

PowerView™ PV450 & PV780 Multi-function colour displays



IX3212 Power Distribution Module CAN system input/output



Presented by
Enovation Controls

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Feature Summary – PowerView™ Displays

- Full colour displays
 - PV780: 7"/178mm, WVGA, 800 x 480 pixel
 - PV450: 4.3"/109mm, WQVGA, 480 x 272 pixel
- Fully sealed, bonded & coated LCD
 - Best-in-class direct sunlight visibility
 - No fogging
 - Day, night & blackout modes
 - Touch control options
- Extensive communication
 - CAN 2.0B: SAE J1939, CANopen, freeform/proprietary
 - USB, RS485, PAL/NTSC video
- Class-leading environmental specs
 - IP67, -40 to +85°C, 7.86G_{rms} vibration, 50G shock
- Flexible mounting
 - Front, back and gimble mount options
- PowerVision Configuration Studio™
 - Full OEM customization of graphics & data display, CAN messaging, fault warnings/diagnostics, service reminders and multiple user languages



PV780



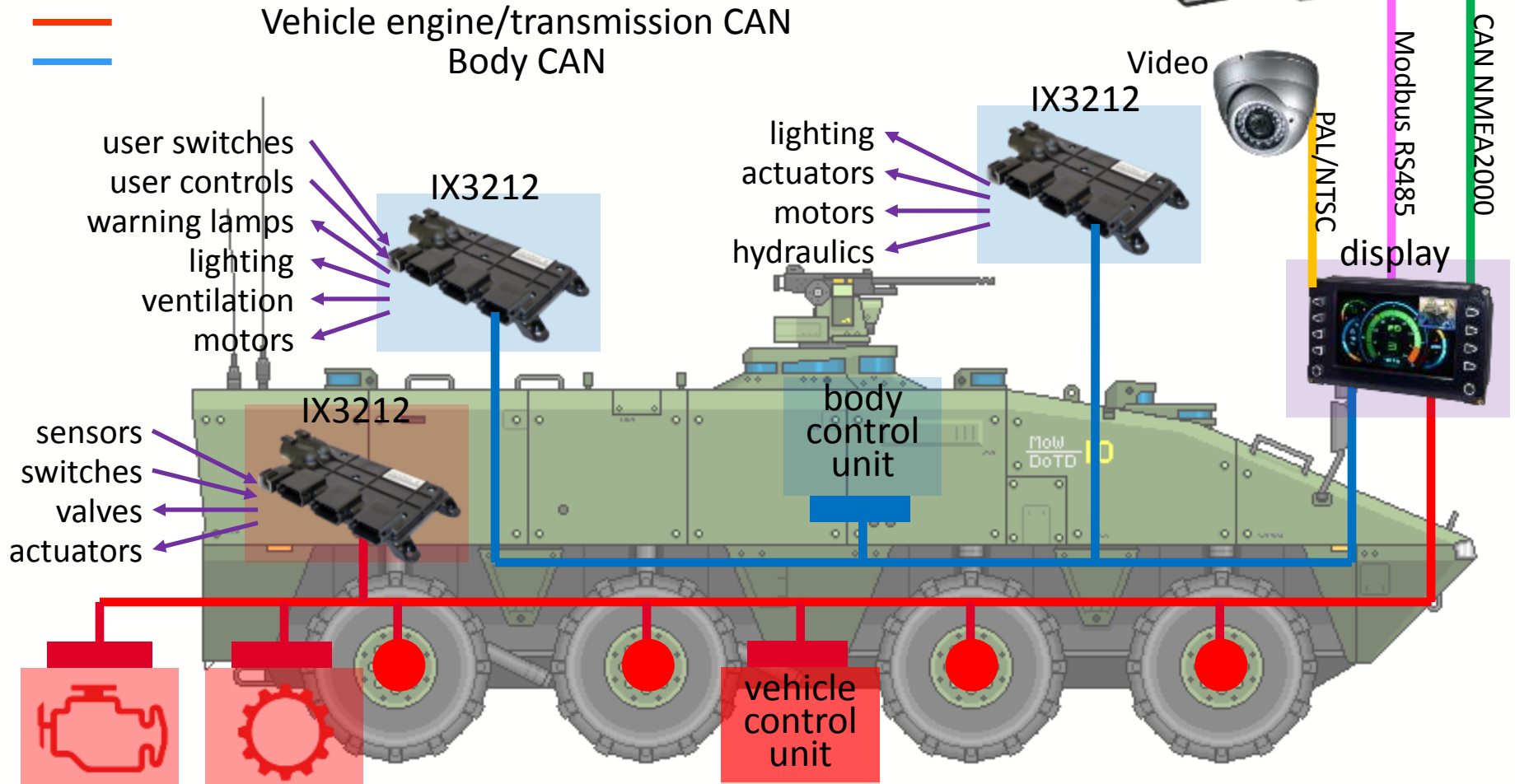
PV450

Feature Summary – IX3212

- Power Distribution Module
- CAN-based input/output
 - Inputs: 8 analogue, 12 digital
 - Outputs: 12 digital/PWM
 - Reduced wiring (4 wire CAN + power)
- High power output ratings
 - 15A per output, 70A total
 - Configurable for high-side, PWM or H-bridge pairs
