On the move with ifm
Reliable mobile control solutions

ifm controls will increase the uptime of your mobile machines

ifm efector – close to you!
ifm is an innovative manufacturer of control systems and HMI displays for mobile machines

ifm efector offers a complete family of control solutions that are designed for mobile machines. Products can be used on vehicles to control lifting, moving, processing, transporting and other automated operations. Our products can be applied individually or as a complete platform solution.

Designed with your environment in mind, ifm’s mobile controls are encased in robust, completely sealed IP67 housings and withstand high levels of shock, vibration, EMI and temperature extremes.

- Hardened PLC controllers with integrated standard IEC61131-3 software for optimal control.
- A variety of CAN-enabled I/O options.
- HMI displays with full-color graphics for viewing and communicating vehicle data.
- CoDeSys software combined with libraries of reusable function blocks enable the user to create clear and easy application programs. Examples include: J1939 engine communication, auto level control and eco control.

The product, people and know-how to help you succeed in your business

Over the past 10 years, more than 500 mobile equipment OEMs worldwide have applied ifm controllers, HMIs and I/Os on their vehicles to increase uptime and reduce installation costs.

The ifm mobile team has vast experience in developing, testing and commissioning vehicles from start to finish. Our team can offer the following services:

- Audit your current controls architecture and give clear advice on options for your specific application
- Offer engineering support during the design phase
- Arrange on-site ifm commissioning support during prototype startup
- Provide technical support during validation testing
- Conduct training for your engineering, service and production teams
- Make recommendations to reduce production time and total install costs

Global network, local focus
ifm has subsidiaries in 70 countries around the world. If you ship your mobile machines internationally or have manufacturing plants all over the world, you can count on local support from ifm employees.

Investment in R&D
Developing new products that increase your market competitiveness is a core belief of our company. We apply advanced technology and use innovative manufacturing techniques in our products to improve the performance and reliability of your mobile equipment.

From design to commissioning and testing – once your machine is moving, you’ll see how ifm is the logical choice for reliable mobile control solutions. Let the ifm mobile team exceed your expectations.
ifm’s ecomat mobile controls exceed the demands of severe environments

R360 mobile controllers
Hardened PLCs with integrated CAN networks are easily programmed using standardized IEC 61131-3 software. These stand-alone units offer configurable built-in I/O and are ideal for automating all of the working functions on your vehicle. In addition, the built-in SAE J1939 functionality enables easy communication with the vehicle powertrain.

HMI displays
Visual display of vehicle operating conditions and diagnostics, I/O status, fault monitoring and data collection. Full-color or monochrome user interfaces featuring backlit function keys for data entry and handling. Graphical pages are created using CoDeSys programming software, and RS-232 interface allows communication with other units.

CoDeSys IEC 61131-3 software
Easy-to-use software for application programming and configuration setting. The software is modular and offers a choice of six different languages that can be selected within a project. Code can be reused and exported to other projects, saving time in software development.

CANbus I/O modules
CANbus I/Os reduce complex wire harnesses that are heavy, difficult to troubleshoot and add weight to a vehicle. Decentralized I/O modules connect binary and analog sensors to the controller via CANbus. Easily integrates into dashboards and operating panels or mounts outside vehicle.

Sensors for mobile use
Robust sensors for position detection, hydraulic system pressure, temperature, and inclination are available to replace mechanical devices on your vehicle.

ifm offers flexible control and networking systems to enhance the automation of your mobile machine. Our products are designed and tested to increase the uptime of your machines – guaranteed!
Mobile Controllers

- Hardened PLCs with integrated CAN networks simplify application integration with existing CAN-based devices
- Designed to withstand shock, vibration, extreme temperature fluctuations, moisture, dirt and ingress
- Electronics are packaged in a compact, robust housing that provides safe operation under extreme operating conditions
- Easily programmable using standardized IEC 61131-3 software which ensures that all control functions are easily integrated
- Configurable built-in I/O – digital, analog, PWM – automates all working functions on a vehicle

ifm has the right controller for your vehicle applications

ifm offers a complete line of controllers that cover a broad range of applications on large, mid-sized and small vehicles.

