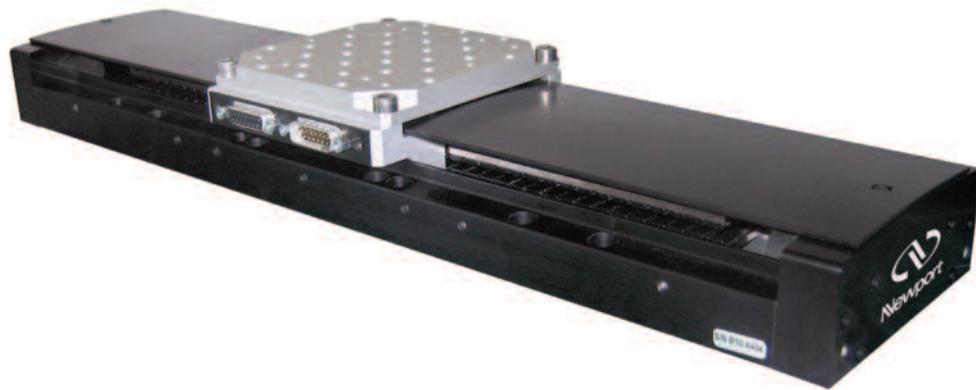




ILS-LM-S Series

High-Performance Linear Motor Stages



 **Newport®**

USER'S MANUAL

Warranty

Newport Corporation warrants this product to be free from defects in material and workmanship for a period of 1 year from the date of shipment. If found to be defective during the warranty period, the product will either be repaired or replaced at Newport's discretion.

To exercise this warranty, write or call your local Newport representative, or contact Newport headquarters in Irvine, California. You will be given prompt assistance and return instructions. Send the instrument, transportation prepaid, to the indicated service facility. Repairs will be made and the instrument returned, transportation prepaid. Repaired products are warranted for the balance of the original warranty period, or at least 90 days.

Limitation of Warranty

This warranty does not apply to defects resulting from modification or misuse of any product or part.

CAUTION

Warranty does not apply to damages resulting from:

- **Incorrect usage:**
 - **Load on the stage greater than maximum specified load.**
 - **Carriage speed higher than specified speed.**
 - **Improper grounding.**
 - **Connectors must be properly secured.**
 - **When the load on the stage represents an electrical risk, it must be connected to ground.**
 - **Excessive or improper cantilever loads.**
- **Modification of the stage or any part thereof.**



CAUTION

Please return equipment in the original (or equivalent) packing.

You will be responsible for damage incurred from inadequate packaging if the original packaging is not used.

This warranty is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness for a particular use. Newport Corporation shall not be liable for any indirect, special, or consequential damages.

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Original instructions.

No part of this document may be reproduced or copied without the prior written approval of Newport Corporation. This document is provided for information only, and product specifications are subject to change without notice. Any change will be reflected in future publishings.

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EC Declaration of Conformity



2 Tech Drive
 Andover, MA 01810
www.mksinst.com

EU27 Declaration of Conformity

Application of Council Directive(s):

- Electromagnetic Compatibility Directive (EMCD) – 2014/30/EU
- Machinery Directive – 2006/42/EC
- Restriction of Hazardous Substances Directive (RoHS2) – 2011/65/EU ⁽⁷⁾
- Restriction of Hazardous Substances Directive (RoHS3) – (EU) 2015/863⁽⁷⁾
- Waste Electrical and Electronic Equipment – Directive 2012/19/EU



Standard(s) to which conformity is declared:

- EN 61326-1:2013 – (EMC)
- EN ISO 12100:2010 Safety of Machinery – General Principles of Design – Risk Assessment and Risk Reduction

Emissions:

- EN 55011: 2016 +A1:2017 ⁽⁴⁾ Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement

Immunity:

- EN 61000-4-2:2009 EMC/Electrostatic Discharge Immunity Test
- EN 61000-4-3:2006+A2:2010 EMC/Radiated Radio Frequency Electromagnetic Field Immunity Test
- EN 61000-4-4:2012 EMC/Electrical Fast Transient/Burst Immunity Test
- EN 61000-4-6:2014 EMC/Conducted Disturbances induced by Radio Frequency Fields Immunity Test
- EN 61000-4-8:2010 EMC/Power Frequency Magnetic Field Immunity Test

Manufacturers Name: MKS Instruments, Inc., 2 Tech Drive, Andover, MA 01810 USA

Authorized Representatives Name & Location: _____

Equipment Type/Description: **High Performance Linear Stage**

Model Number(s) ⁽⁶⁾: **M-/ILS100/200/300/LM-S**

The object of the declaration described above is in conformity with the relevant Community harmonization legislation. MKS product conforms to the above Directive(s) and Standard(s) only when installed in accordance with manufacturer’s specifications. This declaration has been issued under the sole responsibility of the manufacturer.

Date: 7/20/2021

Le Cointe Hervé – Quality Director

4) Class A, Group 2
 6) Compliance of the above model numbers requires the use of a braided shielded cable properly terminated at both ends – if so noted in the MKS Instruction Manual.
 7) RoHS Directive has to be checked for in scope products; cannot CE mark without compliance to RoHS. RoHS Directive can be unchecked only for systems which MKS sells which qualify for “Large Scale Industrial Tool” exclusion.

