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ISO14001  
ISO14001:2015



ISO9001  
ISO9001:2015



HANGCHA trucks conform  
to the European Safety  
Requirements.

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# STAGE V READY

Efficient, reliable solutions for your demands.

HANGCHA BE WITH YOU AT EVERY STAGE



# Full Range of Stage V Engines



Hangcha offers a complete range of Stage V engines. This means we have the flexibility to meet individual requirements and to ensure you get the value and performance you need from your engine choice.

## EU V regulations

### EU V emission limits

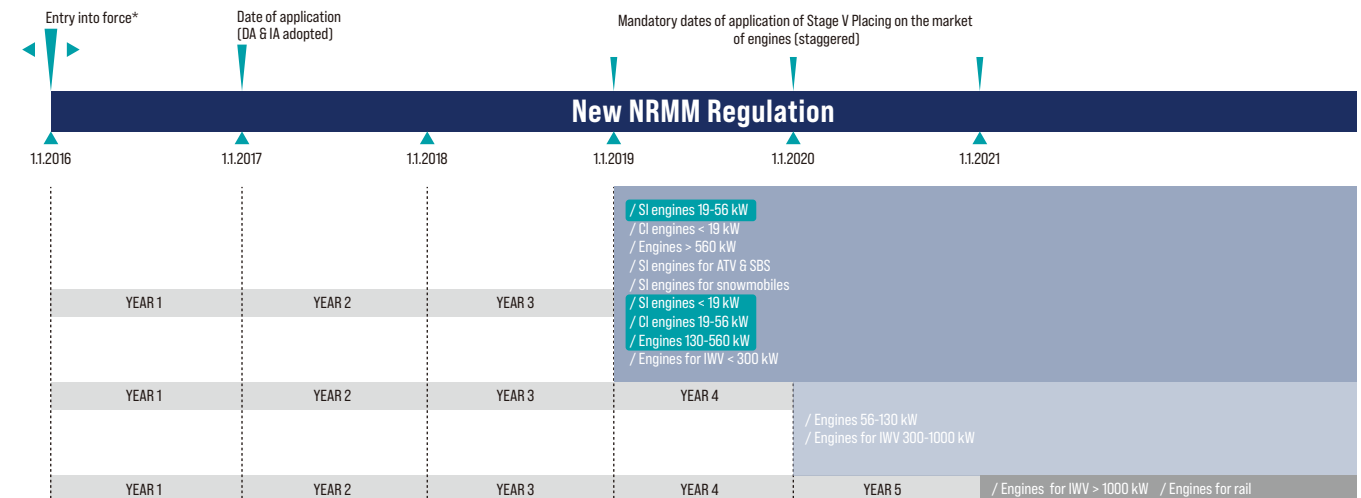
#### Emission limits for non-road mobile machinery:

Engine type	Category	CO	HC	NO <sub>x</sub>	PM	PN	A
	kW	g/kWh	g/kWh	g/kWh	g/kWh	g/kWh	
SI engine	19-56	4.40(*)	HC+NO <sub>x</sub> ≤2.70(*)	HC+NO <sub>x</sub> ≤2.70(*)			
CI engine	19-37	5.0	HC+NO <sub>x</sub> ≤4.7	HC+NO <sub>x</sub> ≤4.7	0.015	1×10 <sup>12</sup>	1.1
CI engine	37-56	5.0	HC+NO <sub>x</sub> ≤4.7	HC+NO <sub>x</sub> ≤4.7	0.015	1×10 <sup>12</sup>	1.1
ALL	56-130	5.0	0.19	0.40	0.015	1×10 <sup>12</sup>	1.1
ALL	130-560	3.5	0.19	0.40	0.015	1×10 <sup>12</sup>	1.1

\* Optionally, as an alternative, any combination of values satisfying the equation  $(HC+NO_x) \times CO^{0.7894} \leq 8.57$  as well as the following conditions:  $CO \leq 20.6g/kWh$  and  $(HC+NO_x) \leq 2.7g/kWh$ .

