

## EXPLORAC R50 Technical specification

EXPLORAC R50 is a robust and reliable drill unit, making it ideal for remote areas. It is designed to perform an outstanding base platform for "down-the-hole" percussion drilling and rotary drilling. Separate drill rig subframe design permits stable mounting on various standard trucks as well as special vehicles.

### BASIC DATA for a standard unit

Basic weight less carrier	5400 kg
Pulldown	48,8 kN
Hold back/lift	80,9 kN
Rotation head	OMT 250
Speed	0 - 97 rpm
Torque, max	5750 Nm
Feed travel length	4,4 m
Drill pipe length	3,0 m



These engineering specifications are computed on a theoretical basis. Actual capacities will vary according to specific drilling ambient conditions. Atlas Copco Craelius reserves the right to change specifications without notification or obligation.

## **STANDARD EQUIPMENT**

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## POWER SOURCE

*Standard equipm.*

A deck mounted 4-cylinder Deutz engine is used as prime mover for the hydraulic system. The model F4L912 is a naturally aspirated, four cycle, direct injected, air-cooled diesel engine, for powering the hydraulic pumps, which are mounted on the flywheel side. Ambient temperature maximum 50°C.

Model	Deutz F4L912
Number of cylinders	4
Power	46 kW at 2300 r/min
Torque	230 Nm at 1600 r/min
Displacement	3,77 dm <sup>3</sup>

Fuel consumption	225g/kWh at max torque, 12,7 lit/hour
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Fuel tank volume	90 lit
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Air cleaner	Dry heavy duty with replaceable main and safety elements with dust load indicator.
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Engine safety	Low oil pressure, high oil temperature and V-belt failure.
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Installation includes	24 V electrical system, fuel filters, lube oil filter, instruments and controls, muffler and heavy duty base.
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## PLATFORM ASSEMBLY

The platform is designed for mounting on a truck chassi, trailer or crawler. The assembly consists of three major parts, front frame, middle frame and rear frame. The idea with this platform design is that it can easily be adapted to most type of carriers. Two longitudinal beams are adjusted in length and width to match the carrier. Rear frame and front frame have fixed measurements and only the middle frame will be adjusted to the final mounting. A spirit level is mounted for easy levelling of rig before raising the mast.

## **OUTRIGGERS, MAST TILT AND SLIDE**

*Standard equipm.*

The four outriggers system uses heavy square section structural tubes which house the hydraulic cylinders. This construction protects the hydraulic cylinder from damage caused by dirt or hard object contact and removes imposed side loads from the hydraulic cylinder rod and rod bearings. The outriggers are bolted to the platform assembly. Dual lock check valves hold the outriggers in both load supporting and transport position. The rear outriggers are independently positioned hydraulically. The front outriggers are hydraulically communicating and jointly manouvred.

Outriggers (4 pcs)	Bore	80 mm
	Piston rod	50 mm
	Stroke	900 mm

The mast tilt cylinder is cushioned to reduce shock loads imposed on the mast pivot support.

Mast tilt cylinder (1pc)	Bore	100 mm
	Piston rod	50 mm
	Stroke	600 mm

The mast support/holder is fitted with a cylinder so the mast, when raised, can be slided 800 mm vertically. This gives the operator a facility to arrange the mast at a convenient height above ground.

Mast slide cylinder (1pc)	Bore	80 mm
	Piston rod	40 mm
	Stroke	800 mm

The outriggers, mast tilt and slide are operated from a separate valve block located on the right hand side of the rig.

## **MAST**

*Standard equipm.*

The mast is constructed from cold-finished steel, pivoted and provided with a hydraulic cylinder for horizontal positioning during transport and vertical during drilling. In the mast top is a fixed jib boom mounted with two pulleys. The outer pulley is used for pipe handling. The inner pulley is used for heavy lifts over the bore hole center line.

At the bottom of the mast is the break-out table with a maximum opening of 310 mm including two sets of inserts from 310 to 203 mm and 203 to 150 mm. Inserts for specified drill pipe size must be ordered separately. The front of the slip box is hinged and can be opened for easy access to the bore hole. A cylinder with 300 mm stroke is fitted on the right side of the table with a 48" Rigid pipe wrench for breaking out tool joints. Chain tong is available as option.

