

# NE CONDUCTIVE LEVEL SWITCH



Flow  
Pressure  
Level  
Temperature  
measurement  
monitoring  
control

N1



- Multiple Setpoints
- Usable with Corrosive Media
- Usable with Dirty Media
- Highly Reliable



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Model:  
NE

Kobold's NE conductive level switch can be used to monitor the level of weakly to strongly conductive liquids. The device works through measurement of the electrical resistance between a sensing electrode and a reference electrode. This simple design incorporates no moving parts and makes this device especially suitable for difficult applications, such as monitoring the level of low density liquids, high viscosity liquids, or liquids containing large quantities of suspended particulates.

The basic NE comes with either one or two electrodes, depending on whether the user has selected to use the container walls (for conductive containers only) as the reference electrode or has opted to obtain a second immersed electrode to serve as a reference. In this configuration, the user may monitor a single level setpoint. Up to six (6) conductive electrodes may be mounted on each NE, making a total of six setpoints possible.

**Description**

A complete NE level switch system consists of a reference electrode, a sensing (control) electrode and a relay/power supply.

**Reference Electrode**

An electrically conductive container well may be used as the reference electrode. If the container is made of a non-conductive material, such as plastic, ceramic, or concrete, for example, then an additional electrode is required to act as ground.

**Control Electrodes**

One electrode is required per switching point. Electrode length depends on the position of the desired switching point. To avoid electrical bridging, the electrodes are coated with a non-conductive cladding. Two cladding choices are possible: a partial coating of the upper 12 inches or a complete coating which leaves only the last 1/4 inch exposed.

**Electrode Relay/ Power Supply**

Operation requires one relay channel per function (alarm or latch control). Two setpoint electrodes and a ground electrode must be connected to the relay unit to provide automatic (latching tank fill/empty) control. The relay/power supply is available in either single or dual channel versions.


**Materials**

The NE level switch is available in a wide variety of materials. Through selection of the proper electrode, concentrated hydrochloric, sulfuric, hydrofluoric or nitric acids present no difficulty. Even with impure media, or in cases where mist forms, faultless function is assured if completely coated electrodes are installed.

Electrodes are available in:

- 316-Ti Stainless Steel
- Hastelloy C
- Titanium

**Available NE Level Switches**

 <p><b>Model: NEL-1... NEK-1...</b></p> <p>Single electrode with terminal box</p>	 <p><b>Model: NEL-2 to 6 NEK-2 to 6</b></p> <p>Multiple electrode, up to 6 switch points</p>	 <p><b>Model: NEH-1 to 6</b></p> <p>Suspended electrodes, up to 6 switch points</p>
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# Single Electrodes

## Technical Data

<b>Protection:</b>	NEMA 4X/IP65	
<b>Max. Pressure:</b>	Polypropylene Fittings	220 PSIG
	Teflon Fittings	90 PSIG
	SS Fittings	440 PSIG
<b>Max. Temperature:</b>	Polyolefine Cladding	190°F
	Teflon Cladding	300°F
	(w. PP Fittings)	190°F
<b>Housing Material:</b>	Polycarbonate	
	Aluminum	

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Model NE...	...L, K,	- 1 ...	...E, H, T...	...A, T, V...	...P, E, F...	/	/
	Connector Housing	Number of Electrodes	Electrode material (Ø 4 mm)	Electrode cladding	Fitting Material	Fitting Size	Electrode Length
	K = Polycarbonate 1.38"×2.05"×1.97" L = Aluminum 1.38"×2.05"×1.97"	1	E = SS H = Hastelloy <sup>2</sup> T = Titanium <sup>2</sup>	A = Polyolefine T = Teflon partially clad (12") V = Teflon fully clad	P = Polyprop <sup>1,3</sup> E = SS F = Teflon <sup>2</sup>	1/2" NPT	Specify Length "L = ..." when ordering

1) Only w/ SS Electrodes    2) Not with Polyolefine Cladding    3) Only w/ Polyolefine Cladding

Sample Part Number: NEK-1EAP L=24"

Order Number				
Model	Description	Polypropylene	Fitting SS	Teflon
NEL-1 EA..	Aluminum housing, SS electrode polyolefine cladding	NEL-1EAP	NEL-1EAE	-
NEL-1 EV..	ditto, but Teflon fully clad	-	NEL-1EVE	NEL-1EVF
NEK-1 EA..	Polycarbonate housing, SS electrode polyolefine cladding	NEK-1EAP	NEK-1EAE	-
NEK-1 ET..	ditto, but Teflon partially clad	-	NEK-1ETE	NEK-1ETF
NEK-1 EV..	ditto, but Teflon fully clad	-	NEK-1EVE	NEK-1EVF

