

US Patent & Trademark Office

Patent Public Search | Text View

United States Patent Application Publication

20250255451

Kind Code

A1

Publication Date

August 14, 2025

Inventor(s)

Kremmel; Aldo Vincent

USER-ACTIVATED DISH STATUS SIGNALING FOR A DISHWASHER APPLIANCE

Abstract

A dishwasher appliance includes a wash tub positioned within a cabinet and defining a wash chamber for receipt of a load of articles for washing, and a door pivotally mounted to the cabinet to provide selective access to the wash chamber. A load status indicator is mounted to a handle of the door for indicating a load status of the load of articles. The dishwasher appliance includes a controller that communicates with a remote device over an external network to receive and provide the load status of the load of articles to users of the dishwasher appliance.

Inventors: Kremmel; Aldo Vincent (Palmyra, IN)

Applicant: Haier US Appliance Solutions, Inc. (Wilmington, DE)

Family ID: 96661152

Appl. No.: 18/440428

Filed: February 13, 2024

Publication Classification

Int. Cl.: A47L15/00 (20060101); A47L15/42 (20060101)

U.S. Cl.:

CPC A47L15/0063 (20130101); A47L15/4261 (20130101); A47L15/4293 (20130101);
A47L2301/06 (20130101); A47L2401/26 (20130101); A47L2401/34 (20130101);
A47L2501/26 (20130101)

Background/Summary

FIELD OF THE INVENTION

[0001] The present subject matter relates generally to dishwasher appliances, and more particularly, to systems and methods for indicating the clean/dirty status of dishes within a dishwasher appliance.

BACKGROUND OF THE INVENTION

[0002] Dishwasher appliances generally include a tub that defines a wash chamber. Rack assemblies can be mounted within the wash chamber of the tub for receipt of articles for washing. Wash fluid (e.g., various combinations of water and detergent along with optional additives) may be introduced into the tub where it collects in a sump space at the bottom of the wash chamber. During wash and rinse cycles, a pump may be used to circulate wash fluid to spray assemblies within the wash chamber that can apply or direct wash fluid towards articles disposed within the rack assemblies in order to clean such articles. During a drain cycle, a pump may periodically discharge soiled wash fluid that collects in the sump space and the process may be repeated.

[0003] After a wash cycle is complete, the cleaned articles may remain within the wash chamber as they are dried. Ideally, a user of dishwasher appliance will immediately empty all articles from the dishwasher after completion of the cleaning and/or drying cycle. However, articles are not commonly removed immediately, e.g., because the user is not near the appliance, does not currently need dishes, or is otherwise occupied. Notably, particularly in appliance settings where multiple consumers use the same dishwasher appliance, certain consumers may have a tendency to only remove dishes as they are needed. Similarly, other consumers may have a tendency to place dirty dishes into the wash chamber without first confirming whether the dishes remaining in the wash chamber are clean.

[0004] While conventional dishwashers may illuminate a light indicating that the load of dishes is clean, this light is commonly turned off after the dishwasher door is open under the assumption that the person accessing the wash chamber has removed all dishes. However, as noted above, this assumption is not always true. Accordingly, conventional dishwasher appliances currently do not provide the user with confidence as to the state of cleanliness of dishes within the wash chamber.

[0005] Accordingly, a dishwashing appliance with features for indicating whether dishes located within the wash chamber are clean would be beneficial. More specifically, a dishwashing appliance that provides a quick and easy user-activated indication of the cleanliness of dishes would be particularly useful.

BRIEF DESCRIPTION OF THE INVENTION

[0006] Aspects and advantages of the invention will be set forth in part in the following description, or may be obvious from the description, or may be learned through practice of the invention.

[0007] In one exemplary embodiment, a dishwasher appliance is provided including a wash tub positioned within a cabinet and defining a wash chamber for receipt of a load of articles for washing, a door pivotally mounted to the cabinet to provide selective access to the wash chamber, and a load status indicator for indicating a load status of the load of articles.

[0008] In another exemplary embodiment, a dishwasher appliance is provided including a wash tub positioned within a cabinet and defining a wash chamber for receipt of a load of articles for washing, a door pivotally mounted to the cabinet to provide selective access to the wash chamber, and a controller in operative communication with a remote device over an external network. The controller is configured to receive a load status of the load of articles from a user and provide a user notification including the load status of the load of articles.

[0009] These and other features, aspects and advantages of the present invention will become better understood with reference to the following description and appended claims. The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate

embodiments of the invention and, together with the description, serve to explain the principles of the invention.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] A full and enabling disclosure of the present invention, including the best mode thereof, directed to one of ordinary skill in the art, is set forth in the specification, which makes reference to the appended figures.

