



集装箱正面吊运机  
Container Reach stacker

**SANY**  
Quality Changes the World



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集装箱正面吊运机单页本2007年2月英文版







**A** Hanger system



**B** Arm support system



**C** Hydraulic system



**D** Electric control system



**E** Engineering machinery chassis



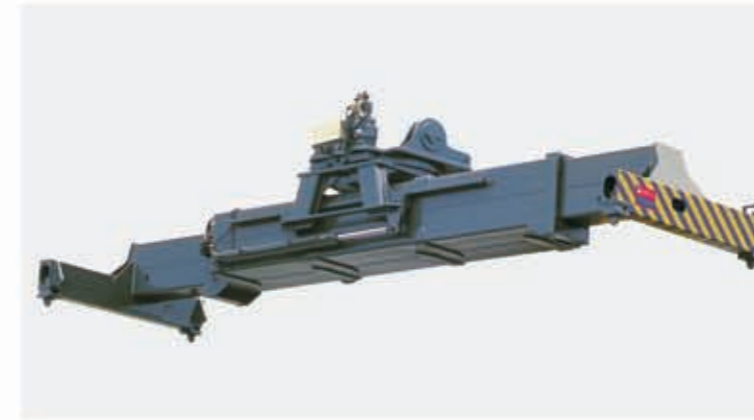
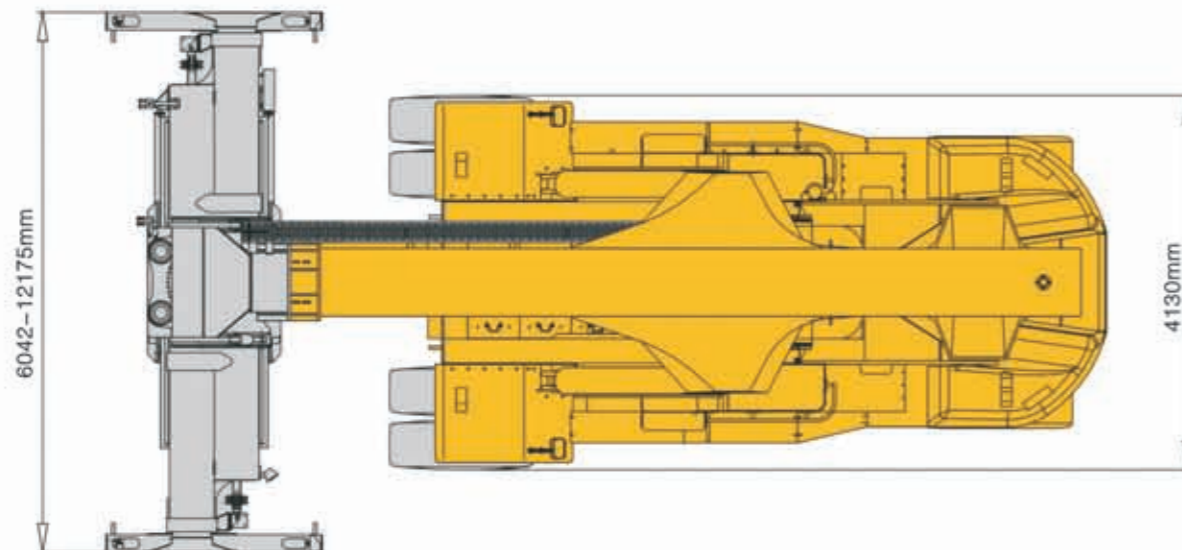
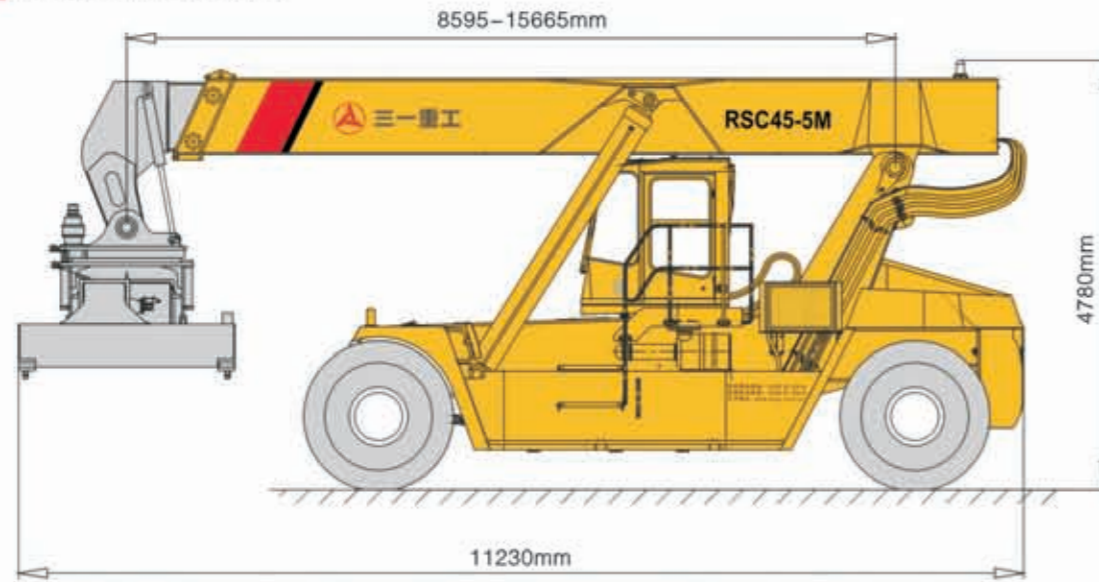
Developed by SANY independently, the high quality RSC45-5(M) container reach stacker incorporates the advantages of several overseas products and also has original patented technologies. With accurate and harmonious cooperation of multiple systems, the machine can carry out container transport and stacking jobs efficiently and smartly. This machine applies to 20 foot and 40 foot standard containers and its max. rated hoisting capacity is 45t.

