

MICRO SWITCH™

Basic Switches

Line Guide



The switch is on. Simple, superior, durable, and irreplaceable even by 21st-century standards, the MICRO SWITCH™ technology cycles on. Today, Honeywell Sensing and Control (S&C) manufactures millions of MICRO SWITCH™ basic switches annually for water and irrigation, aerospace and defense, industrial, off-highway, and medical applications. They are globally compliant, and known worldwide for their compact and lightweight design, accurate repeatability, and extended life.

Looking for enhanced accuracy and repeatability? Our premium line of MICRO SWITCH™ Large and Subminiature switches were designed for high-precision applications. Originally developed

to support United States aircraft in World War II, advancements in packaging and operating controls have helped further expand applications over the past 75 years while maintaining enhanced accuracy and repeatability. Our standard line of basic switches includes our V15 series, and is designed with the same high quality standards, but for low cost-of-failure applications – ones where the cost of replacing the switch is less than the cost of a switch failing.

MICRO SWITCH™ V-Basic series switches are often best suited for presence and absence detection where physical contact with an object is permissible. They also excel in applications requiring simple on-and-off actions.

FEATURES

PREMIUM V-BASIC SWITCHES V7 Series.

Features: Best suited for higher cost-of-failure applications • Designed for 100K operations at a full load or 10M for mechanical life • World-wide package size acceptance • Current rating ranges from 0.1 A to 25 A • UL/CSA recognized, ENEC (European) approval available • Choice of actuation, termination and operating characteristics

Benefits: “Premium” product line. For broad range electrical loads and operating force in high cost-of-failure potential applications: appliances, timing devices, office equipment, computer/business equipment, test instruments, manually operated devices, and valves.

STANDARD V-BASIC SWITCHES V15 Series.

Features: Best suited for lower cost-of-failure applications • Designed for 50K operations at a full load or 5M for mechanical life • Worldwide package size acceptance • Current ratings of 5 A to 26 A • Global approvals (UL/CSA, cUL,

ENEC, and CQC) • Limited configuration options available

Benefits: “Standard” product line. Series for low cost-of-failure potential applications: appliances, gaming, vending machines, water heaters, and industrial controls.

WATERTIGHT SWITCHES V15W Series.

Features: Designed for harsh-duty, wash down areas • Delivers high sealing capability with an IP67 rating (pre-leaded only) • Gives highly accurate machine control for turning circuits on and off

- Current ratings of 0.1 A, 5 A, 10 A
- Global approvals (UL, cUL, ENEC, and CQC)

Benefits: compact, lightweight and long-lasting basic switch. Potential applications include appliances, HVAC wall controls, valves, automotive, truck, and boat wire harnesses, lock modules for tail-gate/trunk, sub-assemblies for convertible roofs, foot pedal controls.

PREMIUM MINIATURE/ SUBMINIATURE SWITCHES SM Series.

Features: Extended operating life

- Elongated mounting hole provides for easier, more accurate mounting
- Choice of actuation, electrical termination, and operating characteristics (sensitive differential travel as low as 0,0254 mm [0.001 in] maximum, low operating force to 0,56 N [2.0 oz] maximum)
- MIL-PFR-8805 qualified listings available

Benefits: Small size and light weight are combined with ample electrical capacity, precision operation, and extended life. Features high precision and repeatability. Options available (gold contacts for low energy switching, bifurcated gold contacts for maximum reliability, power load switching capability to 11 A). Potential applications include aerospace, instrumentation, appliances, office equipment, medical/dental equipment, valves, and more.

MICRO SWITCH™ Basic Switches Line Guide

Products and solutions to meet any need. Honeywell S&C MICRO SWITCH™ premium and standard basic switches are precision snap-action mechanisms enclosed in accurately molded plastic cases. Each switch contains a spring and a set of contacts that convert mechanical energy applied to an actuator into an electrical output. And each regular size, miniature and subminiature basic switch is carefully manufactured and thoroughly inspected.

Honeywell S&C also offers a wide variety of actuators, terminations, circuitry configurations, electrical ratings, contact materials, operating characteristics and sealing — to provide amazing application flexibility. Potential sample applications include power load switching, dc motor and solenoid control, limit and control mechanisms, door interlock and multiple mounting configurations. While special application products include door interlocks that automatically cut power when service drawers are opened, as well as switches handling a variety of special electrical load requirements.