[0011] FIG. 1 provides a perspective view of a dishwasher appliance, including a dishwasher door according to an example embodiment of the present disclosure.

[0012] FIG. 2 provides a cross-sectional side view of the example dishwashing appliance of FIG. 1 according to an example embodiment of the present disclosure.

[0013] FIG. 3 provides an example status indicator for indicating a state of cleanliness of dishes according to an example embodiment of the present subject matter.

[0014] FIG. 4 illustrates a method for operating a dishwasher appliance in accordance with one embodiment of the present disclosure.

[0015] Repeat use of reference characters in the present specification and drawings is intended to represent the same or analogous features or elements of the present invention.

DETAILED DESCRIPTION

[0016] Reference now will be made in detail to embodiments of the invention, one or more examples of which are illustrated in the drawings. Each example is provided by way of explanation of the invention, not limitation of the invention. In fact, it will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope or spirit of the invention. For instance, features illustrated or described as part of one embodiment can be used with another embodiment to yield a still further embodiment. Thus, it is intended that the present invention covers such modifications and variations as come within the scope of the appended claims and their equivalents.

[0017] As used herein, the terms “first,” “second,” and “third” may be used interchangeably to distinguish one component from another and are not intended to signify location or importance of the individual components. In addition, the term “or” is generally intended to be inclusive (i.e., “A or B” is intended to mean “A or B or both”). Furthermore, as used herein, terms of approximation, such as “approximately,” “substantially,” or “about,” refer to being within a ten percent margin of error.

[0018] FIGS. 1 and 2 depict an exemplary domestic dishwashing appliance or dishwasher **100** that may be configured in accordance with aspects of the present disclosure. For the particular embodiment of FIGS. 1 and 2, the dishwasher **100** includes a cabinet **102** having a tub **104** therein that defines a wash chamber **106**. As shown, tub **104** extends between a top **107** and a bottom **108** along a vertical direction V, between a pair of side walls **110** along a lateral direction L, and between a front side **111** and a rear side **112** along a transverse direction T. Each of the vertical direction V, lateral direction L, and transverse direction T are mutually orthogonal to one another.

[0019] The tub **104** includes a front opening **114** and a door **116** hinged at its bottom for movement between a normally closed vertical position (shown in FIG. 2), wherein the wash chamber **106** is sealed shut for washing operation, and a horizontal open position for loading and unloading of articles from the dishwasher **100**. According to exemplary embodiments, dishwasher **100** further includes a door closure mechanism or assembly **118** that is used to lock and unlock door **116** for accessing and sealing wash chamber **106**.

[0020] As illustrated in FIG. 2, tub side walls **110** may accommodate a plurality of rack assemblies. More specifically, guide rails **120** may be mounted to side walls **110** for supporting a lower rack

assembly **122**, a middle rack assembly **124**, and an upper rack assembly **126**. As illustrated, upper rack assembly **126** is positioned at a top portion of wash chamber **106** above middle rack assembly **124**, which is positioned above lower rack assembly **122** along the vertical direction V. Each rack assembly **122**, **124**, **126** is adapted for movement between an extended loading position (not shown) in which the rack is substantially positioned outside the wash chamber **106**, and a retracted position (shown in FIGS. **1** and **2**) in which the rack is located inside the wash chamber **106**. This is facilitated, for example, by rollers **128** mounted onto rack assemblies **122**, **124**, **126**, respectively. Although guide rails **120** and rollers **128** are illustrated herein as facilitating movement of the respective rack assemblies **122**, **124**, **126**, it should be appreciated that any suitable sliding mechanism or member may be used according to alternative embodiments.

[0021] Some or all of the rack assemblies **122**, **124**, **126** are fabricated into lattice structures including a plurality of wires or elongated members **130** (for clarity of illustration, not all elongated members making up rack assemblies **122**, **124**, **126** are shown in FIG. **2**). In this regard, rack assemblies **122**, **124**, **126** are generally configured for supporting articles within wash chamber **106** while allowing a flow of wash fluid to reach and impinge on those articles (e.g., during a cleaning or rinsing cycle). According to another exemplary embodiment, a silverware basket (not shown) may be removably attached to a rack assembly (e.g., lower rack assembly **122**) for placement of silverware, utensils, and the like, that are otherwise too small to be accommodated by rack **122**.

