



UPETROM
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member of UPETROM GROUP

LAND DRILLING RIG F 200-EA / DEA-M, AC VFD DRIVEN



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FIELD OF APPLICATION

The **F 200-EA / DEA-M** winterized land drilling rig is designed for working in the following temperature range: -45 to +50 Celsius degrees.

The **F 200-EA / DEA-M** land drilling rig is driven by AC VFD electric motors (AC of variable frequency drive) and can perform the following jobs:

- conventional well drilling with either the rotary table or the top drive system
- drill-string running in and pulling out;
- casing-string running in;
- removal of troubles and damages at the site;
- drilling-mud mixing, solids control and circulation;
- performance of auxiliary jobs as required by the processes of casing, cementing, etc.

The **F 200- EA / DEA-M** land drilling rig can drill gas/ oil wells down to a depth of 15750 ft (4,800 m) with 5" drill pipes or under conditions involving a limit of 560,000 lbs (2,500 kN) for the max. hook load.

DESCRIPTION

F 200-EA / DEA-M is a fully winterized drilling rig, for arctic operations. All equipments are mounted in insulated, heated and ventilated houses and modules, providing fast rig mounting and start up, for extreme cold weather operation (minimum working temperature -45 Celsius deg).

The rig is also designed for operation in warm weather conditions up to +50 Celsius degrees.

The rig is equipped with a foldable „A” section mast designed for top drive installation.

The mast is folded by the means of draw-works and line raising system.

Rig controls are performed from the computerized, heated and air conditioned driller’s cabin located on the drill floor.

Driller’s cabin is equipped with control joysticks, LCD monitors to visualise all drilling (instrumentation) parameters and video cameras.

The rig drive is electric under AC VFD conditions (variable frequency drive).

Supplying the rig with electric energy is feasible from four (4) units CAT 3512 diesel-electric stations.

Driving is realized under AC conditions, the frequency being adjustable through a numeric control system.

The electric system is equipped with a CAT 3406 stand-by generator set of 292 kW/ 365 kVA/50 Hz c/w battery start up.

The equipment of synchronization, control and adjustment allows four (4) generator sets to be supplied and can drive six (6) AC VFD type electric motors of 850 kW through VFD control station (2 for the drawworks, 2x2 for the mud pumps), one electric motors for the TDS 10 SA top drive system and other auxiliary / lighting consumers.

The rotary table is driven from the draw-work by chain transmission and is equipped with inertia brake with air clutch.

The electric lighting system for the drilling rig, the pipe rack and the buildings around the mast is explosion-proof.

The electric emergency-lighting system is supplied at 12 VDC.

The TF-25 E drawworks and the two GMP 3PN 1600-2EA Unitized Mud Pumps are driven independently from their own power units electric AC motors of 850 kW x 1,000 rpm.

The rig air system is provided with two Ingersoll-Rand screw air compressors and air tanks of 4 cu.m.

The **F 200-EA / DEA-M** drilling rig is equipped with several hydraulic/ air powered devices to power the working jobs on the drill floor.



