



TSL-SM15

Compact precision motion

A Ø15 mm permanent-magnet stepper motor for compact positioning and low-power motion-control applications.

DIAMETER	Ø15 mm
MOTOR TYPE	PM stepper
PHASES	2-phase
VERSIONS	Type A / Type B

TYPE A - TECHNICAL SPECIFICATIONS

Rated Voltage	DC 5.0 V	No. of Phases	2 Phases
Coil Resistance	10 Ω ±10% / Phase	Rotation	CCW
Excitation Method	2-Phase Excitation	Insulation Class	Class F
Max Pull-out Frequency	1500 Hz min.	Max Pull-in Frequency	100 Hz min.
Pull-Out Torque	12 g·cm at 1000 Hz min.		

TYPE B - TECHNICAL SPECIFICATIONS

Rated Voltage	5 V DC (Drive IC: 6219)	Current per Phase	160 mA / Phase
Coil Resistance	31 ±7% Ω / Phase (20 °C)	No. of Phases	2 Phases
Step Angle	18° / Step	Excitation Method	2-Phase Excitation
Drive Mode	Bipolar Drive	Insulation Class	Class E for Coils
Pull-Out Torque	≥8 gf·cm at 500 pps	Insulation Strength	100 V AC, 1 s
Max Response Frequency	≥1000 pps	Max Starting Frequency	≥700 pps
Insulation Resistance	100 MΩ at DC 500 V	Operating Temperature	-20 to +85 °C

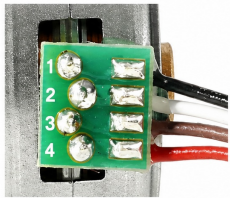
Note: Performance data are reference values and may be customized for specific application requirements.

RECOMMENDED DRIVE PARAMETERS

No.	Test Voltage	Recommended Drive Frequency	Recommended Drive Current
1	DC 12.0 V	1000 pps	≤0.25 A
2	DC 7.40 V	1000 pps	≤0.15 A
3	DC 6.00 V	1000 pps	≤0.10 A
4	DC 5.00 V	1000 pps	≤0.08 A
5	DC 3.70 V	700 pps	≤0.07 A

TERMINAL CONNECTION & COIL IDENTIFICATION

Terminal Wiring Sequence Description (1.25-4Y Wiring Terminal, Wire GB 1571 30/UL AWM 105°)



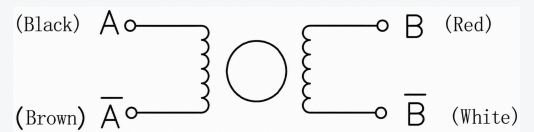
- 1-Black Wire A+
- 2-White Wire B-
- 3-Brown Wire A-
- 4-Red Wire B+

CONNECTOR PIN LOCATION					
PIN NO	COLOR	CCW ← CW (SEEN FROM FLANGE SIDE)		PHASE	
1	Brown	ON	ON		A
2	Black	ON		ON	A
3	White			ON	B
4	Red	ON	ON		B

2-2 Phase CW

Terminal Map

Pin	Wire Color	Phase
1	Black	A+
2	White	B-
3	Brown	A-
4	Red	B+



PRODUCT NOTES

Compact Integration

Suitable for miniature instruments, camera mechanisms, small valve actuators and compact positioning modules.

