HYUNDAI
MATERIAL HANDLING

110/130 160D-9V

Internal Combustion Diesel Engine Forklift Truck

110/130/160D-9V series that satisfies both eco-friendliness and cost-effectiveness!

The 9V series is a creative product that satisfies eco-friendliness and reduces TCO (Total Cost of Ownership) by satisfying the Euro stage 5 regulations and significantly improving fuel efficiency and work efficiency.

110/130/160D-9V

HYUNDAI
MATERIAL HANDLING

www.hyundai-mh.com

2022. SEP

PRODUCT FEATURES
OVERVIEW

VALUE UP

As times change, the standard for high performance should also change

■ Optimized hydraulic system and EGR removed

110/130-9V

32% ↑

160D-9V improved fuel efficiency by **12%**

■ RPM reduction of cooling fan and optimized cabin structure

110/130-9V

5.9dB ↓

160D-9V reduced driver's seat noise by **4.9dB**

ECO-FRIENDLY
ECONOMICAL

Environment-Friendly

- Satisfies EU stage 5 regulations on gas and achieves both eco-friendliness and operating expenses reduction with improved fuel efficiency
  - Cummins B4.5, 6.7 engines

Innovative cost-effectiveness and reliable durability

- Significant TCO reduction - 12~32% fuel efficiency improvement
  - EGR removed, hydraulic system optimized, engine fuel efficiency downsizing
- Newly applied ZF T/M equipped with the upgraded TCU
  - 12~32% fuel efficiency improvement
  - Improved responsiveness and optimized shift timing
  - Applied a non-contact shift lever that is strong against moisture
- Selection of engine working mode according to working conditions
  - "PWR/STD mode" "idle RPM up/down"

Differentiated safety specifications

- Auto-parking brake
- OPSS - Restricted driving, lift and tilt operation
- Road slope warning
  - Alarm warning when the road slope exceeds the standard
- Password-start limit
  - Prevents theft by prohibiting forklift operation by an unauthorized operator
- Travel speed limit
  - Prohibiting driving beyond the speed limit at the place of work
- Real-time display of steering tire position **Option**
  - Providing steering direction information that cannot be easily obtained with the naked eye

Prominent driving comfort specifications

- Applied a new cabin with improved work convenience and serviceability
  - Eliminated visual distortion at the edge of the windshield
  - Increased the side view by applying glass-type side doors
  - Improved accessibility by repositioning the console switches and light buttons
  - Reduced cabin noise while driving (4.9 to 5.9dB)
- Hanging type brake inching pedal
- Air suspension & swivel seat **Option**

Easy and convenient follow-up management

- Auto-tilting cabin that opens up to 52 degrees
  - Eliminated visual distortion at the edge of the windshield
  - Restricting cabin tilting when opening the passenger door to prevent cabin damage accidents
- Automatic DPF & SCR regeneration of the post-processing device by engine load
- Diagnosis of failures such as mission, engine, and fingertip and consumables replacement cycle management on the color monitor

110/130
160D-9V

Eco-friendly Cummins B series engine

Cummins B series engines are widely used throughout the world, and they satisfy European emission regulations.
In addition, the EGR system was done away with to improve energy efficiency and reliability of the exhaust gas reduction system to a large extent. DPF is newly added in addition to the existing DOC and SCR.

	110/130D-9V	160D-9V
Model / CC	B4.5/4,460cc	B6.7/6,690cc
Rated Power (Kw/rpm)	123/2,200	129/2,200
Max torque (kg-m/rpm)	77.9/1,200	114.3/1,100

Innovative reduction of operating expenses

Fuel efficiency is dramatically improved by using an optimized engine, removing the EGR system, and applying a load sensing system.

- Fuel consumption rate (fuel efficiency) : 32% - 11/13tons
- Fuel consumption rate (fuel efficiency) : 12% - 16tons

* Urea consumption increases as the EGR has been removed.
(Urea tank capacity is increased by 21.6 liters.)

110/130D-9V 32%

160D-9V improved
fuel efficiency by 12%

• Fuel economy is based on our internal tests
(VDI 2198) and may be different from actual operation.

Energy efficiency was improved by [illegible]
compared to existing premium products
through the Optimi[illegible]de
performance to reflect [illegible]ket trends an[illegible]
t[illegible]

ENVIROMENT FRIENDLY
GREAT PRODUCTIVITY, DURABILITY

PERFORMANCE UP

An eco-friendly engine ensures both cost-effectiveness and work efficiency!

