



 **HOLMARC**  
OPTO-MECHATRONICS LTD



# LABORATORY AUTOMATION

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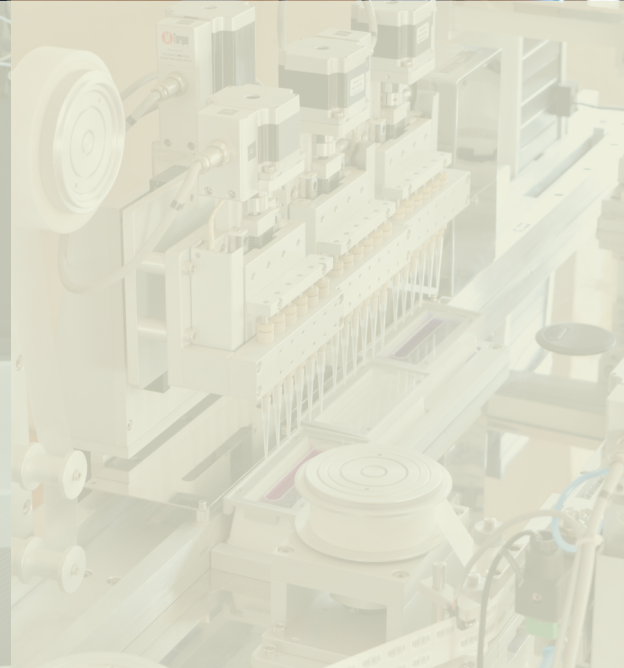
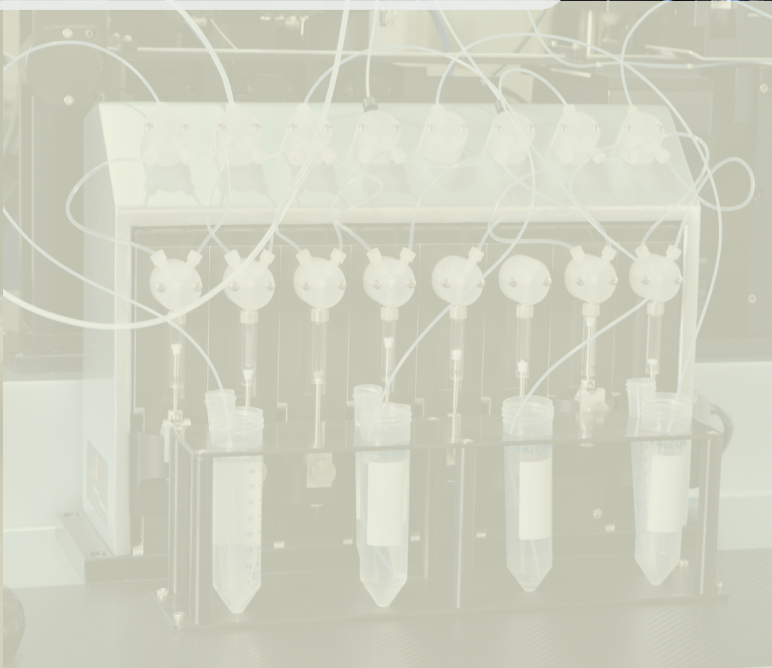


The background of the slide features a collage of laboratory automation equipment. In the upper right, there is a black robotic arm with four vertical grippers positioned over a sample tray. To its right is a computer monitor and keyboard. In the lower half, a large, light-colored liquid handling robot is visible, with a digital display showing '160' and a label that reads 'TDU 700S'.

