Servo system Current-output type

S42S D24 SERIES

ABSOLUTE MAXIMUM RATINGS

Parameters	Symbol	Unit	Value	Remarks
Maximum Supply voltage	Vcc	V	± 25.2	
Primary conductor temperture	T_B	℃	100	

ISOLATION CHARACTERISTICS

Parameters		Symbol	Unit	Value	Remarks
Insulation voltage		Vd	—	AC4400V, for 1minute (Sensing current 0.5mA)	Primary ⇔ Secondary
Impulse withstand voltage		Vw	kV	12	Primary ⇔ Secondary Input waveform : ・Front time 1.2μs ・Time to half value 50μs ・single
Insulation resistance		R_{IS}	MΩ	≧ 500M Ω (at DC500V)	Primary ⇔ Secondary
Clearance distance		d_{Cl}	mm	min : 7.3 (min : 14.0)	Primary ⇔ Secondary (Busbar ⇔ ConnectorPWB)
Creepage distance		d_{Cp}	mm	min : 9.3 (min : 18.2)	Primary ⇔ Secondary (Busbar ⇔ ConnectorPIN)
Case material		—	—	UL94 V-0	
Filler material		—	—	UL94 V-0	
Comparative Tracking Index ; (CTI)	Case	CTI	V	400 ~ 599 (Group II)	
	Filler	CTI	V	600 (Group I)	
Application example		—	—	1kVa.c 1.5kVd.c ,CAT Ⅲ , PD2	Reinforced isolation, non uniform field according to EN62477-1 : 2012 and EN62477-1 : 2012/A11 2014

ENVIRONMENTAL AND MECHANICAL CHARACTERISTICS

Parameters	Symbol	Unit	Value			Remarks
			MIN	TYP	MAX	
Ambient operating temperature	T_A	℃	− 40	—	+ 85	
Ambient storage temperature	T_S	℃	− 40	—	+ 90	
Mass	m	g	—	400	—	

SPECIFICATIONS

T_A=+25℃, R_M=1Ω, Vcc=±24V

Parameters	Symbol	Unit	Value			Remarks
			MIN	TYP	MAX	
Primary nominal current	I_{PN}	A	—	1000	—	
Primary current, measuring range ＊1,2	I_{PM}	A	2100	—	—	at T_A= + 85℃ ,Vcc = ± 22.8V, R_M=1 Ω , t=4sec
Measuring resistance ＊1	Rm	Ω	0	—	—	See Fig1
Conversion ratio	K_N	—	—	1 : 5000	—	
Output current @I_{PN}	Io	mA	—	200	—	Io = I_{PN} /5000. Without Iof.
Accuracy @I_{PN}	X	%	− 0.2	0.0	+ 0.2	T_A=25℃～+ 85℃ , Without Iof.
			− 0.3	0.0	+ 0.3	T_A= − 40℃～+ 85℃ , Without Iof.
Offset current ＊3	Iof	mA	− 0.2	0.0	+ 0.2	at I_P = 0A.
Linearity error （0A ～ I_{PN}）	ε_L	%	− 0.1	0.0	+ 0.1	
Hysteresis error	I_{OH}	mA	− 0.2	0.0	+ 0.2	at Ip = 0A → I_{PN} → 0A
Supply voltage	Vcc	V	± 15 （± 5%）	± 24 （± 5%）		
Consumption current	Icc	mA	—	45	—	at Ip= 0A. Icc = 45 + Ip /5000.
Response time @90% of I_{PN} ＊4	t_r	μs	—	0.5	—	di/dt=100A/μs
Frequency bandwidth （− 3dB） ＊5	BW	kHz	—	150	—	at very low current
Temperature coefficient of Iof ＊3	Tclof	μA/℃	− 4.8	0	+ 4.8	at Ip= 0A
Secondary coil resistance	Rs	Ω	—	—	47.5	T_A = + 85℃

＊1 Current sensor has limited operating time depending on the measured resistance and maximum current.
Internal circuits can become corrupted if you used beyond the limited time.
＊2 The value of measured current which indicates an output with a greater than ± 5% deviation from the theoretical output value.
＊3 Offset current is measured after removal of the hysteresis.
＊4 Measurement condition : Primary conductor cross sectional area is as same as through hole, and penetration with 1turn 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 and EN62477-1 : 2012/A11 2014, UL508（No.E243511）, CSA22.2 No.14-13

※ Please refer to the another sheet about conditions of UL Recognition.

