



V-Basic Standard Switches Introduction

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Honeywell

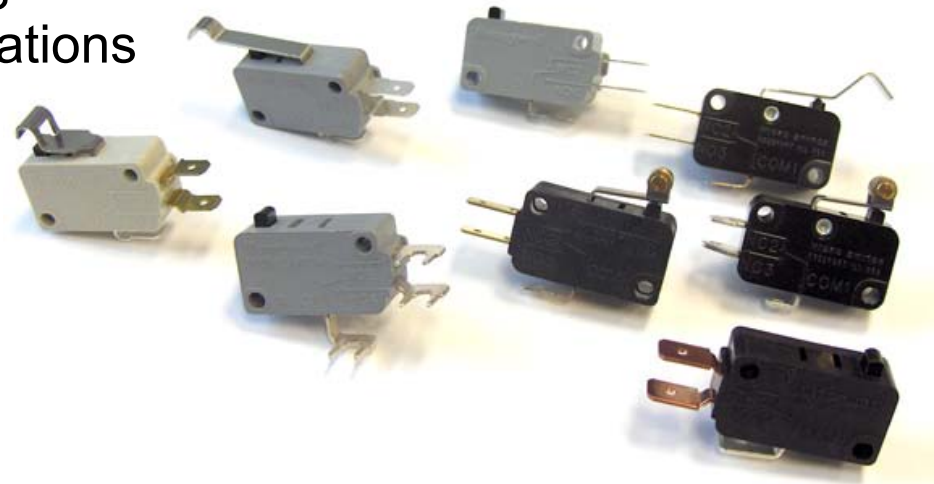
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V-Basic Family Overview

- From its MICRO SWITCH™ beginnings, Honeywell V-series has over 75 years of proven success
- Designed for enhanced operation, repeatability and reliability
- “**Premium**” product line: V7-xxx, V3-xxx and V5-xxx switches designed to withstand 100K operations at full load or 10m for mechanical life
- “**Standard**” line: V15-xxx designed for precision, reliability, 50K operations at full load or 5m for mechanical life of switch



V-Basics Family: Features Overview

- “Premium” and “Standard” product lines to meet various application requirements
 - “Premium” (V7/V5/V3) series for broad range electrical loads and operating force applications in *high cost of failure* applications
 - “Standard” (V15) series for *low cost of failure* applications
- Straight, roller, simulated roller, special actuators
- Variety of integral and snap-on actuators
- Special terminations
- Environmentally sealed
- Precision operation and application versatility
- Enhanced life than competitive products
- repeatability
- Meet international agencies approvals (ENEC, CQC, UL, cUL, CE)
- Wide temperature ranges



V-Basic: Cost of Failure

Cost of Failure: cost to replace the switch or to service any failure related to the switch (*service calls, recalls, insurance claims*)

Low Cost of Failure: cost of the switch failing or cost to service any failure is minimal compared to the cost of failure

Cost of Failure equation:

$[(\text{switch price differential}) \times \text{units}] < [\text{potential cost of failure} \times \text{units}]$

If true = High cost of failure = use premium switch

If false = Low cost of failure = use standard switch



V-Basic: Cost of Failure

When a Premium switch is better*

Recall of 2.3 million appliances resulted in \$172.5 million out-of-pocket cost for manufacturer

$(\$0.44 - \$0.28)^{**} \times 2,300,000 \text{ units} = \$368,000 \text{ incremental cost to manufacture}$

$\$75 \text{ cash back} \times 2,300,000 \text{ units} = \$172,500,000 \text{ cost of failure}$

$\$368k < \$172.5M = \text{use a premium switch}$

*An extra \$0.16 towards a higher quality switch
may save the company hundreds of millions in the longer term*

“Cost of failure” may outweigh switch price difference

*reference: Maytag dishwasher recall - Feb 1, 2007, US Consumer Product Safety Commission
<http://www.cpsc.gov/CPSC/PUB/PREREL/prhtml07/07094.html>

