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# DIRECT

## Electronics Tech.

### (FL)

# Current Shunts Resistors

Web: [www.direct-token.com](http://www.direct-token.com)

Email: [rfq@direct-token.com](mailto:rfq@direct-token.com)

**Direct Electronics Industry Co., Ltd.**

**China:** 12F, Zhong Xing Industry Bld., Chuang Ye Road,  
Nan Shan District, Shen Zhen City,  
Guang Dong, China 518054  
Tel: +86 755 26055363; Fax: +86 755 26055365

**Taiwan:** No.137, Sec. 1, Zhongxing Rd., Wugu District,  
New Taipei City, Taiwan, R.O.C. 24872  
Tel: +886 2981 0109 Fax: +886 2988 7487

## Product Introduction

### Direct's Current Shunt Resistors (FL) for high-current applications aid precision measurement.

Current shunts are low resistance precision resistors used to measure AC or DC electrical currents by the voltage drop those currents create across the resistance. Sometimes called an ammeter shunt, it is a type of current sensor.

A wide range of precision shunts, designed for use with kilowatt-hour meters and other high-current applications where a high level of accuracy is required, is now available from Direct Electronics.



The interchangeable shunts (FL) are used to multiply the measuring range of measuring instrument and designed for PCB and bus bar mounting, are manufactured from electron beam welded copper and manganin, and have low temperature coefficients. Featuring low inductance values, shunts FL series can handle permanent currents of up to 10000A at voltage 75 mV.

FLQ-54 type shunt is made of precision alloy board. Its copper terminals spot welded by silver alloy ensure extremely high electric capability. The construction provides a kind of excellent stability and high overloaded ability non-inductive resistor, applied widely as current limited, current balance or sampling sense in communication system, electric equipment and auto-controlling electrical circuit.

The FL Series is available in bulk packaging and is RoHS compliant and lead free. For non-standard technical requirements and special applications, please contact us with your specific needs, or link to Direct official website "[Current Sensing Resistors](#)" for more information.

**Power Rating:** Watts (W) = Current ( $I^2$ ) × Resistance Value (R)

- Because current shunt is resistor and dissipate heat from the current flowing through them, when they get hot.
- Since that heat can change their resistance and even permanently damage the shunt, so it is often given a power rating or a derating factor.
- In practice current shunt is often rated to be used continuously at only 2/3 of their "rated current".
- The heat produced is power measured in Watts (W).

**Calculate Current:** Current (I) = Voltage (V) / Resistance Value (R)

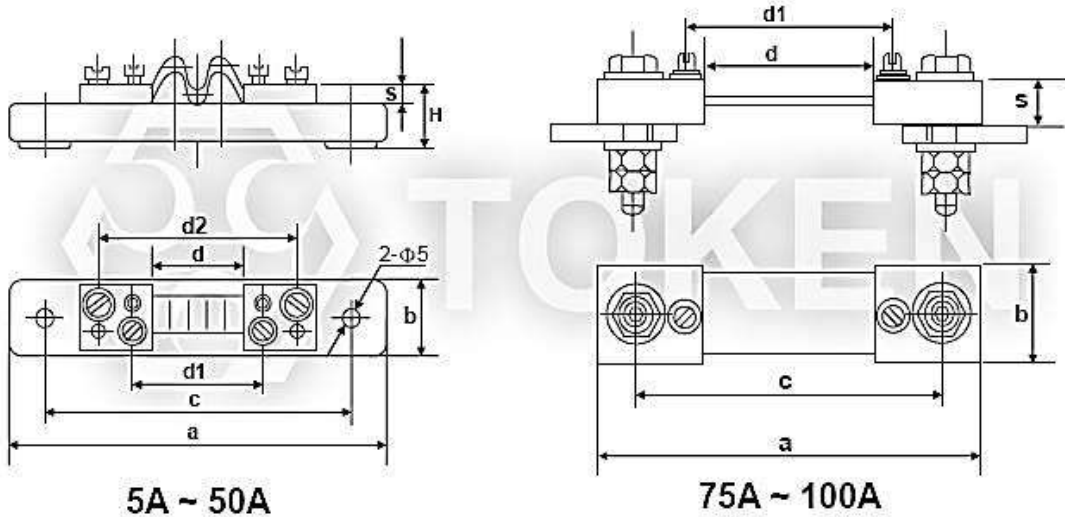
- By inserting a current shunt into a circuit whose current you want to measure your can find the current by measuring the voltage drop across the shunt.
- Then knowing the resistance of the current shunt you can calculate the current using Ohm's law.



