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See your XCMG dealer for available options.



# **ALL TERRAIN CRANE**

# XCA60\_EV



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pure electric operations with zero emission Dual-power for traveling powerful and efficient Heavy-duty single-transverse arm independent suspension system **Good maneuverability** High degree of intelligence Multiple charging modes for convenient operation Human-machine interaction system with appearance

# **SUPERB LIFTING PERFORMANCE** ▶ New single-cylinder pinning telescoping system. Single-plate boom head. ► Six-section boom of 48 m and max. lifting height of 63 m ▶ Optional 16 m fixed jib with three offset angles: 0°, 15°, 30°. ▶ Optional 2.5 m independent jib head.

### PURE ELECTRIC OPERATIONS WITH ZERO EMISSION

- ► The 400V AC realizes plug-and-play and the 170kW motor + high-power charger combination covers all working conditions and reassures pure electric operations.
- ▶ The high capacity battery is installed to realize the battery electric operations, solve the trouble of no power supply in working site, and meet the pure electric operating needs of the users in diversified working sites to the maximum degree.



#### DUAL-POWER FOR TRAVELING, POWERFUL AND EFFICIENT

The dual-power drive (fuel engine and electric motor) is applied for the job-site transfer. Under different traveling conditions, the motor intervenes at appropriate time to drive this product and the torque is intelligently distributed to maintain the engine running within the optimal economic fuel consumption range. The braking and coasting energy is recovered to neglect neither charging nor discharging and lower the fuel consumption by more than 40%.

The dual-power (fuel engine and electric motor) features strong power and provides up to 400kw power, which improved by 42% compared with the products of same level.



#### HEAVY-DUTY SINGLE-TRANSVERSE ARM INDEPENDENT SUSPENSION SYSTEM

▶ The independent bounding left and right wheels are self-adaptive to road conditions to effectively improve the maneuvering stability during high-speed steering and realize excellent off-road performance on narrow and rugged roads.

#### POWERFUL DRIVE TRAIN AND SUPERIOR DRIVING PERFORMANCE

- MTU OM936LA diesel engine, with rated power of 230 kw, and max. torque of 1300N.m
- ▶ High power motor, with rated power of 170KW, and max. output torque of 1100 N.m
- ► Top Gear AMT automatic transmission
- ▶ Max. travel speed is 80km/h, and max. grade ability is 60%

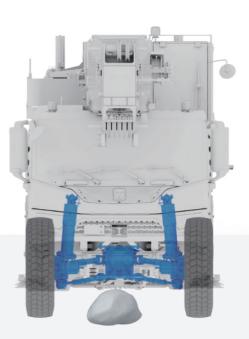
#### **BRAKING SYSTEM**

- ▶ Dual-circuit pneumatic disc brake
- Axles 1, 2 and 3 with spring-loaded brake
- ▶ Auxiliary: electric motor retarding brake, and electric eddy-current retarder brake

Raise single wheel

#### STEERING SYSTEM

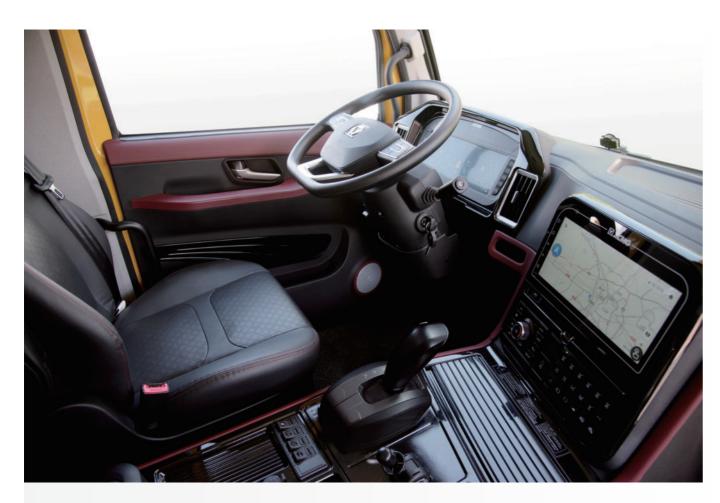
- Axle 1 is mechanically steered and 2, 3 axles adopt electrical-hydraulic proportional steering
- ▶ 6 steering modes can be selected
- ▶ The crane is designed and certified to meet the strictest European standards. Its total length is not more than 12 m and width is less than 2.55 m
- ▶ Max. grade ability is 60% and min. turning diameter is 14.0 m



Raise suspension at center

#### **HUMAN-MACHINE INTERACTION SYSTEM WITH NEW APPEARANCE**

- Industry pioneering man-machine interaction system resembling that of a sedan enables friendly interaction between the operator and the crane. Information about driving and lifting operations are easily accessible, leading to easier and more convenient operations.
- New generation appearance design presents power and vigor. Fashionable new cabs show a perfect combination of streamlining and strength. With ergonomic analysis and user-friendly details integrated, a quality product is created. It is convenient to maintain, easy to drive and comfortable to operate.



## DRIVER'S CAB

- ▶ 12.3" large-mirror true-color display screen achieves clearer display performance
- ▶ 12.1" entertainment display screen provides better experience.
- ▶ Remote key, multifunction steering wheel, electric heating of rearview mirror, multifunctional air suspension seat. Standard heating and A/C system.