For large vehicles, such as excavators and cranes, ifm offers 32-bit controllers that can process 80 I/O, carry 4 CAN networks and offer an IP67 rating.

Mid-sized vehicles that don’t require as much I/O and processing power can benefit from ifm’s 16-bit controllers that carry two CAN networks.

Basic controllers are designed for smaller vehicles such as forklifts and wood chippers and can process up to 24 I/Os on 1 CAN network.
<table>
<thead>
<tr>
<th>Type</th>
<th>Processor</th>
<th>Inputs/Outputs</th>
<th>CAN Networks</th>
<th>Description</th>
<th>IP Rating</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>32-bit Controller</td>
<td>High performance 32-bit</td>
<td>32</td>
<td>4</td>
<td>Analog inputs Discrete/Frequency inputs PWM/current controlled outputs</td>
<td>67</td>
<td>CR 0032</td>
</tr>
<tr>
<td></td>
<td>High performance 32-bit</td>
<td>80</td>
<td>4</td>
<td>Analog inputs Discrete/Frequency inputs PWM/current controlled outputs</td>
<td>67</td>
<td>CR 0232</td>
</tr>
<tr>
<td>16-bit Controller</td>
<td>16-bit</td>
<td>24</td>
<td>2</td>
<td>Analog inputs Discrete/Frequency inputs PWM/current controlled outputs</td>
<td>67</td>
<td>CR 0505</td>
</tr>
<tr>
<td></td>
<td>16-bit</td>
<td>40</td>
<td>2</td>
<td>Analog inputs Discrete/Frequency inputs PWM/current controlled outputs</td>
<td>67</td>
<td>CR 0020</td>
</tr>
<tr>
<td></td>
<td>16-bit</td>
<td>80</td>
<td>2</td>
<td>Analog inputs Discrete/Frequency inputs PWM/current controlled outputs</td>
<td>67</td>
<td>CR 0200</td>
</tr>
<tr>
<td>Cabinet Controller</td>
<td>16-bit</td>
<td>42</td>
<td>2</td>
<td>Analog inputs PWM outputs High amp outputs</td>
<td>20</td>
<td>CR 0303</td>
</tr>
<tr>
<td>Basic Controller</td>
<td>Basic 32-bit</td>
<td>20</td>
<td>2</td>
<td>Analog and resistive inputs PWM outputs</td>
<td>20</td>
<td>CR 0401</td>
</tr>
<tr>
<td></td>
<td>Basic 32-bit</td>
<td>24</td>
<td>2</td>
<td>Analog and resistive inputs PWM outputs</td>
<td>20</td>
<td>CR 0403</td>
</tr>
</tbody>
</table>

**Connector and wiring harness**

- Connector with integrated 1.2 m cable length: EC 2086
- Connector with integrated 2.5 m cable length: EC 2046
- Connector kit for Cabinet Controller: EC 2090
- Connector kit for Basic Controller: EC 0456
HMI Displays

- Visual display of vehicle operating conditions, diagnostics, I/O status, fault monitoring and system messages
- Full-color or monochrome user interfaces features backlit function keys for data entry and handling
- Models with sealed robust metal housings are rated IP67 for surface and panel mounting in both vehicle cabins and on the exterior chassis
- Graphical pages are created using the CoDeSys software package standardized on the IEC 61131-3 language
- ISO symbol font and full unicode support for other languages including Chinese characters

ifm has the right HMI display for your vehicle applications

ifm offers a complete line of HMIs that cover a broad range of applications on large, mid-sized and small vehicles.

Large vehicles such as excavators and cranes can apply the robust PDM New Generation display. The HMI can process large amounts of I/O to display operating conditions, diagnostics, fault monitoring and system messages.

For mid-sized vehicles that don’t require large displays, the PDM Monochrome and Compact displays are another alternative.