► **FL-2 (5A-10000A)**

**Dimensions (5A-100A, Unit: mm) (FL-2)**

Rating Current (A)	Dimensions (Unit: mm)										High Current Bolt (mm)-PC (Option)	Shunt Voltage Bolt (mm)-PC (Option)
	a	c	b	c1	c2	H	S	d	d1	d2		
5	120	100	20			15	5	30	42	60	M5x6-2	M5x6-2
10	120	100	20			15	5	30	42	60	M5x6-2	
15	120	100	20			15	5	30	42	60	M5x6-2	
20	120	100	20			15	5	30	42	60	M5x6-2	
30	120	100	20			15	5	30	42	60	M5x6-2	
50	120	100	20			15	5	30	42	60	M5x6-2	
75	104	85	22			22	10	40	53		M8x35-2	
100	104	85	22			22	10	40	53		M8x35-2	

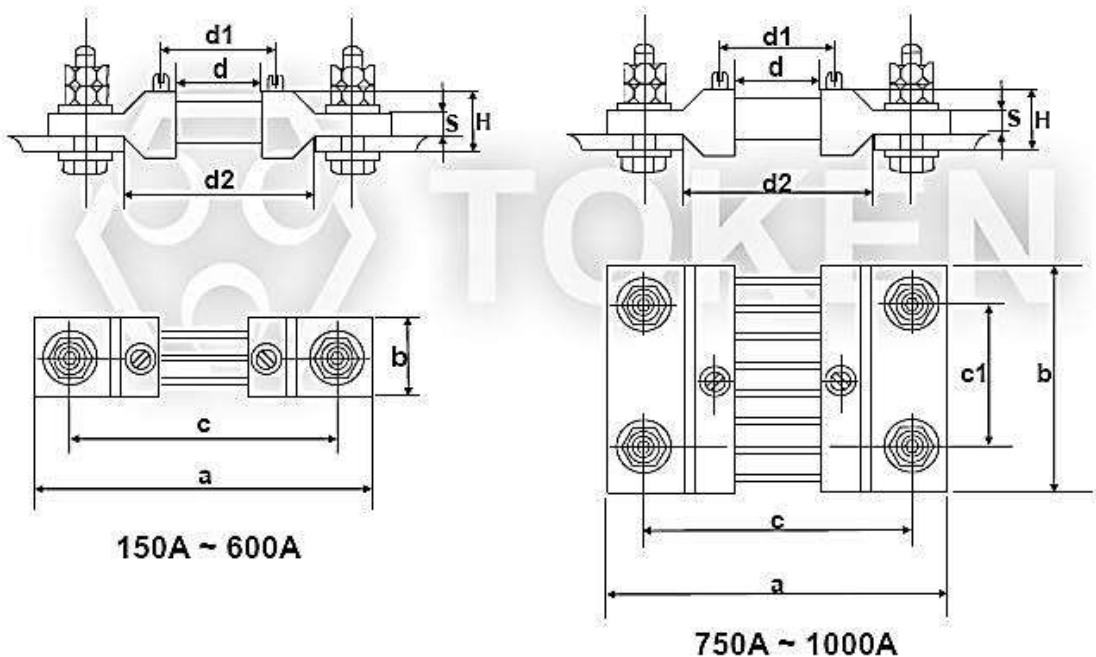


FL-2 Type (5A-100A) Shunt



**Dimensions (150A-1000A, Unit: mm) (FL-2)**

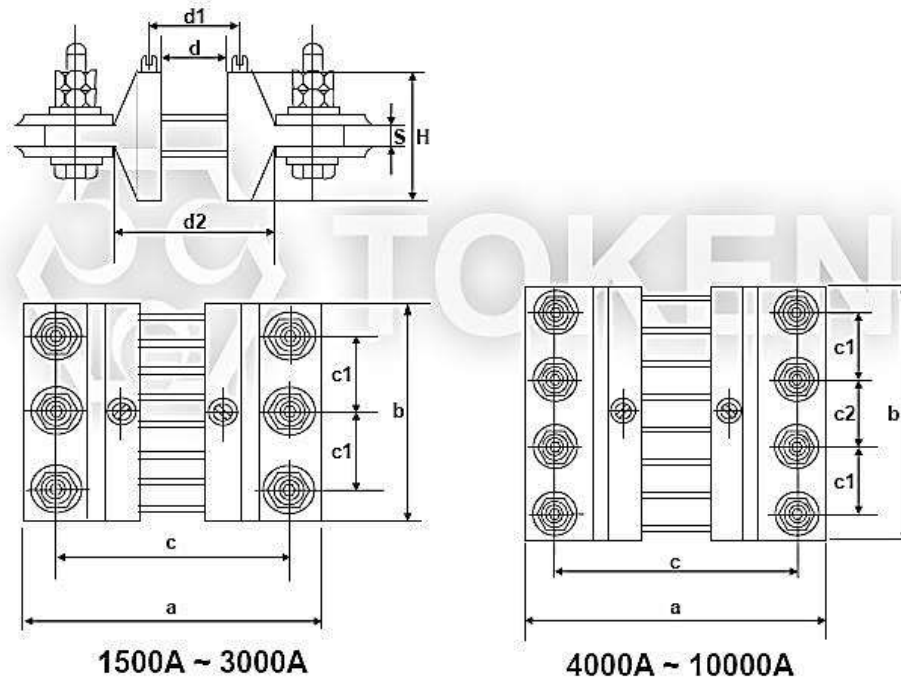
Rating Current (A)	Dimensions (Unit: mm)										High Current Bolt (mm)-PC (Option)	Shunt Voltage Bolt (mm)-PC (Option)
	a	c	b	c1	c2	H	S	d	d1	d2		
150	116	85	22			22	6	30	39	54	M8x35-2	M5x6-2
200	116	85	22			22	6	30	39	54	M8x35-2	
250	126	100	26			22	6	40	49	64	M10x35-2	