 - Direct control of lighting, solenoids, actuators, motors/pumps, etc
- Totally solid state
 - No moving relay parts
 - Current limited protection without fuses
 - Increased reliability over electromechanical relay/fuse boards and wiring
- Fully encapsulated
 - Environmentally sealed, -40 to +85°C operation, 5-25G/30G vibration/shock
- Fully configurable
 - Flexible, expandable, updatable I/O programming
 - Typically configured and controlled from a PowerView display, using the same PowerVision Configuration Suite™ software tool



Total System Integration



PowerView™
PV450 & PV780
Multi-function colour displays





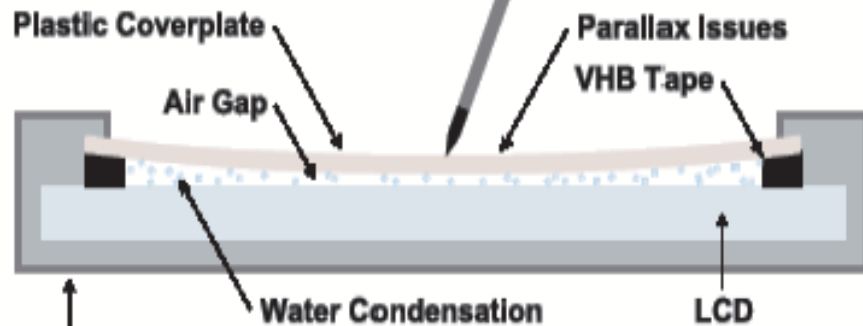
LCD & HMI

	PV450	PV780
Size (diagonal)	4.3 in. / 109 mm	7.0 in. / 178 mm
Resolution, pixels	480 x 272, WQVGA	800 x 480, WVGA
Aspect ratio	16:9	
Colour	16 bit	
Backlight	LED, 500 - 650 cd/m ² , 30000 h life	LED, 1000 cd/m ² , 40000 h life
Viewing angle	horizontal ± 65°, vertical +55°/-65°	
Full bonding	✓	✓
Optical coating	✓	✓
Touch screen	Optional	Optional
Tactile user keys	8, backlit	10, backlit

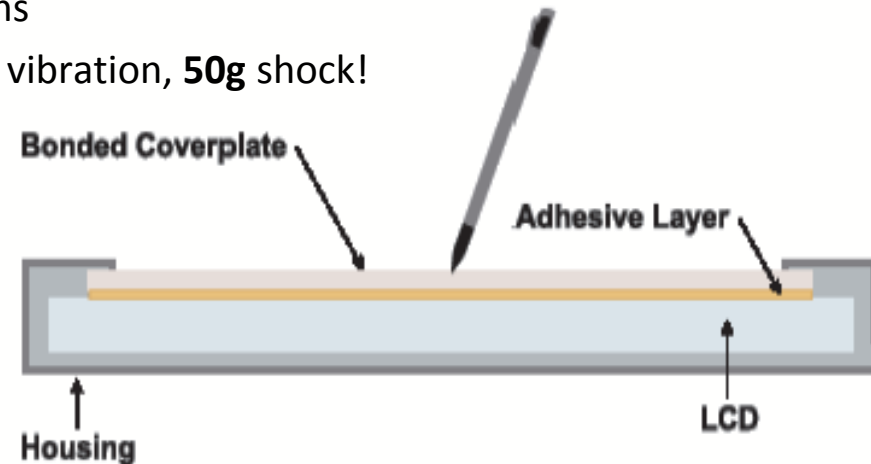
LCD Bonding

PowerView displays are bonded in a state-of-the-art, dust-free chamber at our factory. This gives us direct influence over quality and control standards and provide our customers with the following benefits:

- Optical coupling using an adhesive layer
- Elimination of an air gap between LCD and cover plate
- Allows more backlight to transmit through the LCD
- No parallaxing or fogging
- Reduced reflections
- Exceptional, ultra-bright viewability in direct sunlight
- Improved clarity in low light & night mode conditions
- Increased durability and ruggedness: **7.86g** random vibration, **50g** shock!



Non-Bonded LCD



Bonded LCD



Processor/Memory

	PV450	PV780
Microprocessor	Frescale i.MX357 32 bit, 532 MHz, ARM11 core	
Operating system	QNX® realtime	
RAM	128 MB DDR2 SDRAM	128 MB SRAM
Flash	256MB, expandable to 8 GB	2GB total, 1 GB available for data logging
SD card slot		✓
Real time clock, Li-ion backup	✓	✓
Operating voltage	6 – 32 VDC	6 – 36 VDC



Communications, Input, Output

	PV450	PV780
Supply voltage	6 – 32 VDC, load dump & reverse polarity protected	6 – 36 VDC, load dump & reverse polarity protected
CAN 2.0B ports	(2)	
CAN protocols	SAE J1939, CANopen, NMEA2000, proprietary/freeform	
RS-485 serial	(1) Modbus master/slave	
USB	(1) USB 2.0 host, full speed	
Video	(2, optional) PAL/NTSC, single channel displayed	(3) PAL/NTSC, single channel displayed
Inputs	(1) analog 0-5V, 4-20mA or resistive	(3) analog 0-5V, 4-20mA or resistive (5) digital, active high (1) frequency, 2Hz – 10kHz
Output	(1) digital, low side	(1) digital, low side (1) frequency, 2Hz – 5kHz

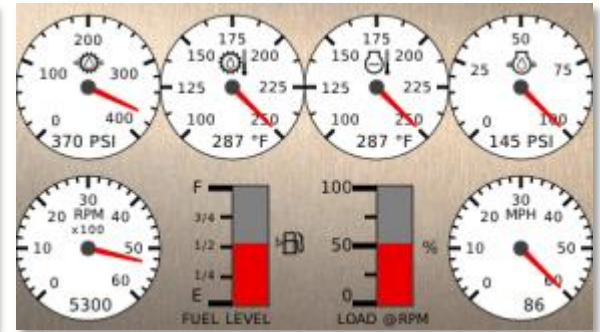


Physical, Environmental

	PV450	PV780
Electrical connectors	4 x Deutsch DT06	2 x AMPSEAL, 23 pin
Dimensions, w x h x d	186.8 x 96.5 x 49.5 mm	247.7 x 158.2 x 65.5 mm
Temperature, operation	-40 to +85°C	
Temperature, storage	-40 to +85°C	
Protection	IP 66 and 67, front and back	
Electromagnetic compatibility	2004/108/EC (EN61000-6-4, EN61000-6-2, EN 501121-3-2, EN12895) J1113/2, 4, 11, 12, 21, 24, 26, 41	
Vibration	7.86 Grms, 5 – 2000 Hz, 3-axis	
Shock	±50 G, 3-axis	

PowerView™ Screen Shots

Stunning, Configurable Graphics



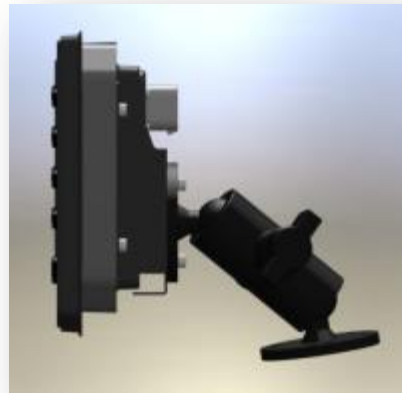
Mounting options

- Front mount with bezel
- Back mount (bezel removed)
- Gimbal mount (PV780)
 - 1.5" RAM mount recommended

Gimbal Kit Contents

- Bracket, Powder Coated
- 4 Screws, for Display
- 4 Screws, for RAM Mount

Does not include RAM Mount



IX3212 Power Distribution Module

CAN system input/output





Overview

What is the IX3212?