UK Declaration of Conformity



2 Tech Drive
 Andover, MA 01810
www.mksinst.com

UK Declaration of Conformity

Application of Council Directive(s):

- Electromagnetic Compatibility Directive (EMCD) – 2014/30/EU
- Machinery Directive – 2006/42/EC
- Restriction of Hazardous Substances Directive (RoHS2) – 2011/65/EU ⁽⁷⁾
- Restriction of Hazardous Substances Directive (RoHS3) – (EU) 2015/863⁽⁷⁾
- Waste Electrical and Electronic Equipment – Directive 2012/19/EU



Standard(s) to which conformity is declared:

- BS EN 61326-1:2013 – (EMC)
- BS EN ISO 12100:2010 Safety of Machinery – General Principles of Design – Risk Assessment and Risk Reduction

Emissions:

- EN 55011: 2016 +A1:2017 ⁽⁴⁾ Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement

Immunity:

- BS EN 61000-4-2:2009 EMC/Electrostatic Discharge Immunity Test
- BS EN 61000-4-3:2006+A2:2010 EMC/Radiated Radio Frequency Electromagnetic Field Immunity Test
- BS EN 61000-4-4:2012 EMC/Electrical Fast Transient/Burst Immunity Test
- BS EN 61000-4-5:2014+A1:2017 EMC/Surge Immunity Test
- BS EN 61000-4-6:2014 EMC/Conducted Disturbances induced by Radio Frequency Fields Immunity Test
- BS EN 61000-4-8:2010 EMC/Power Frequency Magnetic Field Immunity Test

Manufacturers Name: MKS Instruments, Inc., 2 Tech Drive, Andover, MA 01810 USA

Authorized Representatives Name & Location: _____

Equipment Type/Description: **High Performance Linear Stage**

Model Number(s) ⁽⁶⁾: **M-/ILS100/200/300/LM-S**

The object of the declaration described above is in conformity with the relevant Community harmonization legislation. MKS product conforms to the above Directive(s) and Standard(s) only when installed in accordance with manufacturer’s specifications. This declaration has been issued under the sole responsibility of the manufacturer.

Date: 7/20/2021

Le Cointe Hervé – Quality Director

4) Class A, Group 2

6) Compliance of the above model numbers requires the use of a braided shielded cable properly terminated at both ends – if so noted in the MKS Instruction Manual.

7) RoHS Directive has to be checked for in scope products; cannot CE mark without compliance to RoHS. RoHS Directive can be unchecked only for systems which MKS sells which qualify for “Large Scale Industrial Tool” exclusion.

Definitions and Symbols

The following terms and symbols are used in this documentation and also appear on the product where safety-related issues occur.

General Warning or Caution



The exclamation symbol may appear in warning and caution tables in this document. This symbol designates an area where personal injury or damage to the equipment is possible.

The following are definitions of the Warnings, Cautions and Notes that may be used in this manual to call attention to important information regarding personal safety, safety and preservation of the equipment, or important tips.



WARNING

Warning indicates a potentially dangerous situation which can result in bodily harm or death.



CAUTION

Caution indicates a potentially hazardous situation which can result in damage to product or equipment.

NOTE

Note indicates additional information that must be considered by the user or operator.

European Union CE Mark



The presence of the CE Mark on Newport Corporation equipment means that it has been designed, tested and certified as complying with all applicable European Union (CE) regulations and recommendations.

Warnings and Cautions



ATTENTION

This stage is a Class A device. In a residential environment, this device can cause electromagnetic interference. In this case, suitable measures must be taken by the user.

Warnings



WARNING

The motion of objects of all types carries potential risks for operators. Ensure the protection of operators by prohibiting access to the dangerous area and by informing the personnel of the potential risks involved.



WARNING

The magnetic channel included in this device has the potential to disrupt pacemakers. Consequently, it is recommended that individuals maintain a distance of 1 meter or more from the stage as a precautionary measure.

WARNING

Do not use this stage when its motor is emitting smoke or is unusually hot to the touch or is emitting any unusual odor or noise or is in any other abnormal state.

Stop using the stage immediately, switch off the motor power and then disconnect the electronics power supply.

After checking that smoke is no longer being emitted contact your Newport service facility and request repairs. Never attempt to repair the stage yourself as this can be dangerous.

WARNING

Make sure that this stage is not exposed to moisture and that liquid does not get into the stage.

Nevertheless, if any liquid has entered the stage, switch off the motor power and then disconnect the electronics from power supply.

Contact your Newport service facility and request repairs.



WARNING

Do not insert or drop objects into this stage, this may cause an electric shock, or lock the drive.

Do not use this stage if any foreign objects have entered the stage. Switch off the motor power and then disconnect the electronics power supply.

Contact your Newport service facility for repairs.

WARNING

Do not place this stage in unstable locations such as on a wobbly table or sloping surface, where it may fall or tip over and cause injury.

If this stage has been dropped or the case has been damaged, switch off the motor power and then disconnect the electronics power supply.

Contact your Newport service facility and request repairs.

WARNING

Do not attempt to modify this stage; this may cause an electric shock or downgrade its performance.



WARNING

Do not exceed the usable depth indicated on the mounting holes (see section “Dimensions”). Longer screws can damage the mechanics or cause a short-circuit.

WARNING

Do not exceed speed and load limitations as specified in this manual.

Caution

CAUTION

Do not place this stage in a hostile environment such as X-Rays, hard UV,... or in any vacuum environment.

CAUTION

Do not place this stage in a location affected by dust, oil fumes, steam or high humidity. This may cause an electric shock.

CAUTION

Do not leave this stage in places subject to extremely high temperatures or low temperatures. This may cause an electric shock.

- Operating temperature: +10 to +35 °C
 - Storage/Operating altitude: 1000 m
 - Storage/Operating humidity: 85%
 - Storage temperature: -10 to +40 °C (in its original packaging)
-

**CAUTION**

Do not move this stage if its motor power is on.

Make sure that the cable to the electronics is disconnected before moving the stage. Failure to do so may damage the cable and cause an electrical shock.