**Assumption: Premium switch = \$.44, Standard switch = \$.28

V-Basics Premium Series

- Premium switches – Designed for enhanced precision, repeatability, and reliability in “high cost of failure” applications
- 4 week lead times (ex-factory, HK)



V3-xxx

- Part of the original MICRO SWITCH™ product line
- Made in USA
- Military approvals for unique applications



V7-xxx

- Part of the original MICRO SWITCH™ product line
- Made in USA



V5-xxx

- European V-basic product platform
- Made in Scotland

- Honeywell offers the engineering expertise and capability to design specific customer solutions

V-Basics Standard Series

- Standard switches – Designed for repeatability and reliable operation in “low cost of-failure” applications
- 8 week lead times (ex-factory, HK)



V15-xxx

- Asia-Pacific V-basic product platform
- Made in China
- Withstands 50 K operations at full load or 5M operations for mechanical life with electrical rating from 16A to 22A and operating force $\geq 100g$

Standard Switches Introduction

- “Standard” Honeywell snap-action switch line: V15-xxx series
- Designed for applications requiring ≥ 100 g of operating force and electrical ratings ranging from 16 A to 22 A
- Designed for reliability at a great value
- Designed for use in “low cost of failure” applications



V-Basic Standard: Characteristics

V15-xxx series

- Mechanical life:
 - 5,000,000 cycles (operating force \leq 200 g)
 - 1,000,000 cycles (operating force $>$ 200 g)
- Electrical life:
 - 16A and lower: 50K
 - Higher than 16A: 10K
- Agency approvals:
 - ENEC, CQC, UL, cUL
- Higher operating force \geq 100g