Check out the flawless performance of 110/130/160D-9V only.

Upgraded ZF transmission (3WG171)

Responsiveness and shift timing are optimized, and SIL 2 European safety function regulation is satisfied. In addition, the shifting system boasts of increased reliability as a non-contact shifting lever that is not affected by moisture is applied.

Engine output selection button

① PWR/STD button - STD mode is set to 80% output of PWR mode and can be selected according to the work conditions.

② Idle RPM Up/Down button - When slowly lifting cargo without stepping on the accelerator pedal, the engine output can be supplemented. (Adjustable by increments of 25 RPM)

Added the back tilt lock function to the mast New

The function of locking the back tilt is newly added to prevent the natural sagging of the mast.

* The natural sagging function of the mast front tilt is maintained.

Wide work sight of the 3-stage mast–TS mast Option

Usually, the 3-stage mast causes some inconvenience in securing a clear front view due to the primary cylinder in the center. The 3-stage TS mast provides wider work sight by placing the primary cylinder on the left and right sides.

Password – Start limit

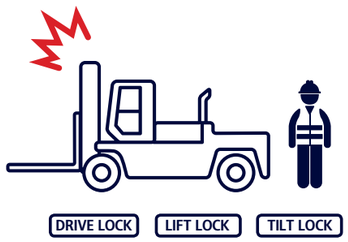
A password can be set to prevent unauthorized driving by an outsider and theft of the forklift. If the password is set, the engine cannot be started without the password.
(Up to ten passwords can be set.)

Auto-parking brake

When the engine stops or OPSS starts, the parking brake is automatically activated to prevent human errors. If the driver needs to use the parking brake while the engine is running, driver can apply/release the brake using a dedicated button.

OPSS system

The OPSS restricts driving, lifting, and tilting when the operator leaves the driver's seat in order to prevent safety accidents.



Additional options for safety

- Auto-tilting – Automatically maintaining the level of the fork and the ground
- Seatbelt interlock – Forcing the wearing of seat belt to prevent secondary accidents

SAFETY UP

**Safety at the logistics site is most important,
safety is supported by complete reliability**

Speed limit

The maximum driving speed can be set to prevent safety accidents caused by exceeding the speed limit. Even though the maximum driving speed is set, hill-climbing ability and mast working performance are maintained at the highest level.

Large side mirror with hot wires Option

A large side mirror is installed on the front wheel fender to secure a wider rear view. In addition, heat wires were inserted into the side mirror to cope with rain or snow.

Displaying the road slope (STD) and steering angle display in real time Option

The road slope is sensed and displayed in real time. When the set value is exceeded, the symbol turns red, and a warning buzzer sounds. In addition, the steering tire position is displayed in real time.

Deluxe next-generation cabin

• The next-generation cabin, which has improved driving convenience and serviceability by listening to customers' voices, provides consistent convenience in any condition.

Noise in the driver's seat

Reduced noise dramatically by optimizing engine capacity, reducing cooling fan RPM (9 to 25%), and complementing the cabin structure.

• 11/13 tons: 5.9 dB reduction (70.4 dB) • 16 tons: 4.9 dB reduction (68.6 dB)

Air suspension & swivel seat Option

Air suspension that provides optimal riding comfort.
The "air suspension & swivel seat" is provided as an option, which improved reverse driving and convenience of getting on/off as the seat can be rotated 20 degrees to the right and 10 degrees to the left.

