

# **FORWARD**

## **C4 CORING DRILL RIG**

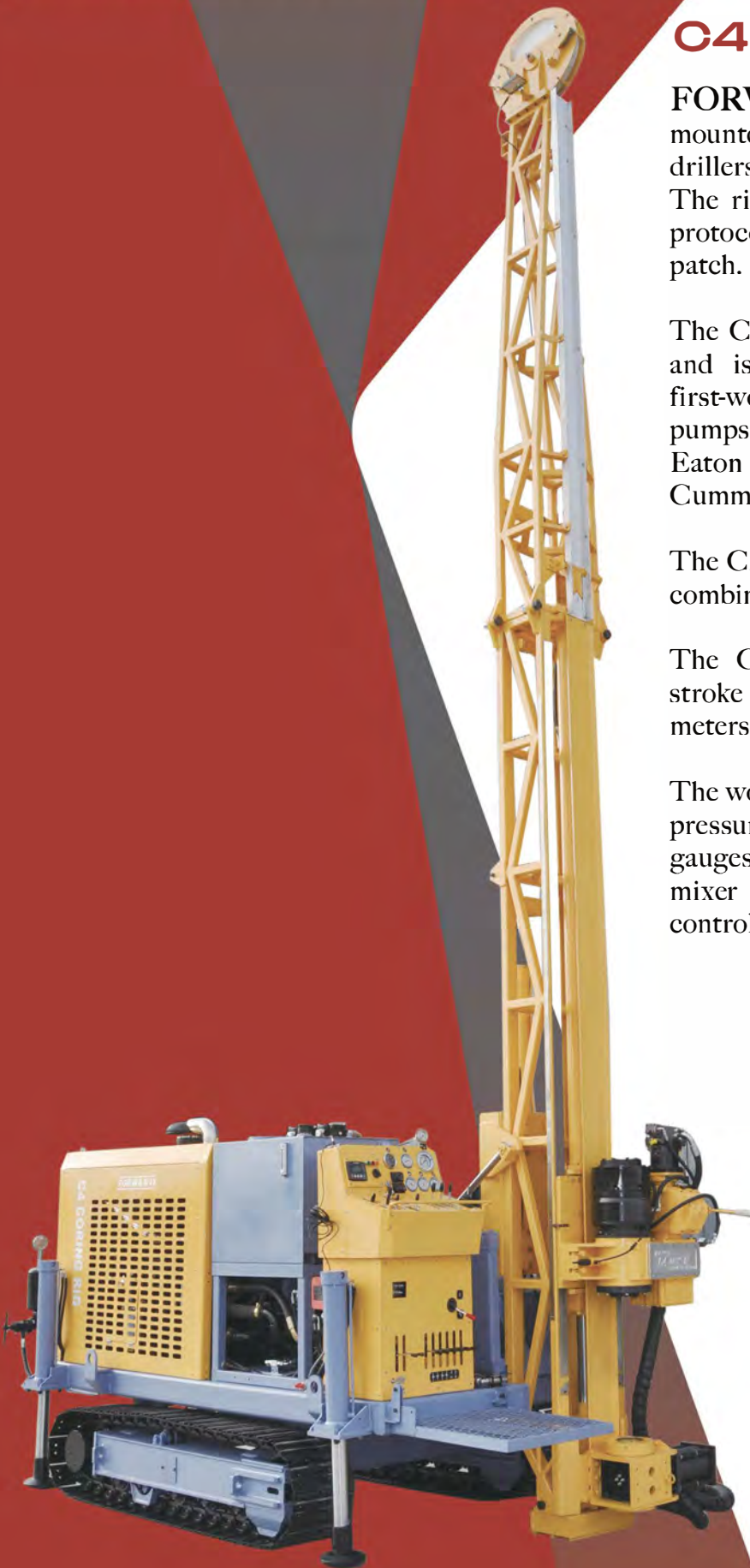
FORWARD'S C4 is a compact crawler mounted rig with all the user-friendly functions drillers are looking for and all at their fingertips. The rigs are built under strict quality control protocols and are rigorously tested before dispatch.

The C4 has been built with reliability in mind and is assembled using only the very best first-world components such as Bosch Rexroth pumps and HAVE valves, Bosch Rexroth and Eaton hydraulic motors, Manuli Hoses and Cummins engines.

The C4 has the 4 speeds gear box provides free combination of torque and rotation speed.

The C4 equipped PQ chuck and 3500 mm stroke of rotation facilitates handling of rods of 3 meters length.

The wonderful convenience of control of feeding pressure, Real time reading of drilling data on gauges on the control panel. Mud pump and mixer powered by the rig's hydraulic system, controlled directly on the rig's panel.





With safety in mind, the C<sub>4</sub> has all the features that you'd expect in a modern rig such as safety guards and emergency stop buttons on all corners of the rig, fire extinguishers and optional automatic Co<sub>2</sub> fire suppression.

## ROTATION HEAD

The 4 Speed Rotation Head can accept all sizes of coring rods up to PQ.

Patented chuck jaws and hydraulic opening/spring close function insures a fail-safe operation.

The Rotation Head is connected direct to the hydraulic feed cylinder which simplifies the whole mast design and minimizes maintenance.

The Rotation Head also rotate to the side and opens the whole mast up to run casing or pull tubes etc.

## MAST

The Rigid design of the mast provides superior performance and reliability even under the toughest geological conditions.

The set-up controls are mounted at the side of the rig and can be isolated from the circuit during drilling operations.

The Mast raise cylinders are equipped with balancing valves to increase safety.

The folding mast allows the rig to be transported on short trailers or in a shipping container.

