BRUSHLESS RESOLVERS

BUILT-IN RESOLVERS
SHAFT RESOLVERS
HOLLOW SHAFT RESOLVERS

Tamagawa TAMAGAWA SEIKI CO.,LTD.

Encoder TS2640N321E64 TAMAGAWA Catalogo Ingles www.viaindustrial.com

BRUSHLESS RESOLVERS

MEET YOUR NEEDS IN MOTION CONTROL APPLICATIONS

Wide Range of Built-in types
for Direct Mounting onto Motors

Smartsyn, and brushless resolvers, are to offer you highly enhanced reliability which has been enabled by excluding human-dependent works in the major production / inspection procedures from parts processing, assembling to shipping.

We'd like to offer the resolvers for such applications as follows.
- Commutation of brushless motors
- Feedback sensor of servo systems
- Robots
- Machine tools
- Aerospace servo systems
- Others where harsh environmental condition is involved

Smartsyn is a name of our brushless resolvers of a new type. They have their inherent characteristics as a resolver : maintenance-free brushless design, immunity to noise, vibration, shock, and high temperature.
And now they have more to offer : homogeneity in the ever-variable parameters like accuracy, transformation ratio, phase shift, etc., which has been realized by highly automated production. Now this new quality can be taken for granted.

FEATURES

- Wide Operating Temperature Range
  −55 to +155°C (Built-in type)
  −30 to +100°C (All Shaft types, TS2028, and TS2054)
- Usable in Demanding Environments
  Vibration : 196m/s^2 (20G) at 10~500Hz
  Shock : 981m/s^2 (100G) for 11ms
  Humidity : 90% Rh Min. at 60°C
- High reliability and long life owing to brushlessness
- Operating speed up to :
  100~500^{-1} (6000~30000min^{-1}) / (Built-in type)
  100s^{-1} (6000min^{-1}) / (Shaft type)
- Free from electrical and mechanical noise

MOUNTING REQUIREMENTS

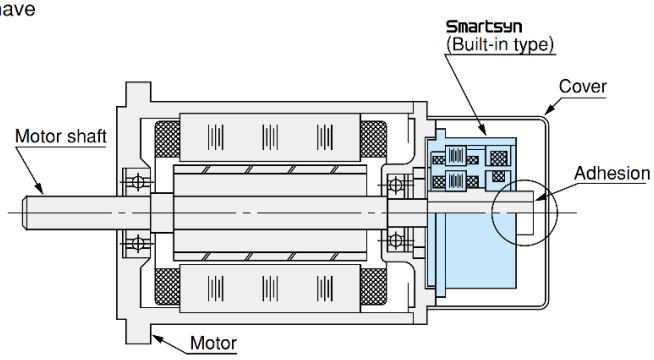
The following mounting requirements should be kept to satisfy the specifications.

• Shaft Run-out
A motor shaft on which Rotor is mounted should have a run-out less than 0.050mm (TIR).

• Concentricity
Centers of resolver and motor shaft should be aligned within 0.050mm (TIR).

• Perpendicularity
Resolver case should be perpendicular to the motor shaft within 0.050mm (TIR).

• Axial Alignment
For built-in types, Stator and Rotor should be axially aligned within the tolerance of MTG.DIM.



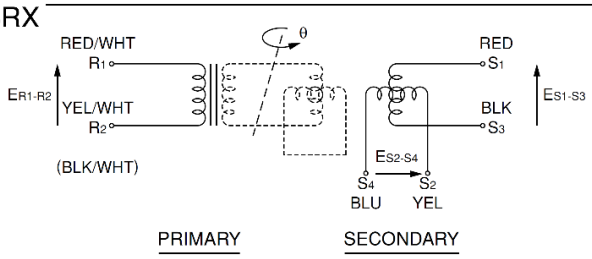
PRINCIPLE

Resolver is a rotary transformer, which outputs AC voltage in accordance with angular position of the shaft.There are two types of resolvers, BRX and BRT, having different types of winding.

BRX resolver is excited by AC voltage to the rotor winding, and outputs from the stator windings sine and cosine voltages proportion to the rotation angle θ.

