



EUROPEAN UNION
European Structural and Investing Funds
Operational Programme Research,
Development and Education



MINISTRY OF EDUCATION,
YOUTH AND SPORTS

PURCHASE CONTRACT

This purchase contract ("**Contract**") was concluded pursuant to section 2079 *et seq.* of the act no. 89/2012 Coll., Civil Code, as amended ("**Civil Code**"), on the day, month and year stated below by and between:

(1) Institute of Physics of the Academy of Sciences of the Czech Republic, a public research institution,

with its registered office at: Na Slovance 2, Praha 8, 182 21, Czech Republic

registration no.: 68378271

represented by: RNDr. Michael Prouza, Ph.D. – director

(„**Buyer**”); and

(2) MIT, spol. s. r. o

with its registered office at: Klánova 71/56, 147 00 Praha 4, Czech Republic

registration no.: 463 483 95

represented by: Martin Moser, managing director

enrolled in the commercial registered kept by Municipal court in Prague, section C, insert No. 10259

(„**Seller**”).

(The Buyer and the Seller are hereinafter jointly referred to as „**Parties**” and individually as “**Party**”.)

WHEREAS

The Buyer is a public contracting authority and the beneficiary of a grant of the Ministry of Education, Youth and Sports of the Czech Republic within the Operational Programme Research, Development and Education. The Buyer carries out a project financed by the grant specified herein in this provision („**Project**”).

(A) For the successful realization of the Project it is necessary to purchase the Object of Purchase (as defined below) in accordance with the Rules for the Applicants and Recipients within the Operational Programme Research, Development and Education.

(B) The Seller wishes to provide the Object of Purchase to the Buyer for consideration.



- (C) The Seller's bid for the public procurement entitled „ **Optical delay lines kits for ultrashort laser pulses**”, whose purpose was to procure the Object of Purchase („**Public Procurement**”), was selected by the Buyer as the most suitable.
- (D) The Seller acknowledges that the Buyer is not, in connection to the subject matter of this Contract, an entrepreneur, and also that the subject matter of this Contract is not related to any business activities of the Buyer.
- (E) The documentation necessary for the execution of the Contract is
- Technical Specification, which forms an integral part hereof as its Annex No. 1 (hereinafter the “TS”); this TS also formed a part of the tender documentation for the Public Procurement in the form of Annex No. 3 of the tender documentation;
 - The Seller's bid, which forms an integral part hereof as its Annex No. 2 (hereinafter the “Seller's Bid”).

IT WAS AGREED AS FOLLOWS:

BASIC PROVISIONS

- 1.1 Under this Contract the Seller shall deliver to the Buyer a device as described and defined in Annex 1 (Technical Specification) to this Contract in the required quality, and with the properties and related performance described therein („**Object of Purchase**”) and shall transfer to the Buyer ownership right to the Object of Purchase, and the Buyer shall take over the Object of Purchase and shall pay the Seller the Purchase Price (as defined below), all under the terms and conditions stipulated in this Contract.
- 1.2 Under this Contract the Seller shall also carry out the following activities („**Related Activities**”):
- a) Transport and delivery the Object of Purchase to the place of delivery (Art. 2.2 of the Contract);
 - b) Cooperate with the Buyer during the performance of this Contract.

2. THE TIME AND PLACE OF DELIVERY

- 2.1 The Seller shall deliver the Object of Purchase and shall carry out Related Activities within **eight (8) weeks** from the effectiveness of this Contract, unless stipulated otherwise in this Contract. The time of delivery is stipulated



herein in favour of the Buyer. The Buyer is entitled to prolong the time for delivery Object of Purchase and for carrying out Related Activities for two (2) more months, should there be important reasons for that on the side of the Buyer, such as, but not only, impossibility to take over the Object of Purchase at the Buyer's premises due to reconstruction works taking place there.

- 2.2 The place of delivery shall be Fyzikální ústav AV ČR, v.v.i - HiLASE Centrum, Za Radnicí 828, 252 41 Dolní Břežany, Czech Republic or any other address in Dolní Břežany, Czech Republic, which the Buyer communicated to the Seller prior to the delivery of the Object of Purchase.
- 2.3 The Seller acknowledges that the deadlines stated in this Article are of essential importance to the Buyer with respect to the timeline of the Project with respect to the deadline by which the Project are to be implemented, and that the Buyer could incur damage as a result of failure to meet the above stipulated deadlines.

3. THE OWNERSHIP RIGHT

The ownership right to the Object of Purchase shall be transferred to the Buyer upon the signature of the Hand – over protocol (delivery note).

4. PRICE AND PAYMENT TERMS

- 4.1 The purchase price for the Object of Purchase is **40.000,- EUR („Purchase Price”) excluding VAT.**
- 4.2 The Purchase Price cannot be exceeded and includes all costs and expenses of the Seller related to the performance of this Contract. The Purchase Price includes, among others, all expenses related to the handover of the Object of Purchase and execution of Related Activities, costs of copyright, insurance, customs, warranty service and any other costs and expenses connected with the performance of this Contract.
- 4.3 The Purchase Price for the Object of Purchase shall be paid on the basis of a tax document – invoice, to the account of the Seller designated in the invoice. The Purchase Price shall be paid only after the Hand – over protocol is signed.
- 4.4 The Buyer shall realize payments on the basis of duly issued invoice within thirty (30) calendar days from their receipt. If the Seller stipulates any shorter due period of the invoiced amount in the invoice, such different due period shall not be deemed relevant and the due period stipulated herein prevails. The invoice shall be issued only after the Hand – over protocol signature. .



4.5 The invoice issued by the Seller as a tax document must contain all information required by the applicable laws of the Czech Republic. Invoices issued by the Seller in accordance with this Contract shall contain in particular following information:

- Name and registered office of the Buyer,
- c) Tax identification number of the Buyer,
- d) Name and registered office of the Seller,
- e) Tax identification number of the Seller,
- f) Registration number of the tax document,
- g) Scope of the performance under this Contract (including the reference to this Contract),
- h) Date of the issue of the tax document,
- i) Date of the fulfilment of the Contract,
- j) Purchase Price,
- k) Registration number of this Contract, which the Buyer shall communicate to the Seller based on Seller's request before the issuance of the invoice,
- l) Declaration that the performance of the Contract is for the purposes of the Project; the exact details of the Project including name and reg. number will be communicated to the Seller based on Seller's request which shall be sent to the Buyer to following e-mails: [REDACTED] and [REDACTED] before an invoice is issued. Seller shall issue an electronic invoice and send it to following e-mails [REDACTED] and [REDACTED] for preliminary check. After the preliminary check the Seller shall send the final electronic invoice to efactory@fzu.cz,

and must also comply with any double taxation treaties applicable to the given case.

4.6 The last invoice in each calendar year must be delivered by the Seller to the Buyer's no later than by December 15 of the given calendar year. In case that the invoice shall not contain the above mentioned information or the invoice does not comply with the requirements stipulated by law or the invoice is delivered to the Buyer later than by December 15 of the given calendar year, the Buyer is entitled to return it to the Seller during its maturity period and this shall not be considered as a default. The new maturity period shall begin from the receipt of the supplemented or corrected invoice to the Buyer.



4.7 The Buyer's invoicing details are set out in provision (1) hereof.

5. **SELLER'S RIGHTS AND DUTIES**

5.1 The Seller shall ensure that the Object of Purchase and Related Activities are in compliance with this Contract including all its annexes and applicable legal (e.g. safety), technical and quality norms.

5.2 During the performance of this Contract, the Seller proceeds independently. If the Seller receives instructions from the Buyer, the Seller shall follow such instructions unless these are against the law or in contradiction to this Contract. If the Seller, while exercising due professional care, finds out or should have found out that the instructions are for any reason inappropriate or illegal or in contradiction to this Contract, then the Seller must notify the Buyer.

5.3 All things necessary for the performance of this Contract shall be procured by the Seller, unless this Contract stipulates otherwise.

6. **HANDOVER OF THE OBJECT OF PURCHASE**

6.1 Handover and takeover of the Object of Purchase shall be realized on the basis of hand-over protocol ("**Hand – over protocol**") which shall be signed during Object of Purchase delivery and which shall contain following information:

- identification of the Seller, the Buyer and all subcontractors, if there are any,
- description of the Object of Purchase,
- the list of defects and deficiencies of the Object of Purchase, if there are any, and the deadlines for their removal,
- the signature and the date of the hand-over.

6.2 Instructions and manuals related to all items of the Object of Purchase shall be attached to the Hand-over protocol at the latest.

6.3 If the Seller fails to duly carry out all Related Activities or if the Object of Purchase does not fully meet requirements of this Contract, the Buyer is entitled to refuse the takeover of the Object of Purchase. In such a case, the Seller shall remedy the deficiencies within thirty (30) calendar days, unless



Parties agree otherwise. The Buyer is entitled (but not obliged) take over the Object of Purchase despite the above mentioned deficiencies, in particular if such deficiencies do not prevent the Buyer in the proper operation of the Object of Purchase. In such a case, the Seller and the Buyer shall list the deficiencies in the Hand-over protocol, including the manner and the date of their removal (remedy). If the Parties do not reach agreement in the Hand-over protocol regarding the date of the removal, the Seller shall remove the deficiencies within fourteen (14) calendar days.