# 13

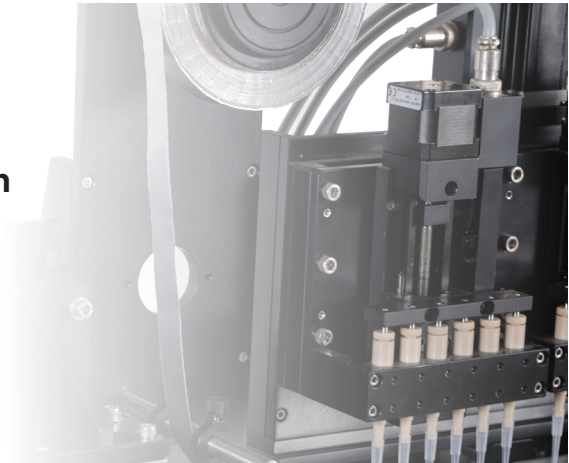
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# Stages and Laboratory Automation

- **Heavy load support with minimal friction**
- **Precision positioning for long-term industrial use**



Linear motion Slides from Holmarc are ready to fit, cost effective, factory preloaded, low friction, light weight slides that are ready for installation right out of the box. Balls or crossed rollers act as the interface between base and carriage by perfectly rolling on four surfaces arranged at 90 degree, called guide ways. In the case of slides from HOLMARC, hardened and ground rods act as guide ways. Wear and tear is negligible even after long use as there is a perfect rolling contact between rolling elements and guide ways. Friction is very less and in most cases, coefficient of friction is less than 0.002. The slides can support heavy loads without compromising performance accuracies. Factory pre-loading of the slides during assembly practically eliminates play and wobble.

Our linear motion slides prove to be the best solution for the ever-demanding performance requirements of modern machine tool shops. They are specially made to operate dry, offering self-lubrication with high performance. These features make our system best suited for OEM applications.

## Linear Slides

### MS Series

Miniature Slides are designed as complete and compact assemblies for space restricted linear motion applications. As in the case of other standard slides, hardened and precision ground alloy steel rods are used as guide ways. Play and wobble are practically eliminated by pre-loading the slides during assembly at our factory. Smooth and friction free motion is guaranteed by ensuring perfect rolling between balls and guide ways.

Holmarc manufactures miniature slides in four series depending on their width and thickness. Many models are available in each series for differing travel ranges. There are mounting holes at top (moving part) and base (fixed part) for the ease of use. In addition to these standard products, holmarc also manufactures custom slides. We also entertain custom specification of mounting holes without any increase in cost from standard models.



### MS 14 Series

| Model No.            | MS - 14 x 20 | MS - 14 x 25 | MS - 14 x 30 | MS - 14 x 40 |
|----------------------|--------------|--------------|--------------|--------------|
| Travel               | 10           | 12           | 15           | 25           |
| Load capacity ( Kg ) | 0.3          | 0.5          | 0.7          | 1            |
| L ( mm )             | 20           | 25           | 30           | 40           |
| A ( mm )             | 12           | 17           | 22           | 32           |
| B ( mm )             | 4            | 4            | 4            | 4            |



### MS 20 Series

| Model No:            | MS - 20 x 20 | MS - 20 x 25 | MS - 25 x 30 | MS - 20 x 40 | MS - 20 x 50 |
|----------------------|--------------|--------------|--------------|--------------|--------------|
| Travel               | 10           | 15           | 20           | 25           | 30           |
| Load capacity ( Kg ) | 0.5          | 1            | 2            | 3            | 5            |
| L ( mm )             | 20           | 25           | 30           | 40           | 50           |
| A ( mm )             | 10           | 15           | 20           | 30           | 5            |
| B ( mm )             | 30           | 5            | 50           | 40           | 5            |

### MS 25 Series

| Model No             | MS - 25 x 20 | MS - 25 x 30 | MS - 25 x 40 | MS - 25 x 50 | MS - 25 x 75 |
|----------------------|--------------|--------------|--------------|--------------|--------------|
| Travel               | 10           | 15           | 20           | 25           | 35           |
| Load capacity ( Kg ) | 1            | 3            | 4            | 4            | 7            |
| L ( mm )             | 25           | 30           | 40           | 50           | 75           |
| A ( mm )             | 15           | 20           | 30           | 40           | 50           |
| B ( mm )             | 5            | 5            | 5            | 5            | 5            |