#### OPERATOR'S CAB

- ▶ 12.1" true-color touchscreen.
- ▶ The cab is installed with remote sliding door, electric telescopic board and electric seat.
- ▶ The boom head, winch and counterweight cameras are convenient for the operator to observe the operation state.
- Standard heating and A/C system .



#### HIGH DEGREE OF INTELLIGENCE

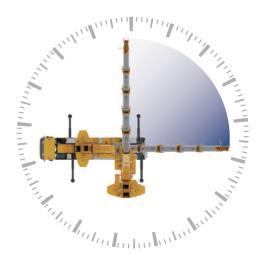
#### **AUTOMATIC CONFIGURATION PLANNING TECHNOLOGY**

- Automatically recommend the most proper working conditions.
- Searching and setting work condition simply.

#### **GOOD MANEUVERABILITY**

- ▶ Plunger pump load-sensing control system, more than 15% of fuel can be saved, effectively lowering oil temperature with high safety.
- ▶ Dual-pump separate and confluence control technology improves the working efficiency by more than 10%,less working time and lower cost.
- ▶ Precise flow control; winch adopts high-performance motor, and the minimum stable lifting speed is 2.5m/min.

The low-speed high torque slewing system is adopted, and the minimum stable slewing speed is 0.1° /s.







The min. stable hoisting speed is 0.8-1m/min

#### MULTIPLE CHARGING MODES FOR CONVENIENT OPERATION

- ➤ The multiple charging modes, including AC and DC charging modes, are provided. The AC charging power is up to 40kW and the adaptable charging power is available in >95% working sites. The attached 50m charging cable is plug-and-play, featuring high convenience and rapidity.
- ► The DC fast charging guarantees high charging efficiency. With operations at daytime and charging at nighttime, this product saves every second for you.

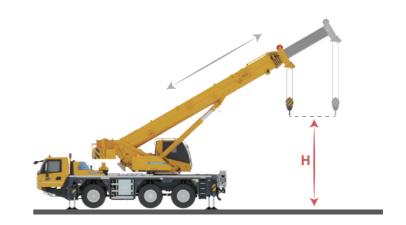
#### **AUTOMATIC LUFFING COMPENSATION TECHNOLOGY**

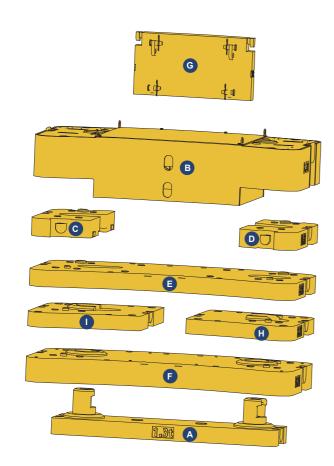
▶ With elevation compensation technology applied, it automatically realizes the compensation of the amplitude change caused by the deformation of the boom when lifting and lowering the hook.



#### WINCH SERVO CONTROL TECHNOLOGY

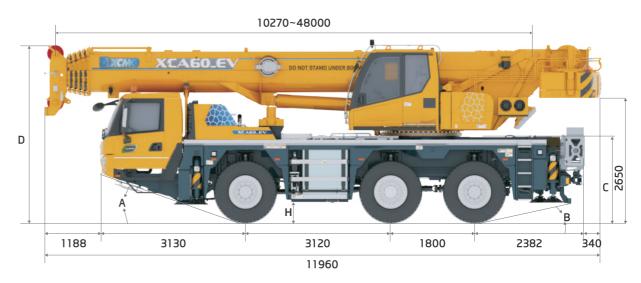
- ▶ With winch servo control technology applied, winch is automatically managed by control system during telescoping and luffing operation, which saves operation time over 40%.
- ▶ There are 3 modes: winch rope servo action mode while luffing the boom, the hook height above the ground is not changed; winch rope servo action mode while telescoping the boom, the hook height above the ground is not changed; winch rope servo action mode while telescoping the boom, the clearance between the hook and boom head is not changed.
- Convenient wireless remote control is adopted to integrate various functions into one, so the crane can be operated by only one person with lower cost.

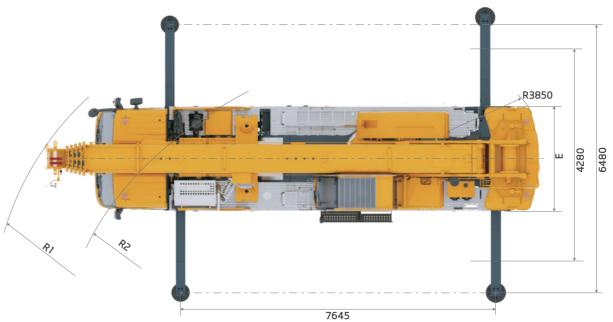




Counterweigh	t A	В	C/D	Е	F	G	H/I
Dimension	2.11 × 0.54	2.5 × 1.313	1.25 × 0.56	2.5 × 1.313	2.5 × 1.313	1.1 × 0.57	1.04 × 1.313
L/W/H(M)	×0.52	× 0.56	×0.184	×0.174	× 0.259	×0.247	× 0.17
Weight(t)	1.3	2.2	0.5	2.8	3.1	0.6	1.1

