

ENOVATION CONTROLS®



Great
Place
To
Work.

Certified

MAY 2021-MAY 2022

USA

CONFIDENTIALITY

- Confidential information, intellectual property and innovative ideas are valuable assets of Enovation Controls and should not be disclosed
- Sensitive information must be reserved for business purposes only
- U.S. Securities Laws prohibit individuals who are in possession of material non-public information concerning a public company from purchasing or selling or helping others



WE EXIST TO CONQUER COMPLEXITY

CLEAR A PATH

TO CATALYZE OUR CUSTOMERS' SUCCESS

We fearlessly engage in any effort to eliminate our customers' risk and clear a path to their success. We immerse ourselves in our customers' world, reveal unknowns and deliver integrated solutions.

QUESTION EVERYTHING

TO CULTIVATE EXCELLENCE

We embrace a sense of healthy paranoia in which quality and performance must be proven and never assumed. We constantly ask "What have we missed?" We hold each other accountable to the highest standards and will not rest without resolution.

ENRICH LIVES

TO UNLEASH POTENTIAL

We strive to laugh often and find meaning in our individual and collective efforts. We attract, develop and recognize exceptional people and inspire them to be their best at home, at work and in our communities.

BE RELENTLESS

TO WIN

We are tenacious, tireless and never discouraged in the pursuit of our goals. When we encounter roadblocks, we intensify our focus to break through. We relentlessly strive for perfection to drive flawless execution.

CHALLENGE CONVENTION

TO CHANGE THE GAME

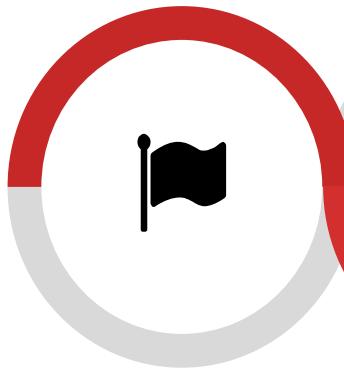
We step back to question assumptions, capture the learning and embrace new perspectives. We ask "Are we solving the right problem?" We skillfully leverage our expertise and platforms to rapidly generate solutions that separate us from the competition.

DO THE RIGHT THING

TO LIVE IN INTEGRITY

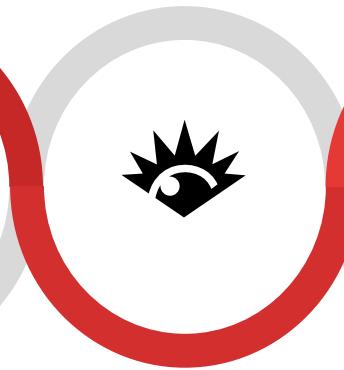
We treat everyone with respect and foster a culture of humility and trust. We humbly own what is perfect and what is flawed. Honesty, hard work and fairness are central to everything we do.

BRIEF COMPANY HISTORY



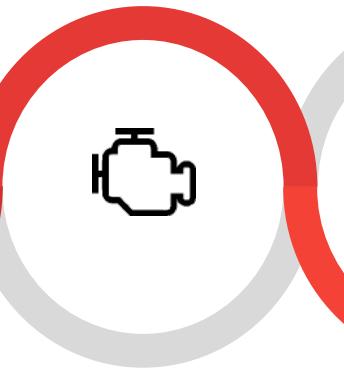
1939 ESTABLISHED

FW Murphy Manufacturing was founded by Frank W. "Pat" Murphy in his home in Mt. Carmel, Illinois.



2003 FIRST POWERVIEW DISPLAY

Our PV101 was an industry-leading J1939 CAN display that blazed the trail for our modern display offerings.



2012 FIRST POWERCORE CONTROLLER

We released the MPC-20, the first PowerCore Controller.



2016 ACQUISITION

Helios Technologies acquired Enovation Controls' Power Controls and Vehicle Technologies business units.



2021 NAMED A BEST WORKPLACE

Listed on FORTUNE® magazine's Best Workplaces in Manufacturing and Production two years in a row.

HELIOS TECHNOLOGIES PORTFOLIO



Enovation Controls is a subsidiary of Helios Technologies and provides system solutions under 3 brands. It is joined by Balboa Water Group, Sun Hydraulics, Faster Group, NEM S.r.l. and others.



