluid condition

## Features and Benefits

- The main parts are made of 4330V steel, with strong internal and external pressure-bearing capacity and good stability
- The surface of the tool parts are treated with phosphating or QPQ, which greatly improves the abrasion and erosion resistance performance
- The circuit boards and have relatively independent compartments, which ensures the safety of the circuits
- All parts in the hydraulic section have been cleaned through a special cleaning process to ensure clean and pollution-free

## Specification

	8 "	8 "	8 "	5.67 "
Maximum outer diameter (mm)	203.2	203.2	203.2	144
Minimum inner diameter (mm)	114.3	114.3	101.6	71.45
Length (mm)	6968.5	3455.5	4851	4459
Rated temperature (°C)	120/150	120/150	120/150	120/150
Differential pressure (MPa)	70	70	70	70
Rated displacement of oil pump (ml/r)	0.012	0.012	0.012	0.012
Rated speed of motor (r/min)	3000	3000	3000	3000
Power supply	battery	Cable transmission	battery	battery
Activation mode	Pressure pulse inside the pipe	Cable control	Pressure pulse in the pipe / annulus space	Annulus pressure pulse
Ball valve closing time (min)	15-20	15-20	15-20	15-20
Ball valve opening time (min)	15-20	15-20	15-20	15-20



## Introduction

The Electric Toe Sliding Sleeve is designed to provide circulation path for smart cementing and fracturing system. The pressure sensor of sliding sleeve converts pressure signal received from surface to electric signal. The execution unit (motor + oil pump) is controlled by the opening instruction of the mainboard. The condition of Electric sliding sleeve can be determined by the feedback information and actual fluid condition. Electric sliding sleeve system can also be used for other non-cable completion operation to establish circulation path for downhole string.

## Features and Benefits

- High compatibility with large ID
- Controlled by typical pressure wave code to prevent false start
- Execution unit consists of small-volume and large force motor-pump assembly
- Large battery capacity to support long-term stand-by
- Large ID to ensure smooth circulation after fracturing operation
- Equipped with mechanical rupture disk to provide another method of opening
- Key components of smart cementing and completion

## Specification

OD (mm)	146~212
Length (mm)	3964
ID (mm)	114.3
Temp. (°C)	120/150
Pressure (MPa)	140
Cross sectional area of piston chamber (mm <sup>2</sup> )	6182
Power supply to E-magnetic valve (VDC)	12



## Introduction

The Electric bridge type sand control production system is composed of the downhole electro-hydraulic wet connection system, Electric hanger packer, Electric bridge type sliding sleeve, Electric isolation packer, and Electric sand trap packer. The system is suitable for the production of various sand-containing oil wells, and by matching different specifications of screen tubing, the production of this well can be increased. The production rate of the well can be regulated by Electrically adjusting the opening degree of the bridge slide sleeve. The control of different layers is independent of each other, and the production parameters of different layers can be observed in real time through the ground control system

## Benefits and Features

- The cable-controlled method provides constant power
- Remote transmission and power supply between tools are independent of each other, and the transmission speed is greatly improved
- The packer adopts high-strength slips and high-performance rubber element, which ensures the stability and the sealing between the layers
- The production channel of the sliding sleeve adopts high wear-resistant ceramic inserts, which increases the stability of the channel overflow area

## Specification

Item	Electro-hydraulic wet connection systems	Electric Packer	E-bridge Sliding Sleeve	Electric Sand Packer
Max OD (mm)	211	214	200	214
Min ID (mm)	98.5	90	88.9	90
Length (mm)	3000	3184	3758	3758
Temperature (°C)	125	125	125	125
Pressure (MPa)	70	70	70	70
Power Supply	Cable	Cable	Cable	Cable
Equivalent ID (mm)	—	—	56	—
Activate / Deactivate	—	Micro Hydro System	—	Micro Hydro System
Adjust	—	—	Hollow Transmission System	—
Setting	—	9.625"-40-47#	—	9.625"-40-47#



## Introduction

RSS system provides more efficient and safer performance in long horizontal section drilling scenario with double way communication

## Features and Benefits

- High precision steering, low drag and torque, low stick slip, high build rate, high drainage area
- Monitor the near-bit inclination and GR data in real time, to make sure the trajectory in maximum optimized condition
- Equipped with vibrating monitor with double 3-axis accelerator sensor and 3-axis gyro, and compatible with all MWD system

## Specification

OD	171.45 mm	[6¾ in.]
Hole Size	212.8 ~ 250.8 mm	[8¾ in. ~ 9¾ in.]
Max Collar OD	178.00 mm	[7 in.]

Flow Rate	1,135–2,840 lpm	[300–750 gpm]
Max DLG for Rotating	5°/30 m	[15°/100 ft]
Max DLG for Sliding	30°/30 m	[30°/100 ft]
Max Build Rate	15°/30 m	[15°/100 ft]
Max WOB	250 kN	[56,200 lb]
Max Working Torque (@ bit)	21 kNm	[15,500 ft-lb]
Min Failed Torque (@ bit)	32 kNm	[23,500 ft-lb]
Min Failed Tensile	3,400 kN	[764,000 lb]
Max RPM	250 rpm	
Max Working Temp.	302°F	[150°C]
Max Hydraulic Pressure	20,000 psi	[1,380 bar]





## Introduction

The system can meet the requirement of various types of directional drilling operation. The system transmits the downhole data measured by the probe tube to the surface by controlling the rotation of the rotor of the pulser, changing the overflow area and generating positive mud pulse pressure pulses. After the mud pressure signal is collected by the pressure transducer, it is decoded in real time through the processing system on the surface and the measurement data is calculated and processed to provide drilling engineering data. Drilling engineers and geologists can effectively understand the lithological changes of the drilled formations in real time and adjust the drilling parameters (BHA, WOB, ROP, mud properties, etc.) in time to effectively avoid risks, protect the reservoirs, improve labor efficiency, save costs, and increase the recovery rate



## Features and Benefits

- Comprehensive drilling parameters including inclination, azimuth, tool-face and azimuthal GR
- Specially designed software to quickly show downhole data
- Hi-temp. & Hi-accuracy sensors
- Upper hanging type pulse generator provides stable and high-strength signal
- Can be used for Ultra Short Radius Drilling System

## Specification

Hose Size (mm)	114.3~508
Temp. (°C)	150 (175 and 200 optional)
Shock-resistance	1000g/1mS, 1/2sin 3-axial
Vibration-resistance	20g/10~250Hz rms 3-axial
Pressure Bearing (MPa)	120, 150 optional
Pressure Bearing Barrel OD (mm)	φ48/ φ38
Total Length (m)	≤5.7 (without GR), ≤7 (with GR)
Battery Life (h)	>250~300 (without GR), >200 (with GR)
Flow Rate (L/s)	10~55
Pressure Drop(PSI)	50~200
Mud Signal Strength (MPa)	75~220PSI 0.5~1.5
Rotation Speed (RPM)	60~100
Data Transmitting Rate (bit/s)	≥ 1
GR Detection Range (API)	0~500

## Introduction

Mud turbine generator provides Electric energy for MWD, which is powered by drilling fluid to push the impeller to rotate, and the impeller drives the rotor in the closed chamber of the generator to rotate by utilizing the principle of magnetic coupling, so as to make the magnets on the rotor and the stator coil around to form a power generation system to output three-phase AC voltage. Different combinations of turbine and guide wheel can be selected according to the size of flow rate to suit the generator speed and the input voltage range of the rectifier circuit. When not specified by the user, the turbine-guide wheels supplied with the generator are suitable for conventional flow rate

## Features and Benefits

- Downhole turbine generator power supply with high temperature axial flow design
- Extra long life, high reliability and easy maintenance
- Turbine adjustable to suit flow rate

## Specification

Vibration Resistance (g)	20
Shock Resistance (g/ms)	1000/0.5
Max Temp. (°C)	150
Pressure Rate (MPa)	140
Rated Output Voltage (V)	DC36±0.5 (adjustable)
Rated Output Current (A)	4.5
Mud Flow Rate (L/s)	25-55 (adjust turbine specification)
Min RPM (rpm)	2500
Interface Length Adjustable	Yes
Over-current and Short-circuit Protection	Yes



## Introduction

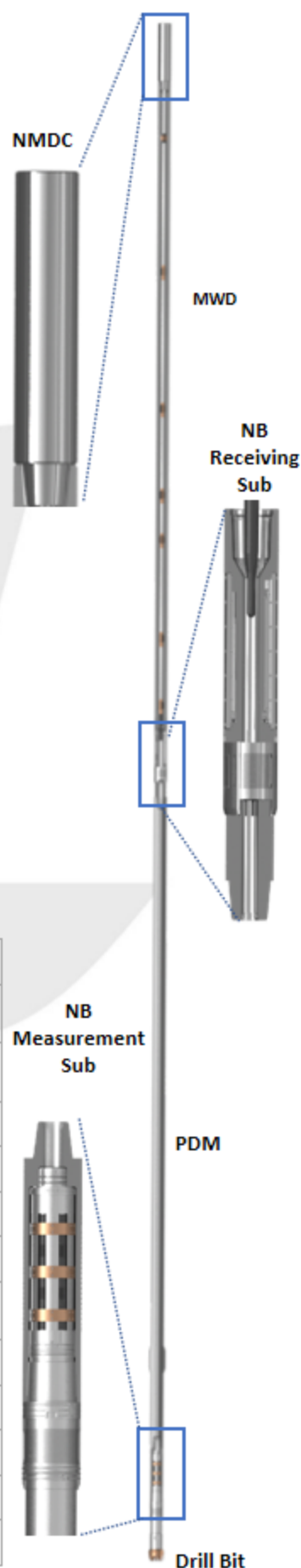
The Near Drill Bit Measurement System is an intelligent measurement system for oil drilling system to obtain the real parameters of the bottom hole. The near-bit measurement-sending sub can detect the natural gamma in different azimuth around the bore hole and provide real-time parameters such as well inclination, temperature, and ROP with clearance of 0.5 meters away from the drill bit. Combined with the geo-steering software, it provides GR imaging to identify the change of formation lithology and control the BHA to penetrate in the best position of the oil and gas reservoirs. It is suitable for geo-steering and geological evaluation of horizontal wells, and can realize precision targeting, accurately identifying the direction of changes in the geological structure of the reservoir encountered by the drill bit, increasing the encountering rate, reducing the circulating and waiting time, and improving the drilling efficiency

## Features and Benefits

- **Hi-temp. directional probe:** A group of high-precision sensor system ensures full-time high-precision acquisition of data, and the vibration-damping design ensures the stability of the whole system
- **Hi-temp. azimuthal GR probe:** The GR detection can be divided into 16 sections, especially suitable for complex reservoir and thin layer
- **Near-bit attitude measurement:** High data accuracy and stability; dynamic geo-steering with short clearance
- **Double wireless design:** Hi-speed data transmitting with Min interference, and can be connected with any MWD brand

## Specification

Model	4 3/4		6 3/4
OD (mm)	Sending Sub 130 Receiving Sub 130		Send Sub 172 Receiving Sub 172
Connecting Length (mm)	Sending Sub 575 Receiving Sub 1003		Sending Sub 1146 Receiving Sub 1078
Temp. (°C)	150/175		
Pressure (MPa)	125/140		
Continuous Working Hours	>200		
Wireless Data Rate (bit/s)	128		
Wireless Communication Distance(m)	14		
Pulse Generator RPM	30~450		
Item	Measure Range	Measure Accuracy	Distance to Bit
Inclination	0-180°	±0.2°	≤0.5m
Tool Face	0-180°	±1.0°	≤0.5m
Azimuthal GR	0-512API	±5%	≤0.5m



## Introduction

Intensive Continuous electric Precision Fracturing System includes telecommunication system, electric safety back-off tool, electric slide sleeve, electric packer, electric isolation valve, magnetic positioning tool, electric rotation tool, electric boring tool and other components. Firstly, the packer is lowered to the designated position to anchor and seal, the isolation valve is closed to pressure test casing. De-activate packer and pull coiled tubing to perform casing boring operation. After the bore is completed, lower coiled tubing and activate the packer and slide sleeve to start the fracturing operation.