CAUTION

Be careful that the stage is not bumped when it is being carried. This may cause it to malfunction.

CAUTION

When handling this stage, always unplug the equipment from the power source for safety.

CAUTION

When the carriage is in its end-of-run position, it is strongly recommended not to go beyond this point as this may damage the stage mechanism.

CAUTION

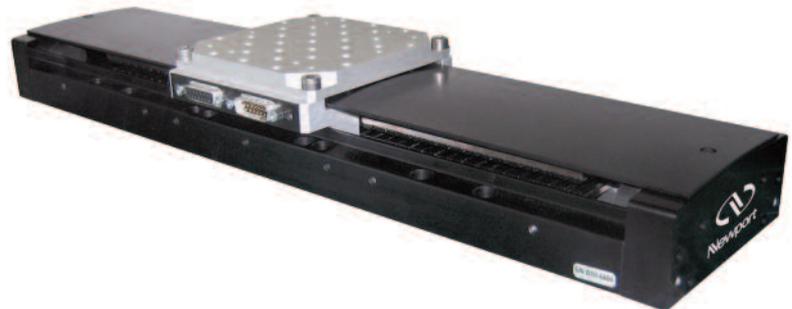
Contact your Newport service facility to request cleaning and specification control every year.

High-Performance Linear Motor Stages

ILS-LM-S Series

1.0 Introduction

This manual provides operating instructions for the stage that you have purchased in the ILS-LM-S Series.



ILS300LM-S Stage.

RECOMMENDATION

We recommend you read carefully the chapters 4.0 and 5.0 for the connection to an electronics, before using an ILS-LM-S stage.

2.0 Description

The ILS-LM-S Series linear stages are designed for self-supporting applications with travel ranges from 100 mm to 300 mm. The stages feature a robust design with high performance but with low cost, making them cost-effective solutions for precision industrial applications such as semiconductor wafer inspection, micro-electronics test and assembly, pick and place, DNA sequencing, or laser machining,

The ILS-LM-S series linear motor stages are designed for self-supporting applications with travel ranges from 100 mm to 300 mm. The stages feature a robust design with high performance but with low cost, making them cost-effective solutions for precision industrial applications such as semiconductor wafer inspection, micro-electronics test and assembly, pick and place, DNA sequencing, or laser machining.

Based on industry proven technology of the ILS, the ILS-LM-S series utilizes an FEM-optimized extruded aluminum body that is extremely stiff, while minimizing the bending effect caused by the different thermal expansion coefficients of the aluminum body and the steel rails. The rails' position relative to the profile's neutral fiber minimize the effect due to bi-metal thermal expansion. The body's rigidity minimizes the deflection under load.

Unlike screw driven stages, the ILS-LM-S employs a centered, high efficiency 3-phase, synchronous ironless, linear motor as the driving element. This drive system is absolutely noise-free and has the advantage of higher speed, high acceleration and high system responsiveness without wear associated with motor brushes or drive screws. And because of the fully integrated linear motor, the ILS-LM-S is more than 150 mm shorter than a comparable screw driven stage. Thus, the ILS-LM-S is the optimum solution for space constrained applications that require high-throughput, high reliability, and ultra-quiet operation.

Recirculating ball bearing slides provide excellent payload capabilities and long life. The movement is smooth with low noise.

Precision position feedback is supplied by a very repeatable linear scale mounted in the stage. The encoder signals are interpolated by Newport's XPS motion controller with nanometer resolution for outstanding position sensitivity, repeatability, and stability. A home position is incorporated on the same scale, avoiding the use of additional electronics or mechanics for improved reliability and accuracy.

2.1 Design Details

Base Material	Extruded Aluminum
Bearings	Recirculating bearings
Drive System	3-phase synchronous ironless linear motor (without Hall effect sensors)
Motor Initialization	Has to be done by the controller. The XPS controller uses an initialization routine to limit the stochastic motions of stages.
Motor Commutation	Done by the controller on encoder feedback
Feedback	Linear steel scale, 20 µm signal period, 1 V _{pp}
Limit	Switches Optical
Home Switch	Optical, on encoder's fiducial track, located at center of travel
Controller Compatibility	ESP
MTBF	20,000 hours

3.0 Characteristics

3.1 Definitions

Specifications of our products are established in reference to ISO 230 standard part II “Determination of accuracy and repeatability of positioning numerically controlled axes”.

This standard gives the definition of position uncertainty which depends on the 3 following parameters:

Absolute Accuracy

Difference between ideal position and real position.

Accuracy

Difference between ideal position and real position after the compensation of linear errors.

Linear errors include: cosine errors, inaccuracy of screw or linear scale pitch, angular deviation at the measuring point (Abbe error) and thermal expansion effects. All Newport motion electronics can compensate for linear errors.

The relation between absolute accuracy and on-axis accuracy is as follows:

$$\text{Absolute Accuracy} = \text{Accuracy} + \text{Correction Factor} \times \text{Travel}$$

Repeatability

Ability of a system to achieve a commanded position over many attempts.

Reversal Value (Hysteresis)

Difference between actual position values obtained for a given target position when approached from opposite directions.

Minimum Incremental Motion (MIM or Sensitivity)

The smallest increment of motion a device is capable of delivering consistently and reliably.

Resolution

The smallest increment that a motion device can theoretically move and/or detect. Resolution is not achievable, whereas MIM, is the real output of a motion system.

Yaw, Pitch

Rotation of carriage around the Z axis (Yaw) or Y axis (Pitch), when it moves.

The testing of accuracy, repeatability, and reversal error are made systematically with test equipment in controlled environment (20^{±1} °C).

