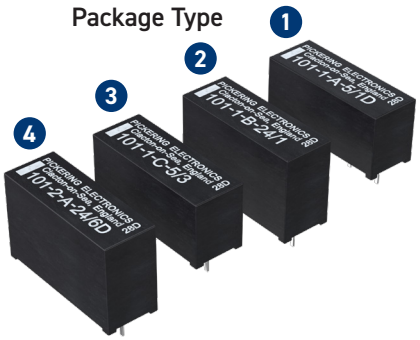
- Direct drive from **74HC** or **HCT**
- Stacking on **0.3 inches** pitch
- Highest quality instrumentation grade dry switches
- Board space may be saved by eliminating the need for drivers
- Encapsulated in plastic package with internal mu-metal magnetic screen
- **1 Form A**, **2 Form A**, **1 Form B** & **1 Form C** configurations
- Two Pole relay requires the same board area as the single pole type
- Insulation resistance **$>10^{12}\,\Omega$** for dry **Form A** devices
- **3 V**, **5 V**, **12 V** or **24 V** Coils with optional internal diode
- Additional Build options are available
- Many benefits compared to industry standard relays (see last page)



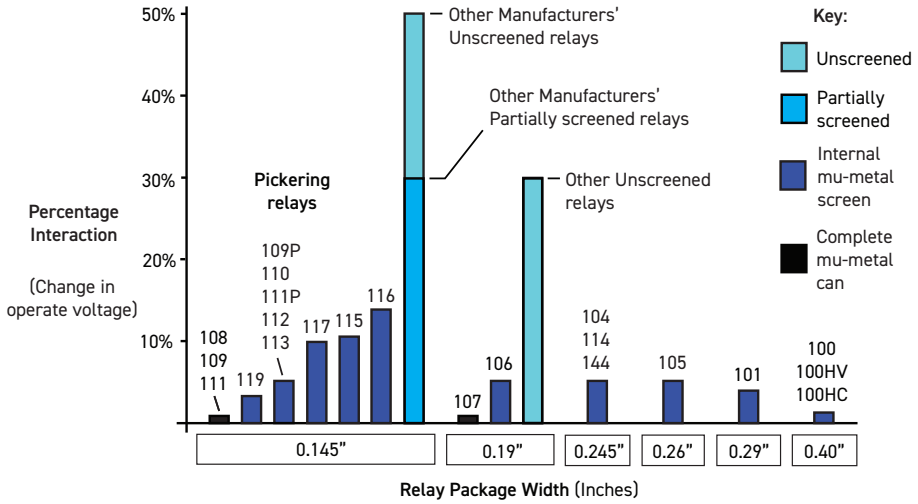
The Series 101 have very high coil resistances. 5 V dry versions may be driven directly from 74HC or 74HCT logic without the need for additional drivers.

74HC logic will drive up to 4 mA at 5 V, therefore a coil resistance of 1600 Ω is desirable to avoid running the IC at its maximum rating; 1600 Ω is the coil resistance of the single pole dry Series 101.

The switches in the 2 Form A version are vertically stacked so the relay requires the same board area as the 1 Form A type.

A special 1 Form A, 5 V version is available with an even higher coil resistance of 3000 Ω. This is particularly suited to applications such as battery powered portable equipment as it requires a coil current of only 1.7 mA. This part, the 101-1-A-5/17 or 17D has the advantage of a lower level of thermal EMF of 3 µV or less. Other special parts are also available that may be operated from 3 V logic.

Magnetic Interaction



This chart demonstrates the percentage changes in operate voltage due to magnetic interaction depending on the level of magnetic screening offered from the relay package. For more information on magnetic interaction **click here**.

