

## Introduction of Products

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### Compact-size Wheel Loaders WA40-8 and WA50-8

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*The new compact-size wheel loaders WA40-8/WA50-8, which conform to Tier4 exhaust gas regulation, have been developed under the concept of “environment”, “safety” and “Information and Communication Technology (ICT)” and launched on the market.*

*This report introduces the main features of the new models.*

**Key Words:** *Compact-Size wheel loader, electronic control hydrostatic transmission, exhaust gas regulation, multi-monitor, KOMTRAX, environment, safety, ICT*

## 1. Introduction

Our WA40/50 series, a compact-size wheel loader with bucket capacity of 0.5m<sup>3</sup> or 0.6m<sup>3</sup>, launched WA40-6/WA50-6 which met in 2008 the 2006 regulation of emissions from non-road special motor vehicles and was equipped with electronic control hydrostatic transmission (HST), and received high acclaim on its performance.

Here, as the interim measure (23 months) period of the 2011 regulation of emissions from non-road special motor vehicles ends in August, 2015, we have developed and introduced to market the compact-size wheel loaders WA40-8/WA50-8 (**Fig. 1**) which are equipped with new-generation engines which meet the 2014 regulation of emissions from non-road special motor vehicles, inherit the electronic control HST which has been highly acclaimed in 6-series, and furthermore meet higher safety requirement and market needs, which is described below.



**Fig. 1** Photograph of Appearance of WA50-8  
(cited from the catalog photograph)

## 2. Aim of development and its achievement method

The pursuit of higher-dimension “environment,” “safety,” and “ICT” based on Komatsu’s “quality and reliability” is the basic concept. We, based on this concept, have complied with environmental regulation, pursued safety, utilized ICT technology, and also greatly increased the commercial value of the product by meeting market needs. The outline and benefits are listed below.

### (1) Environment

- Compliance with Japan’s 2014 regulation of emissions from non-road special motor vehicles
- Compliance with the super low noise type construction machine (except for the specification for stock raising) stipulated by Ministry of Land, Infrastructure, Transport and Tourism
- Adoption of electronic control HST

### (2) Safety

- Adoption of cab and canopy complying with ROPS (ISO3471) and FOPS (ISO3449)
- Addition of alarm for not-fastening seat belt
- Addition of secondary engine stop switch
- Addition of hazard lamp

### (3) ICT

- Adoption of 3.5 inch color liquid-crystal multi-monitor
- Enhancement of KOMTRAX information
- Addition of the function to identify operator with ID key (option)

### (4) Enhancement of equipment

- Two up-and-down steps
- Adoption of intermittent windshield wiper
- Addition of grease pump holder and tool box
- Adoption of reclining seat

## 3. Selling point

Based on the above sections, the selling point, its achievement method, and technology of WA40-8/WA50-8 will be explained.

### 3.1 Compliance with environment

#### 3.1.1 Compliance with regulation of emissions

In the case of Japan, the change of the regulation values of carbon monoxide (hereinafter called CO), particulate

matter (hereinafter called PM), nitrogen oxide (hereinafter called NOx), and non-methane hydrocarbon (hereinafter called NMHC) in the emission regulation for WA40/50 class (engine output: 19 kW to 37 kW) is as follows. (Fig. 2)

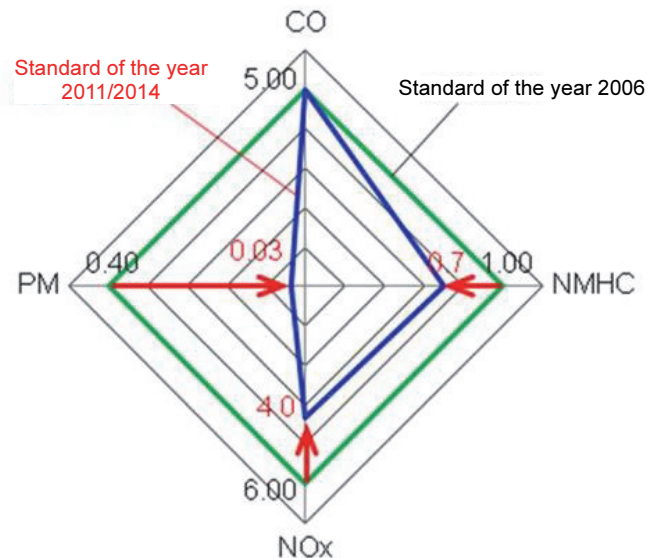


Fig. 2 Change of Emission Standard Values in Japan (cited from in-house document)