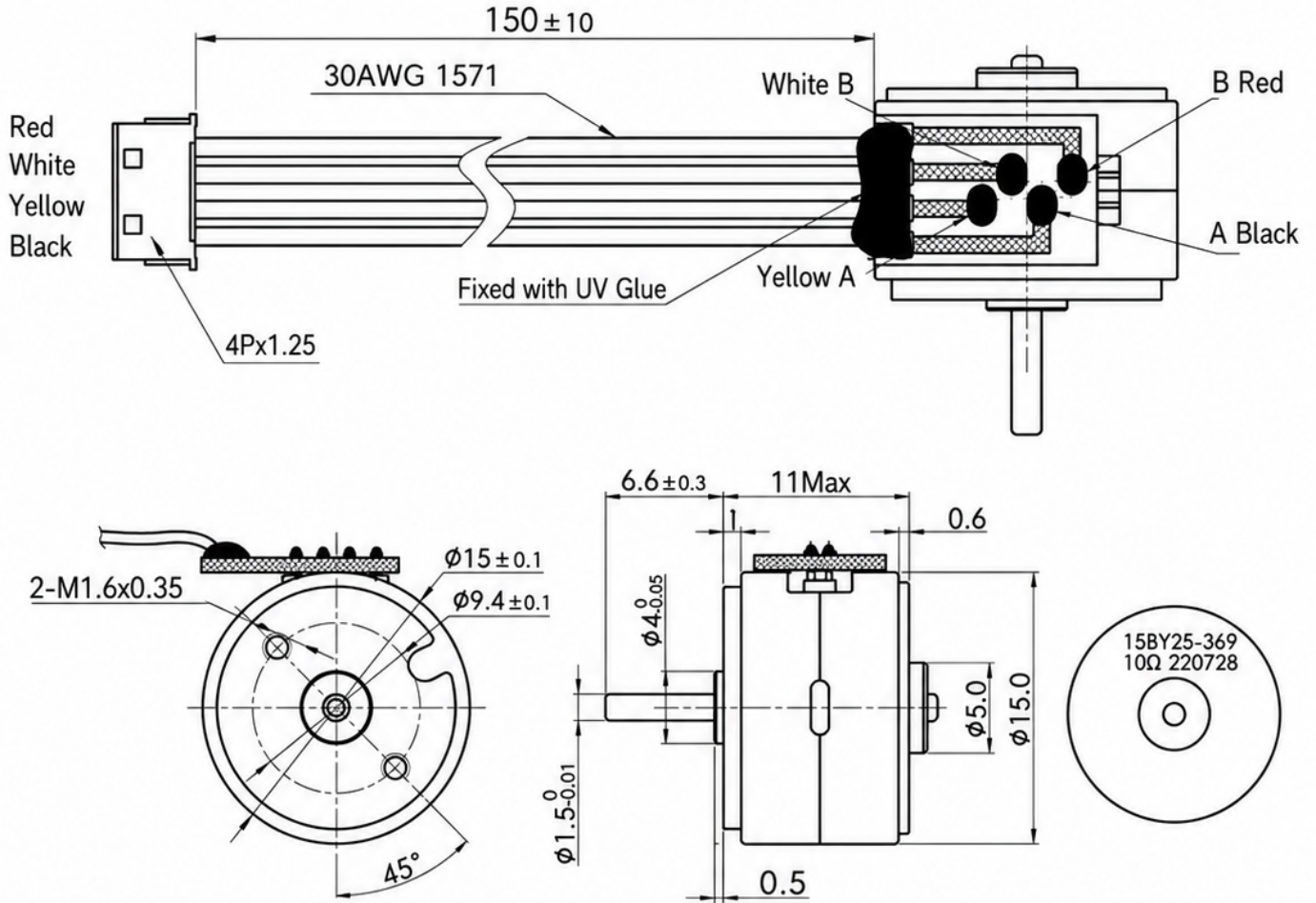
Drive Guidance

Use current-limited drive control. Select voltage, current and pulse rate within the recommended operating conditions.

Customization

Lead length, connector, winding, shaft configuration and performance targets can be customized subject to evaluation.

Dimensions in millimetres unless otherwise specified. Type A includes the excitation sequence and wiring method shown below.