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Switch Ratings - Dry Switches

1 Form A (energize to make)	1 Form B (energize to break)	1 Form C (changeover)	2 Form A (energize to make)
Up to 1 A switching at 20 W	Up to 1 A switching at 20 W	0.25 A switching at 3 W	Up to 1 A switching at 20 W

Dry Reed: Series 101 switch ratings - contact ratings for each switch type

Switch No	Switch form	Power rating	Max. switch current	Max. carry current	Max. switching volts	Life expectancy ops typical (see Note[1])	Operate time inc bounce (max)	Release time	Special features
1	A or B	20 W (*15 W)	1.0 A	1.2 A	200	10^9	1.0 ms	0.75 ms	General purpose
2	A or B	10 W	0.5 A	1.2 A	200	10^9	1.0 ms	0.75 ms	Low level
3	C	3 W	0.25 A	1.2 A	200	10^7	1.25 ms	1.0 ms	Change over
4	A	10 W	0.5 A	1.2 A	500	10^8	1.0 ms	0.75 ms	1000 V stand-off

Switch no.2 is particularly good for switching low currents and/or voltages. It is the ideal switch for A.T.E. systems where cold switching techniques are often used. Where higher power levels are involved, switch no.1 is more suitable.

Note[1]: Life Expectancy

The life of a reed relay depends upon the switch load and end of life criteria. For example, for an 'end of life' contact resistance specification of 1Ω, switching low loads (10 V at 10 mA resistive) or when 'cold' switching, typical life is approx 1 x 10^9 ops. At the maximum load (resistive), typical life is 1 x 10^7 ops. In the event of abusive conditions, e.g. high currents due to capacitive inrushes, this figure reduces considerably. Pickering will be pleased to perform life testing with any particular load condition.

Operating Voltages

Coil voltage - nominal	Must operate voltage - maximum at 25 °C	Must release voltage - minimum at 25 °C
3 V	2.25 V	0.3 V
5 V	3.75 V	0.5 V
12 V	9 V	1.2 V
24 V	18 V	2.4 V

Environmental Specification/Mechanical Characteristics

In the table below, the upper temperature limit can be extended to +125 °C if the coil drive voltage is increased to accommodate the resistance/temperature coefficient of the copper coil winding. This is approximately 0.4% per °C. This means that at 125 °C the coil drive voltage will need to be increased by approximately 40 x 0.4 =16% to maintain the required magnetic drive level. Please contact sales@pickeringrelay.com for assistance.

Operating Temperature Range	-20 °C to +85 °C
Storage Temperature Range	-35 °C to +100 °C
Shock Resistance	50 g
Vibration Resistance (10 - 2000 Hz)	20 g
Soldering Temperature (max) (10 s max)	270 °C
Washability (Proper drying process is recommended)	Fully Sealed

Washing Guidelines

Pickering do not make any specific recommendations on washing reed relays, due to the large number of factors in cleaning processes, however we do have suggestions on best practices. Click here for more information.