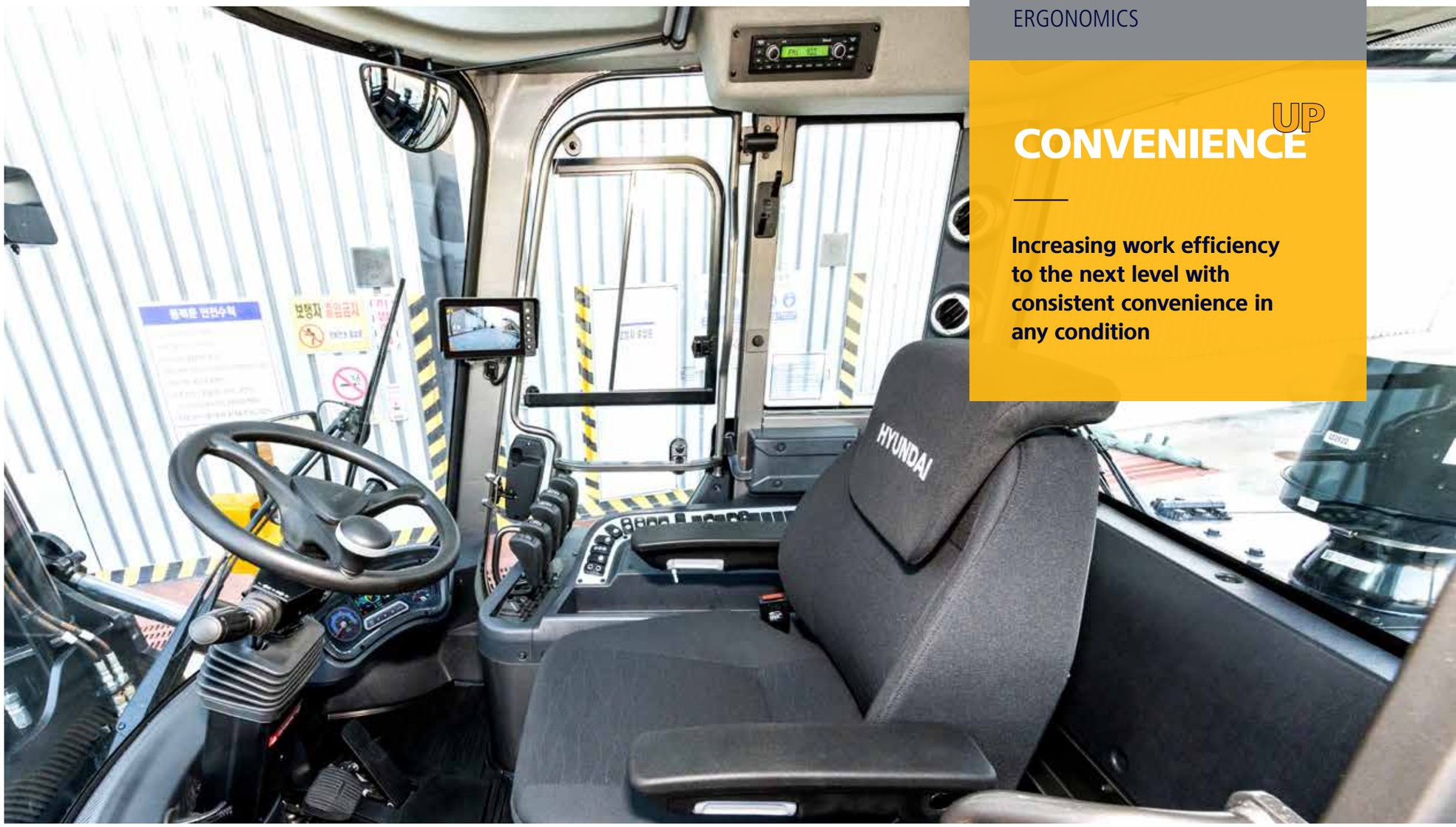
* Basic specification: Full-suspension Grammer seat

Multi-functional digital display

A multi-functional cluster that delivers essential information in colored images and which is equipped with various features such as function setting and malfunction diagnosis of major parts.

CONVENIENCE UP

Increasing work efficiency to the next level with consistent convenience in any condition



Easy-to-use steering handle

The problem of heavy handle when handling abruptly is improved, as the handle can be adjusted up and down by 80mm and front and back by 40 degrees. In addition, the work convenience of the driver is improved by reducing the handle diameter by 35mm.

High operability fingertip system Option

The fine controllability of the new fingertip system is improved by changing MCV control to dither control. The system provides fast response within 0.1 seconds as well as the same controllability regardless of ambient temperature.

Inching pedal and brake pedal that are easy to operate, efficiently placed air vent

Fatigue accumulated in the legs is reduced by changing the brake pedal and inching pedal to a hanging type.
The air conditioning effect is improved by installing two air vents above the pedal.