The new technologies for the engine we incorporates in this development to meet the 2014 regulation of emissions from non-road special motor vehicles are listed below. (Fig. 3)

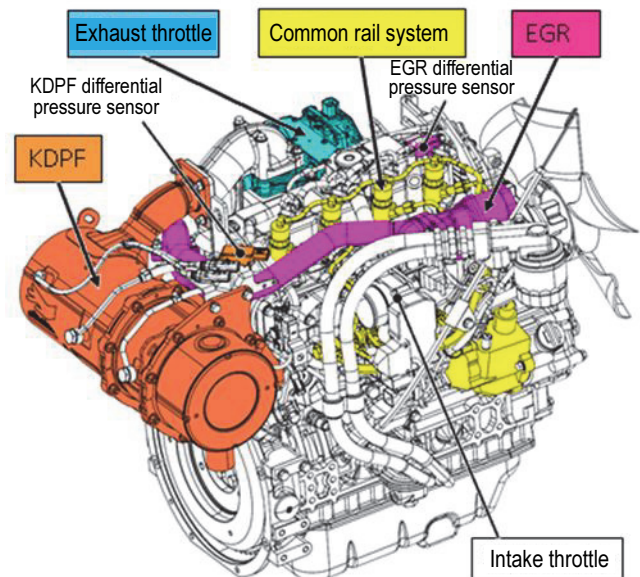


Fig. 3 New Technologies Incorporated in Engine (cited from in-house document)

- Exhaust-gas aftertreatment device

Newly developed Komatsu Diesel Particulate Filter (KDPF) is adopted. The KDPF, composed of oxidation catalyst and soot filter, purifies exhaust gas by decomposing hazardous components in exhaust gas with oxidation catalyst and burning and removing after capturing PM with soot filter.

- Fuel injection system

For fuel injection system, the adoption of common rail system and the electronic control can optimize the fuel injection and reduce the PM in exhaust gas.

- Intake and exhaust system

An intake throttle and an exhaust throttle are loaded in the intake and exhaust system, and their electronic control allows the exhaust gas temperature to be always kept at a proper level, and therefore, the sufficient PM burning temperature of the KDPF is maintained regardless of how vehicles are used (load). In addition, the exhaust system adopts Exhaust Gas Recirculation (EGR) to reduce hazardous material.

### 3.1.2 Super low noise type compliance

The new product, as does the currently used one, meets the standard value of the super low noise type construction machine stipulated by Ministry of Land, Infrastructure, Transport and Tourism. The adoption of a V-shape fin for cooling can increase the heat discharge, absorb the amount of heat which is increased due to the measure against exhaust gas, and meet the super low noise type construction machine standard values stipulated by Ministry of Land, Infrastructure, Transport and Tourism with the noise level identical to that of the currently used product.

### 3.1.3 Hydraulic pressure system

The hydraulic pressure system inherits the electronic control HST which has been highly acclaimed in the currently used products and is equipped with traction mode selection function (P mode: Best suited for ground leveling, N mode: Best suited for loading, and S mode: Best suited for slippery roads such as snowy road) and speed control function (the highest speed can be arbitrarily set between 3 and 15 km/h), which allows the optimum performance to be selected depending on the work environment.

## 3.2 Safety

### 3.2.1 ROPS canopy and cab

The new product is by default equipped with the canopy which complies with the standards of two-rear-support ROPS, FOPS, and head guard and automatic winder type seat belts. The cab (option) complies with the same standard as well.

