

Command devices and indicator lights for heavy-duty applications

Product overview



Command devices and indicator lights for heavy-duty applications



This overview presents command devices and indicator lights for 22.3 mm mounting holes. The devices shown here are particularly suitable for heavy-duty applications, i.e. for applications subject to special stresses or functional requirements. They also include developments to suit demanding customer requirements.

Accordingly, Elan is continuing its long-standing entrepreneurial tradition of specialising in industrial command devices and indicator lights.

These pushbuttons are significantly different to standard control devices in that they have been developed and enhanced so as to meet the very demanding applications of specific customers who operate in all fields where rugged construction, superior materials and elevated electrical performance is mandatory to ensure reliable control function.

Under these criteria all standard commercial device types are available as complete ranges:



1. Command devices and indicator lights for applications in difficult operating conditions (E series)



2. Command devices and indicator lights with IP 67/IP69K protection class (resistant to high-pressure cleaners) for hygiene-critical applications (N series)



3. Command devices and indicator lights IP 67/ IP 69K protection class (resistant to high-pressure cleaners) for the other industrial applications (E ... O series)

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In addition to the delivery range supplied up to now, Elan offers various device groups and individual groups (see page 6 et seq.) which have also been designed and developed for applications subject to special stresses or functional requirements.

Command devices and indicator lights for applications in difficult operational conditions (E series)



Example of a customer-specific design (D-30)

- Where there is an increase in mechanical strain due to the operator or due to shock or vibrations
- Increased requirements in terms of availability or high frequency of operation where the device needs to provide consistent "high demand" operating performance over the life cycle.



Typical applications

- Where temperature effects are increased, for example on glass and casting machines
- Where aggressive cooling and cleaning agents take effect, for example on machine tools or printing presses

Special design features

- Robust designs
 - Due to metal bezels and metal buttons
 - Due to glass lens covers in illuminated pushbuttons and indicator lights
- Bellows-type seals
- Protection class > IP 65 (IP 67 on request)

- ... -40°C versions on request
- A choice of three connection techniques (screw terminals, flat-pin plugs and "WAGO Cage Clamp®")
- Contact and light elements system EF/EL (see page 4)

As an alternative for glove operation: Devices D-30 (front design as before but with bezel height 5 mm, other contact and light element system)



Command devices and indicator lights with protection class IP 67/IP 69K (resistant to high-pressure cleaners) for hygiene-critical applications (N series)



Typical applications

- Food-processing machinery for processing raw goods such as meat, fish and poultry, raw eggs or milk.
- Other machines in the food-processing industry with special requirements in terms of cleaning capabilities or hygiene-conform design, for example to prevent the risk of cross contamination

Special design features

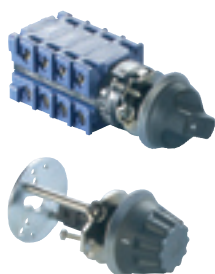
- Type of protection for front side: IP 67, IP 69 K
- Special seals close the gaps between the fixed and moving device parts
- Special shapes (smooth surfaces, without corners or edges) make it easy to clean the devices
- Selection of materials (for example, resistant to smoke resin remover) and colouring to suit the respective application
- Illuminated devices with "super bright" multiple LEDs as illuminants
- Contact and light blocks optionally with screw terminals, flat-pin plugs or cage clamp terminals (WAGO Cage Clamp®)
- EF/EL contact and light elements (see page 4)



Hygiene



design award
winner
2003



Adapter bracket for contact blocks with protection class IP 67:

- For SEK position switches (with momentary contacts, 2-pole, 2 NC contacts, 2 NO contacts, NC-NO combination and SEPK (with spring function 1 NC/1 NO
- For pushbuttons, mushroom buttons, single-plunger selector switches / selector buttons

Command devices and indicator lamps with protection class IP 67/IP 69K (resistant to high-pressure cleaners) for other industrial applications (E ...O series)