Highlights of the next-generation cabin

Front sight

- Applied single curved glass, removing distortion of vision in corners
- Double-arm large wiper – Removing water from a wider area
- 7-inch monitor for the rear camera only

Rear sight and air vents

- Applied flat glass without distortion of view
- Applied single-arm wiper as a standard
- Air vent (left and right symmetrical) that controls the air volume in four directions

Upper window / sun visor

- Applied single-arm wiper as a standard
- Ceiling interior materials with high insulation effect
- A sun visor that can control the position in three phases and which is made of materials that reflect the direct rays of the sun

Protecting the glass and field of view on the left / right

- Minimizing blind spots in the field of view
  - Whole glass structure that has no filler in the middle of the door / Increased glass area
- Preventing direct collision with glass when moving objects in the cabin

Optimal air conditioning – multiple air vents

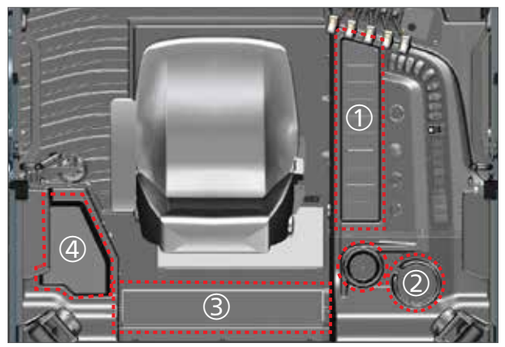
- Upper side of the cabin : 2 left and right C pillars each (4 in all)
- Dashboard : 2ea on the top of the pedal
- Removing windshield moisture : 3 ea on the front of the dashboard

Console – improved accessibility

- Placed switches in one row (in order of use frequency)
- Applied the 12V power port (2ea)
- Placed the air conditioning control dial near the headliner

4 storage spaces separated by use

① Mobile device
② Beverage bottle / can
③ Driving accessories
④ Sub-space



MAINTENANCE UP

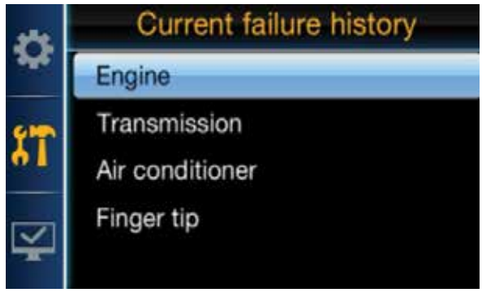
Easy maintenance and cost-effective after-sales service
Even though the work is finished, the satisfaction continues

Wide maintenance space

The cabin can be tilted up to 52 degrees, enabling easy access to the powertrain, hydraulic, and electrical system of the forklift. The cooling system and engine consumables can be easily managed by opening the cover of the wing-type engine room.

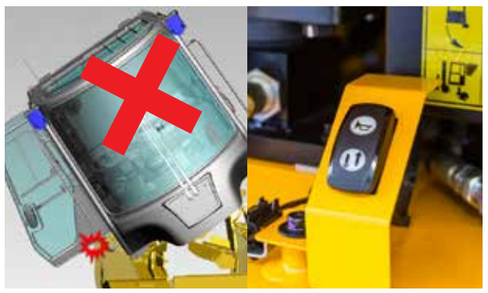
Self-diagnosis of engine and consumables management

The failure details and history can be checked on the cluster screen. In addition, when the replacement cycle of any consumables is entered into the cluster, parts whose replacement is due are displayed on the monitor.



No tilting when the door is opened & cabin tilting switch

If the right door is open, damage to the door is prevented by prohibiting cabin tilting. The cabin can be opened and closed both automatically or manually.



Tankless-type compressor

Unlike the tank-type compressor that should be refilled, the tankless-type compressor can use compressed air for a long time at constant pressure.

Management of exhaust gas after-treatment device

DPF and SCR are automatically regenerated by engine load.
DPF can be easily removed by disassembling the band only.

* When CK-4 grade engine oil is applied, DPF cleaning at an interval of 5,000 hours is not required.

Hi-MATE Option

Forklift operation and status, safety, and human resources can be remotely managed using the on-site management solution Hi-MATE. The accumulated data can be used for devising a forklift operation plan.

HiMATE

Hi-MATE, a solution for field control based on data

Data collected at the sensors and modules mounted on equipment during the operation of forklift truck at the operation control system of Hyundai Industrial Vehicle is provided to the mobile device or computer of the customer in real time through the server of Hyundai Construction Equipment. Such visual data can be used for establishing a control plan for safety control in fields, productivity improvement, and cost saving.