### 3.2.2 Alarm for not-fastening seat belt

The function which calls operator's attention when a seat belt is not fastened by lighting up an icon in the upper left of the monitor is added. (Fig. 4)



Fig. 4 Alarm for Not-fastening Seat Belt  
(cited from in-house document)

### 3.2.3 Secondary engine stop switch

In case a main switch cannot stop the engine when vehicle malfunctions, a secondary engine stop switch to stop the engine for emergency is installed in the lower left of the operator's seat. (Fig. 5)



Fig. 5 Secondary Engine Stop Switch  
(cited from in-house document)

### 3.2.4 Hazard lamp

The function to light up a hazard lamp during stopping and parking is added. (Fig. 6)



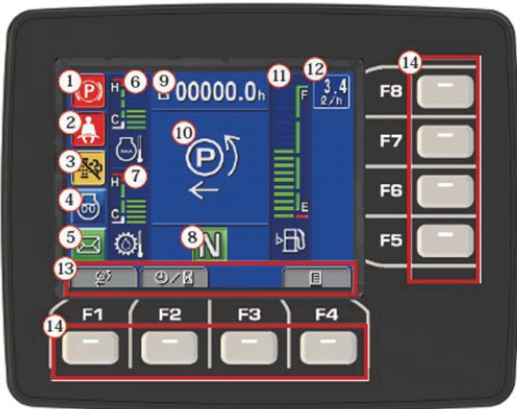
Fig. 6 Hazard Lamp  
(cited from in-house document)

## 3.3 ICT

### 3.3.1 3.5 inch color liquid-crystal multi-monitor

The adoption of high-definition liquid-crystal panel which is less affected by view angle or brightness greatly improves visibility. In addition, the information which can be handled drastically increases, which is explained below.

1) A monitor default screen and switch function are shown in the following Figure. (Fig. 7)



Indicator, operating switch

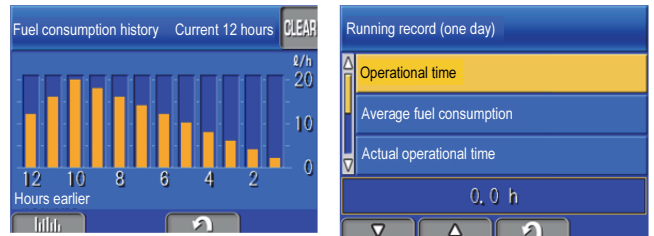
- |   |                       |
|---|-----------------------|
| ① Parking brake display                           | ⑧ Neutral lamp        |
| ② Seat belt caution display                       | ⑨ Clock/service meter |
| ③ KDPF reconditioning or KDPF reconditioning stop | ⑩ Traction mode       |
| ④ Preheating                                      | ⑪ Fuel gauge          |
| ⑤ Message display                                 | ⑫ Fuel meter          |
| ⑥ Engine water temperature gauge                  | ⑬ Guidance icon       |
| ⑦ HST oil temperature gauge                       | ⑭ Function switch     |

Fig. 7 Multi-monitor Default Screen  
(cited from in-house document)

2) The following two items can be displayed as operation records. (Fig. 8)

(1) Fuel consumption history: The graph of the average fuel consumption per hour or the average fuel consumption per day is displayed.

(2) Running record: The running record per day is displayed.



Fuel consumption history      Running record

Fig. 8 Operation Record Screen  
(cited from in-house document)

3) Maintenance (Fig. 9)

When the remaining various maintenance time is running out, a maintenance mark in the upper left of the monitor screen is displayed. (Fig. 9-1)

Pressing a menu button displays the items which requires maintenance. (Fig. 9-2)

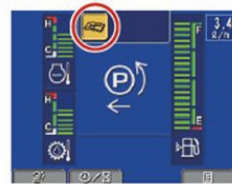


Fig. 9-1

Fig. 9-2

Fig. 9 Maintenance Screen  
(cited from in-house document)

4) KDPF manual reconditioning display (Fig. 10)

When the manual reconditioning is necessary, the reconditioning request mark is displayed in the upper left of the screen and the screen is automatically switched into a manual reconditioning screen to inform us.

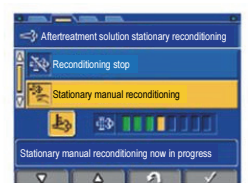


Fig. 10 KDPF Status Screen  
(cited from in-house document)

### 3.3.2 Enhancement of KOMTRAX information

As the information volume including a multi-monitor which we can handle within vehicle increases, KOMTRAX tremendously upgrades its function so that various functions can be handled on site or in office.