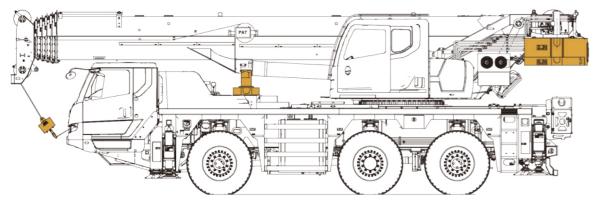
Working mode	13.2t	12.6t	11t	10.4t	10.4t	9.8t	9.4t	8.8t	8.2t	7.9t	7.6t	7.3t
	B+C+	B+C+	B+C+	B+C+	B+C+	B+C+	B+A+	B+A+	B+C+	B+C+	B+C+	B+C+
Combinations	D+E+	D+E+	D+E+	D+A+	D+E+	D+A+	F+H+	F+H+	D+A+	D+E+	D+A+	D+E+
Combinations	A+F+	A+F+	A+F+	F+H+	A+F	F+H+I	I+G	I	F+G	A+G	F	Α
	H+I+G	H+I	G	I+G								
Working mode	7.2t	6.6t	6.6t	6t	5.1t	4.5t	4.1t	3.8t	3.5t	3.2t	2.8	2.2
O analain atiana	B+A+	B+C+	B+A+	B+C+	B+C+	B+C+	B+A+	B+C+	D. A	B+C+	D.O	В
Combinations	F+G	D+E+ G	F	D+E	D+A+ G	D+A+	G	D+G	B+A	D	B+G	В





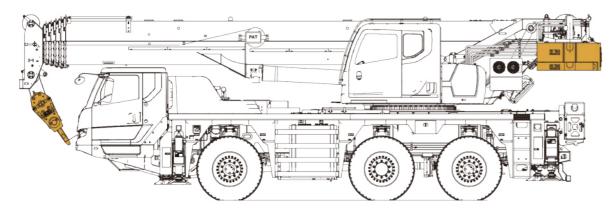
### Note:Tight turning steering mode

		-	-		_			<b>D</b> 2
	Α	В	C	D	E	Н	R1	R2
Unit	0	0	mm	mm	mm	mm	mm	mm
385/95R25(14.00R25)	19	12	1810	3790	2550	330	9150	7000
445/95R25(16.00R25)	20	13	1860	3840	2550	380	9950	8250
525/80R25(20.5R25)	20	13	1860	3840	2715	380	10770	9380

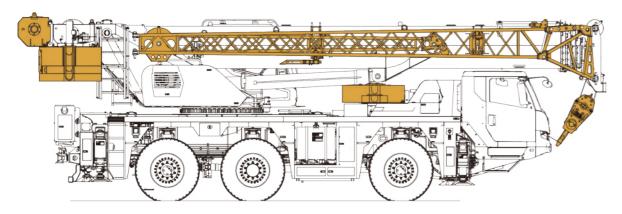


Drive/Steer: 6x4x6. Tire specifications: 385/95R25 (14.00R25)

GVW 36t C/T 4.5t Axle load ≤12t 5t hook



Drive/Steer: 6x4x6. Tire specifications: 445/95R25 GVW 35.4t Axle load ≤12t C/T 3.2t 60t hook



Drive/Steer: 6x4x6. Tire specifications: 385/95R25

GVW 48t Axle load ≤16t 60t hook C/T 12.6t



Hook	No. of lines	Weight(kg)	Dimensions(mm)	Parameter
60t	12	560	1330 × 440 × 570	Dual hook Optional
35t	7	304	1200 × 440 × 300	Dual hook
15t	3	270	1080 × 440 × 250	Single hook
5t	1	100	540×φ 300	Single hook

Dimensions	Unit	Parameter
Length × Width × Height	mm	11960 × 2550 × 3790
Wheel base	mm	3120+1800
Track (Front/ Rear )	mm	2150
Front/ Rear overhang	mm	3130/2382
Front/ Rear extension	mm	1188/340

Power	Unit	Parameter
Engine model	1	OM936LA(EU StageV)
Engine rated power	kW / r/min	230 KW/2200 rpm
Engine rated torque	N.m / r/min	1300 Nm/1200 rpm
Motor rated power	kW / r/min	170 kW/1600-2300 rpm
Motor rated torque	N.m / r/min	1100 Nm/800-1400 rpm

Travel	Unit	Parameter
Max. travel speed	km/h	80
Min. travel speed	km/h	2
Maria de la Caracteria	,	16 m: on road driving
Min. turning diameter	1	14 m: all wheel steering
Min. ground clearance	mm	330
Approach angle	0	19
Departure angle	0	12
Braking distance (at 30 km/h)	m	10
Max. grade ability	%	60