TYPICAL CHARACTERISTIC CURVES

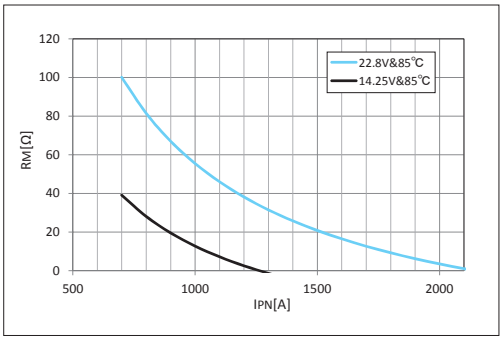
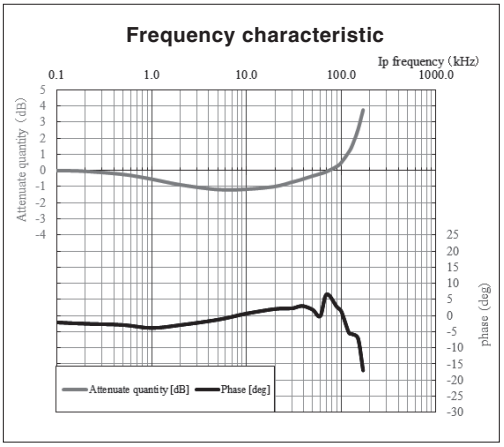


Figure 1 : Maximum Measureing Resistance



Measurement conditions:
T_A=+25℃ , R_M=2.4 Ω, I_P=3A * 20T, Vcc= ± 24V

Figure 2 : Frequency response curve

CONNECTION

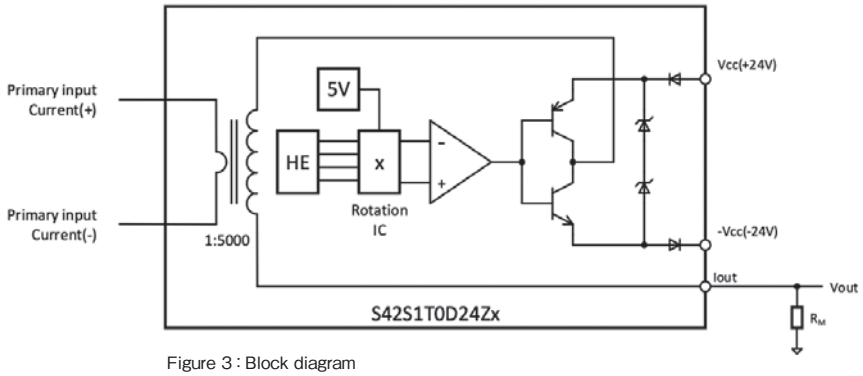
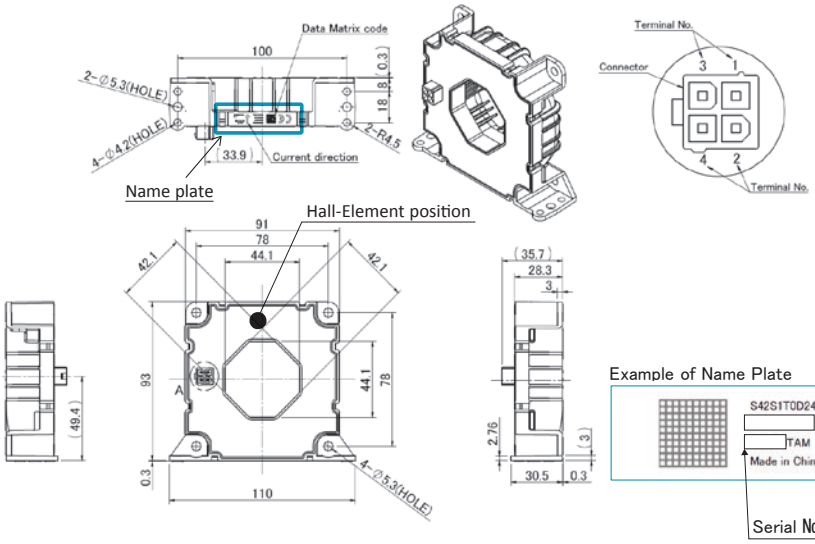