[0022] Dishwasher **100** further includes a plurality of spray assemblies for urging a flow of water or wash fluid onto the articles placed within wash chamber **106**. More specifically, as illustrated in FIG. **2**, dishwasher **100** includes a lower spray arm assembly **134** disposed in a lower region **136** of wash chamber **106** and above a sump **138** so as to rotate in relatively close proximity to lower rack assembly **122**. Similarly, a mid-level spray arm assembly **140** is located in an upper region of wash chamber **106** and may be located below and in close proximity to middle rack assembly **124**. In this regard, mid-level spray arm assembly **140** may generally be configured for urging a flow of wash fluid up through middle rack assembly **124** and upper rack assembly **126**. Additionally, an upper spray assembly **142** may be located above upper rack assembly **126** along the vertical direction V. In this manner, upper spray assembly **142** may be configured for urging or cascading a flow of wash fluid downward over rack assemblies **122**, **124**, and **126**. As further illustrated in FIG. **2**, upper rack assembly **126** may further define an integral spray manifold **144**, which is generally configured for urging a flow of wash fluid substantially upward along the vertical direction V through upper rack assembly **126**.

[0023] The various spray assemblies and manifolds described herein may be part of a fluid distribution system or fluid circulation assembly **150** for circulating water and wash fluid in the tub **104**. More specifically, fluid circulation assembly **150** includes a pump **152** for circulating water or wash fluid (e.g., detergent, water, or rinse aid) in the tub **104**. Pump **152** may be located within sump **138** or within a machinery compartment located below sump **138** of tub **104**, as generally recognized in the art. Fluid circulation assembly **150** may include one or more fluid conduits or circulation piping for directing water or wash fluid from pump **152** to the various spray assemblies and manifolds. For example, as illustrated in FIG. **2**, a primary supply conduit **154** may extend from pump **152**, along rear **112** of tub **104** along the vertical direction V to supply wash fluid throughout wash chamber **106**.

[0024] As illustrated, primary supply conduit **154** is used to supply wash fluid to one or more spray assemblies (e.g., to mid-level spray arm assembly **140** and upper spray assembly **142**). However, it should be appreciated that according to alternative embodiments, any other suitable plumbing configuration may be used to supply wash fluid throughout the various spray manifolds and assemblies described herein. For example, according to another exemplary embodiment, primary supply conduit **154** could be used to provide wash fluid to mid-level spray arm assembly **140** and a dedicated secondary supply conduit (not shown) could be utilized to provide wash fluid to upper spray assembly **142**. Other plumbing configurations may be used for providing wash fluid to the

various spray devices and manifolds at any location within dishwasher appliance **100**.

[0025] Each spray arm assembly **134**, **140**, **142**, integral spray manifold **144**, or other spray device may include an arrangement of discharge ports or orifices for directing wash fluid received from pump **152** onto dishes or other articles located in wash chamber **106**. The arrangement of the discharge ports, also referred to as jets, apertures, or orifices, may provide a rotational force by virtue of wash fluid flowing through the discharge ports. Alternatively, spray arm assemblies **134**, **140**, **142** may be motor-driven, or may operate using any other suitable drive mechanism. Spray manifolds and assemblies may also be stationary. The resultant movement of the spray arm assemblies **134**, **140**, **142** and the spray from fixed manifolds provides coverage of dishes and other dishwasher contents with a washing spray. Other configurations of spray assemblies may be used as well. For example, dishwasher **100** may have additional spray assemblies for cleaning silverware, for scouring casserole dishes, for spraying pots and pans, for cleaning bottles, etc. One skilled in the art will appreciate that the embodiments discussed herein are used for the purpose of explanation only and are not limitations of the present subject matter.

[0026] In operation, pump **152** draws wash fluid in from sump **138** and pumps it to a diverter assembly **156** (e.g., which may be positioned within sump **138** of dishwasher appliance **100**). Diverter assembly **156** may include a diverter disk (not shown) disposed within a diverter chamber **158** for selectively distributing the wash fluid to the spray arm assemblies **134**, **140**, **142** or other spray manifolds or devices. For example, the diverter disk may have a plurality of apertures that are configured to align with one or more outlet ports (not shown) at the top of diverter chamber **158**. In this manner, the diverter disk may be selectively rotated to provide wash fluid to the desired spray device.

