Low Signal Relay

Subminiature, Sensitive Signal Relay

- Subminiature 7.87 H x 9.91 W x 16 L mm.
- High sensitivity with pick-up coil power of 98 mW.
- Surge withstand voltage meets FCC Part 68 requirements.
- Unique moving loop armature reduces relay size, magnetic interference, and contact bounce time.
- Bifurcated crossbar contact assures high reliability.
- Single and Dual coil latching versions available.
- Fully sealed construction.
- RoHS Compliant.



B17

Ordering Information

To Order: Select the part number and add the desired coil voltage rating, (e.g., G6E-134P-ST-US-DC6).

Contact form			Model					
Contact form		Terminal style	Standard	Single coil latching	Dual coil latching			
SPDT	SPDT Bifurcated crossbar		Straight	G6E-134P-US	G6EU-134P-US	G6EK-134P-US		
			Self-clinching	G6E-134C-US	G6EU-134C-US	G6EK-134C-US		

Model Number Legend

G6E __ - __ _ _ _ _ _ _ _ _ _ _ DC __

1. Relay Function

None: Single-side stable
U: Single-winding latching
K: Double-winding latching

2. Contact Form 1: SPDT 3. Contact Type

3: Bifurcated crossbar Ag (Au-Alloy) contact

4. Enclosure Ratings

4: Fully sealed

5. Terminals

P: Straight PCB
C: Curved tail

6. Special Function

L: Low sensitivity coil (400 mW)

7. Standoff dimension Blank: 0.3 mm ST: 0.64 mm

8. Approved Standards US: UL, CSA certified

9. Rated Coil Voltage 3, 5, 6, 9, 12, 24, 48 VDC

Specifications

■ Contact Data

Load	Resistive load (p.f. = 1)	Inductive load (p.f. = 0.4) (L/R = 7 ms)
Rated load	0.40 A at 125 VAC, 2 A at 30 VDC	0.20 A at 125 VAC, 1 A at 30 VDC
Contact material	Ag (Au clad)	
Carry current	3 A	
Max. operating voltage	250 VAC, 220 VDC	
Max. operating current	3 A	
Max. switching capacity	50 VA, 60 W	25 VA, 30 W
Min. permissible load (See note)	10 ?A, 10 mVDC	

Note: P level: $\lambda_{60} = 0.1 \times 10^{-6}$ /operation

This value was measured at a switching frequency of 120 operations/min and the criterion of contact resistance is 50Ω . This value may vary depending on the switching frequency and operating environment. Always double-check relay suitability under actual operating conditions.

■ Coil Data

Standard Non-latching Type (G6E-134P(-ST)-US, G6E-134C(-ST)-US)

Rated voltage	Rated current	Coil resistance		uctance lue) (H)	Pick-up voltage	Dropout voltage	Maximum voltage	Power consumption
(VDC)	(mA)	(Ω)	Armature OFF	Armature ON	% of rated voltage		(mW)	
3	66.70	45	0.08	0.06	70% max.	10% min.	190% at 23°C	Approx. 200
5	40	125	0.18	0.17				
6	33.30	180	0.31	0.24				
9	22.20	405	0.62	0.50				
12	16.70	720	1.20	0.99				
24	8.30	2,880	4.70	3.90				
48	8.30	5,760	5.35	5.12			170% at 23°C	Approx. 400

Low-sensitivity Non-latching Type (G6E-134PL(-ST)-US)

Rated voltage	Rated current	Coil resistance		luctance llue) (H)	Pick-up voltage	Dropout voltage	Maximum voltage	Power consumption
(VDC)	(mA)	(Ω)	Armature OFF	Armature ON	% of rated voltage		(mW)	
3	133	22.50	0.03	0.03	70% max.	10% min.	190% at 23°C	Approx. 400
5	79.40	63	0.08	0.07				
6	66.60	90	0.12	0.10				
9	44.30	203	0.21	0.19				
12	33.30	360	0.45	0.42	1			
24	16.70	1,440	1.77	1.65				