300	126	100	26			22	6	40	49	64	M10x35-2	
400	126	100	38			22	6	40	49	64	M10x35-2	
500	126	100	45			22	6	40	49	64	M10x35-2	
600	126	100	62			22	6	40	49	64	M10x35-2	
750	126	100	76	50		22	6	40	49	64	M10x35-4	
1000	126	100	95	50		22	6	40	49	64	M10x35-4	



FL-2 Type (150A-1000A) Shunt

**Dimensions (1500A-10000A, Unit: mm) (FL-2)**

Rating Current (A)	Dimensions (Unit: mm)										High Current Bolt (mm)-PC (Option)	Shunt Voltage Bolt (mm)-PC (Option)
	a	c	b	c1	c2	H	S	d	d1	d2		
1500	190	160	95	50		100	6	40	52	64	M12x60-4	M5x6-2
2000	190	160	95	50		100	6	40	52	64	M12x60-4	
2500	190	160	110	50		100	13	40	52	84	M12x60-4	
3000	190	160	145	2-50		100	13	40	52	84	M12x60-6	
4000	190	160	195	2-50	55	100	13	40	52	84	M16x80-8	
5000	284	220	195	2-50	55	150	18	40	52	88	M16x80-8	
6000	284	220	210	2-50	80	150	18	40	52	88	M16x80-8	
7500	290	220	320	3-50	2-60	150	18	40	52	88	M16x80-12	
10000	290	220	400	3-50	2-90	150	18	40	52	88	M16x80-12	