- Control Area Network (CAN) SAE J1939 based I/O module
- Solid state technology: no moving parts
- Replaces relay and fuse-based power distribution
- 12 or 24 VDC supply
- 12 Digital inputs (HS & LS on each input pin allows up to 24 digital in).
- 8 Analogue inputs, 10 bit resolution:
0 – 5 V standard, other options for high volume.
- 12 High current outputs:
15 A each, max 70 A simultaneous, H-Bridge on output pairs is possible
- Class-leading environmental protection



Overview

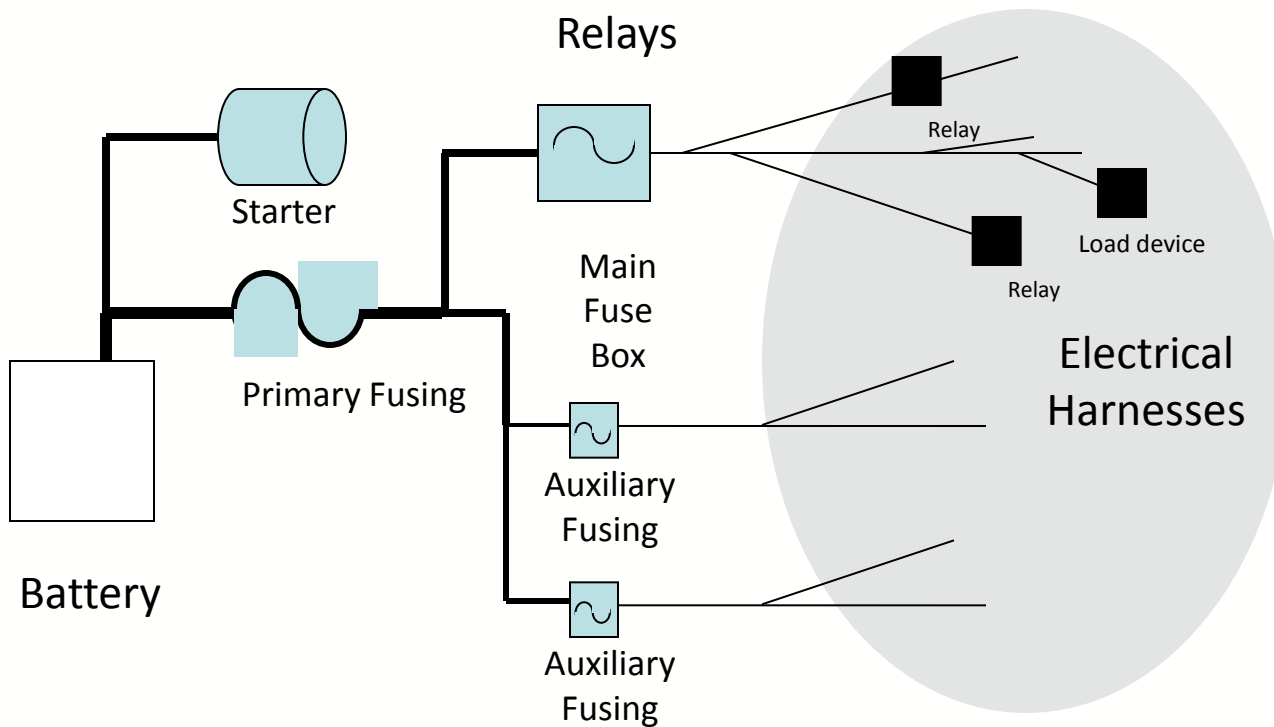
How is it used?

- IX3212 is configured via standard SAE J1939 Proprietary A messages
e.g. from a PowerView display, using setup from PowerVision Configuration Suite™
- Outputs are commanded via standard SAE J1939 Proprietary A messages
- Input data used to generate standard SAE J1939 Proprietary A messages
(transmit rate is configurable)
- Normally used in conjunction with a display, controller or other device capable of performing logic and sending/receiving CAN messages