- ★ In the power range 19-560kW a particulate number (PN) limit value will be introduced which requires DPF technology.
- ★ EU Stage V requirements apply for variable and constant speed engines

### Regulation implementation time (for engines)



Mandatory dates of application of Stage V - Type Approval: = 1 year BEFORE indicated dates for placing on the market of engines [staggered]

\* Floating date

- ★ Introduction dates: 1.1.2019 for most applications; 1.1.2020 for 56 - 130 kW.

## Regulation implementation time (for engines)

The new Stage V emission standards will start from **January 2019**.

Original Equipment Manufacturers (OEMs) will have 18 months to consume inventory of engines of the previous emissions type into their machines and a further six months to place them in the market.

Engine Manufactures must complete production of pre-buy engines by the end of 2018.

OEMs must complete selling products within below period;

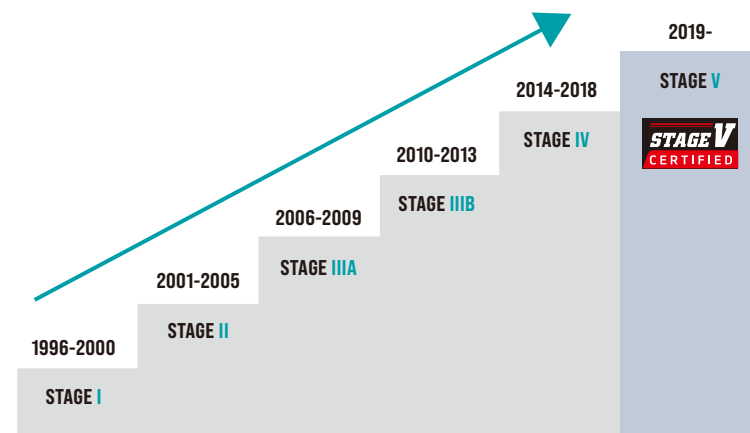
Machines mounted engine 0~56kW, ≥ 130kW: by 31st DEC 2020

**[must complete production by 30th JUN 2020]**

Machine mounted engine 56~130kW : by 31st DEC 2021

**[must complete production by 30th JUN 2021]**

Power of Engine	Content	2018	2019	2020	2021	2022
0~56 kW, ≥130kW	Regulation	IIIA/IIIB/non-regulated	Stage V			
	Production		Assembling (production)			
	Selling		Place on the market			
56~130 kW	Regulation	Stage IV		Stage V		
	Production			Assembling (production)		
	Selling			Place on the market		