The system adopts carrier wave communication system and high-temperature micro-servo electro-hydraulic control system to realize the monitoring and control of. We have developed electro-hydraulic packer, electro-hydraulic sliding sleeve and electro-control casing boring to solve the technical problems of electro-control plugging, real-time monitoring of fracturing fluids and precision orientation boring of casing. The electro-hydraulic packer realizes cable communication to control the packer sitting and releasing action, integrating a variety of sensors to monitor the bottom hole pressure and temperature in real time. The electro-hydraulic sliding sleeve realizes remote cable communication to control the opening and closing of circulating channels at the bottom hole, carrying out sand cleaning and fracturing operation

## Benefits and Features

- Cable-through CT is used for various complex casing well fracturing
- Full-time electronic monitoring, real-time transmission of tool status, downhole pressure, temperature and other information
- Specialized surface system for remote control and quick response
- Equipped with UPS and automatic unsealing and recovery and anchoring functions in case of power failure, which can cope with abnormal power failure
- Realize multi-layer perforating and fracturing operation with one trip, reducing the operation procedure and cost

## Specification

Running Method	CT with cable inside
CT Size	2'
Cable	Φ8 Single-core steel wire armoured cable
Max OD	Φ109/φ115 (packer)
Total Length (m)	16.2
Casing Size	5 1/2" 17.0-23.0lb/ft (ID 118.62-124.3mm)
Sliding Sleeve	Switch 100 times under pressure of 20MPa
Max Working Temp. (°C)	150
Pressure Level (MPa)	140
Perforating Method	Electric
Set / Unset Method	Micro Electro-hydro Servo System



## Introduction

Remote Communication System is designed for providing power, communicating and controlling of Heli Electric downhole tools

The high voltage power is connected to the telecommunication system through a steel wire armored cable inside the coiled tubing. The telecommunication system has a built-in telecommunication module and a high temperature power supply module, which converts the high voltage power into the low voltage DC power needed by the tool and transmits it down to the downhole tool through the eccentric structure and special connector. The special software on the ground communicates with the telecommunication system to control the work of the downhole tool and read the downhole information. The operator uses the information received to synthesize and judge the actual status of the fracturing operation

The Remote Communication System can also be used for completion with cable, supplying power and communication to downhole tools

## Features and Benefits

- Hi-speed & hi-accuracy downhole communication
- Hi-efficiency Electric downhole tools control
- Eccentric structure, high and low voltage circuit across without interference, providing power and communication for high and low voltage tool at the same time
- Large ID ensure smooth circulation after fracturing
- Temperature up to 150°C
- Pressure level up to 140MPa
- Specially designed control software

Max OD (mm)	91 (3.583in)	Cable	8mm Steel Wire Armored Cable
ID (mm)	≈φ25.4 (1in)	Power	1000V DC/5A
Temp. (°C)	150	Connection	3.2'-8 Stub Acme BOX×PIN
Pressure (MPa)	140	Communication Depth (m)	7000
Communication & Control	Surface software and cable		





## Introduction

Electrically Controlled Safety Back-off tool is used for releasing certain part of downhole tool, retrieving coiled tubing and cable

Through the high-voltage / high-current / high-pressure grade sealed Electric connector to the remote communication system, the remote communication system gives the low voltage DC power supply required by the tool, and in case of emergency, the back-off command is sent from the ground through the special software to activate the tool; when the tool fails in special circumstances, the string can also be mechanically back-off by lifting to ensure the safety of the operation

Eccentric structure and special connector can be connected with remote communication system, and downlink to downhole tools

## Features and Benefits

- Hi-voltage/Hi-current/Hi-pressure sealed Electric connector
- Double methods for releasing (Electric/mechanical)
- Cable control ensures fast downhole reacting
- Mechanical releasing force adjustable
- Non-cable releasing type is optional
- Temperature up to 150°C
- Pressure rate up to 140MPa
- Specially designed software control

## Specification

Max OD (mm)	91 (3.583in)
OD (mm)	≈φ25.4 (1in)
Temp. (°C)	175
Pressure (MPa)	140
Time needed for Releasing (min)	1
Lifting force for mechanical releasing (t)	10 (adjustable)
Connection	3.2"-8 Stub Acme BOX×PIN
Hi-voltage DC capacity	1000V DC/5A
Max Non hi-voltage passing capacity	8/60V DC/3A



## Introduction

Electrically Controlled Sliding Sleeve system is used for providing pass-way or isolation for downhole string. Through the telecommunication system, the high-voltage power is converted into the low-voltage DC power required by the electric sliding sleeve, and is transmitted down to the electronic cabin of the tool through the eccentric structure and special connector, and the special software on the ground communicates with the downhole system to control the opening or closing operation. Through the feedback information and the actual fluid situation to determine the actual state of the sliding sleeve. Electric sliding sleeve system can also be used for other cabled completion operation to establish circulation pass-way

## Features and Benefits

- Small OD, applicable for multi-scenarios
- The slide sleeve is controlled by surface signal
- The actuator consists of small-size and high pushing force motor-oil pump assembly
- Eccentric structure, no interference for hi & low voltage circuit across
- Large ID ensures smooth circulation after fracturing
- The shielding of hi & low voltage circuit ensures the continuity and integrity of signal

## Specification

Max OD (mm)	91~111	Length (mm)	1700
ID (mm)	≈φ25.4 (1in)	Pressure (MPa)	140
Temp. (°C)	175	Motor RPM	2000~3000
Duration for single run (s)	90	Low voltage (VDC)	48
Oil Pump Flow Rate (ml/r)	0.016	Hi voltage (VDC)	400
Piston Cavity Volume (ml)	40	Power supply to E-magnetic valve (VDC)	12



## Introduction

HELI has developed an Electrically Controlled Packer for horizontal wells, which can be timed or real-time for sealing and unsealing any section, preventing the damage which always happened on mechanical packers. The design of the packer takes into account the number of repetitive seating of the horizontal section and the pressure-bearing performance of the seal, especially the cooperation between the micro-motor and the micro-pump, in order to ensure that the maximum output torque is obtained in the allowable casing space and the compression seating of the packer barrel. The temperature and pressure resistance, output torque and seat force of the packer has been evaluated by tests, and all the performance indexes met the design requirements

## Structure

It is composed of control unit, e-hydraulic unit, rubber element and slips

## Application

- Intelligent Completion
- Electric dragging fracturing
- Multi-section injection & production

## Benefits and Features

- High seating pressure, repeatable seat, high stability
- Precise positioning with electric magnetic positioning tool

## Specification

Max OD (mm)	109~105
Length (m)	2.4
Casing Size (in)	5 1/2
Temp. Level (°C)	0~175
Pressure Level (MPa)	137.895 (20000psi)
Working Pressure Difference (MPa)	25 (3625psi)
Set Method	Micro Hydraulic System
Unset Method	Micro Hydraulic System



## Introduction

Casing Magnetic Positioning Tool, used as a pilot tool for precise positioning during downhole operations, can stably identify the casing joints, thus ensuring the accuracy of the working position of other tools. It is connected to the telecommunication system through a high-voltage, high-current and high-pressure grade sealed Electric connector, which supplies low-voltage DC power required for casing magnetic positioning, uploads casing information in real time through the cable, and recognizes the casing coupling when the magnetic positioning passes through them and draws a curve graph in the corresponding interface of the ground control software, so as to judge the coupling position clearly. At the same time, the casing magnetic positioning has very high sensitivity, which meets the needs of different speeds of string entry to identify the coupling. The eccentric structure and special connector can be connected to the telecommunication system, and can transmit high and low voltage electricity and communication lines to the downhole tools to ensure the normal operation of the series of tools

## Features & Benefits

- High-current & high-pressure grade sealed Electric connector
- Cabled communication, real time transmission
- Surface software quickly decoding
- High sensitivity
- Operating with cable, no duration limit
- Temp. up to 150°C
- Pressure rate up to 140MPa
- Special software to control, recognize and read information

## Specification

Max OD (in)	3.583
Temp. (°C)	150
Pressure Rate (MPa)	140
Max Running Speed	No Limit
Sensitivity	High
Connection	3.2"-8 Stub Acme BOX×PIN
Hi-voltage DC passing capacity	1000V DC/5A
Maximum non-high voltage harness passing capacity	8/60V DC/3A



## Introduction

The Electric Rotation Tool is a key equipment used in oil and gas drilling, in helping to control the direction and position of the drill bit to ensure that drilling operations go according to plan. Rotation tools play a vital role in oil and gas exploration and development. They are widely used in directional wells, horizontal wells, multiple boreholes, and other complex well types to help realize an efficient, safe, and accurate drilling process.

It helps drilling engineers achieve precise control of the borehole trajectory by measuring the trajectory of the borehole and adjusting the direction and position of the drill bit. This tool can improve the efficiency and safety of drilling operations, reduce the occurrence of drilling accidents, lower drilling costs, and also optimize the efficiency of oil and gas extraction.

## Features & Benefits

- Hydraulically drive, precision angle control
- Rotate clock-wise and anti clock-wise

## Application

- Smart Completion
- Electric drag-type fracturing
- Multi-layer injection and production

## Specification

Max OD (mm)	107
Rotation Angle (°)	360
Torque (N·m)	2000
Time for Clockwise Rotation (min)	18
Time for Anticlockwise Rotation (min)	12
Pressure (MPa)	137.895 (20000psi)
Temp. (°C)	0-150





## Introduction

Electric Perforating Tool is a downhole tool specially used for fracturing operation. The compact structure and strong boring capacity help to complete the operation with high efficiency under harsh environment

## Features & Benefits

- Hydraulically anchored, motor provides boring force
- Equipped with rotation tool, providing precision positioning system
- Equipped with the monitoring system of pressure, inclination and motor specification, realizing the visualization of the whole boring process
- Hi-RPM boring

## Application

- Smart Completion
- Electric Dragging Type Fracturing
- Multi-layer injection and production

## Specification

Max OD (mm)	107
Length (m)	2.2
Casing Size (in)	5 1/2
Temp. Level (°C)	0-150
Pressure Level (MPa)	137.895 (20000psi)
Power Requirement	Cable supply, surface 450V,4A
Boring Diameter (mm)	φ20
Boring Duration (min)	11



## Introduction

Electric Bypass Circulation Tool is a downhole drilling tool to realize the remote control of the open/close of bypass hole by pressure wave, consisting of a series of micro motor, micro-oil pump, hydraulic valve assembly, sensors and high battery module. The tiny pressure pulse can be detected by pressure sensors, and then the hard ware with algorithm recognize, process and analyze the signal and give instruction for power unit to drive the tool

## Features and Benefits

- Wireless pressure pulse control to realize infinite remote activation and deactivation
- Micro hydraulic system to realize small volume and large output to provide tool more reliability
- Hi-temp. battery module can continuously supply power for 200 hours without generator and cable
- Build-in storage unit to record downhole parameters including pressure and temperature

## Specification

Max OD (mm)	158.8~203.2
ID (mm)	28.8~73.025
Tensile (klbs)	1500
Torsion (kft.lbs)	120
Qty. of bypass hole	3
Temp. (°C)	150/180
Pressure (psi)	15000



## Introduction

The Electric Cutter is run with cable, consisting of control system, cutting execution system and anchoring execution system, applicable for cutting pipes between 73mm to 101.6mm, with temp. tolerance 150°C and pressure tolerance 140MPa. It can realize the automatic anchoring and cutting. The main shaft motor has good loading capacity, and the anchoring system has high power output ability

The Electric cutter consists of power module and control module. The power module contains hi-temp. micro brushless DC motor & reducer, piston oil pump, high-temp. micro E-magnetic valve, hi-temp. sliding ring and hi-temp. pressure sensors

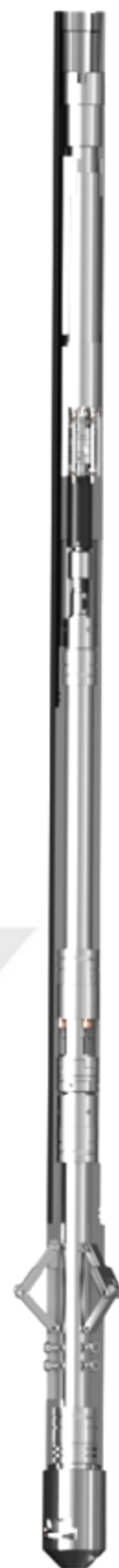
Controlling system contains motor drive, master logic terminal, DC-DC battery module, communication module. All components, including MCU, Flash, crystal oscillator and capacitor are all hi-temp. bearing

## Benefits and Features

- To improve workover efficiency and reduce interference to oilfield
- Reduce the labor intensity and the cost of the enterprise
- Fast and accurate cutting with pollution-free
- Mechanical internal cutting method
- Stable cutting with high working efficiency
- Accurate cutting positioning
- Flat cutting surface

## Specification

OD (mm)	Φ38	Φ54	Φ70
Cutting Range	2.063-2 7/8"	2 7/8"-4 1/2"	4"-5 1/2"
Pressure Level (MPa)	140	140	140
Temp. Level (°C)	150	150	150
Battery Requirement	600-1000VDC/2A Or 36V battery	600-1000VDC/2A	600-1000VDC/2A



## Introduction

It is a big challenge to conduct sidewall coring in unconsolidated, hard, corrosive and extremely over balanced formation. Heli provides sidewall coring solution for complicated scenario, and completely changes the method of data analysis after coring finished. The data of formation core can be quickly integrated into the reservoir model to better understand the geology condition of reservoir and to maximum improve the performance of reservoir development

## Features and Benefits

- The large OD sidewall coring operation can be conducted in unconsolidated formation to obtain an unbroken core, in which the USC may be lower than 200 psi
- New design applicable for hard formation improving cutting return efficiency 60%
- The coring success rate in high over balanced condition can be increased 40% by integrating advanced coring equipment and AI Modeling
- The uncertainty of reservoir development is decreased by using digital core lab technology

## Application

- Decrease the uncertainty of reservoir development
- Better understand reservoir production and evaluate reserves
- Improve drilling and completion design
- Calibrate logging curves
- Evaluate the effect of carbon storage



