



# DFI

## *DFI Provides BenQ the Most Reliable Brain for Autonomous Mobile Robot and Heart of Central Control System*

Autonomous Mobile Robot (AMR) has become the most purchased items in the manufacturing, logistics and warehousing, and healthcare because of higher application deployment flexibility. As member of the Qisda Group, BenQ uses DFI's KSM-AL series of modular panel computers to create innovative production of AMR and central control systems and set up a brand new benchmark for the practice of Industry 4.0.

Region: **Taiwan**

Industry: **Industrial Automation**

Application: **Autonomous Mobile Robot, Central Control System**

Solution: **KSM070P-ALW48-N50, KSM150P-ALD12-N50**



Not only does the advanced autonomous mobile robot (AMR) have higher application deployment flexibility than the automated guided vehicle (AGV), but it infinitely expands the operating range. It can also be combined with robotic arms for processing operation and have no longer limited actions to a single workstation.

As a Qisda Group member, DFI has developed a brand-new product line series - the KSM series adopts an "Adaptive Display Platform (ADP)" and an emerging and innovative approach to modularized touch panel PC design. This diverse combination of computing units and touchscreens provides system integrators with a more flexible and cost-efficient solution by upgrading specific modules instead of the whole unit. With the advantage of updating prospects, easy maintenance, and rugged design, DFI's new-series industrial all-in-one PCs with ADP technology are the ideal solutions for factory automation, transportation, in-vehicle, and critical mission applications.

The KSM modular PC series provides outstanding reliability and durable performance that features the capability of wide voltage 9~48V DC power input and can survive under the extended temperature range of -40°C to 70°C with fanless, anti-vibration, and cableless design. These industrial-grade PCs can operate stably 24/7 under challenging environments like in-vehicle, logistics, aviation, and marine. Therefore, DFI's KSM-AL modular panel computer has become the brain of the BenQ autonomous mobile robot and the heart of central control system.

### BMAL Transformer





**KSM070P-ALW48-N50**

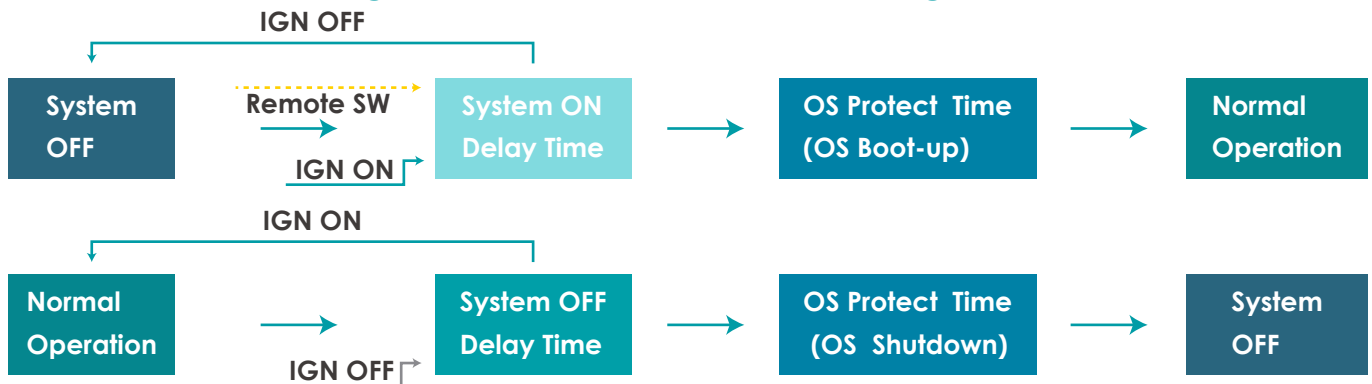
**Key Features**

- ▶ Proprietary modular design Adaptive Display Platform
- ▶ Multiple Panel Sizes with Resistive/P-Capacitive Touch Screen
- ▶ Supports 9~48V / 9~36V DC Input
- ▶ Fanless Design
- ▶ 12V/24V/48V Ignition Power Control

DFI's KSM-AL series are patented with a convertible power management module for replacing the MCU (Micro Controller Unit) with an onboard Embedded Controller. This is cost-efficient and space-saving to achieve Power Ignition (IGN) function and support with 7-level delay on/off time management for low voltage power protection (System On/Off Delay Time) to let the operating system have sufficient time to switch on and off (OS Protection Time) and ensure the integrity of the operating system data of the onboard computer. This touch panel PC series is available with wide voltage power modules, including 3 options of 12V, 9~48V, 24V power boards to fulfill different demands in in-vehicle, AMR, AGV, and industrial automation.