Premium V-Basic Switches

V7 Series

Amp rating	0.1 A to 25 A
Circuitry	SPDT, SPNO, SPNC
Operating force	0.7 oz max. to 14.6 oz max.
Terminations	quick connect, pc board, pcb straight angle left
Actuators/Levers	pin plunger, straight, short flag, roller, sim. roller, curved tip, loop, paddle
Voltage	125 Vac, 250 Vac, 277 Vac
Approvals	UL, CSA, ENEC
Operating temperature	-40 °C to 82 °C [-40 °F to 180 °F]
Contacts	silver, silver cadmium oxide, gold
Housing material	PCT polyester thermoplastic



Standard V-Basic Switches

V15 Series



V15W Watertight Series

Amp rating	5 A to 26 A	0.1 A, 5 A, 10 A
Circuitry	SPDT, SPNO, SPNC	SPDT, SPNC, SPNO
Operating force	US: ≥100 g (16 A to 26 A); AP: 15 g to 400 g (5 A to 26 A)	15 g, 25 g, 50 g, 100 g, 200 g
Terminations	quick connect; direct wire connection with no terminals, RAST	preleaded; terminals: 4,8 mm x 0.8 mm or 4,8 mm x 0.5 mm
Actuators/Levers	pin plunger, straight, roller, sim. roller	pin plunger, straight, roller, sim. roller, special
Voltage	125 Vac, 250 Vac	125 Vac, 250 Vac, 30 Vdc, 48 Vdc
Approvals	UL, cUL, ENEC, CQC	UL, cUL, ENEC, CQC
Operating temperature	-25 °C to 150 °C [-13 °F to 300 °F]	-40 °C to 85 °C [-40 °F to 185 °F]
Contacts	silver cadmium oxide	silver nickel, gold-plated option
Housing material	PBT polyester thermoplastic	PBT polyester thermoplastic



Premium Miniatures and Subminiatures

SM Series

SX Series

Amp rating	0.1 A to 11 A	1 A to 7 A
Circuitry	SPDT	SPDT, SPNO
Operating force	0.04 oz to 2 oz	0.71 oz to 6 oz
Terminations	quick connect, solder, pcb	quick connect, solder, pcb
Actuators/Levers	pin plunger, straight, roller, sim. roller, paddle	pin plunger, straight, roller, sim. roller, offset flag, crossed roller
Voltage	115 Vac, 125 Vac, 250 Vac, 30 Vdc	125 Vac, 250 Vac, 28 Vdc
Approvals	UL, CSA, ENEC, CE	UL, CSA, ENEC, CE
Operating temperature	-55 °C to 125 °C [-67 °F to 267 °F]	-55 °C to 125 °C [-67 °F to 267 °F]
Contacts	silver, gold	silver, gold
Housing material	phenolic	phenolic or valox



Standard Miniatures and Subminiatures

ZD Series

ZM Series

ZV Series

ZW Series

ZX Series

Amp rating	0.1 A, 3 A	0.1 A, 5 A, 10.1 A, 16 A	0.1 A, 6 A, 10.1 A	0.1 A, 5 A	0.1 A, 3 A
Circuitry	SPDT	SPST, SPDT, SPNO	SPDT, SPNO, SPNC	SPDT, SPNO, SPNC	SPDT
Operating force	130 gf to 195 gf	0.18 oz to 8.78 oz	0.78 oz to 11.01 oz	1.94 oz to 7.16 oz	0.53 oz to 5.3 oz
Terminations	solder, pcb straight, pcb left angle, pcb right angle, pre-wired	quick connect, solder, pcb	quick connect, solder, pcb	quick connect, solder, cable bottom/end, cable side exit	solder, pcb snap-in, pcb left angle, pcb right angle
Actuators/Levers	pin plunger, straight, sim roller	pin plunger, straight, roller, sim. roller, L-shaped	pin plunger, straight, roller, sim. roller	pin plunger, straight, roller, sim. roller	pin plunger, straight, sim. roller, special
Voltage	125 Vac, 12 Vdc	125 Vac, 250 Vac, 30 Vdc	125 Vac, 250 Vac, 6(2) A 250 Vac	125 Vac, 250 Vac	125 Vac, 48 Vdc
Approvals	UL, cUL, CE, ENEC	UL, CSA, CE	UL, cUL, ENEC, CE	UL, cUL, CE, ENEC	UL, CSA
Operating temperature	-40 °C to 85 °C [-40 °F to 185 °F]	-25 °C to 85 °C [-13 °F to 185 °F]	-25 °C to 85 °C [-13 °F to 185 °F]	-25 °C to 80 °C [-13 °F to 176 °F]	-25 °C to 85 °C [-13 °F to 185 °F]
Contacts	silver, gold-plated silver	silver, gold-plated silver, silver-tin-indium oxide	silver, gold-plated silver, silver-tin-indium oxide	silver, gold-plated silver	silver, gold-plated silver
Housing material	PBT polyester	polyamide (nylon)	polyamide (nylon)	PBT (polyester)	polyamide (nylon)