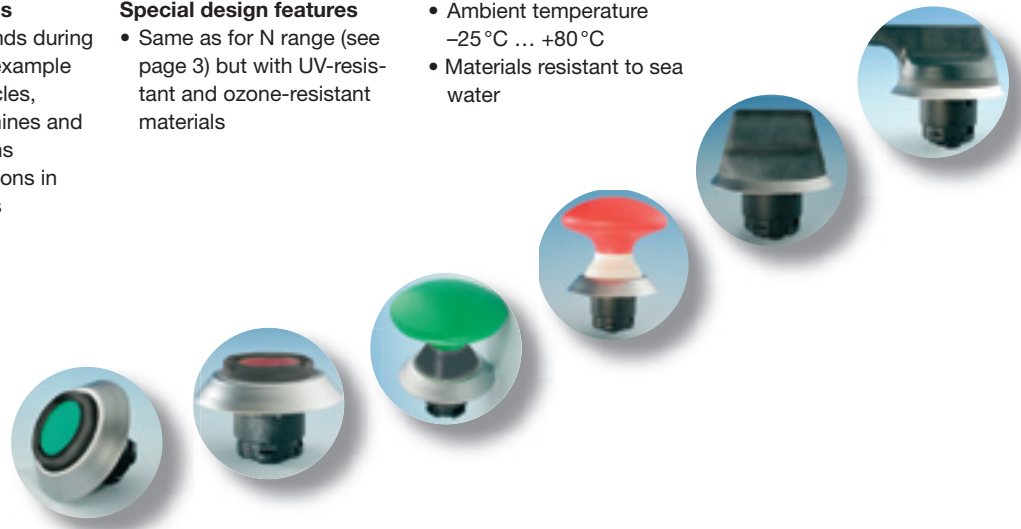


Typical applications

- Inputting commands during external use, for example on industrial vehicles,
- Clean-room machines and similar applications
- On-deck applications in sea-going vessels

Special design features

- Same as for N range (see page 3) but with UV-resistant and ozone-resistant materials
- Ambient temperature $-25^{\circ}\text{C} \dots +80^{\circ}\text{C}$
- Materials resistant to sea water



EF/EL contact and light unit blocks

Special design features

All elements in the EF/EL systems have the following special design features:

- A self-cleaning contact bridge system, known as Elan special bifurcated, which is particularly suitable for low-voltage and has a lower switching capacity of 5 VDC/3.2 mA (max 400 VAC/8 A). It is designed in the form of a bent twin contact bridge, with parallel and also diagonal operation



- Robust element mounting by means of snap-on stainless steel springs
- NC contacts with positive openings in conformance to EN 60947-1-5
- Galvanically isolated contact circuits in 2-pole blocks
- High resistance to shock and vibrations, in particular in cage clamp terminals (WAGO Cage Clamp®, see page 5)
- Complete terminal designations visible at a glance in conformance to EN 50005 and EN 50013 with a complete function and sequence number. The function number identifies the NC and NO contact, the sequence number specifies the number and the order of the contacts on the complete switching device.

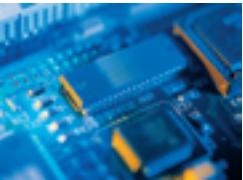


EF/EL contact and light element system (continuation)

Connection systems

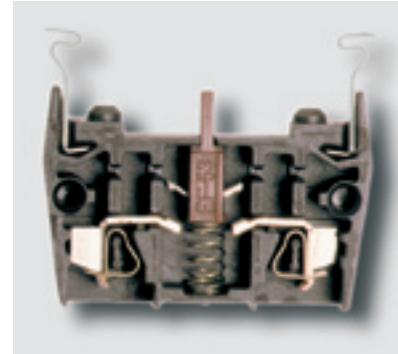
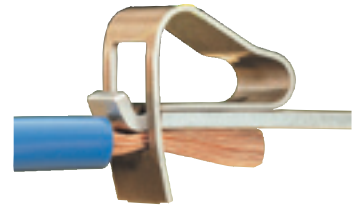
The EF/EL system offers a choice of the following connection systems:

- Screw terminals (1-pole/ 2-pole elements)
- Flat-pin plugs (1-pole/ 2-pole elements)
- WAGO Cage Clamp® terminals (1-pole elements).

