



**INNOVATIVE  
INTELLIGENT  
INTEGRATED**

**intelligent**  
MACHINE CONTROL

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**KOMATSU**

*Driven by your success*

# INTELLIGENT MACHINE CONTROL

## INTRODUCING... INTELLIGENT MACHINE CONTROL

Komatsu's innovative INTELLIGENT MACHINE CONTROL (iMC) technology solutions are making our customers more productive today... and into the future. Adding Komatsu iMC machines and solutions to your fleet is a formula for unmatched productivity improvement.

## WHY INTELLIGENT MACHINE CONTROL?

At Komatsu, we have a long history of introducing market-leading technology and Innovation to the industries we serve. Understanding the needs of our customers, we are constantly working towards enhancing and improving their productivity – including meeting the challenge of the ever-growing demand for skilled machine operators. Skills shortages, along with demands for increased construction site productivity, finite resources and project management pressures are key factors behind the development of Komatsu's iMC technology, which is driving our SMARTCONSTRUCTION philosophy.

## iMC – NEXT GENERATION MACHINE CONTROL

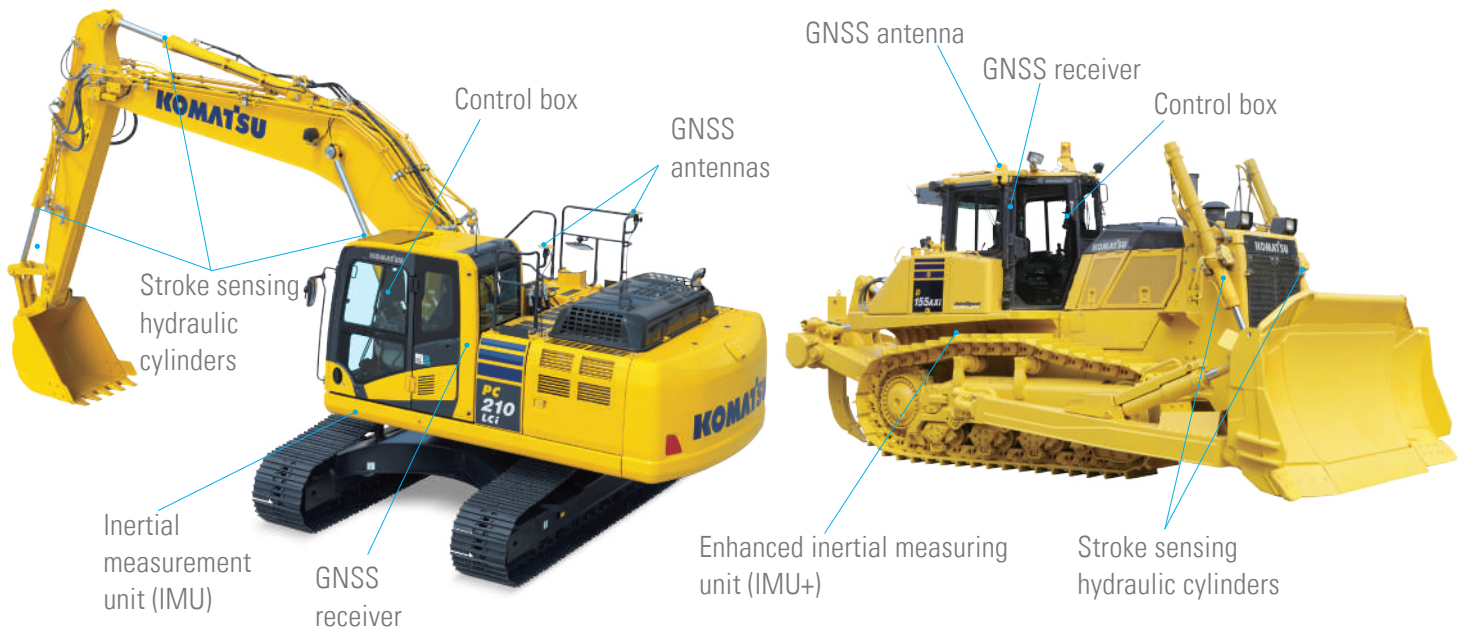
Komatsu's exclusive iMC concept is designed to let operators focus on moving material efficiently – from bulk excavation to final trim – without having to worry about over-excavation or damaging the target surface – and resulting in significant improvements in efficiency and productivity compared with conventional construction processes. Currently covering a range of four dozers and one excavator, each model in Komatsu's iMC range incorporates as standard a factory-installed fully integrated 3D GNSS (Global Navigation Satellite System) machine control system.