[0027] According to an exemplary embodiment, diverter assembly **156** is configured for selectively distributing the flow of wash fluid from pump **152** to various fluid supply conduits, only some of which are illustrated in FIG. **2** for clarity. More specifically, diverter assembly **156** may include four outlet ports (not shown) for supplying wash fluid to a first conduit for rotating lower spray arm assembly **134** in the clockwise direction, a second conduit for rotating lower spray arm assembly **134** in the counter-clockwise direction, a third conduit for spraying an auxiliary rack such as the silverware rack, and a fourth conduit for supply mid-level or upper spray assemblies **140**, **142** (e.g., such as primary supply conduit **154**).

[0028] The dishwasher **100** is further equipped with a controller **160** to regulate operation of the dishwasher **100**. The controller **160** may include one or more memory devices and one or more microprocessors, such as general or special purpose microprocessors operable to execute programming instructions or micro-control code associated with a cleaning cycle. The memory may represent random access memory such as DRAM, or read only memory such as ROM or FLASH. In one embodiment, the processor executes programming instructions stored in memory. The memory may be a separate component from the processor or may be included onboard within the processor. Alternatively, controller **160** may be constructed without using a microprocessor (e.g., using a combination of discrete analog or digital logic circuitry, such as switches, amplifiers, integrators, comparators, flip-flops, AND gates, and the like) to perform control functionality instead of relying upon software.

[0029] The controller **160** may be positioned in a variety of locations throughout dishwasher **100**. In the illustrated embodiment, the controller **160** may be located within a control panel area **162** of door **116**, as shown in FIGS. **1** and **2**. In such an embodiment, input/output (“I/O”) signals may be routed between the control system and various operational components of dishwasher **100** along wiring harnesses that may be routed through the bottom of door **116**. Typically, the controller **160** may be in operative communication with a user interface panel **164** through which a user may select various operational features and modes and monitor progress of the dishwasher **100**. In one embodiment, the user interface **164** may represent a general purpose I/O (“GPIO”) device or functional block. In certain embodiments, the user interface **164** includes input components **166**,

such as one or more of a variety of electrical, mechanical or electro-mechanical input devices including capacitive touch screens/buttons, rotary dials, push buttons, and touch pads. The user interface **164** may further include one or more display components **168**, such as a digital display device or one or more indicator light assemblies designed to provide operational feedback to a user. The user interface **164** may be in communication with the controller **160** via one or more signal lines or shared communication busses.

[0030] It should be appreciated that the invention is not limited to any particular style, model, or configuration of dishwasher **100**. The exemplary embodiment depicted in FIGS. **1** and **2** is for illustrative purposes only. For example, different locations may be provided for user interface **164**, different configurations may be provided for rack assemblies **122**, **124**, **126**, different spray arm assemblies **134**, **140**, **142** and spray manifold configurations may be used, and other differences may be applied while remaining within the scope of the present subject matter. Moreover, aspects of the present subject matter may be applied to other appliances as well, such as refrigerators, ovens, microwaves, etc.

[0031] Referring now generally to FIGS. **1** and **2**, door **116** will be described according to exemplary embodiments of the present subject matter. Although door **116** is described herein as being used with dishwasher **100**, it should be appreciated that door **116** or variations thereof may be used on any other suitable residential or commercial appliance. As described herein, door **116** may share a coordinate system with dishwasher **100**, e.g., when door **116** is in the closed position (e.g., as shown in FIG. **2**). Specifically, door **116** may define a vertical direction V, a lateral direction L, and a transverse direction T. Therefore, these directions may be used herein to refer to features of door **116** and its various components and sub-assemblies.

[0032] As shown, in the normally closed position, door **116** extends from a top end or top edge **180** to a bottom end or bottom edge **182** along the vertical direction V; from a front end **184** to a rear end **186** along the transverse direction T; and between two lateral ends **188** along the lateral direction L. According to exemplary embodiments, door **116** may be formed from one or more exterior panels that define an interior chamber of door **116**. According to exemplary embodiments, the exterior panels of door **116** may be panels that are stamped from stainless steel or may be formed from any other suitably rigid material, such as thermoformed plastic, other metals, etc. In general, the exterior panels of door **116** may be assembled in any suitable manner, e.g., may be secured together using any suitable mechanical fastener, welding, snap-fit mechanisms, etc. In addition, it should be appreciated that an insulating material (not shown), such as fiberglass or foam insulation, may be positioned within door **116** to provide thermal and/or sound insulation to dishwasher **100**.

[0033] Referring still to FIGS. **1** and **2**, user interface panel **164** is positioned proximate top edge **180** of door **116** along the vertical direction V. In this manner, user interface panel **164** may be partially hidden below a countertop when dishwasher appliance **100** is installed below the countertop and door **116** is closed. Accordingly, dishwasher appliance **100** may be referred to as a “top control dishwasher appliance.” However, it should be appreciated that aspects of the present subject matter may be used with dishwasher appliances having other configurations or any other suitable appliance. For example, user interface panel **164** may be alternately positioned on front face or front end **184** of door **116**.