Mast overall length	6200 mm
Feed travel length	4400 mm
Max distance between floating sub and B-O table	4200 mm
Drill pipe std length	3 m

Below the break-out table mounts a rubber curtain for improving working environment, preventing cuttings and water to splash on the crew.



## FEED SYSTEM

*Standard equipm.*

The feed system is activated by one hydraulic traverse cylinder mounted inside the mast. The force is transmitted to the top head by a heavy duty chain. The chain connects to the slab-back to which the top head is mounted. Drilling is done in "slow feed" mode and includes adjustable pressure relief valves for pull down and hold back insuring correct bit load at all times. Pipe handling is done in "rapid feed" mode saving considerable time when performing roundtrips or when retrieving the string. Feed and rotation is independently controlled.

Feed cylinder stroke	2200 mm
piston Ø	100 mm
piston rod Ø	63,5 mm
Feed force (theor.)	48,8 kN
Pull down speed, slow	16,8 m/min
Pull down speed, rapid	48,2 m/min
Pull up capacity (theor.)	80,9 kN
Pull up speed, slow	10,2 m/min
Pull up speed, rapid	29,1 m/min

## TOP HEAD ROTATION

The heavy duty top head has been designed to provide drilling speed and torque characteristics for "down-the-hole" hammer technique and light rotary drilling. The rotation head is a single reduction oil bath gear box, ratio 3,89:1, equipped with two hydraulic motors type OMT 250 as standard. The motors have maximum torque at near stall conditions.

Housing	Fabricated and machined steel
Mounting	Flanged mounted to a cradle of "swing-out" type to allow lifting in centre line with winch. The cradle is guided at the mast rails with adjustable rollers.



## **TOP HEAD ROTATION** (continued)

*Standard equipm.*

Main shaft Alloy steel with 50 mm through hole.

Rotation input power 38 kW

Torque max. at 210 bar with standard two motors 5750 Nm

Speed range for standard motors 0 – 97 rpm

Floating spindle Direct flanged to gear box with 3 ½” reg box thread.

## **WINCH**

A hydraulically powered winch is mounted on the rear part of the platform. The steel wire rope can be guided either over a swivel mounted pulley block at the fixed jib boom which facilitates pipe handling or over a fixed pulley block in the jib boom for lifting in the centre line. The winch runs independently of the rotation and slow feed hydraulic circuits.

Pull capacity, empty drum	17 kN
Rope speed, empty drum	18,6 m/min
Wire rope supplied	30 m, Ø 10 mm

## **AIR SYSTEM AND LUBRICATOR**

A complete 50 mm (2 in) air system for 20 bar (290 psi) pressure is mounted on the rig. There is also a pressure regulator connected to a branch line reducing maximum outlet pressure to 7 bar (100 psi) for simultaneously running of optional pneumatic equipment when high pressure is used for the drilling operation.

An in-line venturi type lubricator, including a needle valve, is mounted in the air line for lubricating percussion tools. An oil tank with 20 lit capacity is included as well.

Use only lubrication oil recommended by tool manufacturer. Check that oil actually reaches the hammer before drilling starts.

## **CONTROL PANEL**

*Standard equipm.*

All operating controls and instruments are conveniently placed on the control panel on the left hand side of the mast within sight of the bore hole and protected by a lockable hood. All controls for positioning the rig are mounted separately in order to avoid accidental operation during drilling.

Following controls and instruments are mounted in the control panel

- slow and rapid feed control including press. gauges
- rotation control and press. gauge
- rotation speed control
- feed and hold back press.
- winch control
- valves, air press. gauge, main air valve, rpm counter, panel light and emergency stop
- controls for optional equipment are also installed in the panel

## **TOOL COMPARTMENT**

A tool compartment can be mounted below deck on either right or left side for storing of bits and hand tools.

