Betonelli

UNSTOPPABLE POWER

UNMATCHED PERFORMANCE

BN60H

OPERATION MANUAL

NOTICE

This manual, or a copy of it, must be kept with the machine at all times. There is a manual storage container located on the machine for your convenience.

Table of contents

Betonelli

BN60H

60" Ride-on Power Trowel

1. Technical Specifications

Specification	
Engine:	Hatz 4H50TIC
Engine power :	55.4KW/74hp
Fuel Type:	Diesel fuel
Drive system hydraulic:	Poclain, Rexroth
Steering control system:	Hydraulic power
Cylinder lifting (operated by button):	Hydraulic system
Blade (size):	14*58cm
Maximum blade speed:	145 rpm (no load)
Fuel capacity:	44L
Water spray capacity: (operating button control)	18L
Hydraulic oil capacity:	53.06L
Lighting:	6 LED lights
Weight:	1380KG
Dimensions (L x W x H):	3131×1745×1637.6mm
Lifting:	Hook/Forklift

- **Hydraulic Control Unit (HCU)**
  The engine serves as the power source, communicating with a closed-loop pump, gear pump, valves, and other components. To ensure the safety and stability of the equipment, multiple filters and temperature sensors are installed to provide
  warnings for blockages and to monitor hydraulic temperature, preventing damage to components. This system works in conjunction with the Hydraulic Control Unit (HCU) to maintain maximum efficiency, and precise speed and control.
- **Engine Control Unit (ECU)**
  The engine's ECU utilizes multiple sensors to gather information on the engine's operational status. The system uses CAN communication to read engine information, displaying the engine's real-time status as data on the display screen, allowing for a faster and better understanding of the equipment's condition. The engine is integrated with the HCU for closed-loop control to ensure uniform and safe flow control.
- **Engine Overload Protection (EOP)** - When the machine is in operation, excessive resistance from the concrete can cause a decrease in engine power. The ECU, through its real-time monitoring function, will first reduce the engine's power when it detects a drop in torque due to extreme resistance from the working condi - tions. Simultaneously, the engine speed will decrease. If the resistance from the work exceeds the engine's operational limits, the ECU, after detecting the actual conditions, will issue a shutdown command.

2. Engine specifications (Hatz 4H50TIC)

Type		In-line four-stroke water-cooled diesel engine
Number of cylinders		4
Fuel injection system		Direct injection, Bosch common rail EFI system
Injection pressure [bar]		1800
Inhalation method		Turbocharger, intercooler
Cylinder bore x stroke [mm]		84 x 88
Average piston speed @3000rpm[m/s]		8.8
Compression ratio		17.5:1
Oil consumption, fully loaded		0.5% of fuel consumption (maximum)
Oil addition amount	Maximum [L]	7.0
	Minimum [L]	6.0
Speed control	Minimum idling speed [rpm]	900
	Control method	CAN J1939 or multi-position switch
Approximate combustion air requirement @2800rpm[kg/h]		340
Approximate cooling air requirement @2800rpm[kg/h]		6650
Moment of inertia J engine [kgm2]		0.234
Starting motor voltage [V]		24 [3.0KW/4.1hp]
Low temperature start [℃]		-32 [24V]
Charger charging current [A]		60 [28V]
Maximum battery capacity [Ah]		66 [24V-300A DIN]

Betonelli

BN60H

60" Ride-on Power Trowel

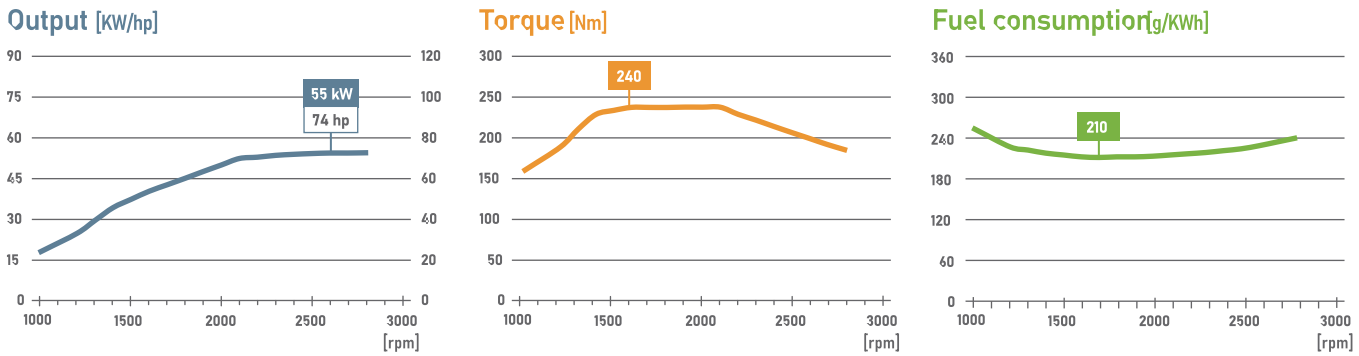
Weight [kg] Standard output power (overload is not allowed) Note: Only for maximum constant load Power indication, cannot be used as rated power	FF (Flywheel to Fan)	180
	OPU	262
Length × width × height [mm]	FF (Flywheel to Fan)	965 x 620 x 713
	OPU	1141 x 687 x 807
Braking power output under intermittent load [IFN] according to ISO3046-1	2800	55.0 / 73.8
	2600	54.9 / 73.6
	2300	54.0 / 72.4
	2000	50.3 / 67.5
	1800	45.2 / 60.6
	1500	37.1 / 49.8
According to ISO3046-1 standard Under constant load [ICFN]	2800	49.5 / 66.4
	2600	49.4 / 66.4
	2300	48.6 / 66.2
	2000	45.2 / 60.8
	1800	40.7 / 54.5
	1500	33.4 / 44.8
According to ISO3046-1 standard At constant speed and load [ICFN] Standard output power (overload not allowed)	1800	36.4 / 48.8
	1500	28.7 / 38.5