## Introduction

Casing slotting operation is critical during the process of oil and gas development, and is necessary to realize the oil tubing pressure balance and fluid circulation. In extreme scenarios, all type of casings and tubing may need large quantity of slotting operations. The high-temp. brushless motor and transmission mechanism provides the torque to knives, and then the cutting operation can be completed with reliable feeding module

## Features and Benefits

- Precision Control: Real time monitor cutting process and confirm the completion of cutting
- Flexibility: the distance between slot and depth of the slots can be adjusted. The direction can also be adjusted by adding the rotation indexing tool
- Reliability: the tool contains a build-in knife to ensure the operation safety during the trip
- Cutting size: 5.5 in casing (6.2mm-10.54mm thickness)

## Specification

OD (mm)	107
Slot Width (mm)	3
Casing Size (in)	5.5 (139.7mm)
Pressure (MPa)	137 (20000psi)
Temp. (°C)	150
Cutting Motor Power (W)	1000
Rate Voltage of Slotting Motor (V)	450
Rated Current of Slotting Motor (A)	3
Power Supply	Cable, surface 450V, 4A





## Introduction

The drilling precision and efficiency is directly related to the drilling cost and oil production. Conventional rotation/indexing tool always has low precision and efficiency. Electric CT Indexing/Rotation tool solved the problem mentioned above by using hi-temp. micro motor system to realize the high building accuracy. The tool switches to full rotation model when sliding

## Features and Benefits

- Precision control: small single rotation angle to realize precision adjustment by E-hydraulic system
- High efficiency: applicable for both sliding and rotating drilling mode
- Easy to operate: time of endurance is adjustable by adopting changeable battery module without cable
- Low cost: to decrease comprehensive drilling cost

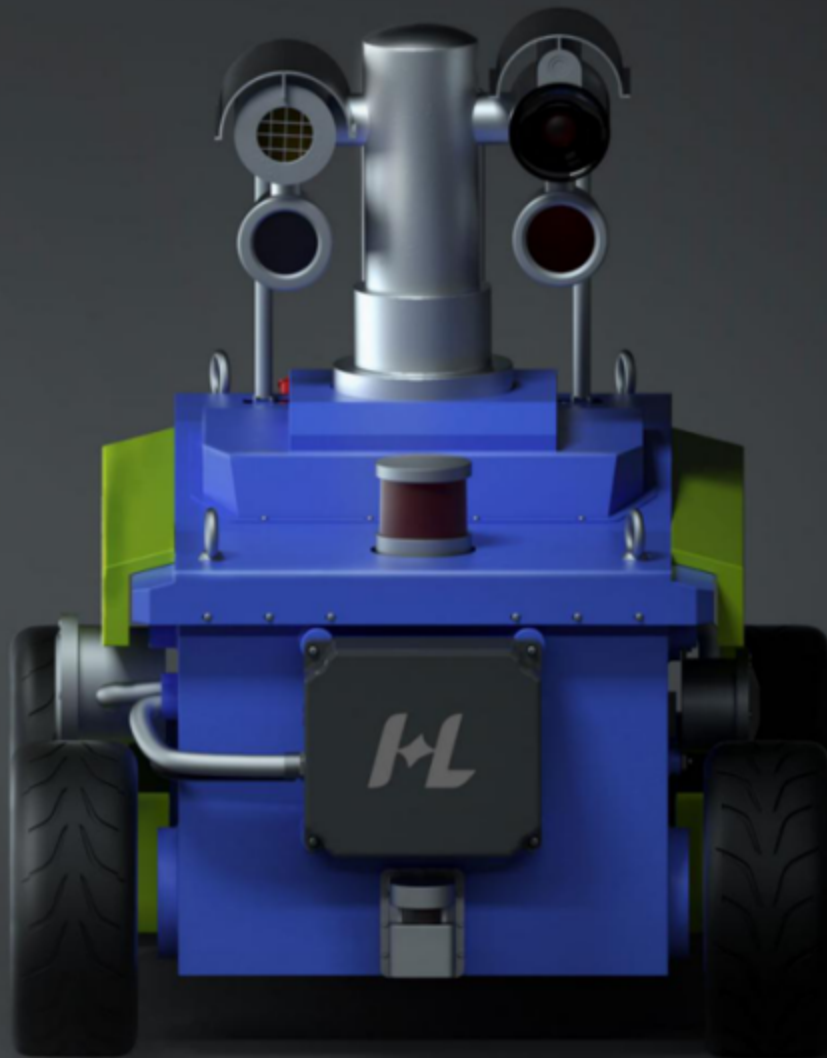
## Specification

OD (mm)	108
Single Rotate (°)	18
Full Rotation RPM	13
Torque (Nm)	>3000
Pressure (MPa)	137.895 (20000psi)
Temperature (°C)	150
Rated Motor Power (W)	29.5
Rated Motor Voltage (V)	48
Rated Motor Current (A)	0.9
Single Battery Holder Supply (h)	50 (extendible)



# Smart Equipment R&D and Manufacturing

- Surface Equipment R&D and Manufacturing
- Subsea System R&D and Manufacturing



## Introduction

Heli Rotary Casing Running System is a specialized device for casing running or casing drilling based on TDS system. The product series contains two types of structure covering different size of casing, including internal catch and external catch. The system has been widely used worldwide as an alternative of conventional TRS equipment, taking full advantage of TDS. By applying RCRS, the rotation and circulation of casing can be realized anytime if needed, reducing the downhole risk and enhancing the operation efficiency dramatically

## Features & Benefits

- Integrated operation of rotating, hoisting and circulation
- Two hoisting type (elevator & slips) with micro teeth invasion tech
- Replaceable slips to cover different size of casing

## Specification

	Internal Catch	External Catch
Catch Range(in)	9-5/8-13-3/8	3-1/2-7-5/8
Rated Loa(sTon)	500 Short Tons	350 Short Tons
Max M/U Torque ( ft-lb)	40,000 Ft Lbs.	40,000 Ft Lbs.
Standard	API 8C PSL1	API 8C PSL1
Max Push(t)	12.5	12.5
Max RPM	200	200
Max Cir. Pressure(PSI)	5,000	5,000
Max Flow Rate(GPM)	760	490



## Features and Benefits

- Positive pressure explosion-proof system, high working load
- Provide precision torque value with fast dynamic response
- The whole-process connection M/U & B/O monitor
- TmD pro software to determine if the torque requirement is met
- Compatible with different type of hydraulic power tongs



## Introduction

Torque Controller Suitable for Casing Tong :TQ340-35Y/TQ508-70Y Explosion-proof Torque Hydraulic Power Tong Controller is an advanced torque signal processing controlling and recording system, which can measure, display, record and control the torque of the pipe during the bucking, in order to ensure that the optimal torque of the pipe joints and the tightening process of each joint to produce graphic line data saved on disk for future inquiries. The system is used in conjunction with the hydraulic power tong to automatically control the torque of pipe joints to avoid the over-torque

## Benefits and Features

- Adopt digital transmission technology to realize the non-contact transmission of measurement data, thus improving the measurement degree
- High sampling rate, 12-bit hi-precision analog A/D converter module is used as input and output.
- Adopting incremental rotary encoder to record the circles of buckling
- The parameters including pipe body can be set according to the requirements of the operation
- Display, control and record the process data of buckling, and record the process data of buckling on the disk for future inquiry
- Suitable for special thread including VAMTOP, BGT1, FOX, 3SB, 13Cr. It can detect and record tightening torque, shoulder torque, shoulder torque ratio

## Specification

Power Supply Voltage	220V AC $\pm 15\%$ 50 to 60Hz
Working Voltage (VDC)	24
Torque Sensor Measuring Range (Kg)	6000
Power Voltage of Torque Measuring (V)	24
Output Signal of Torque Measuring (mA)	4~20
Torque Measuring Range	2000Kg $\times$ 9.8N $\times$ force arm m
Load Output	DC24V-1A
Unloading Flow Rate (L/min)	120
Environment Temperature ( $^{\circ}$ C)	-20~+65
Environment Humidity (R-H)	10%~80%
Packing Dimension (mm)	600 $\times$ 450 $\times$ 220





## Introduction

Torque Controller Suitable for Tubing Tong: XQ140/12YA Explosion-proof Torque Hydraulic Power Tong Controller is an advanced torque signal processing controlling and recording system, which can measure, display, record and control the torque of the pipe during the bucking, in order to ensure that the optimal torque of the pipe joints and the tightening process of each joint to produce graphic line data saved on disk for future inquiries. The system is used in conjunction with the hydraulic power tong to automatically control the torque of pipe joints to avoid the over-torque

## Benefits and Features

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- High sampling rate, 12-bit hi-precision analog A/D converter module is used as input and output
- Adopting incremental rotary encoder to record the circles of buckling
- The parameters including pipe body can be set according to the requirements of the operation
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- Suitable for special thread including VAMTOP, BGT1, FOX, 3SB, 13Cr. It can detect and record tightening torque, shoulder torque, shoulder torque ratio

## Specification

Power Supply Voltage	220V AC $\pm 15\%$ 50 to 60Hz
Working Voltage (VDC)	24
Torque Sensor Measuring Range (Kg)	2000
Power Voltage of Torque Measuring (V)	24
Output Signal of Torque Measuring (mA)	4~20
Torque Measuring Range	2000Kg $\times$ 9.8N $\times$ force arm m
Pulse / Round	100
Load Output	DC24V-1A
Unloading Flow Rate (L/min)	120
Environment Temperature ( $^{\circ}$ C)	-20~+65
Environment Humidity (R·H)	10%~80%
Packing Dimension (mm)	600 $\times$ 450 $\times$ 220



## Introduction

Kelly Busing is used for delivering the power of rotary table to drive the Kelly. Smart Kelly Bushing consists of upper cover, base, axle, roller, tighten bolt and strain collector. The strain collector is used for collecting useful data including torque and moment of inertia to realize the real time monitoring



## Features and Benefits

- High-precision stress variation collection, monitor drilling parameters in real time
- Battery supply power, no need external power source
- Kelly directly touches rollers with low friction and precision WOB

## Application

- Smart Drilling
- Torque Monitor

## Specification

Max Torque Measured (N·m)	20000
Accuracy (N·m)	0.5
Lifespan (h)	170
Qty of Battery	2sets
Charger	1

## Introduction

Dual-tubing running slips is made of high-strength steel. 4 set of independent pneumatic cylinder can be controlled separately, eliminating the risk of mis-operation. The system meets the requirement of 1" to 3.5" tubing running, with load capacity of 400 tons and the function of guidance of downhole control lines and electric cable. The control unit of upper slips and lower slips can be connected separately with function of automatic self-locking to avoid unwanted disconnect. The system needs a 80 psi air supply



## Introduction

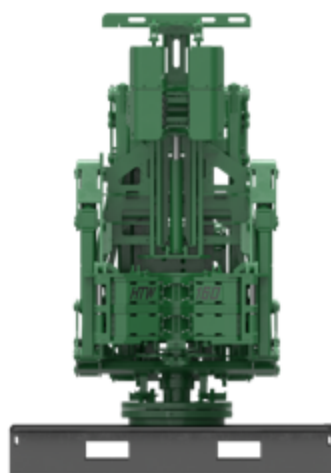
This is an electric smart Iron Roughneck applicable for deep-sea drilling platform with high level of automation, which supports both wireless and local operation

## Features and Benefits

- HTW-160 is an electric smart surface equipment with both mode of wireless and local operation, meanwhile it can be integrated into driller sole system with the function of one-button automatic operation
- Equipped with VI system to identify the position of pipe joint to realize the unmanned operation with low labor intensity and high safety level
- During the process of making up, the digital screen with remote control shows the torque valve and the percentage of operation, which is convenient for precision controlling levers and torque
- The special connection design between main and back tong makes sure that the making-up angle can be up to 60 degrees, which is more time-saving

## Specification

Catching Size (in)	3-7/8~10	Weight (kg)	9300 (including beam)
Max M/U Torque (Nm)	135000	Rotation Speed (RPM)	80 (5in pipe)
Max B/O Torque (Nm)	160000	Dimension (m)	2.4*1.6*2.6
Max Rotation Torque (Nm)	4000	Qty. of Rollers	4
HPU Pressure (bar)	175	HPU Output (KW)	37
HPU Flow Rate (L/m)	200	HPU Voltage (V/Hz)	380/50