### MS 25 Series

| Model No             | MS - 35 x 35 | MS - 35 x 40 | MS - 35 x 50 | MS - 35 x 75 |
|----------------------|--------------|--------------|--------------|--------------|
| Travel               | 15           | 20           | 30           | 35           |
| Load capacity ( Kg ) | 3            | 4            | 5            | 7            |
| L ( mm )             | 35           | 40           | 50           | 75           |
| A ( mm )             | 20           | 25           | 35           | 60           |
| B ( mm )             | 7.5          | 7.5          | 7.5          | 7.5          |

# Linear Slides

## MS Series

Ball slides, as the name suggests, use balls as rolling elements. Each ball will have four point contact with guide way during its entire travel. Point contact rolling helps in self cleaning of the rolling path on the guide ways. Hence, the ball slides are maintenance free and are suitable for operation without lubrication. Ball slides exhibit significantly less friction compared to roller slides. Due to this feature, for applications where smooth, low friction movements are more important than load capacity and shock resistance, ball slides make better choice.

### Built-in mounting holes

### Lubrication free operation



- **Factory pre-load adjustment prevents side play and back lash**
- **Steel shafts, ground over entire length, are used as guide ways**
- **Built-in mounting holes make its use easy and time efficient**
- **Light weight aluminium carriage and base**
- **High accuracy and repeatability**
- **No lubrication required**

### MS 50 Series

| Model No.     | Travel | Load capacity ( Kg ) | L (mm) | A ( mm ) | B ( mm ) |
|---------------|--------|----------------------|--------|----------|----------|
| MS - 50 x 50  | 30     | 4                    | 50     | 15       | 10       |
| MS - 50 x 60  | 40     | 5                    | 60     | 20       | 10       |
| MS - 50 x 75  | 50     | 6                    | 75     | 25       | 12.5     |
| MS - 50 x 100 | 75     | 7                    | 100    | 25       | 12.5     |
| MS - 50 x 150 | 100    | 10                   | 150    | 25       | 12.5     |
| MS - 50 x 200 | 150    | 15                   | 200    | 25       | 12.5     |

# For Vacuum compatible stage order VC series Slide : Eg:- VCMS - 50 x

### ABS 20 Series

| Model No:     |      |    |     |    |      |
|---------------|------|----|-----|----|------|
| ABS 50 x 75   | 25   | 10 | 75  | 50 | 12.5 |
| ABS 50 x 75A  | 12.5 | 12 | 75  | 50 | 12.5 |
| ABS 50 x 100  | 50   | 18 | 100 | 75 | 12.5 |
| ABS 50 x 100A | 50   | 24 | 100 | 75 | 12.5 |
| ABS 50 x 150  | 100  | 18 | 150 | 50 | 25   |
| ABS 50 x 150A | 50   | 24 | 150 | 50 | 25   |
| ABS 50 x 150B | 25   | 30 | 150 | 50 | 25   |
| ABS 50 x 200  | 150  | 24 | 200 | 50 | 25   |
| ABS 50 x 200A | 100  | 30 | 200 | 50 | 25   |
| ABS 50 x 200B | 50   | 38 | 200 | 50 | 25   |
| ABS 50 x 250  | 200  | 28 | 250 | 50 | 25   |
| ABS 50 x 250A | 150  | 34 | 250 | 50 | 25   |
| ABS 50 x 250B | 100  | 40 | 250 | 50 | 25   |
| ABS 50 x 300  | 250  | 36 | 300 | 50 | 25   |
| ABS 50 x 300A | 200  | 42 | 300 | 50 | 25   |
| ABS 50 x 300B | 150  | 48 | 300 | 50 | 25   |
| ABS 50 x 300C | 100  | 54 | 300 | 50 | 25   |
| ABS 50 x 350  | 300  | 38 | 350 | 50 | 25   |
| ABS 50 x 350A | 250  | 46 | 350 | 50 | 25   |
| ABS 50 x 350B | 200  | 52 | 350 | 50 | 25   |
| ABS 50 x 350C | 150  | 58 | 350 | 50 | 25   |
| ABS 50 x 400  | 350  | 48 | 400 | 50 | 25   |
| ABS 50 x 400A | 300  | 56 | 400 | 50 | 25   |
| ABS 50 x 400B | 250  | 62 | 400 | 50 | 25   |
| ABS 50 x 400C | 200  | 68 | 400 | 50 | 25   |
| ABS 50 x 400D | 150  | 78 | 400 | 50 | 25   |