Electronic Displays,
Controls & Instruments



Electronic Controls,
Spa & Bath Products



Hydraulic & Electro-Hydraulic
Valves & Manifolds



Hydraulic Connections
& Multi-Connector
Solutions

ENOVIATION CONTROLS FAMILY OF BRANDS

MURPHY[®]

by **ENOVIATION CONTROLS**



Rugged Electronic Monitoring
& Control Solutions

HCT

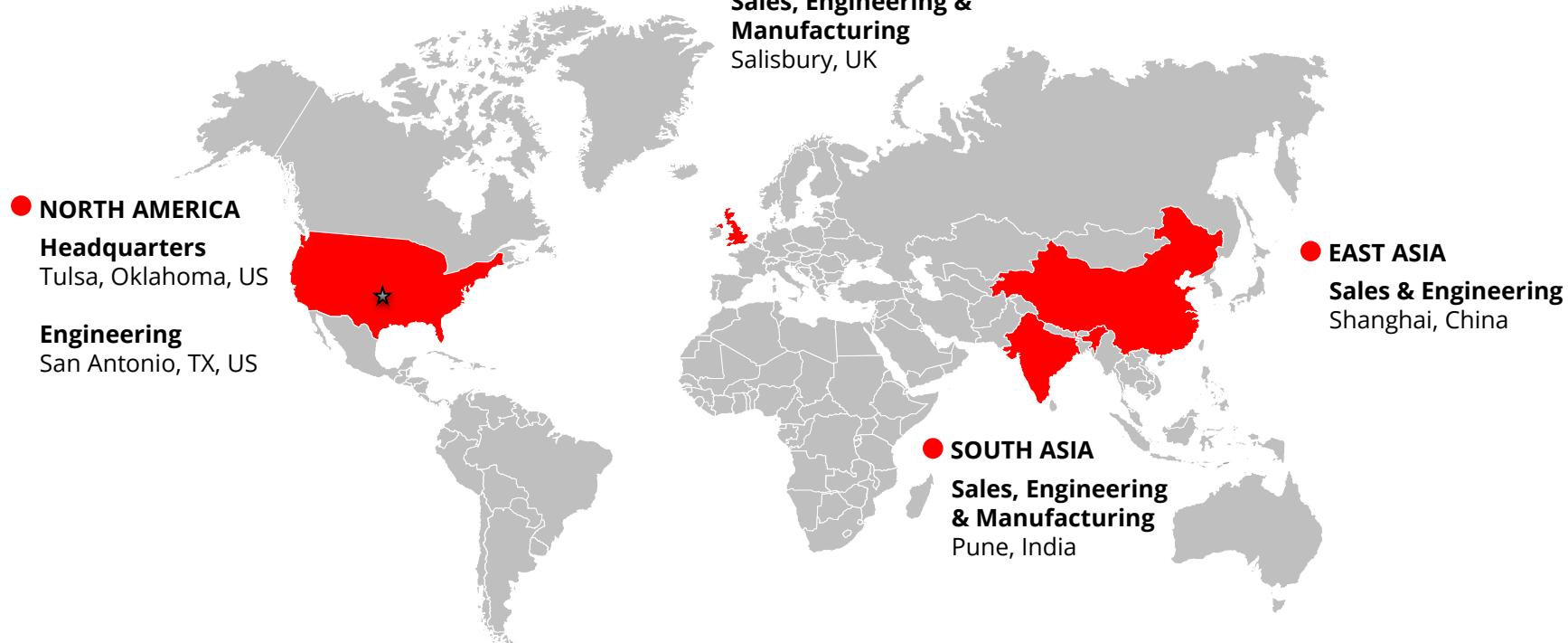
by **ENOVIATION CONTROLS**



Hydraulic and Fan Control
Solutions

LOCATIONS AROUND THE WORLD

We are a proud American corporation with sales, R&D, application engineering and manufacturing facilities around the world.



MARKETS WE SERVE



Off-Highway
Equipment & Vehicles



Recreational
& Commercial Marine



On-Road
Recreational Vehicles



Off-Road
Speciality Vehicles



Industrial &
Mobile Equipment



Agriculture &
Water Pumping



Material Handling



Engine Manufacturers

CUSTOMER SNAPSHOT

We take pride in our loyal, long-term partnerships with Fortune Global 500 companies across multiple markets.



WHY ENOVATION CONTROLS?



PRODUCTS WE MAKE



HMI/PLC
Displays &
Infotainment



Engine & Mobile
Machine Controllers



Mobile Hydraulic
Machine Controllers



Integrated
CAN I/O



Gauges and
Instrumentation



Engine Control
Panels



Equipment Sensors,
End Devices & Actuators



Battery Chargers

Innovative displays, instruments and controls for engines, driven equipment and specialty vehicles.

