

# **COD305**

## **ANALYSIS OF A WASHING MACHINE CONTROL PANEL**

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## General View

**Control Knob/Dial:** The central rotating dial is the **primary input** device, which allows the user to select different washing programs. The symbols and numbers around the dial indicate various washing modes and temperatures.

**Drawer:** There is a pull-out drawer likely used for adding detergent and fabric softener.

**Display Elements:** LED **indicators** or lights next to the buttons show the **status** of the selected option, such as whether the machine is ready, washing, rinsing, or in the spin cycle. These indicators provide immediate, **visual feedback** of the machine's status.



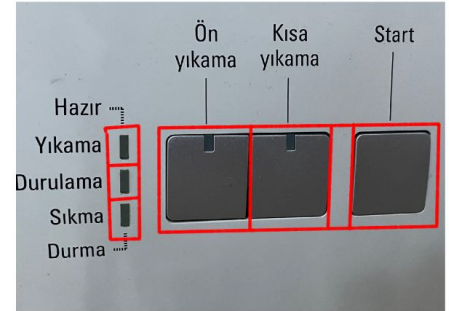
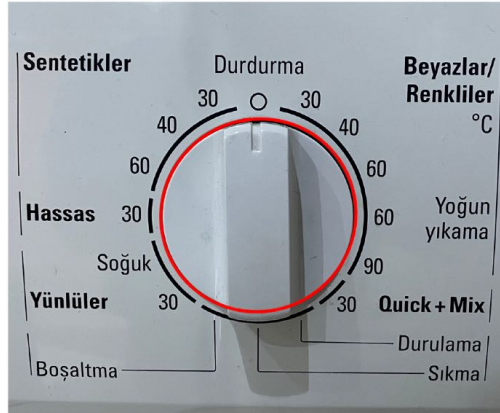
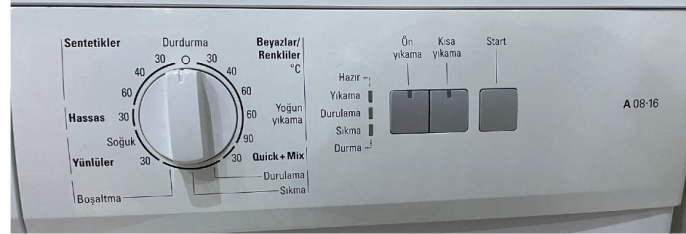
**Control Panel:** This is the area containing the **rotary selector knob**, buttons, and LED indicators for program selection and additional washing options.

**Buttons:** There are **push buttons** for start, pre-wash or short wash options, depending on the model.

**Door:** The front-loading door is typically made of glass, allowing users to see inside the drum. It usually features a safety lock that prevents it from being opened during a wash cycle.

**Emergency Drain:** The small circular panel at the bottom right is an emergency drain/filter access. It's used for maintenance, like cleaning the filter or draining water in case of an issue that prevents the machine from doing so automatically.

# Detailed View of Siemens Washing Machine



# Analysis of Control Panel in Terms of Gestalts

Good

**Proximity:** Controls for related functions are grouped together, such as the temperature settings and spin settings around the control dial.

**Similarity:** The buttons for "Start", "Pre-wash", and "Short wash" (if present) are usually similar in shape and size, signaling that they are related controls.

**Closure:** This principle is less directly applied here, but the circular design of the door and the dial may provide a sense of completeness and continuity.

**Symmetry and Order:** The balance between the dial, buttons, and LED indicators creates an orderly structure, making the interface appear organized.



Can Be Improved

**Proximity:** Could be improved by placing emergency features like the filter access closer to other control elements to suggest their relatedness.

**Similarity:** The buttons and indicators could employ more distinct colors or shapes for different functions to improve differentiation and reduce confusion.

**Closure:** Adding a visual cue to indicate the completion of the cycle or the status of the washing machine might help users understand the process better.

**Symmetry and Order:** Maintaining a symmetric layout for newer features or additional controls would preserve the organized appearance.

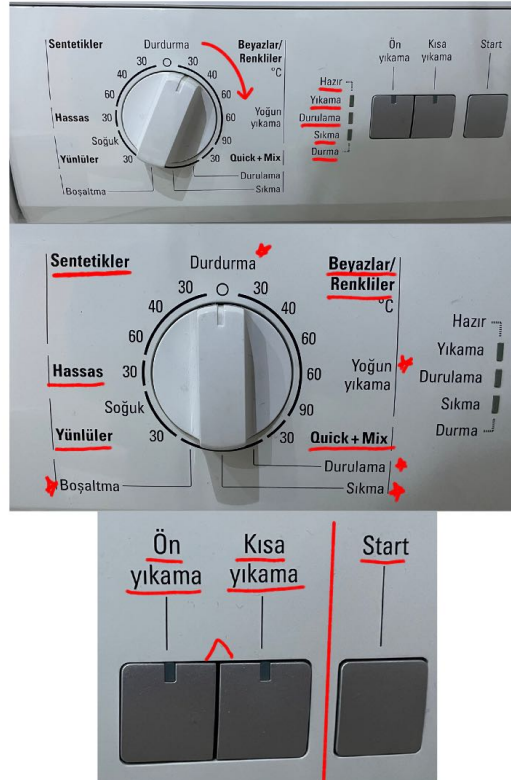
# Analysis of Control Panel in Terms of Gestalts