Volume 0,7 m<sup>3</sup>

## **WORK LIGHT / ELECTRIC SYSTEM**

The 24V electric system is connected to the separate diesel engine. Circuits are protected by fuses.

Alternator	27A, 28V	
Lights	mast	2 x 100W floodlights
	control panel	2 x 5W panel lights
	work area	1 x 100W floodlight
	work area	1 x 24W floodlight

## HYDRAULIC SYSTEM

*Standard equipm.*

All drilling and associated functions are powered by an open loop hydraulic system. Three pumps, two fixed gear pumps and one variable volume piston pump, of heavy duty type provide a long trouble free operation. All hydraulic circuits are protected by safety valves.

The hydraulic system is designed for continuous drilling operation in an ambient temperature of up to 50°C. All hydraulic hoses are SAE 100R2A or equivalent and fitted with swaged connections manufactured for JIC/ISA standards. The hydraulic tank has a capacity of 240 lit. and has in-tank return oil filters with 10 micron filtration. The tank is also fitted with a breather and a hand pump so oil may be filled directly from a barrel through the tank filter.

Fixed wing pump for rotation circuit	25VQTxxx12 max. flow 92 lit/min, 40 cm <sup>3</sup> /r
Fixed wing pump for rapid feed and auxiliary functions circuit,	V20xxx11 max. flow 82 lit/min, 35,7 cm <sup>3</sup> /r
Variable piston pump for slow feed circuit	max. flow 25 lit/min

Rated volumes refer to 2300 rpm with separate diesel engine power pack.

## OIL COOLER

A heat exchanger package provides cooling for the hydraulic oil system. The system is thermostatically controlled to maintain minimum operating temperatures.

System design temp.	48°C
Cooling fan size Ø	538 mm
Cooling fan speed	2200 r/min
Fan drive	hydraulic

## HOLD BACK SCALE

The hold back gauge can be fitted with a scale ring. When the drill string is balanced the scale is set and when drilling starts (hold back pressure reduced) the correct bit load can be read off the scale.



## OPTIONAL EQUIPMENT

Not all options are compatible and therefore may not be available on the same unit.  
Please consult factory for confirmation.

### PRIME MOVER, 4-cyl turbo diesel engine

A four stroke, air cooled, direct injected turbo charged diesel engine for standard unit to be used at high altitude operations.

Model	Deutz BF4L 913
Power at 2200 r/min	68 kW
Torque at 1650 r/min	342 Nm
Cylinder volume	4086 cm <sup>3</sup>
Fuel consumption	200 g/kWh
Alternator	28V 27A

### PRIME MOVER, 6-cyl diesel engine

A deck mounted 6-cylinder Deutz engine can be used as prime mover for the hydraulic system and options when additional power is required. The model F6L912 is a naturally aspirated, four cycles, direct injected, air cooled diesel engine for powering the hydraulic pumps, which are mounted on the flywheel side. Ambient temperature maximum 46°C.

Model	Deutz F6L 912
Power at 2300 r/min	70 kW
Torque at 1600 r/min	345 Nm
Displacement	5660 cm <sup>3</sup>
Fuel consumption	225 g/kWh at max torque 19,3 lit/hr
Electrical system	24V
Fuel tank volume	90 lit
Engine safety	Low oil pressure, high oil temp., V-belt failure

This option adds appr. 150 kg.

## **PRIME MOVER, 6-cyl turbo diesel engine**

*Optional equipm.*

A deck mounted turbo 6-cylinder Deutz engine can be used as prime mover for the hydraulic system and options when additional power is required for high altitude. The model BF6L913 is a naturally aspirated, four cycles, direct injected, air cooled diesel engine for powering the hydraulic pumps, which are mounted on the flywheel side. Ambient temperature maximum 46°C.

Model	Deutz BF6L 913
Power at 2300 r/min	80 kW at 3000 m.a.s.l
Torque at 1600 r/min	384 Nm
Displacement	6128 cm <sup>3</sup>
Fuel consumption	225 g/kWh at max torque 27,1 lit/hr
Electrical system	24V
Fuel tank volume	90 lit
Engine safety	Low oil pressure, high oil temp., V-belt failure

This option adds appr. 150 kg.