THE FULL SERIES OF POWERVIEW® DISPLAYS

Edge-to-Edge
Color Displays

PV1200



PV1100



PV700



PV500



Tactile-Button
Color Displays

PV780B



PV485



PV450



Monochrome
Displays

PV380



PV350



PV101



Industry leading durability and environmental protection



Best-in-class, glare-free sunlight visibility



Touch screens available
(on some models)



Programmable with
PowerVision Configuration Studio®

EDGE-TO-EDGE DISPLAYS COMPARED



	PV1200	PV1100	PV700	PV500
Screen Size	12.3 inches (320 mm x 130 mm)	10.6 inches (231.36 mm x 138.82 mm)	7-inches (178 mm)	5-inch (108 mm x 64.8 mm)
Resolution	1280 x 480	1280 x 768 (WXGA)		800 x 480 (WVGA)
Processor		Dual-core CPU @ 1.5 GHz		Dual-core CPU @ 1.0 GHz
Communications			(2) CAN 2.0B	
Video	(3) NTSC/PAL Single-Channel Viewable		(4) NTSC/PAL Dual-Channel Viewable	(2) NTSC/PAL Single-Channel Viewable
Inputs		(3) Analog, (5) Digital, (1) Frequency		(1) Analog, (2) Digital
Outputs		(1) Digital, (1) Frequency		(2) Digital

COLOR TACTILE-BUTTON DISPLAYS COMPARED



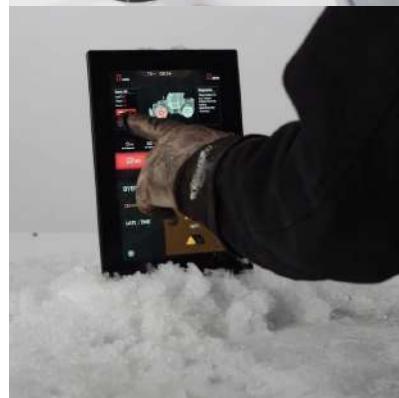
	PV450	PV485	PV780B
Screen Size	4.3-inches (109.22 mm)		7-inch (177.8 mm)
Resolution	480×272 (WQVGA) with 16-bit color		800×480 (WVGA) with 24-bit color
Processor	CPU @ 532MHz		Dual-core CPU @ 1.5 GHz
Communications	(2) CAN 2.0B Optional NMEA 2000 isolation	(1) CAN 2.0B (1) RS-485	(2) CAN 2.0B
Video	(2) NTSC/PAL Single-Channel Viewable	-	(3) NTSC/PAL Single-Channel Viewable
Inputs	(1) Analog	(6) Analog (3) Digital (1) Frequency	(3) Resistive Analog (5) Digital (1) Frequency
Outputs	(1) Digital	(4) Digital, (1) Analog	(1) Digital, (1) Frequency

MONOCHROME TACTILE-BUTTON DISPLAYS COMPARED



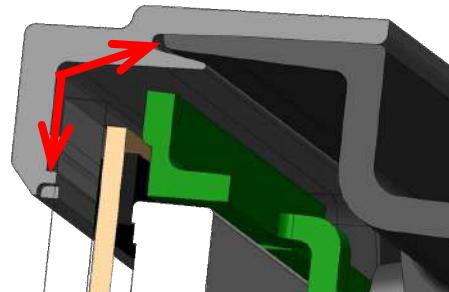
	PV350	PV380
Screen Size	3.8-inch (97 mm) monochrome LCD screen	
Resolution	320 × 240 (QVGA)	
Processor	CPU @ 168MHz	
Communications	(2) CAN 2.0B Second port is NMEA 2000 isolated	(1) CAN 2.0B (1) RS-485 serial
Inputs	(1) Resistive Analog <i>Backlight Control</i>	(4) Resistive Analog (3) Analog (1) Frequency
Outputs	(1) Digital	(2) Digital

KEY DIFFERENTIATOR – RUGGED PROTECTION

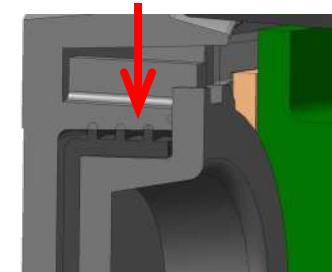


- Rated Up To **IP69K**
- Wide Operating Temperatures
- Dispensed RTV Wet Seal (lens, front, and back housing)

