

# Current Shunt Resistors

**Token's Shunt Resistors (FL) for high-current applications aid precision measurement.**

## ▶ Preview

Current shunt resistors 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 Token Electronics.

The interchangeable shunts (FL) are used to multiply the measuring range of measuring instrument and designed for PCB and busbar 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. It's 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.



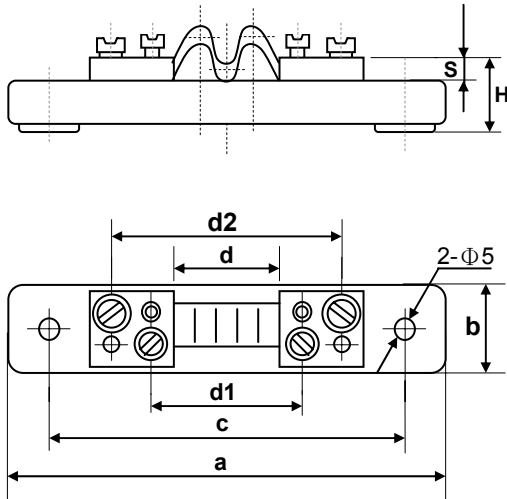
## ▶ Power Rating : Watts (W) = Current (I) x Resistance Value (R)

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

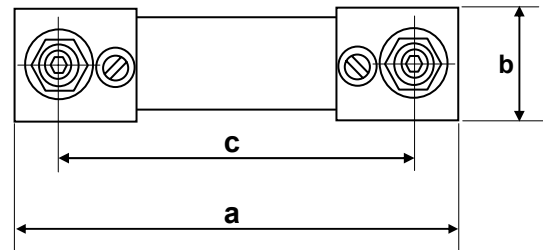
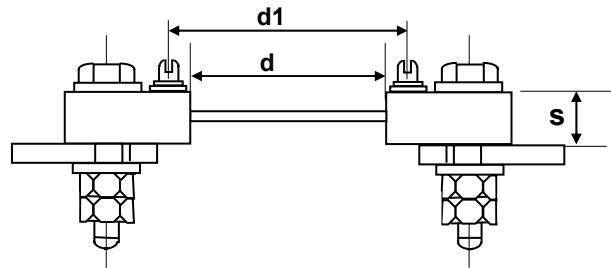
## ▶ Calculate Current : Current (I) = Voltage (V) / Resistance Value (R)

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

▶ FL-2 (5A-100A, Unit: mm)