Main performance		Unit	Parameter
Max. total rated lifting cap	acity	t	60
Min. rated working radius		m	2.1
Jib offset angle		0	0/ 15/ 30
	Base boom length	m	10.3
Boom length	Fully-extended boom length	m	48
	Maximum length of boom and jib	m	64
	Base boom lifting height	m	10.2
Hoist height	Fully-extended boom lifting height	m	48
	Longest boom and jib lifting height	m	63
	Max. load moment of the base boom	kN.m	1722
Hoist torque	Max. load moment of fully-extended boom	kN.m	960
	Max. load moment of longest boom and jib	kN.m	494
0.11	Longitudinal	m	7.65
Outrigger span	Lateral	m	6.5

Working speed		Unit	Parameter
Main winch lifting speed		r/min	135
Auxiliary winch lifting speed		r/min	135
	Boom lifting time	S	38
Hoisting speed	Boom fully extending time	S	310
	Maximum slewing speed	r/min	1.5
	Beam retracting	S	20
Outrigger –	Beam extending	S	25
Outrigger –	Jack retracting	S	30
_	Jack extending	S	60

Hook block	Unit	Parameter
Standard	t	5 /15 / 35
Optional	t	60

	Chassis	Configuratio
Frame	Designed and manufactured by XCMG, made of high strength steel with	
	inverted trapezium cross-section.	•
Outrigges	H-type outrigger, outrigger beam is one-stage telescoping with push-pull	
	outrigger float and two telescoping working position (fully-extended and	
	half-extended) to satisfy various working condition requirements. Outrig-	
	ger control panel is controlled by CAN bus located on the sides of chassis.	
	Reaction force of outrigger at max. lifting load: 28t/41t (front/rear Outrig-	
	gers)	
Engine	Daimler AG OM936LA, 6 cylinders, diesel.	
	Rated power/rpm: 230 kw/2200 rpm.	
	Max. output torque/RPM: 1300N.m/1200rpm	•
	Emission standard: EU Stage V/EPA Tier 4F.	
	Fuel tank capacity: approx. 260 L.	
Motor	High power motor	
	Rated power/RPM: 170kw/1600-2300rpm, Max. output torque/RPM:	
	1100N.m/800-1400rpm.	
	An AC charging gun, a DC charging interface, 50 m AC charging cable.	
Transmission	Automatic transmission manufactured by Top Gear, 7-forward speed and	
	1-reverse speed.	
Axles	High strength divided axles with independent suspension. Axles 1 and 3	
	for driving: $6 \times 4 \times 6$ .	
	Optional drive axle for the 2nd axle: $6 \times 6 \times 6$ .	0
Suspension	With advanced independent suspension technology, the right and left tires	
	can move independently to improve the drive smoothness. The suspen-	
	sion is equipped with effective damped cylinder and accumulator buffer;	•
	fixed on the frame, the main reducer can rise and fall with the frame to	-
	greatly improve the passing ability of vehicle. The stroke of suspension	
	cylinder is ±110mm.	

	Chassis	Configura
Tires	Tire specifications: 385/95 R25 (14.00R25)	
	445/95 R25 (16.00R25)	
	525/80 R25 (20.5R25), without WVTA approval	0
Steering	Axle 1 mechanically steering and axles 2 and 3 electric-hydraulic propor-	
system	tional steering.	•
Braking	Service brake: double-circuit air pressure brake, acting on all wheels.	
system	Parking brake: spring-loaded brake, acting on the wheels of all axles.	
	Auxiliary brake: electric motor retarding brake and electric eddy-current	
	retarder brake.	
Driver's cab	New full dimension steel structure cab, with suspension connecting	
	structure, is equipped with shock absorbers at the rear of the cab.	
	Equipped with LED headlamps, safety glass, electrically operated door	
	window lifter, adjustable air suspension seats, electric heating rearview	
	mirrors, multi-function steering wheel, large screen liquid crystal display,	•
	and 12.1 inch central control display, etc. New combined central control	
	panel is reasonably arranged with arc shape adopted, presenting	
	human-oriented design concept. Heater and air conditioner are standard.	
Elevtrical system	DC 24 V, with 2 sets of 12 V batteries in series.	•
Coupling	Optional for the trailer with the total weight of 18 t	0
device	Optional for the trailer with the total weight of 3.5 t	0
Independent heating for driver's cab	Heating system independent of engine operation.	0
Cold weather starting device	This device is optional to assist the engine to start in the cold weather	0

	Superstructure	Configurati
Frame	Designed and manufactured by XCMG, made of high strength steel.	•
Hydraulic	The load-sensing plunger pump and gear pump are used to control	
system	hoisting of main and auxiliary winches, luffing, telescoping, slewing and	
	auxiliary system. Load-sensing proportional multi-way valve is equipped.	
	Wind-cooled hydraulic radiator is also applied.	
Operating	Pilot electric proportional control is adopted with distributed Canbus	
method	control technology. Apart from the normal control functions, it also has the	
	functions of real time monitoring, automatic fault diagnosis, intelligent	
	boom control, function self-adaptability, single cylinder pinning control.	
	Wireless remote control device.	0
Main	Driven by a hydraulic motor, with built-in planetary gear reducer and	
winch	normally closed brake fitted. Also equipped with: anti-disorder rope	•
	winding drum; rotation-resistant wire rope.	
Auxiliary	Driven by a hydraulic motor, with built-in planetary gear reducer and	
winch	normally closed brake fitted. Also equipped with: anti-disorder rope	0
	winding drum; rotation-resistant wire rope.	
Slewing	A single-row, four-point contact-ball external toothed slewing bearing is	
system	driven by hydraulic motor, with built-in planetary gear reducer and	
	constant-closed brake equipped, and may continuously slew $360^{\circ}$ .	•
	Power control and free swing function as well as stepless speed regulation	
	are available.	
Operator's	The cab is ergonomically designed for safety and comfort. It is equipped	
cab	with safety glass and protective grilles. Windshield sun shade, a sliding	
	door and an adjustable seat are available. Cab tiltable 20° to rear.	•
	Heating & air conditioning are available.	