## Introduction

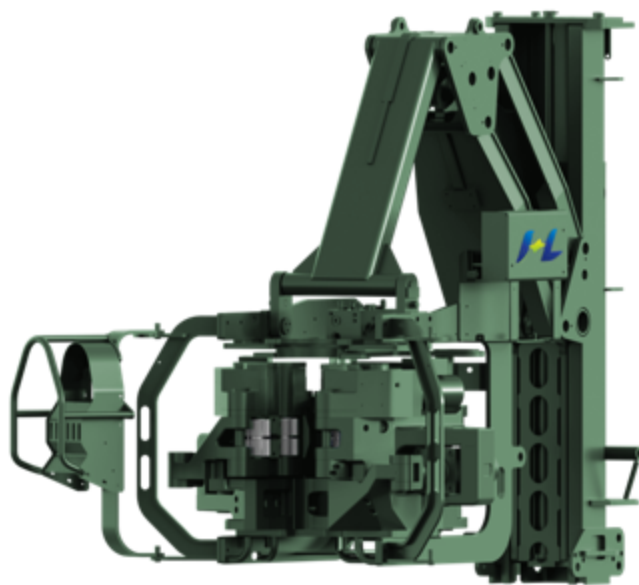
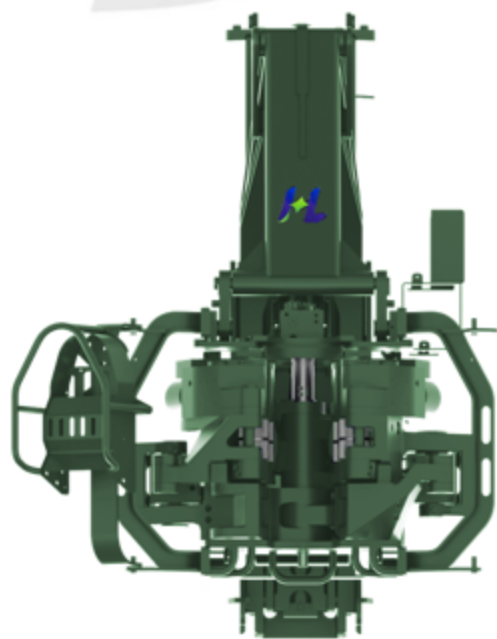
Applicable for small drilling rig with limited space. It has the characteristic of small dimension and fast deploying

## Features and Benefits

- Applicable for the drilling platform with limited space
- It has an integrated design of main and back tong. The lower part is spine-type clamping back tong, and the upper part is the integrated design of main tong and roller
- Hand-controlled hydraulic type. The hydraulic valves are high integrated to realize the fast rotation / making up / breaking out operation
- The roller has compensating bevel angle to prevent the thread from damage, making the system simpler
- The product can be customized, including cancel the beam and sending system, in order to meet the requirement of different clients

## Specification

Catching Size (in)	4.25~8.5	Weight (kg)	3125 (including beam)
Max M/U Torque (Nm)	80000	Rotation Speed (RPM)	80 (5in pipe)
Max B/O Torque (Nm)	100000	Dimension (m)	1.7*1.5*2.2
HPU Pressure (bar)	175	HPU Output (KW)	37
HPU Flow Rate (L/m)	140	HPU Voltage (V/Hz)	380





## Introduction

Full hydraulic 150t small-sized top drive suitable for small drilling / workover rig. It is highly reliable and compact with high power-to-weight ratio

## Features and Benefits

- HDQ-150 top drive adopts full Electric-hydraulic control system with the characteristics of compact and easy to maintenance
- HDQ-150 top drive is equipped with independent hydraulic unit and double-variable motor driven shaft, with Max M/U torque 47453 N-m and continuous torque output 47453 N-m, and the motor output is 2\*112 HP
- All parameters of top drive can be shown on screen for driller to realize the precision control of top drive
- HDQ-150 top drive is equipped with different type of fast connectors
- HDQ-150 hydraulic unit adopts open/close loop to provide power for top drive. When using high power diesel engine or motor, a high pressure of 5000psi will be provided to top drive

## Specification

Dimension (m)	9.84*9.51*3.0	Weight ( kg)	2945
Gear Ratio	14.59:1	Max RPM	200
Max Cont. Torq. ( ft-lb)	15,000	RPM @ Max Cont. Torq.	76
Max B/O Torq. ( ft-lb )	35,000	Lifting Force (sT)	150
Max M/U Torq. ( ft-lb )	35,000	Static Brake ( ft-lb)	15,000
Nominal Diameter (in)	2-13/16	Wash Pipe ( psi)	5,000 (344 bar)
DP Size (in)	2-7/8~4-1/2	IBOP Pressure ( psi)	10,000 (689 bar)
Temp. (°C)	-20~+45	Link (Ton API)	150



## Introduction

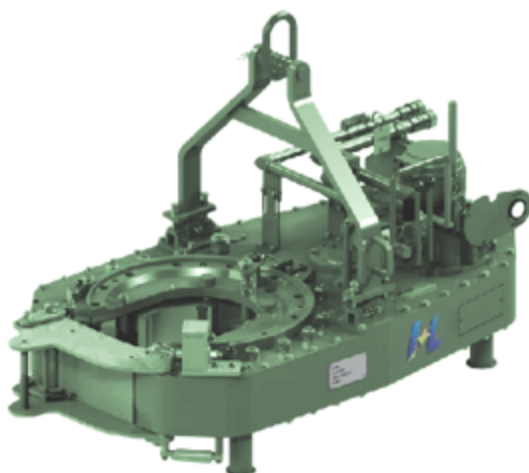
Heli Hydraulic Casing Tong provides high torque up to 75,000 ft-lb (101,700 N•m) for 4 ½"-16" casing. Specially designed large gear makes the casing tong suitable for larger size range of casing

## Features and Benefits

- Mainly used for high-torque scenario including the making up challenge for ultra-deep well
- The special design solves the problem of casing shape change
- It has been widely used in multiple working conditions with low weight
- Easy to switch between low speed and high-speed gear
- Hydraulic door inter-locking system prevents the casing from unexpected action when the door unlocked
- The optional lifting cylinder helps to adjust the equipment to connecting height

## Specification

Pipe Size (in)	6-5/8 ~ 16	4-1/2~14-3/8
Low speed gear rated torq. (ft-lb)	25,000 (33,900 N•m)	75,000 (101,700 N•m)
Hi speed gear rated RPM	93	56
Tong Size (in)	34x54x31(864x1,365x782 mm)	72-1/2x39-3/8x45(1841x1000x1143 mm)
Torque arm length (in)	32 (813mm)	42(1066.8mm)
Weight (kg )	488(1,075 lb)	1431(3,150 lb )
Rated power flow rate (gpm )	30~50	40~80



## Introduction

The HELI Hydraulic Tubing Tong is a hydraulic motor-driven tong capable of running tubing from 1.66" to 5-1/2". The tong can produce up to 15000 ft.lbs in low gear, forward or reverse operation.

The tong design includes a clamping system inside the rotor unit to provide secure tubing grip with maximum gripping forces and protection for the operator under high load conditions. This unique gripping concept also uses a load-bearing hook-type segment to absorb radial forces developed during make-up and break-out operations. The case body and rollers provide axial and radial support for the rotary, which guides the cage plates around the circumference using cam followers

## Features and Benefits

- Floating back tong system. The pipe bears only torque during M/U or B/O, but no force in any other direction
- The hydraulic compensation module to compensate the thread without the existence of spring
- Compatible with the torque monitor system of any brand
- Applicable for CRA pipe running when after changing teeth plate

## Specification

Pipe size range(in)	1.66 ~5.5
M/U & B/O torque( ft.lbs)	15000
Max. rotor speed(RPM)	60
Tong arm length(mm)	762
Length(mm)	962
Width(mm)	1050
Height(mm)	1665
Max. clamping pressure at backup(psi)	5800

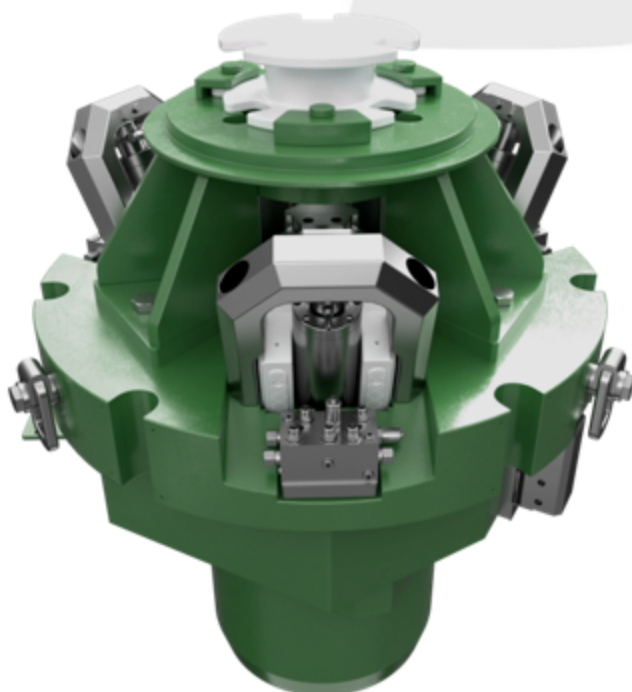


## Introduction

This product is primarily used for casing, tubing and drill pipe operations during oil and gas drilling operations. It is designed with a rotary double wedge-shaped slips assembly, which can be used for pipe operations between 2-3/8~5-1/2 inches without replacing any of the clamping components

## Specification

Dimension	Φ900x1165
Total Weight (t)	1.8
Driven Method	Hydraulic
Rated Load (t)	150
Cylinder Quantity	3
Pipe Size (in)	2 3/8"—5 1/2"
Ex Level	I
Main Frame Material	42CrMo
Environment	-20℃~+55℃, humidity ≤95% (+18℃), altitude ≤2000m



## Introduction

Rotary table is the core equipment in oil drilling operation, mainly used to drive the rotation of drilling tools, bear the weight of drilling string in the well, and ensure the stability and efficiency of the drilling process. The rotary table, bushings, input shaft and other important parts are designed and manufactured in accordance with API Spec 7K, and the performance is in accordance with the standard SY/T5080-2013 for drilling rigs, which is suitable for the medium and deep wells, and is widely used in the field of oil and gas exploration

## Benefits and Features

- High strength and durability: alloy steel gears and optimized structural design can withstand extreme loads and torque fluctuations, suitable for complex operations
- Compatibility and adaptability: adapt to API standard Kelly and a variety of slips
- Intelligent control: supports speed control and real-time data monitoring (e.g., torque, speed) to enhance operational safety and precision

## Specification

Dimension (Length × width × height mm)	2850×1280×585
Total Weight (t)	4
Max RPM (rpm)	120
Max Torque (N·m)	20000
Nominal ID (mm)	444.5
Max Static Load (kN)	1350
Rotary Table Reduction Ratio	3.58
Reducing Mechanism Reduction Ratio	5.6
Total Reduction Ratio	20
Distance Between Rotary Table Center to the First Row Gear (mm)	1118
Fluid Temperature (°C)	-25~103
Ex Level	I
Main Frame Material	Cast Steel, Alloy Steel





## Introduction

The use of this equipment with top drive greatly simplifies the traditional drilling or casing running process, greatly improves the drilling and workover efficiency, and reduces the labor intensity

## Benefits and Features

- The elevator adopts the double door structure to realize the function of automatic opening and closing through the built-in linkage mechanism and safety locking mechanism. The safety locking pin acts on the lever mechanism under the gravity of the pipe through the center of elevator. The locking pin is ejected and locks the latch to ensure reliable closure when lifting. The device complies with Ex d/Ex tb explosion-proof certification, and is suitable for safe operation in potentially explosive environments in Zone 1, Zone 2, Zone 21 and Zone 22
- Multiple bushing sizes available to accommodate different sizes of pipes. Plug-in type bushing without bolts
- Mechanical-hydraulic design. After the left and right door and latch are reliably closed, the completion signal is sent to the top drive for next movement
- Highly integrated and compact design. All hydraulic components are reliably protected to avoid accidental collision and other potential accidents caused by improper operation
- Series design in accordance with API8C, load range 150T, 500T

## Specification

Model	HLDY150T	HLDY500T
Dimension (Length × Width × Height ) mm	718×913×543	773×1073×521
Weight (main part) (kg)	772	1034
Pipe Size (in)	2 3/8~5 1/2	2 3/8~9 3/4
Max Pulling (sTon)	250	500
Operating Pressure (MPa)	15	15
Flow Rate (Lpm)	20	20
Temperature (°C)	-20~55	-20~55



## Introduction

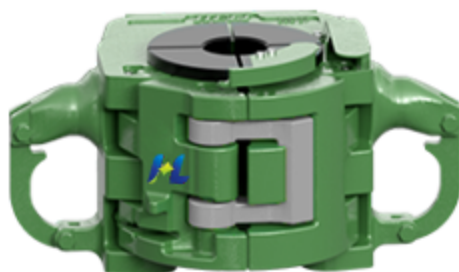
Using together with top drive to simplify the casing running process and to improve the operation efficiency

## Features and Benefits

- With the build-in linkage and safety locking mechanism to realize the automatic door opening. The safety pin act on lever mechanism with the effect of gravity to guarantee the safety opening of the door
- Equipped with standard bushing for different pipe size. The liner bushing can be directly inserted without bolt
- Linkage design of hydraulic and mechanic. The door and lock will be automatically triggered when the pipe inside the elevator. Only the door is locked can the top drive receive the signal and continue the next move
- Highly integrated and compact design to minimize the potential risk
- Comply to API 8C design, with load of 250T and 350T and 500T

## Specification

Model	HLDY250T	HLDY350T	HLDY500T
Dimension (mm)	950*600*420	1020*650*450	1060*750*510
Weight (Kg)	470	690	905
Pipe Size (in)	2-3/8~7-5/8	2-3/8~9-3/4	2-3/8~9-3/4
Capacity (sTon)	250	350	500
Operating Pressure (MPa)	15	15	15
Flow Rate (Lpm)	20	20	20
Temp. (°C)	-20~55		

