

E-PLUS®

Programmable Human Machine Interface for NMEA 2000® and CAN-Based Systems



Product Overview

E-PLUS® is a patent pending user-programmable, NMEA 2000® - compatible pushbutton switch with an integrated RGB LED and controller module. It sits on a CAN bus and combines switch input, LED indication, NMEA 2000® communication, and configurable device behavior in one network-connected platform.

The device allows installers, integrators, and advanced users to customize button logic, LED patterns, timing behavior, inter-device commands, and PGN message handling without reflashing the firmware. Configuration and programming are performed through the E-PLUS® Programmer PC Application using a Kvaser USB-to-CAN interface.

Positioning Summary

E-PLUS® is more than a switch. It is a programmable Human Machine Interface (pHMI) and CAN bus control platform designed to simplify networked switching, reduce wiring complexity, and support flexible system behavior in marine and other distributed control environments. E-PLUS® combines the tactile simplicity of an electromechanical switch with flexible, software-defined control.

NMEA 2000® Network Interface

- NMEA 2000® certified
- Automatic address claim support
- Transmit and receive PGN messages
- Standard M12, 5-pole NMEA connector

Programmable Control Logic

- Event-driven scripting engine
- User-configurable behavior without firmware changes
- 700 bytes non-volatile script storage
- Script persists after power cycle

RGB LED Feedback

- Integrated RGB LED
- Static color and flash modes
- Custom flash timing, breathe, fade up, and fade down effects
- Status and error indication support

Software & Diagnostics

- PC programming application
- Device discovery and CAN bus scan
- CAN bus monitor and filter test tools
- Firmware update and log export support

Typical Applications

- Marine control panels
- Agricultural equipment controls
- Industrial control systems
- Human Machine Interface (HMI) controls
- Navigation and auxiliary system controls
- Lighting control systems
- Pump and actuator control
- Vehicle CAN bus interfaces

Key Benefits

- Reduce hardwired control complexity
- Modify behavior through scripts and configuration
- Provide visual status feedback at the switch
- Support field updates and help future-proof system designs
- Use PC-based diagnostic tools to assist setup and testing

How E-PLUS® Works

E-PLUS® combines pushbutton input, an embedded kernel, a user scripting engine, RGB LED output, and NMEA 2000® PGN messaging. The kernel handles required NMEA 2000® communications and device management while the user script defines application behavior.

Functional Area	Role
Pushbutton Switch	Detects press, release, short push, and long push events.
Kernel	Receives, decodes, processes, and transmits NMEA PGN messages. It also manages device-level functions.
Scripting Engine	Executes user-created scripts triggered by switch events, RX PGN events, timers, and boot/reset.
RGB LED	Provides visual feedback through static colors, flash modes, breathing, fade effects, and error indications.

Core Technical Specifications

Electrical Parameter	Specification	Network Parameter	Specification
Operating voltage	8 to 40 VDC	Protocol	NMEA 2000®
Protection	Built-in reverse polarity and load dump protection	Physical layer	CAN bus
Device LEN (Load Equivalency Number)	5 (250 mA)	Connector	Standard M12, 5-pole NMEA interface connector
Maximum network current	250 mA maximum	PGN support	User-configurable transmit and receive PGN messaging

Programming Parameter	Specification
Programming method	E-PLUS® Programmer PC Application
Script architecture	Event-driven scripting engine
Script storage	700 bytes non-volatile script storage
Event types	13 supported event triggers
User variables	16 configurable variables available for user scripts
Firmware update	Field firmware update supported through PC application

Mechanical and Software Requirements

Category	Detail
Switch format	22mm dia. panel cutout anti-vandal pushbutton switch
Construction	Vandal-resistant, IP-rated pushbutton switch
Illumination	Integrated RGB LED
Required operating system	Windows 10 or Windows 11, 64-bit editions
Required interface	Kvaser USB-to-CAN hardware and Kvaser Windows drivers
32-bit Windows support	Not supported by the E-PLUS® Programmer PC Application

Supported Event Triggers

The scripting engine responds to switch actions, network message reception, boot events, and timers. Each event can contain optional script instructions that are processed by the E-PLUS® kernel.

Event Group	Supported Triggers
Startup	BOOT
Switch actions	PRESSED, RELEASED, SHORTPUSH, LONGPUSH
Received PGN events	RX0, RX1, RX2, RX3
Timer events	TIMER0, TIMER1, TIMER2, TIMER3

LED Capabilities

Mode / Color	Supported Options
LED modes	Static color, flash, custom timed flash, error flash, breathe, fade up, fade down
Supported colors	Black/off, red, green, blue, yellow, cyan, magenta, white
LED control methods	Dedicated LED instructions or script control through the #COLOR variable

E-PLUS® Programmer PC Application

• Device discovery • Network scanning • Device identification • Device diagnostics • Script editing • Script validation	• Device programming • Firmware updates • CAN bus monitoring • CAN filter test • Configuration management • Log file export
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