## **MUD PUMP**

A hydraulic driven duplex piston mud pump can be fitted to the drill rig for mud rotary applications in unconsolidated materials. Speed is infinitely variable up to 100 r/min. The pump is mounted above deck, behind the truck cab.



## **MUD PUMP** (continued)

*Optional equipm.*

Included in the mud pump package is a set of a 4" suction hose, strainer, 2" discharge hose and mud mixing hose.

Model	Gardner Denver FXG99C 5"x6"
Size, bore	5"
Stroke	6"
Flow, clear water	568 lit/min
Pressure, max	21 bar

This option adds appr. 1800 kg.

## **ALTERNATIVE MAST**

The standard mast for 3 m drill pipe can be replaced by a longer mast to accommodate 6m long drill pipe.

Mast overall length	8,8 m
Feed travel length	7,0 m
Max distance between floating sub and B-O table	6,8 m
Drill pipe length	6,0 m (20 ft)

This option adds appr. 700 kg.

## **ROTATION MOTOR ALTERNATIVES**

The standard rotation unit is equipped dual hydraulic motors as per alternative 7 below. By selecting different size of motors, different torque and rpm options will be available. There is a choice of using a single motor or dual motors with a selector valve. Below table illustrates the different options.

	Motor type	RPM	Torque	
	OMT		Nm	kpm
Alt 1 single motor	160	0 - 148	1860	190
Alt 2	200	0 - 120	2310	236
Alt 3	250	0 - 97	2870	293
Alt 4	315	0 - 74	3725	380

## ROTATION MOTOR ALTERNATIVES (continued)

*Optional equipm.*

	Motor type OMT	RPM	Torque Nm	kpm	
Alt 5 dual motors	160	0 – 148	1860	190	in serie
		0 – 75	3725	380	in parallel
Alt 6	200	0 – 120	2310	236	in serie
		0 – 60	4630	472	in parallel
Alt 7	250	0 – 97	2870	293	in serie
		0 – 46	5750	586	in parallel
Alt 8	315	0 – 74	3725	380	in serie
		0 – 37	7470	762	in parallel

## SAVER SUB

To the rotation head is a floating sub flanged and the floating sub has a 3 ½" reg box tool joint.

In order to minimize wear and tear of the floating sub it is recommended to use a saver sub. In addition the saver sub can function as a cross over sub to pin instead of box or another type of thread.

This option adds appr. 10 kg.

## HELPERS PLATFORM

On the right side of the mast a helpers platform can be mounted to simplify handling of drill pipes.

This option adds appr. 80 kg.

## **WATER/FOAM INJECTION PUMP**

*Optional equipm.*

The water injection pump CAT1010 type has an incorporated pulse pump with independent supply lines for water and foam concentrate. The pump is driven by a hydraulic gear type motor. Water is supplied from a water tank or from external supply. A stand for a 20 lit foam concentrate container is option.

Valves for operation of the pump and metering of mixture are mounted on the operators control panel.

A suction hose  $\frac{3}{4}$ ", 3m long, with foot valve for use of separate tank or barrel can be provided separatly. A hose with quick coupling and nozzle for washing purpose is included.

Max flow 45 lit/min  
Max pressure 30 bar  
Rpm 900

This option adds appr. 70 kg.



## **WELDER/GENERATOR**

The MPM 7/265 ID-EL is a combined welder and generator powered by a Lombardini diesel engine. The unit can be mounted on the rig or delivered separatly.

### **D.C. welding**

Rated output at 35 % duty cycle	260 A – 30 V
Rated output at 60 % duty cycle	230 A – 29 V

### **Generator**

Three phase power	7kVA 400 V
Single phase power	5 kVA 230 V

The unit can be supplied with welding cables, electrode holder, chipping hammer, helmet and welding mask.

This option adds appr. 220 kg.

## **BREAKOUT TABLE INSERTS**

*Optional equipm.*

There are two sizes of inserts, 203 mm and 150 mm standard delivered with the rig. To guide selected drill pipes inserts are available for 114 mm, 100 mm 89 mm and 76 mm. Other sizes are available on request.