A linear cycle with 21 data points on the travel and 4 cycles in each direction gives a total of 168 points.

Guaranteed and Typical Specifications

Guaranteed maximum performance values are verified per Newport's A167 metrology test procedure. For more information, please consult the metrology tutorial section in the Newport catalog or at www.newport.com

3.2 Mechanical Specifications

Travel Range (mm)		100, 200, 300
Minimum Incremental Motion (µm)		0.01
Uni-directional Repeatability, Typical (Guaranteed) ⁽¹⁾ (µm)		0.4
Bi-directional Repeatability, Typical (Guaranteed) ⁽¹⁾ (µm)		±0.12 (±0.30)
Accuracy, Typical (Guaranteed) ⁽¹⁾⁽²⁾ (µm)	ILS100:	±0.5 (±1.5)
	ILS200:	±1.0 (±2.0)
	ILS300:	±1.2 (±2.5)
Maximum Speed (mm/s) [See chapters 3.3 to 3.6]		500 ⁽³⁾
Maximum Acceleration, No Load (m/s ²) [See chapters 3.3 to 3.6]		20
Max. Force (Cont.) (N)		15
Max Force (Peak) 4 s (N)		30
Pitch, Typical (Guaranteed) ⁽¹⁾⁽²⁾⁽⁴⁾ (µrad)	ILS100:	±20 (±100)
	ILS200:	±40 (±135)
	ILS300:	±40 (±150)
Yaw, Typical (Guaranteed) ⁽¹⁾⁽²⁾⁽⁴⁾ (µrad)	ILS100:	±15 (±110)
	ILS200:	±25 (±125)
	ILS300:	±25 (±75)
Load Capacity (N)		250



¹⁾ For the definition of Typical and Guaranteed specifications see "Motion Basics Terminology & Standards" Tutorial at www.newport.com
²⁾ For a travel of 300 mm.
³⁾ With a 44 V driver (such as the XPS-DRV02 board of the XPS controller).
⁴⁾ To obtain arcsec units, divide µrad value by 4.8.



CAUTION

To reach specifications stated, stages must be fixed on a plane surface with a flatness of 5 µm.

3.3 Hard Stoppers: Speed Limitation Versus Load

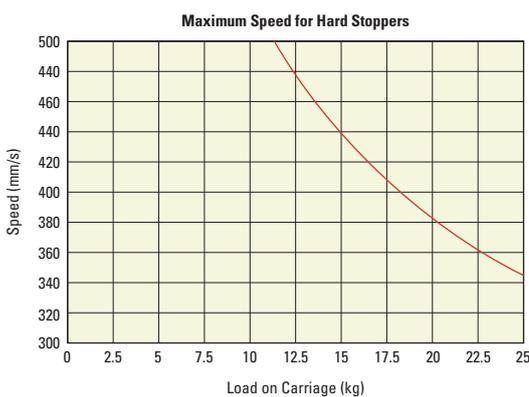
ILS-LM-S stage uses electrical end-of-run and rubber bumper hard stoppers to stop as smoothly as possible the carriage at travel end. The overtravel allowed by the rubber bumpers is 3.5 mm.

When the stage is used with Newport controllers, the factory settings of "software limit" forbid any commanded motion out of travel range.

Nevertheless, for security issue, we recommend to follow the recommendations above to minimize risks of mechanical damage in case of failure or bad adjustment of parameters.

The maximum speed of the stage must be limited so that the rubber bumpers will always stop the carriage in 3.5 mm or less, to avoid any chock between carriage and stage body.

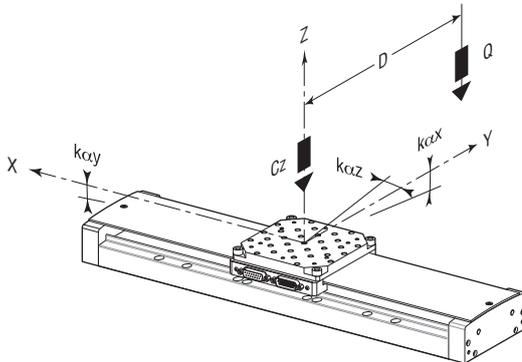
The graph opposite indicates the maximum speed that hard stopper can stop in 8 mm as a function of the load. This graph assumes that a correct wiring of the electrical end of runs will cut motor power before the contact with the rubber bumpers.



3.4 Load Characteristics and Stiffness

Normal Load Capacity (Cz)

Maximum load a stage can move while maintaining specifications.



Cz, Normal centered load capacity	250 N
Kcx, Compliance in roll	15 μrad/Nm
Kcy, Compliance in pitch	10 μrad/Nm
Kcz, Compliance in yaw	10 μrad/Nm
Q, Off-center load (N)	$Q \leq Cz \div (1 + D/60)$
Where D = Cantilever distance (mm)	

3.5 Stage Weights

The stage weights indicated below do not include the cables.

	Weight [lb (kg)]
ILS100LM-S	6.4 (2.9)
ILS200LM-S	8.2 (3.7)
ILS300LM-S	9.9 (4.5)

3.6 Example of Parameters “ScalingAcceleration” & “AccelerationLimit”

This example is based on Newport XPS controller and XPS-DRV02 driver.

Two parameters have to be updated in the parameter file, according to the payload put onto the ILS-LM-S stage:

- The parameter "ScalingAcceleration" is used by the controller to scale the output voltage sent to the driver.

It indicates the theoretical maximum acceleration (friction not taken in account) of the ILS-LM-S carriage when the maximum voltage (10 V) is applied to the driver.

- The parameter "AccelerationLimit" indicates the theoretical maximum acceleration that the controller will be able to require from the ILS-LM-S carriage. It correspond to the ILS-LM-S peak force.

