

# Pilot Devices



22 mm Pilot Devices



30 mm Pilot Devices

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Pilot devices are a family of related products including pushbuttons, selector switches, indicator lamps, toggle switches and stacklights. In its simplest form, a pilot device is simply a device that provides indication and control of a process to an operator. Value is added when the operator is able to make better decisions regarding the control of the process.



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## Objectives

- Recognize opportunities
- Develop solution with related components
- Compete in the market

## Terms to Know

The following terms are used to describe application requirements common to industrial control systems. You should familiarize yourself with the meaning of these terms and the applications they describe.

### Pilot Device Glossary

Term	Definition
contact	The conducting part of a switch that operates with another conducting part to make or break a circuit
contact block	The part of a pushbutton that is activated when the operator is pressed
debouncing	The act of removing intermediate noise spikes from a mechanical switch
double-break	Contacts that break the electrical circuit in two places
drum switch	A manual switch consisting of moving contacts mounted on an insulated rotating shaft
latch	An instruction or component that retains its state after a temporary condition occurs
OFF-delay	A timing function that gains value when an input condition transitions from ON to OFF
ON-delay	A timing function that gains value when an input condition transitions from OFF to ON
one-shot (interval timer)	A timing function that gains value when an input condition transitions from ON to OFF. Output state is maintained while timer is active.
pole	Number of isolated circuits in a switch device
relay	Device that controls one electrical circuit by manipulating contacts in another circuit
throw	Number of closed contact positions per pole
transducer	Device that converts physical parameters to electrical signals

## Product Application

Pilot devices are available in many shapes and sizes based on their functionality and application. In general, devices are designed for application into two general markets: the IEC (global) market, and the NEMA (North American) market.

The NEMA standard does not dictate function and appearance of pilot devices, but the standard does allow the use of industrial market segments to define such requirements.

**Note:** The automotive market segment has adopted a RED “run” indicator standard in which red indicator lights illuminate when machinery is operating and represents a potentially unsafe condition.

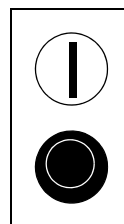
The IEC standard has adopted strict requirements concerning application of pilot devices. For example IEC 60204-1 requires pushbutton actuators be color-coded for universal application according to the format in the following table.

### IEC Color Coding

Color	Meaning	Explanation	Examples
Red	Emergency	Actuate in the event of a hazardous condition or emergency	E-Stop, STOP/OFF
Yellow	Abnormal	Actuate in the event of an abnormal condition	Intervention to suppress abnormal condition. Intervention to restart an interrupted automatic cycle.
Green	Normal	Actuate to initiate normal condition	START/ON
Blue	Mandatory	Actuate for a condition requiring mandatory action	Reset Function
White	No specific meaning assigned	For general initiation of functions except for emergency stop	START/ON, STOP/OFF
Black	No specific meaning assigned	For general initiation of functions except for emergency stop	START/ON, STOP/OFF

Product developed for the IEC market is application-rated, requiring lighter duty-ratings than what the NEMA market requires. For this reason, product is typically 1/3 to 1/2 as expensive and is often positioned as a disposable commodity in the market. OEM customers appreciate the lower price, which reduces their burden cost that they typically pass on to the end-users.

IEC standards 417-IEC-5007 and 417-IEC-5008 require START/STOP and ON/OFF controls be marked with universal symbols. Can you determine which symbol represents ON/START and which represents OFF/STOP?



Purpose:

Purpose:

## Product Selection

**Volume 7—Logic Control Operator Interface and Connectivity Solutions**, CA08100008E, Tab 1 provides product selection tables for pushbuttons, selector switches, indicator lights, potentiometers, enclosures and related accessories. Stacklights and related accessories are supported in Tab 2. The following sections provide an overview of the product groups.

### M22/C22 Series

Eaton M22/C22 industrial heavy-duty pushbutton lines offer a wide array of functional, attractive and ergonomically designed illuminated and non-illuminated pushbuttons, selector switches, push-pulls, alternate action and twist-to-release operators. M22 operators are available with either a silver or a black colored bezel.

- 22.5 mm mounting hole
- M22 modular design allows customers to mix/match contact blocks and operators
- C22 compact, all-in-one design gives customers a simple installation
- NEMA 3R, 4X, 13 and IP67/69k on most operators
- 100% LED technology throughout lines
- Fully custom laser etching available
- Toolless secure assembly of mounting adapter and contact blocks
- Notched hole mounting with anti-rotation nib standard



C22

M22

### 10250T Series

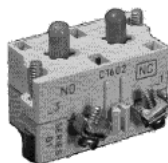
This family of pushbutton, selector switch, indicator light and potentiometer devices represents the flagship product for NEMA applications. It is easily recognized by its brilliant chrome finish.

