



# iLLC-SM and sLLC-SM Datasheet



2025

## iLLC-SM and sLLC-SM Description

The iLLC-SM and sLLC-SM are linear lens changers that employ a high-power, linear servo motor (i.e., LMotor) to rapidly change the objective lenses that are being used with a microscope or other similar system.

The iLLC-SM includes integrated control electronics. The sLLC-SM uses an external controller. Both models require selection of an insert plate compatible with the microscope objective lens type and quantity.

## Ordering Info

Part numbers in [Table 1](#) include required cabling with corresponding use (either as part of MMS or standalone use).

**Table 1 iLLC-SM and sLLC-SM Types**

Type	Part Number
Lens Changer (iLLC-SM-MMS)	971880
Lens Changer (iLLC-SM-SA)	971881
Lens Changer (sLLC-SM-SA)	971910

**Table 2 Insert Plate Types**

Type	Part Number
LC Insert (LCI-SN3) Nikon 3	400836
LC Insert (LCI-SN4) Nikon 4	400860
LC Insert (LCI-SM3) Mitutoyo 3	400849
LC Insert (LCI-SM4) Mitutoyo 4	400837
LC Insert (LCI-SO3) Olympus 3	400911
LC Insert (LCI-SO4) Olympus 4	401518
LC Insert (LCI-SO4) Olympus 4 (CUSTOMIZE)	400910
LC Insert (LCI-SO5) Olympus 5	400838

## Product Specifications

**Table 3 iLLC-SM and sLLC-SM General Specifications**

Parameter	Specification
Motor Shaft Diameter	16 mm
Motor Type Linear	Linear direct drive
Moving Weight With Typical Insert Plate	0.717 kg
Encoder Type Linear	Linear incremental encoder
Encoder Resolution	0.078125 $\mu$ m
Controller Type	Digital servo drive
Controller Options	Integrated or separated
Positional Repeatability	$\pm 0.16 \mu$ m

**Table 4 iLLC-SM and sLLC-SM Specifications**

Specifications	Value		
Insert Plate	3	4	5
Objective Lens Type	Mitutoyo, Nikon, or Olympus	Mitutoyo, Nikon, or Olympus	Olympus
Objective Ring Light Illumination	Yes (2 lenses)	No	No
Weight for iLLC-SM, excluding insert plate and lenses	1.9 kg		
Weight for sLLC-SM, excluding insert plate and lenses	1.6 kg		
Controller	Integrated or Separated		
Default Parameters <sup>a</sup>			
Acceleration (AC)	4500 mm/s <sup>2</sup>		
Deceleration (DC)	4500 mm/s <sup>2</sup>		
Speed (SP)	450 mm/s		
S-Curve Time (SF)	10 ms		
Maximum Speed (SP)	700 mm/s		
Performance <sup>b</sup>			
Lens-to-Lens Change Time	0.3 s		
First-to-Last Lens Change Time	0.5 s		

a. Default parameters with turret fully loaded and  $<2 \text{ m/s}^2$  external force.

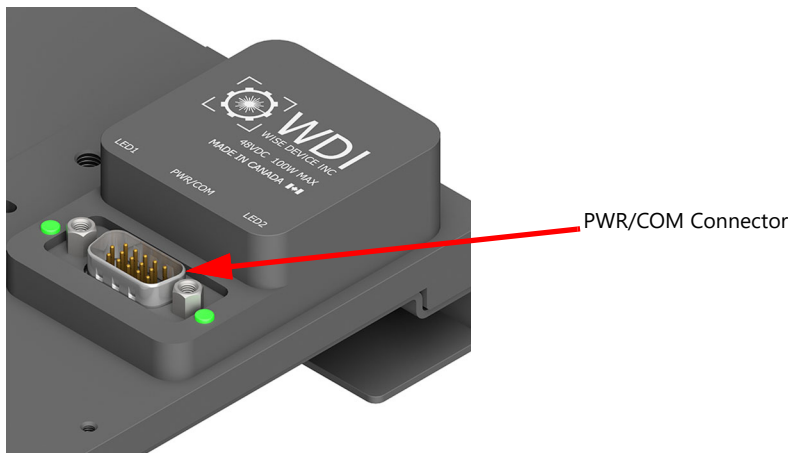
b. Measured with turret fully loaded, default parameters, and 48 VDC power. Lower voltage may increase lens change times.