Dry Relay: Series 101 Coil data and type numbers

Device Type	Type Number	Coil (V)	Coil resistance	Max. contact resistance (initial)	Insulation resistance (minimum at 25 °C) (see Note[4])		Capacitance (typical) (see Note[2])	
					Switch to coil	Across switch	Closed switch to coil	Across open switch
1 Form A Switch No. 1 (*Note 15 W for 3 V coil) Package Type 1	101-1-A-3/1D *	3	800 Ω	0.15 Ω	10^{12} Ω	10^{12} Ω	2.5 pF	0.1 pF
	101-1-A-5/1D	5	1600 Ω					
	101-1-A-12/1D	12	6000 Ω					
	101-1-A-24/1D	24	6000 Ω					
1 Form A Switch No. 2 Package Type 1	101-1-A-3/2D	3	1600 Ω	0.12 Ω	10^{12} Ω	10^{12} Ω	2.5 pF	0.1 pF
	101-1-A-5/2D	5	1600 Ω					
	101-1-A-12/2D	12	6000 Ω					
	101-1-A-24/2D	24	6000 Ω					
1 Form A HV Switch No. 4 Package Type 1	101-1-A-5/4D	5	1600 Ω	0.15 Ω	10^{12} Ω	10^{12} Ω	2.5 pF	0.1 pF
	101-1-A-12/4D	12	6000 Ω					
	101-1-A-24/4D	24	6000 Ω					
1 Form B, Switch No. 1 (*Note 15 W for 5 V coil) Package Type 2	101-1-B-5/1D *	5	3000 Ω	0.15 Ω	10^{12} Ω	10^{12} Ω	2.5 pF	0.1 pF
	101-1-B-12/1D	12	6000 Ω					
	101-1-B-24/1D	24	6000 Ω					
1 Form B Switch No. 2 Package Type 2	101-1-B-5/2D	5	3000 Ω	0.15 Ω	10^{12} Ω	10^{12} Ω	2.5 pF	0.1 pF
	101-1-B-12/2D	12	6000 Ω					
	101-1-B-24/2D	24	6000 Ω					
1 Form C Switch No. 3 Package Type 3	101-1-C-3/3D	3	700 Ω	0.20 Ω	10^{12} Ω	10^{10} Ω	See Note[3]	See Note[3]
	101-1-C-5/3D	5	1600 Ω					
	101-1-C-12/3D	12	6000 Ω					
	101-1-C-24/3D	24	6000 Ω					
2 Form A, Switch No. 1 (*Note 15 W for 5 V coil) Package Type 4	101-2-A-5/1D *	5	1000 Ω	0.17 Ω	10^{12} Ω	10^{12} Ω	See Note[3]	See Note[3]
	101-2-A-12/1D	12	3000 Ω					
	101-2-A-24/1D	24	6000 Ω					
2 Form A Switch No. 2 Package Type 4	101-2-A-3/2D	3	1000 Ω	0.15 Ω	10^{12} Ω	10^{12} Ω	See Note[3]	See Note[3]
	101-2-A-5/2D	5	1000 Ω					
	101-2-A-12/2D	12	3000 Ω					
	101-2-A-24/2D	24	6000 Ω					
1 Form A, Switch No. 2 (Special Extra Sensitive Version) Package Type 1	101-1-A-5/17D	5	3000 Ω	0.12 Ω	10^{12} Ω	10^{12} Ω	2.5 pF	0.1 pF

When an internal diode is required, the suffix D is added to the part number as shown in the table.

Note[2]: Capacitance across open switch

The capacitance across the open switch was measured with other connections guarded.

Note[3]: Capacitance values

The value will depend upon on the mode of connection/guarding of unused terminals. Please contact technical sales for details.

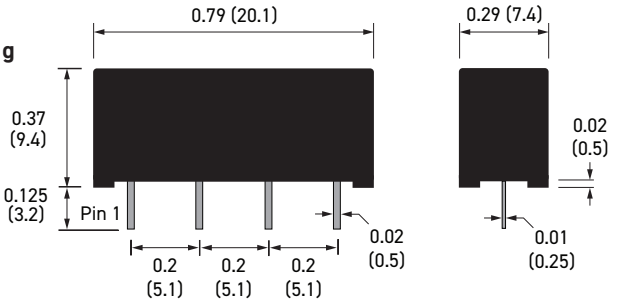
Note[4]: Insulation resistance

Insulation resistance will reduce at higher temperatures. For more information on temperature effects **click here**, or **contact Pickering** for more in depth guidance.

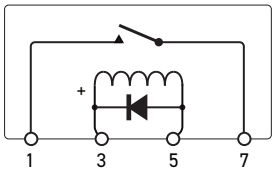
Pin Configuration, Weights and Dimensional Data (dimensions in inches, millimeters in brackets)