[0034] User interface panel **164** is positioned on door **116** such that a user can engage or interact with user interface panel **164**, e.g., to select operating cycles and parameters, activate/deactivate operating cycles, or adjust other operating parameters of dishwasher appliance **100**. User interface panel **164** may include a printed circuit board (not shown) that is positioned within door **116**. According to exemplary embodiments, printed circuit board may include or be operatively coupled to controller **160** and/or user interface panel **164**. In addition, user interface panel **164** may include or be operably coupled to one or more user inputs or touch buttons (e.g., identified generally herein as user inputs **166**) for receiving user input, providing user notifications, or illuminating to indicate

cycle or operating status.

[0035] Specifically, according to the illustrated embodiment, user inputs **166** include a plurality of capacitive sensors that are mounted to user interface panel **164** and are operable to detect user inputs. For example, these capacitive sensors may be configured for triggering when a user touches a top edge **180** of user interface panel **164** in a region associated with a particular user input **166**. In particular, these capacitive sensors can detect when a finger or another conductive material with a dielectric different than air contacts or approaches user interface panel **164**, along with the precise location, pressure, etc. of the finger interaction.

[0036] When a user touches top edge **180** of user interface panel **164** adjacent one of user inputs **166**, the associated capacitive sensors may be triggered and may communicate a corresponding signal to controller **160**. In such a manner, operations of dishwasher appliance **100** can be initiated and controlled. According to exemplary embodiments, the capacitive sensors may be distributed laterally on user interface panel **164**. It will be understood that other any suitable number, type, and position of capacitive sensors may be used while remaining within the scope of the present subject matter. Indeed, any suitable number, type, and configuration of user inputs **166** may be used while remaining within the scope of the present subject matter.

[0037] User interface panel **164** may define a plurality of surfaces that are intended to be illuminated for various purposes. For example, user inputs **166** may be illuminated by light sources to inform the user of the location of the button or to provide some other status indication. Notably, this illumination is typically achieved by directing a light beam along the vertical direction V onto top edge **180** of user interface panel **164**. Door **116** may further include a plurality of light sources or lighting devices that are configured for illuminating one or more surfaces of user interface panel **164**. It should be appreciated that these light sources may include any suitable number, type, configuration, and orientation of light sources mounted at any suitable location to illuminate status indicators or buttons in any suitable colors, sizes, patterns, etc. In other words, the light sources may be provided as any suitable number, type, position, and configuration of electrical light source(s), using any suitable light technology and illuminating in any suitable color. For example, the light sources may include one or more light emitting diodes (LEDs), which may each illuminate in a single color (e.g., white LEDs), or which may each illuminate in multiple colors (e.g., multi-color or RGB LEDs) depending on the control signal from controller **160**.

[0038] However, it should be appreciated that according to alternative embodiments, the light sources may include any other suitable traditional light bulbs or sources, such as halogen bulbs, fluorescent bulbs, incandescent bulbs, glow bars, a fiber light source, etc. Moreover, the light sources may be operably coupled (e.g., electrically coupled) to controller **160** or another suitable control board to facilitate activation or illumination of the light sources (e.g., to indicate a user input, state of the dishwasher appliance, state of the wash cycle, or any other relevant information to a user).

[0039] According to exemplary embodiments, user interface panel **164** may be any suitable transparent or semitransparent feature for diffusing, directing, or otherwise transmitting light from a light source. For example, user interface panel **164** may be formed from a suitable transparent or translucent material configured to direct light energy, such as a dielectric material, such as glass or plastic, polycarbonate, polypropylene, polyacrylic, or any other suitable material.

[0040] In addition, user interface panel **164** may be a dead fronted panel. As used herein, the term “dead front” and the like is generally intended to refer to portions of a control panel which may be used as indicators, buttons, interactive control surfaces, or other user-interaction features without exposing the user to the operating side of the equipment or live parts and connections, i.e., lights, electrical connections, etc. For example, user interface panel **164** may include a transparent or translucent body and an opaque masking material that is selectively printed on top edge **180** of the translucent body to define capacitive touch buttons or user inputs **166**.