**Hangcha has always strived to meet emission regulations across the world.**

## Hangcha's stage EU V products and the technical routes

**TONNAGE**  
**1.0-48**



XF series Diesel/LPG 1.0-3.5t

**TONNAGE**  
**2.5-5.0**



2.5-3.5t all-terrain



XF series Diesel 4.0-10t



X series Diesel 12-48t



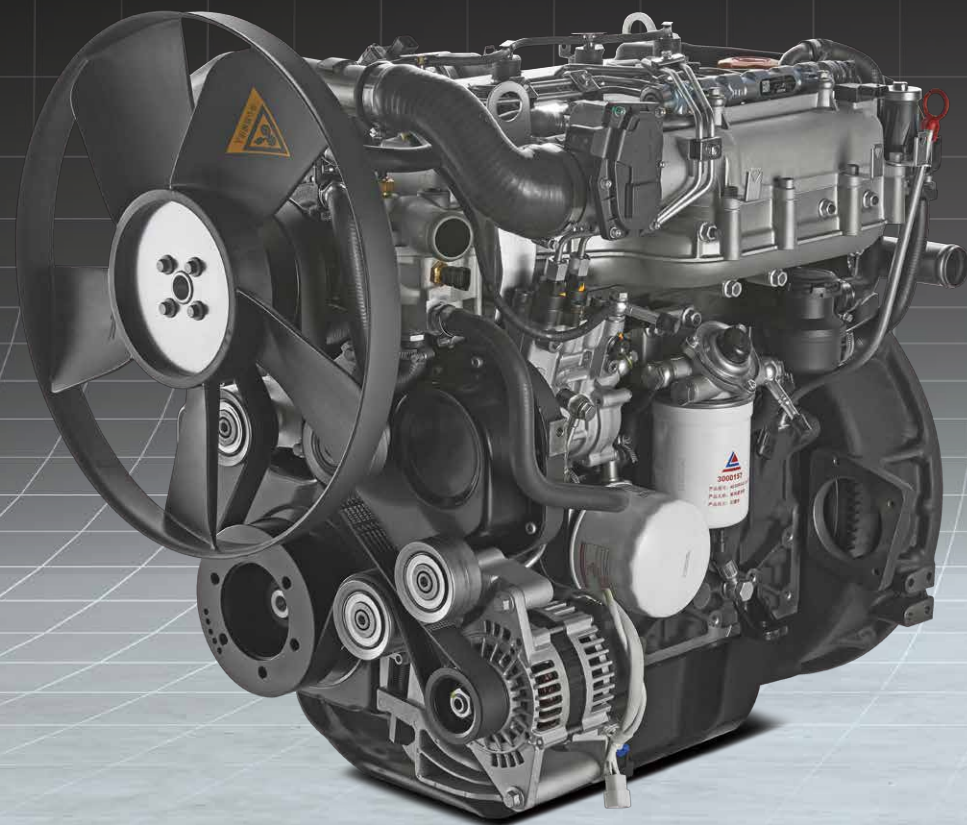
5.0t all-terrain

Capacity	Series	Manufacturer	Engine	Drive Power	Emission Std.	Transmission	Power (kw/rpm)	Technical Route
1.0-1.8t	XF	GCT	GCT GK21LP6 EU-StageV CERT	LPG	StageV	F/OKAMURA	38.4/2700	Single-point EFI + three-way catalysis
2.0-3.5t	XF	GCT	GCT GK25LP6 EU-StageV CERT	LPG	StageV	F/OKAMURA	43.4/2700	Single-point EFI + three-way catalysis
1.0-3.5t	XF	KUBOTA	V2607-CR-E5B	Diesel	StageV/Tier4 final	F	37.4/2400	NA+CR+EGR+DOC+DPF
2.0-3.5t	XF	XINCHAI	3E22YG51	Diesel	StageV	F/OKAMURA	44.8/2400	TC+CR+EGR+DOC+DPF
4.0-5.5t	XF	KUBOTA	V3307-CR-TIE5B	Diesel	StageV/Tier4 final	OKAMURA	54.6/2200	TCI+CR+EGR+DOC+DPF
4.0-5.5t	XF	XINCHAI	4E30YG52	Diesel	StageV	OKAMURA	55.8/2200	TC+CR+EGR+DOC+DPF
5.0-7.0t	XF	DEUTZ	TCD 3.6 L4	Diesel	StageV	ZF	55.4/2300	TCI+CR+EGR+DOC+DPF
8.0-10t	XF	DEUTZ	TCD 3.6 L4	Diesel	StageV	ZF	85/2200	TCI+CR+EGR+DOC+DPF+SCR
12-16t	X	CUMMINS	B6.7	Diesel	StageV/Tier4 final	OKAMURA	116/2200	TCI+CR+DOC+DPF+SCR
14-16t	X	CUMMINS	B6.7	Diesel	StageV/Tier4 final	ZF	149/2200	TCI+CR+DOC+DPF+SCR
16-18t	X	CUMMINS	B6.7	Diesel	StageV/Tier4 final	ZF	149/2200	TCI+CR+DOC+DPF+SCR
20-25t	X	VOLVO	TAD881VE	Diesel	StageV	ZF	185/2200	TCI+CR+EGR+DOC+DPF+SCR
28-35t	X	VOLVO	TAD881VE	Diesel	StageV	ZF	185/2200	TCI+CR+EGR+DOC+DPF+SCR
38-48t	X	VOLVO	TAD1181VE	Diesel	StageV	DANA	265/2100	TCI+CR+EGR+DOC+DPF+SCR
2.5-3.5t	RT	KUBOTA	V2607-CR-TE5B	Diesel	StageV/Tier4 final	CHINA	47.3/2400	TC+CR+EGR+DOC+DPF
5.0t	RT	DEUTZ	TCD 3.6 L4	Diesel	StageV	CHINA	55.4/2300	TCI+CR+EGR+DOC+DPF