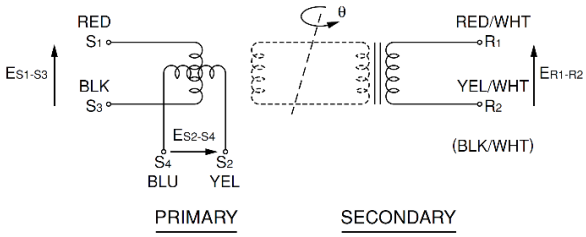
BRT resolver is excited by sine and cosine voltages to the stator windings, and outputs from the rotor winding a sine voltage phase-shifted in proportion to θ.
The difference is illustrated as follows.

BRX



Excitation : $E_{R1-R2}=E\sin\omega t$
Output : $E_{S1-S3}=K\,E_{R1-R2}\cos\theta$
$E_{S2-S4}=K\,E_{R1-R2}\sin\theta$ (Normal Type)
$E_{S2-S4}=-K\,E_{R1-R2}\sin\theta$ (Reverse Type)
K : Transformation Ratio

BRT



Excitation : $E_{S1-S3}=E\sin\omega t$
$E_{S2-S4}=E\cos\omega t$
Output : $E_{R1-R2}=K\,E_{S1-S3}\cos\theta - K\,E_{S2-S4}\sin\theta$
$=KE\sin(\omega t-\theta)$ (Normal Type)
$E_{R1-R2}=K\,E_{S1-S3}\cos\theta + K\,E_{S2-S4}\sin\theta$
$=KE\sin(\omega t+\theta)$ (Reverse Type)
K : Transformation Ratio

+θ:CCW is positive when viewed from mouting end.

Smartsyn®

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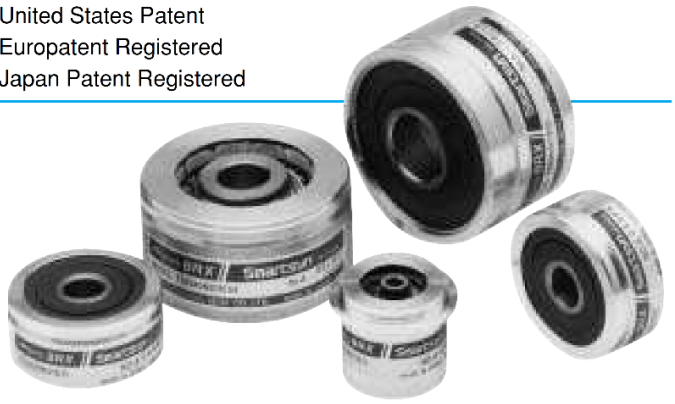
Japan Patent Registered

BUILT-IN RESOLVERS

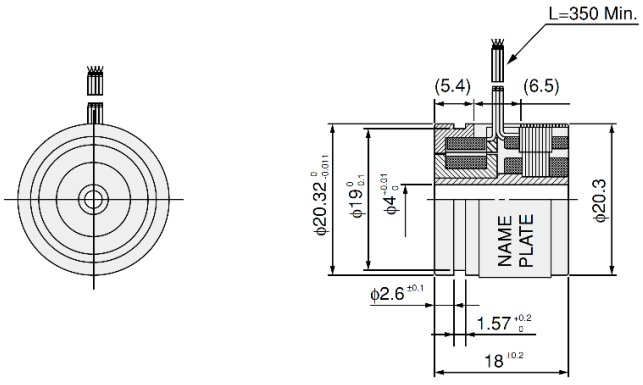


SIZE		08	10	15		21	
Model No.		TS2605N1E64	TS2610N171E64	TS2620N21E11	TS2620N271E14	TS2640N321E64	TS2640N691E125
Type		BRX	⟵	⟵	⟵	⟵	⟵
Primary		R1-R2	⟵	⟵	⟵	⟵	⟵
Input Voltage/Frequency		7Vrms 10kHz	7Vrms 10kHz	7Vrms 10kHz	10Vrms 4.5kHz	7Vrms 10kHz	5Vrms 4kHz
Transformation Ratio		0.5±5%	0.5±5%	0.5±5%	0.5±10%	0.5±5%	0.5±10%
Error		±10′ Max.	±10′ Max.	±10′ Max.	±10′ Max.	±10′ Max.	±8′ Max.
Null Voltage		20mVrms Max.	20mVrms Max.	20mVrms Max.	20mVrms Max.	25mVrms Max.	——
Phase Shift		+10° Nom.	+5° Nom.	0° Nom.	+8° Nom.	-5° Nom.	+0 ~ +10°
Impedance	Z_{RO}	140Ω	160Ω	70+j100Ω	90+j180Ω	110+j140Ω	290Ω Nom.
	Z_{SO}	——	160Ω	180+j300Ω	220+j350Ω	150+j270Ω	——
	Z_{SS}	120Ω	130Ω	175+j257Ω	210+j300Ω	130+j240Ω	420Ω Nom.
Operating Temperature		−55~+155°C	−55~+155°C	⟵	⟵	⟵	⟵
Max. Operating Speed		500s^{-1}	333.3s^{-1}	⟵	⟵	166.7s^{-1}	⟵
Mass		0.03kg	0.04kg	0.06kg	0.07kg	0.22kg	025kg
Output Type		Reverse	Reverse	Normal	Normal	Normal	Normal