## NEXT GENERATION INTELLIGENCE

- » **Innovative** Automated blade/bucket control, from bulk excavation to final grades
- » **Integrated** Fully factory installed Komatsu machine control system, with all components highly secure from damage, vandalism and theft
- » **Intelligent** Multiple automated dozing modes as well as auto grade assist, auto stop control and minimum distance control for the excavator, so jobs are finished faster, more accurately and with minimal rework

## INTELLIGENT MACHINE CONTROL OVERVIEW



### FACTORY-INTEGRATED SENSOR PACKAGE

Conventional “bolt-on” machine control components are replaced with fully integrated factory-installed GNSS antennas, enhanced inertial measuring unit (IMU+) and stroke sensing hydraulic cylinders. This assures Komatsu reliability, durability and quality.

### GNSS ANTENNAS

Komatsu’s exclusive cab-top (iDozer) and handrail mounted (excavator) GNSS antennas greatly reduces the risk of damage, theft or vandalism associated with conventional blade and counterweight mounted antennas and cables – and ensures greater accuracy through more stable GNSS antenna positioning.

### ENHANCED INERTIAL MEASURING UNIT

Komatsu’s chassis-mounted enhanced inertial measuring unit (IMU+) measures machine pitch and roll to enable precision work equipment control, even when working on slopes.

### STROKE-SENSING CYLINDERS

Another Komatsu exclusive, robust stroke sensing hydraulic cylinders use proven sensor technologies for accurate finish grade performance. Stroke-sensing cylinders allow the iMC system to constantly track the angle and location of the blade or bucket edge.

### BENEFITS:

- » Complete bulk dozing and excavation, along with grading and final trim operations faster and to closer tolerances
- » Fewer passes to finish grade or excavation profiles
- » More efficient machine use: Less rework – dig or grade it once and move on
- » Greatly decrease times for staking, survey and even final inspection through having 3D design data held within machine
- » Complete multiple tasks with one machine
- » Lower machine operating costs and whole-of-life costs
- » Better material yields
- » Reduced fuel consumption
- » Improved operator performance
- » Greater machine availability and uptime
- » Simple operation for all operators and experience levels

### SUPPORT AND BACKUP:

- Komatsu Smart Centre supports of all site and machine solutions through:
- » Remote support for all IMC machines (SiteLink3D)
  - » Supported in the field by trained TSE’S (Technology Solution Experts)
  - » Supplemented support through Position Partners national network
  - » Network modem – All Day RTK available (Tokara Option)
  - » ICT Monitoring and energy saving guidance through KOMTRAX
  - » Drone survey support, providing an end-to-end solution

# INTELLIGENT DOZERS

**KOMATSU'S INNOVATIVE INTELLIGENT DOZER RANGE** – consisting of four machines – features a fully integrated intelligent Machine Control (iMC) to deliver significant productivity, efficiency and cost-saving benefits.

Komatsu's iMC system allows all machines in this range to carry out both bulk and final trim dozing in fully automatic mode from start to finish, delivering final grade performance and accuracy. The result is significantly increased productivity and efficiency – up to twice as productive as dozers fitted with conventional third party machine control systems according to Australian users and operators – while reducing the cost of each metre of material moved. This iMC system automatically controls blade elevation and tilt according to target design data, using common industry standard design data software and systems – so not only can the automatic machine control features be used for finish grading but also for bulk dozing – a capability unique to Komatsu intelligent dozers.

Loading of the blade at the start of the cut is controlled through set parameters; during the pass, if the load on the blade increases during bulk dozing operation, the blade is automatically raised to control the load and minimise shoe slip, ensuring efficient dozing at all times. Once the material level approaches the target design surface, the blade will follow it with millimetre-accuracy for close finish grading. Four different machine control operating modes allow operators to best match performance to the application, covering cut-and-carry, cutting, spreading and final trim grading. In addition, construction progress can be checked using the integrated as-built mapping display, which collects surface data by continuously measuring actual elevations as the machine operates.

Komatsu intelligent dozers are capable of operating on multiple sites with all OEM type UHF or UHF digital base solutions, including network corrections through a network base solution.