SPECIFICATIONS

• Max. working hook load with 10 lines	560,000 lbs (250 mton/ 2500 kN)
• Recommended working depth (for a hook load limit of 250 mton) with drill pipes of 5 in	15,750 ft (4,800 m)
• Number of drilling lines	10
• Drilling line size	1.1/4 in (32 mm)
• Pipe stand max. length	88,60 ft (27 m)
• Operation type	EA/ DEA (AC electric operation)
control system type	VFD (variable frequency drive)
prime electric power generating set type	CATERPILLAR 3512 1370 HP; 1050 kW; air start-up.
number of prime electric power generating sets	4
installed power	4x1500 kVA=6000 kVA; 3 x 660 V; 50 Hz
stand-by electric power generating set type	CAT 3406 with SR4 generator
number of stand-by electric power generating sets	1
stand-by electric generating set installed power	365 kVA; 292 kW; 1,500 rpm 3 x 400/231 V; 50 Hz; battery start-up
A.C. VFD electric operating motor type	MABEExelIT3 500S 170-6
electric motor power / speed	1140 HP (850 kW) / 1000 rpm
voltage/ current	660 V/ 901 A
number of A.C. electric operating motors	6 (2 pcs. for draw-works, 2x2 pcs. for unitized mud pumps)
• Draw works type	TF-25E AC VFD driven and speed adjusting, mounted on elevated platform (rig floor level), in insulated and heated rig house.
max. power of the draw-works input shaft	1500 HP
electric motor type	AC VFD MABEExelIT3 500S 170-6; 1140 HP (850 kW) / 1000 rpm
electric motor number	2
max. line pull	56200 lbs (25 mton)
drum speed number	4+4 Reverse
number of drums	1 with lebus groove for 32 mm (1.1/4") drilling line.
parking & emergency brake	Band brake Hydraulically actuated by LIDAN servo-cylinder, with joystick control in driller's cabin and electric HPU for hydraulic supply.
dynamic brake:	VARCO V236 Disc Brake with Electronic Drilling System EDS 2C, featuring Weight on Bit (WOB) and Rate of Penetration (ROP) functions.
crown saver	Pneumatic type
cooling system	Forced water cooling system with el-pumps and water tanks.



LAND DRILLING RIG
F 200-EA / DEA-M, AC VFD DRIVEN

• Mast type	MA 200, "A" section foldable mast, designed for TOP DRIVE installation.
max. hook load with 10 lines	560,000 lbs (250 mton/ 2500 kN)
clear mast height (from the working floor up to the crown block beam)	144.30 ft (44 m)
section number	4 sections
mast raising	by means of the mast raising system and the hoisting system of the drilling rig
racking capacity (5 in pipes arranged as pipe stands of 27 m)	15750 ft (4,800 m)
racking board height	84.30 ft (25.7 m) from the drill floor level.
Derrickman Escape Device	line-installed with seat, brake etc. for emergency escaping beyond rig limits.

• Top drive system	VARCO TDS 10 SA
max. hook load	275 USton (250 mton)
max. working pressure	7500 PSI (500 bar)
number of electric AC VFD driving motors	1
electric AC VFD driving motor power	350 HP
max. torque under discontinuous-regime conditions	36500 lb-ft (49.50 kN.m)
max. torque under continuous-regime conditions	20,000 lb-ft (27.12 kN.m)
rotation speed	0-182 rpm

• Substructure type	Fixed with elevator platform for draw works and draw works drive unit.
max. load of the rotary table beams	560,000 lbs (250 mton)
max. load at the setbacks	335,000 lbs (150 mton)
simultaneously-applied max. load	895,000 lbs (400 mton)
working floor height	31.50 ft (9.60 m)
clear height under the rotary table beams	26.25 ft (8 m)

• Rotary table type	MRL-275
max. opening	27.5 in (698.50 mm)
max. static load	1,100,000 lbs (500 mton)
max. transmitted power	600 HP
max. rotor speed	300 rpm
max. rotor torque (in rotation)	20300 lb-ft (2,800 daNm)
max. static torque of the rotor	86,800 lb-ft (12,000 daNm)
rotary table driving type	independently AC VFD driven
rotary table driving	By chain transmission from draw-works
rotary table speeds	2 forward and 2 reverse, AC VFD speed adjusting
rotary table brake	inertia brake with air clutch