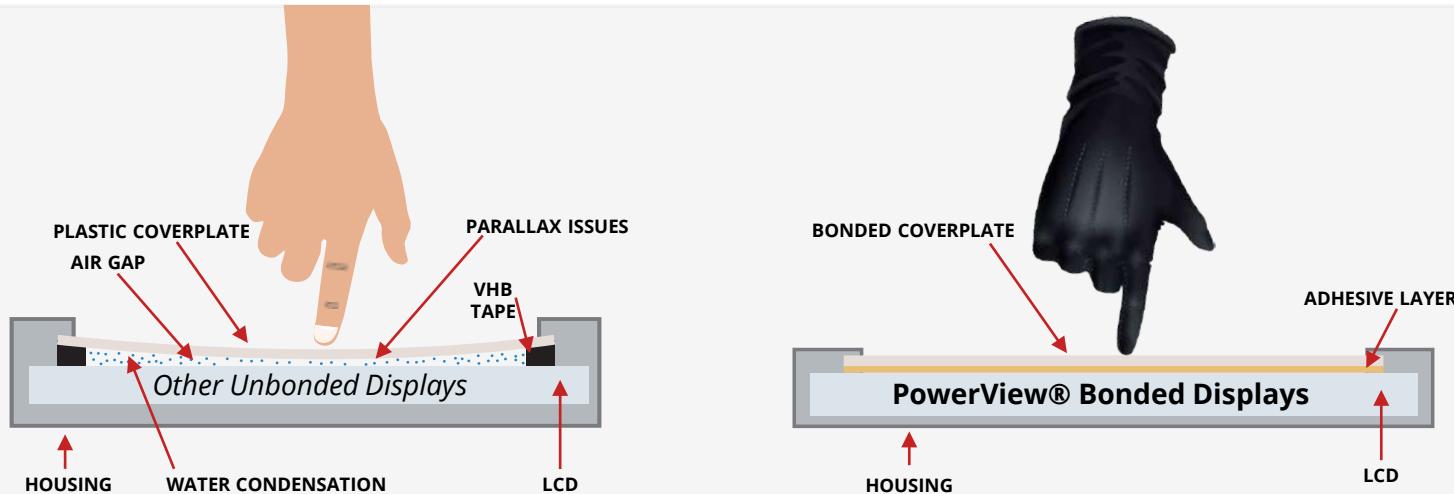
RTV SEAL



SILICON KEYPAD WITH RADIAL SEAL DESIGN



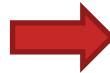
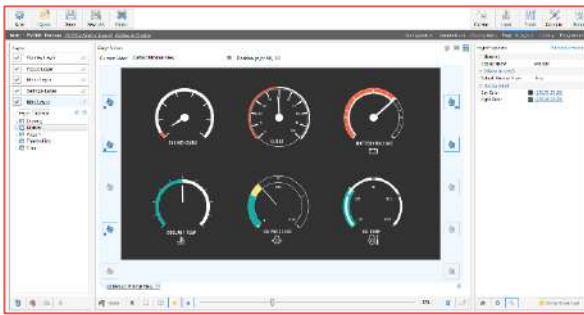
KEY DIFFERENTIATOR – MODERN LCD TECHNOLOGY



- Optically bonded lens improves sunlight viewability and eliminates lens fogging
- Bonding process provides increased protection of LCD and lens from shock/vibration
- Glass lens has superior scratch resistance over plastic
- Acid-etched Anti-Glare (AG) reduces perceived reflection and does not degrade or wash off
- Projected capacitive touch* with water rejection and gloved hand functionality prevents false touches
- Multi-touch capable* for fluid gesture control

* ON COMPATIBLE TOUCH DEVICES

POWERVISION CONFIGURATION STUDIO® SOFTWARE



Features and Benefits

- Allows for custom software configurations to be developed quickly
- Common development environment to easily move configuration from one hardware platform to another
- Programming logic using state machines and scripting
- Built in applications for data logging, machine hours, and external radio head control
- Direct connection to displays for reprogramming using USB interface
- Drag-and-drop page designer and programming interface
- Supports 10+ languages

MOBILE HYDRAULIC CONTROLLERS

uControl™ MOBILE CONTROLLERS

Get the most out of any application with rugged, powerful, flexible and precise controllers.