MICRO SWITCH™ Basic Switches Line Guide



BZ, BA, BM, BE Series



DT Series

Premium Large Basic Switches

Amp rating	15 A (BZ); 22 A (BM); 20 A (BA); 25 A (BE)	10 A
Circuitry	SPDT	DPDT
Operating force	1.0 oz to 28 oz	7.0 oz to 10.0 oz
Terminations	quick connect, solder, screw	screw
Actuators/Levers	pin plunger, overtravel plunger, straight, roller, flexible roller leaf, flexible leaf	pin plunger
Voltage	115 Vac, 125 Vac, 250 Vac	250 Vac, 28 Vdc
Approvals	UL, CSA, ENEC, CE (varies by model)	UL, CSA
Operating temperature	-55 °C to 85 °C [-67 °F to 185 °F]	-55 °C to 85 °C [-67 °F to 185 °F]
Contacts	silver, silver cadmium oxide	silver
Housing material	general purpose phenolic	general purpose phenolic



MT Series



3MN Series



6AS Series

Premium Large Basic Switches

Amp rating	10 A	15 A	10 A, 15 A, 20 A
Circuitry	SPDT	two circuit, double break (2 CKT DB)	SPDT
Operating force	2.0 oz to 18 oz	7.0 oz to 20 oz	8 oz to 14 oz
Terminations	screw	screw	solder, screw, A2, T
Actuators/Levers	pin plunger, straight, roller	pin plunger	straight, roller, leaf
Voltage	125 Vac, 125 Vdc	480 Vac	125 Vac, 250 Vac, 480 Vac
Approvals	UL, CSA	UL, CSA	UL
Operating temperature	-55 °C to 82 °C [-67 °F to 180 °F]	-55 °C to 85 °C [-67 °F to 185 °F]	-55 °C to 85 °C [-67 °F to 185 °F]
Contacts	silver	silver	silver
Housing material	arc resistant melamine	general purpose phenolic	general purpose phenolic



Special Application Precision Switches

AC Series

DM Series

Amp rating	5 A to 25 A	10 A, 16 A
Circuitry	SPDT	SPDT, DPDT
Operating force	–	4,17 N [15 oz] max.
Terminations	turret-type solder, screw, flying leads	quick connect
Actuators/Levers	rod	bullet nose plunger
Voltage	125 Vac, 250 Vac, 480 Vac, 30 Vdc	125 Vac, 250 Vac, 277 Vac
Approvals	UL versions available	UL, CSA
Operating temperature	[-54 °C to 121 °C] -65 °F to 250 °F	-37 °C to 82 °C [-35 °F to 180 °F]
Contacts	silver	silver
Housing material	die-cast stainless steel bracket, stainless steel or polyester rod	polyester

SX Series.

Features: Extended operating life

- Elongated mounting hole for easier, more accurate mounting
- Choice of actuation, electrical termination, and operating characteristics
- MIL-PFR-8805 qualified listings available

Benefits: Lower operating force provides for enhanced operation and application versatility. Features enhanced precision and repeatability. Covered case construction with molded-in terminals allows for very simple adaptation to the customers' actuation systems. Potential applications include aerospace, instrumentation, appliances, office equipment, medical/dental equipment, valves, and more.

STANDARD MINIATURE/ SUBMINIATURE SWITCHES

ZD Series.

Features: Choice of low energy or power duty electrical ratings (gold-plated or silver contacts) • SPDT circuitry • Choice of ratings, actuation, termination, and operating characteristics

Benefits: Used for simple or precision ON/OFF application needs. These switches combine small size and light weight with ample electrical capacity, low cost and long life. Potential applications include automotive, truck, and boat wire harnesses; throttle controls; indicator lights; sub-assemblies for convertible roofs; electrical parking brakes; lock modules for tailgate/trunk; tank and hood latch detection; and, applications where a pre-wired sealed on/off switch is required.

ZM Series.