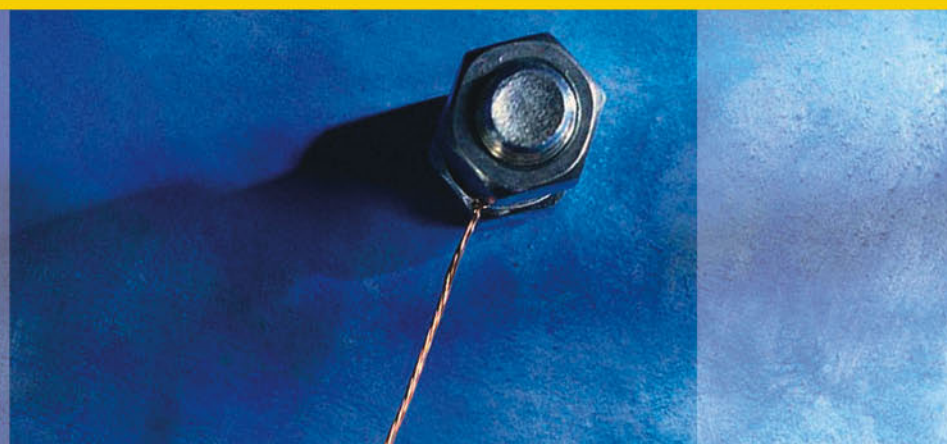
• Crown block type	(5+1).32.GF-300
max. static load on 10 lines	660,000 lbs (300 mton)
number of sheaves	6 for 1.1/4" (32 mm) line diameter

• Hook block type	5.32.MC-300
max. static load on 10 lines	660,000 lbs (300 mton)
number of sheaves	5 for 1.1/4" (32 mm) line diameter

• Swivel type	CH-320
max. static load	720,000 lbs (320 mton) on 10 lines
min. bore size	3" (76 mm)
max. working pressure	5076 PSI (350 bar)
max. rotation speed	300 rpm
thread for connection between the stem and the sub	6.5/8 in REG-LH type
thread for connection between the sub and the kelly	6.5/8 in REG-LH type
thread for connection to the rotary hose	LP 4 in type



• Unitized mud pump type	GMP 3 PN – 1600 – 2 EA, mounted in insulated house, heated and ventilated for extreme cold weather operation.	• Fuel system	c/w fuel tanks and el-pumps pipes and connections.
number of unitized pump	2	total volume of stored fuel, as follows:	723 BBL (115 cu.m)
number of AC VFD electric motors/ pump	2	daily tank	25 BBL (4 cu.m)
electric motor type	AC VFD MABEExelIT3 500S 170-6; 1140 HP (850 kW) / 1000 rpm	storage tank	120 BBL (19 cu.m)
mud pump type	3 PN – 1600-2 EA	storage tank	528 BBL (3x28 cu.m = 84 cu.m)
number of mud pumps	2	daily tank (divided; it supplies the Diesel engines of the electric power generating sets)	50 BBL (4 x 2 = 8 cu.m)
max. power at the pump inlet shaft	1600 HP	• Electric power system (for main equipments drive) c/w:	containerized, insulated, heated and ventilated.
max. working pressure (with liners of 5 in)	5076 PSI (350 bar)	VFD Station	SDACRN for six (6) AC VFD electro motors 1140 HP (850 kW)/ 1000 rpm
total max. theoretic flow rate (with liners of 7.½ in)	2x826 GPM=1652 GPM (2x52.13=104.26 l/s)	Sincronizing, control and coupling Station (SSCG)	1 for four (4) electro generators
• Air compressor unit type	GPA 4cu.m.	Medium Voltage Station (SMT)	1
air compressor type	SSR MU-45 screw el-compressor	Electro Transformers Station (ST)	2
number of air compressors	2	Motor Control Center (MCC) auxiliary consumers Station	1 (EA); 3x400 V/230 V, 50 Hz si 12 V c.c. for auxiliary servicies and lighting.
max. flow rate at 13 bar pressure for one compressor	201.30 CFM (5.7 cu.m/min)	• Electric system for lighting and auxiliary aggregata	conceived for having its "zero" earthed normally manufactured (dust and rain proof) and explosion-proof
discharge max. pressure	188.55 PSI (13 bar)	lighting system for :	Driller's cabin, Rig house (mast, drill floor), well cellar, mud system, mud pumps, electric power system containers, rig camp.
nominal pressure	174 PSI (12 bar)	supply voltage for:	
air tanks capacity	2 x 2 cu.m = 4 cu.m	power receivers	3 x 380 V x 50 Hz
• Mud system		normal-lighting receivers	220 a.c.V x 50 Hz
total mud volume	371 cu.m (2334 BBL)	safety-lighting receivers	12 V
number of mud tanks	3x70 cu.m =210 cu.m (1321 BBL)		
total water volume	60 cu.m (377.3 BBL)		
sand trap tank capacity with three shale shakers	38 cu.m (239 BBL)		
cleaning tank capacity	63 cu.m (396 BBL),		
mud specific weight	1100 ÷ 2200 kg/cu.m		
number of cleaning stages	3		