6.4 Parties hereby exclude application of section 2126 of the Civil Code.

7. **WARRANTY**

7.1 The Seller hereby provides a warranty of quality of the Object of Purchase for the period of 60 months.

7.2 The warranty period shall commence on the day of the signature of the Hand-over protocol by both Parties. However, if the Object of Purchase is taken over with defects or deficiencies, the warranty period shall commence on the date of the removal of the last defect or deficiency by the Seller.

7.3 The Seller shall remove defects that occur during the warranty period free of charge.

7.4 If the Buyer ascertains a defect of the Object of Purchase during the warranty period, the Buyer shall notify such defect without undue delay to the Seller (“**Warranty Claim**”). Defects may be notified on the last day of warranty period, at the latest; an e-mail is considered an adequate way to initiate a Warranty Claim. Warranty Claim sent by the Buyer on the last day of the warranty period shall be deemed to be made in time.

7.5 The Buyer notifies defects in writing via e-mail. The Seller shall accept notifications of defects on the following e-mail address: [REDACTED]

7.6 In the Warranty Claim the Buyer shall describe the defect and the manner of removal of the defect. The Parties shall agree on the manner of defect’s/defects’ removal. If the Parties do not reach the agreement, the Buyer has the right to:

request removal of the defect/defects by the delivery of Object of Purchase or its individual parts, or

m) request removal of the defect/defects by repair, or

n) request adequate discount from the Purchase Price.



1. The choice among the above mentioned rights shall be made by the Buyer. However, in case of a removable defect/defects that occur/occurs for the first time the Buyer shall not request removal of the defect by delivery of new Object of Purchase or its individual parts.
- 7.7 The Seller shall remove the defect within thirty (30) calendar days from the date on which the Warranty Claim was notified to the Seller, at the latest, unless the Buyer and the Seller agree otherwise.
- 7.8 The Seller shall remove defect/defects of the Object of Purchase within periods stated in the Contract also in the instances when the Seller is of the opinion that he is not liable for such defects. In cases when the Seller will not recognize the defect and the Buyer will not agree with such conclusion, the validity of the Warranty Claim shall be ascertained by an expert, which is to be commissioned by the Buyer but with whom the Supplier also must agree. In the event the expert declares the Warranty Claim as justified, the Seller shall bear the costs of the expert's assessment. If the Warranty Claim is raised unjustly according to expert's assessment, the Buyer shall reimburse the Seller all reasonably incurred costs associated with removing the defect/defects.
- 7.9 Parties shall execute a protocol on the removal of the defect, which shall contain the description of the defect/defects and the confirmation that the defect/defects was/were removed. The warranty period shall be extended by the time that expires from the date of exercising the Warranty Claim until the defect/defects is/are removed in cases where the Buyer was prevented from using the Object of Purchase for its intended purpose.
- 7.10 In case that the Seller fails to remove the defect/defects within time stipulated in this Contract or if the Seller refuses to remove the defect/defects, then the Buyer is entitled to remove the defect/defects at his own costs and the Seller shall reimburse these costs within thirty (30) calendar days after the Buyer's request to do so.
- 7.11 The warranty does not cover defects caused by unprofessional handling or by the failure to follow Seller's instructions for the operation and maintenance of the Object of Purchase.
- 7.12 Parties exclude application of the section 1925 (the sentence behind semi-colon) of the Civil Code.
- 7.13 The Seller shall provide to the Buyer technical support (consultation of operational, maintenance and other issues regarding the Object of Purchase) free of charge on the phone no.: [REDACTED]



8. **TERMINATION, RIGHT OF WITHDRAWAL, CONTRACTUAL PENALTIES**

- 8.1 This Contract may be terminated by completing the performance required hereunder, by agreement of the Parties or by withdrawal from the Contract on the grounds stipulated by law or in the Contract.
- 8.2 The Buyer is entitled to withdraw from this Contract, if any of the following circumstances occur:
- (a) the Seller has materially breached obligations imposed by the Contract, specifically by being in delay with the fulfilment of this Contract and such delay lasts more than 4 weeks; or
 - (b) the Seller has materially breached obligations imposed by the Contract, specifically Object of Purchase fails to meet technical parameters and qualities or other requirements defined in the Annex 1 (Technical Specification);
 - (c) the insolvency proceeding is initiated against the Seller's assets;
 - (d) the funding body providing finances for the Project ("Financial subsidy") or any other control body determines that the expenditures or part of the expenditures incurred on the basis of this Contract are ineligible;
 - (e) the Financial subsidy for implementation of the Project is withdrawn from the Buyer; or
 - (f) should it become apparent that the Seller provided information or documents in the Seller's bid, which were not true and which could, therefore, influence the outcome of the Procurement Procedure leading to the conclusion of this Contract (Section 223(2)(b) of the Act No. 134/2016 Coll., on public procurement).
- 8.3 The Seller is entitled to withdraw from the Contract in the event of material breach of the Contract by the Buyer and in case of events outside the control of the Seller (e.g. natural disasters, etc.).
- 8.4 In the event the Seller is in delay with term of delivery as stipulated in Art. 2 herein, the Seller shall pay to the Buyer the contractual penalty in the amount of 0.1% of the Purchase Price for each, even commenced calendar day of delay.
- 8.5 In the case where the Seller fails to remove defects within the periods stipulated in the Contract, the Seller shall pay to the Buyer a contractual



penalty in the amount of 100,- EUR for each defect and for each calendar day of delay.

- 8.6 If the Buyer fails to pay the Purchase Price vices within the deadlines set out in this Contract, the Buyer shall pay the Seller interest on delay in the amount set forth by the law for each day of delay unless the Buyer proves that the delay with the payment of the Purchase Price was caused by late release of the Financial subsidy for the Project by the funding body.
- 8.7 The obliged Party must pay any contractual penalty/penalties to the entitled Party not later than within fifteen (15) calendar days of the date of receipt of the relevant claim from the other party.
- 8.8 Payment of the contractual penalties pursuant to this Article shall in no way prejudice the Buyer's right to claim compensation for damage incurred by the Buyer as a result of the Seller's breach of obligations to which the penalty applies.
- 8.9 The Parties have agreed that the maximal amount of contractual penalties shall be limited to 10% of the Purchase Price.
- 8.10 The Buyer is entitled to set off by unilateral declaration any of its receivable or part of its receivable resulting from contractual penalty/contractual penalties against Seller's claim to pay Purchase Price.

9. SPECIAL PROVISIONS

By signing this Contract, the Seller becomes a person that must cooperate during the finance control within the Act no. 320/2001 Coll., on finance control in the public administration, as amended, and shall provide to the Directing Body of the Operational Programme Research, Development and Education or other control bodies (such as, but not only, European Commission, European Court of Auditors) access to all parts of the bid, Contract or other documents that are related to the legal relationship formed by this Contract. This duty also covers documents that are subject to the protection in accordance with other acts (business secrets, secret information, etc.) provided that control bodies fulfil requirements stipulated by these acts. The Seller shall secure that all its subcontractors are also obliged to cooperate with control bodies in the above stipulated extent. The Seller shall secure that all its subcontractors are also obliged to cooperate with control bodies in the above stipulated extent. The Seller is obliged to duly archive all written material prepared in connection with the execution of this Contract and to provide access to the Buyer to these archived documents until 2027; any finance control may also be carried out until year 2027.



10. FINAL PROVISIONS

- 10.1 This Contract is governed by the laws of the Czech Republic, especially by the Civil Code.
- 10.2 All disputes arising out of this Contract or out of legal relations connected with this Contract shall be preferably settled by a mutual negotiation. In case that the dispute is not settled within sixty (60) calendar days, such dispute shall be decided by courts of the Czech Republic in the procedure initiated by one of the Parties.
- 10.3 All modifications and supplements of this Contract must be carried out in writing as numbered amendment/amendments.
- 10.4 In the event that any of the provisions of this contract shall later be shown or determined to be invalid, putative, ineffective or unenforceable, then such invalidity, putativeness, ineffectiveness or unenforceability shall not cause invalidity, putativeness, ineffectiveness or unenforceability of the Contract as a whole. In such event the Parties undertake without undue delay to subsequently clarify any such provision using Sec 553(2) of the Civil Code, or to replace after mutual agreement such invalid, putative, ineffective or unenforceable provision of the Contract by a new provision, that in the extent permitted by the laws and regulations of the Czech Republic, relates as closely as possible to the intentions of the Parties to the Contract at the time of creation hereof.
- 10.5 The Parties agree that the Seller shall not be entitled to set off any part of its receivable, or receivable of its sub-debtor against the Buyer or any of his receivables, unless this Contract stipulates otherwise. The Seller shall not be entitled to assign any receivable arising in connection herewith to a third party. The Seller shall not be entitled to assign any rights or obligations arising to him hereunder or any of its parts to third parties.
- 10.6 The Parties declare that they accept the “risk of changed circumstances” within the meaning of Sec 1765(2) of the Civil Code.
- 10.7 The Parties declare that they shall maintain confidentiality with respect to all facts and information they learned in connection with the Contract or during the performance of the Contract, and the disclosure of such facts or information could cause damage to the other Party. This confidentiality provision does not affect duties of Parties with respect to applicable legislation.
- 10.8 This Contract shall constitute complete agreement of the Parties on the Contract subject matter including the Object of Purchase and shall substitute



any and all possible previous discussions, negotiations and agreements of the Parties related to the Contract subject matter including the Object of Purchase.