	Superstructure	Configuratio
Safety	Hydraulic balance valve, hydraulic relief valve, hydraulic two-way valve,	
devices	LMI, display, central controller, length/angle sensor, oil pressure sensor	
	and spring centering system for control levers. Lowering limiter for	
	preventing wire rope from over-releasing. Anti-two block at boom head	
	for preventing wire rope from over-winding. Anemometer for measuring	
	the speed of the wind.	
Load	When the actual torque approaches overload, the LMI will warming and	
moment indicator	stop dangerous operation before overloaded. Overload memory function	•
	(black box) and fault self-diagnosis function are available.	
Combined	Total weight is 13.2 t. 24 counterweight combinations of 2.2 t, 2.8 t, 3.2 t,	
counterweight	3.5t,3.8t,4.1t,4.5t,5.1t,6t,6.6t(2types),7.2t,7.3t,7.6t,7.9t,8.2t,	
	8.8 t, 9.4 t, 9.8 t, 10.4 t (2 types), 11 t, 12.6 t and 13.2 t are available.	
Hook block	35t、15t、5t	•
HOUR DIOCK	60 t	0
Electrical system	24 V DC.	•
Power	Rated capacity: 228 Ah	
battery	Rated energy: 115 kWh	•
	Rated voltage: 502.32V	•
	Charge-discharge rate: 1C	

THE STATE OF	Boom and jib system	Configuration
Boom	6-section boom with U-shaped cross-section, welded structure.  Single-cylinder pinning interlocked telescoping system. 46%, 92% and 100% telescoping patterns are available.  Boom length: 10.3 m~48 m.	•
Fixed jib	Lattice jib, welded structure; three offset angles of $0^\circ$ , $15^\circ$ and $30^\circ$ . Fixed jib length: 9.2 m~16 m	0
Single top	Fitted at boom head, used for single line operation.  Its lifting performance is the same as that for boom, but the maximum lifting load does not exceed 4.6 t.	•
Independent jib head	2.5 m, fitted at boom head for lifting operation.	0

Product parts list is as mentioned above.

Please refer to the product quotation for specific parts.

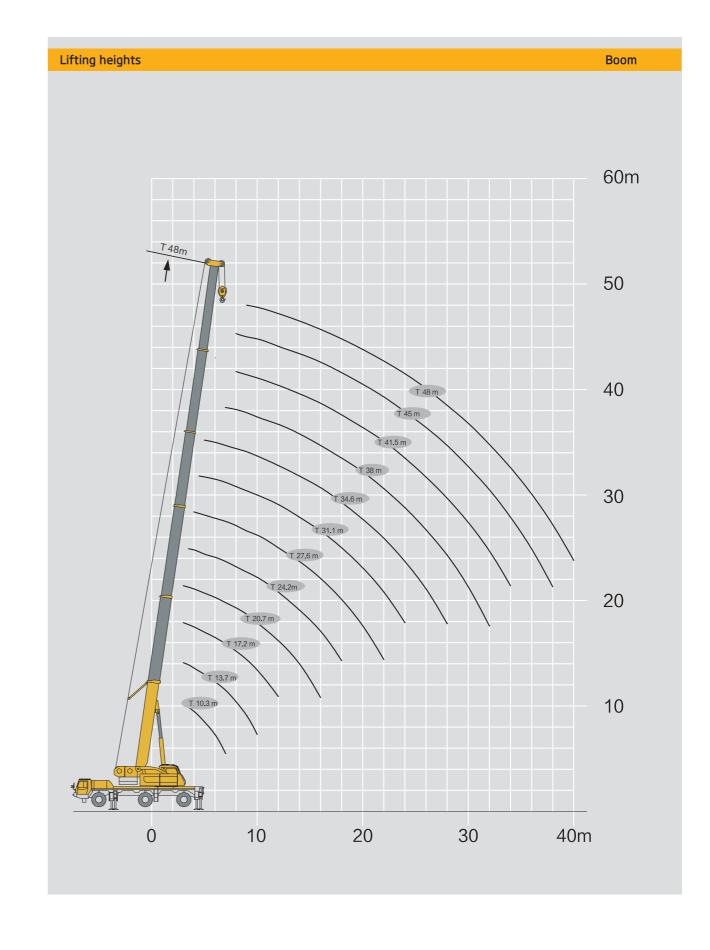
Symbol explanation:

- —it means the standard configuration;
- O —it means the optional configuration.