Good

**Common Fate:** This principle might be seen in motion cues, like the rotation of the drum or the movement of the dial, although these dynamic aspects are not visible in the static images.

**Figure-Ground:** The controls and indicators are designed to stand out against the background of the machine's body, making it clear what can be interacted with.

**Continuation:** The linear arrangement of control buttons and indicators leads the user's eye across the control panel, suggesting the sequence of operations.



Can Be Improved

**Common Fate:** Introducing moving indicators or progress bars could enhance the understanding of the washing cycle's progress.

**Figure-Ground:** Ensuring that any additional labels or instructions stand out clearly against the machine's surface would help users identify them quickly.

**Continuation:** Any new elements or controls added to the machine should be designed to maintain the visual flow established by the current layout.



# Analysis of Hierarchy

**Control Dominance:** The main control knob is the most dominant feature, centrally located and larger than other buttons, which establishes it as the primary interface for interaction. This suggests to users that the first step in using the machine is to select a program.

**Secondary Controls:** Smaller buttons for starting the machine, pre-washing, or selecting a short wash cycle are secondary. Their placement to the right of the dial indicates their role in the sequence of operations, following the program selection.

**Operational Sequence:** There is a clear operational sequence suggested by the layout, moving from left (program selection) to right (start operation), which follows the natural reading order for left-to-right languages, guiding the user through the process.

**Indicator Lights:** Indicator lights or LEDs serve a tertiary role in the hierarchy. They provide status feedback after the primary and secondary controls have been engaged.



# Analysis of Layout



**Grouping:** Controls and indicators are grouped according to function, which is a clear application of the Gestalt principle of proximity. For instance, all temperature settings are grouped around the main dial.

**Alignment:** The elements on the panel are aligned in a straight line, creating a clean and organized appearance that is easy to scan. This alignment also suggests a relationship between elements.

**Consistency:** The layout is consistent with conventions for washing machine design, with the control knob centrally placed and additional controls to the side. This consistency benefits users by matching the machine's layout with their previous experience with similar appliances.

## Analysis of Layout

**Accessibility:** The layout takes into account the need for ease of access, with all controls being front-facing and within reach. However, the low placement of emergency features like the filter access requires bending down, which could be a design oversight in terms of ergonomic layout.

**Balance:** There is a visual balance with the central dial flanked by buttons and indicators, which creates an aesthetically pleasing interface.

**White Space:** The design uses white space effectively, ensuring that the panel does not appear cluttered despite the number of functions and settings. This helps in preventing an overload of visual information and allows the user's eye to rest.



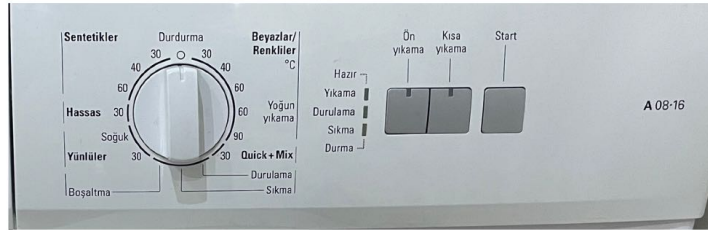


# Analysis of Labeling

**Language and Symbols:** The machine uses a combination of text and symbols. While symbols can be universal, the text appears to be in a specific language (Turkish), which could limit accessibility for non-native speakers.

**Color Contrast:** The washing machine appears to use a simple black-on-white scheme for most labels, which is effective for readability.

**Durability:** If labels are printed on surfaces that are frequently touched or exposed to cleaning agents, they may fade over time, which would be a design flaw. For +10 years the labels are looking good.



## Areas for Improvement

**Multilingual Labels:** Adding multilingual labels or more descriptive symbols could improve accessibility for users who do not speak the language used on the machine.

**Tactile Labels:** For those with visual impairments, raised or braille labels could enhance usability.

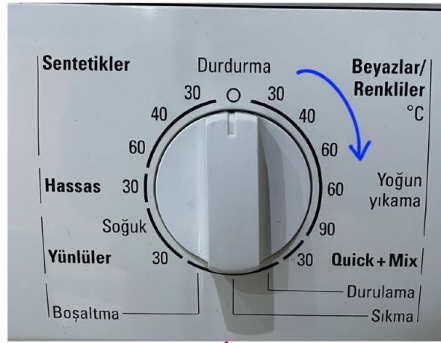
**Label Durability:** If labels are prone to wear, using more permanent methods like etching or in-mold labeling could be beneficial.