BN60H

60" Ride-on Power Trowel

(1). Power, torque, fuel consumption table

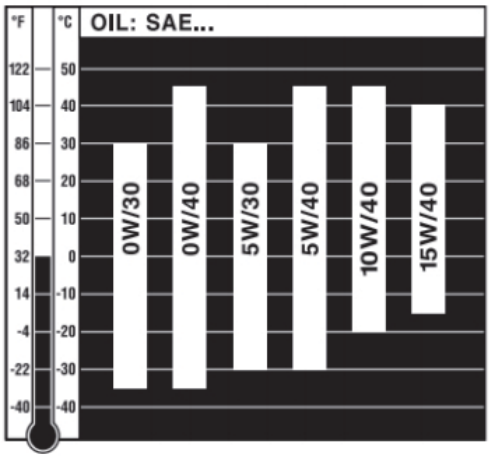
4H50*TICD* | **4H50*TIC***



(2). Engine oil:

Engine without diesel oxidation catalyst (DOC)

- ACEA E6, E7 or E9
- ACEA C1, C2, C3 or C4
- API CK-4, CJ-4 or CI-4



Risk of engine damage due to use of unsuitable oil!
Using an unsuitable oil will significantly reduce the service life of the engine. Please only use oil that meets the above grade specifications.
Oil viscosity number

(3). Engine fuel:

Fuel quality grade

Diesel fuel that meets at least one of the following standards can be used:

- **Europe: EN 590**
- **Europa: EN 15940**

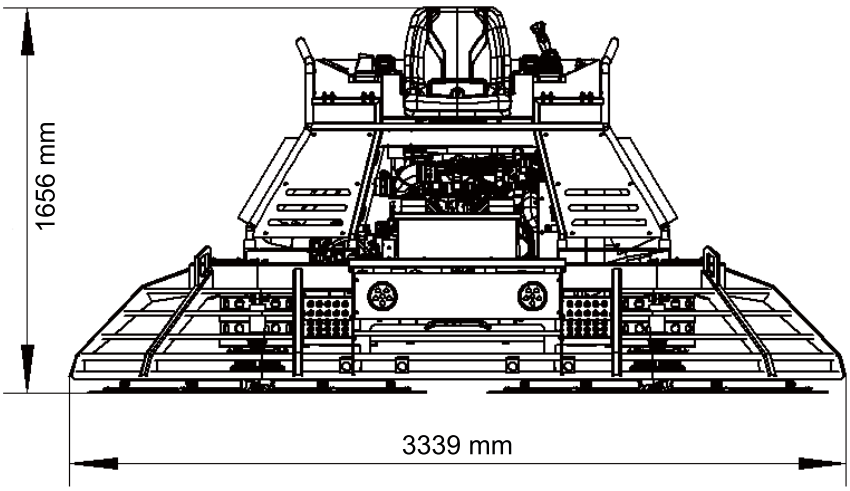
This is "synthetic or hydrotreated diesel", often abbreviated to XTL (Carbonate to Liquids).
BTL (Bio-to-Liquids),
GTL (Gas-to-Liquids),
HVO (Hydro-treated Vegetable Oil),
e-Fuels (electronic fuel) or **CTL** (coal to liquid) .

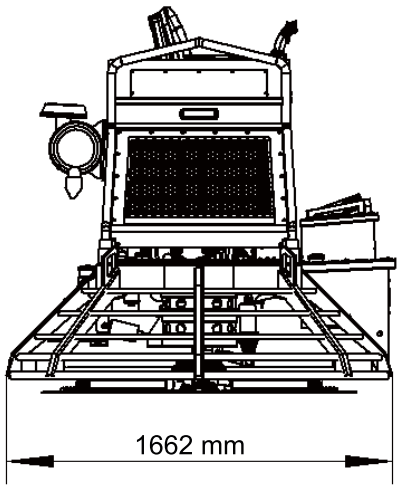
- **UK: BS 2869 A1 / A2**
- **USA: ASTM D 975-09a 1-D S15 or 2-D S15**
- **USA: ASTM D 975-09a 1-D or 2-D** (only for engines without diesel oxidation catalyst DOC)(models).
- **Japan: JIS K 2204** (HFRR value less than 520 μm)

Winter fuel

Diesel will lose fluidity at low temperatures, which will cause problems in use. When the ambient temperature is below 0 ℃, please use
Use low temperature diesel.

(4). Machine size drawing reference:





3. Safety

Do not operate or service the equipment before reading the entire manual. Safety precautions should always be followed when operating this equipment. Failure to read the operating instructions can result in injury to yourself and others.
Safety precautions
Please read the following four safety instructions to identify potential hazards that could injure you or others.

Burn Hazard

Risk of burns/scalds.
There is a risk of burns/scalding when working on a hot engine.
After the engine is started, there is heat and a certain amount of pressure in the cooling system. (Be careful of splashing of high-temperature liquid)
- Allow the engine to cool sufficiently before maintenance
- Wear safety gloves and protective glasses.

Exhaust Fumes

Risk of death from inhalation of engine exhaust fumes!
Inhalation of engine exhaust in a confined and poorly ventilated space can cause coma or even death.
operate the engine in a confined or poorly ventilated space .
- Maintain air circulation to prevent inhalation of engine exhaust gas.

Flammable Materials

Fuel poses a risk of fire!
Leaking or spilled fuel can ignite on hot engine parts and cause serious burns.
- Please wait for a while after the engine is turned off before adding fuel.
- Do not add fuel near burning sparks or open flames.
- Do not smoke when adding fuel .
- Do not spill fuel when adding fuel .

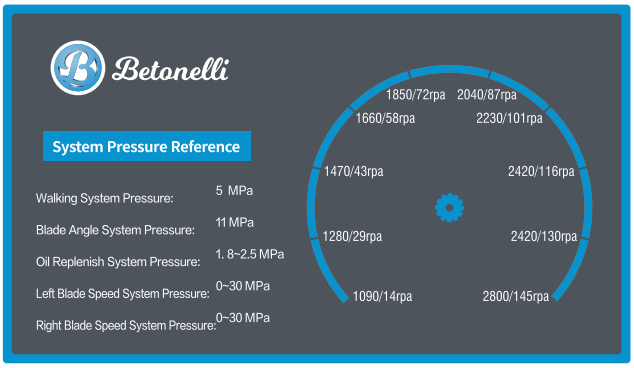
Rotating Parts/Extrusion Repair

When the equipment is started, it is strictly forbidden to touch or detect with hands or tools, and it is forbidden to step into the protective ring cover.