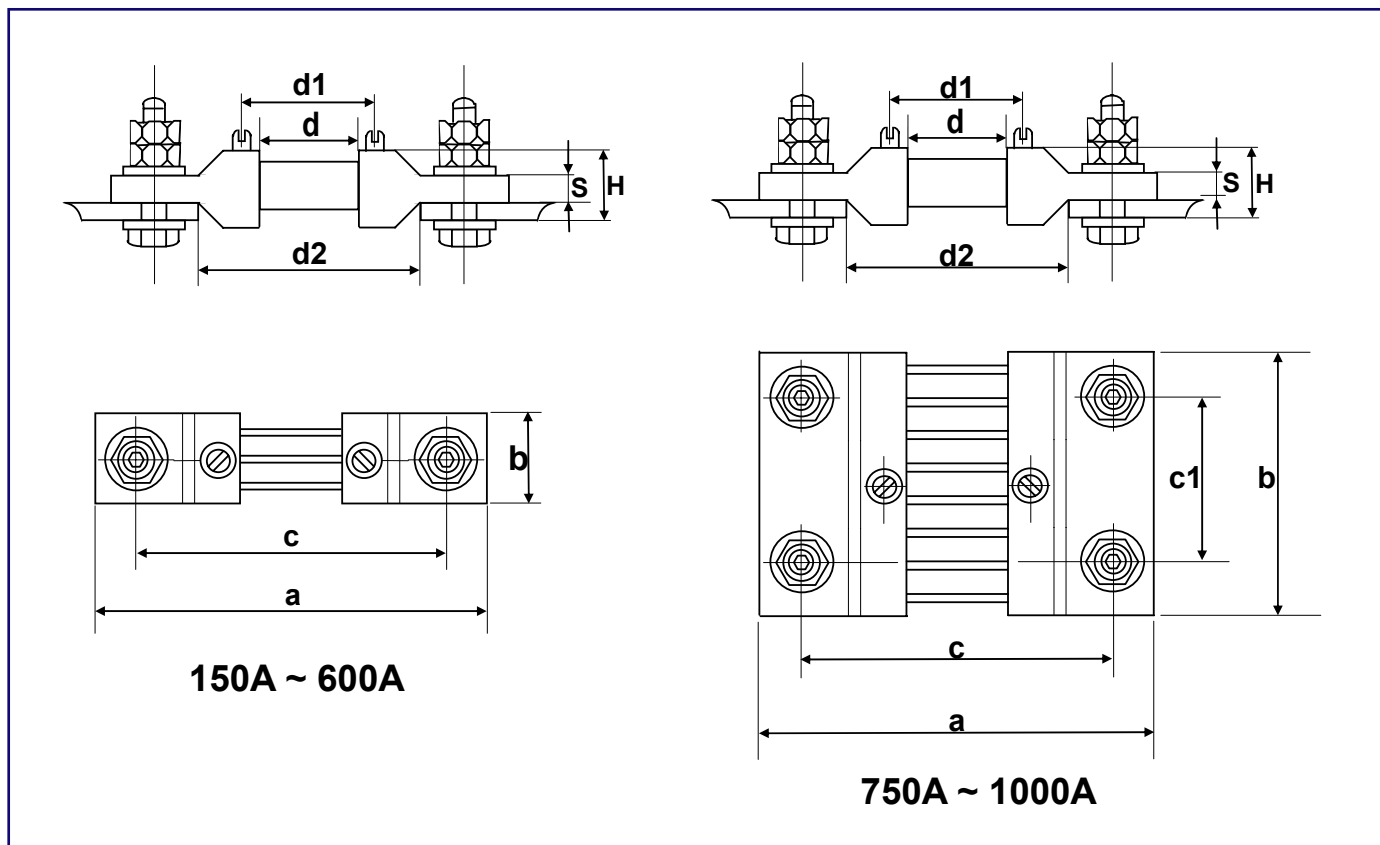
**5A ~ 50A**



**75A ~ 100A**

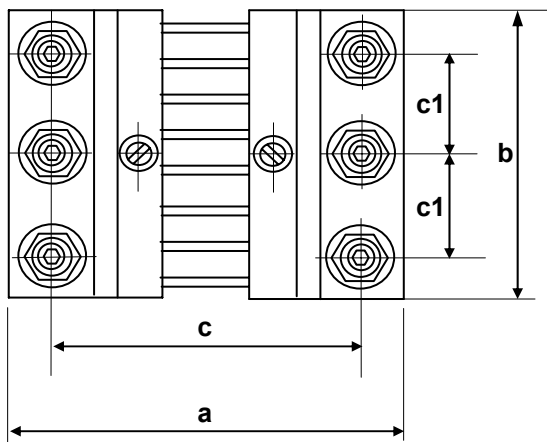
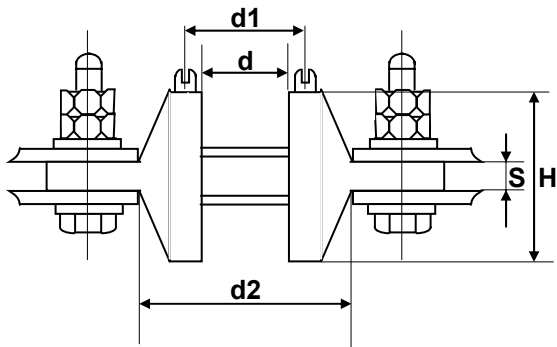
Rating Current (A)	Dimensions (Unit: mm)										High Current Bolt (mm)-PC (Option)	Shunt Voltage Bolt (mm)-PC (Option)
	a	c	b	c1	c2	H	S	d	d1	d2		
5	120	100	20			15	5	30	42	60	M5x6-2	M5x6-2
10	120	100	20			15	5	30	42	60	M5x6-2	
15	120	100	20			15	5	30	42	60	M5x6-2	
20	120	100	20			15	5	30	42	60	M5x6-2	
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 Dimensions (150A-1000A, Unit: mm)