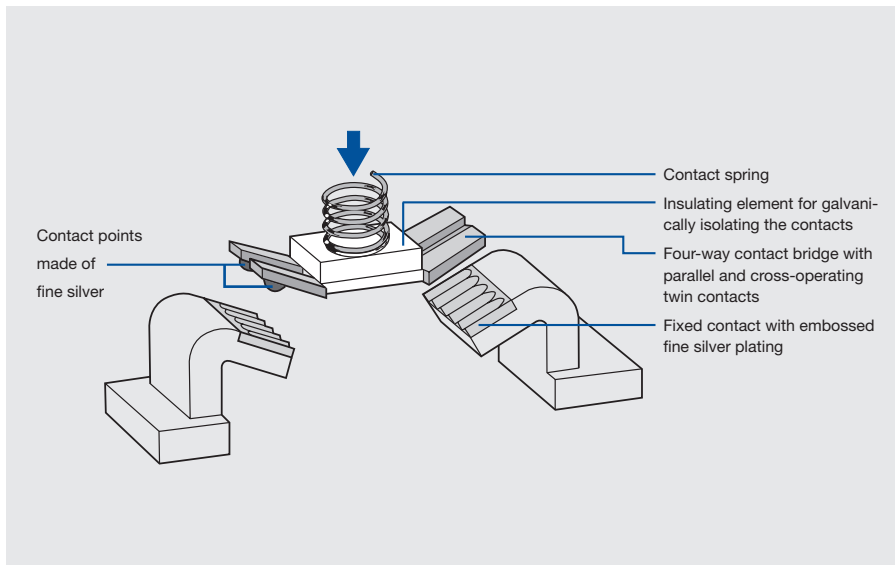


Connection system: WAGO Cage Clamp® terminals

The Elan standard range includes contact and light elements with cage clamp terminals because this connection system not only offers the advantage of saving on wiring time but also a high degree of protection against cable connections becoming loose even under the effects of strong vibrations.

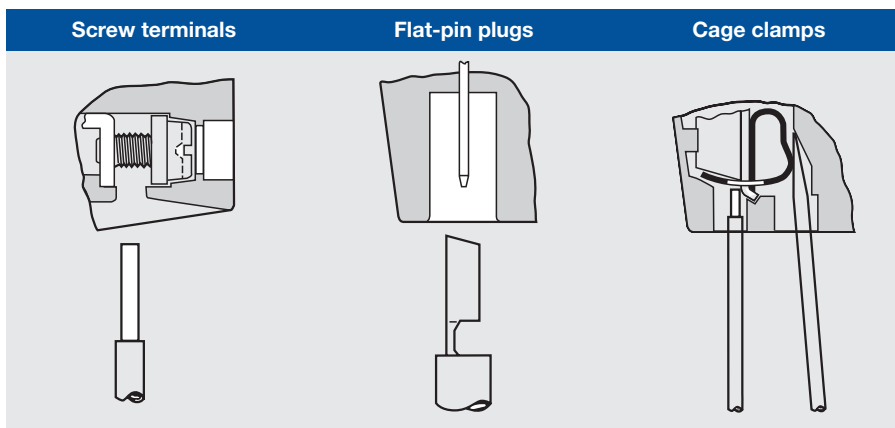


Above: cage clamps (WAGO Cage Clamp®)



Elan four-way system:

The statistical probability of maloperation of the Elan four-way contact system is 0.5 ppm. A variety of special design features (namely the choice of materials and the multi-embossed and angular surface areas of the contacts) provide a high specific contact pressure which together with a micro-movement ensures the continuous self-cleaning of the contacts during actuation and reliably eliminates oxide and dirt particles even with the smallest of currents and voltages.



Two-slotted screws:

Conductor cross-sections 2 x 0.5 ... 2.5 mm², with wire end ferrule max. 1.5 mm² (automatic screwing is possible). The connection screws (recessed head) are sealed on delivery.

Flat-pin plugs:

Standard commercially available flat-pin plugs 6.3 x 0.8 mm or 2 x 2.8 mm x 0.8 mm.

WAGO Cage Clamp® terminals:

Conductor cross-sections 2 x 0.08 mm² ... 1.5 mm², splice protection not necessary but possible.