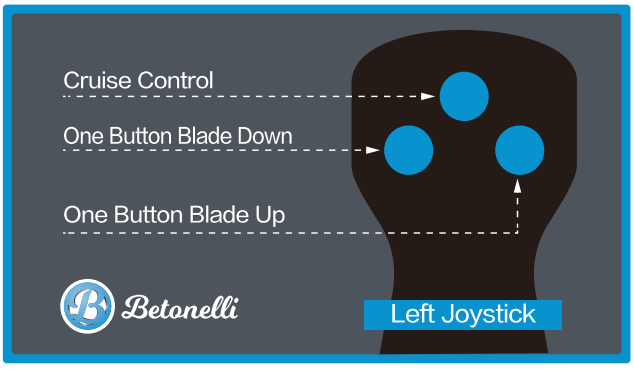
4. sticker

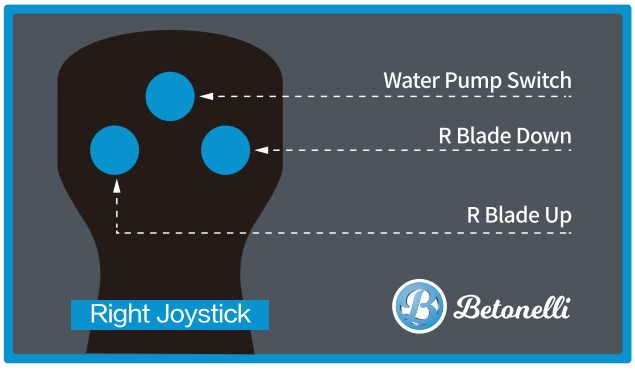
hook up	Liquid leakage environmental pollution	Hearing protection
		

Parameter information

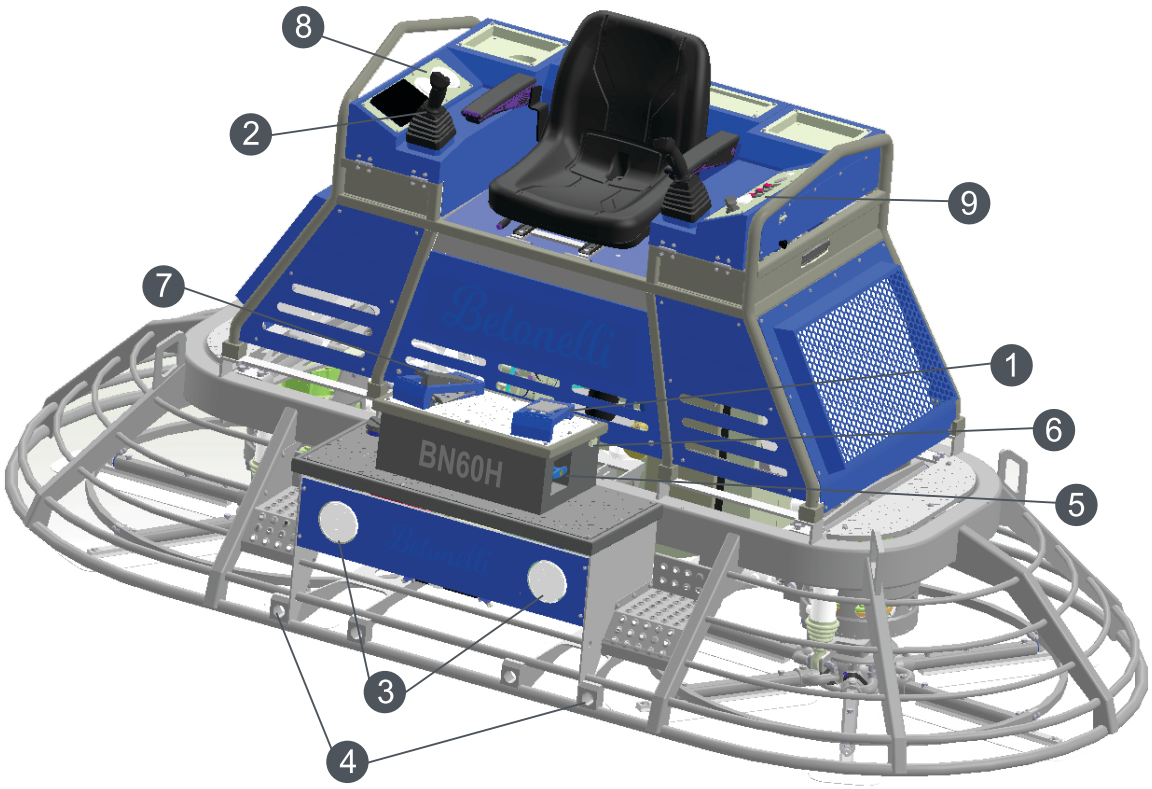


Manipulating annotations





5. Schematic diagram



1. Safety switch - to protect the operator's safety, engine shutdown switch
2. Handle button - function button
3. Lights – LED lighting
4. Wheel mounting holes/forklift guide rails - for use with a transport trolley or for transport by forklift.
5. Main power switch – the main power switch of the equipment.
6. Battery charging port - battery charging port.
7. Accelerator - foot pedal controls the blade speed.
8. Display panel - parameter display.
9. Mode switch - manual/automatic mode