Package Type 1

Weight: Typical 2.92 g

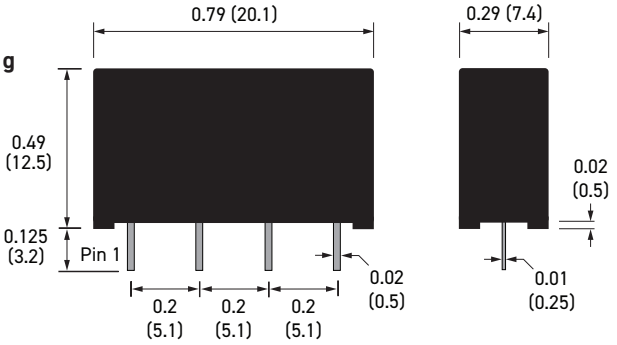


1 Form A

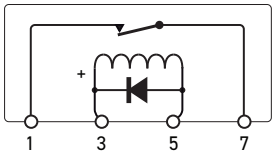


Package Type 2

Weight: Typical 3.34 g

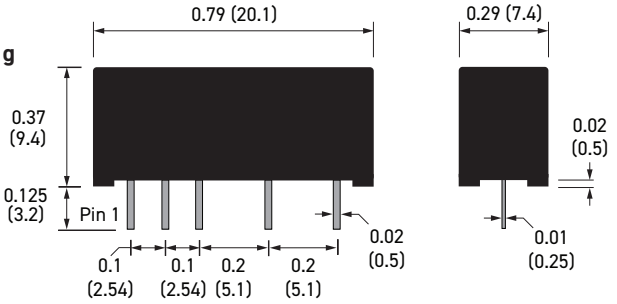


1 Form B (see Note)

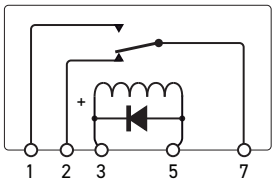


Package Type 3

Weight: Typical 3.03 g

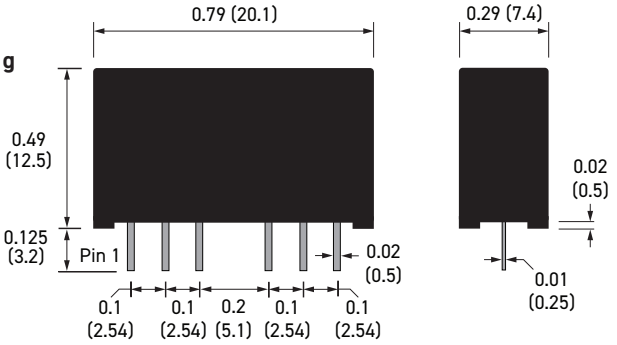


1 Form C

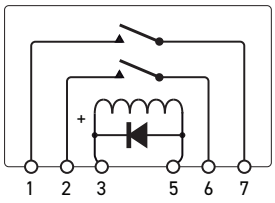


Package Type 4

Weight: Typical 3.45 g



2 Form A



Important: Where the optional internal diode is fitted or for all Form B types, the correct coil polarity must be observed, as shown by the + symbol on the schematics.

Similar Relays Comparison

If the Series 101 is unsuitable for your application, Pickering also manufactures another series of reed relays with similar characteristics, but in different package sizes.

Series Name		100-1-A			100-1-B	100-1-C	100-2-A	101-1-A			101-1-B	101-1-C	101-2-A	
Physical Outline														
Depth	mm (inches)	10.2 (0.40)			10.2 (0.40)	10.2 (0.40)	10.2 (0.40)	7.4 (0.29)			7.4 (0.29)	7.4 (0.29)	7.4 (0.29)	
Width		24.1 (0.95)			24.1 (0.95)	24.1 (0.95)	24.1 (0.95)	20.1 (0.79)			20.1 (0.79)	20.1 (0.79)	20.1 (0.79)	
Height		12.7 (0.50)			15.2 (0.60)	12.7 (0.50)	15.2 (0.60)	9.4 (0.37)			12.5 (0.49)	9.4 (0.37)	12.5 (0.49)	
Package Volume (mm^3)		3122			3737	3122	3737	❶ 1399			❷ 1860	❸ 1399	❹ 1860	
Typical Weights (g)		7.07			8.82	6.65	8.89	2.92			3.34	3.03	3.45	
Contact Configuration		1-A (SPST)			1-B (SPNC)	1-C (SPDT)	2-A (DPST)	1-A (SPST)			1-B (SPNC)	1-C (SPDT)	2-A (DPST)	
Reed Switch Type		Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
Stand-off Voltage (V)		-	-	1000	-	-	-	-	-	1000	-	-	-	-
Switching Voltage (V)		200	200	500	200	200	200	200	200	500	200	200	200	200
Switching Current (A)		1.0	0.5	0.5	1D: 1.0 2D: 0.5	0.25	1D: 1.0 2D: 0.5	1.0	0.5	0.5	1D: 1.0 2D: 0.5	0.25	1.0	0.5
Carry Current (A)		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Switch Power (W)		20 (15)	10	10	1D: 20(15) 2D: 10	3	1D: 20(15) 2D: 10	20 (15)	10	10	1D: 20(15) 2D: 10	3	20 (15)	10