[0041] The opaque material may be deposited on the translucent body to define any suitable

number, size, and configuration of illuminated features. These illuminated features may be shapes or include other forms such as symbols, words, etc. that are visible on user interface panel **164**. More specifically, when light sources are energized, capacitive touch buttons or user inputs **166** on top edge **180** may be illuminated. Thus, the dead fronted top edge **180** may be the surface that is contacted for controlling dishwasher appliance **100** or which may be illuminated for purposes of indicating operating status or other conditions to the user of the dishwasher appliance

[0042] Referring still to FIG. **1**, a schematic diagram of an external communication system **190** will be described according to an exemplary embodiment of the present subject matter. In general, external communication system **190** is configured for permitting interaction, data transfer, and other communications between dishwasher appliance **100** and one or more external devices. For example, this communication may be used to provide and receive operating parameters, user instructions or notifications, performance characteristics, user preferences, or any other suitable information for improved performance of dishwasher appliance **100**. In addition, it should be appreciated that external communication system **190** may be used to transfer data or other information to improve performance of one or more external devices or appliances and/or improve user interaction with such devices.

[0043] For example, external communication system **190** permits controller **160** of dishwasher appliance **100** to communicate with a separate device external to dishwasher appliance **100**, referred to generally herein as an external device **192**. As described in more detail below, these communications may be facilitated using a wired or wireless connection, such as via a network **194**. In general, external device **192** may be any suitable device separate from dishwasher appliance **100** that is configured to provide and/or receive communications, information, data, or commands from a user. In this regard, external device **192** may be, for example, a personal phone, a smartphone, a tablet, a laptop or personal computer, a wearable device, a smart home system, or another mobile or remote device.

[0044] In addition, a remote server **196** may be in communication with dishwasher appliance **100** and/or external device **192** through network **194**. In this regard, for example, remote server **196** may be a cloud-based server **196**, and is thus located at a distant location, such as in a separate state, country, etc. According to an exemplary embodiment, external device **192** may communicate with a remote server **196** over network **194**, such as the Internet, to transmit/receive data or information, provide user inputs, receive user notifications or instructions, interact with or control dishwasher appliance **100**, etc. In addition, external device **192** and remote server **196** may communicate with dishwasher appliance **100** to communicate similar information.

[0045] In general, communication between dishwasher appliance **100**, external device **192**, remote server **196**, and/or other user devices or appliances may be carried using any type of wired or wireless connection and using any suitable type of communication network, non-limiting examples of which are provided below. For example, external device **192** may be in direct or indirect communication with dishwasher appliance **100** through any suitable wired or wireless communication connections or interfaces, such as network **194**. For example, network **194** may include one or more of a local area network (LAN), a wide area network (WAN), a personal area network (PAN), the Internet, a cellular network, any other suitable short-or long-range wireless networks, etc. In addition, communications may be transmitted using any suitable communications devices or protocols, such as via Wi-Fi®, Bluetooth®, Zigbee®, wireless radio, laser, infrared, Ethernet type devices and interfaces, etc. In addition, such communication may use a variety of communication protocols (e.g., TCP/IP, HTTP, SMTP, FTP), encodings or formats (e.g., HTML, XML), and/or protection schemes (e.g., VPN, secure HTTP, SSL).

[0046] External communication system **190** is described herein according to an exemplary embodiment of the present subject matter. However, it should be appreciated that the exemplary functions and configurations of external communication system **190** provided herein are used only as examples to facilitate description of aspects of the present subject matter. System configurations

may vary, other communication devices may be used to communicate directly or indirectly with one or more associated appliances, other communication protocols and steps may be implemented, etc. These variations and modifications are contemplated as within the scope of the present subject matter.

[0047] Referring now generally to FIGS. **1** through **3**, dishwasher appliance **100** may further include a load status indicator **200** for indicating a load status of the load of articles within wash chamber **106**. In this regard, as explained above, after the load of articles is cleaned and a user removes a single article without emptying the entire load from wash chamber **106**, a subsequent user may not know the load status of the load. In general, the term “load status” may be used generally to refer to whether the load of articles is clean or dirty. This information may be particularly important when a user wishes to remove a clean item for use or add a dirty item for a subsequent wash cycle. Accordingly, load status indicator **200** may provide a visual indication to users of dishwasher appliance **100** as to the clean or dirty status of articles located therein.

[0048] According to an example embodiment, load status indicator **200** is a manual toggle switch **202** that is mounted directly to dishwasher **100**. For example, according to the illustrated embodiment, manual toggle switch **202** may be mounted to a handle **204** of door **116**. According to still other embodiments, manual toggle switch **202** may be mounted at any other suitable location on or around dishwasher **100**, such as on a front panel of door **116** or within user interface panel **164**. It should be appreciated that the present subject matter is not limited to the positioning or configuration of manual toggle switch **202**.