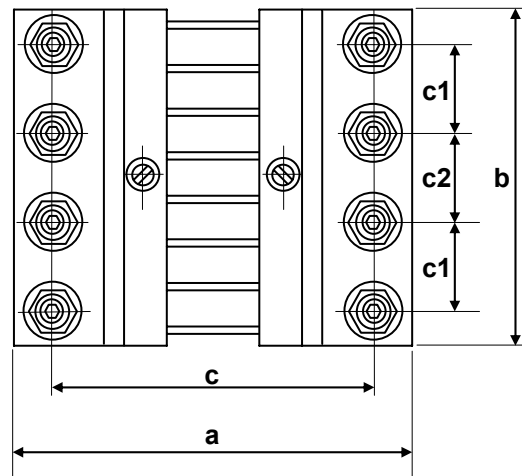


Rating Current (A)	Dimensions (Unit: mm)										High Current Bolt (mm)-PC (Option)	Shunt Voltage Bolt (mm)-PC (Option)
	a	c	b	c1	c2	H	S	d	d1	d2		
150	116	85	22			22	6	30	39	54	M8x35-2	M5x6-2
200	116	85	22			22	6	30	39	54	M8x35-2	
250	126	100	26			22	6	40	49	64	M10x35-2	
300	126	100	26			22	6	40	49	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 Dimensions (1500A-10000A, Unit: mm)



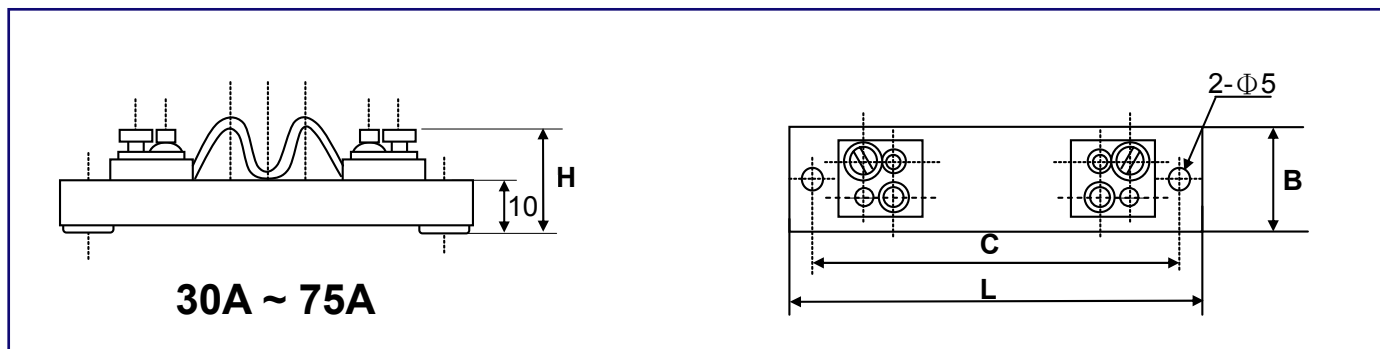
**1500A ~ 3000A**



**4000A ~ 10000A**

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		22	6	40	52	64	M12x60-4	M5x6-2
2000	190	160	95	50		22	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	

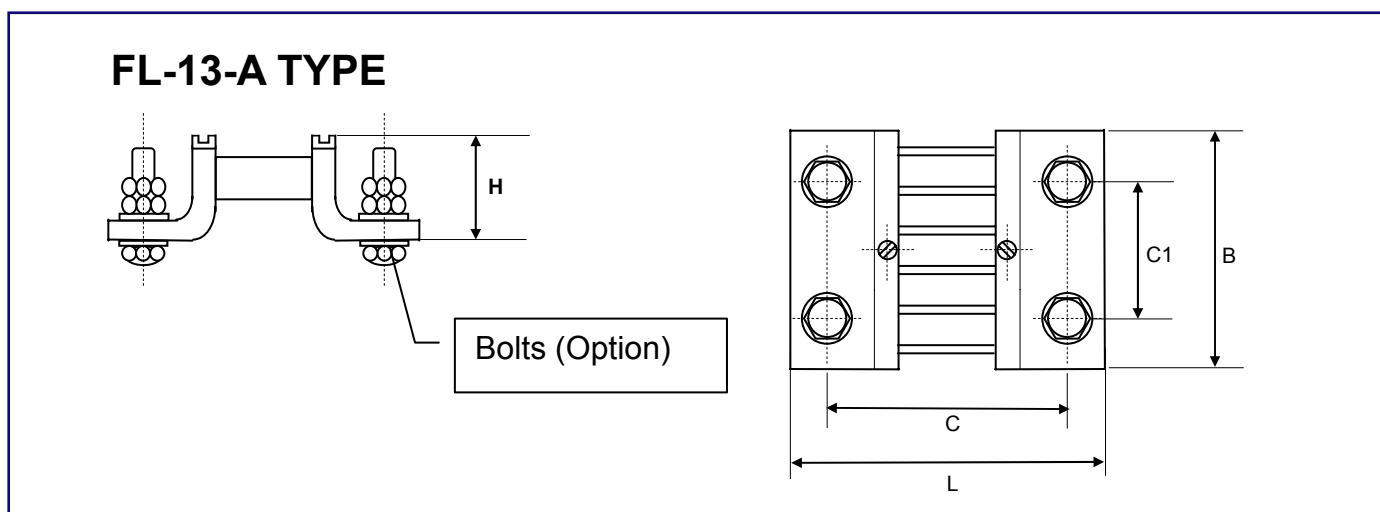
► FL-13 Dimensions (30A-75A, Unit: mm)