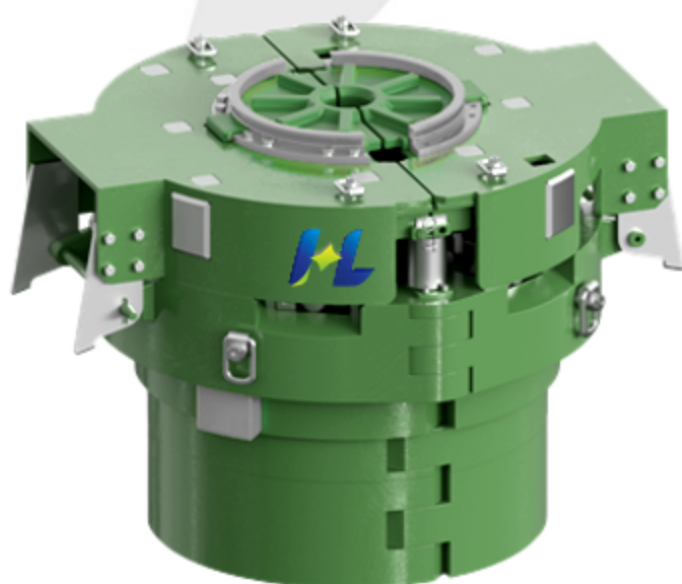


## Introduction

This is a universal multi-function hydraulic slips for casing, tubing and drill pipe with specialized double wedge-shaped design. It is suitable for pipe size between 2-3/8" to 16" without changing any parts

## Specification

Size (in)	37-1/2
Multiple anti-torque adaptor for different rotary bushing	
Standby opening position (in)	Max ID19
Weight (MT)	2.75
Capacity	250 short T, pipe size <5', 3-slip
	500 short T, pipe size >5', 6-slip
Max Torque (ft-lb)	80,000
Cable through	3-1/2
Hydraulic Requirement	P max. 210 bar; Q min.120l/min



## Introduction

This equipment realize the automatic delivery and holding of DP to significantly reduce the labor intensity. The system consists of two module (welding and delivery) with compact design

## Features and Benefits

- Highly integrated and module design
- All operation instruction is integrated within the control sole, which is convenient for operating
- DP automatically delivered with high operation efficiency
- The position of welding gun can be adjusted for different size of DP
- The operating and welding area are separated with observing window
- Easy transportation

## Specification

Drill pipe size (in)	2-3/8~5-1/2
Container Dimension (mm)	6058×2438×2591
Delivery Module Dimension (mm)	6606×4010×1145
Battery Capacity (KW)	45
Power Supply	3 phase 4 wire; AC380 V ; 50HZ
Max pressure of HU (bar)	140
Weight (kg)	7200



## Introduction

This is to supply hydraulic power to petroleum equipment, consisting of hydraulic system and Electric system. The design purpose is to decrease energy consume and increase convenience

## Features and Benefits

- Skid type to satisfy quick onshore and offshore deployment
- Ex d/Ex tb explosion proof certified, suitable for potential explosive environment of area 1, 2, 21 and 22
- Can be customized for low temp. (-40°C~40°C) and high temp. (-10°C~55°C)
- The automatic power adjustable piston pump is used for opened or closed hydraulic system
- Loading sensitivity control system to provide the flow rate of 0-110L/min & 0-210 Bar
- Under the standby mode, the motor is very energy saving to avoid the frequent start of motor and pump. The system can be switched quickly to working mode when receiving instruction, providing suitable hydraulic pressure

## Specification

System Pressure (bar)	210
Max Flow Rate (L /min)	110
Hydraulic Oil Tank Capacity (L)	500
Max Hydraulic Oil Temp. (°C)	70
Filter Fineness of Hydraulic Oil (μm)	10
Power Supply	380V/50Hz, 40A
RPM	1450
Weight (kg)	1130
Dimension (mm)	1766×1000×1860





## Introduction

This is to supply hydraulic power to petroleum equipment, consisting of hydraulic system and Electric system, supplying a high-pressure and high flow rate output. The design purpose is to decrease energy consume and increase convenience

## Features and Benefits

- Skid type to satisfy quick onshore and offshore deployment
- Ex d/Ex tb explosion proof certified, suitable for potential explosive environment of area 1, 2, 21 and 22
- Can be customized for low temp. (-40°C~40°C) and high temp. (-10°C~55°C)
- The automatic power adjustable piston pump is used for opened or closed hydraulic system
- Loading sensitivity control system to provide the flow rate of 0-110L/min & 0-210 Bar
- Under the standby mode, the motor is very energy saving to avoid the frequent start of motor and pump. The system can be switched quickly to working mode when receiving instruction, providing suitable hydraulic pressure

## Specification

System Pressure (bar)	210
Max Flow Rate (L /min)	205
Hydraulic Oil Tank Capacity (L)	450
Max Hydraulic Oil Temp. (°C)	70
Filter Fineness of Hydraulic Oil (μm)	10
Power Supply	380V/50Hz, 80A
RPM	1450
Weight (kg)	2100
Dimension (mm)	1830×1380×1945



## Introduction

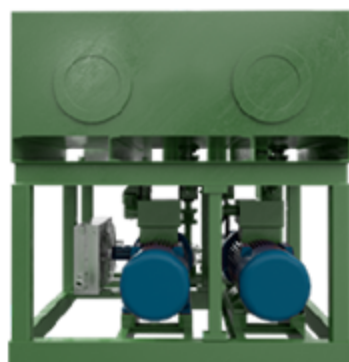
This is to supply hydraulic power to petroleum equipment, consisting of hydraulic system and Electric system, supplying a high-pressure and high flow rate output. The design purpose is to decrease energy consume and increase convenience

## Features and Benefits

- Skid type to satisfy quick onshore and offshore deployment
- Ex d/Ex tb explosion proof certified, suitable for potential explosive environment of area 1, 2, 21 and 22
- Can be customized for low temp. (-40°C~40°C) and high temp. (-10°C~55°C)
- The automatic power adjustable piston pump is used for opened or closed hydraulic system
- Loading sensitivity control system to provide the flow rate of 0-110L/min & 0-210 Bar
- Under the standby mode, the motor is very energy saving to avoid the frequent start of motor and pump. The system can be switched quickly to working mode when receiving instruction, providing suitable hydraulic pressure

## Specification

System Pressure (bar)	210
Max Flow Rate (L /min)	205
Hydraulic Oil Tank Capacity (L)	1800
Max Hydraulic Oil Temp. (°C)	70
Filter Fineness of Hydraulic Oil (μm)	10
Power Supply	380V/50Hz, 103A
RPM	1450
Weight (kg)	4500
Dimension (mm)	2400×1800×2150



## Introduction

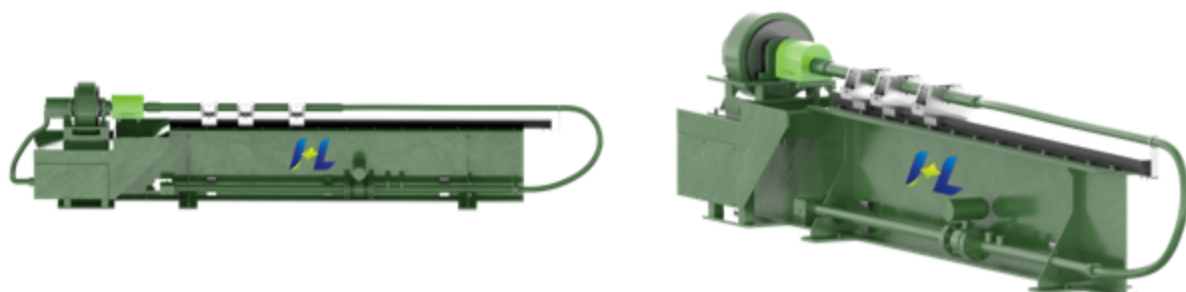
PDM tester is a facility for testing the PDM performance consisting of main module, testing system and circulation system. The parameters tested includes: output torque, output RPM, circulation flow rate, input pressure, medium temperature

## Features and Benefits

- Magnetic powder brake suitable for low-speed & low-to-medium power & frequent start and stop is easy to maintain
- Testing system is integrated to piano console with fast connection reserved
- The embedded computer with displayer is adopted to conduct the overall measurement and control, including equipment control, state inspection and data collection
- Software to guarantee the measurement accuracy. The function includes parameters setting, data collection, process control, alarm, troubleshooting, logging, data process, RPM, torque, loading (automatic display, storage, printing, curve plotting and playback)
- Data measured will be collected and processed and output a series of curve including torque-pressure drop, RPM-pressure drop and power-pressure drop
- Closed loop control for torque, combined error less than 0.3%F.S

## Specification

Max PDM size (mm)	88.9
PDM Length (m)	3-4
Torque range (N·m)	2000
RPM range	0-500
Input pressure (bar)	0-160
Circulation Flow Rate (L/Min)	0-600
Input medium temp	Normal (fresh water)
Weight (Kg)	2036
Dimension (m)	5.6×0.7×1.3



## Introduction

Buck unit is an independent hydraulically driven equipment composed of main part, HPU, Electric control system, mainly used for downhole tools (such as MWD and completion tools) M/U & B/O

## Benefits and Features

- Safe, reliable and easy to use - The head clamp and tail clamp are hinged closed and fully closed structures respectively with controlled torque. The whole set of equipment can be operated independently by a single person
- Accurate torque – all Electric remote control. Monitoring software can intelligently determine whether the curve meets the requirements, and database is easy to call and setup
- More efficient - the main clamp is hinged and closed, which can realize fast and accurate assembly and disassembly
- Flexibility in the installation and maintenance of tooth plates - one set of tooth plates (standard and extra-high) can meet OD requirement. Plates can be quickly replaced

## Specification

Main Tong Catching (in)	3-1/2~18 (Standard Teeth)	Weight (kg)	500
	2-1/2~17 (High Teeth)		
Back Tong Catching (in)	3-1/2~14 (Standard Teeth)	Back Tong Clamping Angle (°)	30
	2-1/2~13 (High Teeth)		
Min M/U Torque (N·m)	2712 (2000 ft-lb)	Max M/U Torque (N·m)	203373 (150000 ft-lb)
Max B/O Torque (N·m)	257605 (190000 ft-lb)	Dimension (mm)	5520×1400×1860 (Control Sole not included)
HPU Output Power (kW)	18.5	HPU Voltage (V/Hz)	380/50
HPU Flow Rate (L/min)	110	HPU Pressure (Bar)	210



## Introduction

ComBM15-160 is a 360° continuous bucking unit with a float back tong used for high-precision downhole tool which has special material and special thread

## Features and Benefits

- Back clamp suspension design, X, Y and Z three directions of freedom can be adjusted, automatic error correction to maintain concentric, avoid due to the main back clamp different heart caused by force imbalance, and damage to the thread
- The hydraulic clamping cylinder adopts energy storage compensation design. When the workpiece is kept working for a long time, there is no need to worry about the clamping clamp teeth slipping due to the pressure of the clamping cylinder, and the pipe body is scratched
- The monitoring software can intelligently judge whether the monitoring curve meets the requirements, and all the data is applied to the database management system, which is easy to call and the data setting operation is very convenient
- The use of double-way shear electronic sensor, compared with the traditional pull and pressure sensor by other forces of the coupling effect is less, make torque control more accurate
- Both the front and back ends of the machine can be equipped with an extension base to be equipped with a quick spinner, a hydraulic push-pull device or a remote-controlled jacking hydraulic cylinder, making the operation safer and more efficient; If the customer has special requirements, can also be eccentric clamping pipe

## Specification

Handling Size(in)	1 to 15	Weight(kg)	6800
Max OD(mm)	384	Size(mm)	6807X1520X1915
Max torque @ 15in(Nm)	217000	Max rpm	10
HU Pressure(bar)	280	HU Output(KW)	37
HU Flow Rate(L/min)	205	HU Voltage(V/Hz)	380V/50