MODEL	MC2-18-6	MC3-21-10	MC4-26-20	MC4-21-14-H8
TOTAL INPUTS	18	21	26	21
TOTAL OUTPUTS	6 (4A)	10 (4A)	20 (4A)	14 (4A) + 8 (15A)
CAN (2.0B, J1939)	2 Channels	3 Channels	3 Channels	3 Channels
SENSOR SUPPLY	1 Supply	1 Supply	2 Supplies	2 Supplies



Easily Scale Up or Down Between Controllers



Universal Inputs & Flexible Proportional Outputs



Expand Equipment Control With Available High-Current Option

MOBILE CONTROLLERS

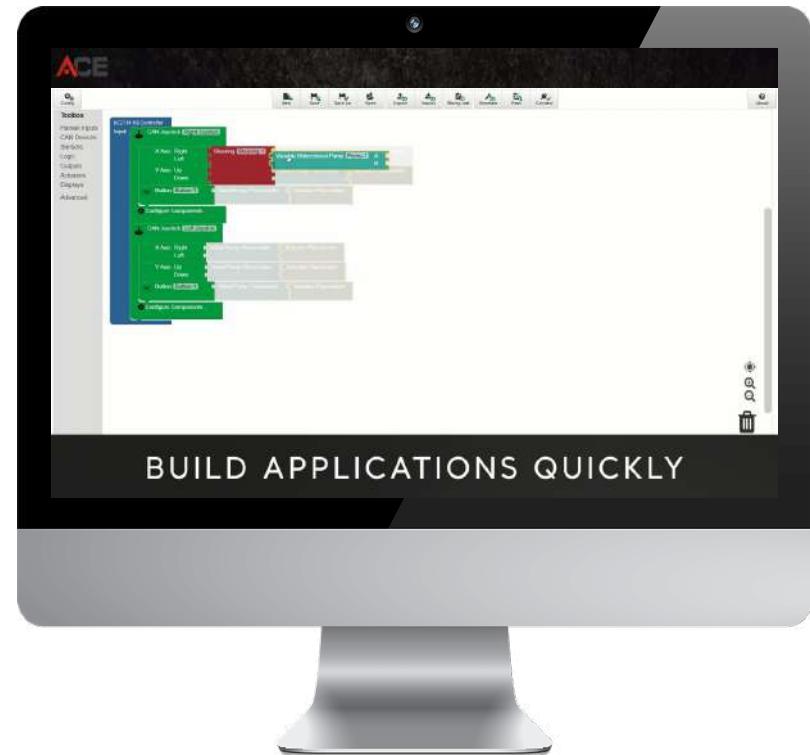
uControl™ Programming Options

ACE (POWERED BY ENOVATION CONTROLS)

- Designed for system experts with little to no software coding experience
- Easy-to-learn and quick to use, users visually compose a system using drag-and-drop function blocks, devices, and logic.

CODESYS

- Focused development system for mid-sized OEMs with internal development teams
- Customer develops apps with our support



CONFIGURABLE CONTROLLERS & PANELS

POWERCORE® CONTROLLERS

Flexibility, power and control are at your fingertips with the Murphy PowerCore lineup.



Multipurpose engine controllers



User programmable from the controller

PowerCore controllers are also available on MurphyLink panels.



RESOURCE COMPARISONS



	MPC-20	MPC-10 / TEC-10	
Analog Input	(8)	(3)	Resistive, 4-20mA, 0-5V, Digital Ground
Digital Input	(6)	(5)	Battery Positive, Ground or Open
Freq. Input	(1)	(1)	Alternator or Mag pick-up
Relay Outs	(6)	(3)	10A SPDT
FET Outs	(2) 2 amp (+) (2) 1 amp (-) (2) 5V 200mA (1) 0-5VDC	(2) 1 amp (+) (2) 1 amp (-) (1) Alt Excite	0-5VDC on MPC-20 for Throttling
CAN Ports	(2)	(1)	Software Controlled Terminating Resistor. Config Load using Ecom Device.
RS485 Port	(1)	(1)	Telemetry, Scada, Up to (8) PVA Gauges
USB Port	(1)	(1)	For loading Configurations. Not on TEC-10

INTEGRATED CAN I/O & POWER DISTRIBUTION



GPS ANTENNA

- High update rate for more accurate location
- Quick boot up from cold or warm
- Easily integrates into NMEA 2000
- IP67 case sealing

XMX500

- General purpose CAN I/O
- Configurable via software programming tool
- Inputs: 4 digital, 7 analog (or extra digital), 1 speed, 1 thermocouple
- Outputs: 2 digital (sinking, 500mA)
- IP65 case sealing