10.9 This Contract is executed in four (4) counterparts and every Party shall receive two (2) counterparts.

10.10 The following Annexes form an integral part of the Contract:

- **Annex No. 1:** Technical Specification Document (if Annex 1 uses the term “Contracting Authority” or “contracting authority” it means Buyer. If Annex 1 uses the term “Supplier” or “supplier”, it means Seller);
- **Annex No. 2:** Seller’s Bid

In case of any discrepancies between this Contract and any of its annexes (Annex No. 1 and/or Annex No. 2), the provisions of this Contract shall prevail. In case of any discrepancies between Annex No. 1 and Annex No. 2, the provisions of Annex No. 1 shall prevail except for those provisions of Annex No. 2, which were evaluated within the Public Procurement under the quality performance criteria and which are also listed on the cover sheet of the Seller’s Bid.

10.11 The Parties agree to publish the full text of this Contract, including its annexes, in the Register of Contracts pursuant to Act No. 340/2015 Coll., on Special Conditions for the Effectiveness of Certain Contracts, the Disclosure of These Contracts and the Register of Contracts, as amended (Act on the Register of Contracts).

10.12 This Contract shall become valid on the date of the signature of both Parties. The Contract shall become effective on the date of its publication at Register of Contracts.

11. Representatives of the Parties

11.1 The Seller has appointed the following authorised representatives for communication with the Buyer in relation to the subject of performance hereunder:

In technical matters: [REDACTED]



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11.2 The Buyer has appointed the following authorised representatives for communication with the Seller in relation to the subject of performance hereunder:

In technical matters: [REDACTED]

IN WITNESS WHEREOF attach Parties their handwritten signatures:

Buyer

Seller

Signature:

Name:

Position:

Date:

Signature:

Name:

Position:

Date:



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ANNEX NO. 1

TECHNICAL SPECIFICATION

(NOTE: Annex No 3 to the Invitation to bid for the Public Procurement shall be attached hereto by the Contracting Authority before signature hereof by the Contracting Authority after the Public Procurement procedure is finished)

Optical delay lines kits for ultrashort laser pulses

This tender applies to the purchase of 6 optical delay line (ODL) kits for pulsed lasers of different wavelengths and pulse durations. Each ODL kit must be new, adapted for the use of the corresponding laser parameters and meet requirements specified in the tables hereafter in terms of reflectivity, resistance to laser induced-damage, and low group delay dispersion (GDD). The ODL lines must be double-pass optical delay lines.

The 6 ODL kits are split into 3 groups corresponding to 3 different laser systems associated with each group (specified below). The optical delay must be computer-controllable and tunable between 0 and at least 500 ps and with an accuracy (error comprising **both** the on-axis absolute accuracy and bidirectional repeatability of the stage) of

- less than or equal to **16 fs for group 1** (containing 3 ODL kits);
- less than or equal to **16 fs for group 2** (containing 1 ODL kit);
- and less than or equal to **2 fs for group 3** (containing 2 ODL kits).

The inherent delay (at 0 stage displacement), must be the same (± 10 ps) for all the optical delay lines within one group.

We require **at least** one controller per group of ODL kit. **Within one group**, it must be possible to control all the ODL kits simultaneously with a single, provided, software. Controllers and softwares may be different between groups (but must be identical within one group). Also, each group of ODL kit will be associated with a different computer. We therefore require the possibility to install the appropriate delay-control software(s) on at least 3 different computers.

Each of the 6 ODL kits must be composed of

- a precise, motorized and computer controlled uniaxial displacement stage;
- the necessary controller(s) of the stage with proper connections to the stage and to a computer;
- an appropriate power supply;
- a user-friendly software to control and vary the optical delay;
- all optomechanics, optics, screws, etc. to built the necessary reflection systems on the stage and partly, if needed, out of the stage. All the optics involved must be adapted for the laser parameters (beam size, peak intensity, anti-reflection coating, GDD, etc.) associated to each ODL kit (see tables hereafter);
- at least 3 mounted apertures centred to the same height (relative to the plane of the optical table where the ODL kits will be installed) to precisely align the system.

For each ODL kit, the necessary reflecting systems considered in this description must be split into 2 parts:

- the movable reflecting part, which can be fastened on the moving base of the displacement stage;
- and the entrance reflecting part to be fastened on another, fixed, part of the stage or on the optical table of the Contracting Authority (metric, M6 threaded holes).

To have sufficient degree of freedom for the optical alignment, at least one of these 2 reflecting parts (either the entrance reflecting part or the movable reflecting part) must be composed of 2 separated mirrors, each of them properly mounted and centred, at **fixed and the same height**. The 2 mirrors mounts must be orientable independently, with at least 2 precision micrometric screws per mirror and so that mirrors can be easily replaced.

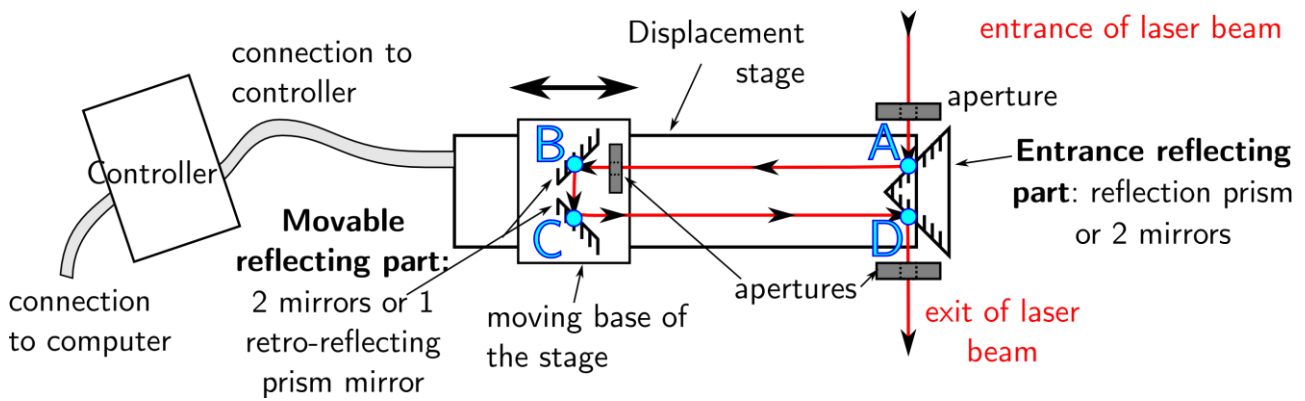


Figure 1: Schematic diagram of one of the required optical delay line kits.

The other reflecting part can be also made the same way.

The other possibility for the other reflecting part is to provide a precision right-angle reflecting prism of appropriate size compared to the laser beam diameter.

In this case, if it concerns the entrance reflecting part, then it must be a precision right-angle prism with 2 lateral side reflecting. Else, if it concerns the movable reflecting part, it must be a precision retro-reflecting prism mirror (cube corner).

In either cases it must be easily to align: the mount should be pre-aligned or a precision rotation stage for it must be provided.

The entrance reflecting part must be removable.

The system must be build in such a way that the paths AB and CD (see Fig. 1) are parallel when the system is operating at any delay, within the precision due to yaw and pitch specified in the tables.

The total price excluding VAT for the 6 optical delay line kits must include the displacement stages, the necessary controllers and connections, all necessary suitable optics and optomechanics, the software, the delivery, and warranty of at least 24 months.

The details of required parameters are given in the tables below.

ODL kits of group 1

In this group, 3 ODL kits are required: #1.1, #1.2 and #1.3.

The ODL kit #1.1 must be appropriate for

- **1030 nm Central Wavelength (C W) pulsed laser,**
- **with 240 fs pulse duration (FWHM),**
- **with 2 mJ/pulse,**
- **with 2 kHz repetition rate,**
- **Gaussian spatial profile with 4.8 mm beam diameter at 1/e² of the intensity,**
- **with linear polarization.**

The ODL kit #1.2 must be appropriate for

- **515 nm C W pulsed laser,**
- **with 240 fs pulse duration (FWHM),**
- **with 0.8 mJ/pulse,**
- **with 2 kHz repetition rate,**
- **Gaussian spatial profile with 4.8 mm beam diameter at 1/e² of the intensity,**
- **with linear polarization.**

The ODL kit #1.3 must be appropriate for

- **343 nm C W pulsed laser,**
- **with 240 fs pulse duration (FWHM),**
- **with 0.4 mJ/pulse,**
- **with 2 kHz repetition rate,**
- **Gaussian spatial profile with 4.8 mm beam diameter at 1/e² of the intensity,**
- **with linear polarization.**

Other needed **features** which are the same for the 3 ODL kits within this group 1 are summarized in the following table.