V-Basic Standard: Features and Benefits

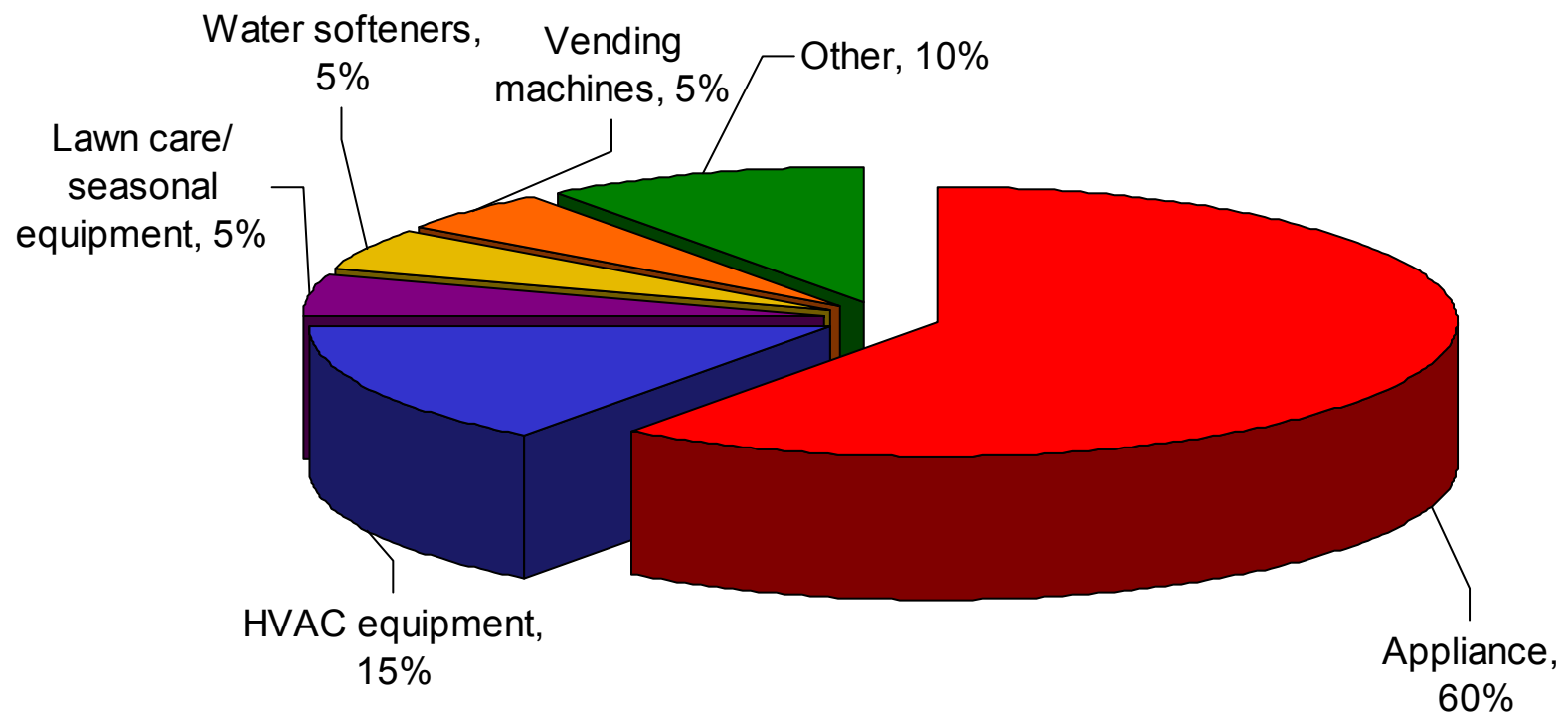
- **Features**

- Broad range of electrical loads
- Straight, roller, simulated roller, and special actuators
- Variety of integral and snap-on actuators
- Special terminations
- Enhanced operation and application versatility
- Wide temperature range
- Push-in terminal options