Standard Single Coil Latching Type (G6EU-134P(-ST)-US, G6EU-134C(-ST)-US)

Rated voltage	Rated current	Coil resistance		uctance lue) (H)	Set pick-up voltage	Reset pick-up voltage	Maximum voltage	Power consumption
(VDC)	(mA)	(Ω)	Armature OFF	Armature ON	% of rated voltage		(mW)	
3	66.70	45	0.05	0.04	70% max.	70% min.	190% max.	Approx. 200
5	40	125	0.13	0.12			at 23°C	
6	33.30	180	0.19	0.17				
9	22.20	405	0.45	0.40				
12	16.70	720	0.84	0.79]			
24	8.30	2,880	3.56	3.10				

Standard Dual Coil Latching Type (G6EK-134P(-ST)-US, G6EK-134C(-ST)-US)

Rated voltage	Rated current	Coil resistance		luctance ilue) (H)	Set pick-up voltage	Reset pick-up voltage	Maximum voltage	Power consumption
(VDC)	(mA)	(Ω)	Armature OFF	Armature ON	% of rated voltage		(mW)	
3	66.70	45	0.05	0.04	70% max.	70% min.	190% max.	Approx. 200
5	40	125	0.09	0.08			at 23°C	
6	33.30	180	0.12	0.11	1			
7	22.20	405	0.25	0.22	1			
12	16.70	720	0.44	0.41]			
24	8.30	2,880	1.66	1.62				

- Note: 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of $\pm 10\%$.
 - 2. Operating characteristics are measured at a coil temperature of 23°C.
 - 3. The maximum voltage is the highest voltage that can be imposed on the relay coil.

Low-sensitivity Dual Coil Latching Type (G6EK-134PL(-ST)-US)

Rated voltage	Rated current	Coil resistance		uctance lue) (H)	Set pick-up voltage	Reset pick-up voltage	Maximum voltage	Power consumption
(VDC)	(mA)	(Ω)	Armature OFF	Armature ON	% of rated voltage		(mW)	
3	133	22.50	0.02	0.01	70% max.	70% min.	170% max.	Approx. 400
5	79.40	63	0.04	0.03			at 23°C	
6	66.60	90	0.06	0.04				
9	44.30	203	0.12	0.09				
12	33.30	360	0.21	0.15				
24	16.70	1,440	0.80	0.58				

- Note: 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.
 - 2. Operating characteristics are measured at a coil temperature of 23°C.
 - 3. The maximum voltage is the highest voltage that can be imposed on the relay coil.

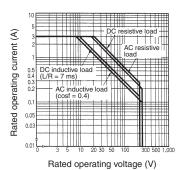
■ Characteristics

Contact resistance (Se	e note 1)	50 mΩ max.			
Operate time (set) time		5 ms max. (mean value approx. 2.90 ms, 48 VDC type, approx. 2.40 ms)			
Release time (reset) time (See note 2)		5 ms max. (mean value approx. 1.30 ms)			
Min. set/reset signal width		Latching type: 15 ms min. (at 23°C)			
Operating frequency	Mechanical	36,000 operations/hour			
(max.)	Electrical	1,800 operations/hour (under rated load)			
Insulation resistance (S	See note 3)	1,000 MΩ min. (at 500 VDC)			
Dielectric strength		1,500 VAC, 50/60 Hz for 1 minute between coil contacts			
		1,000 VAC, 50/60 Hz for 1 minute between contacts of same pole			
Surge withstand voltag	е	1,500 V (10 x160 μs) (conforms to FCC Part 68)			
		2,500 V (2 x 10 μs) (Telcordia Requirement)			
Vibration	Mechanical durability	10 to 55 Hz; 5 mm double amplitude			
	Malfunction durability	10 to 55 Hz; 3.3 mm double amplitude			
Shock	Mechanical durability	1,000 m/s ² , approx. 100G			
	Malfunction durability	300 m/s², approx. 30G			
Ambient temperature	-	-40°C to 70°C with no icing			
Humidity		5% to 85% RH			
Service life	Mechanical	100 million operations min. (at 36,000 operations/hour)			
	Electrical	100,000 operations min (0.4A at 125 VAC resistive; 0.2A at 125VAC inductive) 500,000 operations min. (2A at 30 VDC resistive; 1A at 30VDC inductive) 200,000 operations min. (3A at 30 VDC resistive) See "Characteristic Data"			
Weight		Approx. 2.7 g			