OUTLINE

(DIMENSION : mm)

SIZE 08 **TS2605N1E64**



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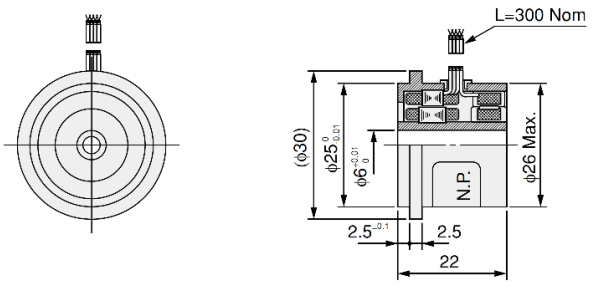

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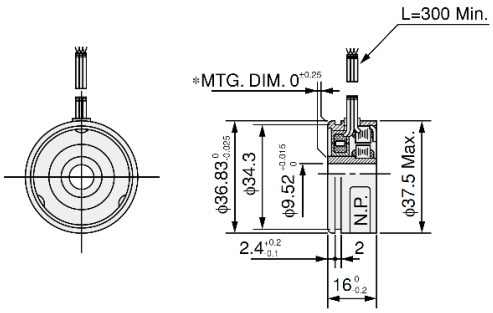

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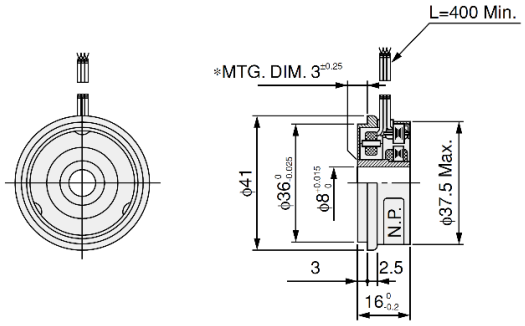
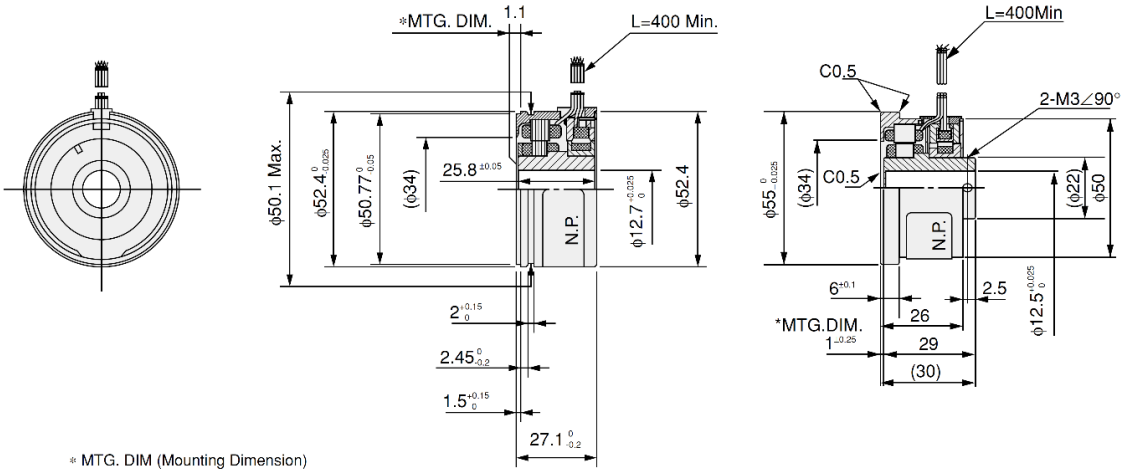


SIZE 21 TS2640N321E64 TS2640N691E125



* MTG. DIM (Mounting Dimension)