### Features of the complete machine

The SANY container reach stacker has excellent performance, high reliability, high grade configuration, advanced electro-hydraulic control system, perfect safeguard protection system, comfortable driving environment, convenient operating system and multiple patent technologies. The complete machine has a compact structure and a smart look, which conform to the design concept of human engineering.

The machine has such characteristics as large hoisting capability, big number of stacking layers, mobility and adaptability, wide vision, convenient to use, strong grade ability, good stability. It can meet the demands of users to maximum extent.

### Overall dimension

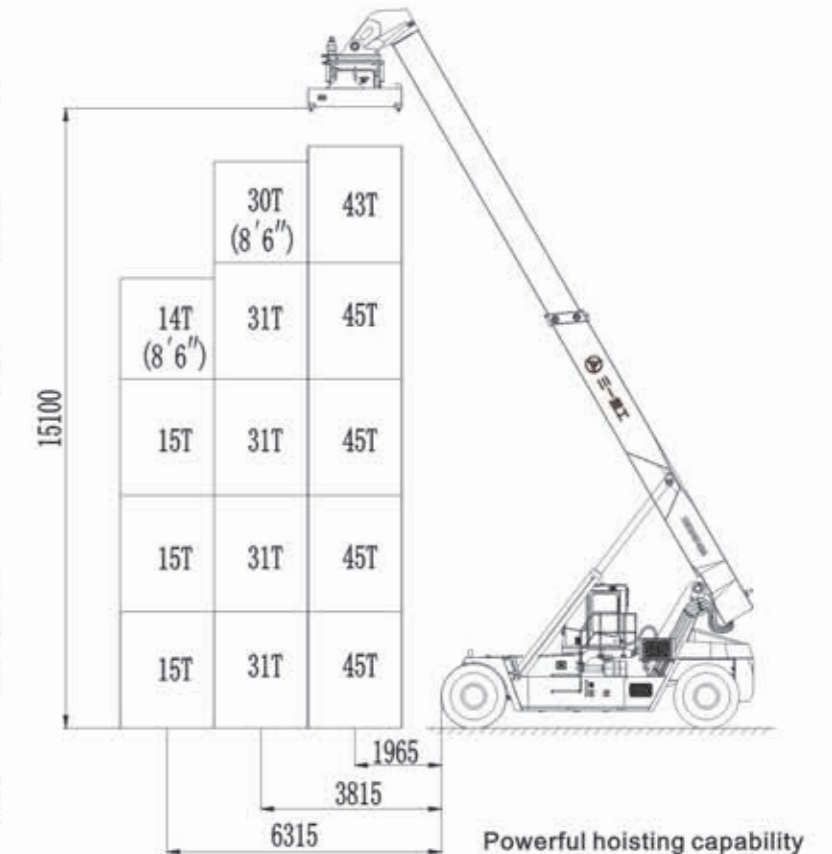


### Hanger system

- Diversity of choices  
Sweden ELEM817 type hanger  
Multifunctional SDJ450 type heavy container hanger of SANY's independent intellectual property
- Strong mobile function  
Angle of rotation: +105/-195°; swing amount: ±800mm;  
Applicable scope: 20-40 foot international standard container.
- Strong safeguard protection function  
Motion of rotary lock has inter-lock function;  
The lock-pin has a mechanical mousing-hook mechanism;  
The hanger has shimmy damping function.