2-2 Phase Excitation

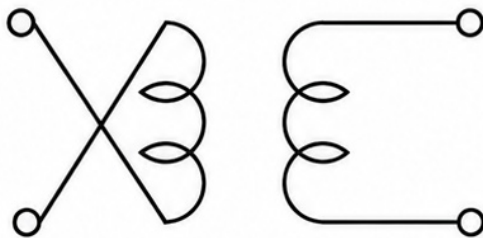
Rotation direction viewed from the output shaft end on the mounting face

CCW

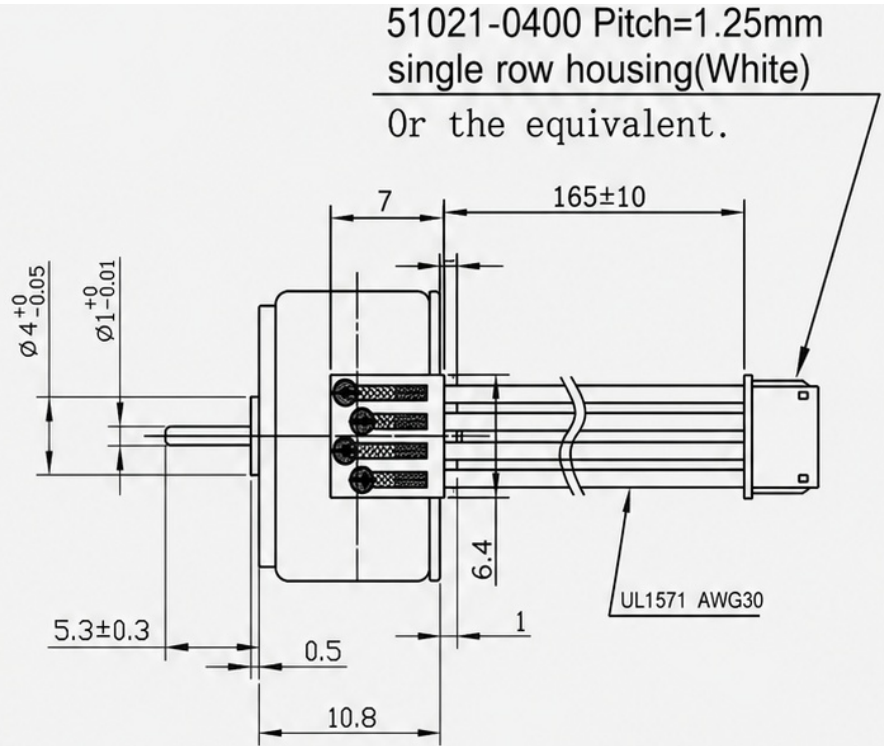
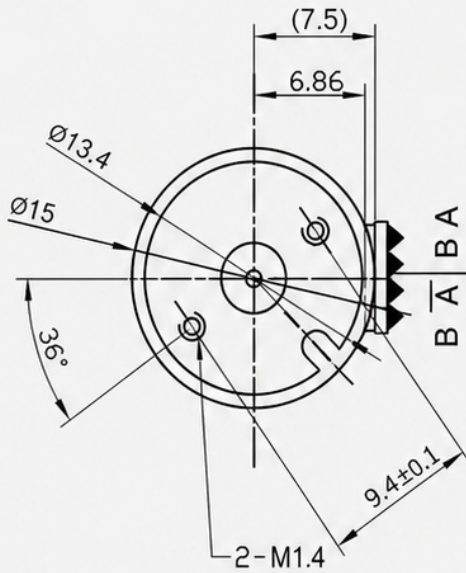
STEP \ PHASE	1	2	3	4
A	+	-	-	+
B	+	+	-	-
\bar{A}	-	+	+	-
\bar{B}	-	-	+	+

CW

Wiring Method:



Dimensions in millimetres unless otherwise specified. Connector: 51021-0400, pitch 1.25 mm, or equivalent.



General Tolerance			
Grade	A	B	C
L ≤ 3	±0.02	±0.03	±0.05
3 < L ≤ 6	±0.05	±0.05	±0.08
6 < L ≤ 16	±0.07	±0.08	±0.10
16 < L ≤ 30	±0.10	±0.10	±0.12
30 < L ≤ 120	±0.10	±0.15	±0.18
120 < L ≤ 300	±0.15	±0.20	±0.25
300 < L ≤ 500	±0.20	±0.30	±0.40
Unspecified angle tolerance		±0.1°	

