EcoStruxure™
Innovation At Every Level

Building efficient operator workstations

Practical tips for enhanced ergonomics and design

schneider-electric.com/control

Life Is On Schneider Electric

Meet the ergonomic needs of your customers

When it comes to industrial machines and operator workstations, ergonomics is a major concern for your customers. It goes without saying that your products must comply with health and safety regulations.

However, you must also ensure that your products are easy to understand and use thanks to an ergonomic design.

This is the best way to better respond to your customers' needs:

• Greater comfort
Machines that are easy to use reduce operator stress.

• Increased productivity
Clever, intuitive controls help operators learn easily, work faster, and make fewer errors.

• Modern design
Schneider Electric is designing modern products that look as good as they feel, and that let you customize your control panels to respond to your customers' tastes and preferences.

The practical tips in this guide will give you a good idea of how you can design more efficient control panels by focusing on three major points:

• Visibility of controls (pushbuttons, illuminated buttons, emergency stop buttons, etc.)
• Access to controls
• Organization and legibility of control information

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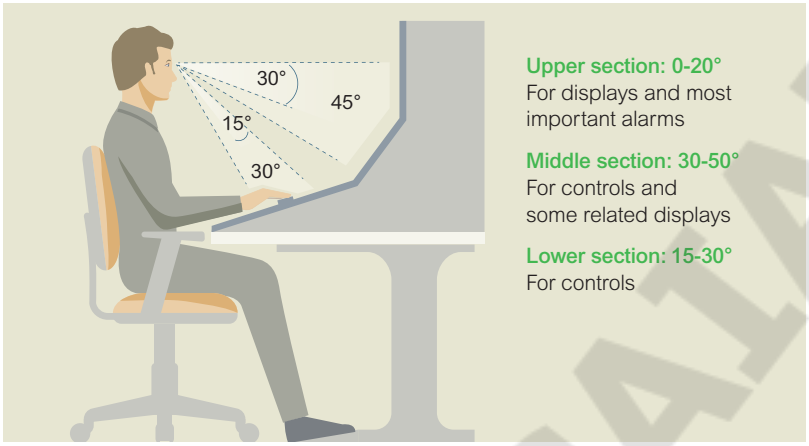
1. Visibility of controls

The operator's field of view

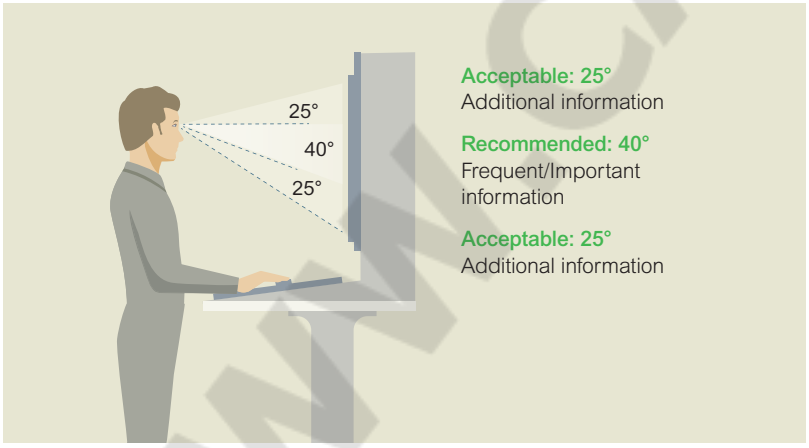
The location of controls on your panels requires careful consideration. One of the first rules to follow is to place the most important information within the operator's field of view, taking into account the operator's natural lines of sight for various visual tasks. This point is especially valid for illuminated alarms, for example.



Upper section: 0-20°
For displays and most important alarms

Middle section: 30-50°
For controls and some related displays

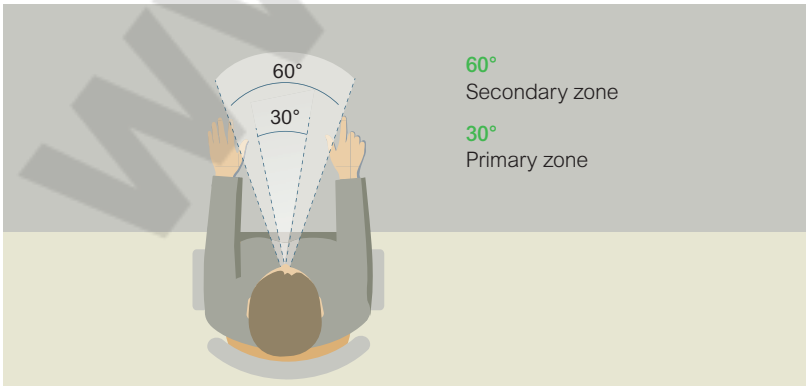
Lower section: 15-30°
For controls



Acceptable: 25°
Additional information

Recommended: 40°
Frequent/Important information

Acceptable: 25°
Additional information



60°
Secondary zone

30°
Primary zone

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Organize controls logically

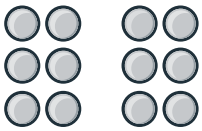
Best practices dictate that controls should be organized logically to ensure coherence between the information provided and the operator movement required to use the control.