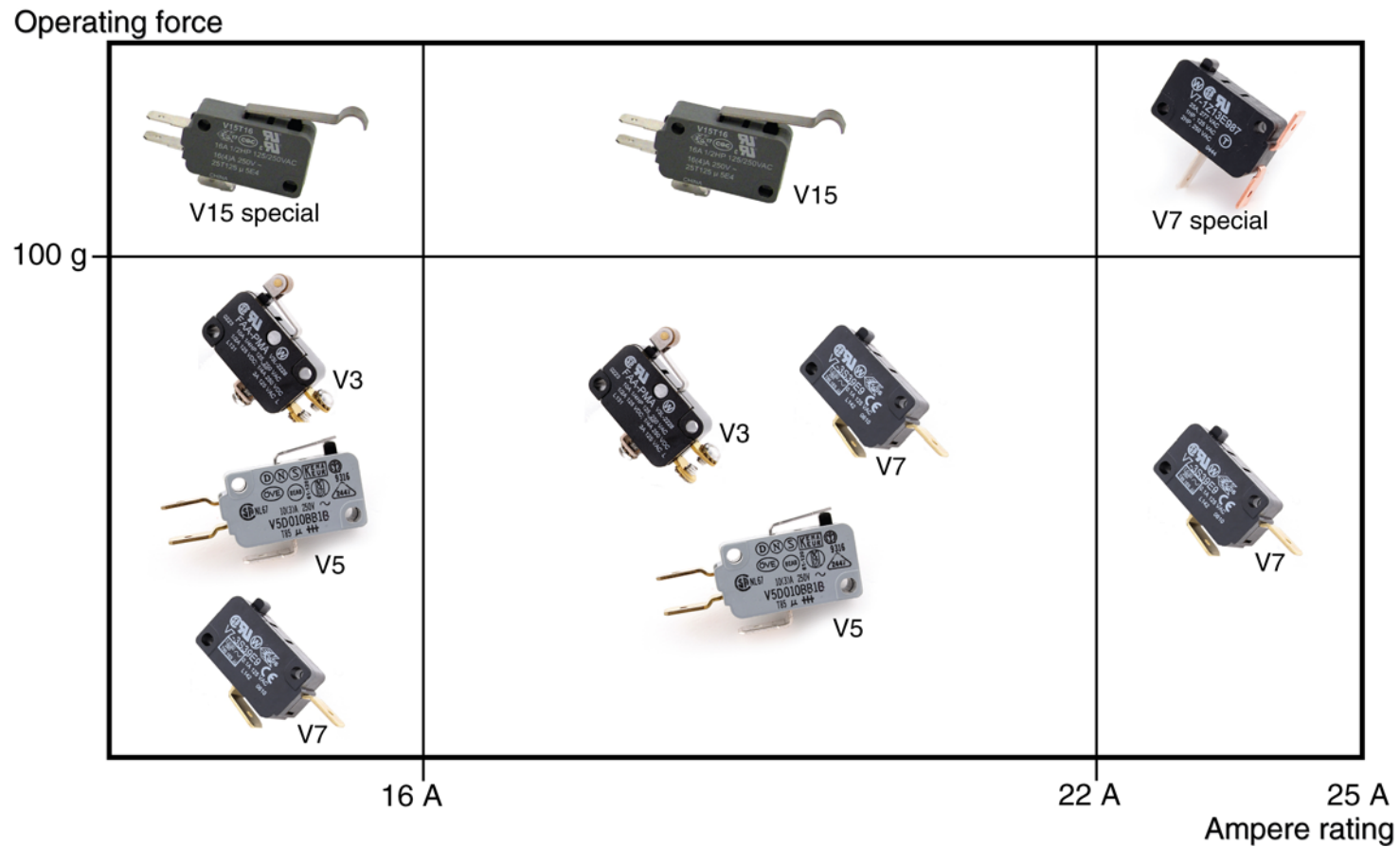
- **Benefits**

- Compatible with many applications due to the switches design flexibility
- Accepts insulated connections and popular quick connect receptacles
- Designed for reliability, repeatability and constant performance within range of conditions
- 8 week standard lead times (ex-HK)
- Push-in terminal option does not require any quick connect terminals on mating wire