For XPS controller and XPS-DRV02 driver, these parameters can be calculated using the following formulas, where the payload must be entered in kg:

$$\text{ScalingAcceleration(Payload)} = 40305 \frac{\text{mm/s}^2}{(\text{Payload} + 0.9)}$$

Examples: ScalingAcceleration(0) = 44800 mm/s²
 ScalingAcceleration(25) = 1556 mm/s²

$$\text{AccelerationLimit(Payload)} = \frac{\text{ScalingAcceleration(Payload)}}{1.1}$$

Examples: AccelerationLimit(0) = 40.727 mm/s²
 AccelerationLimit(25) = 1712 mm/s²

These formulas are explained below:

Inputs from the system

- Motor:
 - Motor force constant: $MotorForceConstant = 11.4 \text{ N/Amp. rms}$
 - Motor thermal resistance: $MotorRth = 1.8 \frac{\text{K}}{\text{Watt}}$
 - Motor constant at 300 K: $MotorK = 18.3 \frac{\text{Newton}^2}{\text{Watt}}$
- Driver:

XPS-DRV02 driver is using sine/cosine commutation on its input. Its maximum current of 5 A is obtained for a 10 V input, so:

$$MaxDriverCurrent = 5 \text{ Amp.}$$

$$TransImpedenceDriver = 0.5 \text{ Amp./V}$$

- Mechanics:
 - ILS-LM-S carriage mass: $Mcar = 0.4 \text{ kg}$
 - Interface plate mass: $Mint = 0.5 \text{ kg}$

- System:

ILS-LM-S rms force is defined to keep motor heating below 25 °C:

$$ILS_RmsForce = \sqrt{\frac{25 \cdot MotorK}{MotorRth}}$$

$$ILS_RmsForce = 15 \text{ Newtons}$$

ILS-LM-S peak force is defined to allow two time the rms force. This value is lower than the theoretical peak force of the motor:

$$ILS_PeakForce = 30 \text{ Newtons}$$

The rms current limitation of the driver is set according to ILS-LM-S rms force:

$$DriverMaximumRMSCurrent = \frac{ILS_RmsForce}{MotorForceConstant}$$

$$DriverMaximumRMSCurrent = 1.32 \text{ A rms}$$

The peak current limitation of the driver is set according to ILS-LM-S peak force:

$$DriverMaximumPeakCurrent = \min\left(\frac{ILS_PeakForce}{MotorForceConstant} \sqrt{2} \cdot 1.05, MaxDriverConstant\right)$$

$$DriverMaximumPeakCurrent = 3.9 \text{ A}$$

The integration time of the driver I²t limitation is set to allow to apply the peak current for 4 seconds. This is obtained with an integration time of 10 s, which is lower than the motor thermal time constant.

$$DriverRMSIntegrationTime = 10 \text{ s}$$

Inputs from the user

- Load on the carriage: $Load = 0 \text{ kg}$

Calculation

- **MovingMass:**

$$MovingMass = Mcar + Mint + Load$$

- **ScalingAcceleration:**

$$ScalingAcceleration = \frac{MotorForceConstant \cdot 10 \text{ Volts} \cdot TransImpedenceDriver}{\sqrt{2} \cdot MovingMass}$$

$$ScalingAcceleration = 44800 \text{ mm/s}^2$$

- **LimitAcceleration:**

$$LimitAcceleration = ScalingAcceleration \cdot \frac{DriverMaximumPeakCurrent}{MaxDriverCurrent} \cdot \frac{1}{1.05}$$

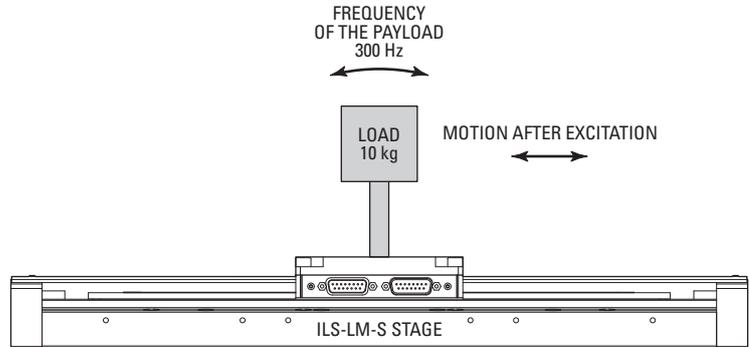
$$LimitAcceleration = 23670 \text{ mm/s}^2$$

