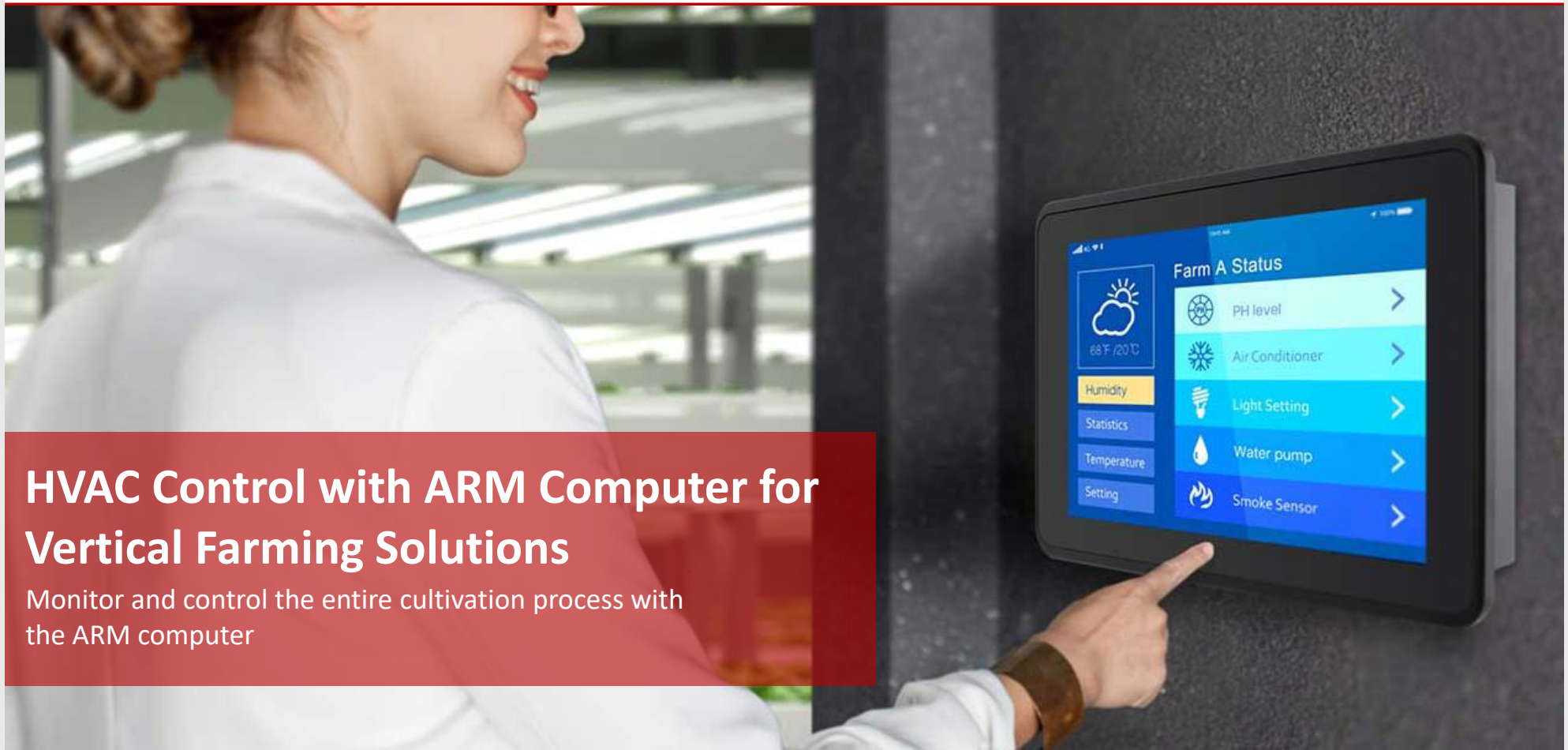
Success Stories



HVAC Control with ARM Computer for Vertical Farming Solutions

Monitor and control the entire cultivation process with the ARM computer

Background

United Nations predictions warn that food production must increase by 70% by 2050 to feed the world. Globally, many regions are not suitable for farming, and climate change and soil degradation aggravate that reality. Irrigation practices are often not sustainable, and perishable food is transported over long distances with a large CO_2 footprint resulting in waste. Urban farms are an upcoming technology to solve future food insecurity caused by climate change leading to an increase in global temperatures and the frequency of extreme weather events. By moving agricultural operations indoors and precisely controlling the environment, reliable conditions for plant growth can be created. The eating Ventilation and Air Conditioning (HVAC) system are one of the central elements of an indoor farm as it is the means to control the temperature and humidity of the growth environment.

The main challenges for HVAC in urban farms are highly energy-efficient solutions to provide optimized operations while constantly and accurately regulating the indoor environment to provide the best growth conditions resulting in the best quality products. This means a high level of automation of the Plant Factory with Artificial Lighting, PFAL, HVAC ventilation, pumps, and valves. Those must be seamlessly integrated into the overall automation system of the farm.

Main Challenges

- **Operating humidity and water splash**

  Humidity, high-temperature range, and insolation may shorten the life of a device or cause trouble to the user if it is not chosen correctly. High temperatures and moisture badly influence display and electronics if the housing and electronic components are not prepared for such an environment. Low luminosity may inconvenience reading information from the panel.

- **Various Industrial Connectivities**

  Besides optimizing energy consumption and labor cost, optimal growing conditions are critical in vertical farming. The HMI needs to be equipped with various industrial wired and wireless connections to support the automation of agricultural processes while supporting remote monitoring and operation with a wide variety of end devices.