V-Basics: Potential Applications



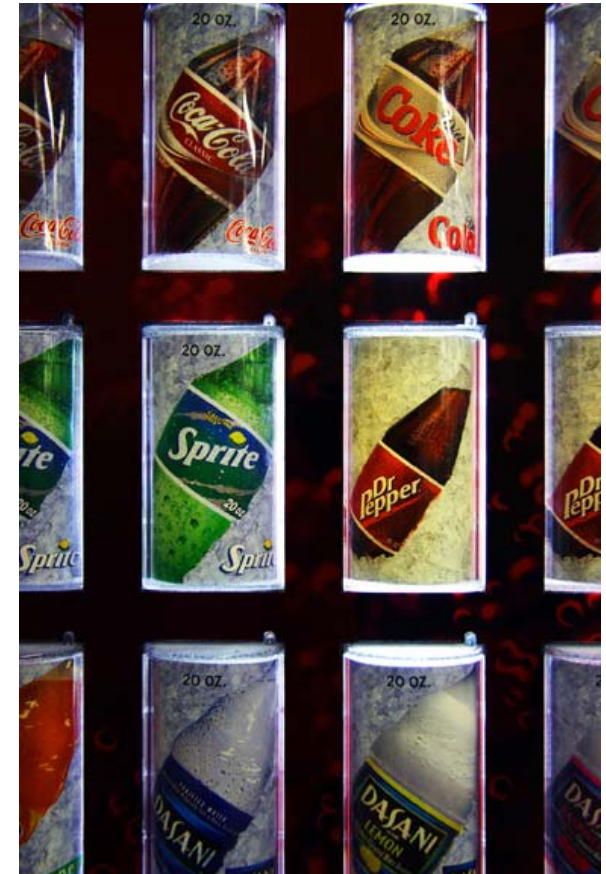
V-Basics Application Positioning



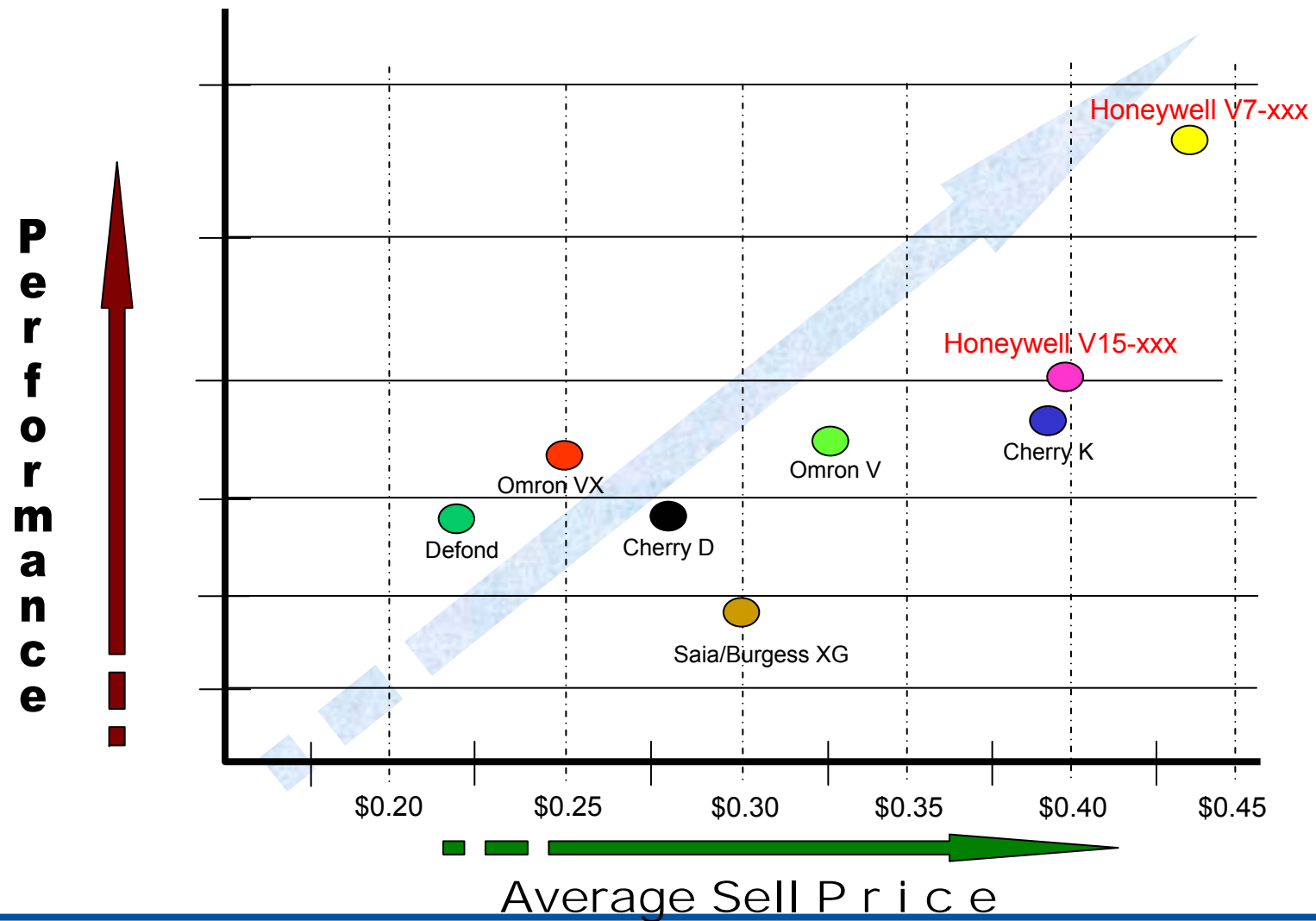
V-Basic Standard: Potential Applications

- **Standard series designed for applications requiring:**
 - High actuation force required (>100 g)
 - Electrical loads ranging from 16 A to 22 A

- **Potential “low cost of failure” applications include:**
 - Appliances (*“low cost of failure” applications only*)
 - Gaming and vending machines
 - Joystick push button
 - Industrial controls
 - Water heaters
 - HVAC
 - Door interlocks