**Table 5 iLLC-SM and sLLC-SM Lens Spacing Specifications**

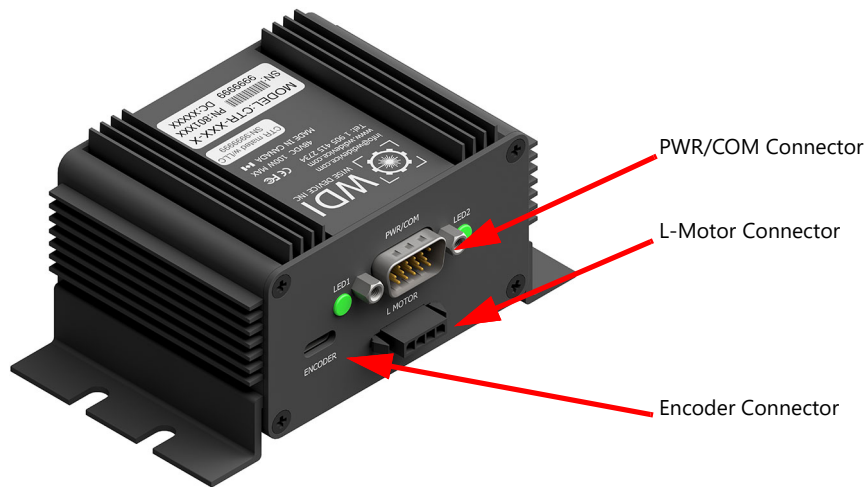
Specifications	Value		
Objective Lens Type	M25x0.75 (Typical Nikon)	M26x36TPI (Typical Mitutoyo)	W0.8"-36 (RMS) (Typical Olympus)
Lens Spacing Center to Center	3 lens - 54.75 mm 4 lens - 36.5 mm	3 lens - 54.75 mm 4 lens - 36.5 mm	3 lens - 54.75 mm 4 lens - 36.5 mm 4 lens - 38 mm, 33.5 mm, 38 mm 5 lens - 27.375 mm

For more details on insert specifications see "*Insert Plate Dimensions*" on page 8.

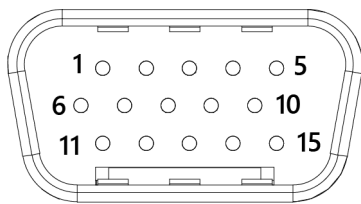
## Electrical Connections



**Figure 1** Connectors – Integrated Controller



**Figure 2** Connectors – Separated Controller



**Figure 3** PWR/COM Connector (DB15HD) Male Pins

**Table 6** PWR/COM Connector Pins

Pin #	Signal	Function
1	VCC	+24VDC or +48VDC
2	GND	Power supply return
3	DO1	Digital output 1

**Table 6 PWR/COM Connector Pins (continued)**

Pin #	Signal	Function
4	CANH	CAN BUS high
5	CANL	CAN BUS low
6	VCC	+24VDC or +48VDC
7	GND	Power supply return
8	GND	Power supply return
9	DI3	Digital input 3
10	DO2	Digital output 2
11	RS485-	RS485 Differential signal (negative)
12	RS485+	RS485 Differential signal (positive)
13	GND	IOs return
14	IO4/E-STOP	Emergency stop input. In order to de-activate emergency stop, drive high (+5VDC to +48VDC)
15	DO5	Digital output 5
Shield	GND	CH Chassis ground