Reed Relay Selection Tool

Because Pickering offer the largest range of high-quality reed relays, sometimes it can be difficult to find the right reed relay you require. That is why we created the Reed Relay Selector, this tool will help you narrow down our offering to get you the correct reed relay for your application. To try the tool today go to: pickeringrelay.com/reed-relay-selector-tool

Mercury Relays

Mercury relays no longer form part of our standard range due to ROHS guidelines, although some exceptions may apply. For more information please visit pickeringrelay.com/mercuryreedrelays, email techsales@pickeringrelay.com, or call +44 (0) 1255 428141.

The technical information shown in this data sheet could contain inaccuracies or typographical errors. This information may be periodically changed or updated and these changes will be included in future versions of this data sheet.

For different values, latest specifications and product details, please contact your local Pickering sales office.

For FREE evaluation samples go to: pickeringrelay.com/samples

Standard Build Options

The Series 101 Reed Relays are available with a number of standard build options to tailor them to your specific application. These options are detailed in the table below. If you decide to go ahead and specify one, or more, of these options you will be allocated a unique part number suffix.

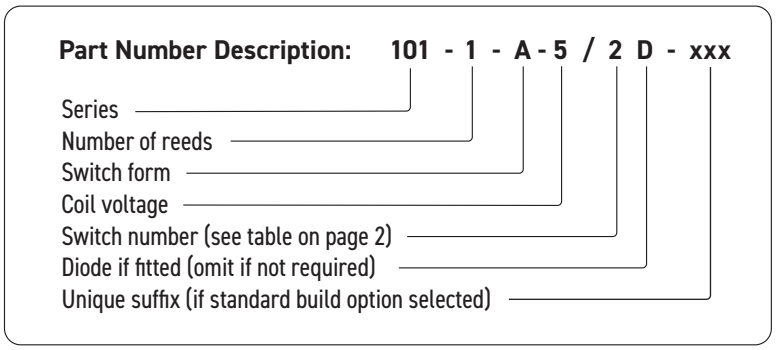
Mechanical Build Options	Electrical Build Options
Special pin configurations or pin lengths	Different coil resistance
Special print with customer's own part number or logo	Operate or de-operate time
Custom packaging possibility	Pulse capability
	Enhanced specifications
	Non-standard coil voltages and resistance figures
	Special Life testing under customer's specific load conditions
	Specific environmental requirements
	Controlled thermal EMF

Customization

If your specific requirements are not met by standard relay, or any of the standard build options, please speak to us to discuss producing a customized reed relay to service your specific application: pickeringrelay.com/contact

3D Models

Interactive 3D models of the complete range of Pickering relay products in STEP, IGS and SLDPRT formats can be downloaded from the website: pickeringrelay.com/3d-models



Help

If you need any technical advice or other help, please do not hesitate to contact our Technical Sales Department. We will always be pleased to discuss Pickering relays with you. email: techsales@pickeringrelay.com