[0049] In general, manual toggle switch **202** may be any suitable tactile button, switch, or other feature that a user may interact with to indicate the load status of the load of articles. For example, referring briefly to FIG. **3**, manual toggle switch **202** is illustrated as a slider switch that includes a dirty indicator **210**, a clean indicator **212**, and a sliding panel **214** that a user may manually slide back and forth to reveal the load status of the load of articles. According to still other embodiments, manual toggle switch **202** may be a rotator switch, a light switch, a press button, or any other feature that a user may interact with to indicate a load status.

[0050] In general, manual toggle switch **202** may be integrated into dishwasher **100** in any suitable manner using any suitable manufacturing technique. For example, according to the illustrated embodiment, manual toggle switch **202** is formed within or molded onto handle **204** or another portion of door **116**. In this regard, for example, a depression may be stamped into handle **204** for receiving manual toggle switch **202** in a flush-mount configuration. Manual toggle switch **202** may be attached using mechanical fasteners, an adhesive, or any other suitable method. For example, manual toggle switch **202** may be a user input **166** and load status indicator **200** may be a display component **168**, such as a light indicator, a textual display, or any other suitable feature.

[0051] In addition, or alternatively, dishwasher **100** may use controller **160** and external communication system **190** to prompt a user for the load status, receive the load status from the user, and communicate the load status to other users of dishwasher **100**. In this regard, as explained above, controller **160** may be in operative communication with a remote device over an external network (e.g., such as external device **192** through network **194**). A user may input the load status by opening a software application on external device **192** and pressing one or more buttons to indicate load status.

[0052] According to example embodiments, the load status received from external device **192** may be communicated to other external devices **192** associated with dishwasher **100** or may be indicated elsewhere on dishwasher **100** (e.g., via a user interface panel **164** or another display component **168**). In addition, controller **160** may be programmed for prompting the user when it detects that the load status may be in question. For example, if a cleaning cycle has been completed and the door is subsequently opened, controller **160** may prompt the user to provide the load status. In addition, it should be appreciated that a user may check the load status at any time using the software application on external device **192**.

[0053] Now that the construction of dishwasher appliance **100** and external communication system **190** according to exemplary embodiments have been presented, an exemplary method **300** of operating a dishwasher appliance will be described. Although the discussion below refers to the exemplary method **300** of operating dishwasher appliance **100**, one skilled in the art will appreciate that the exemplary method **300** is applicable to the operation of a variety of other dishwasher appliances.

[0054] Referring now to FIG. **4**, method **300** includes, at step **310**, determining that a cleaning cycle has been completed in a dishwasher appliance. For example, continuing the example from above, controller **160** may determine that dishes within dishwasher **100** are clean after the end of a cleaning cycle. Until or unless door **116** is opened, controller **160** may assume that the dishes remain clean and provide an indication in this regard. However, step **320** may include determining that a door of the dishwasher appliance has been opened. After door **116** has been opened, controller **160** and subsequent users may have no knowledge of the state of cleanliness of dishes located therein.

[0055] Accordingly step **330** may include transmitting a prompt to a remote device through an external network requesting a load status of a load of articles from a user. According to alternative embodiments, this prompt may be provided directly through a user interface panel **164**. The user that opened door **116** may thereby provide a load status for the convenience of subsequent users. For example, step **340** may include receiving a load status of the articles from a user, e.g., via a user interface panel **164**, a software application on external device **192**, or any other suitable input device.

[0056] Step **350** may include providing a user notification including the load status of the load of articles. In this regard, controller **160**, upon receipt of the load status from the user, may transmit a user notification to an external device **192** such that it is visible to a subsequent user and may provide knowledge as to the state of cleanliness of dishes within dishwasher **100**. According to still other embodiments, step **350** may include illuminating a load status indicator that is positioned on or near dishwasher **100**. In this manner, subsequent users may be provided with quick and easy access to the load status of dishes located within dishwasher **100**.

[0057] FIG. **4** depicts steps performed in a particular order for purposes of illustration and discussion. Those of ordinary skill in the art, using the disclosures provided herein, will understand that the steps of any of the methods discussed herein can be adapted, rearranged, expanded, omitted, or modified in various ways without deviating from the scope of the present disclosure. Moreover, although aspects of method **300** are explained using dishwasher appliance **100** and external communication system **190** as an example, it should be appreciated that this method may be applied to the operation of any suitable dishwasher appliance.