## Introduction

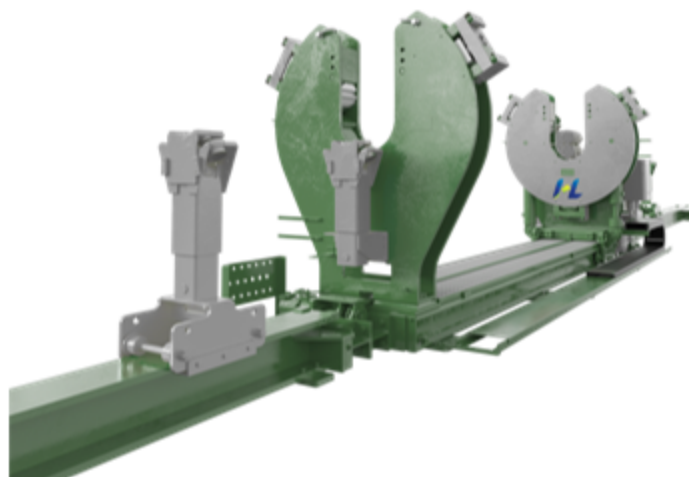
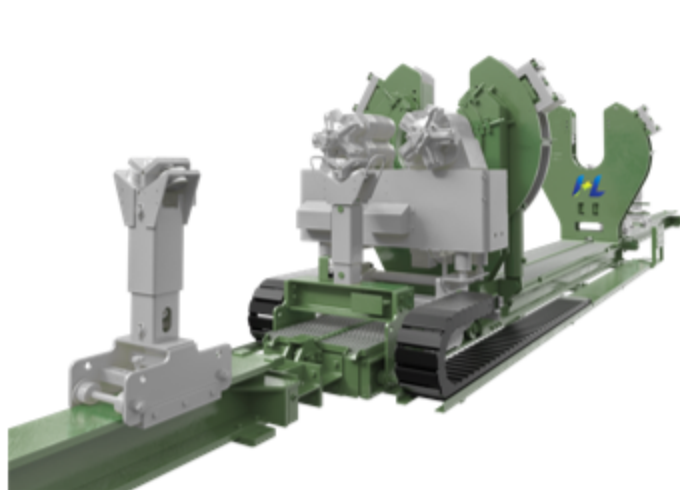
This is an un-continuous rotating bucking unit. The high-speed roller works first to rotate the thread to position, then complete the thread making up with a 30 degrees stroke rotation. This equipment can be used for both offshore offline operation to save rig time and also be used for downhole tools maintenance in workshop

## Features and Benefits

- Suitable for 3.5-26in pipe without changing clamp and teeth
- Shear type sensor provide precision control
- 3-clamp system to minimize the risk of damage
- Fast and easy installation
- Optional floating roller provides fast rotating without extra bent and shear force
- Remote control to provide a safe distance between operator and equipment
- Control system to realize the precision control and display of torque
- Up-type loading and unloading to eliminate pipe delivery system and reduce the floor area

## Specification

Model	Min OD (in)	Max OD (in)	Max Rotation (°)	Max M/U Torque (Nm)
TorkWizard15-150TL	3-1/2	26	30	150,000 ft-lb203,373



## Introduction

Hydraulic Catwalk is one of the key equipment of handling pipes, which is used for pipe transportation between pipe yard and drill floor. It adopts specially designed gear and cylinder to drive the system. The whole system is equipped with automatic safety protection and control program to make sure the whole process safe and reliable. Based on module design, the function of hydraulic lifting, infrared protection, pipe length measurement can be realized to cover 3-14m drill floor for workover operation

## Features and Benefits

- Self-learning control program for automatic pipe delivery
- Large pipe adjustable range and working load
- Completed trouble detecting and protection system to avoid mis operation and accidents
- Emergency retrieving function under full loading to guarantee personnel and equipment safety
- Seamless connection between pipe delivery equipment and oil tubing storage to realize unmanned operation, reducing labor intensity

## Specification

Model	HLMD5	HLMD8H	HLMD10
Lifting Height: (m)	3~5	5~8	8~10
Pipe Length: (m)	10	14	14
Pipe Size: (in)	≤3-1/2	≤9-5/8	≤3-1/2
Lifting Capacity: (Kg)	350	800	800
work cycle: (s)	20	40	40
Total Weight: (Ton)	2.8	7.5	5.5
Operating Pressure: (MPa)	18		
Dimension: (m)	8.5*1.5*1.5	10.5*1.8*1.7	9*1.4*1.6
Temp.: (°C)	-20~55		



## Introduction

Different from the traditional catwalk, the crosshead catwalk is a vertical pipe transfer device, which can fully handle the pipe grabbing, lifting, up and down operation. With automatic functions such as path learning and work point (position) memorization, it is the key equipment for modern wellhead automation

## Features and Benefits

- Self-learning program control, fully automatic delivery of pipe
- Modular design applicable to drilling and workover operations, with a variety of control methods
- According to the site environment, quickly set the wellhead, take pipe point position, avoiding collision point, and automatically memorize after setting
- Multiple work paths can be set, and the program automatically judges and selects the optimal path for operation
- Standard control protocol interface for other wellhead automation equipment

## Specification

Catching Size(″)	2-7/8 -5-1/2
Lifting Height(m)	12
Max Pipe Length(m)	12
Picking Weight(Kg)	1000
Rotation Angle(°)	270
Rotation Torque(N·m)	40000
Working Radius(m)	2.4
Dimension(m)	0.8*0.9*13
Hydraulic Power(MPa)	(17.5)140L
Overall Weight(Kg)	7500



## Introduction

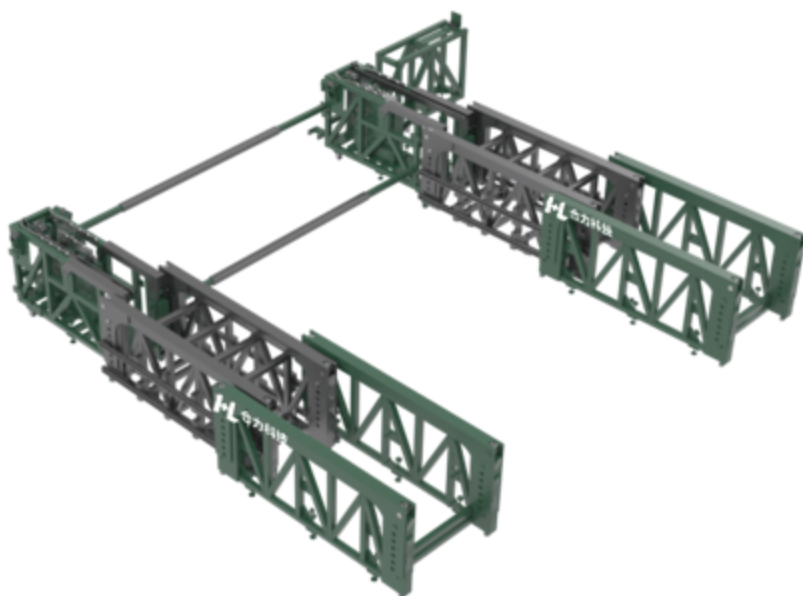
Automatic racking machine is a large-capacity, high-efficiency automatic pipe spacing arrangement and accurate positioning equipment to provide pipes for cross gripping machine. It is mainly composed of expandable, movable bracket, lifting system and positioning system

## Benefits and Features

- High efficiency: automatically arranging pipes, greatly shortening the waiting time of gripper
- High precision: adopting electric drive and high-precision sensor, accurate positioning, high reliability, good stability and adaptability
- Accurate positioning: each pipe can be positioned and aligned accurately
- Large pipe capacity: provides efficient supply for fast drilling
- Strong adaptability: able to adjust the width, suitable for different length of pipe
- Energy saving and environmental protection: the equipment is driven by low electric power
- Improve the quality and consistency of pipe arrangement
- Reduce labor intensity and production cost
- Simple and quick installation

## Specification

Total Weight (t)	7.6
Voltage (V)	24
Power (kW)	10
Total Carrying (KG)	40000
Pipe Size (in)	2-3/8"—5-1/2"
Capacity (joints)	≥40
Max Lifting (mm)	260
Working Period (S)	≤20

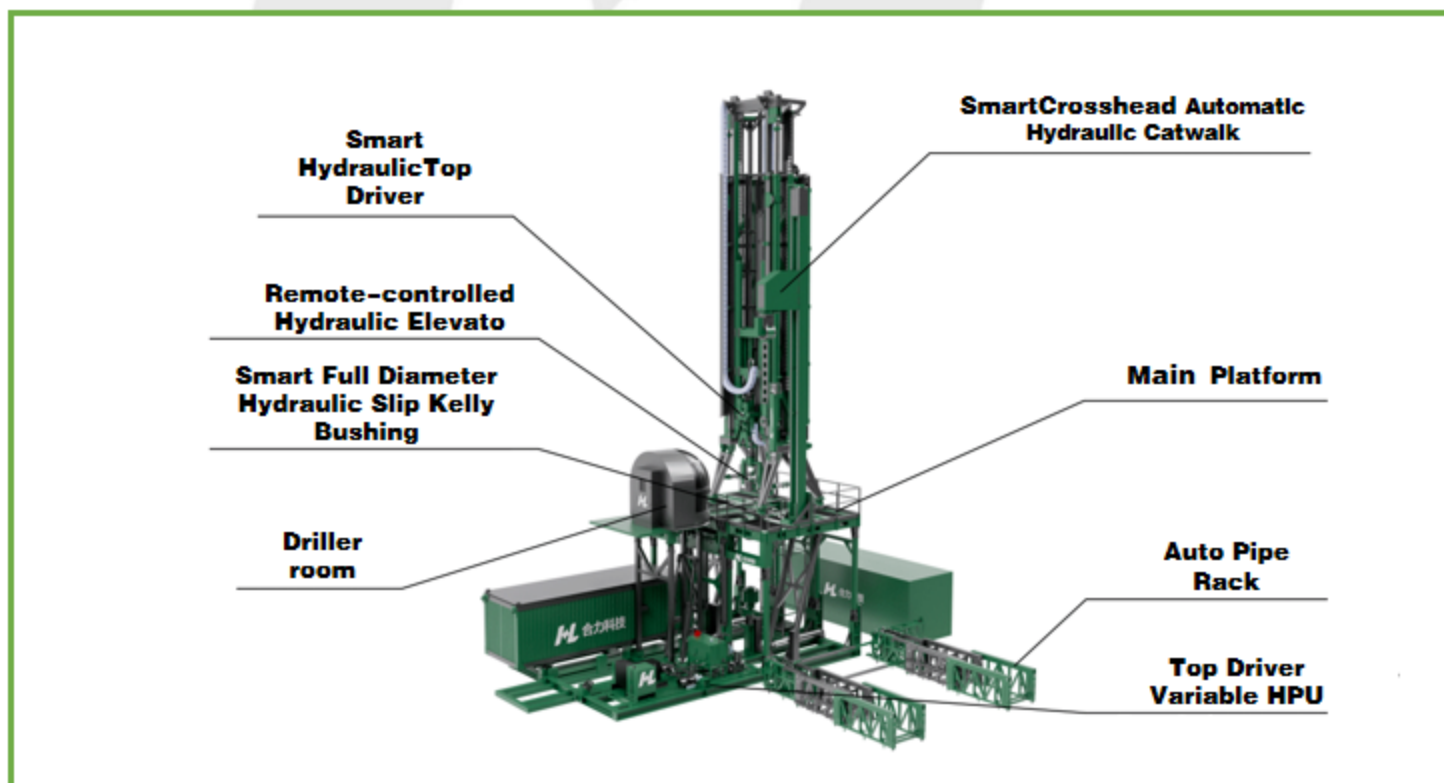


## Introduction

HELI full-automatic intelligent platform comprehensively applies advanced technologies such as machinery, hydraulics, electrics, robotics, intelligent control, etc. It adopts integrated and modularized design concepts, and has remarkable features such as complete functions, compact structure, reasonable layout, and convenient disassembly and transportation. Including hydraulic slips, hydraulic rotary table, crosshead pipe grabber, automatic pipe handler, light iron roughneck, swivel, automatic handling device for BOP stack, automatic hydraulic lifting derrick, slingshot automatic all-hydraulic lifting base, multi-functional power station, control system integration device, and coiled tubing injection head lifting platform, etc.

## Benefits and Features

- The centralized control unit adopts a high-performance CPU unit, which realizes coordinated movements of motion modules and precise position control
- The platform is optional for unmanned automated operation of small workover rig, making small workover rig to complete large workover operation or coiled tubing drilling operation
- Dynamic sensing of the drilling string status, compensating for the leg stroke cylinder lifting and lowering, assisting in increasing the lifting force and downforce of the platform
- Mechanical arm automatically calibrates the position of drill pipe; mechanical arm automatically centralize the mud injection device
- Foldable platform, realizing high efficiency arrangement
- Can be equipped with oil pipe scraping and cleaning device, good environmental performance





## Introduction

This is submersible electronic module (SEM) for underwater HIPPS and X-mas tree, mainly used for underwater data acquisition of various types of sensors, underwater solenoid valve drive of various types. The external interface is up to 100+ channels. The functional safety is in accordance with SIL3 rating, and the product conforms to API17F standards

## Application

Submersible HIPPS system, submersible production system

## Benefits and Features

- Dual Redundancy System
- High-speed long-distance carrier communication technology
- Strong expandability, up to 100+ external interfaces
- The first DNV-accredited manufacturer in China for products achieving functional safety level SIL3.