## ABS 65 Series

| Model No.     | Travel | Load capacity ( Kg ) | L (mm) | A ( mm ) | B ( mm ) |
|---------------|--------|----------------------|--------|----------|----------|
| ABS 65 x 75   | 25     | 10                   | 75     | 50       | 12.5     |
| ABS 65 x 75A  | 12.5   | 14                   | 75     | 50       | 12.5     |
| ABS 65 x 100  | 50     | 12                   | 100    | 75       | 12.5     |
| ABS 65 x 100A | 25     | 16                   | 100    | 75       | 12.5     |
| ABS 65 x 150  | 100    | 18                   | 150    | 50       | 25       |
| ABS 65 x 150A | 50     | 24                   | 150    | 50       | 25       |
| ABS 65 x 150B | 25     | 30                   | 150    | 50       | 25       |
| ABS 65 x 200  | 150    | 24                   | 200    | 50       | 25       |
| ABS 65 x 200A | 100    | 30                   | 200    | 50       | 25       |
| ABS 65 x 200B | 50     | 38                   | 200    | 50       | 25       |
| ABS 65 x 200C | 25     | 44                   | 200    | 50       | 25       |
| ABS 65 x 250  | 200    | 28                   | 250    | 50       | 25       |
| ABS 65 x 250A | 150    | 34                   | 250    | 50       | 25       |
| ABS 65 x 250B | 100    | 40                   | 250    | 50       | 25       |
| ABS 65 x 250C | 50     | 46                   | 250    | 50       | 25       |
| ABS 65 x 300  | 250    | 36                   | 300    | 50       | 25       |
| ABS 65 x 300A | 200    | 42                   | 300    | 50       | 25       |
| ABS 65 x 300B | 150    | 48                   | 300    | 50       | 25       |
| ABS 65 x 300C | 100    | 54                   | 300    | 50       | 25       |
| ABS 65 x 350  | 300    | 38                   | 350    | 50       | 25       |
| ABS 65 x 350A | 250    | 46                   | 350    | 50       | 25       |
| ABS 65 x 350B | 200    | 52                   | 350    | 50       | 25       |
| ABS 65 x 350C | 150    | 58                   | 350    | 50       | 25       |
| ABS 65 x 400  | 350    | 48                   | 400    | 50       | 25       |
| ABS 65 x 400A | 300    | 56                   | 400    | 50       | 25       |
| ABS 65 x 400B | 250    | 62                   | 400    | 50       | 25       |
| ABS 65 x 400C | 200    | 68                   | 400    | 50       | 25       |
| ABS 65 x 400D | 150    | 80                   | 400    | 50       | 25       |