Recommendations:

• Place all the buttons associated with a given function together and separate the different groups of controls.

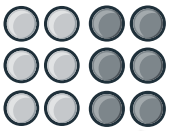
Example: For a control interface managing 2 pumps, the functions related to each pump can be grouped together.

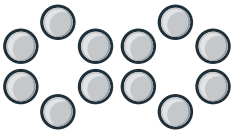
Gestalt laws of grouping:



• Proximity:
The distance between control buttons for two pumps.

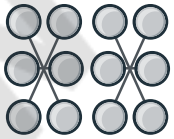
• Similarity:
- White buttons for pump 1 control
- Black buttons for pump 2 control

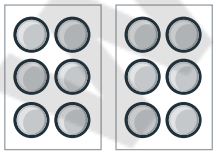




• Continuity:
The circular shapes indicate the difference between the two pumps.

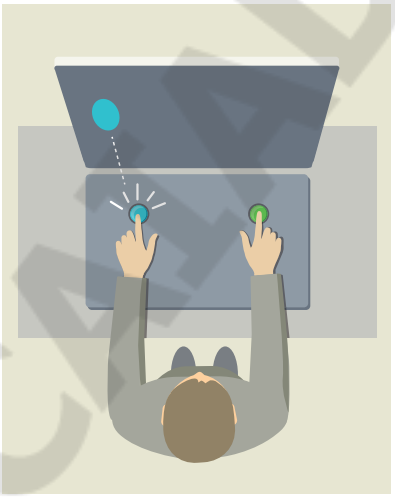
• Connectedness:
The external markings connect the buttons together, indicating the difference between the two pumps.



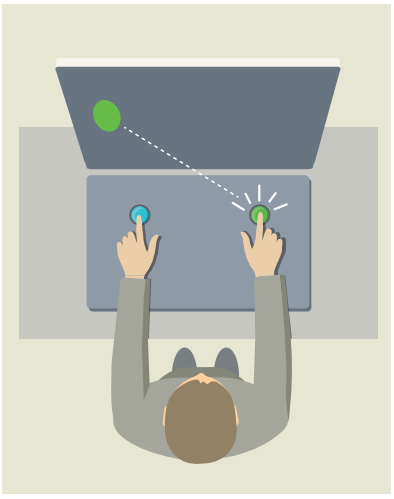


• Common region:
The zoning/external markings indicate the groups of controls for each pump.

• Ensure that indicator lights are directly associated with the relevant buttons (same color, similar location).



Compatible



Incompatible

• Whenever possible, use the same color codes for the HMI and buttons (for example, blue for all controls and information related to the use of water in your process).

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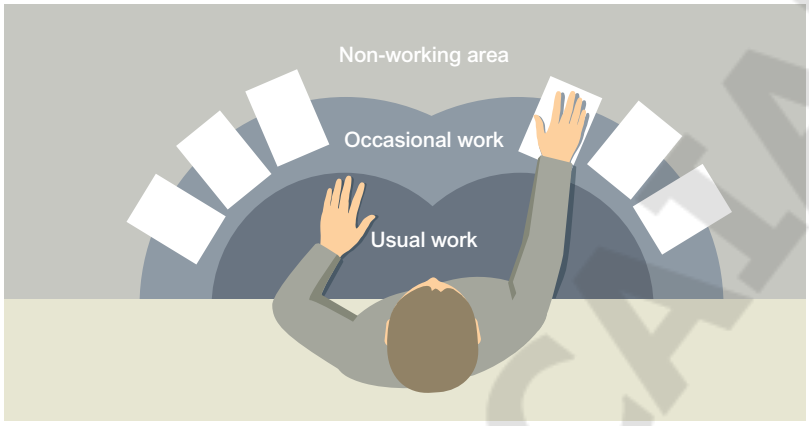
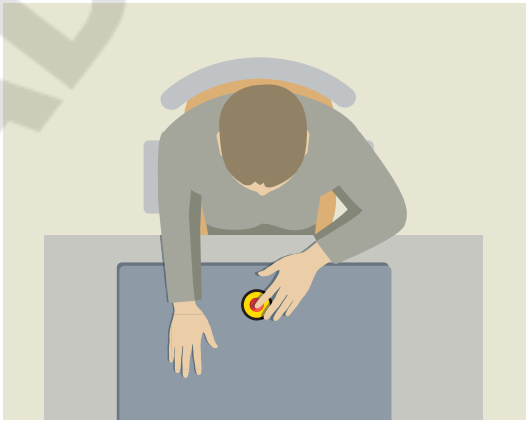
2. Access to controls

Controls should be easy to access, located outside of hazardous areas and away from potential danger to operators.