Note: \* StageV applied for European Union also including Israel and Turkey \* Tier4 Final applied for North American  
\* RT means 2WD/4WD Rough Terrain forklift \* F means full floating transmission



# E SERIES EU V ENGINES



**E SERIES**

### Excellent emission:

A complete set of Bosch off-road fuel system is adopted, and the international famous BASF coating technology is selected for ATS (After-Treatment System), which is fully verified by joint development with Bosch.

Excellent engine raw emission makes the ATS for this series of engines extremely compact. It is suitable for forklift packaging.

### Sufficient power:

The diesel engine family covers power ranges from 37kW to 95.7kW, the maximum torque can reach 430Nm, the torque backup can reach more than 25%, the engine has sufficient power for the application.

### Perfect economy:

BOSCH and XINCHAI carried out multi round engine performance optimization test, and the whole engine map has excellent fuel economy. The minimum specific fuel consumption is less than 215g/kwh; In the common working load, the specific fuel consumption is below 220g/kWh. Other working conditions are about 5 g/kWh less than competitive products.

### High reliability:

Fully validated reliability: the first-class international suppliers (Bosch, Hutchinson, Eaton and Cummins) are selected. The diesel engine and vehicle have passed the several round reliability validations.



dilution ratio

0.44%

Very low dilution ratio of engine oil, the oil dilution ratio after single regeneration is only 0.44%, much lower than the value of 20% specified in the national standard, the oil change interval of E series diesel engine up to 500h.



5,000h

DPF has a long maintenance interval, Based on excellent engine raw emission level and regeneration strategy, the ash cleaning interval up to 5000h.

The engine has been tested for 10000h in total for reliability validation in several round, the reliability has been fully verified. It is worth mentioning that the diesel engine has been tested in Jinan testing center and Bosch Wuxi test bench for 3000h. The diesel engine has excellent reliability, and is rated as Bosch off-road project 'BES' award.

Two kinds of diesel engines are applied in forklifts and complete the summer tests, high altitude tests and winter tests. The diesel engine, the forklift and the after-treatment system have been validated in these extreme operating conditions, and the DPF soot load test is balanced within 90 hours without any regeneration.

	3E22Y651	4E30Y652
Number of Cylinders-Cylinder Diameter x Stroke	3-94*107	4-94*107
Displacement	2.227L	2.970L
Rated Power	44.8kW/2400rpm	55.8kW/2200rpm
Maximum Torque	210N.m/1600~1800rpm	320N.m/1200~1600rpm
Emission Level	EU Stage V	EU Stage V
Technical Route	TC+CR+EGR+DOC+DPF	TC+CR+EGR+DOC+DPF
Scope of Application	1-3.5t Forklift	4-5t Forklift
Transmission Equipped	OKAMURA	OKAMURA

# Kubota EU V engines

## Clean emissions:

The engine has low original emissions, a high post-processing regeneration efficiency and low regeneration triggering criteria. The engine load only needs to reach 30N.m before the emission temperature that triggers regeneration is reached. Therefore, under normal operating conditions, and the ash cleaning interval reaches 6000h. This enables easy use and low maintenance costs.

## Easy maintenance:

The Kubota engine is highly integrated and has a compact engine structure and parts to be maintained arranged on one side to enable easy maintenance.

