4.13 Operation system

4.13.1 Operational joysticks shall be convenient and flexible. All control movements shall not interfere with each other or cause wrong crane movements. Each joystick and pedal shall not deviate from its central position due to vibration.

4.13.2 Clear marking shall be provided near operational joysticks, buttons, indicators and signaling devices to clarify their intended use and operational direction.

4.13.3 All operational joysticks and buttons shall be installed at positions convenient for operation. Moving direction of a joystick and that of its controlled mechanism shall be consistent or related in logic.

4.13.4 Clearance between two operational joysticks shall be no less than 65mm. Operational forces and travel distances shall conform to the requirements in Table 3 below.

Table 3 Operational forces and travel distances

Mode	Position		Force/N	Trip/mm
Hand-operated	Extension and retraction of outriggers	Horizontal extension and retraction	≤80	≤85
		Vertical extension and retraction		
	Main hoisting, auxiliary hoisting, derricking, telescoping and slewing		≤60	≤160
Foot-operated	Brake pedal and telescoping pedal		≤150	≤250
	Accelerator pedal			
Multi-directional control joystick using a cross shaft			≤10N (electric control) ≤60N (hydraulic control)	-

4.14 Driver's cab

4.14.1 The driver's cab of a crane shall confirm to the requirements in GB/T 20303.2.

4.14.2 The driver's cab shall satisfy following requirements:

a) it shall be a fully closed metal or non-metal structure, with smooth and even internal and external surfaces, and without crack or rusting;

b) it shall be spacious and provide good sight; its internal width shall be no less than 700mm, and its height shall be no less than 1300mm;

c) safety glass shall be used for windows; laminated or local tampered glass shall be used for the front windshield; tampered glass can be used for other windows; all glasses used shall conform to the requirements in GB 9656;

d) doors and windows shall be opened conveniently, without spontaneous opening or sticking; doors shall be locked reliably; there shall be no abnormal noise from doors and windows during crane travelling; technical conditions of door lock shall conform to the requirements in JB/T 5934.

e) a wiper and sun shield shall be installed for the front windshield; type, dimension and technical requirements of the wiper shall conform to the requirements in QC/T 46 and QC/T 44; sun shield shall conform to the requirements in QC/T 629;

f) cooling and heating device shall be installed inside the cab, with reasonable layout of hot and cool air passages; air outlets shall not directly face human body; cooling and heating devices shall conform to the requirements in QC/T 656 and QC/T 634;

g) there shall be no sharp flange which might cause injury inside and outside the cab; non-metal parts inside the cabin shall have high flame resistance conforming to the requirements in GB 8410.

h) the driver's cab shall have good sealing, heat preservation, ventilation and waterproof performance; the floor shall be slipping resistant, and the seats shall be comfortable and adjustable.

i) color of paint applied to exposed surfaces shall be even; there shall be no defect such as exposed undercoat, crack, obvious wrinkle or uneven covering, etc.;

j) after each door is installed into the door frame and each window into the window frame, gaps between the door/window and frame shall be uniform.

5 Test methods

Test methods of cranes shall conform to the requirements in GB/T 6068.

6 Inspection rules

Inspection rules of cranes shall conform to the requirements in GB/T 6068.

7 Marking, packaging, transport and storage

7.1 Marking

7.1.1 A product nameplate shall be permanently installed at an obvious position of cranes, which shall include at least following information:

a) model and product name;
b) maximum capacity;
c) engine model;
d) engine rated power;
e) serial number;
f) manufacture date;
g) name of the manufacturer.

7.1.2 A performance plate shall be firmly attached to a place in the operator's cab where it is easy for the operator to access. Rated load charts and lifting height chart shall be provided on the plate. More information shall be provided in performance parameter manual or stored in LMI in electronic format.

7.1.3 Markings of controls shall be provided near each control mechanism.

7.2 Packaging

7.2.1 The crane can be delivered at factory without package. Waterproof and moisture-proof measures shall be established for the attached tools, spares parts and technical documents of the crane.