BenQ's advanced autonomous mobile robot and central control system are paired with DFI's KSM-AL series as the brain and the heart. It has various options, such as industrial or collaborative robotic arms, to provide the most suitable solution to fit management's operating environment and customers' needs. The system can be quickly and flexibly dispatched in large quantities, allowing multiple autonomous mobile robots to shuttle back and forth in the production line to perform multi-station operations. This significantly improves equipment efficiency and is especially suitable for "small-volume large-variety production". It is necessary to deploy such intelligent automation equipment for future Industry 4.0.

**Power Ignition (IGN) To Ensure The Integrity Of Data**



And the industrial-grade touch-control computer has its control screen, making it convenient for setting on-site operations. It has the following advanced features:

- | The robotic arm has a safety protection mechanism that can ensure personnel safety in a human-machine shared environment.
- | It is equipped with machine vision to improve processing, picking and placing, and operating flexibility.
- | Built-in industrial computer with high computing power, full-color human-machine interface (HMI), information display, and making the operation intuitive and convenient.
- | With robust wireless communication capability, remote monitoring or control is possible.
- | Provides track or trackless navigation systems, allowing customers to choose the most suitable solution for their needs.
- | Laser sensor for detection automatically avoids obstacles; There is no risk of collision.
- | A high-safety lithium iron phosphate battery (LiFePO<sub>4</sub> battery) that supports automatic and manual charging at the same time.
- | It is equipped with a fleet management system, which can save the workforce.
- | Humanized and flexible routing software, which can quickly change environmental settings without programming.

By convergence of many advanced technologies, BenQ's advanced autonomous mobile robots can bring many immediate benefits.

| Multi-tasking with one machine in "small-volume large-variety production" can effectively improve equipment utilization.

| Seamless integration of software and hardware, including ERP (Enterprise Resource Planning), MES (Manufacturing Execution System), and WMS (Warehouse Management System).

| An "around-the-clock" autonomous mobile robot that can save at least three labor costs and improve work efficiency.

| Elimination of floor stock inventory, saving 33% of space and reducing inventory costs.

| Able to quickly deploy new businesses and keep their services uninterrupted.

| Replace repetitive and tedious tasks and release human resources for more valuable tasks.

Mounting or changing a touch panel or box module could never be more straightforward as the modular design can be completed within two steps. ADP technology helps HMI (Human Machine Interface) panel PC achieves easy installation, maintenance and ensures no long-term interruption while upgrading or maintaining the equipment.

In the past, the biggest problem with the modular design was the "blind installation" where the bottom cannot be seen. Not only is it challenging to locate and install, but there is also the fear of damage done to the electronic components of the connector, resulting in defects. If you exchange different personal computer modules with different sizes and installation methods, the above problems will be more likely to emerge.