BN60H

60" Ride-on Power Trowel

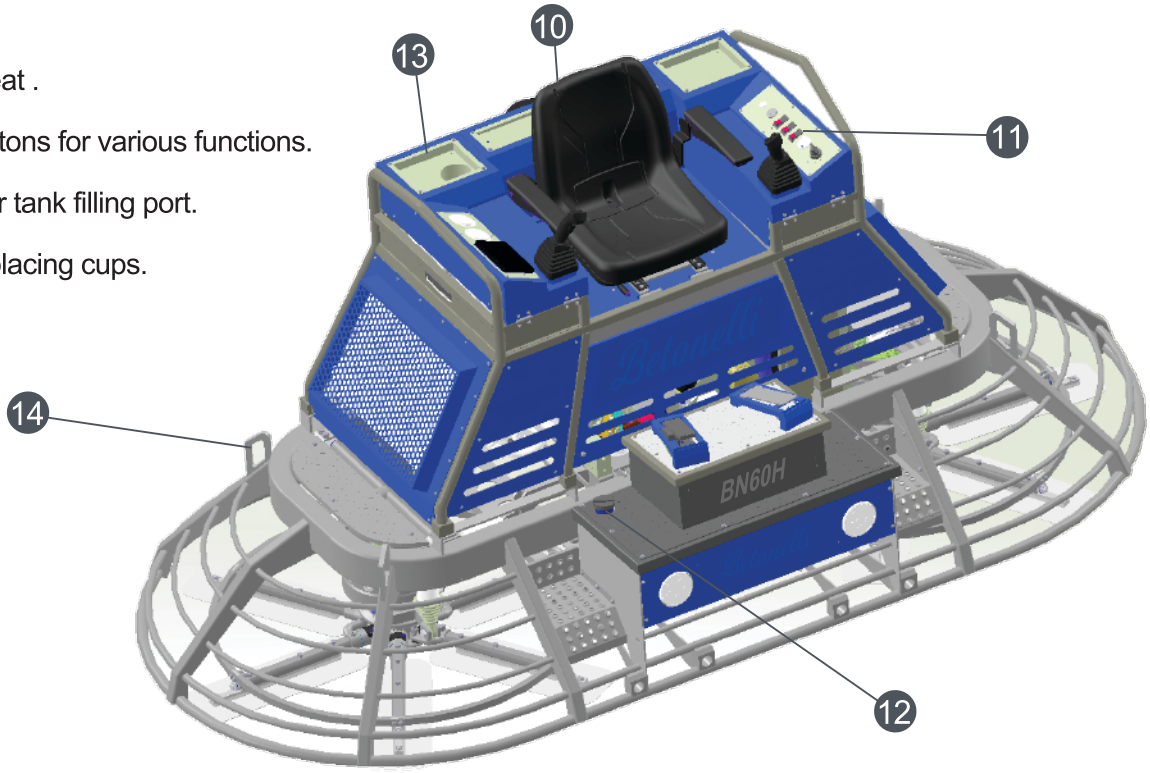
10 Seat - operator seat .

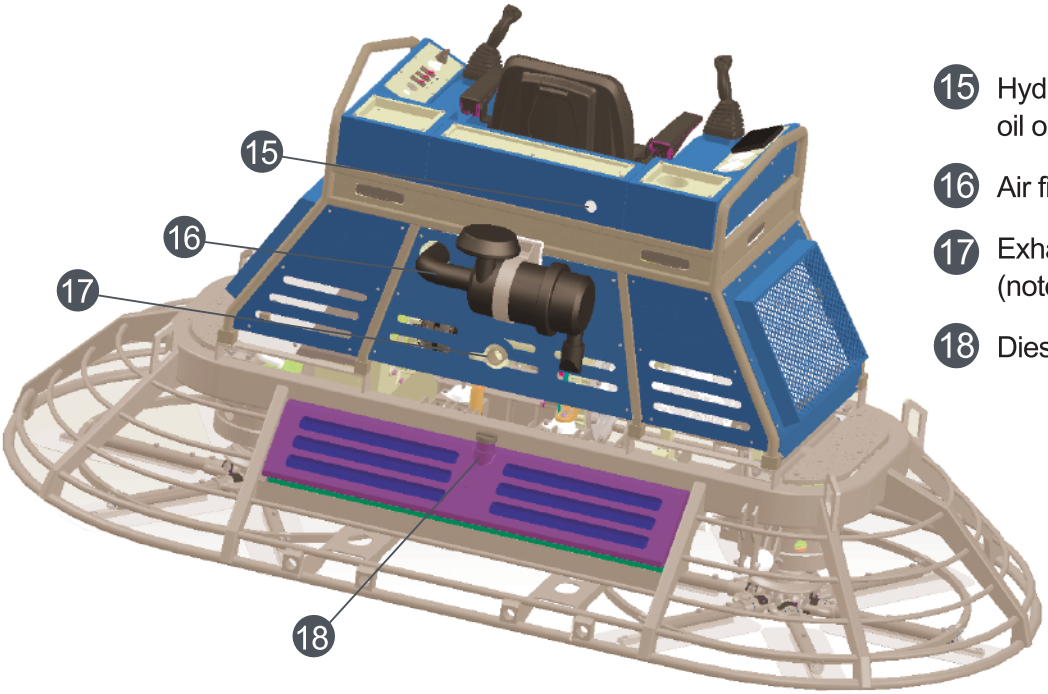
11 Button panel - buttons for various functions.

12 Water tank - water tank filling port.

13 Cup holder – for placing cups.

14 Hook – the hook.





15 Hydraulic oil test mirror - hydraulic oil observation port.

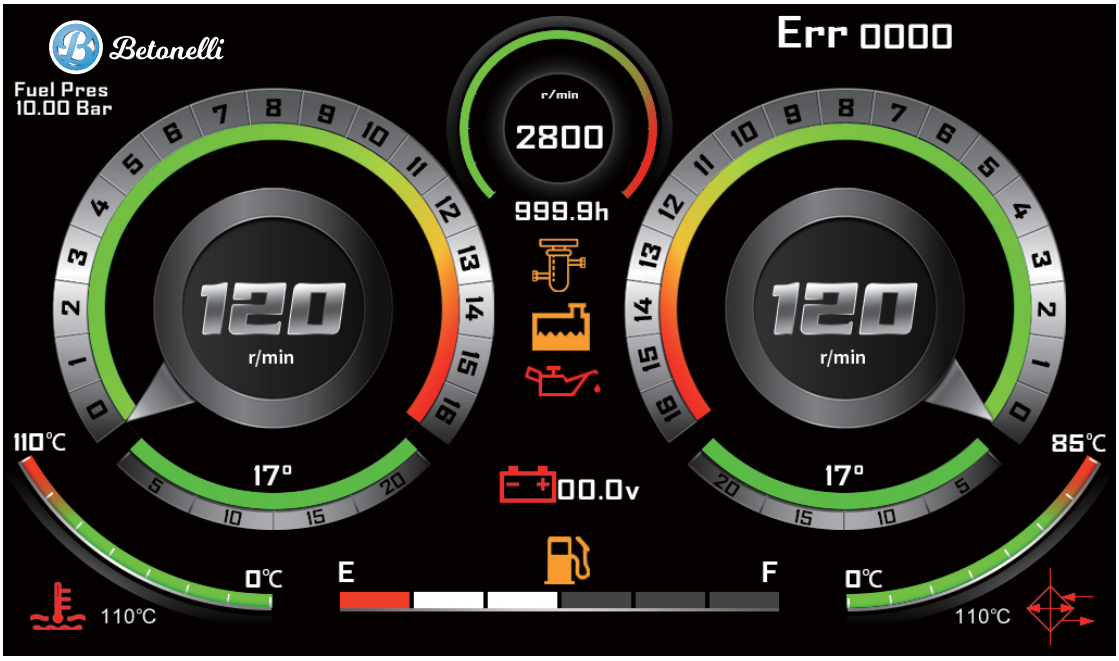
16 Air filter - engine air intake.

