

Guide to Selection

Points to Consider in Making Your Selections

Considerations of life, range and sensitivity are factors in selecting the best pressure or temperature switch for your application. This catalog contains the information and technical specifications needed to specify a switch for process service.

The anticipated life, either time in service or number of cycles, is an important consideration. Surges, pulsations, process temperatures and over-pressures can reduce sensor life. Start up vacuum has no effect on sensor performance, unless it is otherwise noted. High electrical loads can reduce microswitch life. Severe environmental conditions, including shock and vibration, can affect overall product life.

UE microswitches are tested to 100,000 cycle life. Sensors are tested to pressures at a minimum of four times the maximum range pressure. All electromechanical switches are designed to shock and vibration MIL-STD-810. The standard electrical rating is 15 amps, 480 volts AC, 60 Hz. Other ratings are available as options.

For applications with heavy cycling or constant full cycling (using the entire range and sensor movement), contact an authorized UE Distributor for recommendations.

Sensitivity is the minimum change of the input to which a control will respond. For pressure controls, sensitivity is the smallest change in pressure the sensor is capable of detecting. This is also referred to as the deadband, the difference between switch actuation and de-actuation. For temperature switches, response is the key to sensitivity. Deadbands for temperature switches depend on many factors (heat balance, location of the sensor, temperature gradients) and therefore are dependent on the system.

Before you begin to build your part number, you need to determine which series contains the right product for your application needs. A typical series corresponds to the type of service such as explosion-proof, weathertight, or general purpose. Use the chart below to help choose the correct series for your requirements.

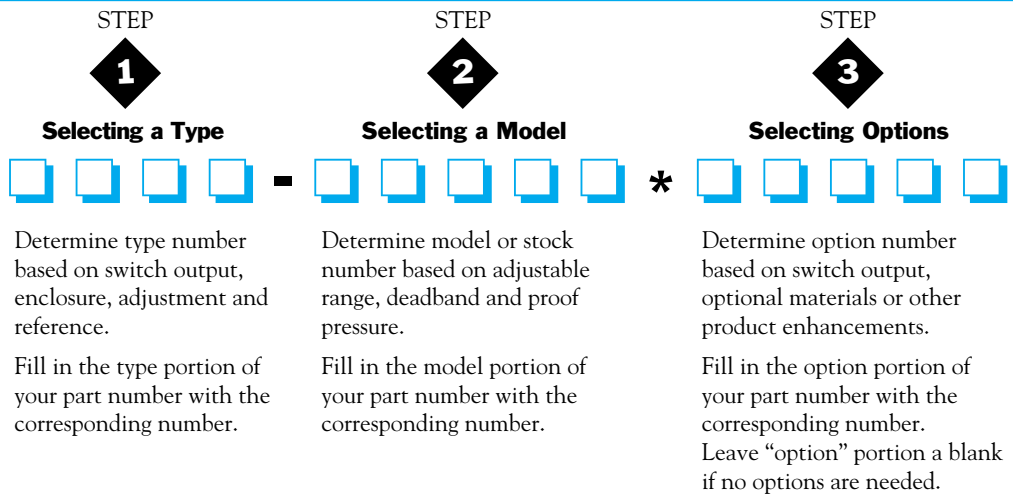
Product Capability Chart

● Standard ✕ Option

Product Series	820	800	400	120	119	117	105	100	J21K	12	J6	One
Located on Page Number	134	134	87	14	39	51	80	103	127	62	118	70
Variable												
Pressure			●	●	●	●	●	●		●	●	●
Vacuum			●	●	●	●	●	●			●	
Differential Pressure			●	●		●	●	●	●	●		●
Temperature	●	●	●	●	●	●	●	●		●		●
Enclosure												
Division 1	●			●	●					●		
Division 2	●			●	●	●				●		●
Zone 1				●	●					●		
NEMA 1 General Purpose	●	●	●	●	●	●	●	●	●	●	●	●
NEMA 4X Watertight	✕	✕	✕	●	✕	●	●	●	✕	●	●	●
Switch Output												
Single SPDT	●	●	●	●			●	●	●		●	●
DPDT			✕	✕				✕				
Dual SPDT	●	●	●	●								
Triple SPDT			●									
Hermetically Sealed SPDT				✕	●	●				●		
Hermetically Sealed DPDT				✕	●	✕				●		
4 to 20 mA												✕
Sensors												
Welded Stainless Steel			●	●	●	●	●	●	●	●	●	
Elastomer Diaphragm			●	●	●	●	●	●		●	●	
Ceramic Sensors												●
Brass/Bronze Bellows			●	●		●	●	●	●		●	
Piston			●	●				●			●	
Process Alloy (see page 9)				✕	✕	✕		✕		✕		
Local Temperature			●	●		●	●	●				●
Bulb & Capillary (remote)	●	●	●	●	●	●	●	●		●		●

How to Order

Building your
Part Number



STEP

1 Selecting a Type

Type configurations correspond to enclosure, switch output, adjustment and reference. The combination of these variables will determine your type number. See each series for a complete list of available types.