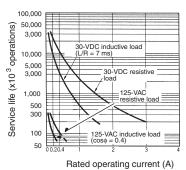
- Note: 1. The contact resistance was measured with 1A at 5VDC with a fall-of-potential method.
 - 2. Values in parentheses are typical values unless otherwise stated.
 - 3. The insulation resistance was measured with a 500-VDC megohmmeter applied to the same parts as those for checking the dielectric strength
 - 4. The above values are initial values.

■ Characteristic Data

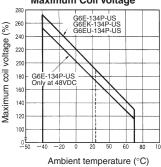
Maximum Switching Capacity



Electrical Service Life



Ambient Temperature vs. Maximum Coil Voltage



Note: The maximum coil voltage refers to the maximum value in a varying range of operating power voltage, not a continuous voltage.

Dimensions

Note: 1. All units are in millimeters unless otherwise indicated.

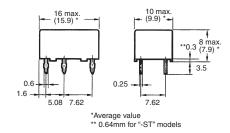
2. Orientation marks are indicated as follows:

Standard coil

G6E-134P(L)(-ST)-US



G6E-134C(-ST)-US

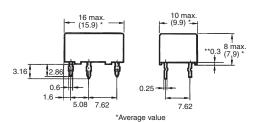


Terminal Arrangement/ Internal Connections (Bottom View)

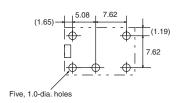


Mounting Holes (Bottom View)

Tolerance: ±0.1



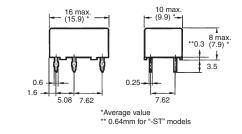
** 0.64mm for "-ST" models



Single coil latching

G6EU-134P(L)(-ST)-US



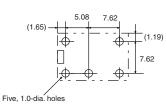


Terminal Arrangement/ Internal Connections (Bottom View)



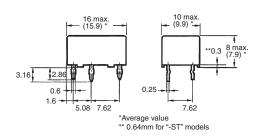
Mounting Holes (Bottom View)

Tolerance: ±0.1



G6EU-134C(-ST)-US



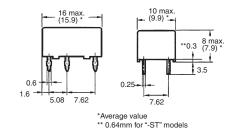




Dual coil latching

G6EK-134P(L)(-ST)-US



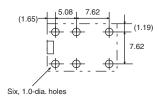


Terminal Arrangement/ Internal Connections (Bottom View)



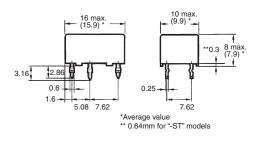
Mounting Holes (Bottom View)

Tolerance: ±0.1



G6EK-134C(-ST)-US





■ Approvals

UL Recognized (File No. E41515) / CSA Certified (File No. LR31928) - - Ambient Temp. = 40°C

Contact form	Coil ratings	Contact ratings	Number of test operations
SPDT	3 to 48 VDC	0.2 A at 250 VAC (General Use)	6,000
		0.6 A at 125 VAC (General Use)	
		2 A at 30 VDC (Resistive)	
		0.6 A at 125 VDC (Resistive, Ag contact only)	

- Note: 1. The rated values approved by each of the safety standards (e.g., UL, CSA, TUV) may be different from the performance characteristics individually defined in this catalog.
 - 2. In the interest of product improvement, specifications are subject to change.