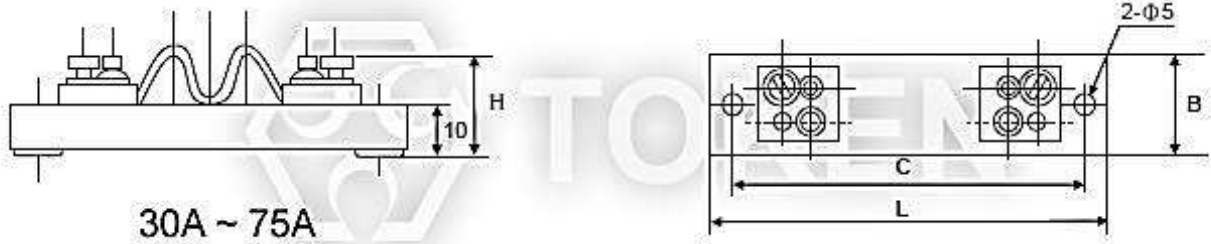
**FL-2 Type (1500A-10000A) Shunt**



▶ **FL-13 (30A-75A)**

**Dimensions (30A-75A, Unit: mm) (FL-13)**

Voltage (mV)	Rating Current (A)	Dimensions (Unit: mm)			Mounting size (mm)	
		L	B	H	C	Bolt
75mV	30A	100	20	21	85	M5
75mV	50A	130	14	30	85	M8
75mV	75A	130	14	30	85	M8



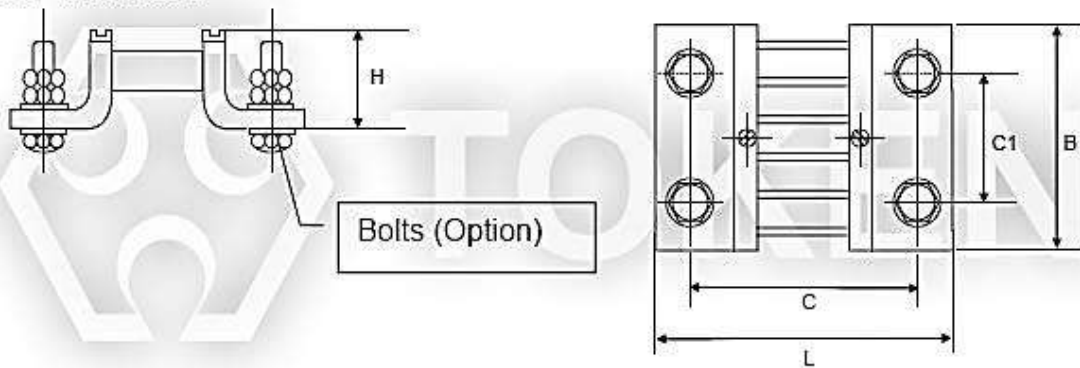
FL-13 Type (30A-75A) Shunt

▶ **FL-13-A (100A-1000A)**

**Dimensions (100A-1000A, Unit: mm) (FL-13-A)**

Voltage (mV)	Rating Current (A)	Dimensions (Unit: mm)			Mounting size (mm)		
		L	B	H	C	C1	Bolt
75mV	100A	130	14	30	85		M8
75mV	200A	130	24	30	85		M10
75mV	300A	130	30	30	100		M10
75mV	400A	130	42	30	100		M10
75mV	500A	130	52	30	100		M10
75mV	600A	130	60	30	100	50	M10
75mV	750A	130	77	30	100	50	M10
75mV	1000A	130	95	30	100		M10

**FL-13-A TYPE**

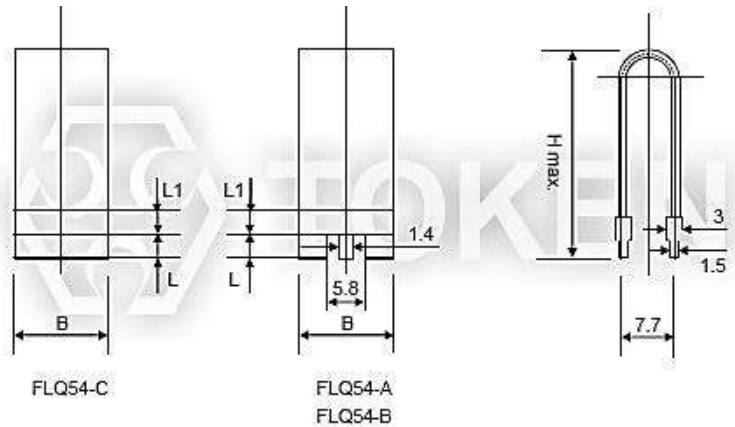


**FL-13-A Type (100A-1000A) Shunt**

► **FLQ54 (30A-100A)**

**Dimensions (30A-100A, Unit: mm) (FLQ54)**

Type	Dimensions (Unit: mm)				Style of terminal
	H max.	B	L	L <sub>1</sub>	
FLQ54-A	37	18	3	3	6
FLQ54-B	60	30	5	5	6
FLQ54-C	32	15	3	3	2