7

STEP

2 Selecting a Model

Model numbers within these series denote sensor type (bellows, diaphragm, piston) and specific performance characteristics (range and deadbands).

The sensor is the key determinant of range, sensitivity, accuracy, life expectancy and cost. United Electric uses a wide variety of sensor configurations to provide our customers with the right control for their specific applications. Bellows, metal and elastomer diaphragms and pistons are used in pressure switches; liquid filled temperature systems are employed for local and remote mounted bulb and capillary versions of temperature switches. A wide choice of pressure and temperature ranges are shown for each series. Select a range where the set point will be at or near the mid point of the range.



Option Overview

In some cases, modifications or additions to standard products are required. For example, the on-off deadband can be narrowed by selecting an optional 5 amp switch in lieu of UE's standard

15 amp switch. Here are our options for process applications and their availability.

Switch options

See series for specific availability



Hermetically Sealed Switch

Code	Description
0140	Gold contacts, 1 amp 125 VAC resistive AVAILABLE J6, J21K, 100, 105, 120, AND 400 SERIES
0500	Close deadband, 5 amp 125/250 VAC resistive AVAILABLE J6, J21K, 100, 105, 120, 400, AND 800 SERIES
1010	DPDT switch, 10 amp 125/250 VAC resistive; deadband and minimum set point will increase; consult factory for information AVAILABLE 100, 120, AND 400 SERIES
1070	10 amp 125 VDC or VAC resistive; deadband and minimum set point will increase; consult factory for information AVAILABLE J6, 100, 105, 120, AND 400 SERIES
1180	Hermetically sealed, SPDT, 11 amp 125/250 VAC resistive; deadband and minimum set point will increase; consult factory for information. AVAILABLE 120 SERIES
1190	Hermetically sealed DPDT, 11 amp 125/250 VAC for products set on rising pressure or temperature (due to inherent separation of circuits on falling pressure or temperature) specify Option 1195 if setting on fall is required; deadband and minimum set point will increase; consult factory for information AVAILABLE 117, 119 AND 120 SERIES
1195	Hermetically sealed, DPDT, 11 amp 125/250 VAC for products set on falling pressure or temperature (due to inherent separation of circuits on rising pressure or temperature) specify Option 1190 if setting on rise is required; deadband and minimum set point will increase; consult factory for information AVAILABLE 117, 119 AND 120 SERIES
1519	Adjustable deadband, 15 amp 125/250/480 VAC resistive; adjustable wheel changes rise setting only; if adjustment on fall setting is required use primary adjustment; AVAILABLE 100 AND 120 SERIES
1520	Adjustable deadband, 15 amp 125/250/277 VAC resistive; adjustable wheel changes rise setting only; if adjustment on fall setting is required use primary adjustment. AVAILABLE J6, J21K, 105, AND 400 SERIES
1530	External manual reset, 15 amp 125/250/480 VAC resistive; latches on rise only AVAILABLE J6, 100, 120, AND 400 SERIES
1535	High ambient, 15 amp 125/250 VAC resistive; temperatures up to 250°F (145°C) AVAILABLE J21K, 105, 120, AND 400 SERIES
1537	Vapor sealed switch, 15A 125/250 VAC resistive AVAILABLE 120, 100, 400 SERIES
1539	Fungus resistant case, 15 amp 125/250 VAC resistive AVAILABLE 120 AND 400 SERIES
2000	20 amp 125/250/480 VAC resistive AVAILABLE J6, 100, 105, 120, 400, AND 800 SERIES
3000	30 amp 125/250/300 VAC resistive AVAILABLE 100 AND 120 SERIES

Sensor options



Optional Materials
an alternative to
diaphragm seals

- M504 316 Stainless steel immersion stem
AVAILABLE 100, 105, 117, 120 AND 400 SERIES
- M540 Viton construction (deadbands will increase approximately 15% and low end range will increase approximately 10%); wetted parts include Viton diaphragm and O-ring
AVAILABLE J6, 100, 105, 117, 120 AND 400 SERIES

Optional materials for "wc sensors:

AVAILABLE 100, 117, 119, 120 AND 400 SERIES (MODELS 520-525)