Contact Us

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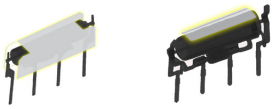
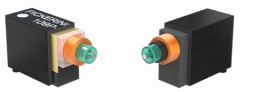
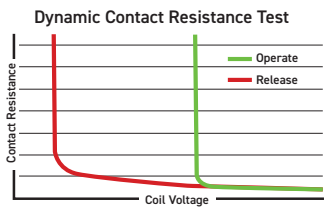
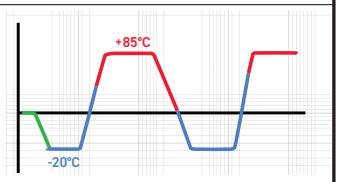
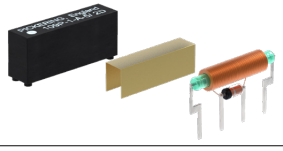
For a full list of agents, distributors and representatives visit: pickeringrelay.com/agents

10 Key Benefits of Pickering Reed Relays

Key Benefit	Pickering Reed Relays	Typical Industry Reed Relays	
1 Instrumentation Grade Reed Switches	Instrumentation Grade Reed Switches with vacuum sputtered Ruthenium plating to ensure stable, long life up to 5x10E9 operations.	Often low grade Reed Switches with electroplated Rhodium plating resulting in higher, less stable contact resistance.	
2 Formerless Coil Construction	Formerless coil construction increases the coil winding volume, maximizing magnetic efficiency, allowing the use of less sensitive reed switches resulting in optimal switching action and extended lifetime at operational extremes.	Use of bobbins decreases the coil winding volume, resulting in having less magnetic drive and a need to use more sensitive reed switches which are inherently less stable with greatly reduced restoring forces.	 Pickering former-less coil Typical industry coil wound on bobbin
3 Magnetic Screening	Mu-metal magnetic screening (either external or internal), enables ultra-high PCB side-by-side packing densities with minimal magnetic interaction, saving significant cost and space. **Pickering Mu-Metal magnetic screen - interaction approx. 5%**	Lower cost reed relays have minimal or no magnetic screening, resulting in magnetic interaction issues causing changes in operating and release voltages, timing and contact resistance, causing switches to not operate at their nominal voltages. **Typical industry screen - interaction approx. 30%**	 X-Ray of Pickering mu-metal magnetic screen X-Ray of typical industry magnetic screen
4 *SoftCenter*™ Technology	***SoftCenter***™ technology, provides maximum cushioned protection of the reed switch, minimising internal lifetime stresses and extending the working life and contact stability.	Transfer moulded reed relays (produced using high temperature/pressure), result in significant stresses to the glass reed switch which can cause the switch blades to deflect or misalign leading to changes in the operating characteristics, contact resistance stability and operating lifetime.	 Pickering soft center protection of the reed switch Typical industry thermo-setting hard moulded protection of the reed switch
5 100% Dynamic Testing	100% testing for all operating parameters including dynamic contact wave-shape analysis with full data scrutiny to maintain consistency.	Simple dc testing or just batch testing which may result in non-operational devices being supplied.	
6 100% Inspection at Every Stage of Manufacturing	Inspection at every stage of manufacturing maintaining high levels of quality.	Often limited batch inspection.	
7 100% Thermal Cycling	Stress testing of the manufacturing processes, from -20 °C to +85 °C to -20 °C, repeated 3 times.	Rarely included resulting in field failures.	
8 Flexible Manufacturing Process	Flexible manufacturing processes allow quick-turn manufacturing of small batches.	Mass production: Usually large batch sizes and with no quick-turn manufacturing.	
9 Custom Reed Relays	Our reed relays can be customized easily, e.g. special pin configurations, enhanced specifications, non-standard coil or resistance figures, special life testing, low capacitance, and more.	Limited ability to customize.	
10 Product Longevity	Pickering are committed to product longevity; our reed relays are manufactured and supported for more than 25 years from introduction, typically much longer.	Most other manufacturers discontinue parts when they reach a low sales threshold; costing purchasing and R&D a great deal of unnecessary time and money to redesign and maintain supply.	

For more information go to: pickeringrelay.com/10-key-benefits