

Magnetic Proportion System / Through Type

L40S D15 SERIES



- [STANDARDS]**
- UL508
 - CSA C22.2 No.14-18
 - EN 62477-1
 - EN 50178



ABSOLUTE MAXIMUM RATINGS

Parameters	Symbol	Unit	Value	Comment
Supply voltage	Vcc	V	± 18V	
Primary conductor temperature	—	°C	105	

ISOLATION CHARACTERISTICS

Parameters	Symbol	Unit	Value	Comment
Insulation voltage	Vd	—	AC5400V, for 1minute (Sensing current 0.5mA)	Primary ⇔ Secondary
			AC7400V, for 1minute (Sensing current 0.5mA)	
Impulse withstand voltage	Vw	kV	9.6	Primary ⇔ Secondary Input waveform : • Front time 1.2μs • Time to half value 50μs • single
			16.5	
Insulation resistance	R _{IS}	—	≥ 1000M Ω (at DC500V)	Primary ⇔ Secondary
Clearance distance	d _{Cl}	—	11.0mm (MIN)	Primary ⇔ Secondary
			20.0mm (MIN)	
Creepage distance	d _{cp}	—	12.7mm (MIN)	Primary ⇔ Secondary
			30.5mm (MIN)	
Case material	—	—	UL94 V-0	
Comparative Tracking Index : (CTI)	Case	CTI	V	600 (group I)
	Filler			

ENVIRONMENTAL AND MECHANICAL CHARACTERISTICS

Parameters	Symbol	Unit	Value			Comment
			MIN	TYP	MAX	
Ambient operating temperature * 1	T _A	°C	- 40		+ 105	
Ambient storage temperature	T _S	°C	- 40		+ 105	
Mass	m	g		280		

* 1 Temperature of the connector should not exceed +105°C because the absolute maximum temperature of the connector is +105°C.

SPECIFICATIONS

Ta=+25°C, RL=10kΩ, Vcc=±15V

Parameters	Symbol	Unit	Value			Comment
			MIN	TYP	MAX	
Primary nominal current	L40S200D15****	I _{PN}	A		200	
	L40S400D15****				400	
	L40S500D15****				500	
	L40S600D15****				600	
	L40S800D15****				800	
	L40S1T0D15****				1000	
	L40S1T2D15****				1200	
	L40S1T5D15****				1500	
Primary current, measuring range * 1, 2	L40S200D15****	I _{PM}	A	-600		600
	L40S400D15****			-1200		1200
	L40S500D15****			-1500		1500
	L40S600D15****			-1800		1800
	L40S800D15****			-2400		2400
	L40S1T0D15****			-2800		2800
	L40S1T2D15****			-2800		2800
	L40S1T5D15****			-2800		2800
Supply Voltage	Vcc	V	± 12 (± 5%)	± 15 (± 5%)		
Consumption current	Icc	mA		17	25	at I _p = 0A, Icc = 17 + Vout / RL
Rated output voltage	Vo	V	3.960	4.000	4.040	at I _{PN}
Offset voltage * 3	Vof	V	-0.020	0.000	+0.020	at I _p = 0A
Hysteresis error	V _{OH}	mV	-10		10	at 0A → I _{PN} → 0A
Temperature coefficient of Vo	TcVo	%/°C	-0.05		0.05	Without TcVof
Temperature coefficient of Vof	TcVof	mV/°C	-1.0		1.0	at I _p = 0A
Linearity error (0A ~ I _{PN})	ε _L	%	-1		+1	
Response time (@90% of I _{PN}) * 4	tr	μs			5	di/dt=100A/μs
Frequency bandwidth (-3dB) * 5	BW	kHz	25			at very low current

*1 If the product of 800A or less operate at Vcc = ± 12V power supplies, measuring range reduced to 2.5 x I_{PN}.
 *2 The value of measured current which indicates an output with a greater than ± 5% deviation from the theoretical output value.
 *3 Offset voltage value is after removal of core hysteresis.
 *4 Measurement condition : Primary conductor cross sectional area is as same as through hole, and penetration with 1 turn in through hole.
 *5 High fundamental frequency primary current and/or harmonic current may result in excessive heating in magnetic core (Silicon steel).