ODL kit of Group:	1
Parameter name	Desired value
quantity of ODL kits	3 (1 for each of the different laser parameter sets specified above)
Maximum tunable delay (without considering the inherent delay of the device)	≥ 500 ps
Minimum incremental delay (associated to minimum incremental motion of the stage) over the 0-500 ps delay range	≤ 2 fs delay
Accuracy in the optical delay (including error and bidirectional repeatability of stage) over the 0-500 ps delay	≤ 16 fs

range	
Maximal yaw over 0-500 ps delay range	$\leq \pm 175 \mu\text{rad}$
Maximal pitch over 0-500 ps delay range	$\leq \pm 175 \mu\text{rad}$
Optical delay control	Via software
Type of stage	Unidirectionnal, motorized
Maximum velocity of displacement	At least 20 mm/s
Minimum load capacity without loss of accuracy and repeatability	At least 10 kg
Maximal surface occupied by the ODL kit over the whole delay range (including the controller, without considering connection to computer and power supply)	$\leq 20 \times 65 \text{ cm}$
Height of the input and output beam in the system	Between 10 cm and 16 cm
Type of optics of the ODL kit	
Movable reflecting part	<p>Either:</p> <ul style="list-style-type: none"> • 2 mirrors of appropriate size compared to the laser beam diameter, mounted on precision mounts at fixed and the same height on the stage (2 mounts fixed on the same plate/base); <p>or</p> <ul style="list-style-type: none"> • a retro-reflecting prism mirror (cube corner) of appropriate size compared to the laser beam diameter. It must be easy to align: mount must be pre-aligned or a manual precision rotation stage must be provided for it).
Entrance reflecting part	<p>Can be*, either:</p> <ul style="list-style-type: none"> • 1 right-angle reflecting prism (right-angle prism with 2 lateral side reflecting). It must be easy to align: mount must be pre-aligned or a manual precision rotation stage must be provided for it.); <p>or</p> <ul style="list-style-type: none"> • 2 mirrors of appropriate size compared to the laser beam diameter, with precision mounts at fixed and the same height on the stage (2 mounts fixed on the same plate/base); <p>* if a retro-reflecting prism mirror is chosen for the movable reflecting part then the 2 mounted mirrors option must necessarily be provided here.</p>

Properties of each reflecting optics	
Suitability of each optical element	Must be suitable (especially in terms of wavelength range and damage threshold) for the sets of laser parameters specified above (1 ODL kit adapted for 1 set of parameters).
Possibility to unmount and change reflecting optics	Yes, easily unmountable and changeable optics (including the possible reflector or right-angle reflecting prism)
Reflection coefficient	$\geq 98\%$ at 45° incidence for both s and p polarization and <ul style="list-style-type: none"> • over a wavelength range of ± 30 nm around the C W for the ODL kit #1.1 associated with 1030 nm C W • over a wavelength range of ± 25 nm around the C W for the ODL kit #1.2 associated with 515 nm C W • over a wavelength range of ± 10 nm around the C W for the ODL kit #1.3 associated with 343 nm C W
Maximal GDD	<ul style="list-style-type: none"> • $\leq \pm 40$ fs² over a wavelength range of ± 30 nm around the C W for the ODL kit #1.1 associated with 1030 nm C W • $\leq \pm 40$ fs² over a wavelength range of ± 25 nm around the C W for the ODL kit #1.2 associated with 515 nm C W • $\leq \pm 40$ fs² over a wavelength range of ± 10 nm around the C W for the ODL kit #1.3 associated with 343 nm C W
Surface quality	20-10 scratch and dig
Surface flatness	$\lambda / 10$ at 633 nm
Optomechanics of the ODL kit	
Apertures	Yes, at least 3, mounted and centred the same height to make possible precise and user-friendly alignment of the ODL
Mirrors mounts type	Precision kinematic mounts for each mirror
Mirrors mounts adjusters	At least 2 adjusters Resolution of the mount adjusters: $\leq 5 \mu\text{rad}$ Mechanical range of the adjusters: $\geq \pm 4^\circ$
Mirrors mounts fixations	Necessary posts, post holders, bases, so that the mirrors centre is at the same height. Necessary clamps to fasten mirrors on the optical table (Metric, M6 threaded holes) and/or on the moving base of the stage.
Mount of retro-reflecting prism mirror or of the right-angle reflecting prism if provided.	Mount must be precisely pre aligned or fastened on a manual rotation stage with a rotation precision ≤ 5 arcminutes.
Controls	
Interface to connect of the computer	At least USB
Software	Included, at least in English, licence not limited in time, with possibility to install it on computers operating under Microsoft Windows 10. The software must be able to control the 3 ODL kits of Group 1 simultaneously.
Others	

Included accessories	Necessary power cables, connection to controller and connection cables to computer, at least 3 m long.
Warranty of the full kit	≥ 24 months

ODL kits of group 2

In this group, 1 ODL kit is required: #2.1.

The ODL kit #2.1 must be appropriate for

- **pulsed laser**
- **with wavelength ranging from at least 1.5 μm to 3 μm ,**
- **with 1 ps laser pulse duration (FWHM),**
- **with up to 0.5 mJ/pulse,**
- **with 100 kHz repetition rate,**
- **Gaussian spatial profile with 4 mm beam diameter at 1/e² of the intensity.**

Other needed features for the ODL kit of this group 2 are summarized in the following table.

ODL kit of Group:	2
Parameter name	Desired value
quantity of ODL kits	1
Maximum tunable delay (without considering the inherent delay of the device)	≥ 500 ps
Minimum incremental delay (associated to minimum incremental motion of the stage) over the 0-500 ps delay range	≤ 2 fs delay
Accuracy in the optical delay (including error and bidirectional repeatability of stage) over the 0-500 ps delay range	≤ 16 fs
Maximal yaw over 0-500 ps delay range	≤ ± 175 μrad
Maximal pitch over 0-500 ps delay range	≤ ± 175 μrad
Optical delay control	Via software
Type of stage	Unidirectionnal, motorized
Maximum velocity of displacement	At least 20 mm/s
Minimum load	At least 10 kg

capacity without loss of accuracy and repeatability	
Maximal surface occupied by the ODL kit over the whole delay range (including the controller, without considering connection to computer and power supply)	$\leq 20 \times 65 \text{ cm}$
Height of the input and output beam in the system	Between 11 cm and 16 cm
Type of optics of the ODL kit	
Movable reflecting part	<p>Either:</p> <ul style="list-style-type: none"> • 2 mirrors of appropriate size compared to the laser beam diameter, mounted on precision mounts at fixed and the same height on the stage (2 mounts fixed on the same plate/base); <p>or</p> <ul style="list-style-type: none"> • a retro-reflecting prism mirror (cube corner) of appropriate size compared to the laser beam diameter. It must be easy to align: mount must be pre-aligned or a manual precision rotation stage must be provided for it).
Entrance reflecting part	<p>Can be*, either:</p> <ul style="list-style-type: none"> • 1 right-angle reflecting prism (right-angle prism with 2 lateral side reflecting). It must be easy to align: mount must be pre-aligned or a manual precision rotation stage must be provided for it).; <p>or</p> <ul style="list-style-type: none"> • 2 mirrors of appropriate size compared to the laser beam diameter, with precision mounts at fixed and the same height on the stage (2 mounts fixed on the same plate/base); <p>* if a retro-reflecting prism mirror is chosen for the movable reflecting part then the 2 mounted mirrors option must necessarily be provided here.</p>
Properties of each reflecting optics	
Suitability of each optical element	Must be suitable (especially in terms of wavelength range and damage threshold) for the set of laser parameters specified above.
Possibility to unmount and change reflecting optics	Yes, easily unmountable and changeable optics (including the possible reflector or right-angle reflecting prism)
Reflection coefficient	$\geq 97\%$ at 45° incidence over the whole wavelength range for both s and p polarization
Maximal GDD	$\leq \pm 60 \text{ fs}^2$ over the whole wavelength range
Surface quality	40-20 scratch and dig

Surface flatness	$\lambda / 10$ at 633 nm
Optomechanics of the ODL kit	
apertures	Yes, at least 3, mounted and centred the same height to make possible precise and user-friendly alignment of the ODL
Mirrors mounts type	Precision kinematic mounts for each mirror
Mirrors mounts adjusters	At least 2 adjusters Resolution of the mount adjusters: $\leq 5 \mu\text{rad}$ Mechanical range of the adjusters: $\geq \pm 4^\circ$
Mirrors mounts fixations	Necessary posts, post holders, bases, so that the mirrors centre is at the same height. Necessary clamps to fasten mirrors on the optical table (Metric, M6 threaded holes) and/or on the moving base of the stage.
Mount of retro-reflecting prism mirror or of the right-angle reflecting prism if provided.	Mount must be precisely pre aligned or fastened on a manual rotation stage with a rotation precision ≤ 5 arcminutes.
Controls	
Interface to connect of the computer	At least USB
Software	Included, at least in English, licence not limited in time, with possibility to install it on computers operating under Microsoft Windows 10.
Others	
Included accessories	Necessary power cables, connection to controller and connection cables to computer, at least 3 m long.
Warranty of the full kit	≥ 24 months

ODL kits of group 3

In this group, 2 ODL kits are required: #3.1 and #3.2.