### Performance advantages

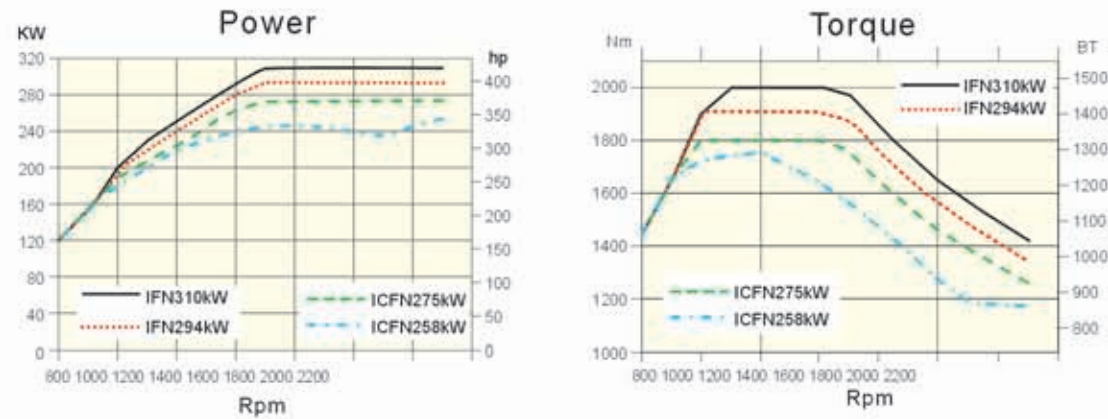
- Superior complete machine performance  
Large hoisting capability, strong container-skip work capacity and good complete machine stability.
- Dynamic mobile cabin  
The hydraulic control cabin can adjust its own position at any moment to requirements of the job and also can change the operation outlook; its detection and maintenance are more convenient.
- Mobile bob weight  
The original mobile bob weight greatly increases hoisting capability and complete machine stability with the same weight.
- Mechanical type ROPS  
The double ROPS has higher safety and reliability.
- Controlling method to motion trace of an object  
The arm support system has vertical hoisting function, so, it is convenient to use the arm support to align and fetch a container; its one-time homing function makes operation handy and also increases work efficiency; the machine has emergency falling function, which provides safety.
- Concealed engine exhaust gas pipeline  
It has long service life, maintenance-free feature and nice appearance and can also prevent the maintenance staff from being scalded.



### Power and drive system

#### Engine

Adoption of Sweden VOLVO TWD 1240 VE model diesel engine;  
 Rated power: 256Kw/21100 r/min; rated torque: 1751 Nm/1200r/min;  
 Advanced performance: in-line 6 cylinder, 4 stroke, turbocharged, central water cooling, full electric control electronic fuel injection;  
 Low fuel consumption: the average fuel consumption rate is 197g/kwh;  
 High reliability, good dynamic performance, low noise, Euro II emission standard compliance.



Power/revolution graph of diesel engine

Torque/revolution graph of diesel engine



1 Engine

#### Gear-box

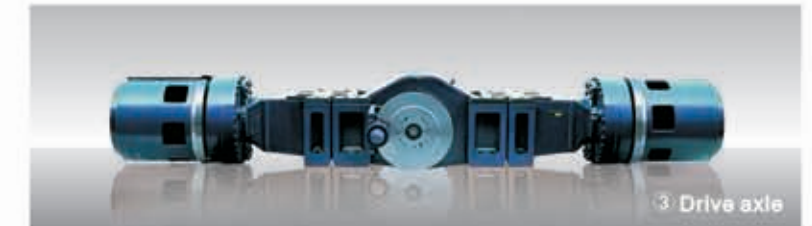
Adoption of American DANA Clark gear-box  
 Hydrodynamic torque converter + transmission gear-box + pilot clutch;  
 Power shift; automatic/manual shift;  
 4 forward gears and 4 reverse gears, forward/reverse anti-reverse-rotation device;  
 Adoption of helical gear drive, which is smooth with low noise;  
 Built-in pipeline is maintenance free.