STANDARDS



EN62477-1:2012, EN62477-1:2012/A1:2017 and EN62477-1:2012/A11:2014

Rated voltage L40SxxxD15*** 600V, CAT III, PD2, Reinforced isolation, non uniform field
 L40SxxxD15C*** 1000V, CAT III, PD2, Reinforced isolation, non uniform field

EN50178:1997

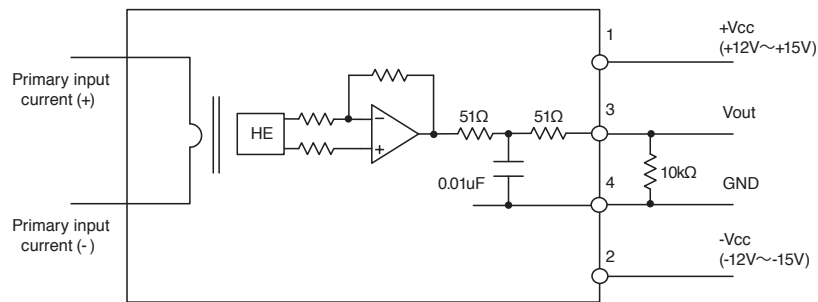
Rated voltage L40SxxxD15C*** 1500V, CAT III, PD2, Reinforced isolation, non uniform field



UL508, CSA C22.2 No.14-18 (CSA FILE No. 218328)

Rated voltage L40SxxxD15*** 600V, PD2
 L40SxxxD15C*** 1500V, PD2

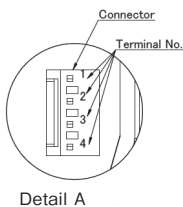
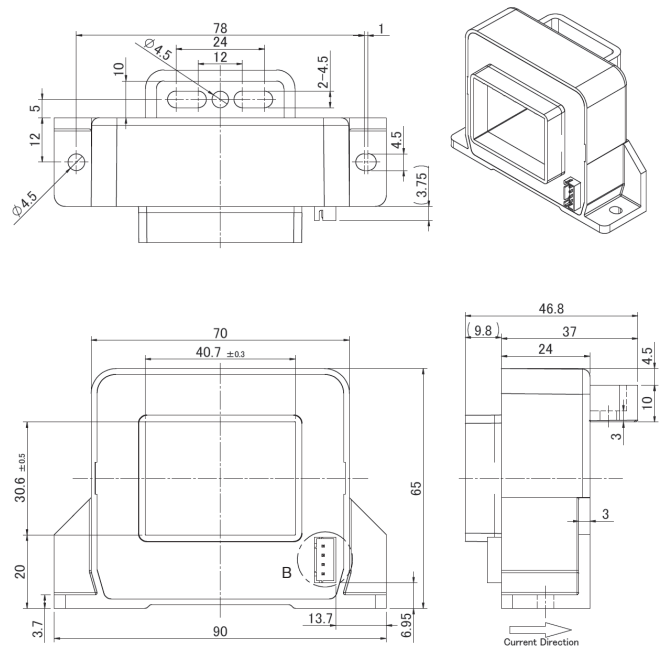
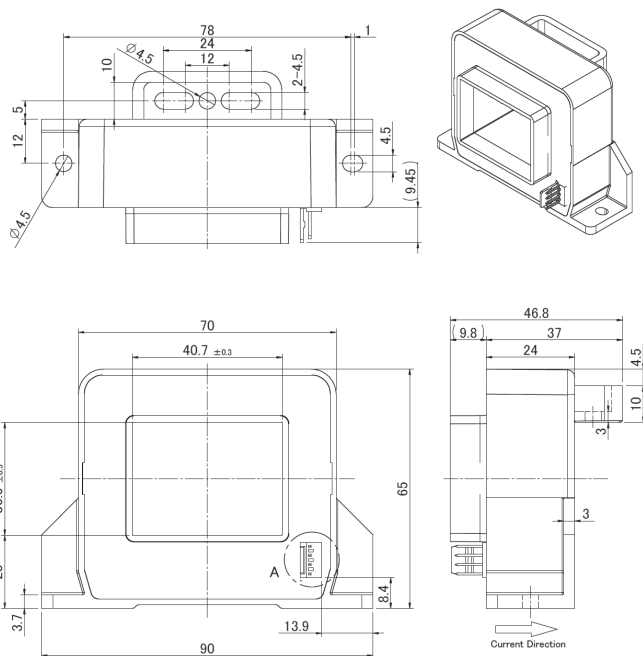
CONNECTION



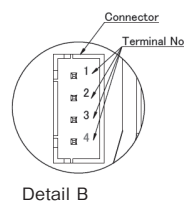
DIMENSIONS (mm)

L40SxxxD15M/M-A

L40SxxxD15J



- Terminal No.
- ① +Vcc (+15V)
 - ② -Vcc (-15V)
 - ③ Vout
 - ④ GND
- ※ Tolerance: ± 1
Unit: mm