Existing solutions

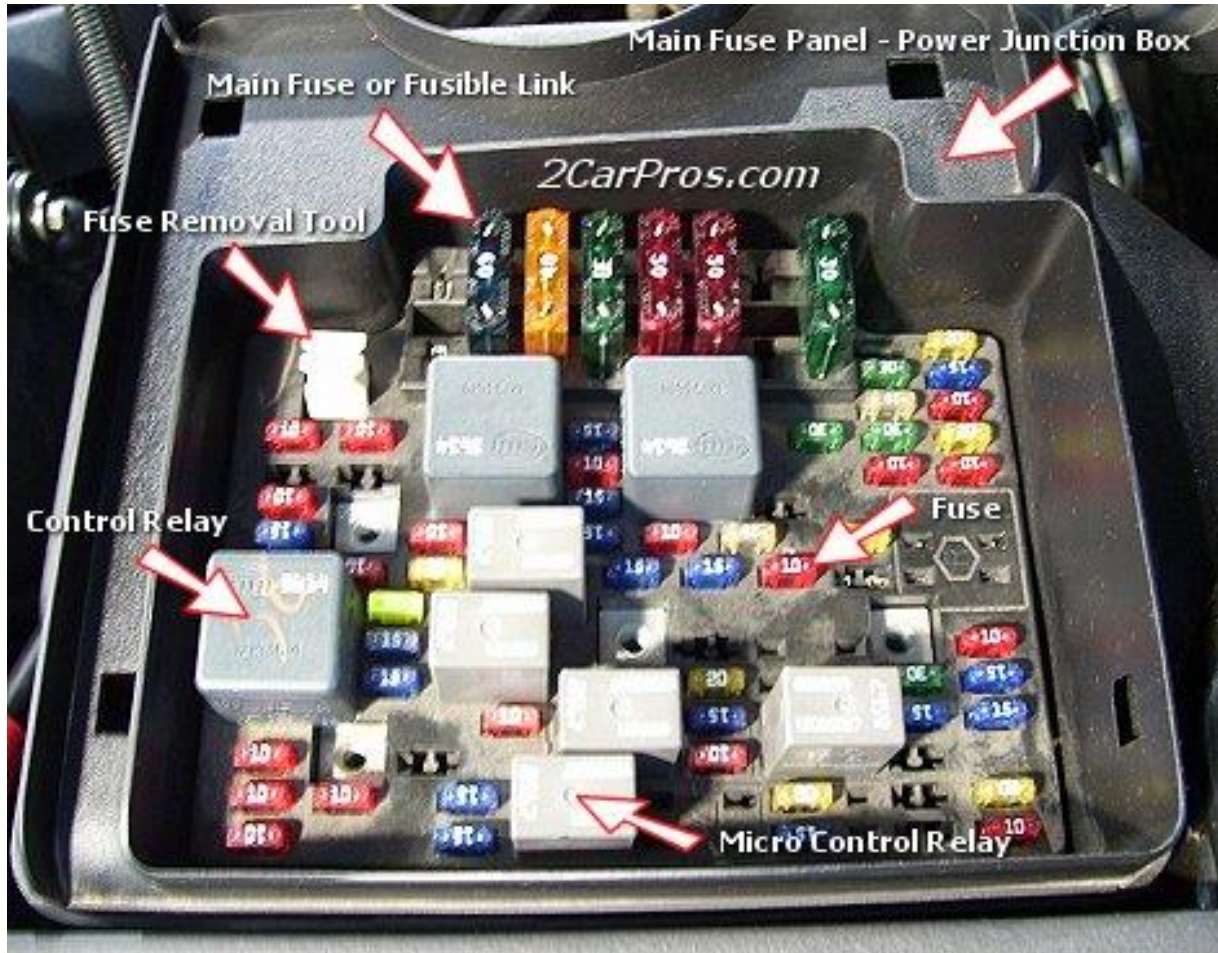
Traditional Power Distribution





Existing Solutions

Relay/fusebox derived

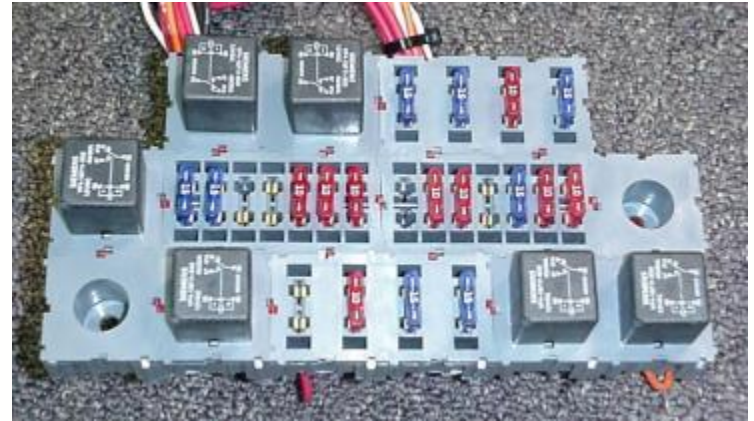




Existing Solutions

Hard Wired Module Method

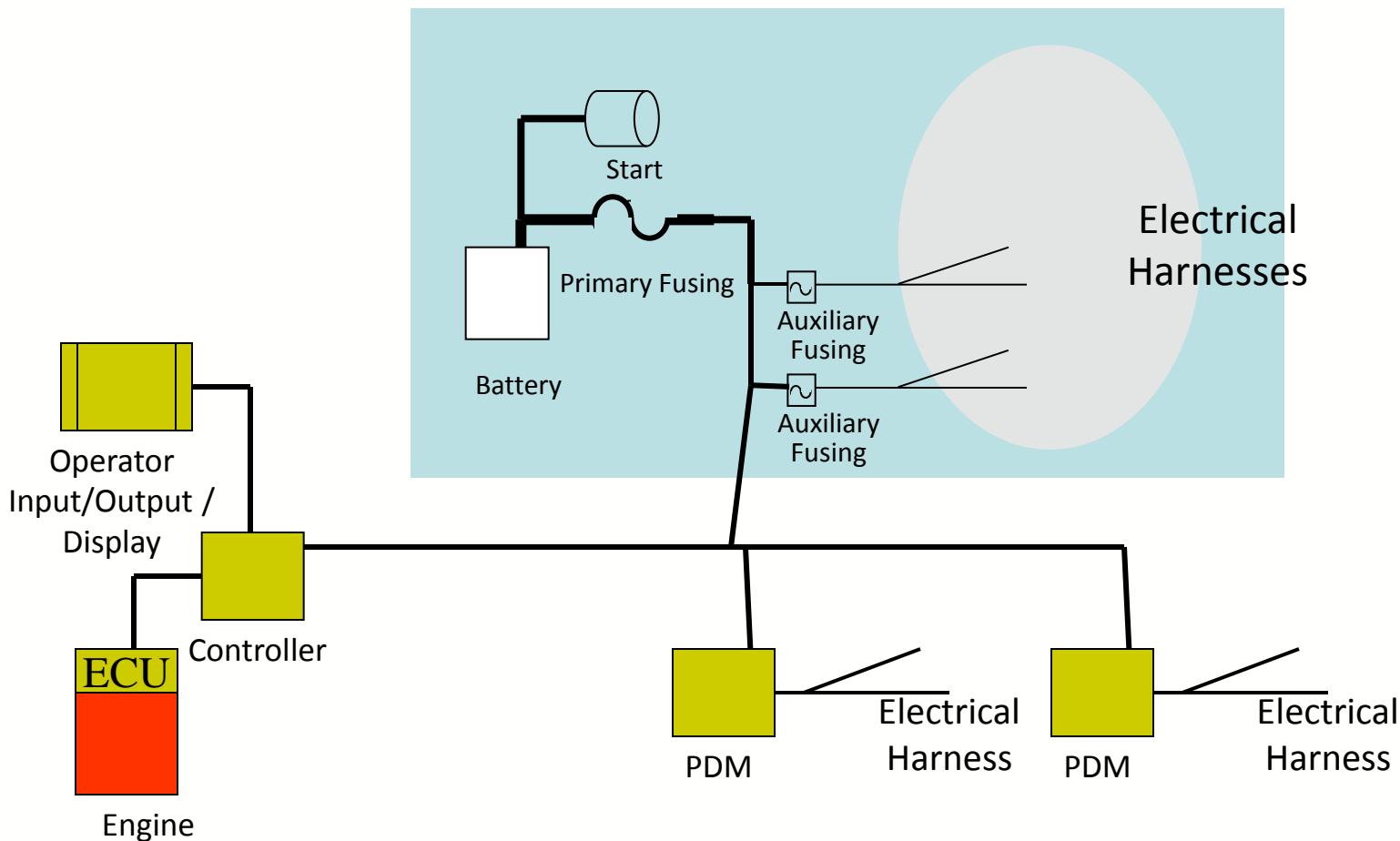
- Hand wiring = high labour costs
- Manual assembly increases quality risks and reduces reliability
- Wire bundle may be vibration sensitive and prone to shorts/failures
- Must be packed in an external housing: extra expense and valuable space
- Not flexible, programmable or easily upgraded