FLQ54 Type (30A-100A) Shunt

**Technical Specifications (30A-100A) (FLQ54)**

Type	Rated Current (A)	Rated Voltage Drop (mV)	Nominal Resistance (mΩ)	Accuracy Class	Temperature Range (°C)	Temperature Coefficient (ppm/°C)
FLQ54-A	30	50	1.6667	0.5	-55 ~ +85	±25
FLQ54-A	50	50	1.0000			
FLQ54-A	60	50	0.8333			
FLQ54-B	60	50	0.8333			
FLQ54-B	75	50	0.6667			
FLQ54-B	100	50	0.5000			
FLQ54-C	30	45	1.5000			
FLQ54-C	60	45	0.7500			





## Characteristics

### Characteristic Specification (FL-2, FL-13, FL-13-A)

Test Items	Specification
Rated Voltage Drop	50mV, 60mV, 75mV, 100mV.
Accuracy Class	0.5% for 5~4000 A; 1% for 5000~6000 A
Over Rating Capacity	120% of rated current for 2 hours.
Ambient Conditions	Temperature: -40~+60°C; relative humidity: ≤95% 35°C
Giving Out Heat When Loaded	Not be more than 80°C at rated current of below 50A.; not be more than 120°C at rated current of 50A and over 50A.
Capacity to Withstand Mechanical Force	It is capable of withstanding the transport bumping at acceleration of 70m/S <sup>2</sup> and shock frequency of 80-120 times/min for 5 hours.

## Order Codes

### Order Codes (FL)

FL-2	-	5A		50mV		F		p	
Part Number		Rating Current (A)		Voltage Drop (mV)		Accuracy Class (%)		Package-Code	
FL-2		5A	5 A	50mV	50 mV			P	Bulk
FL-13		10A	10 A	60mV	60 mV	F	±1%		
FL-13-A		200A	200 A	75mV	75 mV	D	±0.5%		
FLQ54-A		750A	750 A	100mV	100 mV				
FLQ54-B									
FLQ54-C									



## ► General Information

### Your Current Options - Direct Current Sense

As the world becomes more and more technology-driven, the uses for current sensing components will continue to increase. The need for even lower resistance value ranges is already becoming evident, as is the need for these resistors to handle more power. The industry-wide trend is the emergence of smaller and smaller products.

Direct Electronics offers a wide variety of current sensing products from the industry to military standards, such as current sense in Thin-Film / Thick-Film Technology, Bare Element Resistors, and Open Air Shunts. This enables Direct to present an astounding number of possible solutions for any circuit design needs.

### Applications of Current Detecting Components

Direct's TCS and CS Series unique form factor provides automotive designers with several advantages. Both TCS and CS Series are ideal for applications involving window lift motors, fuel pump systems, seat belt pretensioners, and pulse width modulator feedback.

The wider resistive element and lower resistance enables higher current to pass through the device. Direct's LRC ultra low Ohmic metal strip chip series provides the inherent ability to flex slightly and offers stress relief during extreme temperature cycling on typical or metal substrates. This LRC series is suitable for switch power supply applications (DC-DC Converter, Charger, and Adaptor) and power management of monitor.

The open air design of bare element resistor LRA and LRB Series provide a far cooler operation by allowing more air flow under the resistive element to keep excess heat from being transmitted to the PC board. They are suitable for high power AC/DC detection of power supply circuit.

Direct axial moulded BWL series provides power rating up to 10 watts and lower resistance  $0.005\Omega$ , is ideal for all types of current sensing applications including switching and linear power supplies, instruments and power amplifiers.

Direct standard current sensing components can be replacement for Vishay, IRC, Ohmite, KOA, Yageo devices with fast delivery and more competitive price. Contact us with your specific needs.