Command devices with personal protection function



Command devices with personal protection function include mainly

- Robust versions of emergency-stop command devices
- The same for increased safety requirements
- Emergency-stop command devices with key unlocking and
- Enabling switches

Robust versions of emergency-stop command devices

- Special design features**
- Robust anodised aluminium version of command buttons
 - Front construction height 29 mm
 - Mushroom diameters in a choice of 38.5 mm, 49 mm, 70 mm
 - protection class IP 65

The same applies to the increased safety requirements (EDRR series)

- Positive locking actuator locking feature in addition to non-positive locking in conformance to EN 418, i.e. additional security against unintentional unlocking and during increased shock strains (< 100 g/4 ms)

Emergency-stop command devices with key unlocking (EDRRS series)

- Special design features**
- The same as for the EDRR series but mushroom diameters 38.5 mm and protection class IP 65

Consent switches

Although the range of applications for enabling switches is relatively clear, there is no universal solution because functional and ergonomic requirements in particular can differ from case to case or the emphasis on one or the other may vary.

With this in mind, Elan offers a variety of solutions for “enabling operation”.

- There is a choice of enabling switches in diverse versions
- As grip switches
 - Fitted into mobile control housing, with a choice of additional functionalities
 - As “stand-alone” versions

As a rule, these are what are referred to as 3-stage devices.



Command devices with ASi safety-at-work interface, for example for:

- emergency-stop command devices
- reset/restarting buttons
- command boxes
- a choice of ASi flat-cable connection, flange plug (M12 x 1) or screwed cable gland (M16 x 1.5)



Spring-return joy stick switches, maintained joy stick switches, maintained/spring-return joy stick switches

Spring-return joystick switches (due to spring force the device levers reset into the position of rest after manual actuation), **maintained joy stick switch** (the device lever remains latched in position in the actuated position/manual resetting) and **maintained/spring-return joystick switch** (combination with momentary and latching action of device lever) are included in Elan's delivery range of command and signalling devices in the group of special device versions. They are offered for 22.3 mm and 30.5 mm mounting holes in a 40 x 65 mm mounting grid with spring-return joystick switches or 80 x 80 mm with maintained joystick switches.

The Elan devices stand out in the general supply of devices because of their optimum sturdiness and compact sizes. Unlike smaller devices they are also suitable for rough industrial applications, but are more compact in construction than the multifunctional devices familiar in crane controls and commercial vehicles.

Robust design features

The essential design features for the robust version in the devices include e.g.

- Robust attachment in the front plate by means of metal knurled nuts and flange screws for torsion resistance (mounting diameter D-22) and metal bezel and assembly flange (mounting diameter D-30), with option of hexagonal nut and toothed lock washer
- Switch lever made of stainless steel, option – depending on the device version – of additional reinforcement by means of an aluminium sleeve
- Robust actuating balls made of Duroplastic
- Bellows type to suit the respective application, low-temperature versions –40 °C.

Selection criteria

The delivery range varies according to the following selection criteria:

- With 2, 3 and 4 switching positions plus middle position (rest position)
- Option of mechanical locking in the rest position (interlocking to protect against unintentional actuation; the device can be operated by pulling on the interlocking sleeve)

- < 8 switching contacts (24 V/10 mA ... 250 VAC/10 A), option of construction as NO, NC or NO/NC combination with galvanic isolation, option of screw terminals or flat-pin plugs
- switching elements with analog output 0.7 ... 10 V with preceding digital switching signal 24 VDC and screw terminals (in preparation)

Bellows versions (material versions)

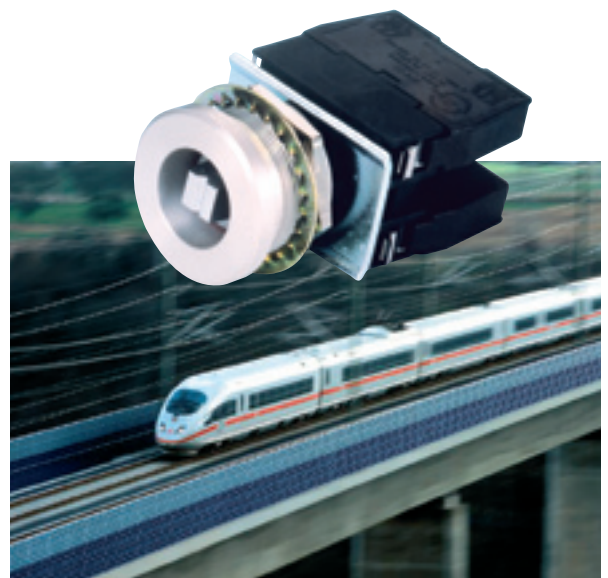
- standard: NBR, colour "black", 0.8 mm material thickness, ambient temperature –25 °C ... +80 °C
- UV-resistant, NBR, colour "black", 0.8 mm material thickness, ambient temperature –25 °C ... +100 °C
- Silicone colour "grey", 0.8 mm material thickness, ambient temperature –50 °C ... +180 °C
- Same as above but thick-walled, 2 mm material thickness (only for return-spring joystick switches without interlocking).