#### Drive axle

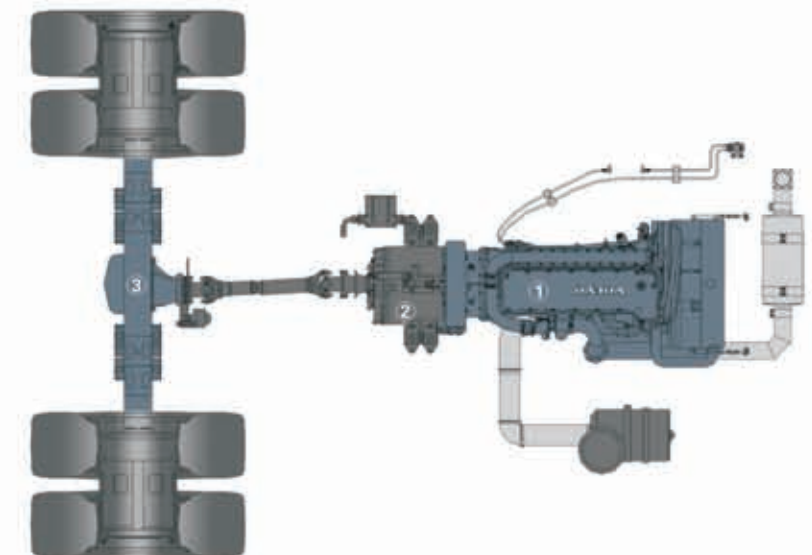
Adoption of Germany Kessler heavy load drive axle  
 Welded axle body has good rigidity and high strength;  
 Adoption of double deceleration differential structure;  
 The fully closed wet multiple disc brake with planetary wheel edge reduction gear is maintenance free;  
 The service braking uses the wet multiple disc brake while parking braking uses the central caliper disc brake, so, braking is safe and reliable;  
 The main reduction gear and the wheel edge reduction gear have respectively comparatively independent lubrication systems.



2 Gear-box



3 Drive axle





Comfortable driving environment



Convenient operating system

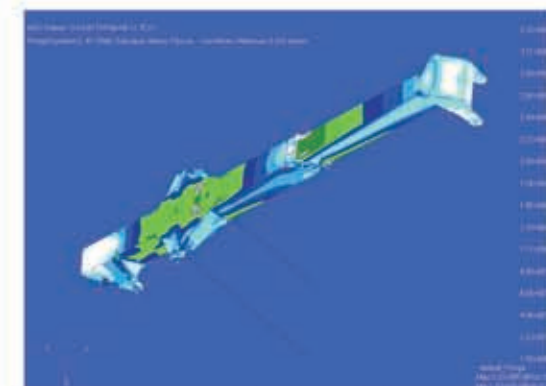
### ■ Cabin and control system

- The canopy guard technology has good safety performance;
- Silicone oil damper and suspended seat can relieve fatigue strength of the operator to maximum extent;
- Open outlook and AC provide all-weather operational conditions;
- Human-machine interface can monitor operation conditions of the complete machine in real time;
- Centralized handle is convenient to control;
- The dynamic mobile cabin of patented technology (optional);
- The hydraulic control cabin can adjust its own position at any moment to meet the requirements of the job and also can change the operational vision; thus making maintenance and overhaul more convenient.
- The equipped lock-pin CCD camera enables the lock-in to align accurately and quickly (optional).

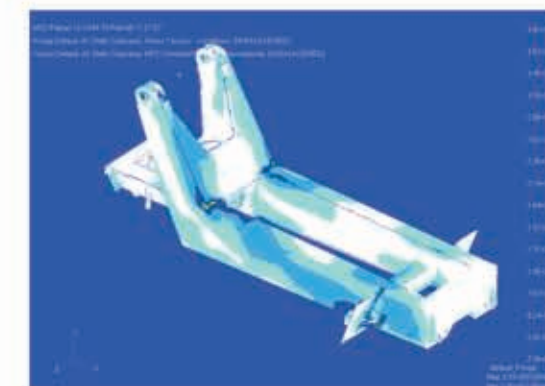
### ■ Arm support and frame systems

The arm support and frame systems have excellent reliability and stability.