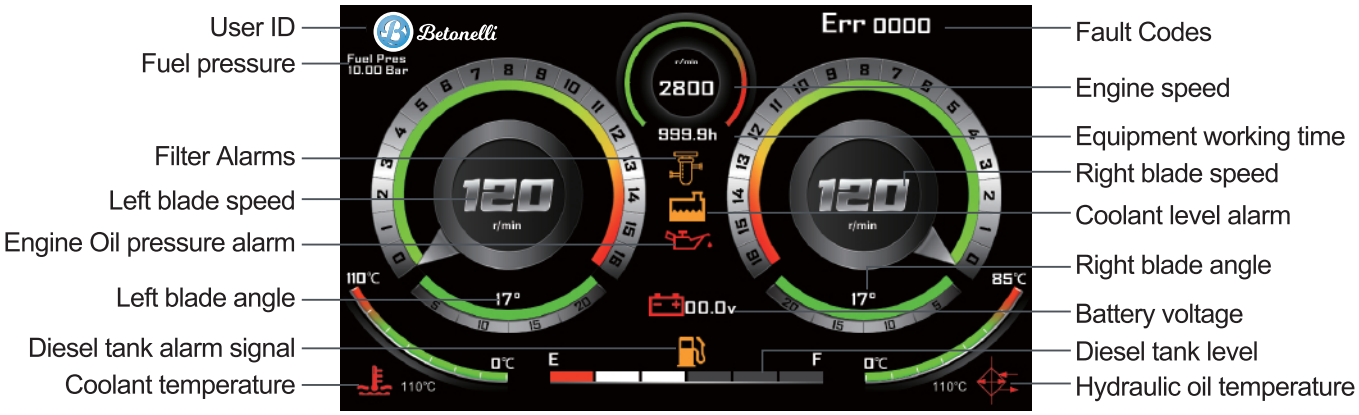
17 Exhaust - Engine exhaust pipe (noted the hot area).

18 Diesel Tank – Add diesel port.

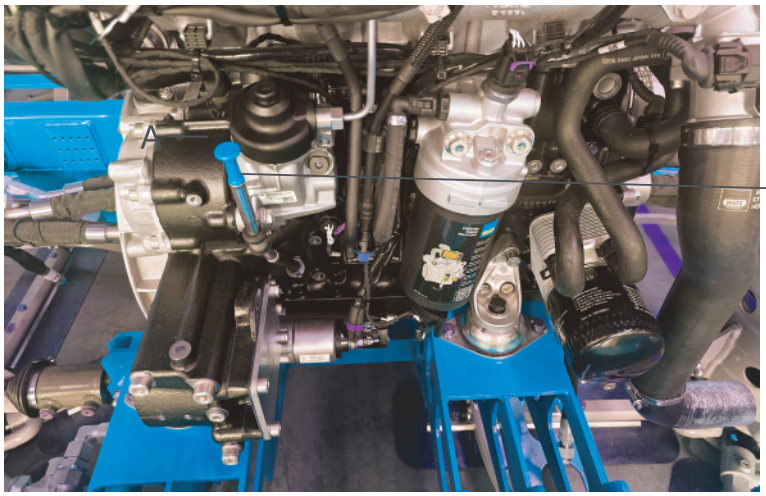
6. Display Panel

It uses a high-resolution 1024*600 LCD color instrument , communicates with the engine via CAN communication, and is equipped with a high-precision sensor to read the status of the equipment in real time and display it on the instrument.





7. Liquid detection



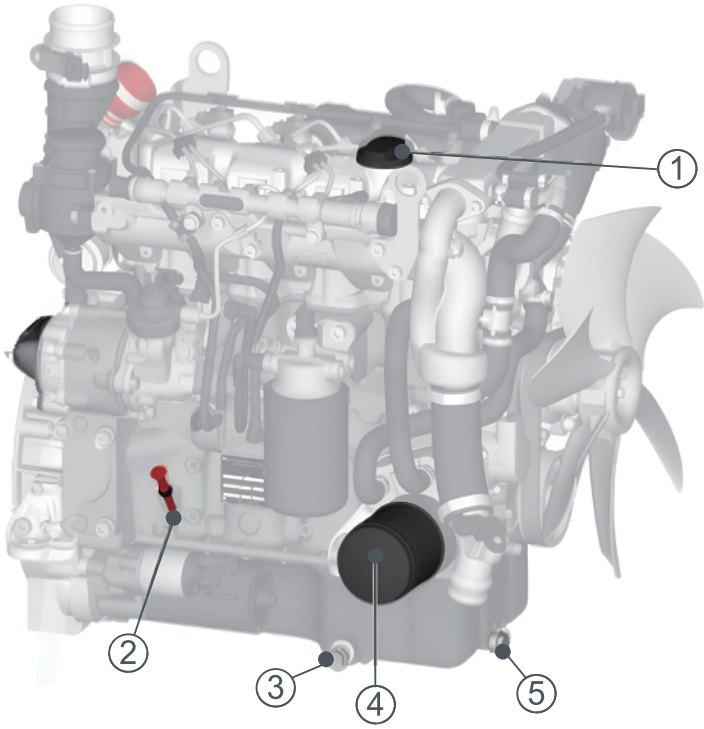
(1) Engine oil detection

1)The equipment should be placed horizontally.