Name	Figure	Weight per unit (kg)	Oty	Dimensions (mm)
Jib and its bracket		1200	1	9900 × 1100 × 1500
Auxiliary sheave (single top)		50	1	655×565×385
Auxiliary winch (wire rope included)		707	1	1130×730×720
60 t hook block		560	1	1330 × 440 × 570
35 t hook block		304	1	1200 × 440 × 300
15 t hook block		270	1	1080 × 440 × 250
Counterweight slab G		600	1	1100 × 570 × 247

Name	Figure	Weight per unit (kg)	Oty	Dimensions (mm)
Counterweight slab E		2800	1	2500 × 1313 × 174
Counterweight slab H		1100	1	1040 × 1313 × 170
Counterweight slab I		1100	1	1040×1313×170
Counterweight slab F		] 3100	1	2500 × 1313 × 259
Independent jib head		450	1	3200 × 850 × 1800
Spare tire		209	1	φ 1360×390
Coupling device (18 t)		50	1	500×360×210
Coupling device (3.5 t)		5	1	130 × 155 × 240





## Lifting capacities XCA60\_EV

## T 10,3-24,2m











Marie P	10.3m	13.7m	13.7m	13.7m	13.7m	13.7m	17.2m	17.2m	17.2m	17.2m
2.1	60*									
3	42.5	29.0	42.5	42.5	42.5	42.0	21.2	31.0	30.0	42.0
3.5	42.0	27.6	42.2	42.4	42.1	41.4	19.6	29.0	28.0	41.0
4	41.2	26.5	39.5	39.4	39.5	39.4	18.9	27.0	26.0	37.5
4.5	38.1	25.0	37.3	36.8	36.4	36.4	17.6	26.4	24.0	35.0
5	35.1	24.0	34.9	34.7	34.3	34.2	16.6	24.6	22.0	33.7
6	29.0	22.0	29.8	30.7	30.3	30.2	14.6	21.5	20.0	30.1
7	25.0	20.0	25.6	27.5	27.2	26.8	13.1	19.3	18.9	26.9
8		19.0	23.2	23.0	22.7	22.3	11.9	18.0	17.2	23.5
9		18.0	19.8	19.5	19.1	18.7	12.3	17.5	16.9	20.2
10		16.9	16.6	16.3	16.0	15.6	11.3	16.8	15.6	17.0
12							9.9	13.1	12.8	12.7
14							8.6	10.3	10.0	9.9

NING.	17.2m	17.2m	20.7m	20.7m	20.7m	20.7m	20.7m	24.2m	24.2m	24.2m
3	42.0	42.0	18.0	27.0	35.0	30.8	35.0	15.0	20.0	30.0
3.5	41.3	40.8	16.5	25.0	34.0	29.0	35.0	14.0	18.8	28.0
4	38.1	37.8	15.8	24.0	31.0	26.8	35.0	13.1	17.0	26.6
4.5	35.6	35.4	14.6	22.8	29.0	25.0	32.9	12.0	16.5	25.0
5	33.4	33.1	13.6	21.0	27.0	23.8	31.5	11.2	15.6	23.5
6	29.8	29.3	12.0	19.0	24.5	21.2	28.0	10.8	14.7	21.5
7	25.0	25.1	11.0	17.6	22.0	19.0	25.6	9.6	13.4	19.0
8	22.0	21.5	10.4	15.6	20.0	17.0	22.9	9.7	12.0	18.0
9	19.6	19.0	9.4	14.5	18.1	15.8	19.3	8.9	11.0	16.5
10	16.5	15.9	9.7	13.6	16.9	15.0	16.3	8.1	10.5	15.0
12	12.2	11.7	8.4	12.8	12.7	12.1	12.1	7.0	9.7	13.1
14	9.4	8.9	7.3	10.4	10.0	9.4	9.3	6.1	8.5	10.4
16			6.5	8.5	8.0	7.5	7.4	5.4	7.5	8.4
18			5.8	7.0	6.5	6.0	5.9	4.9	6.9	6.9
20							6	4.5	6.2	5.8

Notes: \* Capacity class.

## T 24,2-31,1m











NEW P	24.2m	24.2m	27.6m	27.6m	27.6m	27.6m	31.1m	31.1m	31.1m	31.1m	
3	31.0	27.0	17.8	21.6	26.0	23.5					
3.5	30.8	26.8	16.8	21.0	26.0	23.2					
4	30.6	26.0	15.8	20.5	26.0	23.0	14.8	16.0	21.0	21.8	
4.5	29.0	24.0	14.8	19.6	25.6	22.8	14.0	15.8	21.0	21.6	
5	27.6	22.6	13.9	18.8	25.5	22.6	13.3	15.0	20.6	21.4	
6	25.0	20.0	12.5	17.6	24.0	21.0	11.8	14.0	19.4	20.0	
7	22.0	18.4	11.2	16.3	21.5	18.7	10.5	13.1	17.4	18.7	
8	20.0	16.6	10.2	14.8	20.2	17.7	9.7	11.8	15.9	17.7	
9	18.0	15.0	9.4	13.6	18.7	16.0	8.8	10.8	14.3	15.9	
10	16.7	14.0	8.6	12.7	17.1	14.6	8.1	10.0	13.3	14.3	
12	12.4	12.1	7.4	11.1	12.8	12.2	7.0	8.8	11.4	11.8	
14	9.7	9.4	6.5	9.8	10.1	9.5	6.2	7.7	9.9	9.8	
16	7.8	7.5	5.8	8.7	8.2	7.6	5.5	6.8	8.1	7.9	
18	6.3	6.0	5.2	7.3	6.8	6.2	4.9	6.2	6.7	6.5	
20	5.2	4.9	4.8	6.2	5.7	5.1	4.5	5.7	5.6	5.4	_
22			4.4	5.2	4.7	4.1	4.0	5.2	4.7	4.5	
24			4.0	4.5	4.0	3.4	3.7	4.7	4.0	3.8	_
26							3.4	4.0	3.4	3.1	_
28							3.2	3.5	2.9	2.6	_
										·	