- XC001 Aluminum pressure connection, Viton diaphragm, Viton O-ring
- XC002 Aluminum pressure connection, Kapton diaphragm, Buna-N O-ring
- XC003 Aluminum pressure connection, Kapton diaphragm, Viton O-ring
- XC004 316L Stainless steel pressure connection, 316L Stainless steel diaphragm, Viton O-ring
(Over range pressure is limited to 100 psi)
- XC005 316L Stainless steel pressure connection, Viton diaphragm, Viton O-ring
- XC006 316L Stainless steel pressure connection, Kapton diaphragm, Viton O-ring
- XC007 316L Stainless steel pressure connection, Teflon® diaphragm, Viton O-ring

Optional materials for corrosive media:

AVAILABLE 100, 117, 119 AND 120 SERIES (MODELS 183-189, 483-489)

- XD002 Hastelloy C diaphragm
- XD003 Monel diaphragm
- XD004 Tantalum diaphragm
- XP111 Hastelloy B pressure connection
- XP112 Hastelloy C pressure connection
- XP113 Monel pressure connection
- XR211 Kalrez® O-ring
- XR212 Silicone O-ring
- XR213 EPR O-ring
- XR214 Aflas® O-ring

Other options



M210



M900

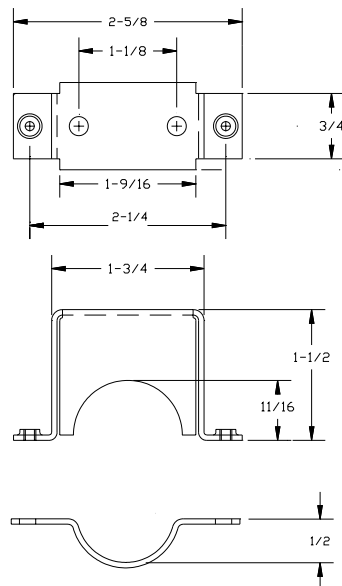
- M007 Drilled 7/8" electrical opening on right side
AVAILABLE 800 SERIES
- M020 Red status light, 115 VAC only
AVAILABLE 100 AND 400 SERIES
- M100 Terminal block wiring
AVAILABLE 800 SERIES
- M201 Factory set one switch; specify increasing or decreasing pressure or temperature and set point
AVAILABLE ONE, J6, 12 J21K, 100, 105, 117, 119, 120, 400 AND 800 SERIES
- M202 Factory set two switches; specify increasing or decreasing pressure or temperature and set points
AVAILABLE 120, 400 AND 800 SERIES
- M203 Factory set three switches; specify increasing or decreasing pressure or temperature and set points; NOTE: the third switch (or middle switch) must always be set to highest pressure or temperature when switches are set apart.
AVAILABLE 400 SERIES
- M210 Differential pressure indication
AVAILABLE J120 AND 400K SERIES
- M270 Range in °C on display and on nameplate
AVAILABLE ONE SERIES
- M276 Range indicated on nameplate in bars/mbars
AVAILABLE ONE, J6, J21K, 100, 105, 117, 119, 120 AND 400 SERIES
- M277 Range in kPa or mPa on nameplate
AVAILABLE ONE, 12 SERIES
- M278 Range indicated on nameplate in Kg/cm²
AVAILABLE ONE, J6, 12, J21K, 100, 105, 117, 119, 120 AND 400 SERIES
- M300 NEMA 4 construction
AVAILABLE 119 AND 800 SERIES
- M311 Venting of adjustment chamber, 1/8" NPTF
AVAILABLE 119 SERIES
- M320 Tamper proof cover
AVAILABLE 800 SERIES

