



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 μ m
Controller Type	Digital servo drive
Controller Options	Integrated or separated
Positional Repeatability	± 0.25 μ 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 ^a			
Acceleration (AC)	4500 mm/s ²		
Deceleration (DC)	4500 mm/s ²		
Speed (SP)	450 mm/s		
S-Curve Time (SF)	10 ms		
Maximum Speed (SP)	700 mm/s		
Performance ^b			
Lens-to-Lens Change Time	0.5 s		
First-to-Last Lens Change Time	0.65 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

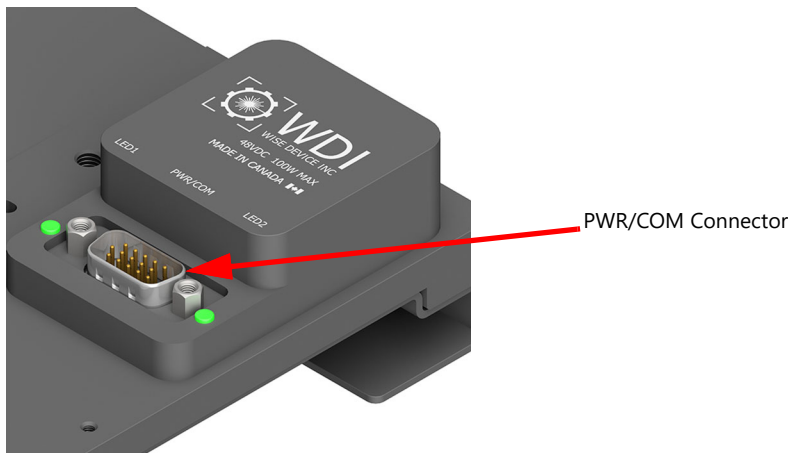


Figure 1 Connectors – Integrated Controller

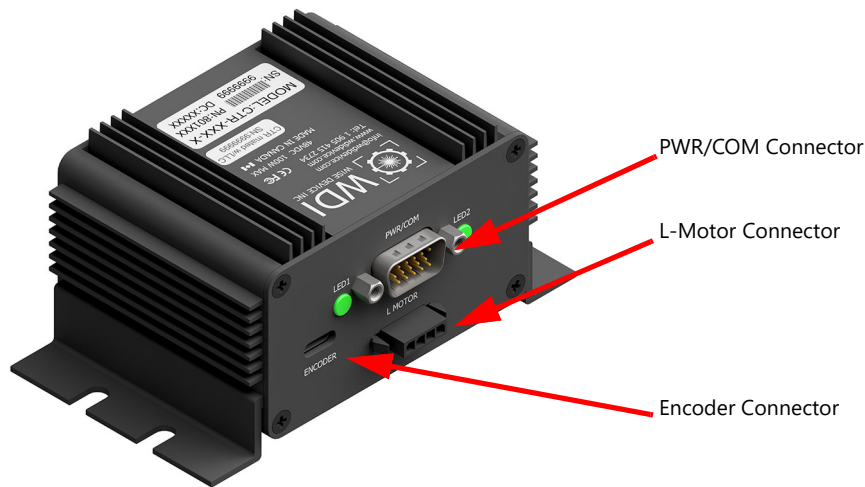


Figure 2 Connectors – Separated Controller