Features include:

- 30.5 mm mounting hole
- Contact blocks feature “reliability nibs” that ensure long life and dependable switching despite oxidation and corrosion on the contact surfaces
- Operators feature “grounding nibs” that ensure electrical grounding of the operator with the panel
- UL 600 Vac rating, 10 million operations (mechanical), 1 million (electrical)
- NEMA 1/2/3/3R/4/4X/12/13 and IEC IP65 ratings

Benefits include:

- New contact block design provides greater visibility with laser-engraved terminal markings and light gray material. Ultrasonic welding of contact blocks have been eliminated, making the components acceptable for low emissivity ratings required by IEC and other global market standards



### E34 Series

The E34 family of pilot device products represents the ultimate in corrosion-resistant packaging of pilot devices. It uses the same design elements of the 10250T, but replaces the brilliant chrome finish with a triple-layer epoxy finish that is extremely durable.

Features include:

- Uses the same contact block, operator mounting, and accessories as the 10250T
- Meets NSF requirements for corrosion resistance from continuous salt spray for 200 hours. Tested to 600 hours before visible corrosion appears

Benefits include:

- OEMs and panelshops may appreciate the distinctive appearance of their panels provided by the black epoxy coatings of the E34 devices

### HT800 Series

This family of pushbuttons, selector switches, indicator lights and related accessories was developed in response to the need for a family of products that provide basic functionality at a low price without sacrificing the appearance of a panel that may contain competitive products.

Features include:

- 30.5 mm mounting hole
- Transparent contact blocks that mount two-across and interlock to prevent separation due to wiring harness stress
- Contact blocks may be mounted in Left/Right or Top/Bottom positions to accommodate a variety of wiring layouts
- Reduced product variation expedites delivery/setup/inventory

Benefits include:

- Lower cost product with basic functionality for customers who don't need advanced features



### E30 Series

Do you have customers that have outgrown their control panels? This situation is obvious to anyone that walks through a facility and observes pilot devices mounted to the tops, sides and back of existing control panels. If so, the E30 family of products provides an elegant solution by integrating the function of pushbutton and indicating light into a single operator.

Features include:

- 30.5 mm mounting hole
- Up to six operations in one package
- Selector switch and potentiometer designs also available
- Unique contact block locking mechanism provides easy removal of contacts without disturbing the panel-mounted operators
- Customized legends/lenses

Benefits include:

- This product is well-positioned for applications requiring minimal panel space



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### E10 Toggle Switches

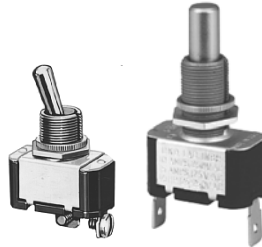
OEMs that supply equipment to commercial, retail and light industrial operations may find the E10 family of selector switches and plunger toggle switches to be an ideal solution for light-duty switching of resistive and inductive loads.

Features include:

- 0.468 in mounting hole
- Packaged in quantities of 10
- 1–4 poles, single and double throw

Benefits include:

- These operators make ideal companions to much larger industrial switches when secondary control is required for remote operation



### E26 Stacklights

Concerned with visibility of indicator lights, or perhaps you'd like to add audible alarms to a control panel? If so, the E26 series of stacklight products provides the solution in the most demanding environments.

Features include:

- Modular design allows customized appearance of colors and blink rates (clear, red, yellow, green, blue, amber)
- Supports monotone, bitone, and intermittent audible alarming
- Incandescent, LED or xenon strobe lamps

Benefits include:

- The lamps are designed to interact with a wide range of control signals, from 12 to 240V. Mounting is accommodated through a variety of bases, including 3/4 in NPT, 3- or 4-hole designs



### Selection Summary

The following table provides general guidelines for application of the various pushbutton, selector switch and indicator light products.

#### Product Applications

	Indoor	Outdoor	Washdown	Corrosive	Explosive
10250T	Yes	Yes	Yes	No	Yes
HT800	Yes	No	Yes	No	No
E34	Yes	Yes <sup>①</sup>	Yes	Yes	Yes
E30	Yes	No	No	No	No
M22	Yes	Yes	Yes	Yes	No
C22	Yes	Yes	Yes	Yes	No

### Selling Strategies

Eaton has a comprehensive selection of IEC and NEMA pilot devices as open components or assembled in packages for enclosed and MCC.

**Selection**—Eaton provides complementary product lines in addition to the basic pilot devices. These products include metallic and nonmetallic enclosures, signal conditioning and isolation transformers, sensors and programmable controls.

**Customization**—Warehouses in Spartanburg, SC, and Memphis, TN, support customized labeling of legend plates and lenses for all pilot devices. Order forms are included in the catalog.

**Ease of Installation**—No tools are required for the IEC rated devices and modular assemblies support the installation of operators separate from the contact blocks for the NEMA rated devices. Products may be ordered fully assembled or as separate components.

**How do Eaton's products compete?** Reinforce the capability of the 48 hour mod center, our warehouse stocking, ProShop training, regional service centers and faster delivery.

### Service

Resources	Value Add
Manufacturing Facilities (Chicago, Denver, Los Angeles, Hartford, Houston)	Regional support for entire product line. Open to customer visits. Able to ship quickly.
Warehouses	Provide balance for distributor stocking
ProShops	Distributor support provides ownership of solution
Mod Center	Flexibility of solutions

#### Note

<sup>①</sup> The E34 family of devices is sensitive to UV light when applied in outdoor applications. The devices will appear slightly discolored after long periods of exposure to direct sunlight. The functionality of the device is not affected.

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