**Other options
(Continued)**

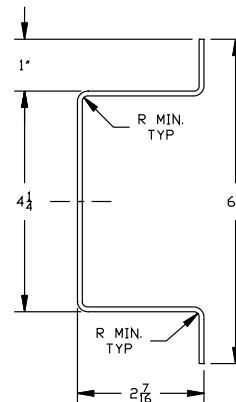


M513

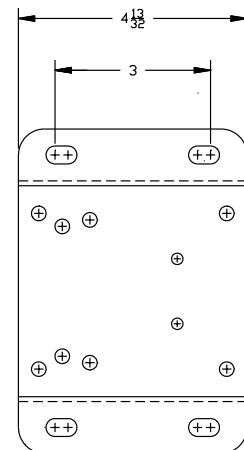
M321	Gasketed Lexan® window AVAILABLE 400 SERIES
M415	FM approval; consult AVAILABLE 120 SERIES
M430	Cover lock AVAILABLE 12 SERIES
M440	Cover chain AVAILABLE ONE AND 120 SERIES
M441	Metric thread (M20) on electrical connection AVAILABLE 119 SERIES
M444	Paper ID tag AVAILABLE ONE, J6,12, J21K, 100, 105, 117, 119, 120, 400 AND 800 SERIES
M446	Stainless steel ID tag & wire attachment (attachment will vary depending on product) AVAILABLE ONE, J6, 12, J21K, 100, 105, 117, 119, 120, 400 AND 800 SERIES
M450	Breather drain AVAILABLE 120 SERIES
M460	External ground screw AVAILABLE 12 SERIES
M511	1/4" NPTM pressure connection AVAILABLE 12 SERIES
M513	Junction box, pre-wired, with (2) 3/4" electrical connections AVAILABLE 12 AND 119 SERIES
M515	DIN connector - 4 terminal; conforms to DIN 43650 (not approved for Class 1, Division 1 and 2 or CENELEC flame proof requirements) AVAILABLE 12 SERIES
M550	Oxygen service cleaning; internal construction may change AVAILABLE ONE, J6, 12, J21K, 100, 105, 117, 119, 120 AND 400 SERIES
M900	Watertight conduit fitting; converts 7/8" hole to 1/2" NPT fitting AVAILABLE J21K, 117, 400 AND 800 SERIES
"Q"	CENELEC flameproof construction EEx d IIC T6 per EN 50 014/50 018 AVAILABLE 120, 820 SERIES
"Z"	CENELEC increased safety construction per EEx ed IIC T6 CENELEC standard EN 50 019/50 014; deadband will increase AVAILABLE ON H117 ONLY, DPDT NOT AVAILABLE
62169-19	Barb fitting for 1/8" tubing AVAILABLE ONE SERIES
6361-694	Junction box, not pre-wired AVAILABLE ONE, 12, 119 SERIES
6361-704	Surface Mounting Hardware for 100, 117, 119, 120 and 400 series
62169-13	Mounting bracket kit for Spectra 12 series pressure and temperature switches only
6361-727	Mounting bracket kit for 12 series differential pressure switch only. Includes parts from kit numbers 62169-13 and 6361-704



62169-13

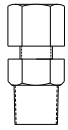


6361-704



Union Connectors

Available for all bulb and capillary switches

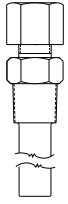


Code	Description	Stock Part/Number
W027	1/2" NPT with 3/4" bushing, brass	SD6213-27
W028	1/2" NPT with 3/4" bushing, 304 stainless steel	SD6213-28
W045	3/4" NPT, brass	SD6213-45
W046	3/4" NPT, 304 stainless steel	SD6213-46
W050	1/2" NPT, 304 stainless steel	SD6213-50
W051	1/2" NPT, brass	SD6213-51

Separable Wells, Remote Temperature

Available for all bulb and capillary switches. Includes union connectors and seals. Stainless steel wells are solid bore construction; brass wells are fabricated.

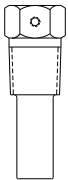
4" and 4.5" BT (below thread) wells fit 3/8" OD bulbs up to 4" long
7" and 7.5" BT wells fit 3/8" OD bulbs up to 7" long



Code	Description	Stock Part/Number
W075	Brass 1/2" NPT with 3/4" bushing adapter x 4" BT	SD6225-75
W076	316 SS 3/4" NPT x 4.5" BT	SD6225-76
W118	Brass 1/2" NPT with 3/4" bushing adapter x 7" BT	SD6225-118
W119	316 SS 3/4" NPT x 7.5" BT	SD6225-119
W177	304 SS 1/2" NPT x 7.5" BT	SD6225-177
W191	Brass 1/2" NPT x 4" BT	SD6225-191
W192	Brass 1/2" NPT x 7" BT	SD6225-192
W193	316 SS 1/2" NPT x 4.5" BT	SD6225-193

Separable Wells, Immersion Stem Temperature

Available for all immersion stem switches, series 100, 105, 117, 120, and 400



Code	Description/availability	Stock/Part Number
W000	Brass Immersion stem construction for use with 1/2" NPT separable well. To be used with 1/2" wells, W097 or W099	
W097	1/2" NPT x 1 ³ / ₂ " BT, Brass, fabricated For use exclusively with W000 stem option	SD6225-97
W099	1/2" NPT x 1 ³ / ₂ " BT, 316 stainless steel, solid bore For use exclusively with W000 stem option	SD6225-99
W139	3/4" NPT x 1 ¹ / ₆ " BT, Brass, fabricated	SD6225-139
W140	3/4" NPT x 1-22/11" BT, 316 stainless steel, solid bore	SD6225-140

Optional Length Immersion Stems

Available on all immersion stem temperature switches. Stem is brass with 1/2" NPT connection does not include thermowell.