Future solutions

CAN & Solid State Power Distribution





Features & Benefits

1. Solid state device:
no moving parts; eliminates fuses & relays; longer, more reliable operating life
2. Wiring reduction and better integration with other systems:
simple power & CAN J1939 network (4 wires)
3. Analogue and digital input measurement and CAN conversion
4. High current drive: 15 A each, 70 A total, H-bridge options
5. Overcurrent shutdown
6. Diagnostic feedback (short, open, overcurrent, overtemp)
7. Rugged, encapsulated & sealed:
Fully sealed enclosure uses standard Deutsch connectors
8. Reduced footprint and flexible mounting (can also simplify harness)
9. System Integration: typically controlled from a PowerView display, via CAN, and programmable using the single PowerVision Configuration Studio™ software tool
10. Flexible upgrade & expansion



Applications

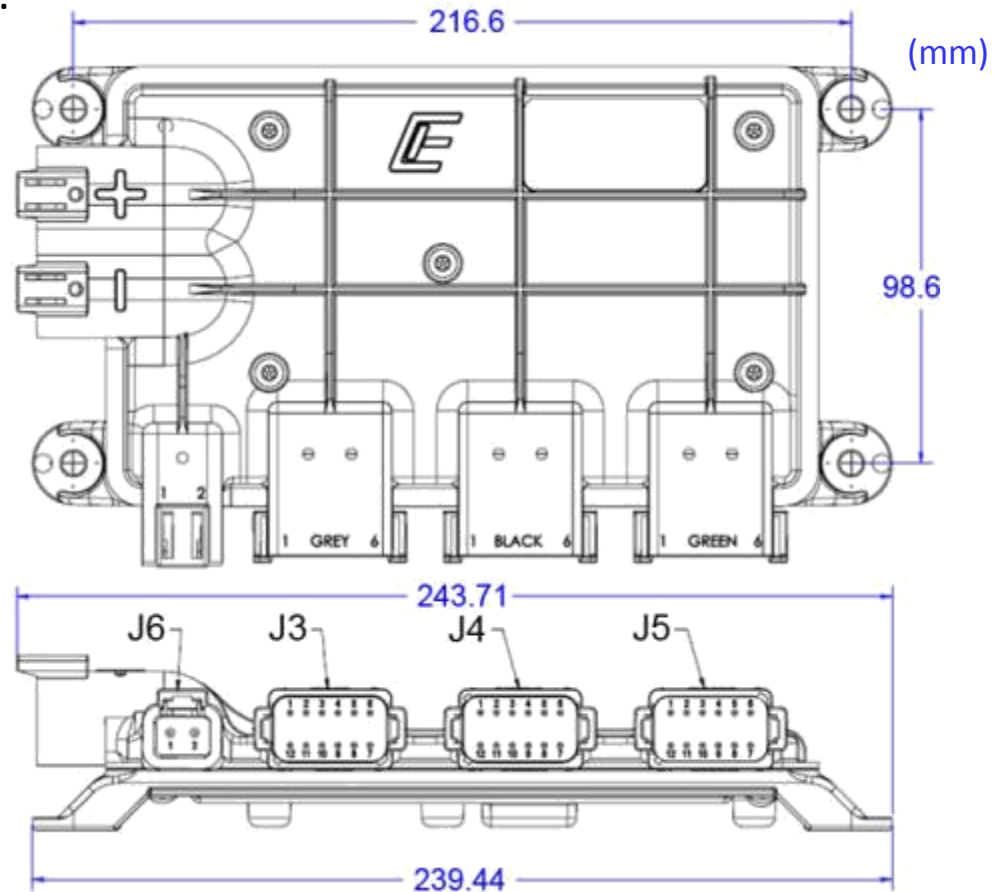
- Collecting input sensor measurement data:
pressure, flow, temperature, position, inclination, etc.
- Collecting user control data:
rocker switch, joystick, keypad, toggle, potentiometer, etc.
- Direct drive of high current loads:
solenoids, actuators, lighting, valves, motors, pumps, fans, etc
- Replacing /expanding relay and fuse based power distribution
- Reducing harness wiring and complexity
- Generating CAN J1939 message data for control or display purposes
- Heavy duty, severe environments: on/off-highway, marine, industrial