V-Basic Switches Competitive Positioning Price vs. Performance

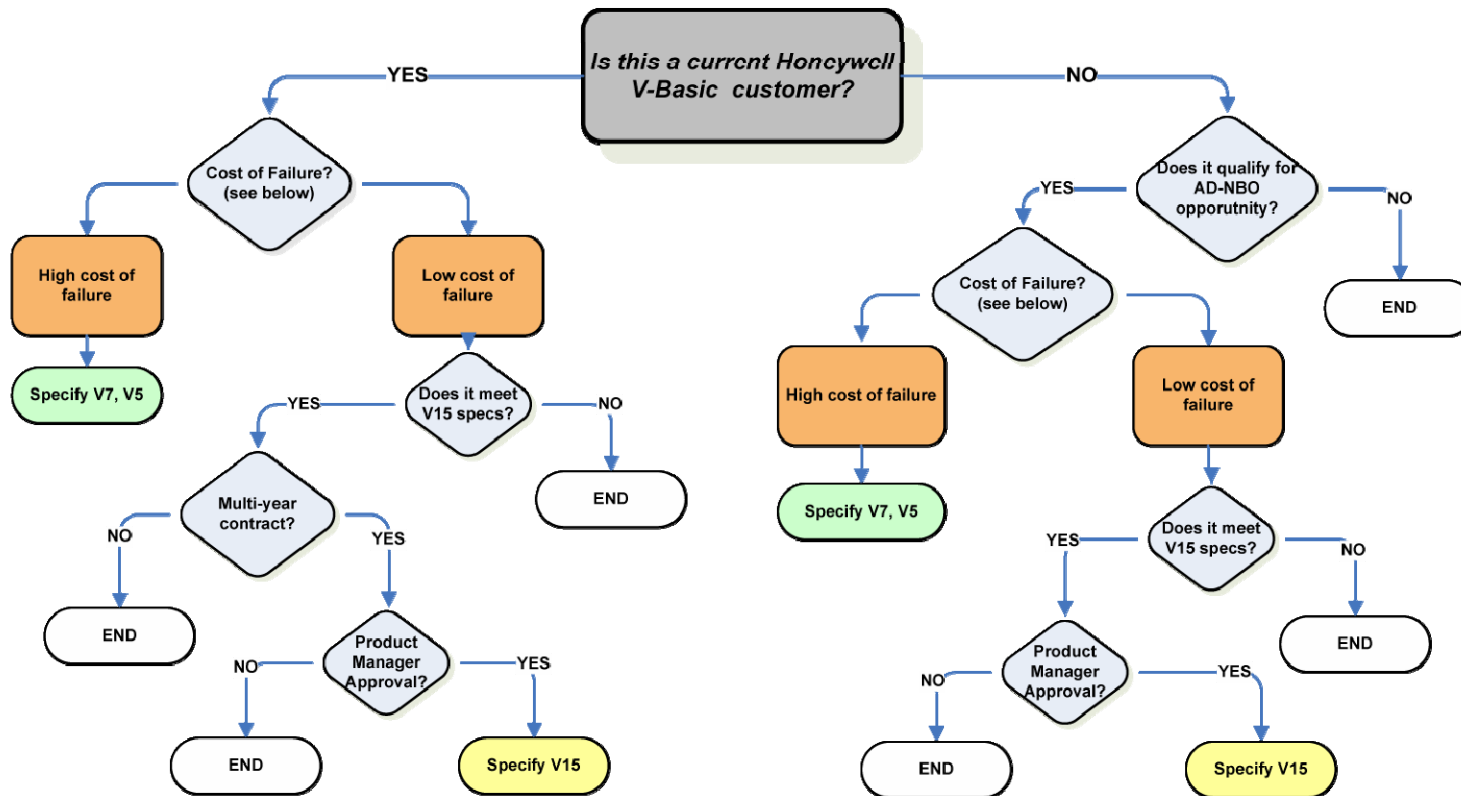




Appendix

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Cost of Failure Decision Tree



Cost of Failure: cost to replace the switch or to service any failure related to the switch

Low Cost of Failure: cost of the switch failing or cost to service any failure is minimal compared to the cost of failure

Cost of Failure equation: $[(\text{switch price differential}) \times \text{units}] < [\text{potential cost of failure} \times \text{units}]$
If true = High cost of failure = use premium switch
If false = Low cost of failure = use standard switch