Figure 3 : Block diagram

DIMENSIONS (mm)

S42S1T0D24Z



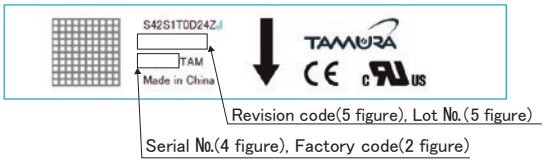
Terminal number

1 N.C
2 Vcc (+24V)
3 −Vcc (−24V)
4 Iout

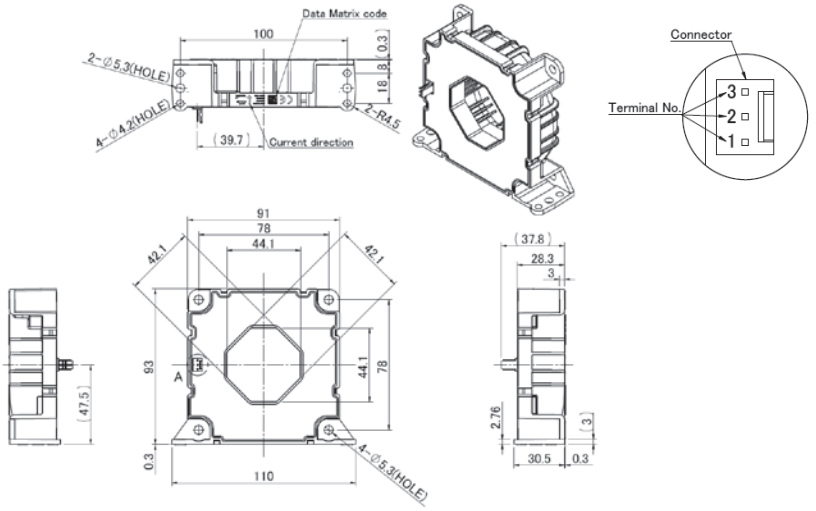
Tolerance : ±0.5
Unit : mm

Connector		
Maker	PartsNo.	old parts No.
Molex	39-28-8040	5566-04A-210

Example of Name Plate



S42S1T0D24ZM



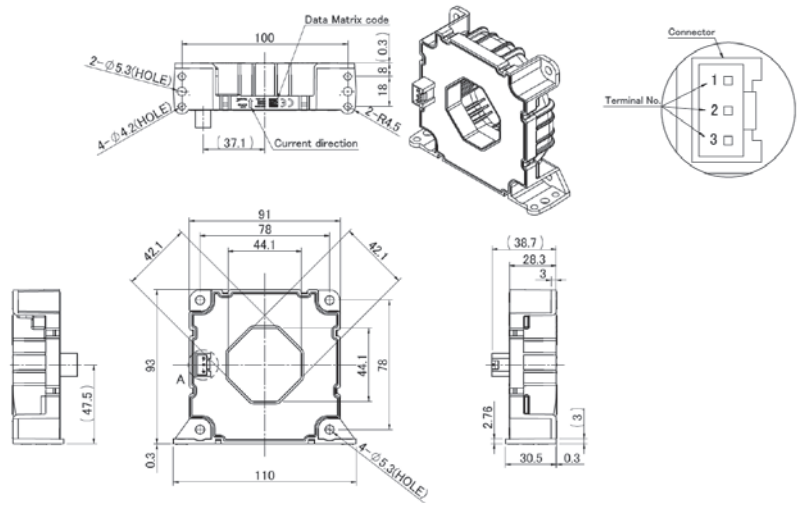
Terminal number

1 Vcc(+24V)
2 Iout
3 −Vcc(−24V)

Tolerance : ±0.5
Unit : mm

Connector		
Maker	PartsNo.	old parts No.
Molex	38-00-6293	AE-6410-03C(197)

S42S1T0D24ZJ



Terminal number

1 −Vcc(−24V)
2 Iout
3 Vcc(+24V)

Tolerance : ±0.5
Unit : mm

Connector		
Maker	PartsNo.	old parts No.
JST	BH3P-VH-1	—

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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.

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