- » **No cables** No coiled cables between machine and blade
- » **No climbing** Integrated GNSS antenna and masts removed from blade
- » **No connections** No daily connections required between machine and work implements

D61EXi-23



D65PXi-18



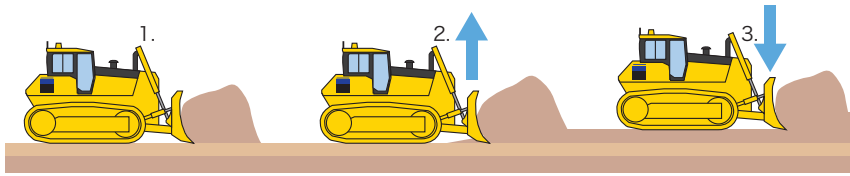
D85EXi-18



D155AXi-8



## INTELLIGENT DOZERS (continued)



### OPERATING WEIGHTS

|   |                  |
|---|------------------|
| D61EXi-23: 19,647kg/D61PXi-23: 20,527kg | Includes Rippers |
| D65EXi-18: 22,730kg/D65PXi-18: 24,980kg | Includes Rippers |
| D85EXi-18: 33,420kg/D85PXi-18: 29,910kg | Rippers EXi only |
| D155AXi-8: 44,560kg                     | Includes Rippers |

### ENGINE

|                                       |                |
|---------------------------------------|----------------|
| D61EXi/PXi-23: 125kW (168HP) @2200rpm | Tier 4 Interim |
| D65EXi/PXi-18: 162kW (217HP) @1950rpm | Tier 4 Final   |
| D85EXi/PXi-18: 197kW (264HP) @1900rpm | Tier 4 Final   |
| D155AXi-8: 264kW (354HP) @1900rpm     | Tier 4 Final   |

### FACTORY INTEGRATED iMC COMPONENTS

|  |                   |
|--|-------------------|
| GNSS Receiver                                | UHF Digital II    |
| Enhanced Inertial Measuring                  | IMU+              |
| Cab Mounted GNSS Antenna                     | Integrated (Roof) |
| Machine Control Monitor                      | Komatsu GX-60     |
| Stroke Sensing Cylinders (with Reset Sensor) | Tilt/Lift/Angle   |

### BLADE OPTIONS

|   |
|---|
| D61EXi: PAT/D61PXi: D61EXi-23 PAT D61PXi-23 PAT |
| D65EXi: Sigmadozer/D65PXi: PAT                  |
| D85EXi: Sigmadozer/D85PXi: Straight             |
| D155AXi-8: Sigmadozer                           |

## FEATURES AND BENEFITS

All machines in Komatsu's intelligent dozer series incorporate as standard a factory-installed fully integrated 3D GNSS (Global Navigation Satellite System) machine control system, combined with a proven hydrostatic drive steering system and exclusive Komatsu Sigmadozer blade design (EXi models) resulting in class leading integrated technology.

Komatsu intelligent dozers deliver unmatched productivity, combined with on-grade accuracy first time every time from bulk dozing to final trim, for faster dozing speeds, fewer passes, less re-work, increased uptime and higher availability.

## Blade options

The D65EXi, D85EXi and D155AXi machines are standard with Komatsu's world-leading Sigmadozer blade. Based on a completely new dozing concept, the Sigmadozer® blade dramatically improves dozing performance and increases productivity. A new frontal design adopted for digging and rolling up material at the centre of the blade increases soil holding capacity and simultaneously reduces sideways spillage. Lower digging resistance produces smoother flow of material, enabling dozing with less power.

Heavy duty six way PAT (Power Angle Tilt) Blade option on D61EXi-23, D65PXi-18 and Straight Tilt Dozer blade on D85PXi-18.

**SIGMADOZER®**

**15% increase**

Automatic transmission with lockup torque converter

**10% reduction**

Tier 4 Final engine

**5% reduction**

**FUEL EFFICIENCY: 30% increase**

Compared to machine with Semi-U blade and manual shift transmission



Advanced Sensor Technologies For Performance

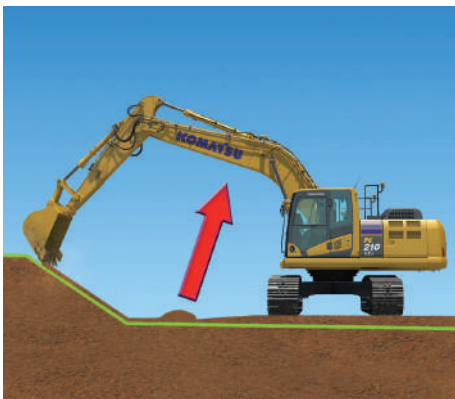


Enhanced inertial measuring unit (IMU+)