2)Take out the dipstick (A) from the engine (see below)

3)Add to the difference between the "min" and "max" marks on the dipstick.

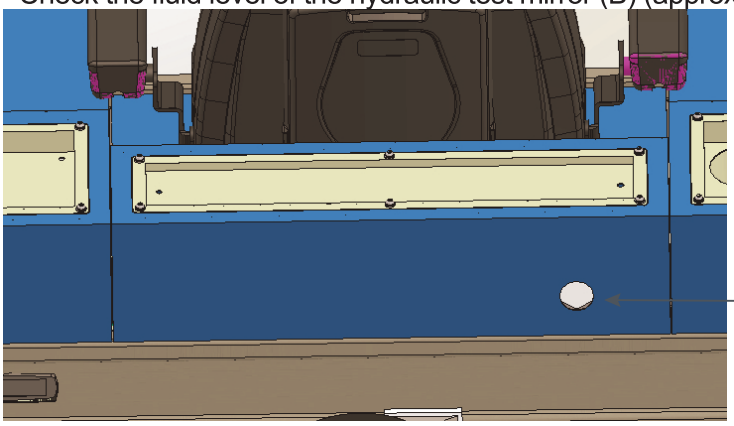
NOTE: Do not add too much oil to the engine.



① ····· Oil inlet, high position
② ····· Oil dipstick
③ ····· Oil drain bolt
④ ····· Oil filter
⑤ ····· Oil drain bolt

(2) Hydraulic oil detection

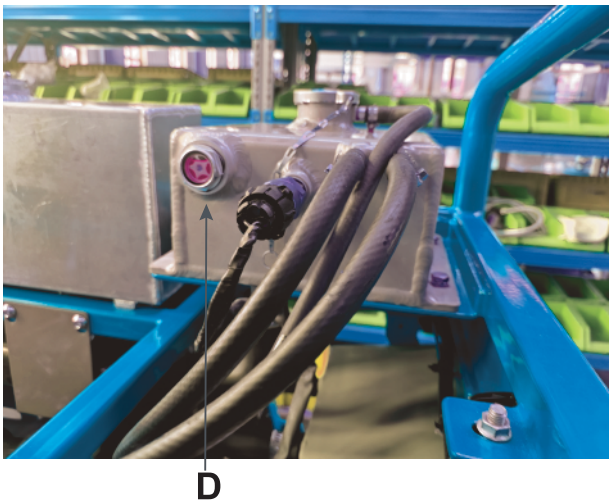
1）The equipment should be placed horizontally.
2）Check the fluid level of the hydraulic test mirror (B) (approximately 2/3 of the sight glass).



3）Open the cover (C) to see the hydraulic oil filler.
4）Hydraulic oil cleanliness 7NAS.
5）L-HM 46 anti-wear hydraulic oil
6）**Note:** The hydraulic oil has a high temperature under working conditions . Before servicing the machine, please leave the equipment to wait for the hydraulic oil to cool down and open the cover () . When servicing, please keep the hydraulic oil clean.

(3) Coolant detection

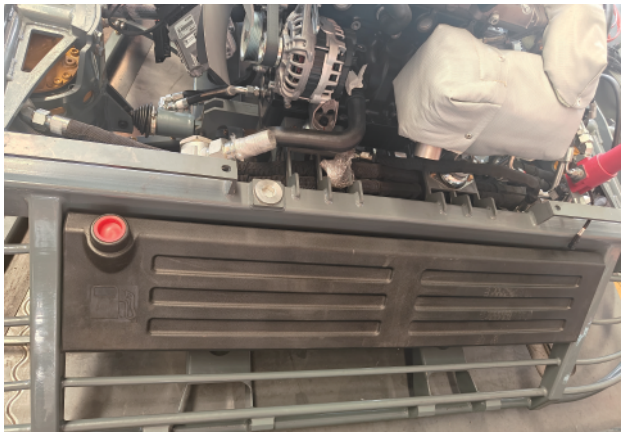
1）The equipment should be placed horizontally and open the armrest box.
2）Check the fluid level of the hydraulic sight glass (D) (approximately 2/3 of the sight glass).
3）H series engines are water-cooled engines, and the indicators and proportions of the coolant are specified by HATZ. Please prepare the coolant according to the manufacturer's relevant guidelines and comply with the information on the antifreeze package. Antifreeze has anti-corrosion and anti-freezing effects, and can significantly increase the boiling point of the coolant and reduce the deposition of lime in the cooling system.
4）Recommended coolant: Mitan C12+ (refer to engine manual for details)
Note: The temperature of the equipment is high under working conditions and the coolant is under pressure. Before repairing the machine, please let the equipment (coolant) stand and cool down to prevent the high temperature liquid from splashing.



(4) Engine fuel (diesel) detection

1）The fuel level is displayed in the instrument (the fuel level indicator turns red or the buzzer warns of insufficient fuel).

2）Refueling station (E).



3）If excessive fuel is added or there is a leak, clean up the leaked fuel immediately .

4）Don't store fuel in the tank when the machine is not in use for a long time . Low-quality fuel will seriously affect the performance of the machine and cause engine damage. The use of fuel additives is not recommended.

Note:

- Do not smoke when refueling. Diesel is a highly flammable substance.
- Fuel leaking on a hot engine may cause a fire or explosion.