# Lifting capacities XCA60\_EV

## T 34.6-48m



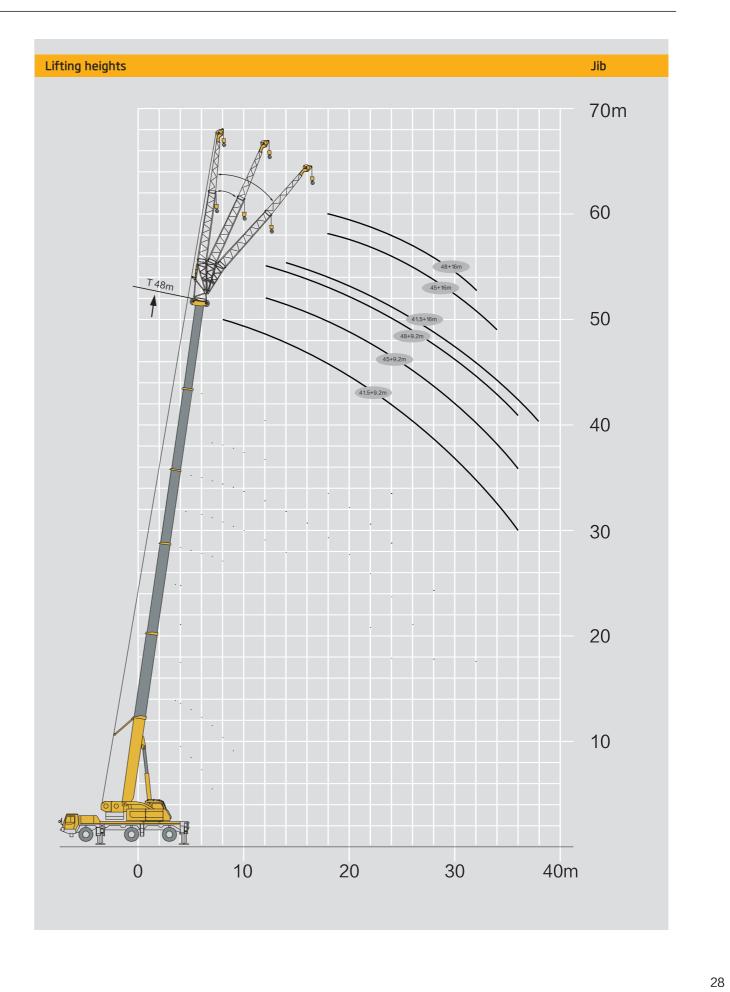








NEW PROPERTY.	34.6m	34.6m	34.6m	38m	38m	38m	41.5m	41.5m	45m	48m
4										
4.5	13.1	15.0	15.5							
5	12.6	15.0	15.5							
6	12.4	14.9	15.5	12.2	12.5	12.9				
7	11.4	14.7	15.4	11.8	12.3	12.9	9.6	10.3	8.2	
8	10.7	13.8	14.8	11.0	11.9	12.6	9.6	10.3	8.2	6.8
9	9.8	12.8	14.0	10.8	10.9	12.0	9.6	10.3	8.2	6.8
10	9.0	11.5	13.3	9.9	10.3	11.5	9.2	9.8	8.2	6.8
12	7.9	10.0	11.0	8.7	8.8	10.3	8.0	8.7	7.8	6.9
14	7.0	8.5	9.2	7.6	7.7	8.6	6.9	8.0	6.9	6.5
16	6.2	7.5	7.6	6.7	6.7	7.5	6.2	7.2	6.3	5.7
18	5.5	6.6	6.5	6.1	6.0	6.4	5.5	6.1	5.9	5.4
20	5.0	5.7	5.4	5.5	5.4	5.4	5.0	5.4	5.0	4.9
22	4.6	4.8	4.5	5.1	4.9	4.6	4.6	4.6	4.4	4.2
24	4.2	4.1	3.8	4.5	4.2	3.9	4.2	4.0	4.1	3.8
26	3.8	3.5	3.1	3.9	3.6	3.3	3.8	3.4	3.6	3.5
28	3.5	2.9	2.6	3.4	3.1	2.8	3.3	2.9	3.1	3.1
30	3.1	2.5	2.2	2.9	2.7	2.3	2.9	2.5	2.7	2.7
32	2.7	2.1	1.8	2.5	2.3	1.9	2.5	2.1	2.3	2.3
34				2.2	2.0	1.6	2.2	1.8	2.0	2.0
36							1.9	1.5	1.7	1.7
38							1.6	1.2	1.4	1.4
40									1.2	1.2
42									1.0	1.0
44										0.8