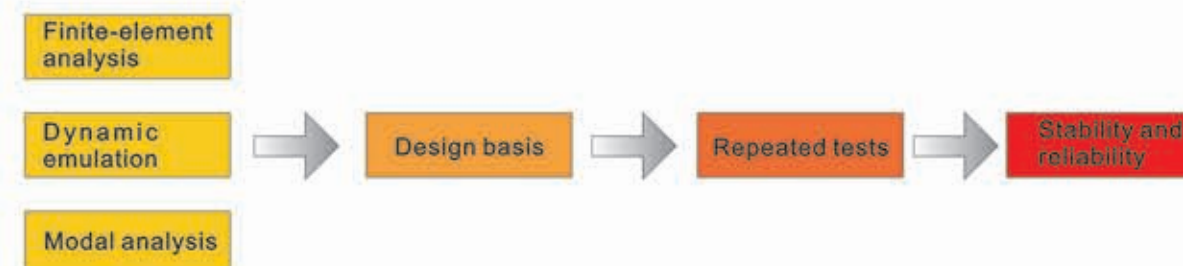
- **Accurate design:**  
Through calculations of advanced finite-element analysis, modal analysis and dynamic emulation analysis and with accurate data support as design basis, the accurate design ensures that the arm support and frame systems have rational structures and superior performances.
- **Superior material quality:**  
The material of the systems also realizes the reliability principle; made of high-strength steel plate with yield strength above 785MPa, the material has higher rigidity and strength.
- **Fine manufacture:**  
The manufacture engineering of the systems is precise and superior. Each piece of steel plate and weld seam have passed 100% nondestructive flaw detection and can withstand strict test.



Finite-element analysis and calculation to arm support



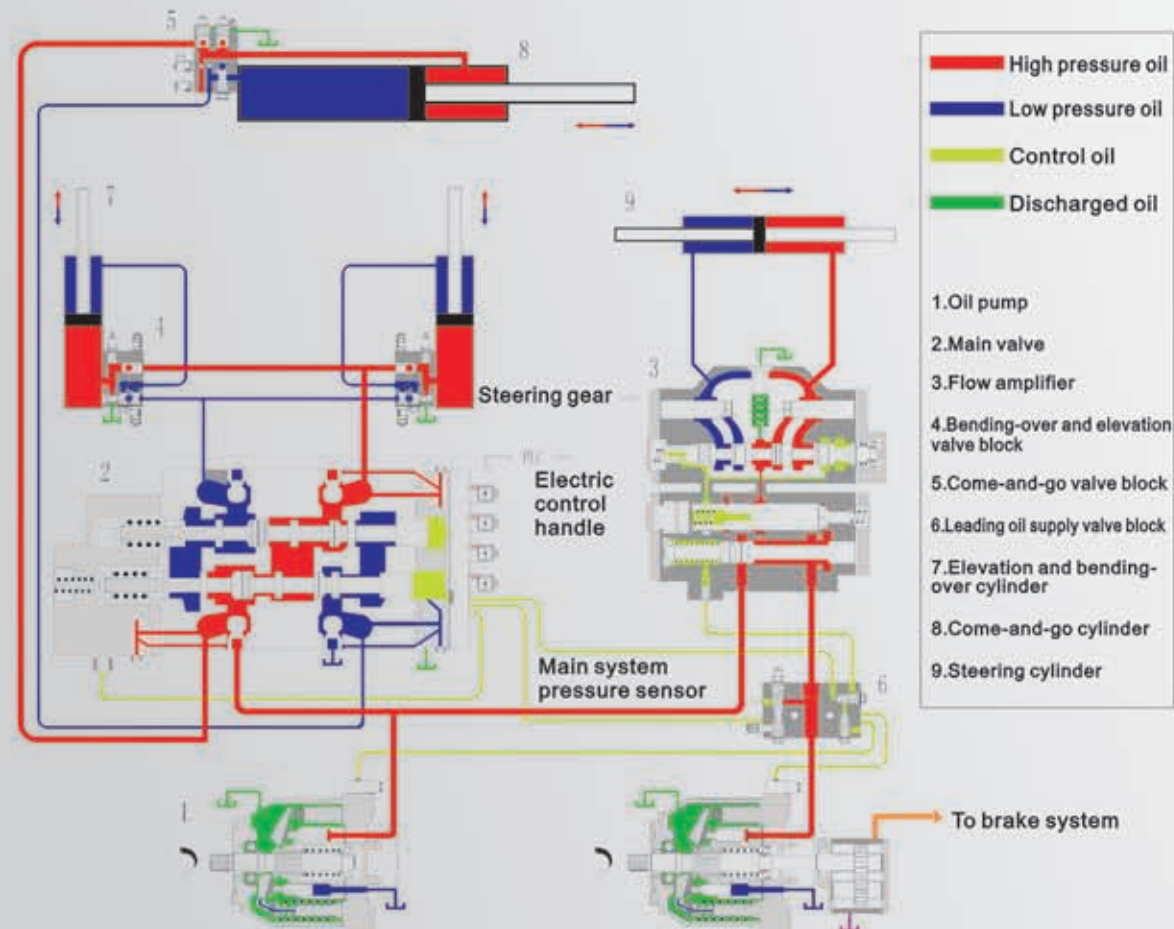
Finite-element analysis and calculation to frame