3.7 Estimated Moving Mass for ILS-LM-S Stages

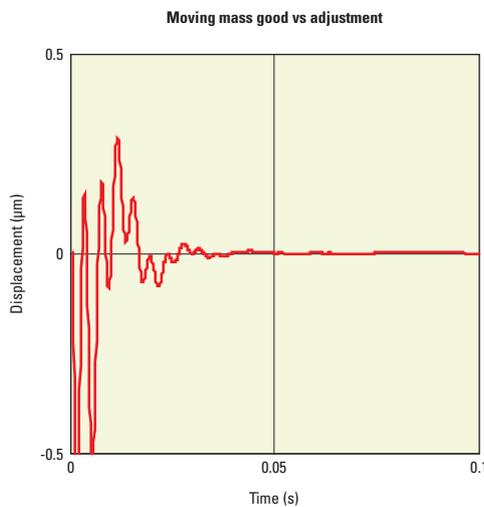
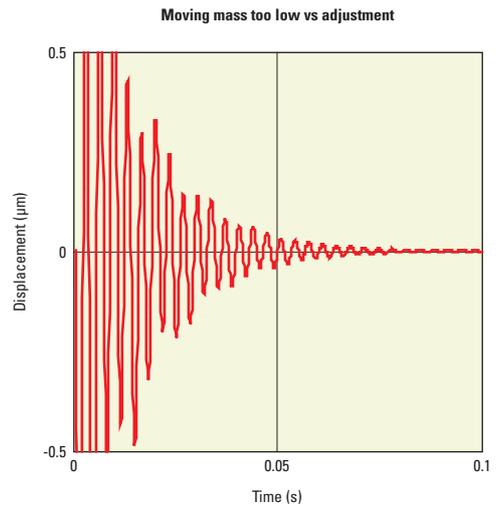
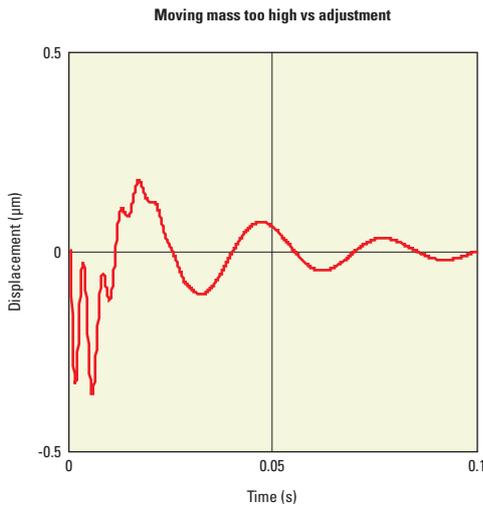


CAUTION

ILS-LM-S stages with linear motor are sensitive to the load variation and its stiffness. The example below shows the behavior of the displacement in accordance with the underestimated/overestimated moving mass.



Driving in force requires a good adjustment of the controller/driver theoretical acceleration parameter (ScalingAcceleration) which depends on the moving mass.



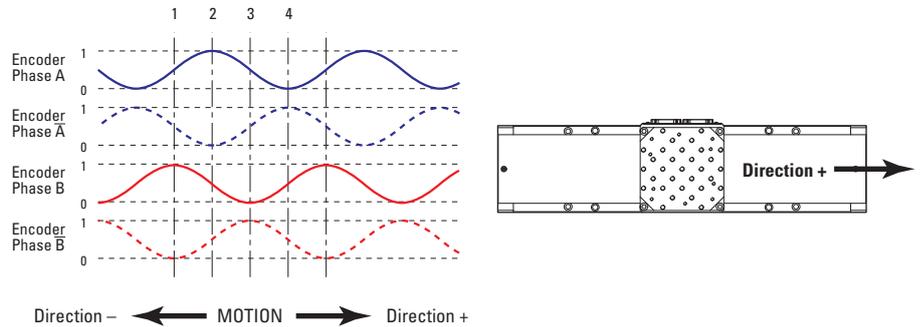
4.0 Drive and Motor

4.1 Motor Characteristics

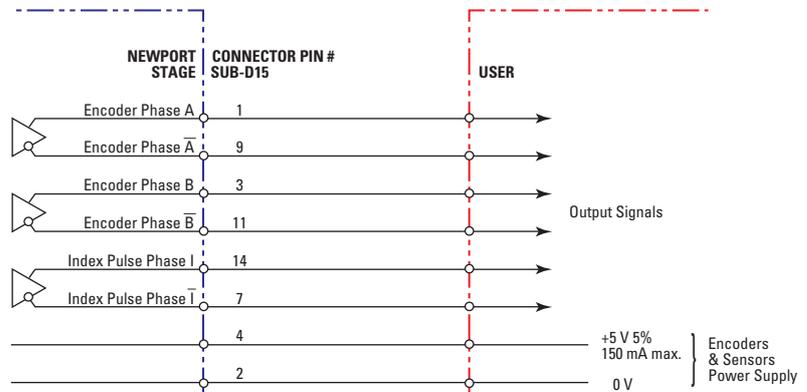
ILS-LM-S stages are equipped with a brushless DC-motor (3-phase synchronous ironless linear motor) and a linear steel scale.

	Motor Constant (N ² /W)	Magnet Pitch (mm)	Nominal Voltage (V)	Max. RMS Current (A)	Max. Peak Current (A)	Resistance per Phase (Ω)	Inductance per Phase (mH)
ILS-LM-S	18.3	16.5	48	1.3	3.9	2.4	0.38

4.2 Feedback Signal Position



The incremental sensor consists of an optical scale and an encoder head. When the carriage moves, the encoder head generates sine-cosine signals in quadrature, sent to pins #1, #3, #9 and #11 of the SUB-D15 connector.

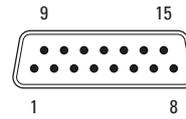


“Encoder” and “Index Pulse” are “differential pair” (type RS-422) type output signals. Using these signals permits a high immunity to noise. Emission circuits generally used by Newport are 26LS31 or MC3487. Reception circuits to use are 26LS32 or MC3486.

4.3 Pinouts

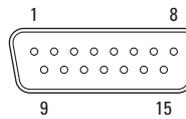
The pinout diagrams for ILS-LM-S stages connectors are shown below.

4.3.1 Motor Connector



SUB-D15F	
1	Ground
2	Phase M Motor
3	Mechanical Zero
4	- End-of-Run
5	Ground
6	N.C.
7	N.C.
8	N.C.
9	Phase N Motor
10	Phase L Motor
11	+ End-of-Run
12	+5 V
13	N.C.
14	N.C.
15	N.C.