## Electrical Specifications

**Table 7 iLLC-SM and sLLC-SM Electrical Specifications**

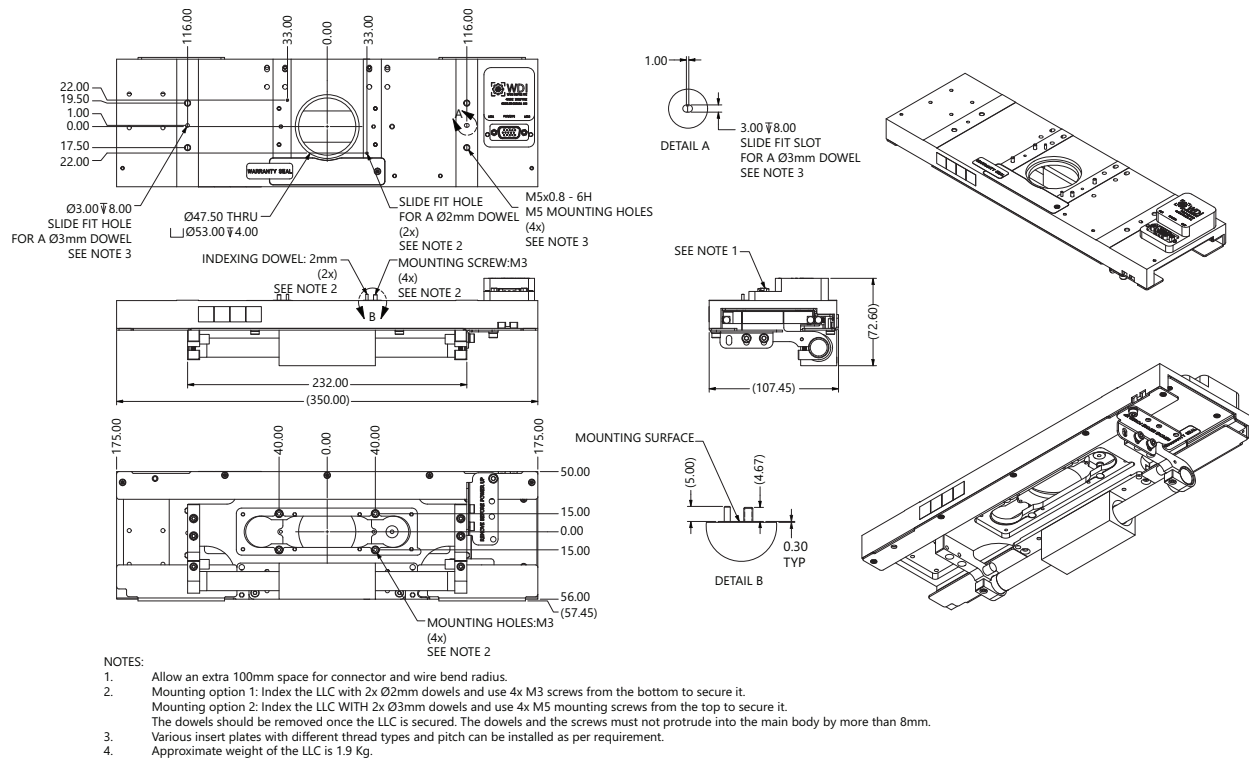
Parameter	Minimum	Typical	Maximum	Units
Operating Voltage	22	24 or 48	49	VDC
Operating Current			5	A
E-Stop Input Voltage High (VIH)	5	24 or 48	49	VDC
E-Stop Input Voltage Low (VIL)	-0.5		2	VDC
E-Stop Input Current		7		mA