Features: Choice of low energy or power duty electrical ratings (gold-plated or silver contacts) • SPDT or SPST circuitry available • Choice of ratings, actuation, termination, and operating characteristics

Benefits: Used for simple or precision ON/OFF application needs. These switches combine small size and light weight with ample electrical capacity, low cost and long life. Potential applications include vending machines, timing devices, computer/business equipment, HVAC equipment, and more.

ZV Series.

Features: Subminiature: 10,6 mm H x 6,4 mm W x 19,8 mm L [0.42 in H x 0.25 in W x 0.78 in L] • Choice of low energy or power duty electrical ratings (gold-plated or silver contacts) • Single pole double throw (SPDT) circuitry or single pole single throw (SPST) circuitry available • Choice of ratings, actuation, termination and operating characteristics

Benefits: Switches combine small size and light weight with ample electrical capacity, low cost and extended life. The molded-in terminals reduce the possibility of switch cavity contamination. Potential applications include vending machines, timing devices, computer/business equipment, HVAC equipment, and more.

ZW Series.

Features: IP67 sealed available • Choice of low energy or power duty electrical ratings (gold-plated or silver contacts) • Single pole double throw (SPDT) circuitry or single pole single throw (SPST) circuitry available • Choice of ratings, actuation, termination and operating characteristics • PBT polyester housing material

Benefits: Switches combine small size and light weight with ample electrical capacity, low cost and extended life. Potential applications include appliances, timing devices, office equipment, test instruments communications equipment, valves, and more.

ZX Series.

Features: Subminiature switch • Choice of low energy or power duty electrical ratings (gold-plated or silver contacts) • SPDT or SPST circuitry available • 0.1 A or 3 A ratings • Choice of actuation, termination and operating characteristics • Polybutylene terephthalate housing material

Benefits: Switches combine small size and light weight with ample electrical capacity, low cost and long life. Potential applications include appliances, vending machines, timing devices, office equipment, computer/business equipment, test instruments, medical/dental equipment, communications equipment, HVAC equipment, manually operated devices, and valves.

PREMIUM LARGE BASIC SWITCHES

BZ, BA, BM, and BE Series.

Features: Accepted world-wide standard "Large Basic" switch • Low operating force and differential travel • Extended mechanical life up to 20,000,000 cycles at 95 % survival • Elongated mounting hole for easier, more accurate mounting • Current rating ranges from 15 A to 25 A • Choice of actuation, termination and operating characteristics • High temperature versions (204 °C [400 °F]) available • Momentary or maintained actions

Benefits: Through the use of optional seal plungers and covers, switches are capable of an IP67 rating. Potential applications include irrigation systems, semi-trailer trucks, timing devices, medical/dental equipment, manually operated devices, valves, and more.

DT Series.

Features: Mounting interchangeability with BZ Series switches • Rated for 10 A at 240 Vac • Design permits several wiring combinations

Benefits: Consists of two independent single-pole double throw (SPDT) circuits in one housing actuated by one actuator. Terminals are separated by a non-conductive shield to reduce shorting. Potential applications include irrigation systems, semi-trailer trucks, timing devices, office equipment, HVAC equipment, and more.

MT Series.

Features: Mounting interchangeability with BZ/BA Series switches • Rated for 10 A resistive at 125 Vac/Vdc and 3 A resistive at 250 Vdc • Expected mechanical life of 100,000 cycles at 95 % survival • Arc-extinguishing design in contact area • Arc-resistant case

Benefits: Magnetic blow-out switches designed to switch high capacity (125 Vdc and 250 Vdc) systems. Integral magnet around the contact gap protects the contacts by deflecting the arc. Vented case allows hot arc gasses to escape promoting extended switch life. Potential applications include large dc motors and generators.

3MN Series.

Features: Double-break circuitry • Power load switching capability to 15 A at 600 Vac • Motor handling capacity of 746 W [1 hp] at 240 Vac • Extended mechanical life to 10,000,000 cycles at 95 % survival • Space between terminals reduces possibility of shorting • Arc-resistant plastic

Benefits: Double-break standard basic switches provide easy gang mounting. Potential applications include mechanisms on machine tools, presses, and other industrial equipment.

6AS Series.

Features: Tandem switch assembly • Variety of actuators • Choice of circuitries, electrical ratings, and terminations • Field adjustable operating point on one or both basic switches

Benefits: Two standard basic switches ganged together and actuated by a single actuator. Potential applications include boiler controls or anywhere two circuits need to be controlled with one actuator.

SPECIAL APPLICATION PRECISION SWITCHES

AC Series.