# INTELLIGENT EXCAVATOR: PC210LCi-10

## THE WORLD'S FIRST INTELLIGENT MACHINE CONTROL EXCAVATOR INCORPORATES A FULLY FACTORY INTEGRATED 3D iMC AND GUIDANCE SYSTEM BASED ON KOMATSU'S UNIQUE SENSOR PACKAGE.

Operators can focus on moving material efficiently, without having to worry about digging too deep or damaging the target surface – delivering over 60% improvement in work efficiency compared with conventional construction processes. Komatsu's iMC excavator enables operators to achieve optimum speed to final grade accuracy with minimal inputs, while eliminating the need for manual grade checking. It also delivers reduced fuel consumption due to its combination of an interim Tier 4 engine with iMC capabilities ensuring every job is on grade first time, minimising rework or over-excavation.



### AUTO GRADE ASSIST

The operator moves the arm, the boom adjusts the bucket height automatically, tracing the target surface and minimising digging too deep. This allows the operator to perform bulk excavation without worrying about the design surface, and to perform fine digging by operating the arm lever only. The working range is expanded by holding the lever to move the boom downward.



### AUTO STOP CONTROL

During boom or bucket operation, the work equipment automatically stops when the bucket edge reaches the required grade, minimising over-excavation or damage to the design surface.



### MINIMUM DISTANCE CONTROL

Bucket control automatically selects point on the bucket closest to the target surface. Even if the machine is not facing a sloped surface at a right angle, it will still follow the target surface, minimising digging below it.

## SPECIFICATIONS

|   |                      |
|---|----------------------|
| Operating Weight                              | 23,300 kg            |
| <b>Engine</b>                                 |                      |
| Komatsu SAA6D107E-2 rated at 123 kW (165HP)   | Tier 4 Interim       |
| <b>Integrated Technology</b>                  |                      |
| GNSS receiver                                 | UHF Digital II       |
| Enhanced Inertial box                         | Komatsu IMU          |
| Machine control multi-monitor                 | X-31 HMI 12.1 inch   |
| Stroke-sensing cylinders (with reset sensors) | Boom, arm and bucket |

## DRONE SUPPORT



Komatsu's SMARTCONSTRUCTION concept uses Skycatch highly reliable, autonomous Unmanned Aerial Vehicles (UAVs) or "drones" for data collection, point cloud maps to within 1 cm accuracy, and highly sophisticated visual intelligence, including the fastest data processing pipeline and most advanced data analysis back-end on the market. Skycatch UAVs scan job sites

to capture imagery and automatically generate highly accurate 3D site data. This data is then compared with 3D drawings of the site to automatically calculate the area and volume of earth to be moved. The results are transmitted as instructions to Komatsu iMC machines for fully autonomous work on the site.

### FEATURES AND BENEFITS

- » Drone capability enhances Komatsu Australia's total site solution business to our customers. It delivers quick, reliable and accurate survey for all earthmoving, quarry and mining applications, adding value to our integrated iMC operations
- » Record current as-built data, plus cut and fill volume reporting
- » Capable of working alongside Komatsu AHS (Autonomous Haulage Systems)
- » Enhances Komatsu Australia's expert optimum fleet recommendation team in the field
- » Total end to end solution for our customers now, tomorrow and in the future
- » The EVO3x Precision 3D mapping drone is the only commercial quadcopter capable of creating 3D point clouds with sub 5cm accuracy without the use of ground control points
- » Rugged hardware for all industrial work sites, operated by trained Komatsu RPAS/UAV CASA approved pilots
- » Fully integrated with Skycatch cloud platform and user friendly dash board
- » Complemented with class leading technologies such as terrain following, for increased accuracy on entire flight plan and improved end results
- » Unprecedented visibility into work site progress
- » Collaborate via a single platform, view data from any device
- » Automatic DTM (Digital Terrain Models) generation (with vegetation objects removed)
- » Overlay any PDF plans
- » 2D and 3D map viewing
- » PDF, TIF and LAS file export
- » Save and export unlimited annotations

**PEOPLE POWERED TECHNOLOGY**



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