## Environmental Specifications

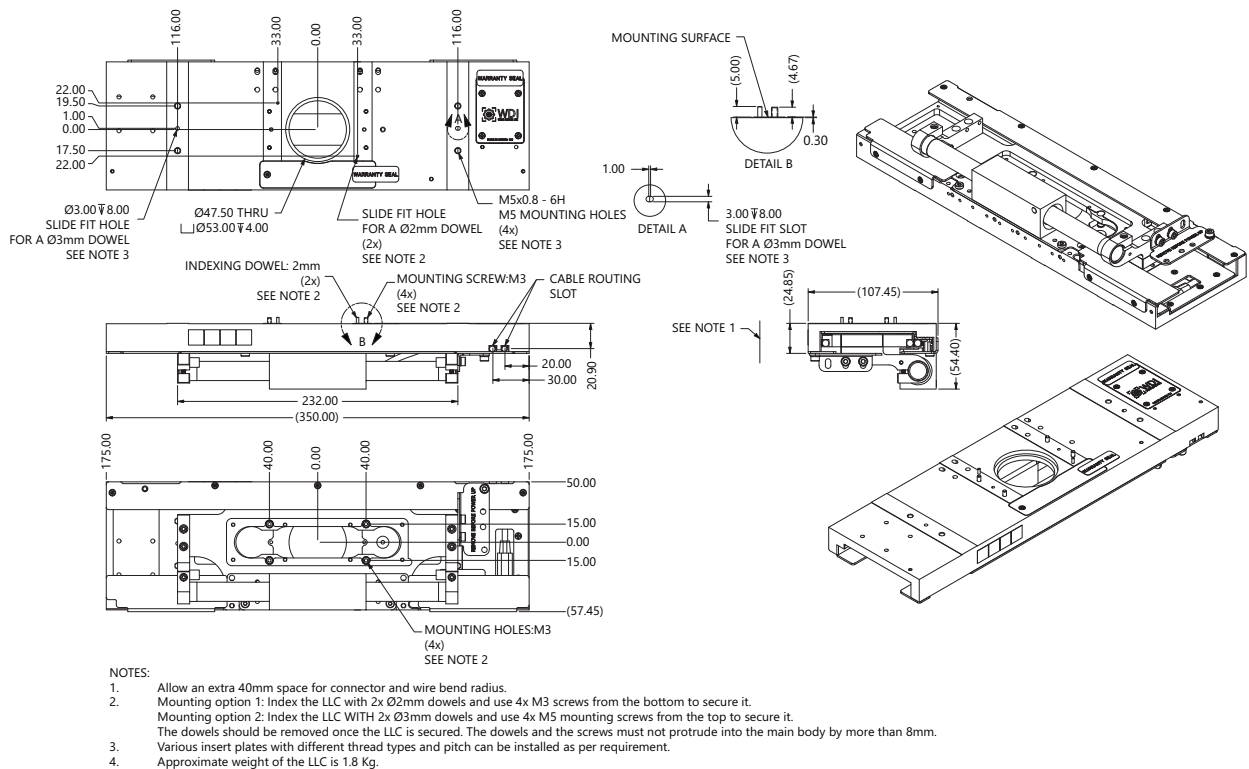
**Table 8 iLLC-SM and sLLC-SM Environmental Specifications**

Description	Value
Operating Ambient Temperature	20°C to 30°C
Transport Temperature (sealed container)	-20°C to 50°C
Storage Temperature	10°C to 40°C
Humidity Temperature	10% to 80% non-condensing