## Specification

Framework	System	Dual redundancy, 2oo1 mode; hot standby operation of each power supply of dual systems; data synchronization of key boards of dual systems
	Chip	ARM + FPGA
Power	Working Voltage	220VAC $\pm$ 10%
	Function	4-channel DC power isolated output; voltage, current detection, protection
Communication	Type	Power Carrier
	Voltage (VAC)	400~800
	Rate (kb/s)	>20.0
	Distance (km)	35
Interface	Analog Acquisition	42 channels 4-20mA; loop powered; all channels with active shutdown
	Digital Output	48-channel 24V12W solenoid valve drive; all channels with over-current protection, over-temperature protection, drive status retrieval, drive current collection; 12-channel with active shutdown function
	Digital Communication	6-chaneels CAN; 2-channels RS422; 8-channels RS485
Upper Computer	Upper Computer	Configuration of the host computer; remote diagnostics; remote firmware upgrade
Safety Function	Circuit	3-channel PT collects pressure signal, when overpressure, 4-channel solenoid valve emergency shutdown
	Level	SIL3
	Organization	DNV
Accreditation	Standard	API STD 17F-2023 includes temperature, vibration, shock, and electromagnetic compatibility (self-tested and passed).
	Organization	DNV



## Introduction

The belt tong is originally designed for hi-torque M/U & B/O for offshore operation. It has been widely used because of the benefits of lightweight and portability. The belt is safer with more friction and higher torque without corrosion. Besides, the belt will not fly away even when damaged

## Features and Benefits

- Provide a safer working environment for labor
- High friction, no corrosion
- The quick-wear parts are easy to change
- Torque up to 165,600 ft.lbs



## Specification

Pipe Size (in)	Type	Hi-torq. Arm (in)	Max Torque (ft.lbs)	Max Tensile (lb)
9 5/8	HL1020-0958	46.31	49,400	12,800
9 7/8	HL1020-0978	46.44	49,500	12,800
10	HL1020-1000	46.50	49,600	12,800
10 3/4	HL1020-1034	46.88	50,000	12,800
11 3/4	HL1020-1134	47.38	50,500	12,800
12 3/4	HL1020-1234	47.88	51,100	12,800
13 5/8	HL1020-1358	48.31	51,500	12,800
16	HL1020-1600	49.50	52,800	12,800
18	HL1020-1800	50.50	53,900	12,800
20	HL1020-2000	51.50	54,900	12,800

Pipe Size (in)	Type	Hi-torq. Arm (in)	Max Torque (ft.lbs)	Max Tensile (lb)
22	HL2036-2200	47.60	77,700	18,900
24	HL2036-24	48.56	81,300	20,100
29	HL2036-29	51.00	90,500	21,300
30	HL2036-30	51.48	92,200	21,500
32	HL2036-32	52.46	95,700	21,900
34	HL2036-34	53.43	98,800	22,200
36	HL2036-36	54.40	102,000	22,500
38	HL2036-38	55.38	105,200	22,800

## Introduction

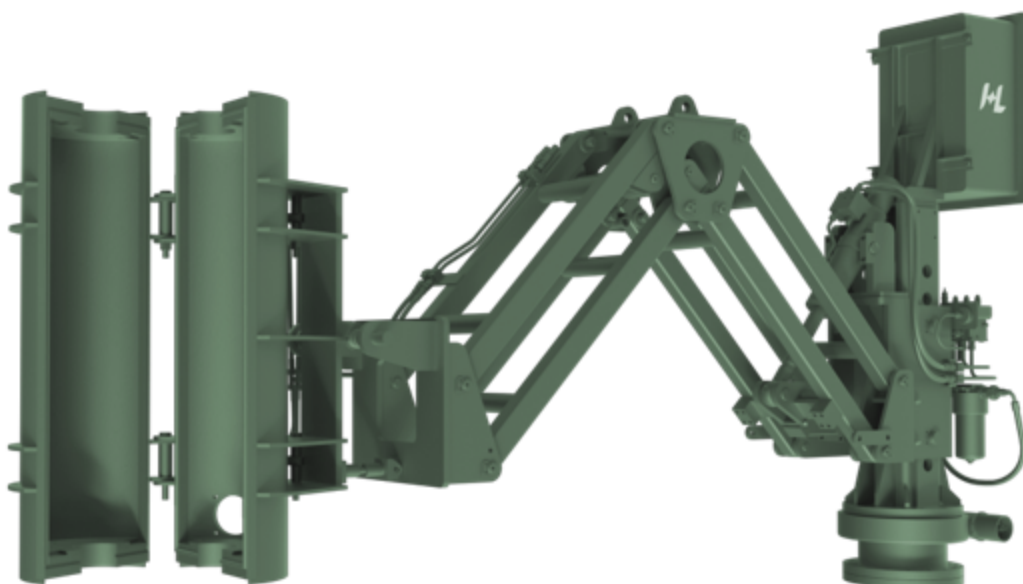
In order to meet the HSE requirements of drilling operations, mud box is widely used in breaking out drill pipes, which is a device to prevent mud splashing around. Heli hydraulic mud box adopts a new combination of hydraulic and electronic control, combining the reliability of hydraulic hand operation, and the convenience of remote & electric control, realizing the automation of wellhead equipment

## Features and Benefits

- Multi control: manual, remote and upper computer system
- One-button operation can be triggered by remote control or upper computer in automatic mode
- RJ45 is installed in explosion-proof box, default MODBUS TCP communication protocol (can be customized upon customer requirements), supporting remote control of upper configuration
- The controller in the explosion-proof box is SIEMENS 1200 series, which has automatic operation, timeout warning & stop and one-button emergency stop

## Specification

Rated Power(W)	300
Rated Voltage(VDC)	24
Rated Current(A)	2
Protection Level	IP65
Temperature(°C)	-20~50
Communication Protocol	MODBUS TCP



## Features and Benefits

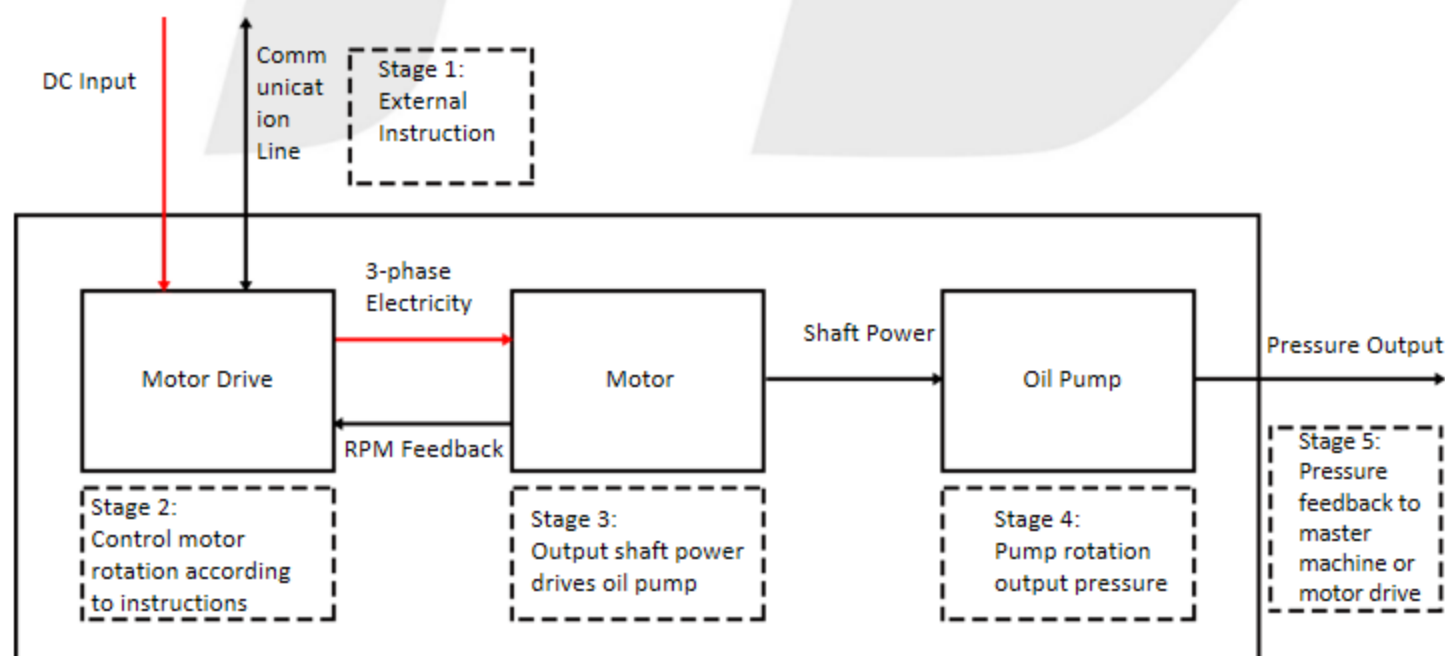
- Adopt 4-wheel 4WD drive mode to provide larger output torque, increase climbing ability and can turn in place
- Universal chassis structure design to realize free replacement of wheel and crawler; wheel type can provide faster movement speed; crawler type can adapt to more complex road surfaces such as mud and sand to achieve greater dragging force and pass-ability; richer applicable scenes
- Adopt 3D laser SLAM navigation, combined with 2D laser point cloud obstacle avoidance, to realize high-precision and high-safety autonomous inspection operation
- The head can be lifted and lowered to cope with complex site environment
- Equipped with explosion-proof wireless charging function components to improve the convenience, reliability and safety of autonomous charging
- Equipped with visual, auditory and various sensors, with intelligent identification algorithms, all-round coverage of various detection needs



## Specification

Chassis (mm)	1250 X 920
Height(mm)	1200
Weight(kg)	350
Navigation	3D laser radar SLAM & IMU Posture correction
Obstacle Avoidance	2D LiDAR point cloud obstacle avoidance
Drive	4 drive
Turning Radius	Rotate in place
Max. Covering(m <sup>2</sup> )	400 thousand
Protection Level	IP66
EP Level	Exd IIB T4 G
Max. Speed( m/s )	Wheel 1.5    Track 0.7
Endurance(hrs)	6
Repeat Position Accuracy(mm)	±20
Continuous Wading Depth(mm)	100
Power(W)	800
Battery	Lithium iron phosphate
Charging	Wireless Charging
Temp(°C)	-40 to +60
Communication	WIFI, 4G, 5G

Research Topic	Research Content	Achievement Submitted
A highly reliable motor drive system with fault-tolerant control	1. Algorithm: motor control strategy with fault-tolerant control, research on a dual-mode motor control strategy with fault diagnosis, identification of system faults, and fault-tolerant operation under partial faults 2. Hardware: a motor drive hardware circuit with partial hardware redundancy, which can continue to operate normally after the power devices are damaged through software cooperation	1. Product: a highly reliable motor drive system with fault-tolerant control 2. Patent: Motor fault-tolerant control algorithm patent 3. Patent: Highly reliable motor drive system patent
A model-based state observation method for electro-hydraulic drive systems	Research on a physical model-based state estimation algorithm for electro-hydraulic drive systems, with a limited number of Electric signals collected, through the model-based estimation algorithm, real-time calculation of the current system pressure output, torque output and other important indicators	1. Patent: A model-based state observation method of electro-hydraulic drive system Patent
A high reliability miniature oil-immersed motor	Research on a special micro-motor for oil-immersed working conditions, through the optimization of electromagnetic parameters, structural optimization and the improvement of the production process, to enhance the life and reliability of the motor	1. Product: A kind of high-reliability miniature oil-immersed motor 2. Patent: A kind of high-reliability micro oil-immersed motor design method
Underwater electro-hydraulic double acting control system	An underwater electro-hydraulic double-action control system, the system mainly includes a communication module, a master control module, and a motor drive module. The system can control the valve to switch on and off through the electro-hydraulic system when the valve fails to act mechanically	1. Product: A kind of high-reliability miniature oil-immersed motor 2. Patent: A kind of high-reliability micro oil-immersed motor design method
Underwater electro-hydraulic double-acting switching valves	Research a can be underwater can be mechanically, hydraulically two ways to control the valve switch, improve the reliability of the valve	1. Products: Underwater electro-hydraulic double-acting switching valve 2. Patent: Underwater electro-hydraulic double-acting switching valve





## Introduction

The platform is mainly composed of all-electric control power tongs, anti-torque wireless chucks, bidirectional all-electric centralizing manipulators, etc. It is a key automated equipment that can be integrated with the platform's own hydraulic elevators and automatic catwalk machines to complete critical operations such as string handling, centralizing, and precise make-and-break of pipe strings. By applying servo motors and Technology's proprietary micro-electro-hydraulic technology, it eliminates the need for traditional equipment to have additional hydraulic stations and numerous hydraulic pipelines. It only requires a single cable to meet operational requirements

## Specification

Pipe String Range	2-3/8" ~5-1/2"
Control Precision (mm)	±2
Power (kW)	10
Overall Dimensions (mm)	2800*1550*2070
Power Supply	308V/50Hz
Weight (Kg)	4600
Make-and-Break Torque (KNm)	34



## Introduction

This iron driller is of a 360° continuous rotating structure, capable of simultaneously meeting the make-and-break operations for drill pipes, tubing and casing. By applying servo motors and micro-electro-hydraulic technology, it eliminates the need for traditional iron drillers to be additionally equipped with hydraulic stations and numerous hydraulic pipelines. It only requires one cable to meet the operation requirements

## Specification

Drill Pipe Range	2-3/8" ~3-1/2"
Casing and Tubing Range	3-1/2" ~5-1/2"
Maximum Make-and-Break Torque (KNm)	34
Maximum Rotation Speed (rpm)	60
Power (KW)	18
Power Supply	380V/50Hz
Horizontal Travel Stroke (mm)	2000
Vertical Lifting Stroke (mm)	1200
Overall Dimensions (mm)	1700*1030*2270
Weight (kg)	1480