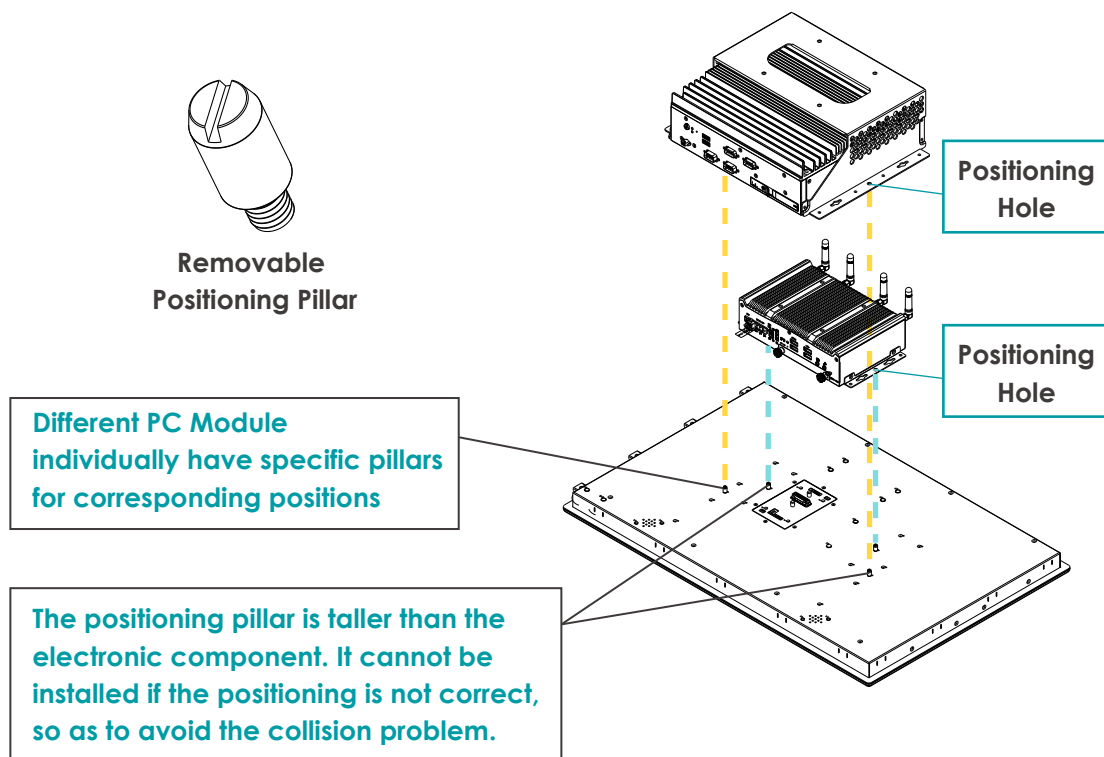
Therefore, DFI has opened the mold to design a detachable positioning column and applied for a patent. The positioning holes designed for different personal computer modules are used to install on the panel module. When assembling, you only need to aim at the positioning holes for easy installation. The height of the positioning post is used to protect the electronic components of the connector. As long as the positioning hole is offset, it cannot be installed and will not hit the electronic components, avoiding damages to the collision parts and improving the vibration resistance and stability significant for robot applications.

DFI's modular touchscreen computers can freely choose the box PC's processing capability and the panel's size depending on their requirements. Customers can also choose from over thirty kinds of I/O expansion modules, along with resistive single-touch or projected capacitive multi-touch displays to build highly customized solutions.

The KSM-AL series is developed based on DFI's 100% in-house proprietary motherboard, ensuring lower maintenance costs by having an all-in-one design and passing through a comprehensive quality control process.

DFI has accumulated rich experience in industrial computers, and combined with Qisda Group's reputed electromechanical R&D resource, can assist BenQ, another group member, to build its innovative autonomous mobile robot and central control system. Not only does it dramatically improve innovative production efficiency, but it also set a brand new benchmark for the practice of Industry 4.0.

Please click or scan the QR code to see our website if you would like us to contact you.



## Reference Information

**DFI KSM-AL product webpage**

<https://www.dfi.com/pressroom/landingpage/384>

**DFI KSM-AL Product Collaterals**

<https://www.dfi.com/product/index/1417#download>

**BenQ Autonomous Mobile Robot Official Website**

<https://www.benqbussolution.com/en/products-solutions/amr>

**BenQ autonomous mobile robot introduction video**

<https://youtu.be/PyHfIgOBXgI>

# DFI

Founded in 1981, DFI is a global leading provider of high-performance computing technology across multiple embedded industries. With its innovative design and premium quality management system, DFI's industrial-grade solutions enable customers to optimize their equipment and ensure high reliability, long-term life cycle, and 24/7 durability in a breadth of markets including factory automation, medical, gaming, transportation, smart energy, defense, and intelligent retail.

Website: [www.dfi.com](http://www.dfi.com)

eStore: [estore.dfi.com](http://estore.dfi.com)



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