7.2.2 Attached technical documents shall include:

a) product certificate;
b) warranty card;
c) instruction manuals (including operator's manual, maintenance manual and spare part catalogue);
d) instruction manual of major parts;
e) packing list;
f) list of attached spare parts;
g) list of attached tools.

7.3 Transportation

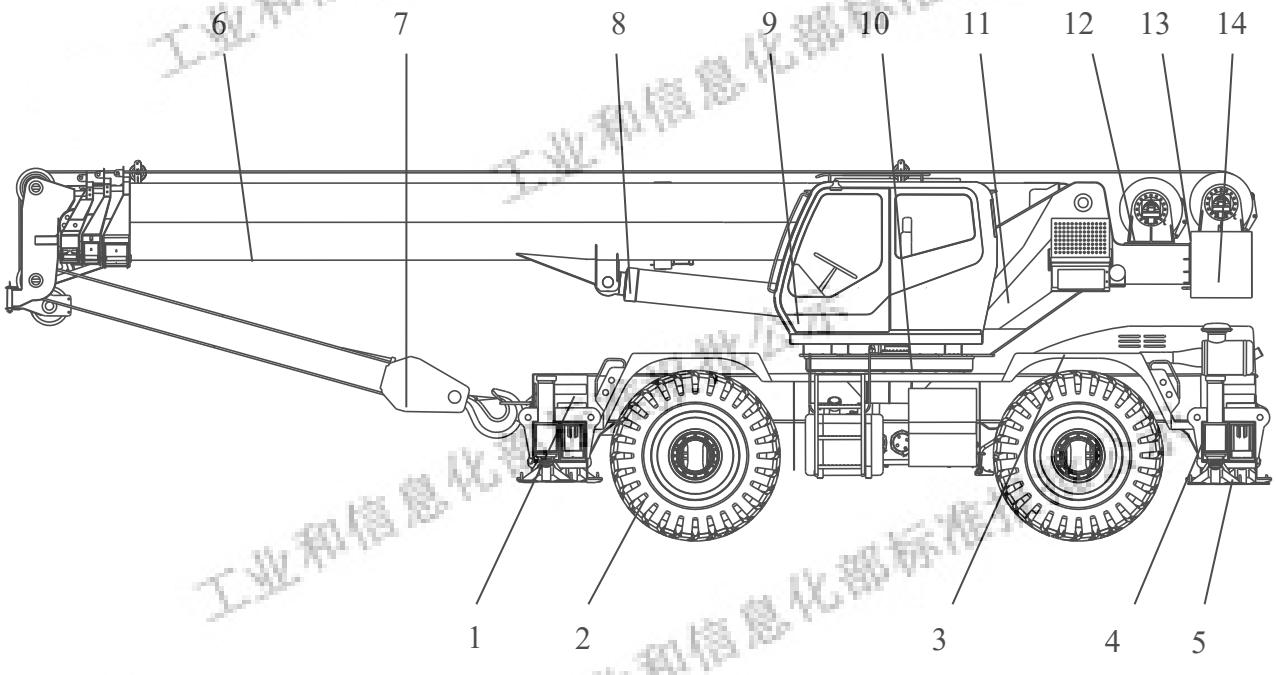
Transportation of the crane shall conform to rules for transportation by waterway and overland established by transportation authorities, as well as loading requirements from railway authorities. Mode of transportation can be negotiated between the provider and buyer.

7.4 Storage

When the crane is to be stored for a long time, coolant and fuel shall be discharged, power shall be cut off, and doors and windows shall be locked. The crane shall be parked in a place with sound ventilation, firefighting, anti-corrosion and sun-proof measures, and without corrosive air or liquid. Periodic maintenance shall be conducted as per the operator's manual.

Annex A
(Informative)
Major parts of a crane

The major parts of a crane are as shown in Figure A.1.



Key

chassis:

1. chassis frame
2. tyre
3. engine
4. outrigger
5. outrigger pad

superstructure:

6. boom
7. hook
8. derricking mechanism
9. cabin
10. slewing mechanism
11. rotating platform
12. auxiliary hoisting mechanism
13. main hoisting mechanism
14. counterweight