## Outstanding performance:

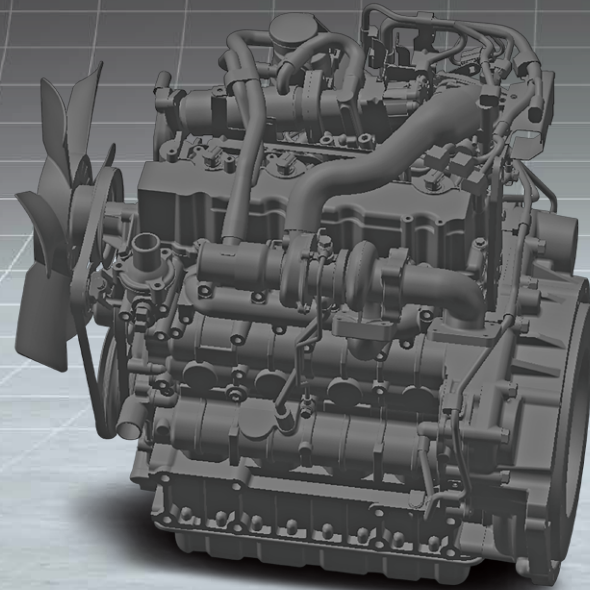
With stable idle loading performance, a V2607 platform that uses a rear-mounted gear train, PTO full torque output, high performance of resistance to stalling at low speeds, a hydraulic system with its overflow pressure adjusted to the maximum limit, the engine can never stall during idle loading and can restore to the normal idle speed within 6s.

Excellent cold start performance: In the low temperature start test, it can start smoothly within 7 seconds when the water temperature is -25 C .

## Great comfort:

With a built-in high-pressure common rail, fuel injector, EGR valve, etc., the engine has low noise, comfortable sounds and less vibration.

## KUBOTA



	V2607-CR-E5	V2607-CR-TE5B	V3307-CR-TIE5
Number of Cylinders-Cylinder Diameter x Stroke	4-87×110	4-87×110	4-94×120
Displacement	2.615 L	2.615 L	3.331 L
Rated Power	37.4 kW/2400 rpm	47.3kW/2400rpm	54.6kW/2200rpm
Maximum Torque	171 N.m/1500rpm	221.7N.m/1500rpm	330N.m/1400rpm
Emission Level	EU Stage VEPA/ CARB Tier 4	EU Stage VEPA/ CARB Tier 4	EU Stage VEPA/ CARB Tier 4
Technical Route	NA+CR+EGR+ DOC+DPF	TC+CR+EGR+ DOC+DPF	TCI+CR+EGR+ DOC+DPF
Scope of Application	1-3.5t	2.5-3.5t all-terrain	4-5t
Transmission Equipped	F	Domestic floating	OKAMURA

# GCT EU V engines

## High consistency:

The engine adopts closed-loop control. Before leaving the factory, each vehicle has its air-fuel ratio calibrated according to the air volume, and air supply volume adjusted in real time according to different operating conditions, to ensure stable performance and emission.

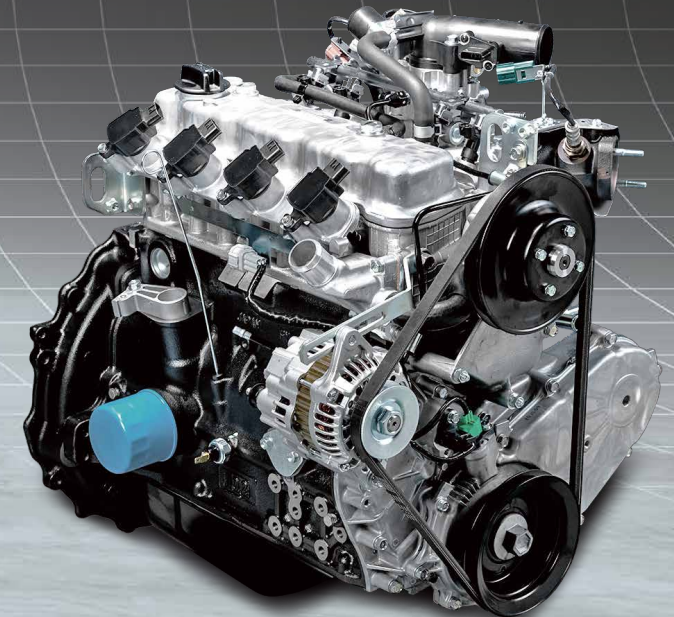
## Clean emissions:

The engine has low original emissions. Basic components of emissions exhausted from the three-way catalytic converter are CO<sub>2</sub> and H<sub>2</sub>O. The three-way catalytic converter is maintenance-free within the life cycle.