The ODL kit #3.1 must be appropriate for

- **800 nm C W pulsed laser,**
- **with 35 fs pulse duration (FWHM),**
- **with up to 3.5 mJ/pulse,**
- **with 1 kHz repetition rate,**
- **Gaussian spatial profile with 12 mm beam diameter at 1/e² of the intensity,**
- **with linear polarization.**

The ODL kit #3.2 must be appropriate for

- **400 nm C W pulsed laser,**
- **with 35 fs pulse duration (FWHM),**
- **with up to 1.7 mJ/pulse,**
- **with 1 kHz repetition rate,**
- **Gaussian spatial profile with 12 mm beam diameter at 1/e² of the intensity**
- **with linear polarization.**

Other needed features which are the same for the 2 ODL kits within this group 2 are summarized in the following table.

ODL kit of Group:	3
Parameter name	Desired value
quantity of ODL kits	2 (1 for each of the different laser parameter sets specified above)
Maximum tunable delay (without considering the inherent delay of the device)	≥ 500 ps
Minimum incremental delay (associated to minimum incremental motion of the stage) over the 0-500 ps delay range	≤ 1 fs delay
Accuracy in the optical delay (including error and bidirectional repeatability of stage) over the 0-500 ps delay range	≤ 2 fs
Maximal yaw over 0-500 ps delay range	$\leq \pm 50$ μ rad
Maximal pitch over 0-500 ps delay range	$\leq \pm 50$ μ rad
Optical delay control	Via software
Type of stage	Unidirectionnal, motorized with stepper motor

Maximum velocity of displacement	At least 20 mm/s
Minimum load capacity without loss of accuracy and repeatability	At least 2 kg
Maximal surface occupied by the ODL kit over the whole delay range (including the controller, without considering connection to computer and power supply)	$\leq 20 \times 65$ cm
Height of the input and output beam in the system	Between 12 cm and 18 cm
Type of optics of each ODL kit	
Movable reflecting part	<p>Either:</p> <ul style="list-style-type: none"> • 2 mirrors of appropriate size compared to the laser beam diameter (at least 30mm diameter), mounted on precision mounts at fixed and the same height on the stage (2 mounts fixed on the same plate/base); <p>or</p> <ul style="list-style-type: none"> • a retro-reflecting prism mirror (cube corner) of appropriate size compared to the laser beam diameter (at least 30 mm). It must be easy to align: mount must be pre-aligned or a manual precision rotation stage must be provided for it).
Entrance reflecting part	<p>Can be*, either:</p> <ul style="list-style-type: none"> • 1 right-angle reflecting prism (right-angle prism with 2 lateral side reflecting) of appropriate size compared to the laser beam diameter (at least 30 mm). It must be easy to align: mount must be pre-aligned or a manual precision rotation stage must be provided for it).; <p>or</p> <ul style="list-style-type: none"> • 2 mirrors of appropriate size compared to the laser beam diameter (at least 30mm diameter), with precision mounts at fixed and the same height on the stage (2 mounts fixed on the same plate/base); <p>* if a retro-reflecting prism mirror is chosen for the movable reflecting part then the 2 mounted mirrors option must necessarily be provided here.</p>
Properties of each reflecting optics	
Suitability of each optical element	Must be suitable (especially in terms of wavelength range and damage threshold) for the sets of laser parameters specified above (1 ODL kit adapted for 1 set of parameters).
Possibility to unmount and change reflecting	Yes, easily unmountable and changeable optics (including the possible reflector or right-angle reflecting prism)

optics	
Reflection coefficient	$\geq 98\%$ at 45° incidence for both s and p polarization and <ul style="list-style-type: none"> • over a wavelength range of ± 60 nm around the C W for the ODL kit #3.1 associated with 800 nm C W • and over a wavelength range of ± 25 nm around the C W for the ODL kit #3.2 associated with 400 nm C W
Maximal group delay dispersion (GDD)	<ul style="list-style-type: none"> • $\leq \pm 30$ fs² over a wavelength range of ± 60 nm around the C W for the ODL kit #3.1 associated with 800 nm C W • $\leq \pm 30$ fs² over a wavelength range of ± 25 nm around the C W for the ODL kit #3.2 associated with 400 nm C W
Surface quality	20-10 scratch and dig
Surface flatness	$\lambda / 10$ at 633 nm
Optomechanics of the ODL kit	
apertures	Yes, at least 3, mounted and centred the same height to make possible precise and user-friendly alignment of the ODL
Mirrors mounts type	Precision kinematic mounts for each mirror
Mirrors mounts adjusters	At least 2 adjusters Resolution of the mount adjusters: ≤ 5 μ rad Mechanical range of the adjusters: $\geq \pm 4^\circ$
Mirrors mounts fixations	Necessary posts, post holders, bases, so that the mirrors centre is at the same height. Necessary clamps to fasten mirrors on the optical table (Metric, M6 threaded holes) and/or on the moving base of the stage.
Mount of retro-reflecting prism mirror or of the right-angle reflecting prism if provided.	Mount must be precisely pre aligned or fastened on a manual rotation stage with a rotation precision ≤ 5 arcminutes.
Controls	
Interface to connect of the computer	At least USB
Software	Included, at least in English, licence not limited in time, with possibility to install it on computers operating under Microsoft Windows 10. The software must be able to control the 2 ODL kits of Group 3 simultaneously.
Others for each ODL kit	
Included accessories	Necessary power cables, connection to controller and connection cables to computer, at least 3 m long.
Warranty of the full kit	≥ 24 months



EUROPEAN UNION
European Structural and Investing Funds
Operational Programme Research,
Development and Education



ANNEX NO. 2 – SELLER'S BID

High-Performance Delay Line Stages

DL SERIES



The DL linear stage series is a high performance but very affordable, linear motor driven stage with an integrated motion controller. Optimized for small loads, repeatable positioning and fast traverse speeds, it is an ideal solution for spectroscopy applications that require delay lines. With travels of 125 mm, 225 mm and 325 mm, this offering covers almost all possible delay needs from femtosecond to nanosecond delays. Spectroscopy applications range from pump-probe, interferometry, 2DIR, etc. To facilitate setups, beam kits consisting of retroreflectors, mirrors, mounts and other optomechanical parts, are available to suit various wavelengths and delay line configurations.



DESIGN DETAILS

Base Material	Extruded Aluminum
Bearings	Recirculating bearings
Drive System	3-phase synchronous ironless linear motor (without Hall effect sensors)
Motor Initialization	Done by the controller.
Motor Commutation	Done by the controller on encoder feedback
Feedback	Linear glass scale, 80 μm signal period, 1 V _{pp}
Limit	Optical
Home Switch	Optical, on encoder's fiducial track, located at the minus end of travel
Controller Compatibility	DL Controller
Cable	3 m long pigtail cables included
MTBF	20,000 hours



- Excellent delay sensitivity and bi-directional repeatability
- Low angular deviation where it counts (pitch)
- Compatibility with optical tables & mounts
- Small footprint
- No moving cable
- Easy to use (Delay line GUI, LabVIEW drivers)

SPECIFICATIONS

		DL125	DL225	DL325
Travel Range (Single Pass)	(mm)	125	225	325
	(ns)	0.8	1.5	2.2
Minimum Incremental Motion (Single Pass)	(nm)	75	75	75
	(fs)	0.5	0.5	0.5
Bi-directional Repeatability, Guaranteed ⁽¹⁾	(μm)	± 0.15	± 0.15	± 0.15
Accuracy, Guaranteed ⁽¹⁾⁽²⁾	(μm)	± 1.5	± 2	± 2.5
Encoder Resolution	(nm)	50	50	50
Origin Repeatability	(μm)	0.4	0.4	0.4
Maximum Speed ⁽³⁾	(mm/s)	500	500	500
Maximum Acceleration, No Load	(mm/s ²)	7500	7500	7500
Pitch, Typical (Guaranteed) ⁽¹⁾⁽²⁾⁽⁴⁾	(μrad)	$\pm 60 (\pm 100)$	$\pm 60 (\pm 100)$	$\pm 90 (\pm 150)$
Yaw, Typical (Guaranteed) ⁽¹⁾⁽²⁾⁽⁴⁾	(μrad)	$\pm 30 (\pm 60)$	$\pm 40 (\pm 90)$	$\pm 50 (\pm 120)$

⁽¹⁾ Shown are peak to peak, guaranteed specifications or \pm half the value as sometimes shown. For the definition of typical specifications which are about 2X better than the guaranteed values, visit www.newport.com for the Motion Control Metrology Primer

⁽²⁾ For a travel of 325 mm.

⁽³⁾ With DL controller.

⁽⁴⁾ To obtain arcsec units, divide μrad value by 4.8.