**Positioning: Clarity and Brevity:** Labels should communicate their message clearly and concisely. Overly verbose labels can be overwhelming and ignored, while too brief labels may not provide enough information for correct operation.

**Consistency:** It appears that the machine maintains consistency in the labeling style.

**Positioning:** Labels should be positioned close to the control or indicator they describe to avoid confusion. The Siemens washing machine seems to follow this principle well.

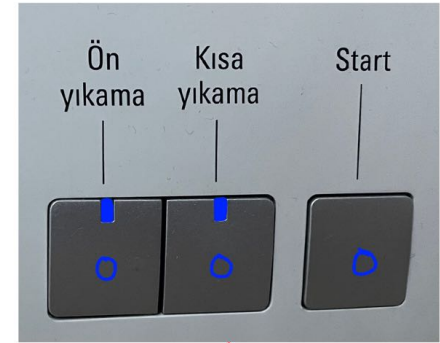
# Analysis of Control Elements



**Rotary Dial:** The main control element for selecting wash programs. The tactile feedback when turning the dial and the clicking into place for each setting help prevent selection errors.



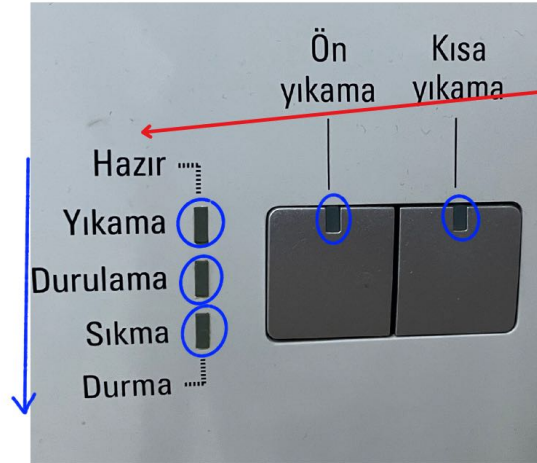
**Detergent Drawer:** This is a pull-out component where users add detergent and fabric softener. Clear labeling inside the drawer usually indicates where each type of washing additive should be placed.



**Push Buttons:** These are used to start the machine, and potentially for additional functions like pre-wash or setting a delay timer. They should have a distinctive feel and possibly a click feedback to confirm activation.

# Analysis of Display Elements

**Indicator Lights/LEDs:** Positioned next to each button or important feature (like the door lock), these lights illuminate to show the current status or selected options, providing immediate visual feedback to the user.



**Progress Indicators:** If present, these lights or a display panel show the stage of the washing cycle, which can include washing, rinsing, spinning, and end of cycle.



**Digital Display:** If a digital display is present, it would typically show the remaining time for the wash cycle, any error codes, or additional information like delayed start timing. However, based on the images provided, this machine does not seem to have a digital display.

Example

# Analysis of Control-Display Mappings

## Analysis of Control and Display Elements:

### Interaction Between Control and Display Elements

**Mapping:** The relationship between the control elements (e.g., buttons, dials) and display elements (e.g., lights) should be logical and intuitive. For example, when a wash program is selected using the rotary dial, a corresponding light might illuminate to indicate the selection.

**Feedback:** When a control element is engaged, the display element should respond immediately to confirm the action. If there is a delay or lack of feedback, it could lead to user confusion or repeated inputs.

### Good Design Aspects

**Affordance:** The design of the controls suggests their function; for example, the rotary dial invites turning, and the buttons suggest pressing.

**Feedback:** Audible clicks from the dial and buttons, along with visual feedback from indicator lights, inform the user that their input has been registered.

**Visibility:** The control elements are all clearly visible and accessible, which is fundamental for ease of use.

### Areas for Improvement

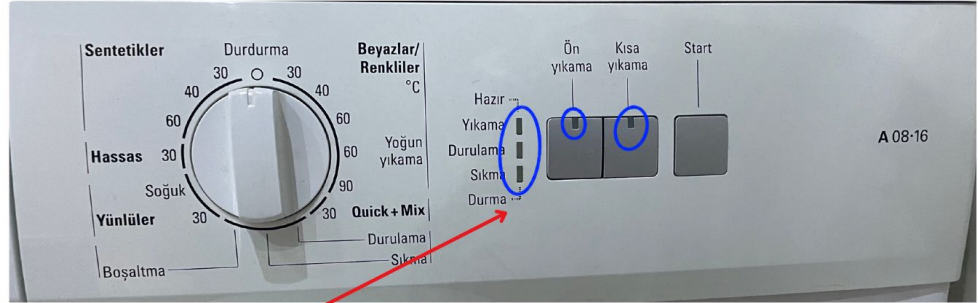
**Lack of Digital Display:** The absence of a digital display limits the amount of information that can be conveyed to the user, such as precise timing or detailed error messages.