## Reliable quality:

With a history of many years of standardized and lean production, the GCT engines have reliable quality. This has long been proved by the mass product market.

## GCT



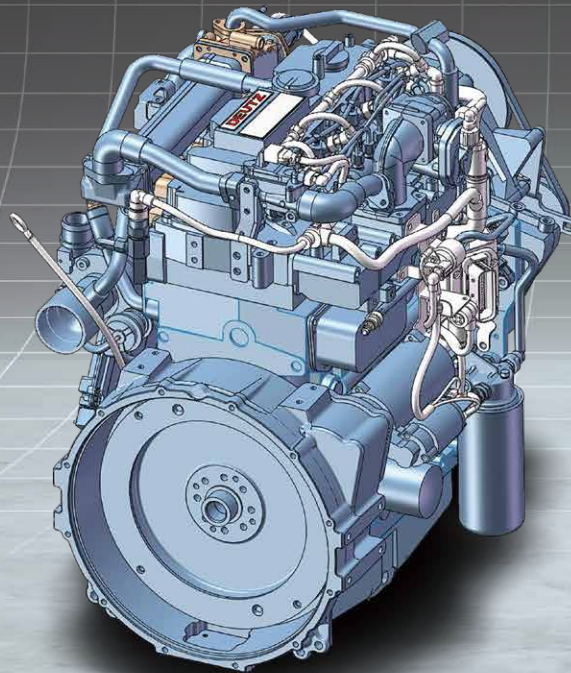
	GK21 LPG EU StageV	GK25 LPG EU StageV
Number of Cylinders-Cylinder Diameter x Stroke	4-89×83	4-89×100
Displacement	2.065L	2.488L
Rated Power	38.4kW/2700rpm	43.4kW/2700rpm
Maximum Torque	151N.m/1600rpm	183.5N.m/1600rpm
Emission Level	EU StageV	EU StageV
Technical Route	Single-point EFI + three-way catalysis	Single-point EFI + three-way catalysis
Scope of Application	1.5-1.8t Forklift	2-3.5t Forklift
Transmission Equipped	F/OKAMURA	F/OKAMURA



# Deutz EU V engines

The DeutzTCD3.6 engine adopts the technical route of "high pressure common rail+Turbocharged Inter-cooled+EGR+DOC+DPF",to meet new European emission level. The power system is made in Germany.It adopts ZF three-speed electric proportional transmission and DeutzTCD3.6 engine which is smooth and reliable. Internationally known Tenneco carrier and its coating technology are selected for post-treatment,with good reliability and long DPF regeneration cycle. Standard CAN communication instrument,integrate Hangcha instrument,engine and gearbox and other key information,convenient for maintenance and use. Compared to European 3B model, the limit of NOx is reduced by 14% and particulate matter decreased by 60%.

## DEUTZ



	TCD 3.6 L4
Number of Cylinders-Cylinder Diameter x Stroke	4-98×120
Displacement	3.621L
Rated Power	55.4 kW/2300 rpm
Maximum Torque	405 N.m/1300rpm
Emission Level	EU StageV
Technical Route	TCI+CR+EGR+DOC+DPF
Scope of Application	5-7t Forklift
Transmission Equipped	ZF

# VOLVO EU V engines

Proven and straight-forward design - built on Volvo Group technology. High torque already at low engine speed. SCR, DPF+DOC and uncooled EGR. Compact, simple installation and easy to service. Same engine footprint for all emission standards. Wide range of optional equipment. Excellent passive soot regeneration. Extended oil service intervals 1000h.