Equipment operation management

* Real-time monitoring and follow-up management of individual vehicles, drivers, equipment on-site, and operation information

- Key-on time, travel hours, work hours, and traveling position

Equipment status management

* Supplying information of the forklift truck linked with operation hours, establishing a follow-up management plan

- Indicating fuel remainder, failure information
- Indicating consumable exchange timing, service timing

Safe traveling control

* Checking and follow-up management of safety accident caused by collision between the field system and forklift truck during operation

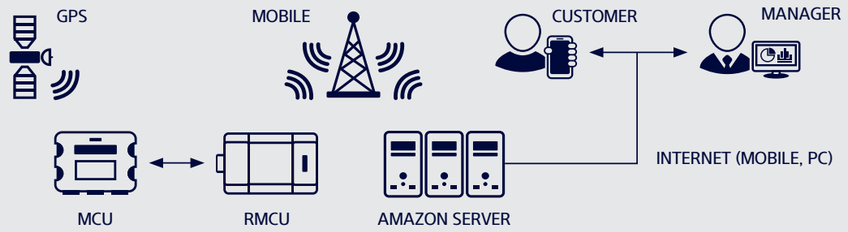
- Count of collision, size of impact

Human resource management

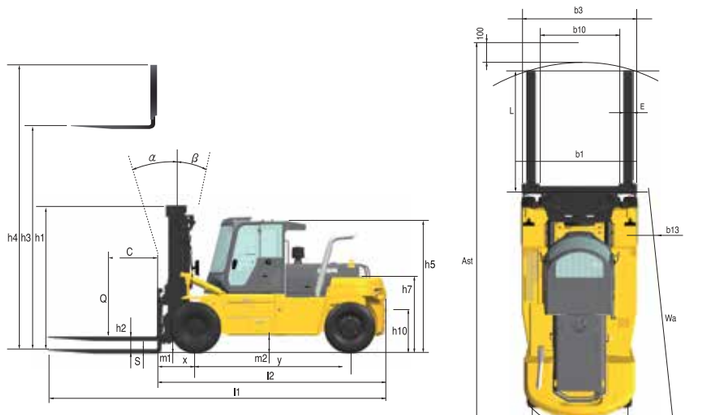
* Checking and follow-up management such as matching between self-diagnosis and equipment conditions before operation

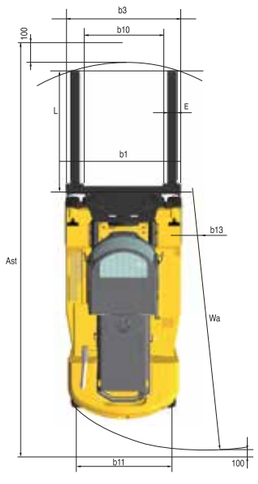
- Driver authorization, self-diagnosis of equipment conditions