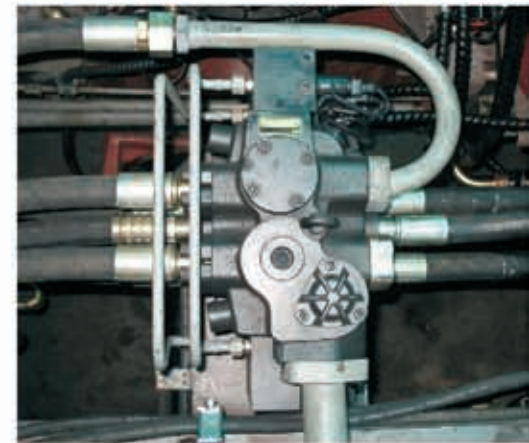
### Hydraulic system

#### Working principle

After PLC receives a signal from the control lever, it will immediately control the electro proportional valve on the main valve, meanwhile, the main valve will feed back a signal to adjust output of flow of oil pump, thus enabling stepless speed governing to actions of come-and-go, elevation and bending-over of the arm support. When steering, the steering gear will feed back a signal to flow amplifier and oil pump, meanwhile, the steering gear will also control the output direction and flow of the flow amplifier, and then it will enable steering through the steering cylinder.



- The advanced load sensitive electric proportional control system is of stepless speed governing and has superior operating performance, good consumption reduction performance and energy saving performance.
- The servo power-assisted steering system makes control more light and flexible.
- The independent brake system has high safety and reliability and long service life.
- The light load differential function greatly increases working efficiency.



Assembly diagram of main valve



Assembly diagram of bending-over and elevation valve block



PARKER P2 series variable plunger pump



PARKER M400LS electric proportional steering valve



Danfoss flow amplifier



IFM control system of Germany



High resolution electronic monitor unit

### Electric control system

The humanized and intellectualized electric control system incorporates human with the machine, which makes operation smooth.

- **Germany IFM control system**  
The controller and display adopt IFM brand products of Germany.
- **High precision sensors**  
Angular and displacement sensors adopt 3B6 brand products of Italy.  
Temperature and speed sensors adopt VDO brand products of Germany.  
Pressure sensor adopts Huba brand product of Switzerland.
- **CAN bus communication**  
It has large communication volume, high speed, stable and reliable system and can fetch all sorts of data in real time.
- **Innovative controlling method**  
The vertical hoisting function makes motion smooth and provides high precision, so, it is convenient to align with a container.  
Torque control and safeguard protection functions are perfect and reliable.  
The system can fully display all sorts of operating parameters of the equipment; it has such functions as real-time monitoring, failure display and sound-light double alarm prompt.

### Safeguard protection system

- **ROPS system**  
Mechanical-electrical double ROPS system.  
Sound-light double alarm is available in case of a hoisting overload, and then the arm support can only retract and can not further extend, bend over or elevate.
- **Hanger protection system**  
Electronic-mechanical chain mechanism is available and motion of rotary lock has inter-lock function;  
The system can ensure when any rotary lock is not at Full Open or Full Locking position, the container reach stacker can not go on to perform other operation;  
The lock-pin has a mechanical mousing-hook mechanism.
- **Engine protection system**  
Only when the gear handle is set at Neutral position (N), the engine can start; thus, protecting engine and gear-box.
- **Overrun protection system**  
The engine will automatically shut down when engine oil pressure is too low, temperature of engine oil or water is high, water level in water tank is low, or oil temperature of gear-box is too high.
- **Running protection system**  
Overspeed protection with or without load.
- **Protection system with data compensation function**  
Accurate weighing and torque calculating system, together with scientific data compensation, can achieve stable and reliable torque control and safeguard protection functions.