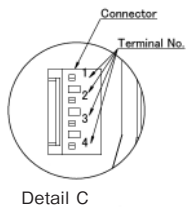
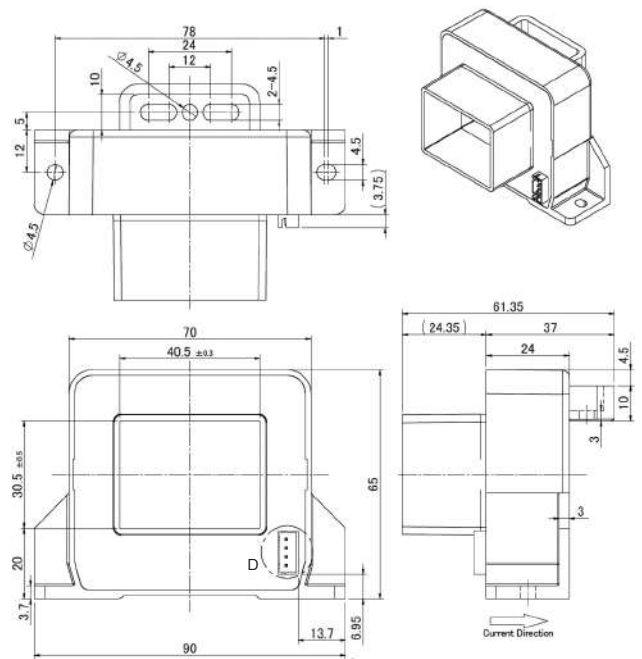
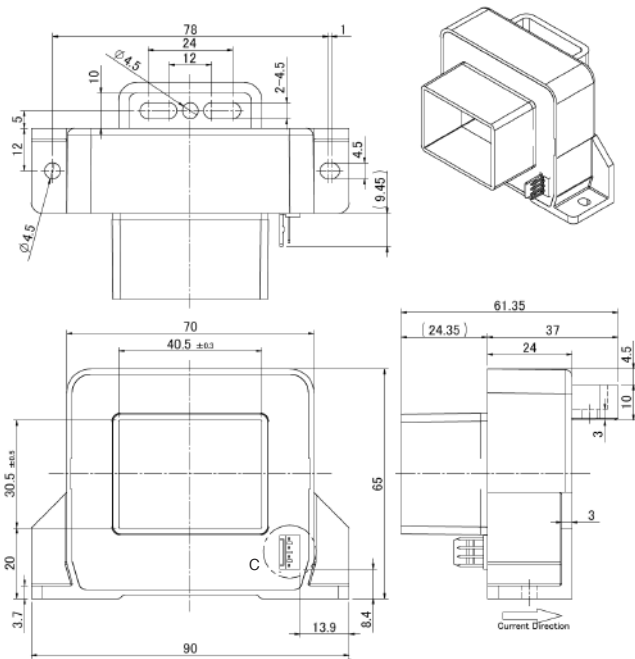


- Terminal No.
- ① +Vcc (+15V)
 - ② -Vcc (-15V)
 - ③ Vout
 - ④ GND
- ※ Tolerance: ± 1
Unit: mm

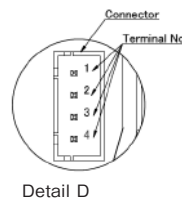
DIMENSIONS (mm)

L40SxxxD15CM/CM-A

L40SxxxD15CJ

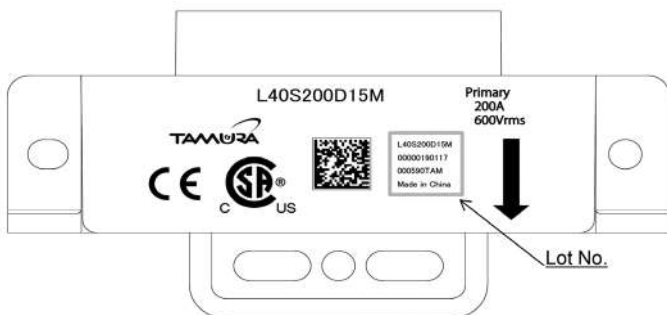


- Terminal No.
- ① +Vcc (+15V)
 - ② -Vcc (-15V)
 - ③ Vout
 - ④ GND
- ※ Tolerance: ± 1
Unit: mm



- Terminal No.
- ① +Vcc (+15V)
 - ② -Vcc (-15V)
 - ③ Vout
 - ④ GND
- ※ Tolerance: ± 1
Unit: mm

MARKING



Lot No. 例 Example of Lot No.