Controls that are used regularly should be placed within the operator's comfort zone. If the operator is seated, the controls should be within reach of a bent —not an extended—arm.

The emergency stop button ought to be placed in the center of the control panel. This ensures that it can be reached quickly and easily by both right-handed and left-handed operators.





Legend panels

Illuminated e-stop

Illuminated ring for e-stop

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3. Organization and legibility of control information

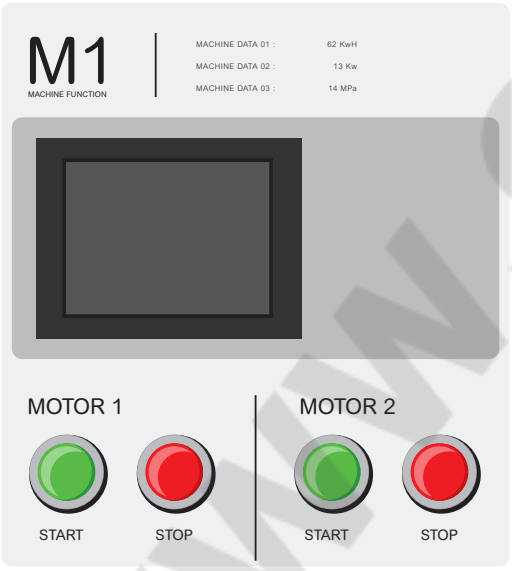
Organizing control information and ensuring that it is legible for operators is crucial to preventing errors and, as a result, ensuring optimal use of controls.

Establish a hierarchy of information

The more information there is, the more difficult it is to establish a clear hierarchy.

To get around this problem, it is important to:

• **Use the right words and organize them correctly.** For example, it is preferable to name a control group “Motor 1 Group” and to label the buttons with “Start/Stop” rather than label the buttons “Start Motor 1” and “Stop Motor 1” without a group label.



• **Take advantage of all of the available types of markings to establish a clear hierarchy.** With markings on the panel, face plates, button surrounds, and on the buttons themselves, there are up to four well-organized levels of information.

• Whenever possible, avoid placing labels below buttons and switches as the operator’s hand will block them from view.
• Use easy-to-identify icons or symbols rather than text.

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Choose fonts and colors carefully

Fonts

- Use sans serif fonts, which are easier and faster to read than fonts with serifs.
- Ensure that the entire panel is coherent and harmonious by using a maximum of two different fonts if needed.
- Use the right size font. It should be large enough to read easily and small enough to leave enough room for all of the necessary information.
- Organize all labels effectively with line spacing, centering, etc.

Sans serif

Serif

Colors

- Give each color a clear, consistent meaning throughout the entire panel.
- Amplify color for important controls.

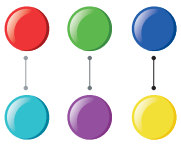
For example, use a red button with a red bezel to highlight the control that will turn off the power.

- Align with the color codes used in certain industries or applications.
- Limit the number of colors used to an absolute maximum of eight; four is best.
- Use complementary colors.
- Do not use similar colors next to each other.

Complementary colors

Not recommended

Recommended



Important

For colorblind operators

Colorblindness is an important consideration. In addition to color, you should use another method, like an icon or symbol, to communicate important information.

Pay attention to contrast

Whether it is for text or colors, make sure that the information is highly contrasted. This ensures optimal legibility. For example, use dark text and/or buttons on a light background or vice versa.

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Online tools to design your control panels faster, easier, and with fewer errors.

Schneider Electric has developed a product selector and configurator available online from any PC or tablet. Design, personalize, and pre-test your control panels before you build them!

Learn more: www.schneider-electric.com/control

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Life Is On | Schneider Electric

35, rue Joseph Monier
F-92505 Rueil-Malmaison Cedex
Phone: + 33 (0) 1 41 29 70 00
Fax: + 33 (0) 1 41 29 71 00
www.schneider-electric.com

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