## Mechanical Dimensions

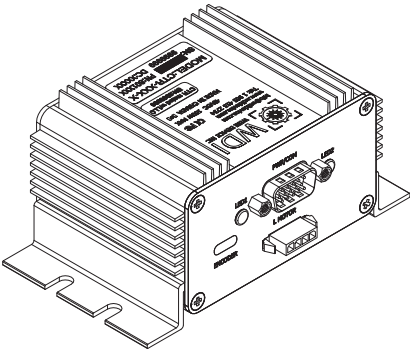
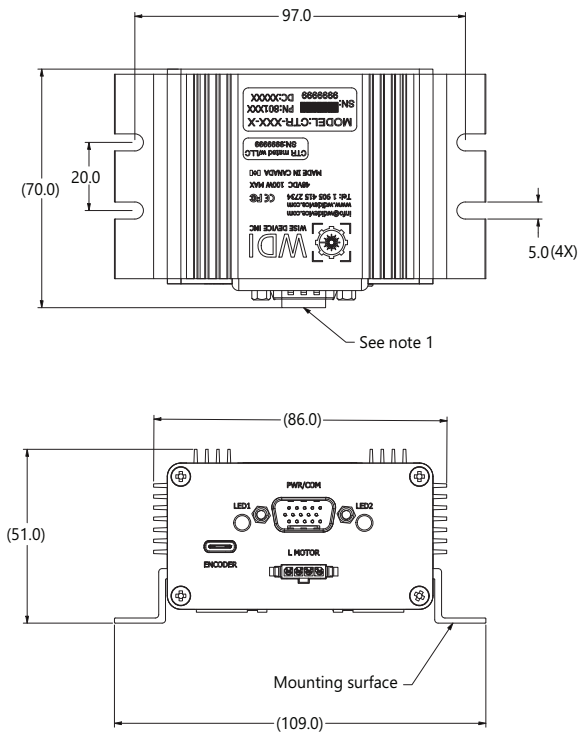