Precautions

■ Precautions for Correct Use

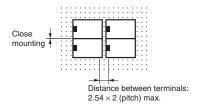
Long-term Continuously ON Contacts

Using the Relay in a circuit where the Relay will be ON continuously for long periods (without switching) can lead to unstable contacts because the heat generated by the coil itself will affect the insulation, causing a film to develop on the contact surfaces. We recommend using a latching relay (magnetic-holding relay) in this kind of circuit. If a single-side stable model must be used in this kind of circuit, we recommend using a fail-safe circuit design that provides protection against contact failure or coil burnout.

Installation

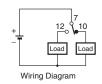
Do not reverse the polarity of the coil (+, -).

Provide sufficient space between Relays when mounting two or more on the same PCB, as shown in the following diagram.



Wiring

Refer to the following diagram when wiring to switch a DC load. The difference in polarity applied to the contacts will affect the endurance of the Relay due to the amount of contact movement. To extend the endurance characteristics beyond the performance ratings, wire the common (pin 7) terminal to the positive (+) side.



Ultrasonic Cleaning

Do not use ultrasonic cleaning on standard relay models. Doing so may result in resonance, coil burnout, and contact adhesion within the Relay.

Relay Handling

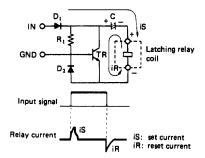
When washing the product after soldering the Relay to a PCB, use a water-based solvent or alcohol-based solvent, and keep the solvent temperature to less than 40°C. Do not put the Relay in a cold cleaning bath immediately after soldering.

■ Hints on Correct Use

Single-winding type (G6EU)

Example of low-power consumption driver circuit

- 1. This is an example of a driver circuit that allows Model G6E to function as a normal relay with a normal switching pulse input.
- 2. The relay is set by an abrupt current charged to capacity C. This current flows in the relay via diode D₁ and C and out via diode D₂.
- 3. The relay is reset by the discharge current of C flowing in the relay via transistor TR and C.



- **Note: 1.** Give adequate consideration to the circuit constant when actually using this circuit, confirming the set and reset status of the relav.
 - 2. OMRON owns the patent on this circuit. Consult OMRON when using this circuit.

Omron Electronic Components, LLC

Terms and Conditions of Sales

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Definitions: The words used herein are defined as follows.

Terms: These terms and conditions

Seller: Omron Electronic Components LLC and its subsidiaries (b)

The buyer of Products, including any end user in section III through VI Buyer: (c)

Products: Products and/or services of Seller

Including without limitation Including: Offer: Acceptance: These Terms are deemed part of all quotations, acknowledgments, invoices, purchase orders and other documents, whether electronic or in writing, relating to the sale of Products by Seller. Seller hereby objects to any Terms proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these

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- Currencies: If the prices quoted herein are in a currency other than U.S. dollars, Buyer shall make remittance to Seller at the then current exchange rate most favorable to Seller; provided that if remittance is not made when due, Buyer will convert the amount to U.S. dollars at the then current exchange rate most favorable to Seller available during the period between the due date and the date remittance is actually made.
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- Cancellation; Etc: Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Seller fully against all costs or expenses arising in connection therewith.
- Force Majeure: Seller shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.

Shipping: Delivery: Unless otherwise expressly agreed in writing by Seller:
(a) All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Seller), at which point title to and all risk of loss of the Products shall pass from Seller to Buyer, provided that Seller shall retain a security interest in the Products until the full purchase price is paid by Buyer;

Delivery and shipping dates are estimates only; and

- Seller will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
- 12. Claims: Any claim by Buyer against Seller for shortage or damage to the Products occurring before delivery to the carrier or any claim related to pricing or other charges must be presented in detail in writing to Seller within 30 days of receipt of shipment.