**30A ~ 75A**

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-A Dimensions (100A-1000A, Unit: mm)

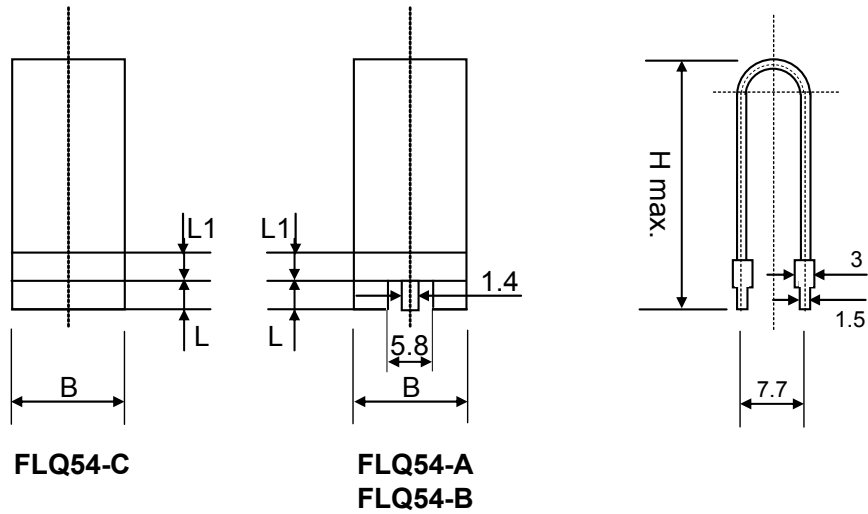


**FL-13-A TYPE**

Bolts (Option)

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 Dimensions (100A-1000A, Unit: mm)



Type	Dimensions (Unit: mm)				Style of terminal
	H max.	B	L	L1	
FLQ54-A	37	18	3	3	6
FLQ54-B	60	30	5	5	6
FLQ54-C	32	15	3	3	2

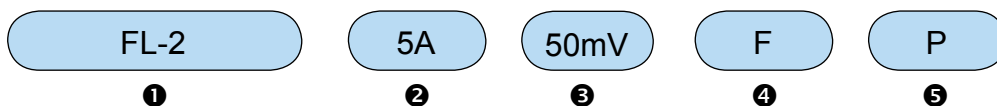
## ▶ FLQ54 Technical Specifications (30A-100A)

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 ppm/°C
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			

## ▶ Current Sunts (FL-2, FL-13, FL-13-A) Characteristic Specification

Test Items	Specification
Voltage Drop	50mV, 60mV, 75mV, 100mV.
Accuracy Class	0.5% for 5 ~ 40000 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 after temperature rise gets steady; not be more than 80°C at rated current of 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 80-20 times/min for 5 hours.

## ▶ How to Order



① Part Number: FL-2, FL-13, FL-13-A, FLQ54-A, FLQ54-B, FLQ54-C

② Rating Current (A)

Code	Rating Current (A)
5A	5A
10A	10A
200A	200A
750A	750A

③ Voltage Drop (mV)

Code	Voltage Drop (mV)
50mV	50 mV
60mV	60 mV
75mV	75 mV
100mV	100 mV

④ Accuracy Class (%)

Code	Accuracy Class (%)
F	±1%
D	±0.5%

⑤ Package-Code

Code	Package-Code
P	Bulk

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