The transfer device can be optionally equipped with rails, support arms, or a foldable structure according to specific requirements



## Introduction

This type of iron roughneck adopts an upper-lower split structure. The upper make-up mechanism uses a servo motor instead of a traditional hydraulic motor; the lower break-out tongs adopt a three-layer pipe tong clamping structure, and the opening degree of the clamping mechanism can be adjusted by the motor in real time according to the drill pipes of different sizes. By applying servo motors and Heli Technology's unique micro-electro-hydraulic technology, the need for additional supporting hydraulic stations and numerous hydraulic pipelines in traditional iron roughnecks is eliminated. Only one cable is required to meet the operation requirements

## Specification

Clamping Range	2-7/8" ~10"
Maximum Make-up Torque (KNm)	135
Maximum Break-out Torque (KNm)	160
Maximum Spinning Torque (Nm)	4000
Maximum Spinning Speed (rpm)	60
Power (KW)	40
Power Supply	380V/50Hz
Horizontal Travel (mm)	2000
Vertical Lifting Stroke (mm)	1600
Rotation Angle (°)	±90
Overall Dimensions (mm)	1700*1200*2400
Weight (kg)	3850

The transfer device can be optionally equipped with a boom or a rail type according to actual needs

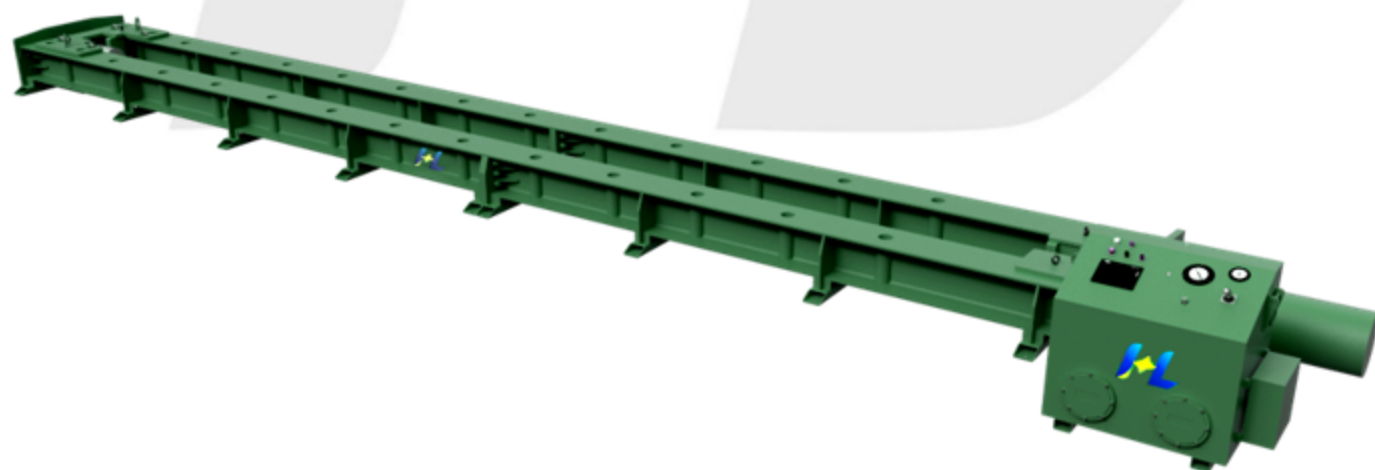


## Introduction

The hydraulic tensile frame is mainly used for testing the tensile and pressure performance of downhole tools such as jars, shock absorbers, and accelerators, and is one of the important testing equipment for petroleum downhole drilling tools. The equipment consists of components such as an equipment base, tailstock hydraulic push-pull device, auxiliary support device, and hydraulic operation table. It features convenient operation, smooth action, large push-pull tonnage, and high safety level

## Specification

Motor Power (KW)	15
Rated Working Pressure (MPa)	16
Maximum Thrust (T)	175
Maximum Tensile Force (T)	135
Test Tool Range (m)	1-11
Push-Pull Cylinder Stroke (mm)	1000
Main Unit Overall Dimensions (mm)	15000×1756×700



## Introduction

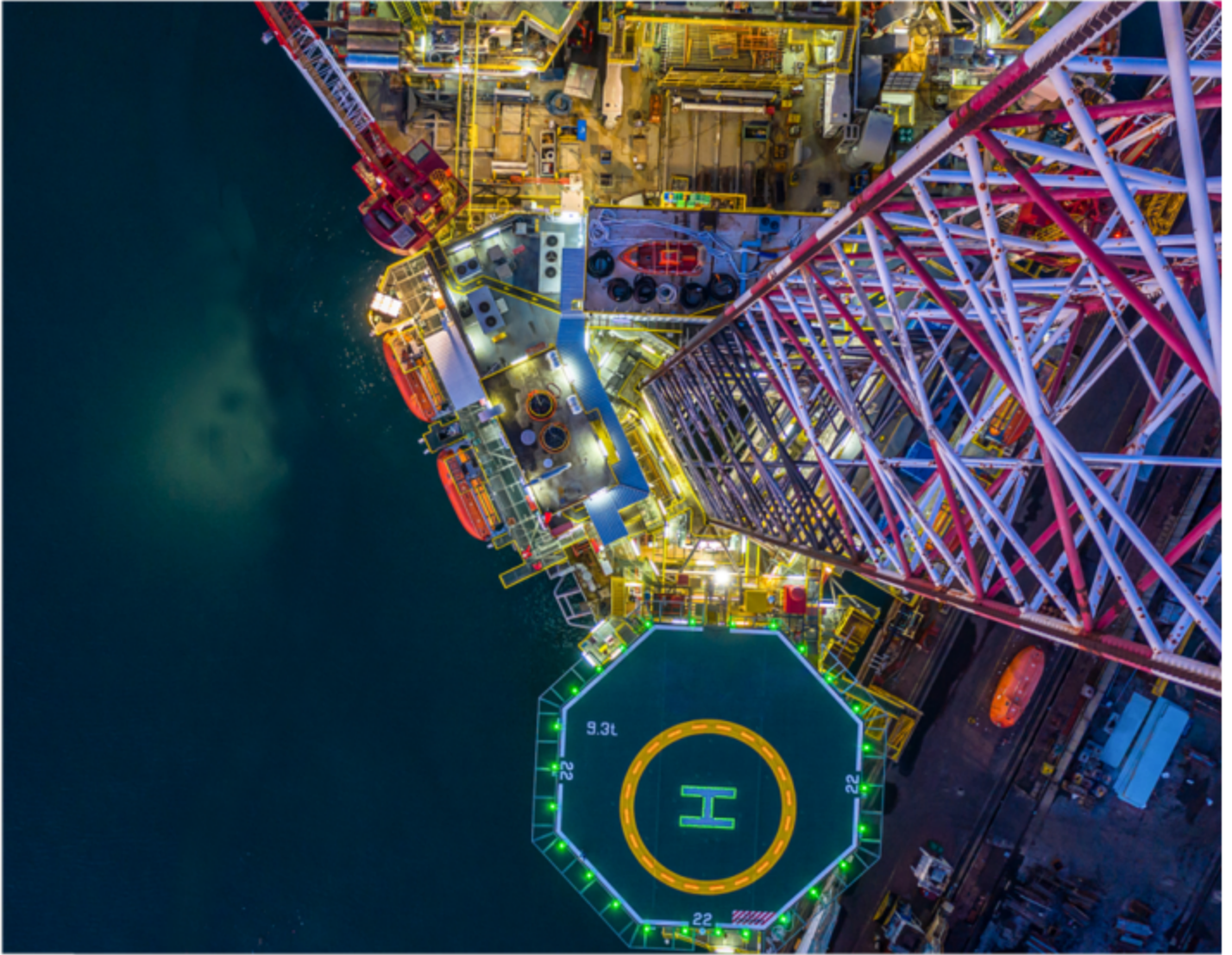
It is powered by a mini power station and uses a wireless module to achieve remote wireless control of the slips. During drilling operations, the slips can rotate together with the rotary table without disconnection. The pipe square kelly bushing is installed on the slips and rotates together with them. Driven by hydraulic cylinders, the four rollers have a variable aperture, enabling the passage of drilling tools with larger diameters

## Specification

Overall Dimensions (mm)	1100x740
Suitable Pipe Diameter	2 3/8—5 1/2 Drill Pipe, 4 1/2—5 1/2 Casing
Clamping Force (KN)	14000
Working Pressure (MPa)	14-20
Flow Rate (L/min)	0.2-0.4
Battery Capacity (AH)	150
Voltage (V)	DC48







## Deep-sea Equipment Management

Heli performs full life-cycle tracking and preventive maintenance with independent-developed software system. A series of projects have been completed including HYSY981, SINOPEC KT-4, Gazprom North Star & North Light, and a large number of data has been collected.



## Geo-Engineering IPM Service

- Oil & Gas Development IPM
- Wellbore Re-entry and Stimulation IPM
- Geo-thermal Development IPM







## Geo-Engineering IPM

Heli Geology-Engineering IPM Service is an organic combination of Geology Analysis & Engineering Operation

Focusing on single well production enhancement, the Geology Analysis provides targeted & predictive research to constantly optimize the program of drilling and fracturing on different stage of reservoir development

The Engineering Operation is not simple accumulation of different product lines, but an integration of Heli downhole tools matrix and delicacy management of project. Based on the specific geology and engineering condition, a customized ROP improving program is proposed for each single project, maximizing the profit of client by reducing well construction period

# Heli Geo-Engineering IPM Advantage

## Geology Analysis

Focusing on single well production enhancement, the Geology Analysis provides targeted & predictive research to constantly optimize the program of drilling and fracturing on different stage of reservoir development

## Technology Innovation

To improve ROP, precise steering & cementing quality by applying Heli downhole tools matrix

## Complex Downhole Troubleshooting

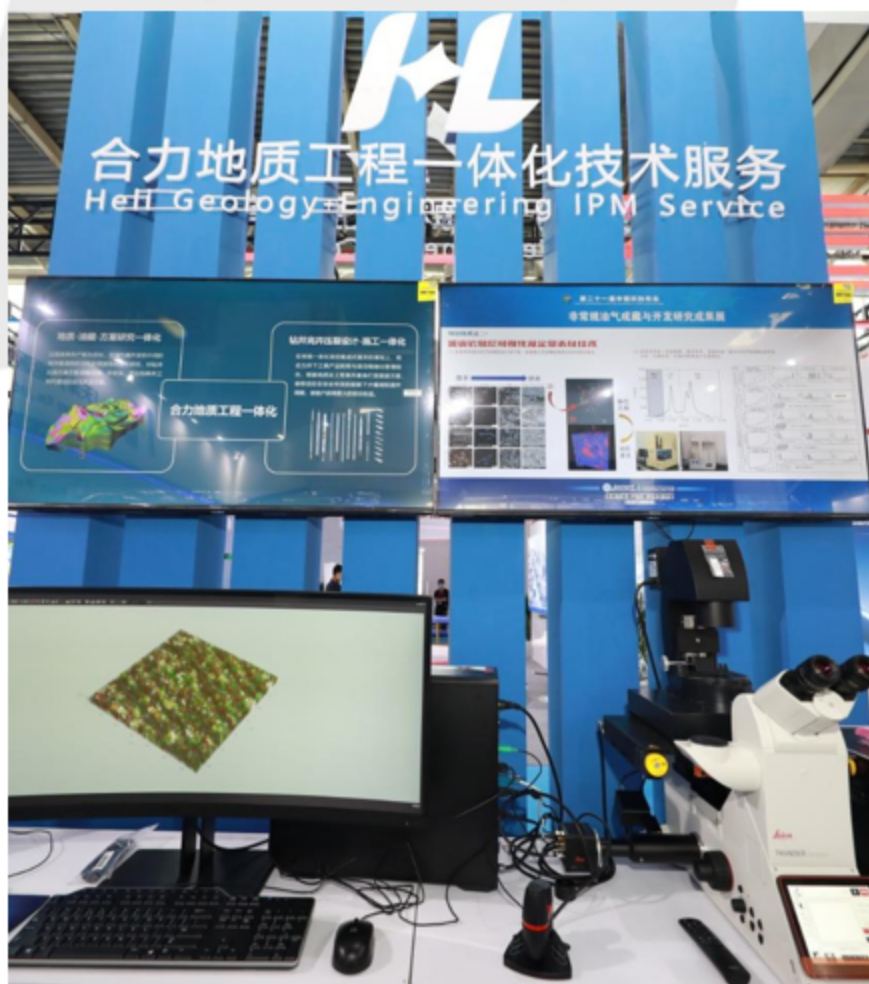
The normal drilling can be recovered quickly when complex condition happened utilizing independent developed fishing tools

## Cost Management

To control project cost by former international IPM team

## Equipment Management

The most strictly certified system of drilling device maintenance guarantee the stable running of drilling rig



**Solve the pain point problems for customers**

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