**Progress Indicators:** Without a segmented progress indicator or countdown timer, users may not have a clear understanding of how much longer the washing cycle will take.

**Error Messaging:** If the machine only uses indicator lights without alphanumeric displays, it may not effectively communicate specific errors or issues, relying on the user to refer to the manual or remember what each light means.

# Analysis of Feedback and Indicators

**Tactile Feedback:** The user receives tactile feedback from the dial and buttons, knowing the input has been registered.



**Visual Feedback:** LED indicators provide visual feedback on the status of the washing machine's cycle.

**Auditory Feedback:** There is auditory signals when the cycle is complete or when the machine is turned on.



# Analysis of Error Prevention Strategies

**Constrained Input:** The dial can only be turned to specific points, preventing selection errors.

**Locking Mechanism:** The washing machine likely has a locking mechanism that prevents the door from being opened during operation, which is a critical safety feature.

## Mechanical Interlocks

**Door Lock:** Washing machines typically have a mechanical interlock that prevents the door from opening during a cycle. This is a critical safety feature that also prevents flooding or damage to the machine.

**Dial Detents:** The dial on the washing machine likely has detents or physical 'clicks' that correspond to specific functions or settings. This tactile feedback helps prevent the user from overshooting the desired setting.



## Programmed Safeguards

**Overload Protection:** The machine may have sensors to detect if it's been loaded with too many clothes, which could cause damage. It would then either not start or alert the user to remove some items.

**Imbalance Detection:** To prevent excessive vibration and potential machine damage, the washer likely has a system to detect an unbalanced load and will attempt to redistribute the load or alert the user.

## Analysis of Error Prevention Strategies

## Visual and Auditory Feedback

**Indicator Lights:** Lights that illuminate to confirm selection or to indicate the current cycle phase help to prevent operator error by clearly showing the machine's status.

**Error Codes:** If the machine encounters a problem, it may display an error code or use a sequence of indicator lights to alert the user. While not as informative as a full digital readout, this still guides the user to recognize and possibly correct the issue.

## Safety Features

**Child Lock:** If present, this feature would prevent children from accidentally changing settings or starting the machine.

**Water Supply Cut-off:** In case of leakage or a malfunction, the machine might have a feature to automatically cut off the water supply to prevent flooding.



## Programmed Safeguards

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# Conclusion

## Parts and Control and Display Elements

Siemens washing machine incorporates a user-friendly design with a central rotary dial, supplementary push buttons, and clear LED indicators as its primary control and display elements. The mechanical door with a safety lock and a detergent drawer are well-integrated into the design for functionality and user safety.

The interface lacks a digital display, which limits detailed feedback but maintains a straightforward user experience with fewer electronic components that could potentially fail.

## Hierarchy and Layout

The hierarchy is clearly defined with the dominant central control knob and secondary buttons, which facilitate a natural operational flow from program selection to cycle start. The layout is clean and orderly, with a logical grouping of controls and consistent alignment that aids in intuitive operation. The design could be improved by adjusting the hierarchy and layout to better integrate less frequently used but important features such as the emergency drain.

## Gestalts

The design of the washing machine effectively uses Gestalt principles to create a cohesive and intuitive user interface. Proximity and similarity are well-utilized in grouping controls and functions. However, there could be improvements in the application of the continuation principle to guide users more naturally through the washing process and in the use of common fate to indicate the progression of the wash cycle more dynamically.



# Conclusion

## Control and Display Elements

The control elements provide tactile and auditory feedback that helps prevent user errors, while the display elements offer visual feedback through indicator lights. The absence of a digital display may limit the amount of feedback regarding cycle progress and error specifics. Enhancements could include more informative feedback mechanisms like alphanumeric displays to convey detailed status information and error messages.

## Labeling

The machine employs a combination of text and symbols for labeling, offering high contrast and legibility that aid user interaction. The reliance on a specific language for some controls could be a limitation for non-native speakers. Improvements could include the use of more universal symbols, multilingual labels, or tactile labels to enhance accessibility for a wider range of users, including those with visual impairments.

## Error Prevention Strategies

The washing machine's design includes several error prevention strategies such as mechanical interlocks, tactile controls, and programmed safeguards to protect against user error and enhance safety. While these features are effective, there is potential for improvement in providing users with more immediate and descriptive feedback for corrective actions, and balancing the complexity of control options to minimize operational mistakes.



**Thank You !**