4.3.2 Encoder Connector



SUB-D15M	
1	Encoder Phase A
2	Ground
3	Encoder Phase B
4	+5 V
5	N.C.
6	N.C.
7	Index Pulse /I
8	N.C.
9	Encoder Phase /A
10	N.C.
11	Encoder Phase /B
12	N.C.
13	N.C.
14	Index Pulse I
15	N.C.

4.4 Cables

The ILS-LM-S stages are supplied without cables.

The appropriate cable kit must be ordered separately, in accordance with the XPS controller configuration used. Please refer to our website for ordering information.



WARNING

The ILS-LM-S Series stages operate only with 5-meter max. cables.



WARNING

Cables of the kits are shielded correctly. For a correct operation, make sure to lock connectors (ground continuity provided by the cable).



WARNING

Keep these cables at a safe distance from other electrical cables in your environment to avoid potential cross talk.

5.0 Connection to Newport Controllers

5.1 Warnings on Controllers

Controllers are intended for use by qualified personnel who recognize shock hazards and are familiar with safety precautions required to avoid possible injury. Read the controller user's manual carefully before operating the instrument and pay attention to all written warnings and cautions.

WARNING

Disconnect the power plug under the following circumstances:

- If the power cord or any attached cables are frayed or damaged in any way.
- If the power plug is damaged in any way.
- If the unit is exposed to rain, excessive moisture, or liquids are spilled on the unit.
- If the unit has been dropped or the case is damaged.
- If you suspect service or repair is required.
- Whenever you clean the electronics unit.

CAUTION

To protect the unit from damage, be sure to:

- Keep all air vents free of dirt and dust.
- Keep all liquids away from the unit.
- Do not expose the unit to excessive moisture (85% humidity).
- Read this manual before using the unit for the first time.



WARNING

All attachment plug receptacles in the vicinity of this unit are to be of the grounding type and properly polarized.

Contact your electrician to check your receptacles.

WARNING

This product is equipped with a 3-wire grounding type plug.

Any interruption of the grounding connection can create an electric shock hazard.

If you are unable to insert the plug into your wall plug receptacle, contact your electrician to perform the necessary alterations to ensure that the green (green-yellow) wire is attached to earth ground.

WARNING

This product operates with voltages that can be lethal.

Pushing objects of any kind into cabinet slots or holes, or spilling any liquid on the product, may touch hazardous voltage points or short out parts.

5.2 Connection

There is a label on every stage indicating its part and serial numbers.



WARNING

Always turn the controller's power OFF before connecting to a stage.

NOTE



These stages are ESP compatible. Enhanced System Performance is Newport's exclusive technology that enables Newport ESP motion controllers to recognize the connected Newport ESP stage and upload the stage parameters. This ensures that the user can operate the motion system quickly and safely.

5.3 Wiring

The ILS-LM-S stages are supplied without cables (see chapter 4.4: "Cables").

6.0 Connection to Non-Newport Electronics

6.1 Connections

WARNING

Newport is not responsible for malfunction or damage of ILS-LM-S stages when used with non-Newport controllers.