Features: Automatically cuts power when service door or drawer is opened • Choice of momentary, maintained or pull-to-cheat actuation • Versatile mounting bracket for side or end mounting • Current rating ranges from 5 A to 25 A • Available with one or two SPDT switches • UL available • Choice of termination

Benefits: Used in simple or precision on/off application needs. Enables circuit testing with POWER ON by manually pulling a rod actuator to the maintained-ON position. Closing the door resets the switch. Potential applications include appliances, vending machines, office equipment, computer/business equipment, test instruments, medical/dental equipment, communications equipment, and HVAC equipment.

DM Series.

Features: Attractive, rugged snap-in panel mount design - easy installation • Choice of momentary, alternate push-pull or pull-to-cheat operation • Quick-connect terminals • Expected mechanical life: 1 million operations, 95% survival

Benefits: Snap-action switches in basic and manual configurations. Quick-connect terminals and snap-in, panel mount housings for ease of installation. Potential applications include appliance door lights, door interlocks, and stop/start switches.

Warranty. Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

For more information about Sensing and Control products, visit www.honeywell.com/sensing or call +1-815-235-6847. Email inquiries to info.sc@honeywell.com

Watertight Switches in Transportation Applications

BACKGROUND

Honeywell's MICRO SWITCH™ watertight basic switches can be used in a wide variety of washdown applications, including trucks, buses, forklifts, lawn mowers, ATVs, and golf carts. The V15W, ZD and ZW series switches are designed specifically for these challenging outdoor applications. Rugged yet precise, they accurately control the machine and are rated to meet IP67 ratings for water and dust protection (switch body only). Reliability, accuracy, and flexible design options make Honeywell V15W, ZD and ZW basic standard watertight switches suitable for electrical absence/detection in these challenging applications.

For design engineering flexibility, the MICRO SWITCH™ V15W, ZD, and ZW series of basic standard switches feature a variety of actuators, terminations, wire connections, operating and electrical characteristics to choose from. From subminiature to miniature switches, select the series that's right for your application.

Figure 1. Golf Cart



1 Reverse alarm – sounds when lever is moved to “reverse” setting

SOLUTIONS

Brake lights, auxiliary controls, reverse alarms, position detection for forklift trucks and operator presence detection switches all require extra protection in wet and dusty environments.

- **Brake light switches** – Position sensing behind brake pedal to turn on brake lights
- **Auxiliary controls and alarms** – Continuous position status with enhanced reliability and accuracy
- **Forklift position detection** – Position sensing on the forks for safe operation
- **Operator presence detection switches** – Presence detection for operator presence in the driver's seat for safety



Figure 2. Forklift

- 1 Foot brake switch – Activates brake light
- 2 Hand lever switch – Activates brake light
- 3 Fork lift mast –Travel limit switch stops vertical travel of the forks
- 4 Fork lift tilt –Travel limit switch stops tilt travel of the forks
- 5 Operator presence – Detects presence of driver, and provides shut-down protection



Watertight Switches in Transportation Applications

Figure 3. MICRO SWITCH™ ZW, ZD and V15W Series Basic Switches

MICRO SWITCH™ ZW and ZD Series Subminiature Switches		MICRO SWITCH™ V15W Series Watertight Miniature Basic Switches
		
<p>ZD SERIES</p> <ul style="list-style-type: none"> Designed for outdoor, wash down, and high-dust environments, meets IP67 standards for sealing (wired version) Available in 0.1 A and 3 A 125/250 Vac/12 Vdc ratings 500K to 2,000K operating life, 500K electrical Available in wired and terminal options with wide variety of shapes and mounting features Dimensions: 14,70 mm x 7,50 mm 	<p>ZW SERIES</p> <ul style="list-style-type: none"> Designed for outdoor, wash down, and high-dust environments, meets IP67 standards for sealing (wired version) Available in 0.1 A, 5 A, and 6 A 125/250 Vac ratings 500K to 2,000K operating life, 6K to 50K electrical life Available in wired and terminal options Dimensions: 19,90 mm x 9,15 mm 	<ul style="list-style-type: none"> Designed for outdoor, wash down, and high-dust environments, meets IP67 standards for sealing (wired version) Wide current range: 0.1 A, 5 A, and 10 A SPDT, SPNO, and SPNC options Straight, roller, simulated roller, and special actuators Available in wired and terminal options, special terminations available upon request Gold contacts available for low current operation Global approvals; UL, cUL, ENEC, and CQC RoHS compliant Dimensions: standard V-Size package

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. We assume no responsibility for its use.

SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

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