Technical parameters of the container reach stacker

Model		RSC45-5 (M)	RSC40-5 (M)
Outline	Length	11230mm	11230mm
	Width	4130mm	4130mm
	Height	4780mm	4780mm
Load capacity	First row	Load center: 1965mm Floor 1-4: 45000Kg Floor 5: 43000 Kg	Load center: 1965mm Floor 1-4: 40000Kg Floor 5: 38000 Kg
	Second row	Load center: 3815mm Floor 1-4: 31000 Kg Floor 5: 30000 Kg	Load center: 3815mm Floor 1-4: 27000 Kg Floor 5: 25000 Kg
	Third row	Load center: 6315mm Floor 1-3: 15000 Kg	Load center: 6315mm Floor 1-3: 14000 Kg
Engine	Model	VOLVO TWD1240VE	VOLVO TWD1240VE
	Type	In-line 6 cylinder, 4 stroke, central water cooling, turbocharged, electronic fuel injection	In-line 6 cylinder, 4 stroke, central water cooling, turbocharged, electronic fuel injection
	Controlling method	CAN bus EDC III full electric control system	CAN bus EDC III full electric control system
	Rated power	256kw/2100r/min	256kw/2100r/min
	Rated torque	1751Nm/1200r/min	1751Nm/1200r/min
	Tail gas emission standard	Euro II	Euro II
	Average fuel consumption	197g/kWh	197g/kWh
Gear-box	Model	CLARK 15.5HR36432	CLARK 15.5HR36432
	Shift manner	Automatic/manual	Automatic/manual
	Gear position	4 forward gears and 4 reverse gears	4 forward gears and 4 reverse gears
Drive axle	Model	D102 PL341/528 NLB8460	D102 PL341/528 NLB8460
	Service brake	Multiple disc wet brake	Multiple disc wet brake
	Parking brake	Disc brake released by spring brake hydraulic pressure	Disc brake released by spring brake hydraulic pressure
	Max. allowable axle load	1500kN	1500kN

Hanger	Model	ELME817 or SDJ450	ELME817 or SDJ450
	Angle of rotation	+105° /-195°	+105° /-195°
	Swing distance	± 800 mm	± 800 mm
	Max. load-bearing	45000 Kg	40000 Kg
	Applicable range	20-40 foot international standard container	20-40 foot international standard container
Hoisted object		International standard container	International standard container
Complete machine mass		71000kg	69500kg
Arm support	Max. hoisting height	15100mm	15100mm
	Angle of inclination	0-60°	0-60°
	Stroke	7070mm	7070mm
Max. hoisting speed (no load/full load)		420/250 mm/s	420/250 mm/s
Max. running speed (no load/full load)		25/21 km/h	25/21 km/h
Max. falling speed (no load /full load)		360/360 mm/s	360/360 mm/s
Grade ability (no load /full load)		39/32 %	39/32 %
Max. traction		360KN	360KN
Min. turning radius		8000mm	8000mm
Steering method		Servo power-assisted steering	Servo power-assisted steering
Wheel base		6000mm	6000mm
Min. ground clearance of body		350mm	350mm
Running speed	Forward/reverse	First gear	3.6 km/h
		Second gear	8.6 km/h
		Third gear	14.8 km/h
		Fourth gear	25 km/h
Noise in cabin		≤72 dB	≤72 dB
Temperature in cabin		15-25°C	15-25°C
Lubrication method		Centralized lubrication	Centralized lubrication
Working pressure of hydraulic system		230 bar	230 bar
Total displacement of hydraulic system		240 ml/r	240 ml/r
Optional devices		<ul style="list-style-type: none"> <li>• The dynamic mobile cabin of patent technology</li> <li>• Original mobile bob weight</li> <li>• Multifunctional hanger CCD camera</li> <li>• Reversing radar system</li> </ul>	

Working scene at Fuzhou harbor



Working scene at Dalian harbor