Data Flow



Dimension



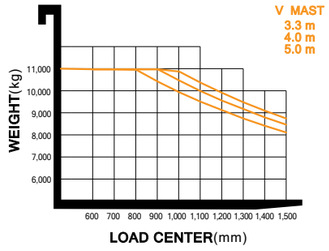


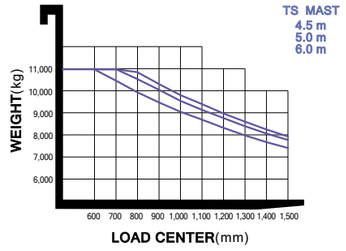
Specification

Identification					
1.1	Manufacturer (Abbreviation)		Hyundai		
1.2	Manufacturer's Type Designation		110D-9V	130D-9V	160D-9V
1.3	Drive : Electric (Battery Or Mains), Diesel, Petrol, Fuel Gas		DIESEL	DIESEL	DIESEL
1.4	Type Of Operation: Hand, Pedestrian, Standing, Seated, Order-Picker		Seated	Seated	Seated
1.5	Load Capacity / Rated Load	kg	11,000	13,000	16,000
1.6	Load Center Distance	C mm	600	600	600
1.8	Load Distance, Center Of Drive Axle To Fork	X mm	750	770	815
1.9	Wheelbase	y mm	3,050	3,050	3,450
Weights					
2.1	Service Weight	Kg	16,337	17,105	20,499
2.2	Axle Loading, Loaded Front/Rear	Kg	24,051/3,286	26,981/3,124	32,479/4,020
2.3	Axle Loading, Unloaded Front/Rear	kg	8,182/8,155	8,142/8,963	9,916/10,583
Wheels, Chassis					
3.1	Tires : Solid Rubber, Superelastic, Pneumatic, Polyurethane		Pneumatic	Pneumatic	Pneumatic
3.2	Tire Size, Front		10.00-20-16PR	10.00-20-16PR	12.00-20-18PR
3.3	Tire Size, Rear		10.00-20-16PR	10.00-20-16PR	12.00-20-18PR
3.5	Wheels, Number Front / Rear (X = Driven Wheels)		4X2	4X2	4x2
3.6	Tread, Front	mm	1,842	1,842	1,842
3.7	Tread, Rear	mm	1,910	1,910	1,958
Basic Dimensions					
4.1	Tilt Of Mast/Fork Carriage Forward/Backrward	Degrees	15/12	15/12	15/12
4.2	Height, Mast Lowered	mm	3,150	3,150	3,400
4.3	Free Lift	mm	0	0	0
4.4	Lift Height	mm	3,305	3,305	3,300
4.5	Height, Mast Extended	mm	4,765	4,765	5,010
4.7	Height Of Overhead Guard (Cabin)	mm	2,955	2,955	2,990
4.8	Seat Height / Stand Height Rel. To Sip	mm	1,825	1,825	1,825
4.12	Coupling Height	mm	629	626	665
4.19	Overall Length	mm	5,920	5,930	6,430.5
4.20	Length To Face Of Forks	mm	4,570	4,580	5,080.5
4.21	Overall Width	mm	2,450	2,450	2,497
4.22	Fork Dimensions	mm	75X200X1,350	85x200x1,350	90x200x1,350
4.23	Fork Carriage Iso 2328, Class / Type A, B		Pin Mount	Pin Mount	Pin Mount
4.24	Fork-Carriage Width	mm	2,362	2,362	2,497
4.31	Ground Clearance, Below Mast, Loaded	mm	250	250	250
4.32	Ground Clearance, Center Of Wheelbase	mm	319	316	355.5
4.34.1	Aisle Width For Pallets 1000 X 1200 Crossways	mm	6,660	6,660	7,280
4.34.2	Aisle Width For Pallets 800 X 1200 Lengthways	mm	6,660	6,660	7,280
4.35	Turning Radius	mm	4,350	4,350	4,895
4.36	Smallest Pivot Point Distance	mm	1,634	1,634	1,865
Performance Data					
5.1	Travel Speed, Loaded / Unloaded	Km/h	33.2/35.9	32.7/35.8	30.5/34.2
5.2	Lift Speed, Loaded / Unloaded	mm/s	480/500	480/500	390/420
5.3	Lowering Speed, Loaded / Unloaded	mm/s	550/500	550/500	550/450
5.6	Max. Drawbar Pull, Loaded / Unloaded	N	121,897/117,062	122,740/116,895	155,230/145,972
5.8	Max. Gradeability, Loaded / Unloaded	%	45.1/27.4	40.5/27.4	42.6/27.7
5.10	Service Brake		Full Hydraulic	Full Hydraulic	Full Hydraulic
Combustion-Engine					
7.1	Engine Manufacturer / Type		CUMMINS/B4.5	CUMMINS/B4.5	CUMMINS/B6.7
7.2	Engine Power Acc. To Iso 1585	KW/rpm	123/2,200	123/2,200	129/2,200
7.3	Maximum Torque	Kgf.m/rpm	77.9/1,200	77.9/1,200	114.3/1,100
7.4	No. Of Cylinders / Displacement	EA/cc	4/4,460	4/4,460	6/6,690
7.5	Fuel Consumption Acc. To Vdi Cycle	l	214	214	276
Addition Data					
8.1	Type Of Drive Control		Full auto	Full auto	Full auto
8.2	Operating Pressure, System / Attachments	bar	230	230	230
8.3	Oil Volume For Attachments	LPM	283.5	283.5	283.5
8.5	Trailer Coupling, Type Din		Pin	Pin	Pin