This option adds appr. 30 kg/ set.

## **HOLDING SPANNERS**

Holding keys, manually inserted, fitting into the break-out table are available in a range of sizes to fit key slots on drill pipes, DTH drills, subs, collars, stabilizers etc.

This option adds appr. 10 kg each.

## **BIT BREAKER PLATES**

Bit breaker plates are designed to fit in the break-out table to keep drill bit from rotating or falling through when the tool joint is loosened. Specify bit type, size and manufacturer. If not available, bit breaker plates can be supplied blank (bit profile not cut into the plate) for final fitting in the field.

This option adds appr. 7 kg each.

## **HYDRAULICALLY TILTED PIPERACK**

The standard fixed piperack can be replaced by a hydraulically operated rack for 3m long drill pipes. Two hydraulic cylinders tilt and shift the rack from transport to drilling position. The rack is activated from the auxiliary control panel by two levers.

Capacity of the rack is 20 pipes diam. 114 mm (4 ½")

This option adds appr. 50 kg.

## EXPLORATION DRILLING OPTIONS

*Optional equipm.*

### TOP HEAD ADAPTION to RC drilling

A standard Explorac R50 top head is adapted to a 4 ½”, 4” or 3 ½” RC drilling system. Designed for using dual tube reverse circulation air drilling method. The cuttings are conveyed to the surface through the top head and collected. A special discharge swivel and top head shaft wear sleeve are provided with this option. Side inlet swivel is not included in this item. Floating sub is not provided.

Head wear tube ID	40 mm	3 ½” RC system
	50 mm	4”
	50 mm	4 ½”

This option adds appr. 120 kg.



### SIDE INLET SWIVEL (less sub)

Introduces the flushing air into the dual pipe annulus and ports the sample cuttings through the top head for collection. Includes installation to the top head, but not sub for the drill pipe.



Model:	3 ½”	4”	4 ½”
Upper thread:	3 ½” RC Metzke box	4” RC Metzke box	4” RC Metzke long box
Lower thread:	3 ½” RC Metzke pin	4” RC Metzke short pin	4 ½” RC Metzke pin
Side port:	1 ½” BSP	2 ½” NPT	2 ½” NPT
I.D. of shaft:	62,3 mm	68,6 mm	68,6 mm

This option adds appr. 30 kg.

## JIB BOOM, FIXED EXPLORATION

*Optional equipm.*

For handling drill pipe on angles up to 30 ° from vertical. The fixed boom is manually pinned in position to suit the choosen angle of drilling. This option requires the helpers platform as well as the winch kit for RC pipe handling. The winch is hydraulically driven and mounted on the boom.



Operating angle: 0 – 30 ° , mast is manually locked in 5 ° increments.

Jib boom capacity 2,5 kN

This option adds appr. 60 kg.

## HELPERS PLATFORM

On the right side of the rig platform, a helpers platform can be mounted to simplify and give extra safety to the handling of RC drill pipes.

This option adds appr. 120 kg.



## CRAWLER

The rig unit can be mounted on a not oscillating crawler chassi with hydraulically driven axial piston type motors.

Hyd. motor displacement 32 cm<sup>3</sup>  
Reduction gear ratio 115,5 : 1  
Speed on level ground 2,4 km/hour

This option adds appr. 3900 kg.

## **CYCLONE**

*Optional equipm.*

A cyclone is located at the right rear of the machine. Cyclone assembly reduces the velocity of the cuttings to allow complete sample recovery. The cyclone can, if desired, be delivered separately free standing. An air operated cylinder activates a door releasing the sample.

The assembly includes

- 3" hose connecting the top head and the cyclone
- duct diverting hose

Capacity    280 lit/sec (600 cfm), 4", 4½" system  
                  160 lit/sec (350 cfm), 3½" system

This option adds appr. 300 kg.

## **SPLITTER**

Used in conjunction with the cyclone, the splitter provides a method to reduce the volume of the collected material, while maintaining a representative sample.

This option adds appr. 90 kg.



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