8. Equipment operation steps (continued)

(1) Basic operation of the equipment

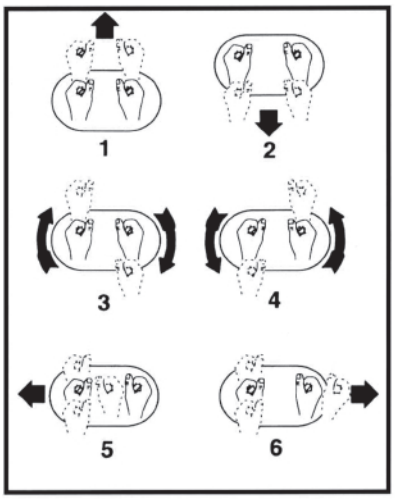
Before starting the device, please make sure that the Manual/Auto switch knob is in the direction you need; this will determine your control method;

- Turn the main power switch in the direction of the ON arrow until it is fully rotated. At this time, only the engine ECU working power is turned on;
- After sitting in the operator's seat, insert the key into the ignition switch jack and turn the key to the ON position; at this time, the equipment is powered on and can control all lights, water pumps and other peripheral equipment (except starting the engine)
- Adjust the blade angle;
- Press the safety switch and hold it, turn the key to the Start position, hold it for about 2 seconds, and start the engine. Note: If you want to keep the engine working, you must keep pressing the safety switch; once you release the safety switch, the engine will shut down immediately.
- When the engine starts running, release the key immediately and the key will automatically bounce back to the ON position;
- Press the right foot accelerator pedal, the blade starts to rotate, the rotation speed is determined by the depth of the pedal (note the control mode Manual/ Auto ;
- Operate the left/right handle to control the movement, steering and other actions of the device;
- When the equipment is running, lift the safety switch with your left foot, the engine will shut down and the equipment will stop running;
- After using the equipment, be sure to lower both blades to the ground and turn off the engine before powering off the equipment ;
- After the engine is turned off, turn the key switch to the OFF position to cut off the power to the equipment;
- After using the device, if you do not want to continue using it, to prevent the battery from feeding, please turn the main power switch in the direction of the OFF arrow until the switch is rotated into place, and the entire device will be powered off;

Note: After the left foot safety switch is released, the engine will shut down immediately. At this time, the engine ECU is still in working state. You need to wait for about 30 seconds to 1 minute before turning off the main power switch;

(2) Driving operation

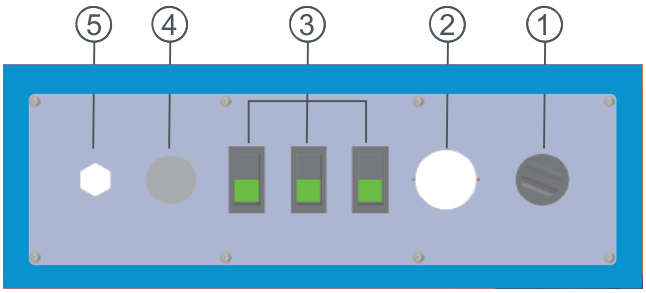
While operating the right-hand joystick, a slight forward and backward "forward and backward movement" is required with the left-hand joystick.

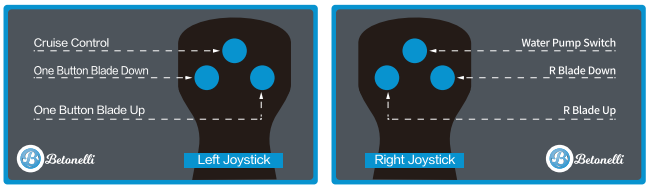


Driving Operation

1. .....Go forward
2. .....Go backward
3. .....Rotate clockwise
4. .....Counterclockwise rotation
5. .....Move to the left
6. .....Move to the right

(3) Function button

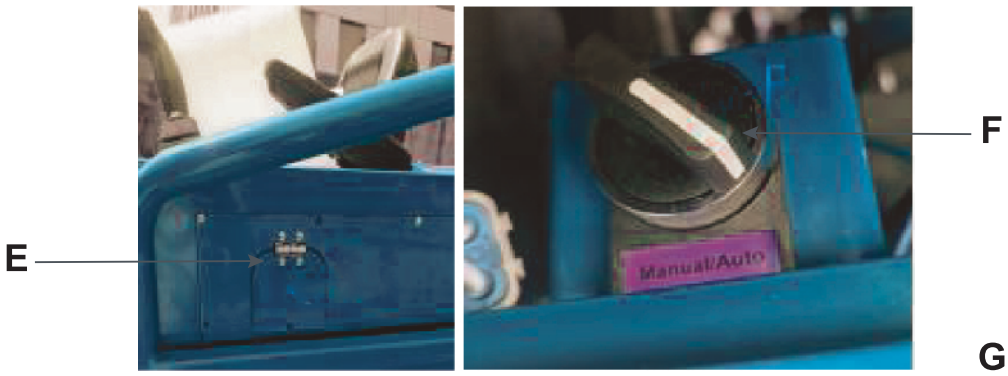




1. Key switch
2. Engine speed knob in manual mode
3. Three button switches for front, middle and rear LED lights
4. USB charging port
5. Buzzer
7. Water pump switch
8. Blade lift
9. Blade lower
10. Right blade up
11. Right blade down
12. Cruise control

(4) Mode switch

- The left armrest box has a cover (E).
- After opening the cover, there is a manual/automatic switch knob (F) inside.

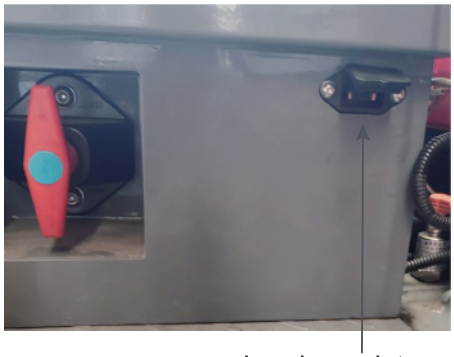


- Manual mode: Switch the manual/automatic knob to manual mode. After the engine starts, rotate the throttle knob (G). The engine speed increases from 900 to 2800 at idle speed, and decreases to 900 in the reverse direction. At this time, step on the accelerator pedal and the blade will automatically adapt to different speeds according to different gears. (Note:At 900rpm,step on the accelerator will shut down the engine.)

- Automatic mode (Auto) : witch the manual/automatic knob to automatic mode (Auto), press the accelerator pedal, and the device will automatically adjust the engine speed and blade speed according to the depth of the accelerator pedal.

(5)Battery charging

- The equipment has a reserved battery charging port. If the equipment is not used for a long time, the battery may be exhausted, causing the equipment to fail to start. Therefore, you should maintain the habit of charging the battery regularly (once a week). You do not need to fully charge it, as long as you keep the battery unpowered. When the equipment is running, the generator of the engine will automatically charge the battery. The charging port is on the right side of the device's main power switch, as shown in the figure.