	TAD881VE
Rated Power	185kW(2200rpm)
Maximum Torque	1175N.m(1400rpm)
Number of Cylinders-Cylinder Diameter x Stroke	6×110×132
Displacement	7.700L
Emission Level	EU stageV / EPA Tier4 fina
Technical Route	TCI+CR+DOC+DPF+SCR+uncooled EGR
Transmission	ZF

## VOLVO

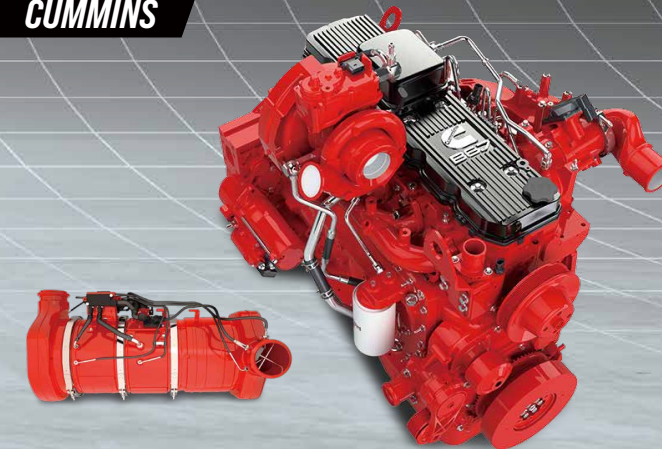


# CUMMINS EU V engines

Comparing with the Stage IV engine, this one enjoys 5% more power and 31% more peak torque. The technical route adopts EGR-free design to reduce thermal design power loss and improve reliability. The Single Module post-processing system combines DPF, SCR and urea mixing tubes into a composite unit, reducing 50% space and 30% weight. High sulfur resistance to meet the limited fuel quality capacity regions' needs.

	B6.7
Rated Power	149kW(2200rpm)
Maximum Torque	990N.m(1300rpm)
Number of Cylinders-Cylinder Diameter x Stroke	6×107×124
Displacement	6.700L
Emission Level	EU stageV / US EPA Tier4 fina
Technical Route	TCI+CR+DOC+DPF+SCR
Transmission	ZF

## CUMMINS





# Features of EU V vehicles

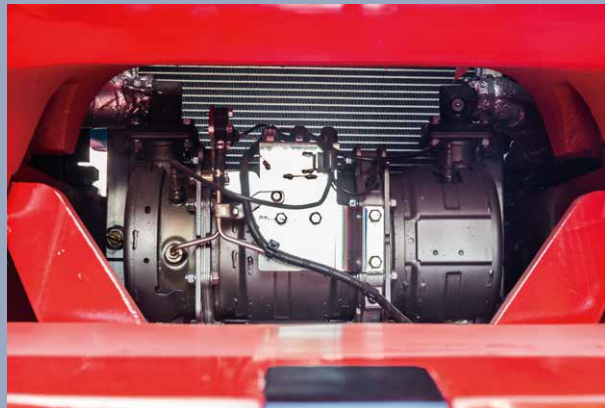
All 1-10t series vehicles are equipped with interactive instruments.



Used for Deutz engine

Interactive instrument: The instrument adopts LCD display with four interactive buttons, and has one CAN bus communication function. The communication protocol is compatible with SAE J1939 standards.

All 1-10t series vehicles are equipped with a new type of heat-insulated high-position emission system respectively to prevent post-processing regeneration emissions from scalding rear people.



4-10t series vehicles are equipped with wet axle.



**STAGE V**  
**CERTIFIED**



With Hangcha you can meet all Stage V/Tier 4f emissions standards which provides customer demands for value, innovation and performance. The technologies include common rail fuel systems, diesel oxidation catalysts (DOC) and diesel particulate filters (DPF). Designed and optimised to every engine model, our forklift truck maximises efficiency and reliability.