Code	Description
I270	4-9/16 BT (x 4" well)
I271	6-9/16 BT (x 6" well)
I272	8-9/16 BT (x 8" well)
I273	10-9/16 BT (x 10" well)
I274	12-9/16 BT (x 12" well)
I275	15-9/16 BT (x 15" well)

Optional Length Immersion Stems (with wells)

Available on all immersion stem temperature switches. Stem is brass with 1/2" NPT connection

Code	Description
W346	4" BT
W347	6" BT
W348	8" BT
W349	10" BT
W350	12" BT
W351	15" BT

Optional Capillary Length and Capillary Protection

Optional Capillary Length and Capillary Protection (e.g., E121 - 6BS - 10S - 10S specifies type E121, model 6BS, with optional 10 feet of stainless steel capillary and 10 feet of stainless steel armor cable).

- Consult UE regarding repeatability and ambient effects on capillary lengths over 30 feet.

Copper Capillary

	Copper capillary	Copper capillary with stainless steel armor cable
Length	Code	Code
6'	-	6C - 6S
10'	10C	10C - 10S
15'	15C	15C - 15S
20'	20C	20C - 20S
25'	25C	25C - 25S
30'	30C	30C - 30S
40'	40C	40C - 40S
50'	50C	50C - 50S

Stainless Steel (st/st) Capillary

	Stainless steel capillary	Stainless steel capillary with stainless steel armor cable	Stainless steel capillary with Teflon® over bulb and capillary	Stainless steel capillary with Teflon® over capillary ONLY	Stainless steel capillary with Teflon® over bulb ONLY
Length	Code	Code	Code	Code	Code
6'		6S - 6S	6S - 6T	6S - 6TC	6S - TB
10'	10S	10S - 10S	10S - 10T	10S - 10TC	10S - TB
15'	15S	15S - 15S	15S - 15T	15S - 15TC	15S - TB
20'	20S	20S - 20S	20S - 20T	20S - 20TC	20S - TB
25'	25S	25S - 25S	25S - 25T	25S - 25TC	25S - TB
30'	30S	30S - 30S	30S - 30T	30S - 30TC	30S - TB
40'	40S	40S - 40S	40S - 40T	40S - 40TC	40S - TB
50'	50S	50S - 50S	50S - 50T	50S - 50TC	50S - TB

Custom Capillary Lengths

In addition to the options listed above, UE now offers capillaries in “custom” lengths from 1 foot to 50 feet. You can also get armor or Teflon® protective covering in lengths less than or equal to your capillary length. Metric units are available from 30cm to 1500cm. Consult factory for part number.

Flanges

Flanges conform to ANSI B16.5; maximum pressure is limited by flange rating

	Stainless Steel		Hastelloy		Hastelloy		Alloy 400	
	316 L		B-2		C276		(Monel)	
150#	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat
1/2"	F100	F101	F106	F107	F104	F105	F102	F103
3/4"	F108	F109	F114	F115	F112	F113	F110	F111
1"	F116	F117	F122	F123	F120	F121	F118	F119
	F196*							
1 1/4"	F124	F125	F130	F131	F128	F129	F126	F127
1 1/2"	F132	F133	F138	F139	F136	F137	F134	F135
2"	F140	F141	F146	F147	F144	F145	F142	F143
	F197**							
300#								
1/2"	F148	F149	F154	F155	F152	F153	F150	F151
3/4"	F156	F157	F162	F163	F160	F161	F158	F159
1"	F164	F165	F170	F171	F168	F169	F166	F167
	F198*							
1 1/4"	F172	F173	F178	F179	F176	F177	F174	F175
1 1/2"	F180	F181	F186	F187	F184	F185	F182	F183
2"	F188	F189	F194	F195	F192	F193	F190	F191
	F199**							

Flange Availability

	Flange Material	Series 100, 117, 119, 120 and 400
Standard Faced Flanges	316L Stainless Steel	Models 171-174, 190-194, 490-494, 530-535, 183-186, 483-486, S126B-S164B
	Hastelloy B-2	Models 183-186, 483-486 with option XP111
	Hastelloy C276	Models 183-186, 483-486 with option XP112
	Alloy 400 (Monel)	Models 183-186, 483-486 with option XP113
Flush Mount Flanges	316L Flush Diaphragm	*Models 565-567 only
		** Models 560-564 only