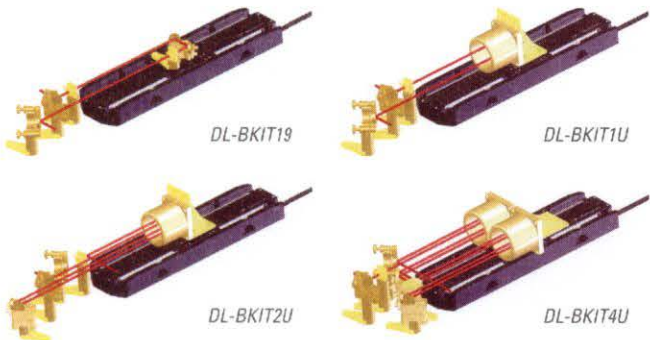
			Single Pass	Dual Pass	Quad Pass
Delay	DL125	(ns)	0.8	1.7	3.3
	DL225	(ns)	1.5	3.0	6.0
	DL325	(ns)	2.2	4.3	8.7
MIM		(fs)	0.5	1.0	2.0

DL SERIES

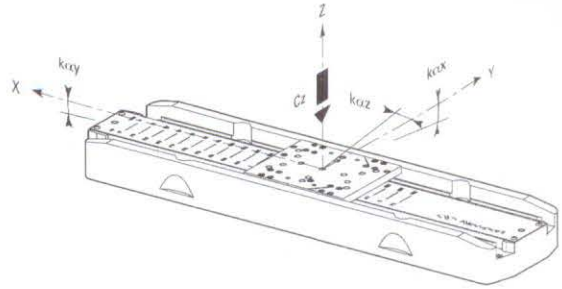
HIGH-PERFORMANCE DELAY LINE STAGES

ORDERING INFORMATION

Model	Description
DL125	125 mm Travel range stage with DL controller
DL225	225 mm Travel range stage with DL controller
DL325	325 mm Travel range stage with DL controller
DL-PS	Power supply for DL stages
DL-BKIT19	Beam Kit, 9848 reflector, 1 pass for UV, IR or Vis
DL-BKIT1U-S	Beam Kit, UBBR retroreflector, 1 pass, IR or Vis
DL-BKIT1U-UV	Beam Kit, UBBR retroreflector, 1 pass, UV Beam
DL-BKIT2U-S	Beam Kit, UBBR retroreflector, 2 pass, IR or Vis
DL-BKIT2U-UV	Beam Kit, UBBR retroreflector, 2 pass, UV Beam
DL-BKIT4U-S	Beam Kit, UBBR retroreflector, 4 pass, IR or Vis
DL-BKIT4U-UV	Beam Kit, UBBR retroreflector, 4 pass, UV Beam



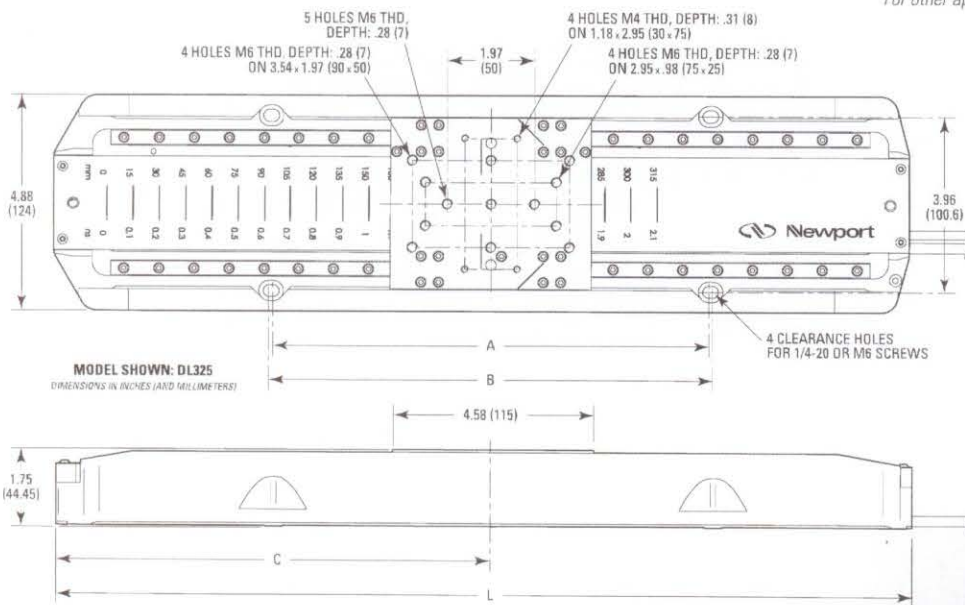
LOAD CHARACTERISTICS AND STIFFNESS



C_z , Normal center load capacity on bearings	20 N
k_{cx} , Compliance in roll	15 $\mu\text{rad}/\text{Nm}$
k_{cy} , Compliance in pitch	10 $\mu\text{rad}/\text{Nm}$
k_{cz} , Compliance in yaw	10 $\mu\text{rad}/\text{Nm}$

Note: It is recommended to keep the load centered on the carriage. For other applications, contact tech@newport.com

DIMENSIONS



MODEL	TRAVEL	L	A	B	C
DL125	4.92 (125)	11.42 (290)	5.91 (150)	6.0 (152.4)	5.91 (150)
DL225	8.86 (225)	15.35 (390)	7.87 (200)	8.0 (203.2)	7.87 (200)
DL325	12.80 (325)	19.29 (490)	9.84 (250)	10.0 (254)	9.84 (250)



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 Complete listings for all global office locations are available online at www.newport.com/contact

www.newport.com

Newport Corporation, Irvine, California and Franklin, Massachusetts; Evry and Beaune-la-Rolande, France and Wuxi, China have all been certified compliant with ISO 9001 by the British Standards Institution. Santa Clara, California is DNV certified.

DL-DSE (04/18)

Ultra-Precision Linear Motor Stages

XM-S SERIES

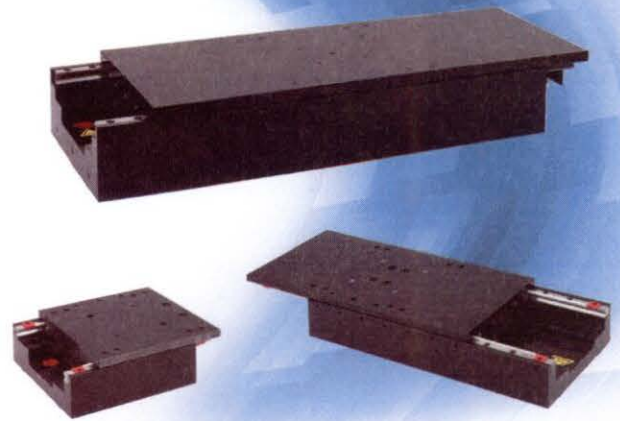


The XM-S ultra-precision linear stages provide high sensitivity and outstanding trajectory accuracy in a compact, robust and cost effective package. They are an excellent, ultra high-performance solution for applications such as semiconductor wafer inspection, sensor test and calibration, laser machining and ultra-precision assembly.

XM-S stages are machined from stress-relieved 7075 aluminum, ensuring long-term strength and stability. All critical stage surfaces undergo multiple machining processes and precision grinding under stringent temperature and quality control to further improve overall performance and accuracy. The T-shaped carriage used on the XM-S provides the optimum solution for precision XY assemblies without impacting the stage preload. It is also more robust and is more tolerant to non-ideal mounting conditions than stages with a C-shaped carriage design.

To ensure the most accurate trajectory control, XM-S stages feature matched pairs of best-in-class anti-creep crossed roller bearings, leading to outstanding ripple-free motion adequate for the most demanding scanning and inspection systems. Moreover, geared retainers prevent bearing cage migration, which can occur with other linear bearing products.

Unlike screw driven stages, the XM-S employs a center-driven, ironless linear motor as the driving element. Since the linear motor is a frictionless direct drive device, there is no backlash or hysteresis, wind-up or stiction limiting performance. The linear motor drive also has the advantage of higher speed, acceleration and system responsiveness with no wear to motor brushes or drive screws. The extra-large, ironless motor coil ensures zero cogging for ultra smooth velocity control and provides higher efficiency compared to other stage designs. This results in significantly less heat generation, which is generally the main limit for ultra-precision motion applications. To further improve thermal management and its effect on stage performance, the XM-S also has the benefit of a sophisticated length decoupling of the magnetic track from the stage carriage



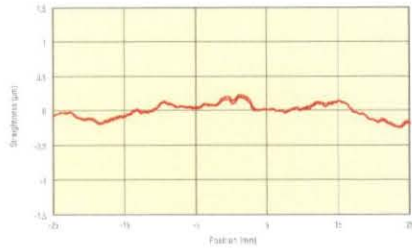
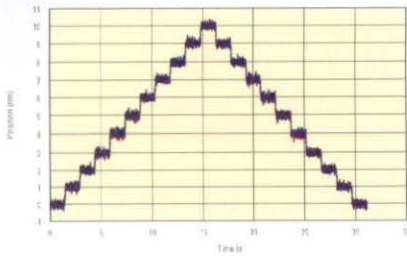
- Ultra-high performance with Minimum Incremental Motion of 1 nm
- Non-contact, direct-drive system ensures ultra-precision motion with high dynamics and reliability
- Sub-nm, high precision glass scale encoder provides accurate position feedback with 80 nm repeatability
- Extra-large, ironless, high-efficiency linear motor minimizes heat generation
- Ultra-quiet anti-creep crossed roller bearings assure ripple-free motion without cage migration

Precision position feedback is supplied by a high accuracy LIF 481 Heidenhain Linear Scale. The precision alignment and mounting of this low thermal expansion scale in the center of the stage minimizes the impact of temperature changes on stage repeatability and accuracy. The encoder signals are interpolated by Newport's XPS motion controller with sub-nm resolution and less than 10 nm noise for outstanding position sensitivity and stability. Absolute home position and limit signals are incorporated on the same scale without further electronics or mechanics for improved reliability and accuracy. In general, all electronics are attached to the stationary base, so there are no moving cables inside the stage. This results in an extremely compact design with exceptional reliability and safety. The space-saving, fixed read head design eliminates any moving cables inside the stage and underscores the robustness and reliability of the XM-S stages, exemplified by an MTBF of 20,000 hours.