Smaller vehicles such as forklifts and wood chippers can benefit from the Basic display that operates as an engine interface and gauge replacement.
## Display Product Line

<table>
<thead>
<tr>
<th>Type</th>
<th>Display Size</th>
<th>Color / Monochrome</th>
<th>Unique Features</th>
<th>CAN Networks</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDM New Generation</td>
<td>7”</td>
<td>Color</td>
<td>Ethernet, USB, Encoder interface, V/O – 1 in, 1 out</td>
<td>4</td>
<td>CR 1080</td>
</tr>
<tr>
<td></td>
<td>7”</td>
<td>Color</td>
<td>Ethernet, USB, Pushbutton interface, V/O – 1 in, 1 out</td>
<td>4</td>
<td>CR 1081</td>
</tr>
<tr>
<td>PDM Monochrome</td>
<td>5.7”</td>
<td>Monochrome</td>
<td>Ethernet</td>
<td>2</td>
<td>CR 1050</td>
</tr>
<tr>
<td>PDM Compact</td>
<td>3.8”</td>
<td>Monochrome</td>
<td>Portrait</td>
<td>1</td>
<td>CR 1052</td>
</tr>
<tr>
<td></td>
<td>3.8”</td>
<td>Monochrome</td>
<td>Portrait with I/O</td>
<td>1</td>
<td>CR 1053</td>
</tr>
<tr>
<td></td>
<td>3.8”</td>
<td>Monochrome</td>
<td>Landscape</td>
<td>1</td>
<td>CR 1055</td>
</tr>
<tr>
<td></td>
<td>3.8”</td>
<td>Monochrome</td>
<td>Landscape with I/O</td>
<td>1</td>
<td>CR 1056</td>
</tr>
<tr>
<td>Basic Display</td>
<td>2.8”</td>
<td>Color</td>
<td>Engine interface and gauge replacement</td>
<td>1</td>
<td>CR 0451</td>
</tr>
</tbody>
</table>

**ifm mobile machine display means quality**

- Standard M12 interface connections
- Ethernet connectivity with FTP server
- 7” High-brightness (350 NIT) display
- WVGA 800 x 480 display resolution
- Backlit programmable soft keys
- Robust aluminum enclosure
- Built-in ISO symbol font library
- Internal 1 Gbyte RAM for data-logging
CANbus I/O modules – a better alternative to complex wire harnesses

- Reduce complex wire harnesses that are heavy, difficult to troubleshoot and add weight to a vehicle
- Decentralized I/O modules connect binary and analog sensors to the controller via CANbus
- Configurable input / output function – baud rate and node number selectable via coding switch or software
- Low-profile design enables easy integration in dashboards, operating panels and mounts outside vehicle
- I/O modules are fitted with M12 connectors for quick integration into the cable harness

Reduce complex wire harnesses with ifm CANbus I/O modules
Traditional wiring with complex harness
• Traditional wiring requires multiple connection points that result in massive wire harnesses
• Wire harnesses are heavy and add extra weight to a vehicle
• Troubleshooting faults can be complex and take a great deal of time
• Vehicle reliability is compromised due to the greater number of connection points.

CANbus network wiring
• CANbus I/O modules improve reliability with fewer connection points
• Wire harness size and weight can be reduced
• Easy troubleshooting and enhanced communication performance
• Faster vehicle production time

CANbus I/O modules – a better alternative to complex wiring harnesses

### Cabinet I/O Modules

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Unique Features</th>
<th>IP Rating</th>
<th>Inputs / Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR 2012</td>
<td>16: 12 inputs (4 analog) 4 outputs</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>CR 2016</td>
<td>16 inputs (4 analog) 16 outputs (4 PWM)</td>
<td>20</td>
<td>32</td>
</tr>
</tbody>
</table>