Notice:

- The battery must be charged with a lead-acid battery charger. Do not use a lithium battery charger to charge the battery, otherwise it will cause damage to the battery;
- The maximum charging current of the charger is 10A. Do not use a high current charger to charge the battery.
- The charging port is only used for charging and cannot be used for discharging the battery;

9. Transport trolley

(1) Transport trolley parameters:

Travel speed	≤4 m/s
Battery voltage	DC 48V
Battery capacity	10Ah
Battery Type	Lithium iron phosphate/Lithium manganese
Battery life	1 hour
Hydraulic ram speed	0.01 m/s
Charging (full charge time)	180 min
Total weight	70 KG

(2) Open/close the trolley wheel operation:

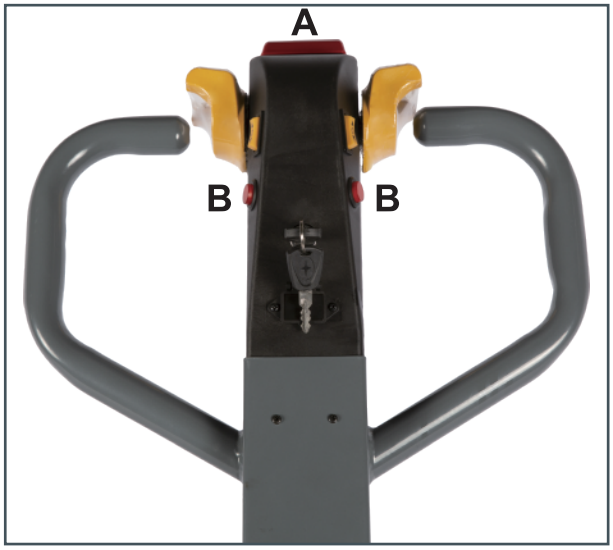
Turn on/off with key

- The key switch has the first priority (when the key switch is powered on, the password can no longer be used to turn the machine on and off. After the key switch is powered off, the password can be used to turn the machine on and off. After the password is turned on, the key switch can be turned off directly);
- Insert the key switch and turn it to the right to start the trolley;
- Push the knob to move the trolley forward/backward (the speed will increase linearly with the knob holding time);
- During operation, press the deceleration button and the car will slow down normally;
- Press the up/down button on the left/right side of the hydraulic rod to raise/lower the hydraulic push rod mechanism;
- When moving backward, press the safety switch (A) , the vehicle will stop immediately and then move forward quickly for a short distance ;
- Press the horn switch (B) and the horn sounds;
- The charging port can be charged with a dedicated charger;
- Key shutdown - Turn the key switch to the left, the car will be powered off and shut down (the password can be used to turn on/off the car at this time)

Use password to turn on/off the machine (power-on password 1234)

- You must first turn the key switch to the left to power off the car (only then can you use the password to turn on/off the car)
- Enter the power-on password 1234 , then press the OK button; the car will beep twice, and the power display will light up to show the battery level;
- The operation method of the trolley is the same;
- Shutdown: Press and hold the OK button for 3 seconds to shut down the car;

Please refer to the operation video of the trolley (attachment)



10. Maintenance

The following table lists basic engine maintenance. For additional information on engine maintenance, refer to the OEM engine manufacturer's operating manual. Comes with H50 Fault List, H50 User Guide, Engine Parts Order Number (optional) .

（1）. Common fault codes (see H50 fault list for details)

SPN	FMI	Component/Value	Troubleshooting Check Description
96	1	Fuel System	The fuel tank level is below the critical level or there is a risk of air entering the fuel system
98	4	Engine oil level	Duty cycle greater than the maximum
98	2	Engine oil level	Duty cycle is less than the minimum value
100	3	Engine oil pressure sensor	Engine oil pressure sensor signal range check value is too high
100	4	Engine oil pressure sensor	Engine oil pressure sensor signal range check value is too low
110	3	Water temperature sensor	Water temperature sensor signal range check value is too high
110	4	Water temperature sensor	The water temperature sensor signal range check value is too small
110	16	Water temperature	Water temperature authenticity check too high
1136	16	ECU temperature	The physical range check value exceeds the maximum limit
23618	3	Battery/power supply	If the battery voltage is greater than the maximum calibrated limit for longer than the debounce time, the power stage diagnostics will shut down 23618 4 Battery/Electricity DFC_DevLibBattULo
23618	4	Battery/power supply	If the battery voltage is below the minimum calibrated limit for longer than the debounce time,the power stage diagnostics will shut down.
97	15	Moisture sensor	Water detected (fuel pre-filter)

Note:

The following table lists basic engine maintenance. For additional information on engine maintenance, refer to the OEM engine manufacturer's operating manual. Comes with H50 Fault List, H50 User Guide, Engine Parts Order Number (optional) .

（2）.Maintenance plan (For details on engine filter replacement, see the H50 User Guide)

Maintenance plan						
part	**every day**	**20h**	**500h/ 12 months**	**3000h**	**4000h**	**4 years**
Hydraulic oil level	▲					
Coolant level	▲					
ENGINE oil level	▲					
Check the combustion air intake area (air filter)	▲					
Check radiator blade contamination	▲					
Cleaning the engine			▲			
Check the antifreeze concentration of the coolant			▲			
Change engine oil and filter			▲			
Check the belt			▲			
Replace the oil mist filter element of the crankcase breather			▲			
Replace the fuel prefilter			▲			
Replace the main fuel filter			▲			
Intercooler fluid drain			▲			
Replace the air filter (primary filter)			▲			
Oil-water separator drain			▲			

Replace the belt				▲		
Clean the main cooler of the exhaust gas recirculation system (EGR) (operated by trained technicians)					▲	
Clean the Diesel Particulate Filter (DPF) (operated by trained technicians)					▲	
Replace the coolant						▲

（3） Maintenance accessories

Replacing the coolant			
Serial number	Part Number	name	quantity
Flame-out switch (safety switch)			
Insert type fuse			
Electric proportional accelerator pedal			
More spare parts in the spare parts box			

Betonelli

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