Electrical Connection

Standard Deutsch connectors, IP67 sealing:

- J1 DTHD 06-1-4S
- J2 DTHD 06-1-4S
- J3 DT 06-12SA (GREY)
- J4 DT 06-12SB (BLACK)
- J5 DT 06-12SC (GREEN)
- J6 DTP 06-2S





Electrical Connection

Standard Deutsch connectors, IP67 sealing:

- J1 DTHD 06-1-4S
- J2 DTHD 06-1-4S
- J3 DT 06-12SA (GREY)
- J4 DT 06-12SB (BLACK)
- J5 DT 06-12SC (GREEN)
- J6 DTP 06-2S

J3 – J5 require a W12S wedgelock and size 16 contacts

J6 requires a WP-2S wedgelock and size 12 contacts

Murphy mating connector kit **B6587**:





Specification, Electrical

- DC Supply:
 - 12 or 24 VDC (universal 8 - 32V)
- Inputs:
 - 8 analogue, 0 - 5 VDC standard
 - 12 digital, tri-state (high side, low side, open)
 - Supply for sensor excitation, 5 VDC/70mA
- Outputs:
 - 12 digital, high current (15A each, 70A total, configurable as high side, PWM or 6 H-bridge pairs)
- CAN:
 - CAN 2.0B active, default protocol SAE J1939, Baud rate 250Kbits



Specification, Physical

- Housing
 - Combination PBT and E-coated aluminium with integrated mounting feet
- Temperature
 - Operating: -40 to +85°C (-40 to +185 F)
 - Storage: -40 to +125°C (-40 to +257 F)
- Environmental Sealing
 - SAE J1455, sections 4.5.3 water intrusion: 1500 psig water @ 50° C, 4 inches away, for 15 minutes with the harness connected.
- Vibration/shock
 - Vibration: 5 to 25G, 50-2000Hz, 72 hours/axis.
 - Shock: 30G, 3 cycles
- Electromagnetic Compatibility
 - Radiated immunity, tri-plate test 100 V/M, 10 KHz - 1 GHz



Summary

Key Features	Benefits
Solid-state device	<ul style="list-style-type: none"> More reliable than relays No fuses to replace No moving parts
CAN multiplexed system	<ul style="list-style-type: none"> Reduction in wiring OEMs are seeing a 40-60% decrease in wires... \$\$\$ Integration with display and CAN systems
Configurable	<ul style="list-style-type: none"> Flexible inputs/outputs High power outputs for lamps, motors, actuators, etc One common part fits many uses
Fully sealed enclosure	<ul style="list-style-type: none"> Locate IX32/PDM near the loads to reduce wiring
Built-in diagnostic feedback	<ul style="list-style-type: none"> Shorts, opens, over-current, over-temp handled by IX32/PDM, with CAN message diagnostics
Sold 20k in the past 3 years	<ul style="list-style-type: none"> Proven reliability!

PowerVision Configuration Studio™

- PC-based display development software
- Allows OEM customization of:
 - PowerView PV450/780 colour displays
 - PV350/380 monochrome displays
 - PDM Power Distribution Module
- Full control of:
 - Multi-layer screen graphics: gauges, data, video, pop-ups
 - CAN messaging: J1939, NMEA2000, CANopen, freeform/proprietary
 - Fault codes & diagnostics
 - Multiple user languages
 - State machines
 - Data logging
- Display update via USB:
 - Hard-wire PC -> PowerView connection (development/update)
 - Memory stick (portable update)



PowerVision Configuration Studio™

- Latest version V2.7:
 - Simplified/new widgets in Page Designer
 - Datalogging with timestamp
 - Support for high performance animation (without scripting)
 - Supports both (old protocol) PDM and (new protocol/features) IX3212 Power Distribution Module
 - Better debugging support
 - Larger more complex configurations via compressed data files
 - Auto Discovery system for finding/connecting with multiple connected displays
 - Activity programming
- One license per company
- Online support community
 - forum.fwmurphy.com
 - 300 users



Questions?



Thank you

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