#### 1) Support of vehicle management work

The ways to use such as machinery fuel consumption information, time for work mode, and load frequency in addition to the conventional positional information or hour meter information can be displayed now, which allows the machinery status to be understood in detail.

[Main item]

- Fuel consumption and actual operational fuel consumption
- Traction mode time
- Running time
- Load frequency
- Exchange information of maintenance items
- Reconditioning information of KDPF

#### 2) Report of energy-saving operation support

Based on the work information of fuel consumption or idling operation, the useful information such as the report of energy-saving operation support (Fig. 11) can be supplied to customers.



Fig. 11 Report of Energy-saving Operation Support (cited from in-house document)

#### 3) Browsing allowed from smart phone

Without referring to PC, the vehicle information can be easily checked from a smart phone. (Fig. 12)



Fig. 12 Browsing Allowed from Smart Phone (cited from catalog)

#### 4) Addition of monitor message function

Messages such as maintenance notices can be sent from sales agents.

### 3.3.3 Operator identification function

The attachment of ID keys (option) allows the information such as operational time slot for each operator, operational time, idling time, work mode setting time, and fuel consumption to be captured. (Fig. 13)

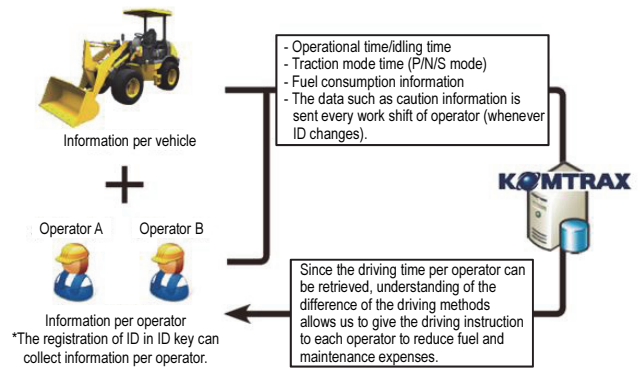


Fig. 13 Operator Identification Function (cited from in-house document)

### 3.4 Others

#### 3.4.1 Enhancement of equipment

The current development incorporates the functions for users to be able to work comfortably, based on the thorough survey of market needs.

## 1) Adoption of two steps

Compact-size wheel loaders can be operated by many female users or short users because of its passenger car size. The currently used product is equipped with one up-and-down step, however, here one more step is added underneath to improve the moving up-and-down performance. (Fig. 14)



**Fig. 14** Two Steps  
(cited from catalog)

## 2) Adoption of intermittent windshield wiper (cab specification)

Intermittent windshield wipers are adopted for the cab specification to secure comfortable visibility during the work under snow or light rain.

## 3) Tool box and grease pump holder as standard equipment

A tool box and a grease pump holder are installed by default within the right front frame of the vehicle so that the maintenance can be conducted anywhere. (Fig. 15)



**Fig. 15** Tool Box and Grease Pump Holder  
(cited from catalog)

## 4) Adoption of reclining seat

The reclining seat function is added so that an operator can freely choose a driving position depending on his/her size. (Fig. 16)



**Fig. 16** Reclining Seat  
(cited from in-house document)

## 4. Conclusion

The WA40-8/WA50-8 is one of the major products which play a central role on Komatsu's compact-size wheel loader. It not only meets the regulation of emissions from non-road special motor vehicles, but also incorporates many elements to improve the commercial values from the standpoint of how it will be used by users. From now on, it will be put on the market all over Japan, and we expect this to receive a high reputation in every geographical areas.

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Joined Komatsu Ltd. in 1984.  
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**[A few words from writers]**

With a close cooperation with development centers, quality assurance divisions, and factory divisions of Komatsu, we could improve the characteristics of WA40-6/WA50-6 which had been highly acclaimed at market and could develop the more complete compact-size wheel loaders.

We have been launching the compact-size wheel loaders which are made up by the combination of not only the development and manufacturing divisions but also the related all the divisions, and this development could not be possible without the cooperation of not only Komatsu's internal divisions but also many companies. We appreciate everybody's efforts and also would deeply thank all.