

# Specialty Linear Shaft Motor

# NPM

## Scaleless SL Motor: Linear Motor with Built-In Encoder

- Line Driver output
- Built in Interpolator
- Real-time Single processing
- High dynamics
- Excellent force to volume ratio
- No residual force present
- Non-magnetic aluminum housing
- Compact and robust construction
- No lubrication required
- Simple installation and configuration
- Repeat accuracy:  $\pm 1$  count ( $5 \mu\text{m}$ )



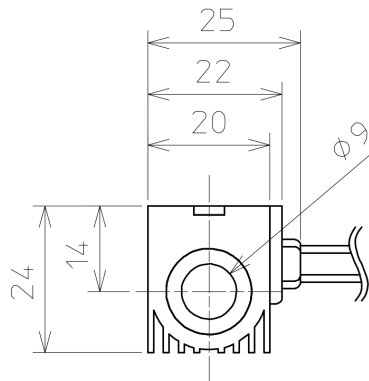
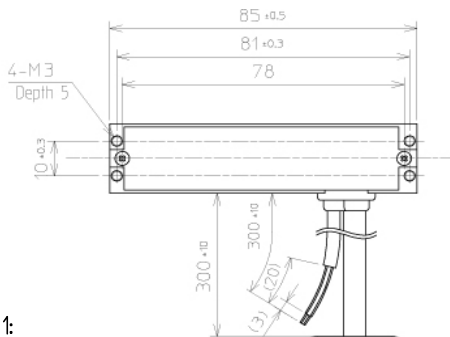
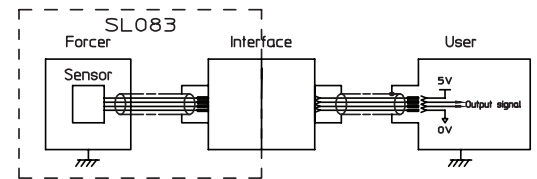
The Scaleless SL Motor is a tubular linear motor with a built-in Linear Encoder. The simple design features just two parts, the shaft (magnets) and forcer (coils). In addition to the coils, the forcer also contains the integrated linear encoder and hall sensors. The stainless steel shaft has the scale for the linear encoder integrated into a single unit.

The absence of residual static force and the excellent relationship between the linear force and current make these motors ideal for use in micro-positioning applications. Position control of the Scaleless SL Motor is made possible by the built-in Linear Encoder.

in markets such as medical devices, laboratory equipment, instrumentation, factory automation and robotics, to name only a few.

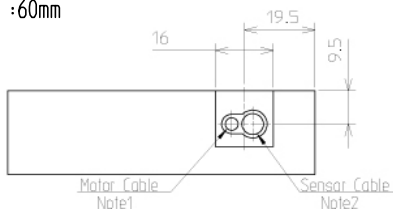
The Scaleless SL Motor is non-contact. Since the coil completely wraps around the magnets, all the magnetic flux is efficiently used. This allows for a large 0.5 mm nominal annular air gap that is non-critical, meaning there is no variation in force as the gap varies over the stroke of the device, or if the shaft is turned in the forcer.

An integrated solution, the Scaleless SL Motor makes integration of a linear motion a very simple matter into a wide variety of applications



Note 1:  
Cable (Motor)  
UL2103-AWG24  
Red : U, White : V, Black : W, Green : FG  
Bending Radius : 44mm

Note 2:  
Cable (Sensor)  
UL20276 AWG30  
Bending Radius : 60mm



Pin	Signal
1	A+
2	A-
3	NC
4	B+
5	B-
6	U (Hall Sensor)
7	V (Hall Sensor)
8	W (Hall Sensor)
9	GND1
10	+5V VCC
11	Z+
12	Z-
13	NC
14	GND2 (Hall Sensor)
15	+5V (Hall Sensor)

*Encoder	SL083
Power Supply Voltage	DC5V $\pm 5\%$
Consumption Current	Max.25mA
Output Circuit	Line Driver
Resolution	5 $\mu\text{m}$
Signal Cycle	20 $\mu\text{m}$
Max. Travel Speed	4m/s

*Hall Sensor	SL083
Power Supply Voltage	DC5V $\pm 5\%$
Consumption Current	Max.12mA
Output Circuit	Open Collector (24V, Max.20mA)

Specs	SL083
Continuous Force	2.9N
Continuous Current	0.9Arms
Acceleration Force	11.5N
Acceleration Current	3.6Arms
Force Constant	3.2N/Arms
Back EMF	1.1V/m/s
Resistance	6.8 $\Omega \pm 5\%$
Inductance	1.03mH $\pm 5\%$
Max Phase Temp.	80° C (at case)
Magnetic Pole Pitch	30mm (N-N)
Mass	Max.130g

\*Encoder and Hall Sensor power supply voltage are internally isolated