Maintained or spring-return selector switches with square/triangular actuators

Instead of a grip as in standard commercially available maintained or spring-return selector switches, these device versions are actuated by means of a square tool (or on request – a triangular tool). They are familiar as "train-guard switches" because this kind of device is used to close railway carriages.

This tool aids in ensuring that the devices cannot be actuated at will. Compared to the key-operated maintained or spring-return selector switches the advantage of these switches is that they are less sensitive to ambient influences, such as dust, dirt etc.



Die-Cast Two-Hand Control Panels



Example of an "SEPG05.3..." two-hand control panel in a customised version with integrated control and with central part.

Special design versions

- Ergonomically designed arrangement or integration of the actuators
- Support surface, designed as a kind of support for the wrist when actuating mushroom buttons
- Possibility of fitting up to 8 command and signalling devices in addition to an emergency-stop command device in the central part of the desk.
- Terminal strip assembly is possible in the inside
- Consoles on stands and options of with/without
 - spacing ring
 - height adjustment
 - foot operation
 - castors
- Two-part housing, folding with strap hinges and additional mounting brackets for holding the bottom part of the console
- Outlets which can be knocked out for screwed cable glands
- Console surface impact-proof and scratch-resistant, powder-coated, resistant to many chemical influences
- Customised supply versions



Actuators for two-hand operation

Mushroom button (ADP55/3SW...) type with shortened actuating stroke and minimised actuating forces

- Ergonomic construction, 55 mm actuation surface, 22.3 mm mounting hole
- Actuation forces (depending on the necessary shock resistance) 10.5 N (< 35 g), option of 7 N (< 18 g)
- Easy-to-grip plastic surface
- Actuating stroke only 3 mm
- Protection class IP 65



Touch sensor button (BWT... type, BG-tested)

- Capacitive effect when utilising the human body as a dielectric
- Prototype-tested for BG in accordance with EN 954-1 control category 4 or EN 574 Type III/C
- With check for foreign matter and contamination
- Robust, impact-resistant, tight to oil and water (protection class IP 65)



Mushroom button (type EDP...) in conventional version for special applications

- Ergonomic construction, choice of 42 mm or 55 mm actuation surface, 22.3 mm mounting hole
- Robust metal versions
- For heavy-duty applications
- Protection class IP 65
- Contact elements with safety springs on request



Stand in the form of a folded sheet-metal panel design with spacer ring, carry/pull fixture, height adjustment and mounting facility for single or double-pedal footswitches.



Attachment housing

Special design features

- Robust aluminium cast versions
- Protection class IP 67, if required with a hole for draining moisture condensation
- Component mounting to suit customers wishes



Customer-specific versions

Example 1

- Display and actuators for fork-lift trucks
- Ordered by Jungheinrich AG



Example 2

- Command devices and light indicators for keyboard-like device arrangements with direct printed circuit board connection
- Grid measurement 25 x 25 mm
- 33 mm mounting grid

- Easy to install, time-saving
- Protection class IP 65
- Contacts suitable for very low voltages
- Large diversity in versions
- Fibreglass-reinforced plastic versions
- At the suggestion of M.A.N. Roland Druckmaschinen AG, Augsburg



Devices with 30.5 mm mounting holes



Analogue button (DA... series)

- Analogue switching signal 0.7 VDC Æ 10 VDC depending on the 6 mm actuating stroke
- Upstream digital switching signal 24 VDC
- Mounting diameter D-30

Vandal-proof versions (model E...V)

- Product range: push-buttons, illuminated push-buttons, indicator lights
- Flush mounting (front panel overall height: 2.5 mm)



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