### Field I/O Modules

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Unique Features</th>
<th>IP Rating</th>
<th>Inputs / Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR 2031</td>
<td>PWM Output Current controlled (4 shared)</td>
<td>67</td>
<td>8</td>
</tr>
<tr>
<td>CR 2032</td>
<td>8 inputs (4 analog), 8 outputs (4 PWM)</td>
<td>67</td>
<td>16</td>
</tr>
<tr>
<td>CR 2033</td>
<td>8 inputs (4 analog), 4 outputs (PWM)</td>
<td>67</td>
<td>12</td>
</tr>
</tbody>
</table>

### Relay Module

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Unique Features</th>
<th>IP Rating</th>
<th>Number of Fuse Connections</th>
<th>Number of Relay Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR 0421</td>
<td>Relay module with fuse contacts (centralized point for wiring and power distribution)</td>
<td>20</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>
CoDeSys IEC 61131-3 programming software

- Easy-to-use software for application programming and configuration setting
- Offers six different programming languages for editing
- Modular code enables quick and easy project development
- Code can be re-used and exported to other projects reducing development time
- Powerful interfaces and integrated graphics for I/O monitoring, sampling trace and easy maintenance
- Built-in network configurator simplifies CAN setup
- Simulation mode for simplified off-line tests

CoDeSys software offers flexibility in programming languages for all levels of expertise

- **Ladder diagram (LD)**: Ladder Diagram is also a graphical editor that connects coils and contacts, and creates a circuit diagram.
- **Function block diagram (FBD)**: Function Block Diagram is a graphic-based language which allows for fast and easy programming.
- **Continuous function chart (CFC)**: Continuous Function Chart is very similar to function block diagram, however it is more flexible and allows program elements to be placed anywhere on-screen.
- **Sequential function chart (SFC)**: Sequential Function Chart is ideal for process applications where actions occur in a chronological order.
- **Structured text (ST)**: Structured Text is a high level text-based language.
- **Instruction list (IL)**: Instruction List is an assembler-like language.

Ifm has the know-how to support your software engineers. From training to commissioning, we are close to you!
ifm has created several libraries that include common function blocks to aid in project development

Sample software screen

PDM display screen using the J1939 function block in the program.

Example of ifm function block as seen in program.
Our mobile team will help ensure a successful project!

Audit your current controls architecture and give clear advice on options for your specific application.

Offer engineering support during the design phase.

Arrange on-site ifm commissioning support during prototype startup.

Provide technical support during validation testing.

Conduct training for your engineering, service and production teams.

Make recommendations to reduce production time and total install costs.

ifm facts
ifm has more than 70 subsidiaries located in all major countries. Our international network of 3500 employees serve more than 90,000 customers worldwide with annual global sales exceeding $600 million USD.

Global network, local focus
Whether you ship your mobile machines internationally or have manufacturing plants all over the world, you can count on local ifm support worldwide.

Investment in R&D
ifm makes large investments in R&D and employs over 400 development engineers. The ifm R&D team has more than 500 registered ifm patents and has received multiple awards for innovation and breakthrough technologies.

Reliable products, innovative design
Designing new products that increase your market competitiveness is a core belief of our company. We apply advanced technology and use innovative manufacturing techniques in our products to improve the performance and reliability of your mobile equipment.

Commitment to quality
The ifm new product development process incorporates specific testing for mobile controls to withstand extreme environments. ifm’s mobile controls are encased in robust, completely sealed IP67 housings and withstand high levels of shock, vibration, EMI, dirt and temperature extremes.

Lean manufacturing, short lead time
On-time delivery and accuracy of your order is ifm’s commitment to our customers. There can be no compromises when it comes to the uptime of your mobile machines. With a shipment accuracy rate of 99.8%, our reliable logistics team can meet your just-in-time mobile controls needs.

Reliable service from a dedicated team
ifm’s team of dedicated employees has one common goal: to be your premier technology partner for mobile controls. How does ifm offer you products with great performance, quality and value? Simply because you’re dealing with the manufacturer. Let the ifm team exceed your expectations.

Your ifm mobile specialist:

Get to know us.
Call 800-441-8246
or visit www.ifm.com/us

Visit our Mobile Forum:
mobilecontrols.ifmefector.com

Email Support:
ecomatmobile.support.us@ifm.com