L40SxxxD15****
 00000190117
 000590TAM
 Made in China

Types
 Revision code(5 figure), Date code(6 figure)
 Serial No.(4 figure), Factory code(2 figure)
 Country of production

Order number and Safety application / Connector number (terminal plating)

Types		Safety application		Connector			
		UL508-600V EN	UL508-1500V EN	Manufacturer	Part Number	Old Part Number	Plating of terminal
L40SxxxD15J	Standard	○	○	JST	B4B-XH-A-G	-	Au
L40SxxxD15CJ							
L40SxxxD15M	Standard	○	○	Molex	22-04-1041	5045-04A	Sn
L40SxxxD15CM							
L40SxxxD15M-A	Build to Order	○	○				
L40SxxxD15CM-A							

* As for the L40SxxxD15M series of a gold-plated connector, 'A' attaches to the end of the product name.

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 - Use in liquids such as water, oil, chemical solutions, or organic solvents, and use in locations where the product will be exposed to such liquids.
 - Use that involves exposure to direct sunlight, outdoor exposure, or dusty conditions.
 - Use in locations where corrosive gases such as sea winds, Cl₂, H₂S, NH₃, SO₂, or NO₂, are present. (Some product improves durability)
 - Use in environments with strong static electricity or electromagnetic radiation.
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Application notes

<General Considerations>

1. The sensor uses polar electronic components. When the polarity of the power supply is mistaken, the sensor is damaged.
2. Static electricity or excessive voltage can increase an offset voltage in the Hall element, and cause offset voltage to change. Please exercise care in handling and application.
3. In order to prevent the influence of noise, the use of twisted cable or shielded cable for the output line is recommended
4. If using this device within a magnetic field generated by other devices, the specified accuracy may not be obtainable.
5. Our products (several models are excluded) are adjusted with the trimming method by the measurement condition (Load resistance, Power supply voltage) of specification sheets. Therefore, characteristics (Offset, Output, etc.) and its deviation may be changed in different circuit conditions from the measurement condition. All change characteristic items are not indicated on specification sheets.
6. The performance of current sensors with through-hole (aperture) is dependent on the position of the primary conductor. Tamura specifications are based on a primary conductor completely filling the through-hole (aperture) area.
7. The current sensor rated current in DC Amps.
8. Please use mating connector with equivalent terminal plating material to insure proper operation and avoid possibility of 'galvanic corrosion' .
9. Please do not store in high-temperature and high-humidity storage environment. Please use it after confirming soldering when it is kept for six months or more. (product soldered with substrate)
10. We recommend performing a zero offset adjustment by measuring the offset voltage at startup. In continuously operation for a few months, or at change of ambient temperature or humidity is large, we recommend regularly performing a zero offset adjustment at being idling (it is clear that the current is not apply) .
11. The current sensor doesn't have built-in protection circuit (devices and fuses, etc.). As a failure mode of the sensor, there is a short circuit and open state. In the case of a short-circuit state, the abnor-mal temperature rise of the internal parts is assumed, and there is a possibility to smoke and to ignite. If it is used in safety critical circuit blocks, please take appropriate measures by protection devices, protection circuits, etc. For closed loop -type sensors and flux gate (closed loop type) sensors, the consumption current of the secondary power supply varies in proportion to the measurement current.

<Open loop>

1. High frequency primary current may result in excessive heating in iron magnetic core and cause damage to internal circuitry; for high frequency applications select current sensor with ferrite core material.
2. If the measured current exceeds the rated current, magnetic core saturation will occur and the output voltage signal will not be linearly proportional to the measured current.

<Closed Loop>

1. For closed loop current sensors please insure the power supply voltage is balanced, symmetrical, and, applied simultaneously to avoid potential increase in DC offset error.
2. Maximum rated current measurement duration is timedependent. Maximum rated current applied in excess of the time limit can result in damage to internal electronic circuitry; please consult Tamura for assistance.
3. When using a measurement resistor to convert current output to voltage output select a resistor with stable temperature characteristic to insure accuracy of the output voltage.
4. Compensation current supplied to the secondary winding varies in proportion to the measured current based on the conversion ratio. (If/KN; KN = secondary turns) Please insure the PSU has required current capacity to supply compensation current to the secondary winding.

<Flux-Gate>

1. Compensation current supplied to the secondary winding varies in proportion to the measured current. Please insure the PSU has required current capacity to supply compensation current to the secondary winding.
2. There is 450kHz ripple voltage present on the output and reference output voltage signals . An external capacitor maybe added if necessary.