# Multiple Electrodes



### Technical Data

<b>Protection:</b>	NEMA 4	
<b>Max. Pressure:</b>	Polypropylene Fittings	220 PSIG
	Teflon Fittings	90 PSIG
	SS Fittings	440 PSIG
<b>Max. Temperature:</b>	Polyolefin Cladding	190°F
	Teflon Cladding	300°F
	(w/ PP Fittings)	190°F
<b>Housing Material:</b>	Polyamide Glass Fiber Reinforced	
	Aluminum	

Model NE...	...L, K	-2-6...	...E, H, T...	...A, T, V...	...P, E, F...	/	/
	Connector Housing	Number of Electrodes	Electrode material	Electrode cladding	Fitting Material	Fitting Size	Electrode Length
	L = Aluminum 2.17"x3.15"x2.95"  K = Polyamide	2 3 4 5 6	E = SS  H = Hastelloy <sup>2</sup>  T = Titanium <sup>2</sup>	A = Polyolefin  T = Teflon partially clad (12") V = Teflon fully clad	P = Polypropylene <sup>1,3</sup> E = SS  F = Teflon <sup>2</sup>	1-1/2" NPT	Specify Length "L1 = ... L2 = ... etc" when ordering

1) Only w/ SS Electrodes

2) Not with Polyolefin Cladding

3) Only w/ Polyolefin Cladding

# Multiple Electrodes

**N1**

Ordering Data				
Model	Description	Fitting		
		Polypropylene	SS	Teflon
NEL-2 EA..	Aluminum housing, 2 SS electrodes Polyolefin cladding	NEL-2EAP	NEL-2EAE	-
NEL-3 EA..	ditto, but 3 electrodes	NEL-3EAP	NEL-3EAE	-
NEL-4 EA..	ditto, but 4 electrodes	NEL-4EAP	NEL-4EAE	-
NEL-5 EA..	ditto, but 5 electrodes	NEL-5EAP	NEL-5EAE	-
NEL-6 EA..	ditto, but 6 electrodes	NEL-6EAP	NEL-6EAE	-
NEL-2 ET..	Aluminum housing, 2 SS electrodes Teflon fully clad	-	NEL-2ETE	NEL-2ETF
NEL-3 ET..	ditto, but 3 electrodes	-	NEL-3ETE	NEL-3ETF
NEL-4 ET..	ditto, but 4 electrodes	-	NEL-4ETE	NEL-4ETF
NEL-5 ET..	ditto, but 5 electrodes	-	NEL-5ETE	NEL-5ETF
NEL-6 ET..	ditto, but 6 electrodes	-	NEL-6ETE	NEL-6ETF
NEL-2 EV..	Aluminum housing, 2 SS electrodes Teflon fully clad	-	NEL-2EVE	NEL-2EVF
NEL-3 EV..	ditto, but 3 electrodes	-	NEL-3EVE	NEL-3EVF
NEL-4 EV..	ditto, but 4 electrodes	-	NEL-4EVE	NEL-4EVF
NEL-5 EV..	ditto, but 5 electrodes	-	NEL-5EVE	NEL-5EVF
NEL-6 EV..	ditto, but 6 electrodes	-	NEL-6EVE	NEL-6EVF
Longer electrodes (SS), per 4"	Polyolefin clad			
	Teflon partially clad			
	Teflon fully clad			
Hastelloy or Titanium electrodes available (Model NEL-.H..., NEL-.T...)				



# Suspended Electrodes

## Single Electrode

### Technical Data

<b>Max. Pressure:</b>	90 PSIG	
<b>Max. Temperature:</b>	Neoprene Cable	140°F
	Teflon Cable	300°F
<b>Housing Material:</b>	Polycarbonate	
	Aluminum	

Model NE...	...H	-1...	...E, H, T...	...N, V...	...P, F...	/	/
	Connector Housing	Number of Electrodes	Electrode material	Cable Cladding /Diameter	Fitting Material	Fitting Size	Electrode Length
	H = without Housing, w/6' cable  Suffix "K" Polycarbonate Housing 1.38"x2.05"x1.97"  Suffix "L" Aluminum Housing 1.38"x2.05"x1.97"	1	E = SS  H = Hastelloy <sup>2</sup>  T = Titanium <sup>2</sup>	N = Neoprene/ 0.23"  V = Teflon / 0.08"	P = Polyprop. <sup>1,3</sup>  F = Teflon <sup>2</sup>	1/2" NPT	Specify Length  "L1 = ..." when ordering