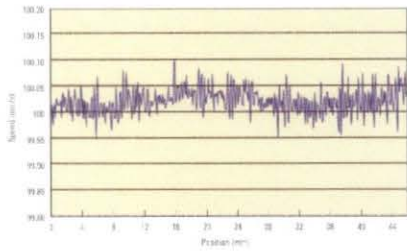
XM-S stages are also compatible with the GTS30V vertical stage, GTS series ultra-precision linear stages, URS and RGV100BL rotation stages, VP-25X precision compact linear stages and VP-5ZA vertical lift stages. XM-S stages are shipped with a test certificate at no additional charge.

 **Newport®**

XM-S SERIES



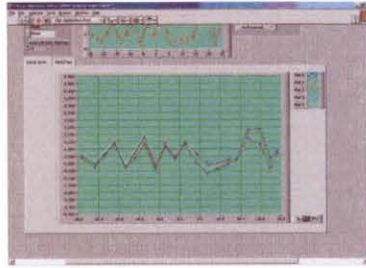
XM-S stages deliver ripple-free motion as required by many precision scanning and wafer inspection processes. Shown is the straightness of an XMS50-S during one forward and return cycle, measured with an interferometer.



XM-S stages provide exceptional speed stability in continuous scanning or laser machining applications. Shown is the speed of an XMS50-S gathered at a rate of 1 kHz using an interferometer.

Need Accuracy to <1 µm ?

Contact Newport to learn about our micropositioning calibration services needed for critical positioning applications. Upon request, we will create, implement and verify an electronic compensation routine to improve the absolute position accuracy of XM-S stages to 1 µm/100 mm when used with our XPS advanced motion control system. A certificate of calibration along with measured error maps is included.



Accuracy of an XMS50-S stage with linear error compensation and error mapping. The data was taken one day after the calibration and at different positions. The plot shows error readings over five cycles of back and forth motion. The accuracy is 0.3 µm peak-to-peak.

DESIGN DETAILS

Base material	High-strength 7075 Aluminum
Bearings	Anti-creep crossed roller bearings
Drive mechanism	3-phase synchronous ironless linear motor (without Hall effect sensors)
Motor initialization	Utilizes XPS controller patented feature that avoids large motions during initialization, without using Hall effect sensors
Motor commutation	Done by the XPS controller using encoder signals
Feedback	Heidenhain LIF 481 scale, 1 Vpp, 4 µm signal period, 32768-fold signal subdivision when used with XPS controller
Limit switches	Optical, on encoder's fiducial track
Origin	Optical, at center of travel, including mechanical zero signal
Drive type	Brushless DC Servo
Cable	A 5-m cable kit must be ordered separately

SPECIFICATIONS

	XMS50-S	XMS100-S	XMS160-S	XML210-S	XML350-S
Travel range (mm)	50	100	160	210	350
Minimum Incremental Motion, linear ⁽¹⁾⁽³⁾ (µm)			0.001		
Bi-directional repeatability, Typical (Guaranteed) ⁽¹⁾⁽²⁾ (µm)	±0.030 (± 0.040)	±0.030 (± 0.040)	±0.030 (± 0.040)	±0.032 (± 0.040)	±0.035 (± 0.040)
Accuracy, Typical (Guaranteed) ⁽¹⁾⁽³⁾ (µm)	±0.2 (±0.7)	±0.3 (±0.75)	±0.5 (±0.7)	±0.5 (±1.5)	±0.5 (±1.5)
Maximum speed ⁽²⁾ (mm/s)			300		
Maximum acceleration ⁽³⁾ (m/s ²)			5		
Max. force (cont.) ⁽³⁾ (N)		16		37	
Load capacity, horizontal (N)		100		300	
Straightness, Typical (Guaranteed) ⁽¹⁾⁽²⁾ (µm)	±0.37 (±0.75)	±0.37 (±0.75)	±0.37 (±0.75)	±0.75 (±1.5)	±0.75 (±1.5)
Straightness, Typical (Guaranteed) ⁽¹⁾⁽²⁾ (µm)	±0.37 (±0.75)	±0.37 (±0.75)	±0.37 (±0.75)	±0.75 (±1.0)	±0.75 (±1.0)
Pitch, guaranteed ⁽¹⁾⁽²⁾⁽⁴⁾ (µrad) ⁽⁵⁾	±10 (±25)	±12 (±25)	±12 (±25)	±15 (±50)	±20 (±50)
Yaw, guaranteed ⁽¹⁾⁽²⁾⁽⁴⁾ (µrad) ⁽⁵⁾		±10 (±25)			±10 (±45)
MTBF (h)		20,000			

¹⁾ For the definition of Typical and Guaranteed specifications see "Motion Basics Terminology & Standards" Tutorial at www.newport.com

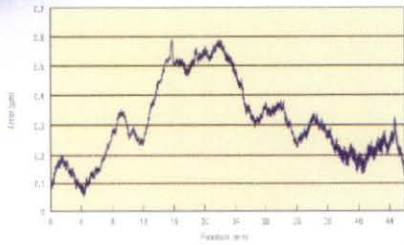
²⁾ Middle 80% of travel

³⁾ To obtain arcsec units, divide µrad value by 4.8.

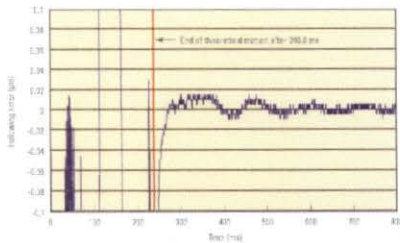
⁴⁾ Requires operation in a controlled environment to achieve specification.

⁵⁾ Driver dependent. Contact Newport technical support for additional information..

ULTRA-PRECISION LINEAR MOTOR STAGES

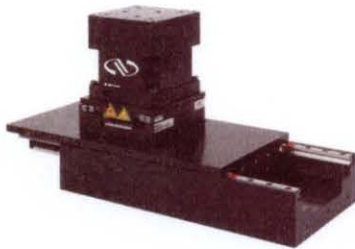


Accuracy of a XMS50-S stage after linear error correction. The data was taken dynamically at a rate of 10 kHz while the stage was moving at a speed of 100 mm/s. Both the encoder and the interferometer positions were acquired by an XPS motion controller with a latency of less than 50 ns between the different signals.

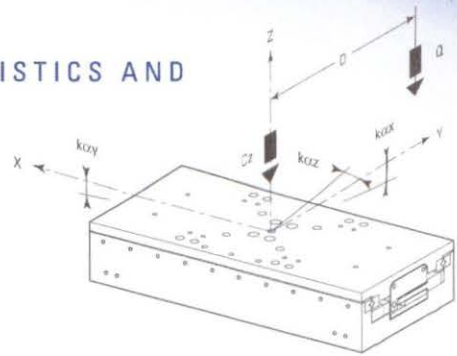


The high responsiveness and stiffness of the XM-S stages result in very short settling times that improve the performance and throughput of many stepping processes.

A typical assembly using XML210-S, XMS50-S and a GT30V vertical stage.



LOAD CHARACTERISTICS AND STIFFNESS



	XMS50-S	XMS100-S	XMS160-S	XML210-S	XML350-S
Cz, Normal centered load capacity (N)	100	100	100	300	300
k _{cx} , Compliance in roll (µrad/Nm)	3.5	2.0	1.5	0.5	0.1
k _{cy} , Compliance in pitch (µrad/Nm)	3.5	2.0	1.5	0.5	0.1
k _{cz} , Compliance in yaw (µrad/Nm)	3.5	2.0	1.5	0.5	0.1
a, Construction parameter (mm)	109	109	109	155	155
Q, Off-center load	$Q \leq Cz \div (1 + D/a)$				
where D = Cantilever distance in mm					

RECOMMENDED CONTROLLERS/DRIVERS

XM-S Series ultra precision linear stages are compatible with the XPS universal high-performance motion controller/driver using XPS-DRV11 and XPS-EDBL driver modules with associated cable kits.

Model	Description
XPS-D	1- to 8-axis universal high-performance motion controller/driver
XPS-DRV11	Universal digital driver card for stepper, DC and direct motors
XPS-RL	1- to 4-axis universal high-performance motion controller/driver
XPS-EDBL	High-power, 3-phase, sinusoidal DC brushless motor driver

ORDERING INFORMATION

Model	Description
XMS50-S	Ultra-precision linear motor stage, 50 mm travel
XMS100-S	Ultra-precision linear motor stage, 100 mm travel
XMS160-S	Ultra-precision linear motor stage, 160 mm travel
XML210-S	Ultra-precision linear motor stage, 210 mm travel
XML350-S	Ultra-precision linear motor stage, 350 mm travel

CABLE KITS

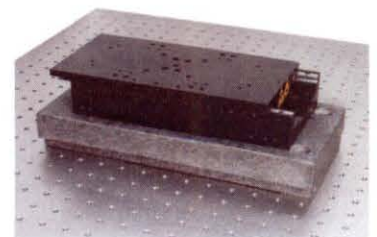
Model	Description
XPS-RK14	Motorized stage cable kit, for stage IMS-LM-S and XPS-EDBL driver module
XPS-DK22	Motorized stage cable kit, for stages IMS-LM-S, XML-S, XMS-S and XPS-DRV11 driver module
XPS-DK24	Motorized stage cable kit, for stages IMS-LM-S, XML-S, XMS-S and XPS-EDBL driver module

ACCESSORIES

The flatness of the surface is often a major factor in the positioning accuracy and repeatability of a motion system. The polished granite surfaces are among the flattest and commercially available structures. Granite's tight flatness tolerance and extreme hardness make it an attractive option to complement Newport's ultra-precision linear motor XM-S series stage. The GB series granite base plates feature 3 point mounting, to make-up for non-flat tables. Edge handles facilitate handling and locating the base plate on the work surface.