Core Products

- Winmate 15.16 inches ARM-based E series HMI
- Winmate 10.1 inches ARM-based low-cost EL series HMI
- Rugged tablet PC

Why Winmate

Lightweight design for versatile uses

Permanently soldered components and the absence of moving parts ensure maximum resistance to shock and vibration. Wide temperature ranges allow operation under harsh environments. The front side of the panel is rated IP65 dust-tight and splashproof protection. The lightweight, fanless, and true flat design of the ARM computer panel support multi-purpose uses in various industrial use, is easy to clean, and prevents dust build-up on the panel edges.

Clear and precise PCAP touch panel

User input via projected-capacitive (PCAP) touchscreens allow the use of multi-touch gestures (e.g., pinch-to-zoom, swipe, two-hand operation). The visually appealing, optical-bonded glass surface is easy to clean. The exclusive use of industrial components guarantees a long service lifespan and availability. Winmate HMIs boasts brilliant displays with optical bonding, clear visual display, intense colors, and a long service life that makes a lasting impression. The ARM computer HMI series is available in various screen widescreen diagonals (7” to 15.6” for E series and 4.3″ to 15.6″ for EL series) and offer high resolutions, e.g., 15.6″ with Full-HD.

Rich wired and wireless connectivities

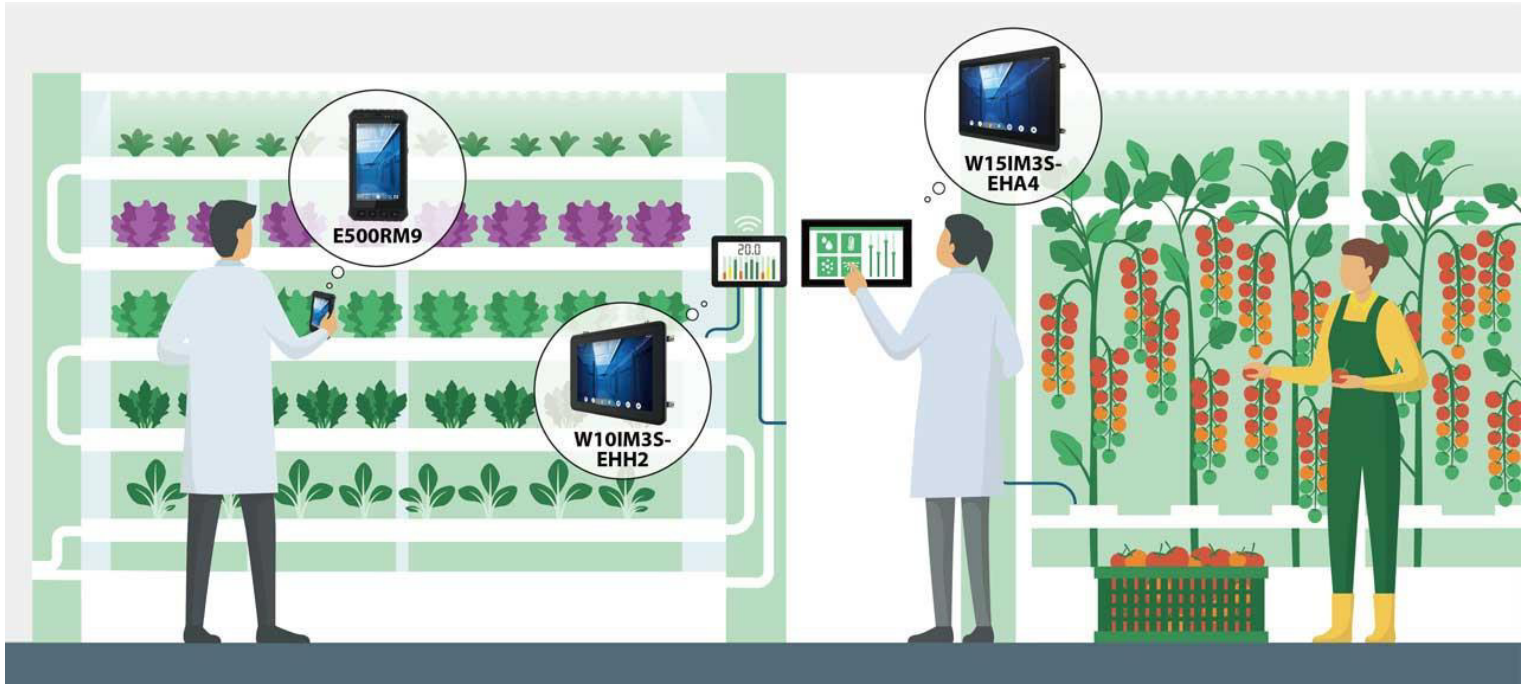
Via Winmate E and EL series ARM computer panels, users can monitor the farm, adjust individual parameters, and choose the matching programs for the cultivated plants. Including ventilation, temperature, lighting, pH, and conductivity of the nutrient solution. Meanwhile, the added wired and wireless connectivities enable remote monitoring and control solutions of the farm via any mobile device.

Comprehensive ARM-based computers

Winmate provides a series of Arm-based computing platforms with the latest embedded software services to accelerate Arm-based platform development.

Our ARM-based computers are readily available and can be customized to meet your industrial needs.

Application Diagram



Related Products

Winmate Panel PC
W15IM3S-EHA4

15,6" TFT-LCD Panel-PC
Touchscreen (Kapazitiv)
Passiv gekühlt
IP65 (frontseitig)

Winmate Panel PC
W10IM3S-ELH2

10,1" TFT-LCD Panel-PC
Touchscreen (Kapazitiv)
IP65 (frontseitig)
4 GB Speicher onboard