Cost of Failure Calculations

Calculator tool available:

Application	
Customer Name	
Location	

Base Line			
	Honeywell Vbasic	Other	Delta
Price Paid	\$0.40	\$0.30	\$0.10
Total units per yr	100,000		
Total investment	\$10,000.00		

Direct switch replacement costs		
	Per Unit	Total
What is the failure rate experienced with competitive switch per year?	5%	5,000
Cost of replacing switch	\$0.30	\$1,500
Subtotal		\$1,500

Additional costs related to switch failure		
If the switch fails what is the additional cost of replacing related parts?	\$5.00	
How many switches per assembly?	2	2,500
Cost of service call/customer to replace defective assembly	\$45.00	
How many hrs will take to change the switch and fix the problem?	1.00	
Subtotal		\$125,000
Total cost of failure		\$126,500
Estimated ROIC/yr		0.07905138
Estimated ROIC/month		0.00658762

V-Basic Switch Choice Chart: USA

V-Basic: USA

	High cost of failure*	Low cost of failure	Typical applications
Operation force			
Low operating force: < 75gf	<ul style="list-style-type: none"> • V7-2 • V7-4 	<ul style="list-style-type: none"> • V7-3 • V7-5 	• N/A
General operating force: ≥ 100gf	<ul style="list-style-type: none"> • V7-1 • V7-7 • V7-9 	<ul style="list-style-type: none"> • V7-6 • V7-8 	• V15
Electrical current			
< 5 A	<ul style="list-style-type: none"> • V7-_A • V7-_F • V7-_L • V7-_S 	<ul style="list-style-type: none"> • V7-_D • V7-_G • V7-_M 	• N/A
5 A to 16 A	<ul style="list-style-type: none"> • V7-_B • V7-_E • V7-_P • V7-_U 	<ul style="list-style-type: none"> • V7-_C • V7-_N • V7-_R • V7-_W 	• V15-_16
20(6) A to 22(8) A	<ul style="list-style-type: none"> • V7-_K 	<ul style="list-style-type: none"> • V7-_V 	• V15-_22
25 A	<ul style="list-style-type: none"> • V7-_Z 		• N/A
Environmental temperature			
T85	<ul style="list-style-type: none"> • V7 		• V15
T125	<ul style="list-style-type: none"> • V7 		• V15
T150	<ul style="list-style-type: none"> • V7 		• V15
High load applications			
>3 mm contact air gap	<ul style="list-style-type: none"> • V9-25 		• V9-25

*“_” use of underscore denotes wildcard in part number nomenclature. See nomenclature tree

V-Basic Switch Choice Chart: EMEA

V-Basic: EMEA

	High cost of failure*	Low cost of failure	Typical applications	
Operation force				
Low operating force: < 75 gf	<ul style="list-style-type: none"> • V5F • V5H 	<ul style="list-style-type: none"> • V5G • V5L 	• N/A	Water heater, pressure switch, ice maker
General operating force: ≥ 100 gf	<ul style="list-style-type: none"> • V5 		• V15	Industry control, home appliances
Electrical current				
< 5 A	<ul style="list-style-type: none"> • V5G • V5J • V5L 	<ul style="list-style-type: none"> • V5H • V5K 	• N/A	Ice maker, pressure switch, water heater, other home appliances
5 A to 16 A	<ul style="list-style-type: none"> • V5B • V5D • V5P • V5T 	<ul style="list-style-type: none"> • V5C • V5F • V5R • V5U 	• V15-_16	Home appliances, industry control
20(6) A to 22(8) A	<ul style="list-style-type: none"> • V5A • V5S 	<ul style="list-style-type: none"> • V5N 	• V15-_22	Power tools, industry control, home appliances
25 A	<ul style="list-style-type: none"> • V7-_Z 		• N/A	Power tools, industry control, home appliances
Environmental temperature				
T85	<ul style="list-style-type: none"> • V5 		• V15	Home appliances (microwaves, water heater, coffee machine, oven etc.) industry control
T125	<ul style="list-style-type: none"> • V5 		• V15	Home appliances (microwaves, water heater, coffee machine, oven etc.) industry control
T150	<ul style="list-style-type: none"> • V5 		• V15	Home appliances (oven, timer), industry control
High load applications				
>3 mm contact air gap	<ul style="list-style-type: none"> • V9-25 		• V9-25	Power tools, industry control