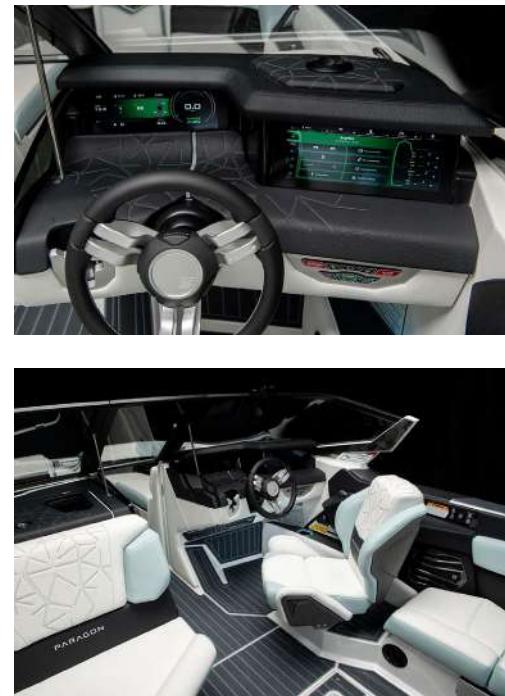
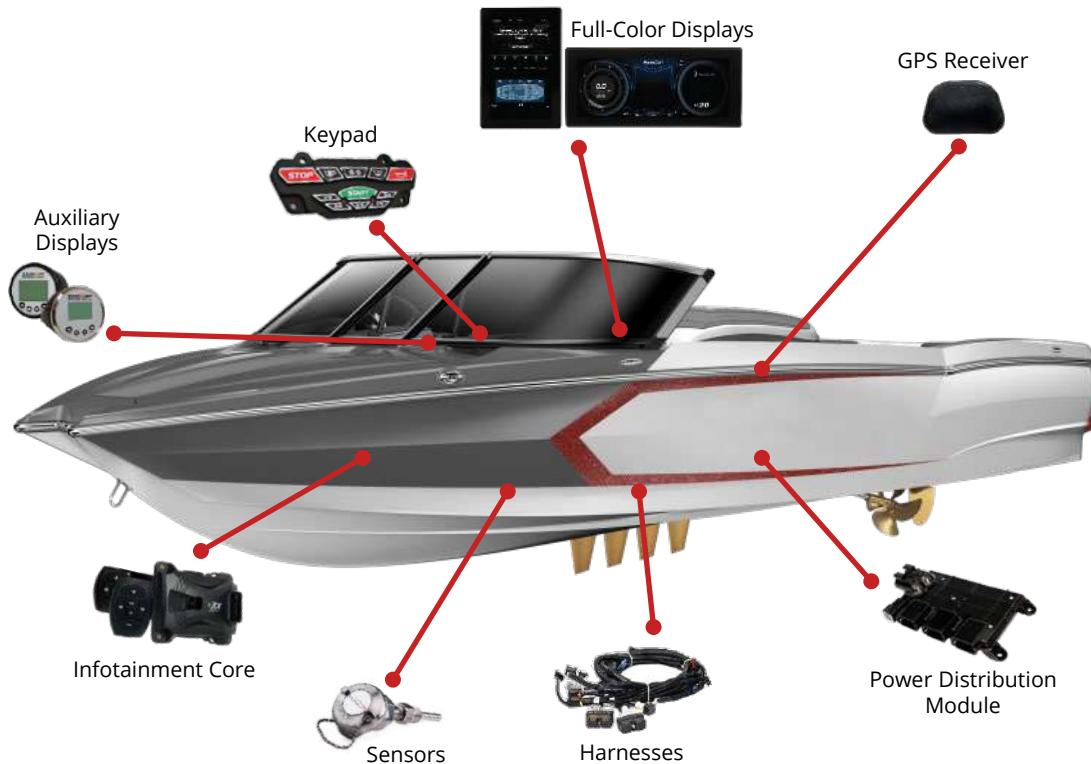
SenderCAN™, MeCAN™ and FuelCAN

- Up to 4 inputs & 2 outputs
- Compact case for surface or in-harness mounting
- SenderCAN is customized to volume OEM requirements
- Standard MECAN models for mechanical engine senders/switches and magnetic pickups
- Standard FuelCAN model for fuel level senders