## J 9,2m













## J 16m













ALL STATES		10.3m			34.6m			38m	
	0°	15°	30°	0°	15°	30°	0°	15°	30°
3	8.8								
3.5	8.6								
4	8.2	7.4							
4.5	8	7							
5	7.7	6.7							
4.5 5 6	7.2	6.2	5.2						
7	6.8	5.6	5	6					
8	6.5	5.2	4.8	6			5.8		
9	6	4.9	4.2	6	5.8		5.8		
10	5	4.6	3.8	6	5.7		5.8		
12	4.2	3.8	3	6	5.6	5	5.6	5.5	4.3
14	3.6	3.4	2.5	6	5.2	5	5.4	5.2	4.1
16				5.9	5	4.9	5.3	4.9	3.9
18				5.2	4.9	4.7	4.7	4.5	3.5
20		-		4.7	4.4	4.2	4.1	4.1	3.1
22		-		4.2	4	3.7	3.6	3.6	2.9
24		-		3.5	3.7	3.4	3.2	3.3	2.7
26		-		3	3.2	3	3	2.9	2.4
28				2.6	2.7	2.7	2.6	2.7	2.1
30				2.2	2.3	2.3	2.2	2.3	2.1
32				1.9	2	2	1.9	2	2
34				1.6	1.7		1.6	1.7	1.7
36				1.3	1.4		1.3	1.4	
38							1.1	1.2	















NIE P		10.3m			34.6m			38m	
7	0°	15°	30°	0°	15°	30°	0°	15°	30°
3	4.3								
3.5	4.3								
4	4.3								
4.5	4				-				
5	3.9								
6	3.7								
7	3.6								
8	3.4			4					
9	3.2	3.2		4					
10	3.1	3		3.8					
12	2.8	2.6	2.4	3.7	3.1		3.4		
14	2.6	2.5	2.3	3.5	3		3.2		
16	2.3	2.2	2	3.4	2.9	2.4	3.2	2.8	
18	2	2	1.8	3.3	2.8	2.4	3.1	2.6	
20	1.7	1.8	1.6	3.2	2.7	2.3	2.8	2.6	2.3
22				3	2.6	2.3	2.7	2.5	2.2
24				2.9	2.5	2.2	2.4	2.4	2.1
26				2.7	2.4	2.2	2.1	2	2
28				2.5	2.4	2.1	2	1.9	1.9
30				2.3	2.3	2.1	1.9	1.9	1.7
32				2	2.1	2.1	1.6	1.5	1.5
34				1.7	1.9	1.9		1.3	1.3
36				1.4	1.6	1.7		1.1	1.1
38				1.2	1.3	1.4		1	
40					1.1				













30

NITE OF		41.6m			45.1m			48m	
7	0°	15°	30°	0°	15°	30°	0°	15°	30°
9	5.5								
10	5.5			4.2			3.7		
12	5.5	5.2		4.2	4		3.7	3.6	
14	5.5	5	4.2	4.2	4	3.2	3.8	3.8	3
16	4.8	4.6	4	4.2	4	3.2	3.8	3.8	3
18	4.2	4.1	3.5	3.9	3.7	2.9	3.7	3.4	2.7
20	3.7	3.7	3.2	3.5	3.4	2.6	3.3	3	2.5
22	3.3	3.3	2.7	3.1	3	2.4	2.9	2.8	2.4
24	2.9	2.9	2.4	2.8	2.8	2.4	2.5	2.5	2.3
26	2.7	2.7	2.3	2.5	2.5	2.2	2.4	2.3	2.2
28	2.4	2.4	2.2	2.3	2.3	2.1	2	2.2	2.1
30	2.2	2.2	2.1	2.1	2.1	2.1	1.9	1.9	2
32	1.9	2	2.1	1.9	1.9	1.9	1.8	1.8	1.8
34	1.6	1.7	1.8	1.7	1.8	1.8	1.7	1.6	1.6
_36	1.4	1.5	1.5	1.5	1.6	1.6			

NE P	41.6m			45.1m			48m		
	0°	15°	30°	0°	15°	30°	0°	15°	30°
12	3.2			2.8			2.5		
14	3			2.8			2.5		
16	2.8	2.6		2.8	2.4		2.5		
18	2.8	2.5		2.5	2.3		2.5	2.2	
20	2.6	2.5	2.2	2.4	2.2	2	2.4	2.1	
22	2.4	2.4	2.2	2.2	2.2	2	2.2	2.1	2
24	2.3	2.3	2.1	1.9	2	1.9	2	1.7	1.7
26	2.1	1.9	1.9	1.8	1.7	1.7	1.9	1.5	1.4
28	1.8	1.8	1.8	1.6	1.5	1.5	1.8	1.4	1.3
30	1.5	1.5	1.5	1.5	1.4	1.4	1.5	1.5	1.1
32	1.4	1.4	1.3	1.4	1.3	1.3		1.4	1
34		1.2	1.2	1.3	1.4	1.1			
36		1.2	1.1						
38		1.2							
40		1.1							