1) Only w/ SS. Electrodes    2) Only w/ Teflon Cladding    3) Only w/ Neoprene Cladding

Sample Part Number: NEH-1HVFK    L=24 feet

Ordering Data			
Model	Description	Electrode and Cable/Fitting Material	
		Neoprene/Polypropylene ..NP	Teflon/Teflon ..VF
NEH-1 E..	1 electrode with SS tip, 1/2" NPT connection	NEH-1ENP	NEH-1EVF
NEH-1 H..	1 electrode with Hastelloy tip, 1/2" NPT connection	-	NEH-1HVF
NEH-1 T..	1 electrode with titanium tip, 1/2" NPT connection	-	NEH-1TVF
Suffix "K"	Adder for Polycarbonate connector housing	NEH-1ENPK	NEH-1EVFK
Suffix "L"	Adder for Aluminum connector housing	NEH-1EVFL	NEH-1EVFL

# Suspended Electrodes

# Multiple Electrodes

## Technical Data

**Max. Pressure:** 90 PSIG  
**Max. Temperature:** Neoprene Cable 140°F  
 Teflon Cable 300°F  
**Housing Material:** Polyamide Glass Fiber Reinforced Aluminum

N1

Model NE...	...H	-2-6...	...E, H, T...	...N, V...	...P, F...	/	/
	Connector Housing	Number of Electrodes	Electrode material	Cable Cladding /Diameter	Fitting Material	Fitting Size	Electrode Length
	H=without Housing, w/ 6' of cable each  Suffix "K" Polyamide Housing 2.17"x3.15"x2.95"  Suffix "L" Aluminum Housing 2.17"x3.15"x2.95"	2 3 4 5 6	E = SS  H = Hastelloy <sup>2</sup>  T = Titanium <sup>2</sup>	N = Neoprene/0.23"  V = Teflon/0.08"	P = Polyprop <sup>1,3</sup>  F = Teflon <sup>2</sup>	1-1/2" NPT	Specify Length "L1 = ... L2 = ... etc" when ordering

1) Only w/ SS. Electrodes    2) Only w/ Teflon Cladding    3) Only w/ Neoprene Cladding

Sample Part Number: NEH-3ENPK L1=12ft., L2=16ft., L3=18ft.

Ordering Data			
Model	Description	Electrode and Cable/ Fitting Material	
		Neoprene/Polypropylene	Teflon/Teflon
NEH-2 E..	2 electrodes with SS tip, with 6' of cable, NPT connection	NEH-2ENP	NEH-2EVF
NEH-3 E..	ditto, but 3 electrodes	NEH-3ENP	NEH-3EVF
NEH-4 E..	ditto, 4 electrodes	NEH-4ENP	NEH-4EVF
NEH-5 E..	ditto, 5 electrodes	NEH-5ENP	NEH-5EVF
NEH-6 E..	ditto, 6 electrodes	NEH-6ENP	NEH-6EVF
Suffix "K"	Polyamide connector housing	-K	-K
Suffix "L"	Aluminum connector housing	-L	-L
-	Longer cable available		
Hastelloy or Titanium electrode tips available (NEH-. H..., NEH-. T...)			



# Electrode Relays

Kobold's NE level switch is powered by our NE-104/304 relay/power supply. These devices are capable of providing the user with a minimum or maximum setpoint signal for use in controlling liquid levels.

The NE-104X series is a single channel controller and the NE-304X series has two independent control channels.

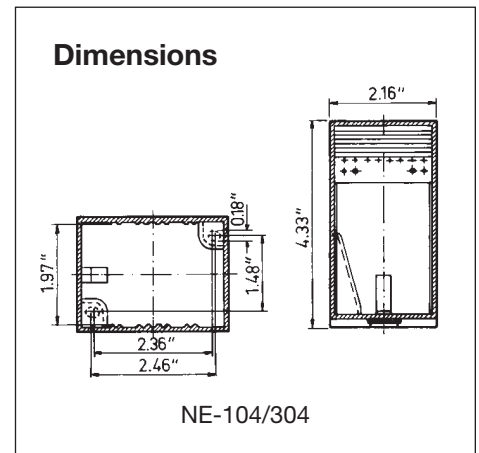
**Technical Data: NE-104 (1-Channel)**  
**Power Supply:** 230 VAC  
 110 VAC  
 24 VAC  
 ± 10 %  
**Power Consumption:** 2 VA  
**Maximum Electrode Voltage:** 10 VAC  
**Maximum Electrode Current:** 0.5 mA