**Figure 4** iLLC-SM Dimensions



**Figure 5** sLLC-SM Dimensions

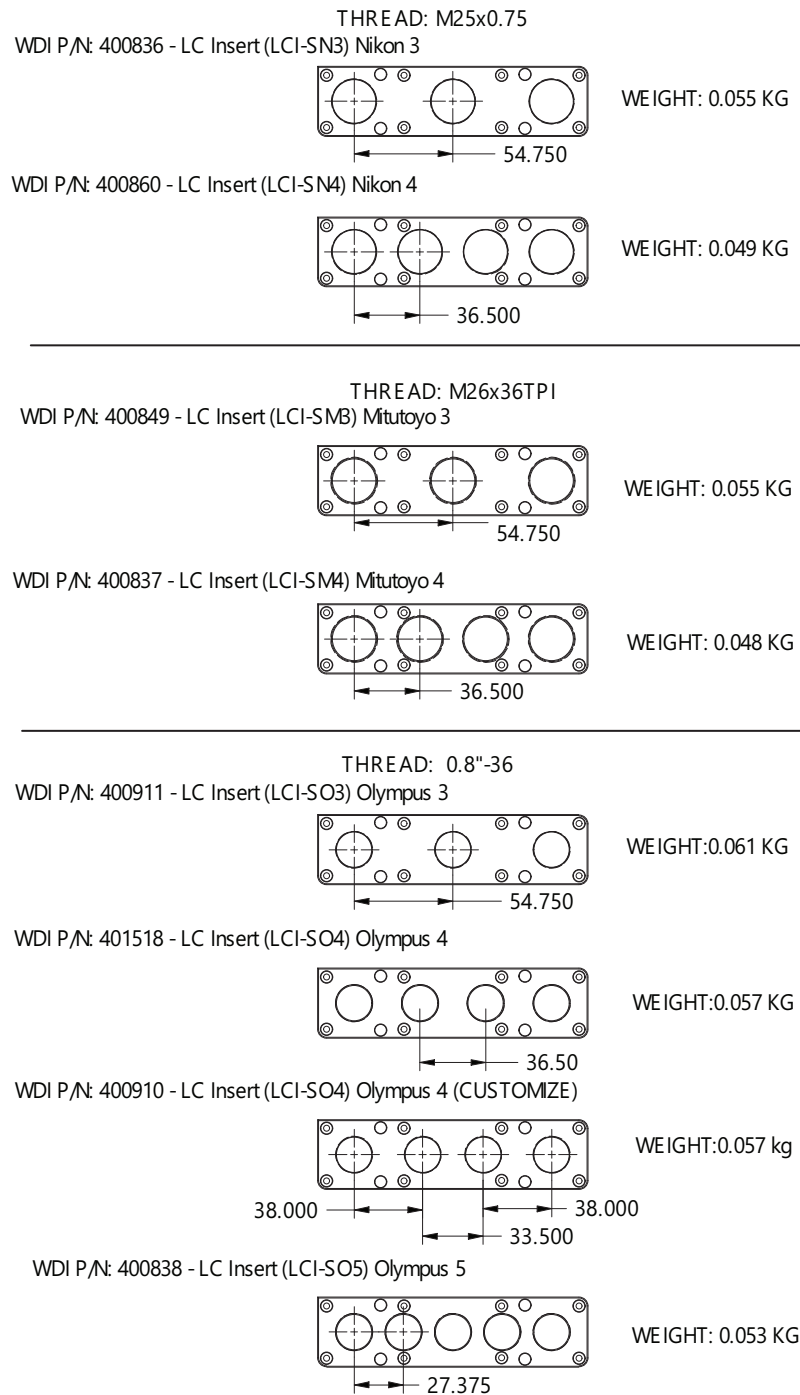
sLLC Controller Dimensions



- NOTES:
1. Allow an extra 100 mm for cable bend radius.
  2. Approximate weight of 0.22 Kg does not include cables.

**Figure 6** sLLC Controller Dimensions

## Insert Plate Dimensions



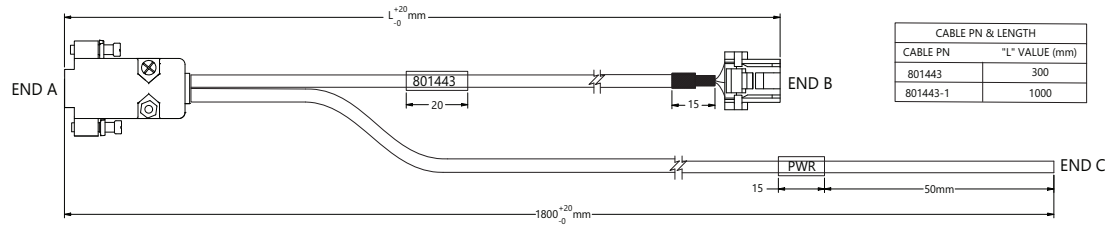
**Figure 7** iLLC-SM and sLLC-SM Insert Plates



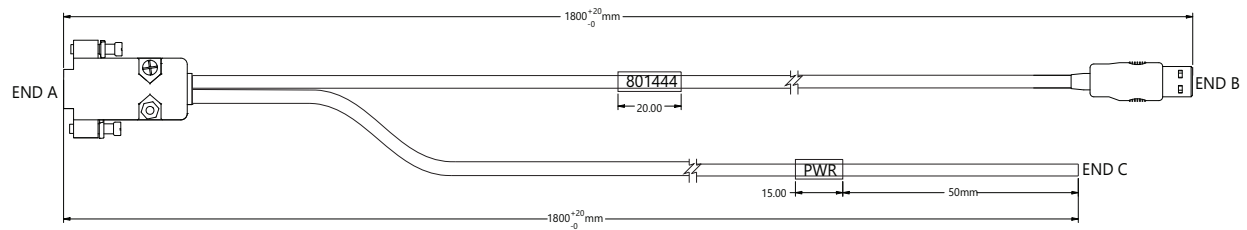
## Accessories

**Table 9 iLLC-SM and sLLC-SM Accessories**

Accessory	Part Number	Remarks
Cable (CAB-LLC-MMS), (300 mm)	801443	300 mm length (for attached and integrated controller configurations)
Cable (CAB-LLC-MMS), (1000 mm)	801443-1	1 m length (for separated controller configuration)
Cable (CAB-LLC-USBR5485), (1800mm)	801444	1800 mm in length (for standalone configuration)



**Figure 8** CAB-LLC-MMS Cable Wiring



**Figure 9** CAB-LLC-USBR5485 Cable Wiring