LAND DRILLING RIG
F 200-EA / DEA-M, AC VFD DRIVEN

• Instrumentation	M/D TOTCO Instrumentation system: indicators and recorders for all drilling parameters
• Power Devices	
Hydraulic Power Tong type	9.5/8 for the following tubing sizes: 3.1/2"; 4.1/2"; 5"; 5.1/2"; 5.3/4"; 6.1/4"; 6.5/8"; 7"; 7.5/8"; 8"; 9.5/8".
Hydraulic Power Tong type	17" for the following tubing sizes: 12.3/4"; 16.3/4".
Hydraulic power Unit for power tongs supply	AC electric; 380V; 50 Hz explosion proof.
Drilling tong type	BJ-HT 35 VARCO for the following tubing sizes: 2.3/8" – 3.668"; 2.7/8" – 4.1/4"; 3.1/2" – 5.1/4"; 5.1/4" – 7"; 7" – 10.3/4"; 2.3/8" – 7"; 7" – 8.5/8".
Drilling tong type	BJ-HT 65 VARCO for the following tubing sizes: 3.1/2" – 8.1/4"; 8 – 11.1/4"; 11.3/4" – 14.3/8"; 16" – 17".
Tong balancer	DEC Type Hydraulically actuated with two hydraulic cylinders, line and hydraulic control panel; max. tong – suspending line force 24 kN (5395 lbs).
Torque Cat head for tubing thread make up-break out	DISS Type torque Cat head with hydraulic cylinder and 11 kW / 240 bar HPU, pulling line and sheaves; 120 kN (26077 lbs) max tong line force; 192 kN. m (141600 lb-ft) max. tong torque for 1.6 m manual tong length.
BOP well cellar hoisting system	Ingersoll-Rand Air Powered Hoist to transport and install the BOP stack in the well cellar; max. hoist force 2 x 125 kN = 250 kN (56202 lbs), 12 bar (174 PSI) max. WP.
Power Slips	PSA 150 Blohm & Voss Air Power Slips for 27.5" Rotary table, 10 bar (145 PSI) max. WP; tubular material dimensions: 2.3/8"; 2.7/8"; 3.1/2"; 4.1/2"; 5"; 5.1/2"; 6.5/8"; 7".
Drill Pipe Stands handling device	Drill Pipe Stands handling device electrically driven.
Pipe Rack handling device	150 kN pivoting, telescopic hydraulic boom power device.
Drill floor auxiliary hoisting device	One 50 kN line pull Electric winch Ingersoll-Rand, Explosion proof, operating with mast mounted rotational boom.
Bit feed control and drill string escape device	Automatic Bit Feed and drill string escape device (DAAS): electro-hydraulic driven - max. load. 250 kN; - rate of penetration 0-25 m/h; - weight on bit 0 ... 3 kN; - drill string escape (lifting) speed 25 m/h.
• Rig heating system	Containerized steam heating system and afferent pipes on the rig houses, drill floor, pipe setbacks, racking board cabin.
• Rig ventilation system	electric ventilators installed in rig house, well cellar, mud system and mud pumps houses.
• Rig working temperature	-45 to +50 Celsius deg.
• Rig Storage temperature	-60 Celsius deg.





**LAY-OUT FOR THE F 200-EA/DEA P1
LAND DRILLING RIG
(operations in arctic regions)**

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