**Sensitivity (Adjustable):** 0-50 kΩ  
**Response Time:** Approx. 1 second  
**Ambient Operating Temperature:** 0°-140°F  
**Output:** 1 SPDT Relay  
 Max. 250 VAC  
 @ 5 A, 600 VA  
**Enclosure:** NEMA 1/IP40  
 Rail Mountability  
 for DIN 46121 rail



**Technical Data: NE-304 (2-Channel)**  
**Power Supply:** 230 VAC  
 110 VAC  
 24 VAC  
 ± 10 %  
**Power Consumption:** 4 VA  
**Maximum Electrode Voltage:** 10 VAC  
**Maximum Electrode Current:** 0.5 mA  
**Sensitivity (Adjustable):** 0-50 kΩ  
**Response Time:** Approx. 1 second  
**Ambient Operating Temperature:** 0°-140°F  
**Output:** 2 SPDT Relays  
 Max. 250 VAC  
 @ 5 A, 600 VA  
**Enclosure:** NEMA 1/IP65  
 Rail Mountability  
 for DIN 46121 rail

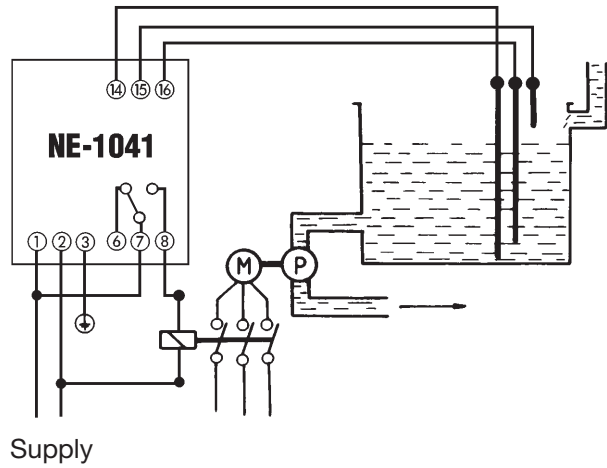
Ordering Data		
Power Supply	Number of Control Channels	
	1 Channel	2 Channels
220 VAC	NE-1040	NE-3040
110 VAC	NE-1041	NE-3041
24 VAC	NE-1042	NE-3042



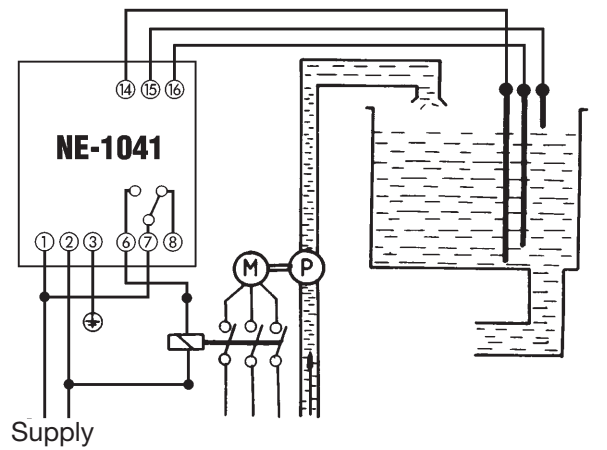


Function Model NE-1041 - Electrode Relay

Fill Container



Empty Container



Function	Model NE-1041 - Electrode Relay
<p>Overflow Protection</p>	
<p>Minimum Level Protection</p>	

### Adjustment

The ground electrode at terminal 14 of the electrode relay may be omitted if the container wall is conductive. Terminal 14 is then connected directly to the container wall. To ensure reliability the ground electrode should always be installed fully isolated when dealing with high resistance media. The same applies for very short electrodes.

Once the NE-1041 relay and the electrodes are connected, adjustment may only take place if at least 2 electrodes are immersed in the conductive liquid. The sensitivity controller is adjusted to the far right i.e., to the most insensitive position. The controller is then slowly moved to the left until the relay

picks up (is audible). The controller should then be turned a further 10° (approx.). If the relay has already picked up at the end position (eg. with water), the controller should still be turned approx. 10° to the left.