110D-9V

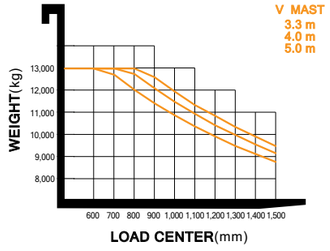
Mast Type		Maximum Fork Height	Overall Height (Lowered)	Free Lift Height	Mast Tilt		Load capacity	Truck Weight (Unloaded)
					Fwd	Bwd	600mm LC	
		mm	mm	mm	deg	deg	kg	kg
2 Stage Limited Free Lift	V300	3,005	3,000	0	15	12	11,000	16,261
	※ V330	3,305	3,150	0	15	12	11,000	16,337
	V350	3,505	3,250	0	15	12	11,000	16,387
	V400	4,005	3,550	0	15	12	11,000	16,639
	V450	4,505	3,800	0	15	12	11,000	16,764
	V500	5,005	4,100	0	15	12	11,000	16,914
	V550	5,505	4,350	0	15	12	11,000	17,144
	V600	6,005	4,650	0	15	12	11,000	17,296
	V650	6,505	4,900	0	15	12	11,000	17,429
	V700	7,005	5,150	0	15	12	10,820	17,560
3 Stage Full Free Lift	TS450	4,521	2,950	1,555	10	10	11,000	17,391
	TS500	5,025	3,117	1,725	10	10	11,000	17,482
	TS550	5,525	3,284	1,891	10	10	11,000	17,574
	TS600	6,023	3,551	2,055	10	10	11,000	17,720
	TS650	6,525	3,718	2,223	10	10	10,720	17,812
	TS700	7,025	3,935	2,389	10	10	10,380	18,052
	TS750	7,525	4,102	2,555	10	10	10,080	18,145

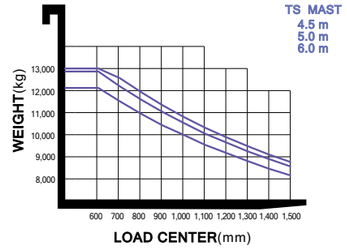




130D-9V

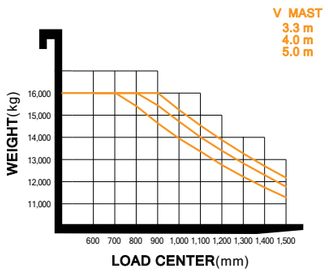
Mast Type		Maximum Fork Height	Overall Height (Lowered)	Free Lift Height	Mast Tilt		Load capacity	Truck Weight (Unloaded)
					Fwd	Bwd	600mm LC	
		mm	mm	mm	deg	deg	kg	kg
2 Stage Limited Free Lift	V300	3,005	3,000	0	15	12	13,000	17,029
	※ V330	3,305	3,150	0	15	12	13,000	17,105
	V350	3,505	3,250	0	15	12	13,000	17,154
	V400	4,005	3,550	0	15	12	13,000	17,407
	V450	4,505	3,800	0	15	12	13,000	17,532
	V500	5,005	4,100	0	15	12	13,000	17,681
	V550	5,505	4,350	0	15	12	13,000	17,912
	V600	6,005	4,650	0	15	12	12,610	18,064
	V650	6,505	4,900	0	15	12	12,250	18,197
	V700	7,005	5,150	0	15	12	11,900	18,328
3 Stage Full Free Lift	TS450	4,521	2,950	1,555	10	10	13,000	18,223
	TS500	5,025	3,117	1,725	10	10	12,860	18,314
	TS550	5,525	3,284	1,891	10	10	12,480	18,406
	TS600	6,023	3,551	2,055	10	10	12,100	18,552
	TS650	6,525	3,718	2,223	10	10	11,750	18,644
	TS700	7,025	3,935	2,389	10	10	11,380	18,884
	TS750	7,525	4,102	2,555	10	10	11,060	18,977