Model	Description
GB50	Granite base for XMS50-S
GB100	Granite base for XMS100-S
GB160	Granite base for XMS160-S

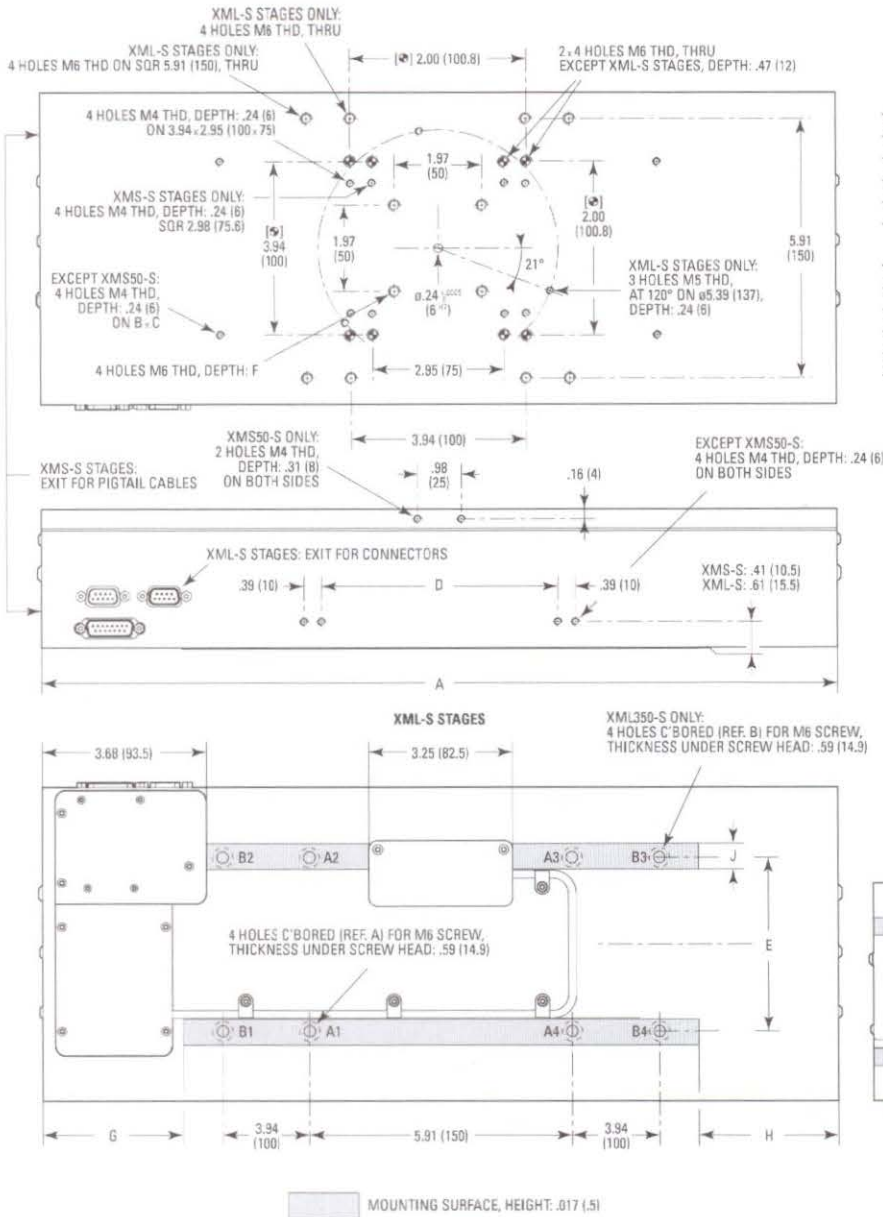
Model	Description
GB210	Granite base for XML210-S
GB350	Granite base for XML350-S



GB160 granite base plate with XMS160-S stage.

DIMENSIONS

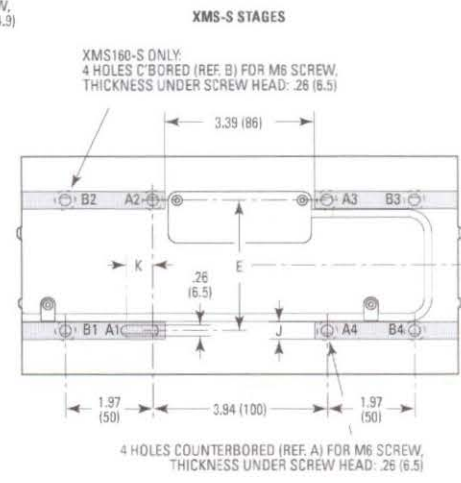
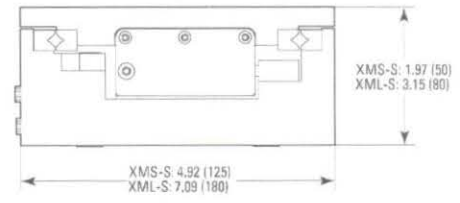
DIMENSIONS IN INCHES (AND MILLIMETERS)



	A	B	C	D	E
XMS50-S	4.92 (125)	-	-	-	2.95 (75)
XMS100-S	7.28 (185)	6.10 (155)	1.77 (45)	5.31 (135)	2.95 (75)
XMS160-S	9.84 (250)	7.28 (185)	1.77 (45)	7.87 (200)	2.95 (75)
XML210-S	13.98 (355)	9.84 (250)	3.94 (100)	5.31 (135)	3.94 (100)
XML350-S	21.85 (555)	9.84 (250)	3.94 (100)	13.19 (335)	3.94 (100)

	F	G	H	J	K
XMS50-S	.28 (7)	-	-	.39 (10)	.28 (7)
XMS100-S	.28 (7)	-	-	.39 (10)	.59 (15)
XMS160-S	.28 (7)	-	-	.39 (10)	.59 (15)
XML210-S	.47 (12)	2.91 (74)	2.66 (67.5)	.59 (15)	-
XML350-S	.47 (12)	3.15 (80)	3.15 (80)	.59 (15)	-

XMS-S & XML-S STAGE CONNECTORS:
 SUB-D9M FOR MOTOR
 SUB-D9F FOR END-OF-RUNS & THERMISTANCE
 SUB-D15M FOR ENCODER



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Complete listings for all global office locations are available online at www.newport.com/contact

Newport Corporation, Irvine, California and Franklin, Massachusetts; Evry and Beaune-la-Rolande, France and Wuxi, China have all been certified compliant with ISO 9001 by the British Standards Institution. Santa Clara, California is DNV certified.

XM-S-DSE (09/18)



1-axis Direct Drive Controller/Driver, ethernet, Basic GPIO and PCO

MODEL: XPS-RLM

€3,227

In Stock

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Overview

Technical Specs

Resources & Downloads

Overview

The XPS-RLM is a high-performance, very easy to use, one-axis integrated motion controller/driver for direct drive motors. Using the same robust QNX operating system as the XPS-Qx, it has a faster PCI bus enabling 10kHz servo control per axis. The web interface has been improved for easy login, configuration, programming, etc. High-speed communication is achieved through 10/100 Base-T Ethernet for outstanding trajectory accuracy and powerful programming functionality. Basic I/O and PCO functions, as well as XPS-DRV02 driver card are included.

For stage compatibility click here: [Stage Compatibility Matrix](https://www.newport.com/n/stage-and-controller-compatibility)
(<https://www.newport.com/n/stage-and-controller-compatibility>)



(/f/xps-rl-universal-high-performance-motion-controller)

Product Series Overview

Universal 1-4 Axis XPS-RL Motion Controllers (/f/xps-rl-universal-high-performance-motion-controller)

Technical Specs

Command Set	Objected oriented language, 100+ functions, TCL generated scripts, EPICS Compatible	Motion	Synchronized pt to pt, Spindle, Linear/circular interpolation, Splines, PVT, Analog tracking, Master-slave
Compensation	Linear error, backlash compensation, error mapping	Number of Axis	1
Computer Interfaces	Two Ethernet 10/100/1000 Base-T (RJ45) with Fixed and Dynamic IP with DHCP & DNS for local and network communication	Weight	8 kg
Control Algorithm	PI Position, PIDFF, Velocity, PIDFF, Acceleration, PIDDualFF, Voltage, Variable PID's, Derivative, Cut-off Filter, Notch Filters, or Open Loop		
ESP Compatibility	ESP Stage Detection		