[0058] As explained above, aspects of the present subject matter are generally directed to a manual actuating “clean” or “dirty” signal feature present on the door, or on a door handle of a dishwasher. For example, when the door is opened and dishes are taken out after the completion of a dishwashing process, the user can still manually activate the notification feature to inform the other user whether the dishes are “clean” or “dirty.” This notification feature can be implemented using a physical actuation feature on the handle portion of the dishwasher for manually activating the notification feature to display whether the dishes are “clean” or “dirty.” The manual actuating “clean” or “dirty” signal feature can also be present in handle pocket in the form of slider, rotator, a light switch toggle, etc. In addition, the toggle may be a virtual toggle switch actuated using a remote device (e.g., such as a mobile phone) and the status indicator may be a light, textual display, or any other suitable indicator.

[0059] This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled

in the art. Such other examples are intended to be within the scope of the claims if they include structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal languages of the claims.

Claims

1. A dishwasher appliance defining a vertical direction, a lateral direction, and a transverse direction, the dishwasher appliance comprising: a wash tub positioned within a cabinet and defining a wash chamber for receipt of a load of articles for washing; a door pivotally mounted to the cabinet to provide selective access to the wash chamber; and a load status indicator for indicating a load status of the load of articles.
2. The dishwasher appliance of claim 1, wherein the load status indicator is a manual toggle switch mounted to the dishwasher appliance.
3. The dishwasher appliance of claim 2, wherein the manual toggle switch is a slider switch, a rotator switch, or a light switch.
4. The dishwasher appliance of claim 3, wherein the manual toggle switch is mounted to a handle of the door.
5. The dishwasher appliance of claim 3, wherein the manual toggle switch is formed within or molded onto the door.
6. The dishwasher appliance of claim 1, further comprising a controller in operative communication with a remote device over an external network, the controller being configured to: receive the load status of the load of articles from a user; and provide a user notification including the load status of the load of articles.
7. The dishwasher appliance of claim 6, further comprising: a user interface panel comprising a load status indicator, wherein providing the user notification comprises illuminating a load status indicator.
8. The dishwasher appliance of claim 6, wherein the controller is further configured to: determine that a cleaning cycle has been completed; determine that the door has been opened; and transmit a prompt to the remote device requesting the load status from the user.
9. The dishwasher appliance of claim 6, wherein providing the user notification comprises providing the user notification to the remote device over the network.
10. A method of operating a dishwasher appliance, the dishwasher appliance comprising a wash tub positioned within a cabinet and defining a wash chamber for receipt of a load of articles for washing and a door pivotally mounted to the cabinet to provide selective access to the wash chamber, the method comprising: receiving a load status of the load of articles from a user through a remote device over an external network; and providing a user notification including the load status of the load of articles.
11. The method of claim 10, wherein providing the user notification comprises illuminating a load status indicator on a user interface panel of the dishwasher appliance.
12. The method of claim 10, wherein providing the user notification comprises providing the user notification to the remote device over the external network.
13. The method of claim 10, further comprising: determining that a cleaning cycle has been completed; determining that the door has been opened; and transmitting a prompt to the remote device requesting the load status from the user.
14. A dishwasher appliance defining a vertical direction, a lateral direction, and a transverse direction, the dishwasher appliance comprising: a wash tub positioned within a cabinet and defining a wash chamber for receipt of a load of articles for washing; a door pivotally mounted to the cabinet to provide selective access to the wash chamber; and a controller in operative communication with a remote device over an external network, the controller being configured to:

receive a load status of the load of articles from a user; and provide a user notification including the load status of the load of articles.

15. The dishwasher appliance of claim 14, further comprising: a user interface panel comprising a load status indicator, wherein providing the user notification comprises illuminating a load status indicator.

16. The dishwasher appliance of claim 14, wherein the controller is further configured to: determine that a cleaning cycle has been completed; determine that the door has been opened; and transmit a prompt to the remote device requesting the load status from the user.

17. The dishwasher appliance of claim 14, wherein providing the user notification comprises providing the user notification to the remote device over the network.

18. The dishwasher appliance of claim 14, further comprising: a load status indicator for indicating a load status of the load of articles, wherein the load status indicator is a manual toggle switch mounted to the dishwasher appliance.

19. The dishwasher appliance of claim 18. wherein the manual toggle switch is a slider switch, a rotator switch, or a light switch.

20. The dishwasher appliance of claim 18. wherein the manual toggle switch is mounted to a handle of the door.