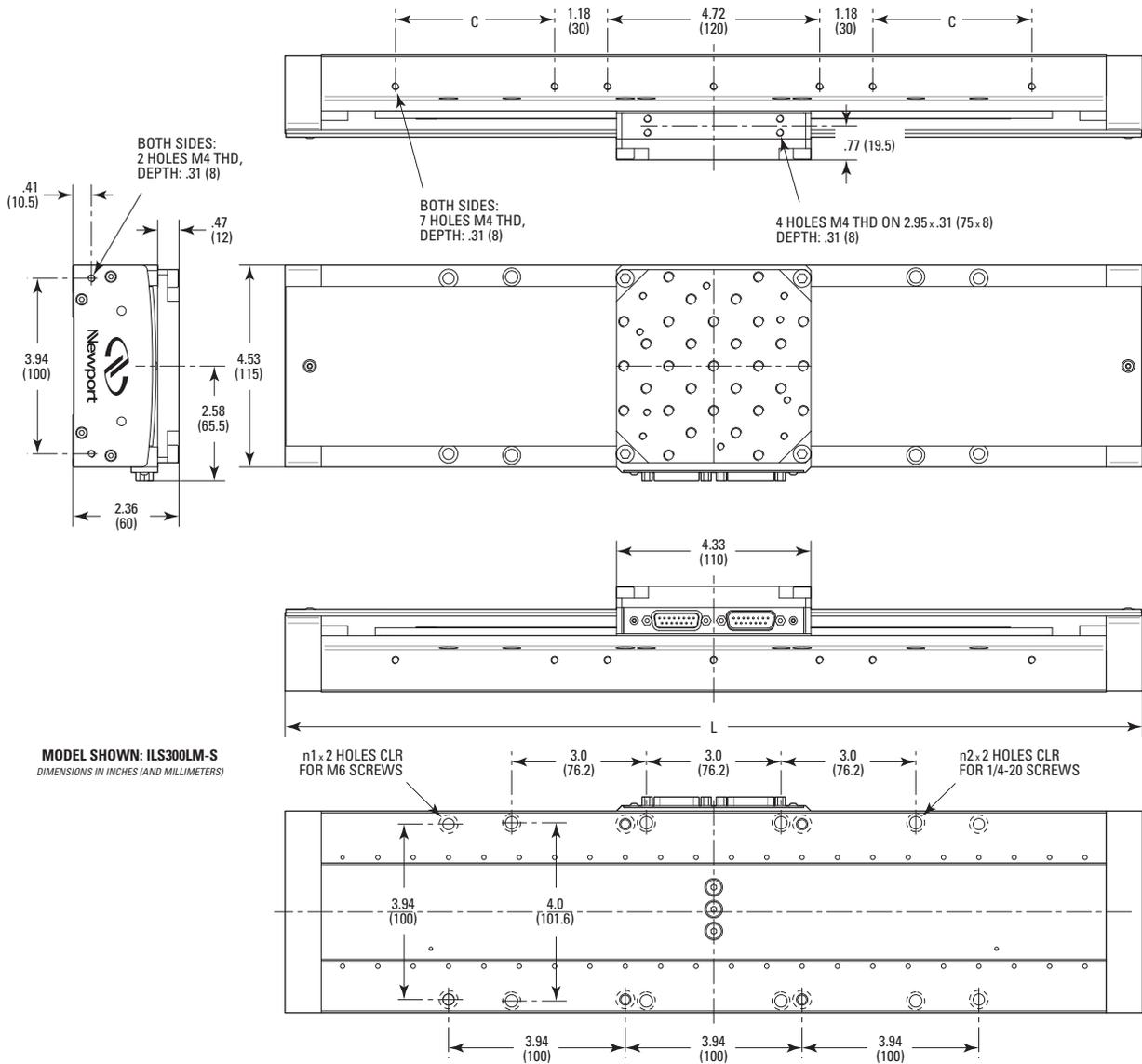
WARNING

Newport guarantees “CE” compliance of ILS-LM-S stages only if used with the appropriate Newport cable kit and a XPS series controller.

It is the customer's responsibility to modify the cable and take care of sensor signal connections, when using the stage with non-Newport controllers.

7.0 Dimensions

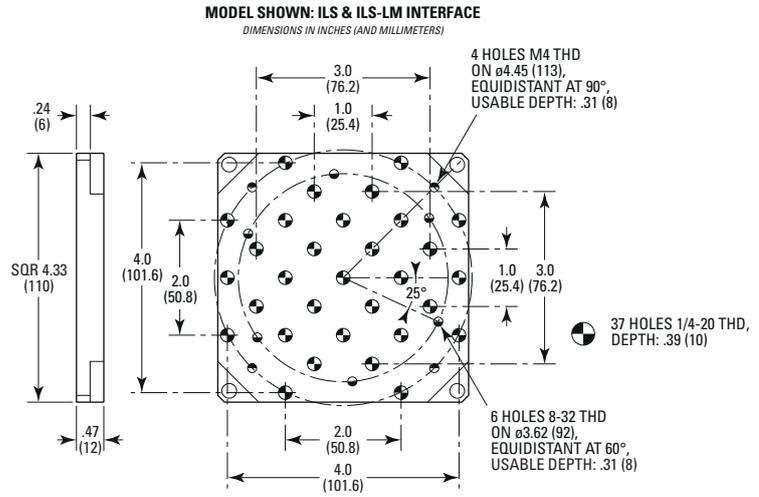
7.1 (M-)ILS-LM-S Stages



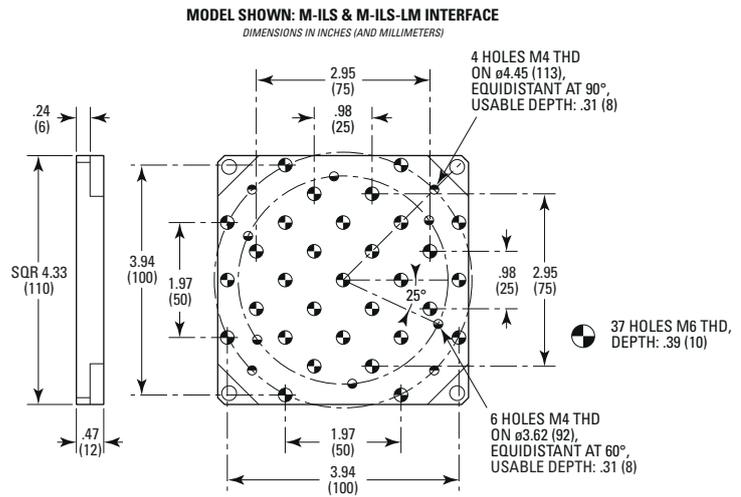
MODEL (METRIC)	n1	n2	C	TRAVEL	L
(M-)ILS100LM-S	2	2	1.08 (27.5)	3.94 (100)	11.22 (285)
(M-)ILS200LM-S	4	4	2.76 (70)	7.87 (200)	15.16 (385)
(M-)ILS300LM-S	4	4	3.54 (90)	11.8 (300)	19.09 (485)

7.2 Top Plate Interfaces

ILS-LM-S Stages Top Plate Interface



M-ILS-LM-S Stages Top Plate Interface



8.0 Maintenance

RECOMMENDATION

Please contact Technical Sales Support team for recommendations on application specific maintenance.

8.1 Maintenance

The ILS-LM-S stage requires no particular maintenance. Nevertheless, this is a precision mechanical device that must be kept and operated with caution.

PRECAUTIONS

The ILS-LM-S stage must be used or stocked in a clean environment, without dust, humidity, solvents or other substances.

RECOMMENDATION

It is recommended to return the stage to Newport for re-lubrication after 2000 hours of use.

If the ILS-LM-S stage is mounted on a workstation and cannot be easily removed, please contact Newport's After Sales Service for further instructions.

8.2 Repair

CAUTION



Never attempt to disassemble a component of the stage that has not been covered in this manual.

To disassemble a non specified component can cause a malfunction of the stage.

If you observe a malfunction in your stage, please contact us immediately to arrange for a repair.

CAUTION



Any attempt to disassemble or repair a stage without prior authorization will void your warranty.

8.3 Calibration

CAUTION



It is recommended to return your ILS-LM-S stage to Newport once a year for recalibration to its original specifications.



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www.newport.com

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