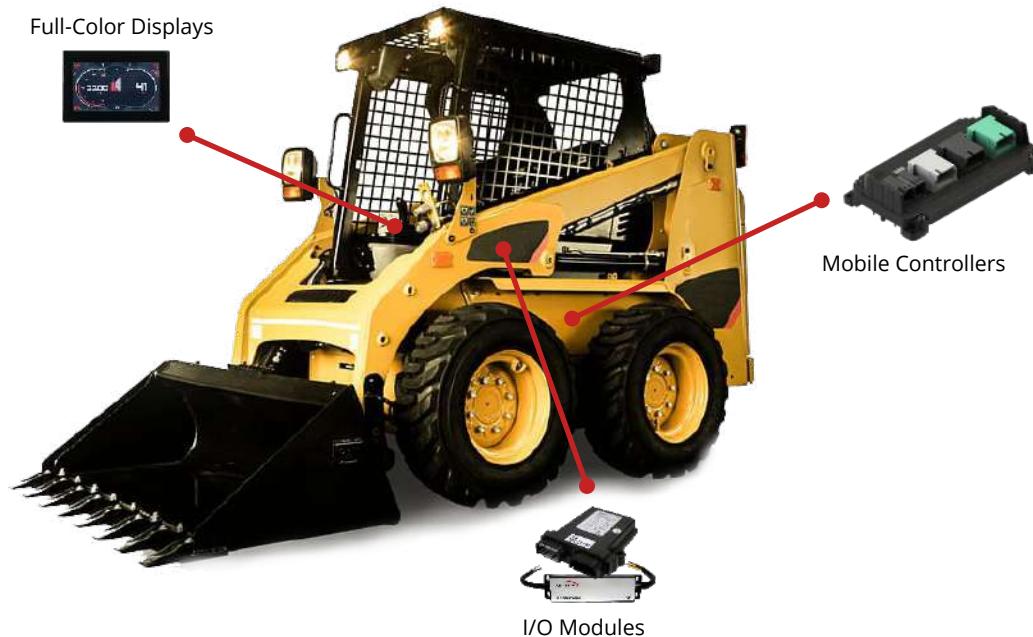
IX3212 Power Distribution Module

- Simple way to integrate multiple switches and sensors into display with CAN J1939 Communications
- 12V or 24V
- 12 High-Power Outputs (15A) with configurable current limits, PWM, soft-start & H-bridge motor control
- 8 Analog Inputs and 8 Digital Inputs
- Class-leading environmental sealing, temperature and shock/vibration specs

SYSTEM SOLUTIONS – RECREATIONAL MARINE



SYSTEM SOLUTIONS – OFF-HIGHWAY



SYSTEM SOLUTIONS – OFF-HIGHWAY



SYSTEM SOLUTIONS – OFF-HIGHWAY



ENGINEERING CAPABILITIES – QUALITY & TESTING

IN-HOUSE PRODUCT TEST EQUIPMENT

- Thermal Chambers
(temperature and humidity,
Thermotron & Test Equity)
- Vibration Table +
Dynamic Signal Analysis
System
(measure vibration profiles)
- HALT Chamber
- High Pressure Washer
- (5,000 psi)
- Vacuum Bell
- Mechanical Drop Fixture
- IP-67 Tester
- UV Tester
- EFT/Surge Tester
- TEM Cell (Radiated Immunity)
- Load Dump
- ESD Tester



IN-HOUSE FABRICATION EQUIPMENT

- 3D Printer
- CNC Milling Machines
- Fully Equipped Machine Shop
- Sheet Metal Fabrication
- Powder Coat Booth



FM 28221 (Tulsa, OK - USA)
FM 29422 (UK)

QUALITY POLICY

At Enovation Controls we delight our customers by exceeding their expectations in quality, reliability, and service. We provide implicitly trusted products worldwide, and support our employees through continuous development and training in the pursuit of never-ending improvements in quality.



FM 28221 (*Tulsa, OK - USA*)
FM 29422 (*UK*)





MURPHY®

by **ENOVATION** CONTROLS

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THANK YOU

POWERVIEW 1200

The Murphy PowerView 1200 packs power and viewability in an ultra-wide display.

- Largest color display in the PowerView line at 12.3 inches
- High-speed processor and 8GB of internal storage
- Glass display surface offers enhanced clarity and strength
- Available with or without touch

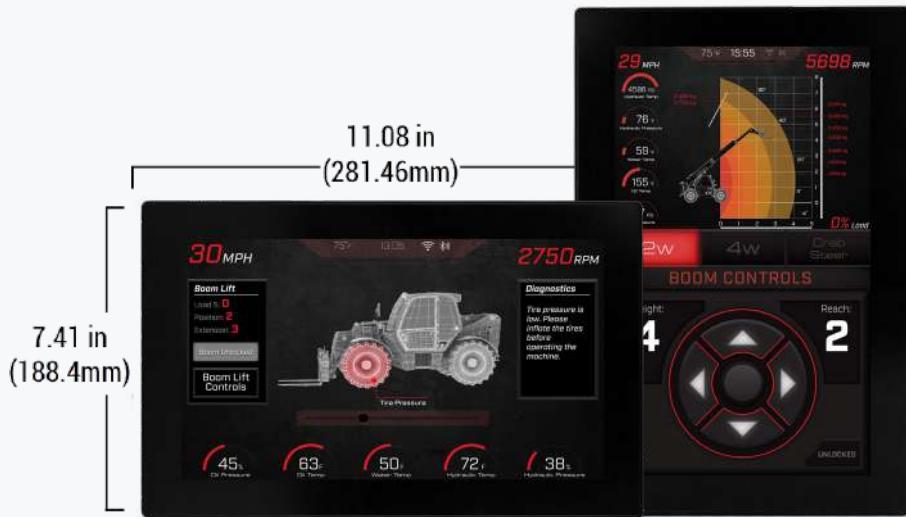


- All Weather
- Sunlight Visible
- Great for In-Cab
- Engine Monitoring
- Glove-Friendly
- Touch Capable
- Gauge Replacement
- Video Input
- Programmable