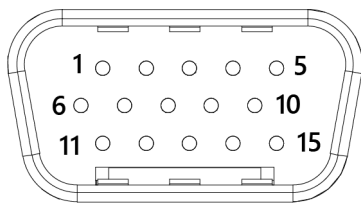


Figure 3 PWR/COM Connector (DB15HD) Male Pins

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

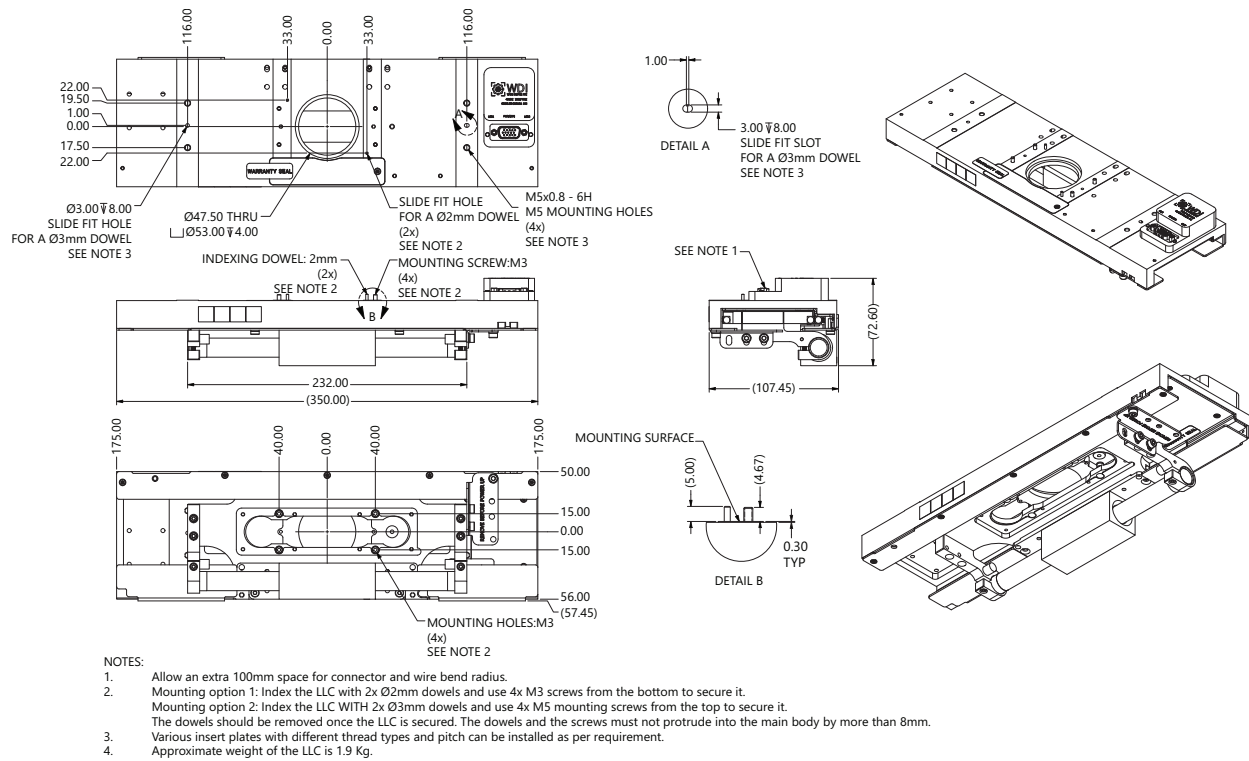


Figure 4 iLLC-SM Dimensions

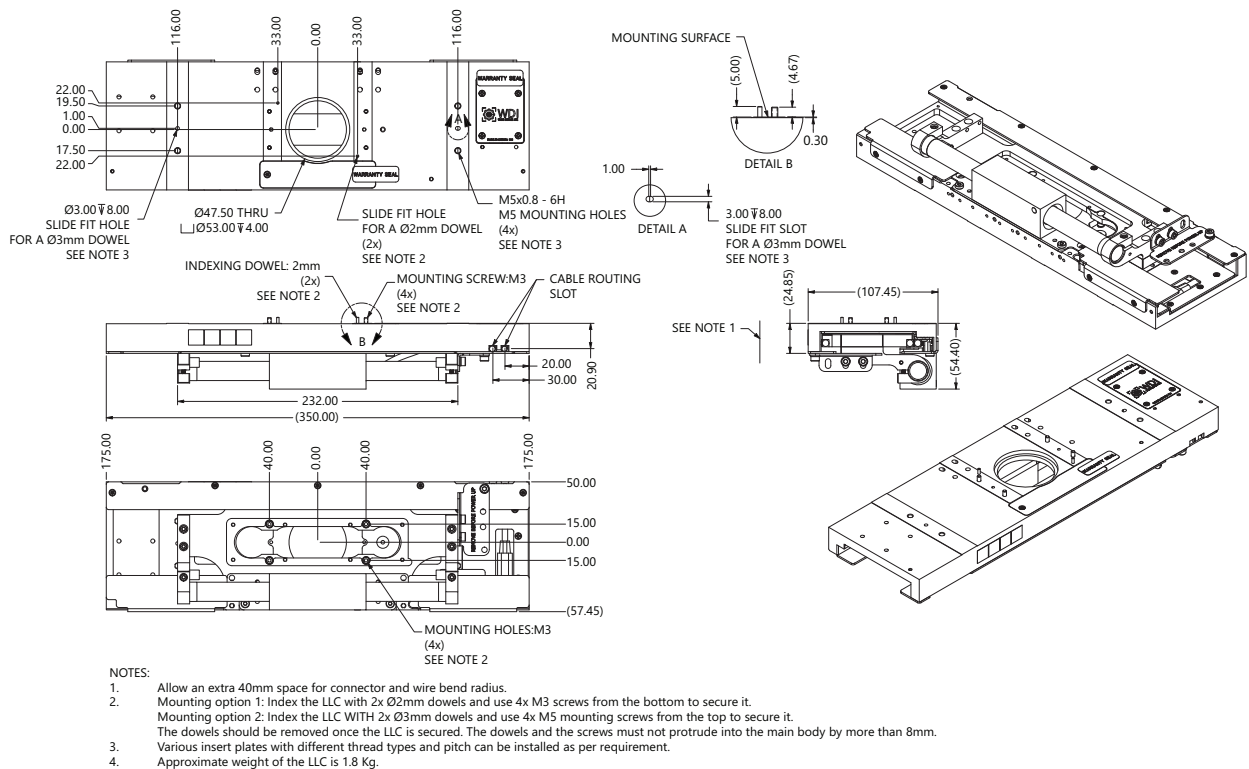
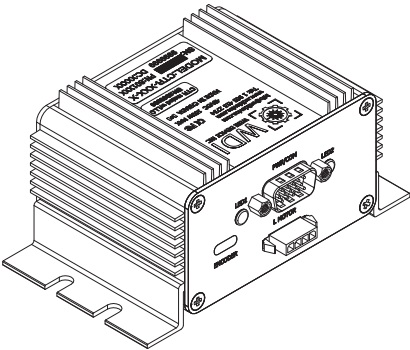
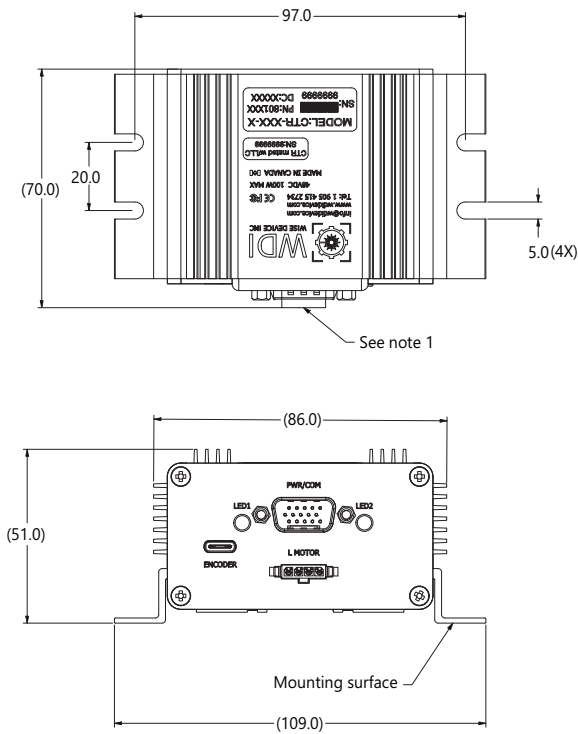