*“_” use of underscore denotes wildcard in part number nomenclature. See nomenclature tree

V-Basic Switch Choice Chart: AP

	Low cost of failure*	High cost of failure	Typical applications
Operation force			
Low operating force: < 75gf	<ul style="list-style-type: none"> • V15__-__015 • V15__-__025 • V15__-__050 	<ul style="list-style-type: none"> • V7-2 • V7-4 	<ul style="list-style-type: none"> • V7-3 • V7-5 <p>Water heater, pressure switch, ice maker</p>
General operating force: ≥ 100gf	<ul style="list-style-type: none"> • V15__-__100 • V15__-__200 • V15__-__300 • V15__-__400 	<ul style="list-style-type: none"> • V7-1 • V7-7 • V7-9 	<ul style="list-style-type: none"> • V7-6 • V7-8 <p>Industry control, home appliances</p>
Electrical current			
< 5 A	<ul style="list-style-type: none"> • V15-_05 	<ul style="list-style-type: none"> • V7-_A • V7-_F • V7-_L • V7-_S 	<ul style="list-style-type: none"> • V7-_D • V7-_G • V7-_M <p>Ice maker, pressure switch, water heater, other home appliances</p>
5 A to 16 A	<ul style="list-style-type: none"> • V15-_10 • V15-_16 	<ul style="list-style-type: none"> • V7-_B • V7-_E • V7-_P • V7-_U 	<ul style="list-style-type: none"> • V7-_C • V7-_N • V7-_R • V7-_W <p>Home appliances, industry control</p>
20(6) A to 22(8) A	<ul style="list-style-type: none"> • V15-_22 	<ul style="list-style-type: none"> • V7-_K 	<ul style="list-style-type: none"> • V7-_V <p>Power tools, industry control, home appliances</p>
25 A	<ul style="list-style-type: none"> • V15 special 	<ul style="list-style-type: none"> • V7-_Z 	<p>Power tools, industry control, home appliances</p>
Environmental temperature			
T85	<ul style="list-style-type: none"> • V15 	<ul style="list-style-type: none"> • V7 	Home appliances (microwaves, water heater, coffee machine, oven etc.) industry control
T125	<ul style="list-style-type: none"> • V15 	<ul style="list-style-type: none"> • V7 	Home appliances (microwaves, water heater, coffee machine, oven etc.) industry control
T150	<ul style="list-style-type: none"> • V15 	<ul style="list-style-type: none"> • V7 	Home appliances (oven, timer), industry control
High load applications			
>3 mm contact air gap	<ul style="list-style-type: none"> • V9-25 	<ul style="list-style-type: none"> • V9-25 	Power tools, industry control

*“_” use of underscore denotes wildcard in part number nomenclature. See nomenclature tree



V15 Basic Switch - Warranties and Remedies

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Warranties and Remedies

- Warranty disclaimer

WARNING


IMPROPER INSTALLATION

- Consult with local safety agencies and their requirements when designing a machine-control link, interface and all control elements that affect safety.
- Strictly adhere to all installation instructions.

Failure to comply with these instructions could result in death or serious injury.

WARNING

IF USED IN APPLICATIONS CONCERNING HUMAN SAFETY

- Only use NC direct opening (“positive opening”/“positive break”) contacts, identified by the symbol .
- Do NOT use flexible/adjustable actuators. Only use actuators designed for safety applications.
- Do NOT defeat, tamper, remove, or bypass this switch.
- Hazardous voltage, disconnect power before servicing.
- Strictly adhere to all installation and maintenance instructions
- Consult with local safety agencies and their requirements when designing a machine-control link, interface, and all control elements that affect safety.

Failure to comply with these instructions could result in death or serious injury.

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. However, we assume no responsibility for its use.