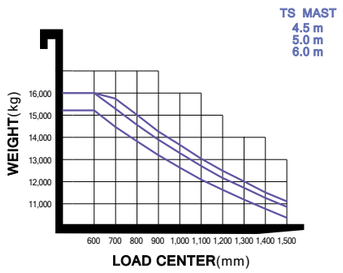




160D-9V

Mast Type		Maximum Fork Height	Overall Height (Lowered)	Free Lift Height	Mast Tilt		Load capacity	Truck Weight (Unloaded)
					Fwd	Bwd	600mm LC	
		mm	mm	mm	deg	deg	kg	kg
2 Stage Limited Free Lift	V300	3,010	3,250	0	15	12	16,000	20,404
	※ V330	3,310	3,400	0	15	12	16,000	20,499
	V350	3,510	3,500	0	15	12	16,000	20,543
	V400	4,010	3,750	0	15	12	16,000	20,831
	V450	4,510	4,000	0	15	12	16,000	20,985
	V500	5,010	4,300	0	15	12	16,000	21,168
	V550	5,510	4,550	0	15	12	16,000	21,436
	V600	6,010	4,850	0	15	12	16,000	21,619
	V650	6,510	5,125	0	15	12	15,700	21,785
	V700	7,010	5,375	0	15	12	15,270	21,936
2 Stage Full Free Lift	VS300	3,010	3,200	1,550	10	10	16,000	20,433
	VS330	3,310	3,350	1,700	10	10	16,000	20,513
	VS350	3,510	3,450	1,800	10	10	16,000	20,577
	VS400	4,010	3,700	2,050	10	10	16,000	20,741
	VS450	4,510	3,950	2,300	10	10	16,000	20,996
	VS500	5,010	4,250	2,550	10	10	16,000	21,194
	VS550	5,510	4,500	2,800	10	10	16,000	21,388
	VS600	6,010	4,800	3,050	10	10	16,000	21,649
3 Stage Full Free Lift	TS450	4,516	2,950	1,500	10	10	16,000	21,508
	TS500	5,017	3,167	1,667	10	10	16,000	21,708
	TS550	5,515	3,333	1,833	10	10	15,680	21,856
	TS600	6,016	3,550	2,000	10	10	15,220	22,053
	TS650	6,517	3,717	2,167	10	10	14,800	22,211
	TS700	7,015	3,933	2,333	10	10	14,360	22,523
	TS750	7,515	4,100	2,501	10	10	13,960	22,686





Standard & Option

		Description	110D-9V	130D-9V	160D-9V
OPERATION ROOM	Cabin	New Cabin	●	●	●
		Wiper for Top window	○	○	○
	A/C	A/C & Heater	●	●	●
	Seat	Long Back Seat - Full Suspension	●	●	●
		Seat Options - Air suspension & Swivel seat, Leather Seat	○	○	○
		Seat Accessories - Orange belt, Arm rest, Buckle switch, Heat	○	○	○
	Lever	Lever - General	●	●	●
		Finger Tip	○	○	○
	etc.	Bluetooth Radio	●	●	●
		Extinguisher	○	○	○
MAST & ATTACHMENT	Mast	Standard Mast	V400	V400	V400
		2 stage Mast	○	○	○
		3 stage Mast	○	○	○
	Fork	Standard Fork	2,440mm	2,440mm	2,440mm
		Fork Options - 1,200mm~2,600mm Fork	○	○	○
		Lumber Fork	○	○	○
	Carriage	Shaft(pin) Type Carriage	●	●	●
		Carriage Options - Sliding, Sliding&Holder, Simplet type	○	○	○
	Attachment	Intergral Side Shift	○	○	○
		Fork Positioner – Independent, Synchronized	○	○	○
		Side Shift & Positioner – Independent, Synchronized	○	○	○
HYDARULIC	MCV & Hoses	4 Spool MCV + attached piping for V400 Mast	●	●	●
		MCV Options - 5 Spool	○	○	○
		Attached Piping for All MCVs & Masts	○	○	○

		Description	110D-9V	130D-9V	160D-9V
TIRE	Tires	Pneumatic Tires	●	●	●
		Tire Options - Solid Tires	○	○	○
VISIBILITY	Lamp	Working Lamp - Front & Rear LED	●	●	●
	Mirror	L/H & R/H Back Mirror & Panorama Mirror	●	●	●
		Heated L/H & R/H Back Mirror	○	○	○
	Camera	Rear Camera	●	●	●
CONVENIENCE	-	Auto Tilt	○	○	○
		Load Sensor	●	●	●
		Load Sensor & Angle Sensor	○	○	○
		Accumulator	○	○	○
		Auto Grease	○	○	○
		Unidirectional Fan	●	●	●
SAFETY	-	Seat Belt interklock	○	○	○
		Hazard Switch	○	○	○
		LED Beacon Lamp	○	○	○
		Wheel Bolt Protector	○	○	○
OTHERS	-	Air Compressor	○	○	○
		Under Cover	○	○	○
		Oil - VG46	●	●	●
		Oil Options - VG32 for Tropical, VG15 for Cold Area	○	○	○
		Hi-MATE (General)	○	○	○
		Hi-MATE (Premium)	○	○	○

● STD / ○ OPT