Figure 5 sLLC-SM Dimensions

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

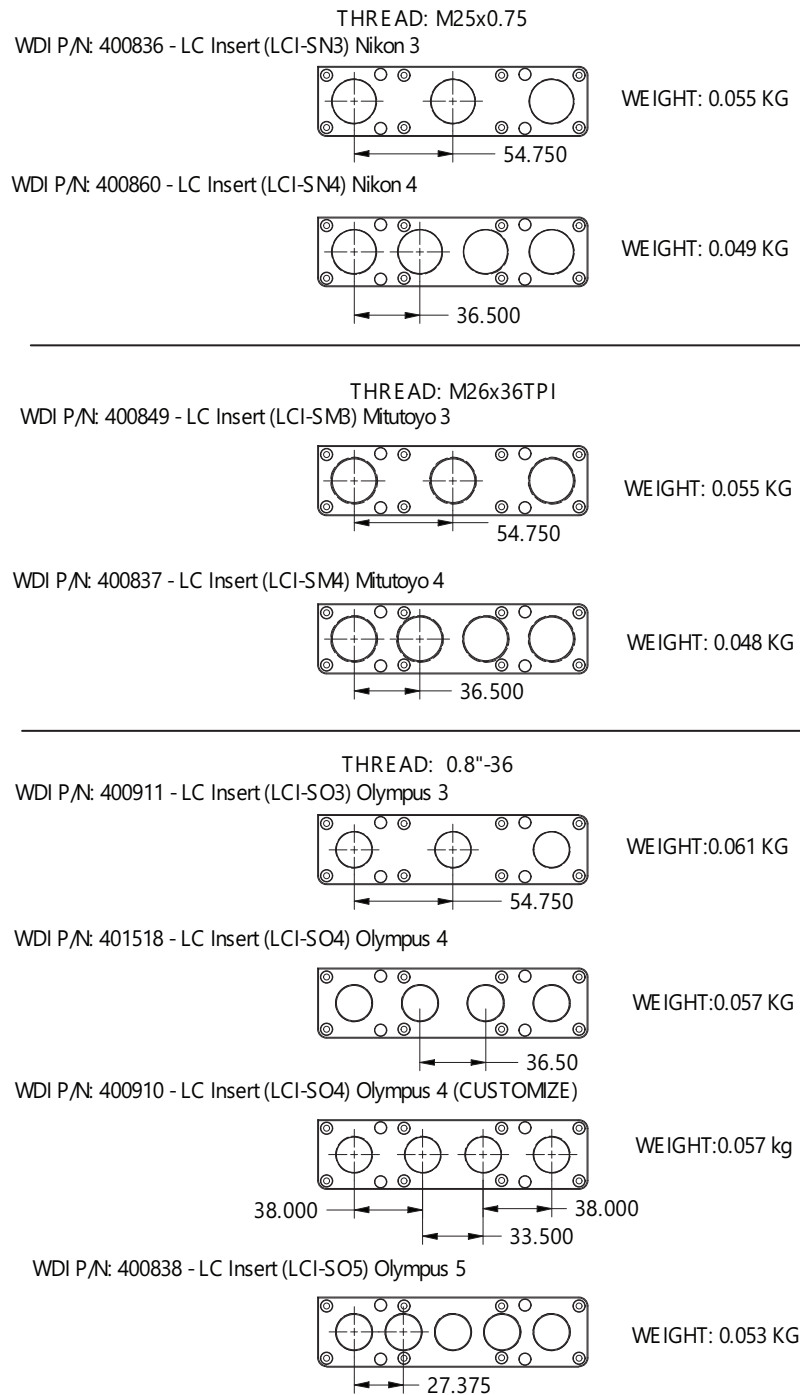


Figure 7 iLLC-SM and sLLC-SM Insert Plates

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)

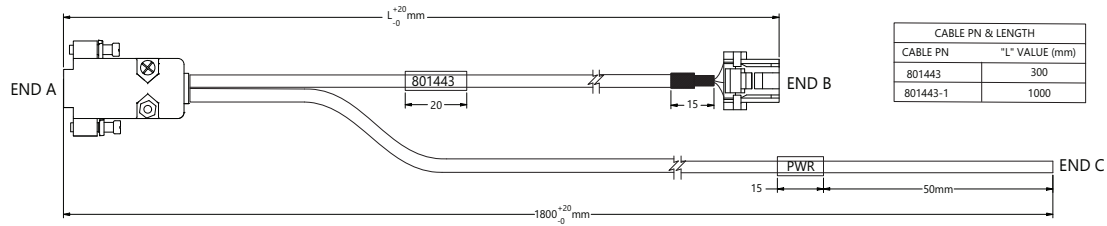


Figure 8 CAB-LLC-MMS Cable Wiring

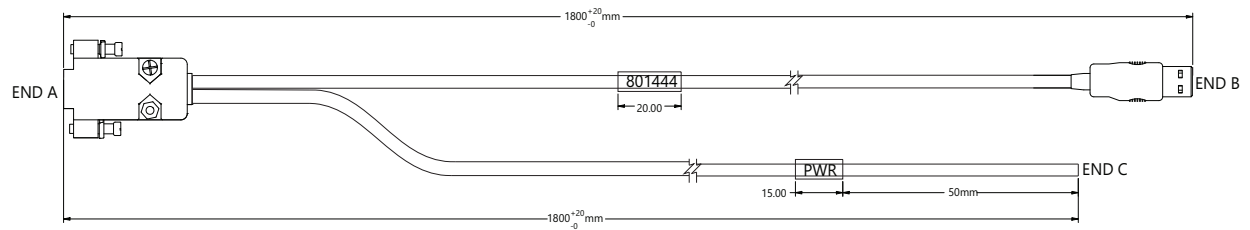


Figure 9 CAB-LLC-USBR5485 Cable Wiring