POWERVIEW 1100

The Murphy PowerView 1100 display streamlines size and speed in a single display.

- 10.6-inch color display available in portrait and landscape orientations
- High-speed processor and 8GB of internal storage
- Highest resolution PowerView display (1280x768)
- Bonded glare-free LCD screen with high-brightness for superior visibility in sunlight



All Weather



Sunlight Visible



Great for In-Cab



Engine Monitoring



Programmable



Gauge Replacement



Video Input



Glove-Friendly



Touch Capable



ENOVATION CONTROLS

POWERVIEW 700

The Murphy PowerView 700 packs power and viewability in a compact display.

- 7-inch display with rich color graphics
- IP69K-rated enclosure for harsh environments
- Connect four video inputs and watch two feed simultaneously
- Glass display surface offers enhanced clarity and strength



All Weather



Sunlight Visible



Great for In-Cab



Engine Monitoring



Programmable



Gauge Replacement



Video Input



Glove-Friendly



Touch Capable



ENOVATION CONTROLS

POWERVIEW 500

The Murphy PowerView 500 packs power and versatility in an ultra-small footprint.

- Optically-bonded 5-inch color display designed for harsh environments
- High brightness screen for full sunlight viewability
- Glass lens offers enhanced clarity and strength



- All Weather
- Sunlight Visible
- Great for In-Cab
- Engine Monitoring
- Glove-Friendly
- Touch Capable
- Gauge Replacement
- Video Input
- Programmable

POWERVIEW 780B

The Murphy PowerView 780B display provides power and reliability with an easy-to-read interface.

- 7-inch display featuring rich color graphics
- 10 tactile configurable soft keys with white LED blacklight
- High-speed processor and 8GB of internal storage.
- Available in touch and non-touch models



All Weather

Sunlight Visible

Great for In-Cab

Engine Monitoring

Programmable

Gauge Replacement

Video Input

Glove-Friendly

Touch Capable

POWERVIEW 485

The Murphy PowerView 485 is an all-in-one color display and controller designed to meet the needs of modern electronic engines and equipment applications.

- 4.3-inch display featuring rich, color graphics
- 5-tactile configurable soft keys
- Customizable I/O with RS485 serial connection
- Optically-bonded glare-free LCD screen for superior visibility in sunlight



All Weather



Sunlight Visible



Great for In-Cab



Programmable



Gauge Replacement



Engine Monitoring



Glove-Friendly



POWERVIEW 450

The Murphy PowerView 450 features a rich features set and full customization in a compact size.

- 4.3-inch display featuring rich, color graphics
- 8-tactile configurable soft keys
- Customizable bezel, I/O interface and more
- Optional NMEA 2000 isolation
- CSA PV450 version available
(Class I Div 2 Groups B, C & D)



All Weather



Sunlight Visible



Great for In-Cab



Engine Monitoring



Gauge Replacement



Video Input



Glove-Friendly



Programmable



POWERVIEW 380

The Murphy PowerView 380 is a robust, multifunction display for advanced monitoring of electronic engines and mechanical engines.

- Easy-to-read 3.8-inch (97 mm) QVGA monochrome LCD screen
- User-configurable for out-of-the-box use
- Setpoint alarm and shutdown control
- Equipped with five tactile push buttons to quickly access a convenient menu



All Weather



Sunlight Visible



Great for In-Cab



Programmable



Gauge Replacement



Engine Monitoring



Glove-Friendly



POWERVIEW 350

The Murphy PowerView 350 is a robust, multifunction display for advanced monitoring of electronic engines with an NMEA 2000 isolated CAN port.

- Easy-to-read 3.8-inch (97 mm) QVGA monochrome LCD screen
- Customizable using the PowerVision Configuration Studio® software
- Equipped with five tactile push buttons to quickly access a convenient menu



All Weather

Sunlight Visible

Great for In-Cab

Programmable

Gauge Replacement

Engine Monitoring

Glove-Friendly



ENOVATION CONTROLS

CAN COMMUNICATION DEFINED