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- Suitability: IT IS THE BUYER'S SOLE RESPOINSIBILITY TO ENSURE THAT ANY OMRON PRODUCT IS FIT AND SUFFICIENT FOR USE IN A MOTORIZED VEHICLE APPLICATION. BUYER SHALL BE SOLELY RESPONSIBLE FOR DETERMINING APPROPRIATENESS OF THE PARTICULAR PRODUCT WITH RESPECT TO THE BUYER'S APPLICATION INCLUDING (A) ELECTRICAL OR ELECTRONIC COMPONENTS. (B) CIRCUITS, (C) SYSTEM ASSEMBLIES, (D) END PRODUCT, (E) SYSTEM (E) MATERIALS OR SUBSTANCES OR (C) OPERATING ENVIRONMENT SYSTEM, (F) MATÉRIALS OR SUBSTANCES OR (G) OPERATING ENVIRONMENT. Buyer acknowledges that it alone has determined that the Products will meet their requirements of the intended use in <u>all</u> cases. Buyer must know and observe all prohibitions of use applicable to the Product/s.
- Use with Attention: The followings are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible use of any Product, nor to imply that any use listed may be suitable for any Product:
 - Outdoor use, use involving potential chemical contamination or electrical interference.

(b) Use in consumer Products or any use in significant quantities.

Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and

installations subject to separate industry or government regulations.

(d) Systems, machines, and equipment that could present a risk to life or property.

Prohibited Use: NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Motorized Vehicle Application: USE OF ANY PRODUCT/S FOR A MOTORIZED VEHICLE APPLICATION MUST BE EXPRESSLY STATED IN THE SPECIFICATION BY

SELLER.

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- Buyer Remedy: Seller's sole obligation hereunder shall be to replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product or, at Seller's election, to repay or credit Buyer an amount equal to the purchase price of the Product; provided that there shall be no liability for Seller or its affiliates unless Seller's analysis confirms that the Products were correctly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be
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- Indemnities: Buyer shall indemnify and hold harmless Seller, its affiliates and its employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Seller is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products.

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 Performance Data: Performance data is provided as a guide in determining suitability

and does not constitute a warranty. It may represent the result of Seller's test conditions, and the users must correlate it to actual application requirements.

- Change In Specifications: Product specifications and descriptions may be changed at any time based on improvements or other reasons. It is Seller's practice to change part numbers when published ratings or features are changed, or when significant engineering changes are made. However, some specifications of the Product may be changed without any notice.
- Errors And Omissions: The information on Seller's website or in other documentation has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.
- Export Controls: Buyer shall comply with all applicable laws, regulations and licenses regarding (a) export of the Products or information provided by Seller; (b) sale of Products to forbidden or other proscribed persons or organizations; (c) disclosure to noncitizens of regulated technology or information.

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- <u>Waiver</u>: No failure or delay by Seller in exercising any right and no course of dealing between Buyer and Seller shall operate as a waiver of rights by Seller.
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- Amendment: These Terms constitute the entire agreement between Buyer and Seller relating to the Products, and no provision may be changed or waived unless in writing signed by the parties.
- Severability: If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision.

Certain Precautions on Specifications and Use

- <u>Suitability for Use</u>. Seller shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in Buyer's application or use of the Product. At Buyer's request, Seller will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases but the following is a non-exhaustive list of applications for which particular attention must be given:
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 - Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government

 - Use in consumer products or any use in significant quantities. Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

- <u>Programmable Products.</u> Seller shall not be responsible for the user's programming of a programmable product, or any consequence thereof. <u>Performance Data.</u> Performance data given in this publication is provided as
- a guide for the user in determining suitability and does not constitute a war-ranty. It may represent the result of Seller's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to
- correlate it to actual application requirements. Actual performance is subject to Seller's Warranty and Limitations of Liability.

 Change in Specifications. Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Seller representative at any time to confirm actual specifications of purchased Product.

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