The Dump Mast reaches the ground at angles up to 45degrees and ensures all the pullback forces are absorbed by the ground and not the rig.





## **CONTROL PANEL**

Both the Rotation and Fine Feed controls are fitted with friction dampeners with positive and easy to find neutral positions.

All the gauges are conveniently located for ease of monitoring.

## **HOOD**

The steel hood provides adequate protection from the elements yet opens up for ease of maintenance.

## **HYDRAULIC SYSTEM**

All the hydraulic pumps are genuine Variable Displacement, Pressure Compensated, Load Sensed Sauer Danfoss Piston pumps.

## **MAIN HAUL WINCH**

The Haul Winch is securely mounted central to the rig chassis.

## **WIRELINE WINCH**

The Wireline Winch has auto spooling and 1500 meters capacity.

## **CRAWLER CHASSIS**

The Crawler chassis is manufactured in house and has quality Korean sourced hydraulic drive motors.

## **MUD PUMP**

The 1000psi mud pump is conveniently located at the front of the rig for ease of maintenance but high enough to allow a descent angle of attack when traversing creek beds.





## TECHNICAL SPECIFICATIONS

ROD SIZE	MUD FILLED HOLE	
Drill Rod/Core Barrel	Hole Depth (Meters)	Hole Depth (Feet)
BRQ/BQ	1,300	4,265
NRQ/NQ/NQ2	1000	3,280
HRQ/HQ	700	2,300
PHD/PQ	400	1,312

\* The figures have been calculated based on a vertical, straight, clean down hole using a 8000Kg hoist (single line pull). Actual drilling capacity will depend on in-hole tools, conditions, drilling techniques and equipment used.

### Engine

Cummins 6BTA5.9-C180, liquid cooled, turbo charged, inter-cooled diesel engine

	Metric	U.S.
Displacement	5.9 L	5.9 L
Power (maximum) at 2,500 RPM	132 KW	180 HP
Emissions Certification	EU II	EU II

### Torque and RPM Ratings

(hydraulic motor at maximum/minimum displacement at 2,200rpm engine setting)

	Speed (no load)	Torque (stall) (Max)
	RPM	Nm
1 <sup>st</sup> Gear	0 – 190	4 257
2 <sup>nd</sup> Gear	180 – 378	2 408
3 <sup>rd</sup> Gear	380 – 679	1 340
4 <sup>th</sup> Gear	670 - 1200	680

NOTE: Drill head output speed and torque are infinitely variable in each gear range as indicated. Actual rotation speed is affected by engine RPM and hydraulic motor displacement setting.



Hydraulic System		
	Metric	U.S.
Primary Pump	Axial piston, variable displacement load sensing, pressure compensated with low pressure standby.	
Max Flow	182 L/min	48 gpm
Maximum Pressure*	28 Mpa	4 060 psi
Secondary Pump	Axial piston, variable displacement load sensing, pressure compensated with low pressure standby.	
Max Flow	135 L/min	11 gpm
Maximum Pressure*	20 Mpa	2 900 psi
Tertiary Pump	Axial piston, variable displacement load sensing, pressure compensated with low pressure standby.	
Max Flow	39 L/min	26 gpm
Maximum Pressure*	21.5 Mpa	3 120 psi

\*Factory setting

Drill Head	
Stand PQ – Hollow Spindle	
Rotation Motor	Bosch Rexroth hydraulic motor – variable/reversible
Mechanical Transmission	Funk 4 speed
Final Drive	Straight cut gears
Head lateral movement	Hydraulically operation
Hydraulic PQ Chuck	Hydraulically opened. Disk spring closed.
	Axial holding capacity of 244 640 N (55 000 lbf)
Drill Head Lubrication	Force fed to the bearings and oil bath for gears
Lubricating Oil Filtration	25 micron high pressure oil filter

Drill Mast And Feed System		
	Metric	U.S.
Feed Stroke	3.5 m	11.5 ft
Feed Pull	107 000 N	24 054 lbf
Feed Thrust	59 600 N	13 400 lbf
Rod pull	6 m	20 ft
Drilling Angle	30° off horizontal to 90° vertical down	

Draw Works		
	Metric	U.S.

#### Main Line Hoist

##### Double speed motor

##### Hook Load ( single part line)

Bare Drum	80 000 N	17 894 lb
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##### Hoisting Speed (single part line)

High Speed (Bare Drum)	85 m/min	278 ft/min
Low Speed (Bare Drum)	50 m/min	164 ft/min
Main Hoist Cable	22mm	0.886 in
Minimum Breaking Strength	160 000 N	35970 Lbf
Foot Clamp Capacity	PWT	

#### Wireline Hoist

Line Pull		
Bare Drum	1 500 Kg	3 300 lb
Full Drum	425 Kg	940 lb
Line Speed		
Bare Drum	121 m/min	395 m/min
Full Drum	430 m/min	1 410 m/min
Drum Capacity (6mm swaged)	1 600 m	5 250 ft
Minimum Breaking Strength	3 420 Kg	7 540 lb

Additional Information		
	Metric	U.S.
Fuel Tank Capacity	200 L	52 US gal

Fluid Circulation Pump		
Single-Action Triplex Piston Pump, Manual shift, Pump Speed are infinitely variable.		
	Metric	U.S.
Displacement	0 - 160 LPM	0 - 42 gpm
Pressure	0 - 10 Mpa	0 - 1 450 psi

## DIMENSIONS AND WEIGHT

Dimensions and Weight	
Weight	8 500 Kg
Transportation Dimensions (L×W×H)	6 200 ×2 240 × 2 600 mm

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