## ABS 90 Series

| Model No.     | Travel | Load capacity ( Kg ) | L (mm) | A ( mm ) | B ( m ) |
|---------------|--------|----------------------|--------|----------|---------|
| ABS 90 x 100  | 50     | 18                   | 100    | 75       | 12.5    |
| ABS 90 x 100A | 25     | 24                   | 100    | 75       | 12.5    |
| ABS 90 x 150  | 100    | 16                   | 150    | 50       | 25      |
| ABS 90 x 150A | 75     | 21                   | 150    | 50       | 25      |
| ABS 90 x 150B | 50     | 24                   | 150    | 50       | 25      |
| ABS 90 x 200  | 150    | 24                   | 200    | 50       | 25      |
| ABS 90 x 200A | 100    | 30                   | 200    | 50       | 25      |
| ABS 90 x 200B | 50     | 38                   | 200    | 50       | 25      |
| ABS 90 x 250  | 200    | 28                   | 250    | 50       | 25      |
| ABS 90 x 250A | 150    | 34                   | 250    | 50       | 25      |
| ABS 90 x 250B | 100    | 40                   | 250    | 50       | 25      |
| ABS 90 x 250C | 50     | 46                   | 250    | 50       | 25      |
| ABS 90 x 300  | 250    | 36                   | 300    | 50       | 25      |
| ABS 90 x 300A | 200    | 42                   | 300    | 50       | 25      |
| ABS 90 x 300B | 150    | 48                   | 300    | 50       | 25      |
| ABS 90 x 300C | 100    | 54                   | 300    | 50       | 25      |
| ABS 90 x 350  | 300    | 38                   | 350    | 50       | 25      |
| ABS 90 x 350A | 250    | 46                   | 350    | 50       | 25      |
| ABS 90 x 350B | 200    | 52                   | 350    | 50       | 25      |
| ABS 90 x 350C | 150    | 58                   | 350    | 50       | 25      |
| ABS 90 x 400  | 350    | 48                   | 400    | 50       | 25      |
| ABS 90 x 400A | 300    | 56                   | 400    | 50       | 25      |
| ABS 90 x 400B | 250    | 62                   | 400    | 50       | 25      |
| ABS 90 x 400C | 200    | 68                   | 400    | 50       | 25      |
| ABS 90 x 400D | 150    | 80                   | 400    | 50       | 25      |

## Specifications

|                             |                        |
|-----------------------------|------------------------|
| 1. Co-efficient of friction | Less than 0.002        |
| 2. Positional Repeatability | 0.002 mm               |
| 3. Straight- line accuracy  | 0.01 mm / 25mm travel. |

# Linear Roller Slides

## ARS Series

In roller slides, rollers which are placed alternately crisscrossed to each other are used as rolling elements. Hardened, precision ground and flattened rods are used as guide ways. The rollers are encased in a nylon cage. A line contact is maintained between guide ways and rollers throughout the travel range, achieving perfect rolling motion. Load capacity is increased at least 10 fold as a result of line contact of rollers compared to ball slides using equal diameter balls.

Co-efficient of friction in roller slides is 0.004, when preloaded. This is almost double that of ball slides of similar size. Where load capacity is more important than friction, roller slides are preferable.



- **High accuracy and repeatability**
- **Light weight aluminium carriage and base**
- **Alternately crossed rollers handle force in any direction**
- **Factory pre-load adjustment prevents side play and back lash**
- **Built-in mounting holes make installation easy and time efficient**

### Specifications

|                             |                       |
|-----------------------------|-----------------------|
| 1. Co-efficient of friction | 0.004                 |
| 2. Positional Repeatability | 0.002 mm              |
| 3. Straight- line accuracy  | 0.01 mm / 25mm travel |

### ARS 90 Series

| Model No:     | Travel | Load capacity ( Kg ) | L (mm) | A ( mm ) | B ( mm ) |
|---------------|--------|----------------------|--------|----------|----------|
| ARS 50 x 100  | 50     | 35                   | 100    | 75       | 12.5     |
| ARS 50 x 100A | 25     | 45                   | 100    | 75       | 12.5     |
| ARS 50 x 150  | 75     | 50                   | 150    | 50       | 25       |
| ARS 50 x 150A | 50     | 60                   | 150    | 50       | 25       |
| ARS 50 x 150B | 25     | 75                   | 150    | 50       | 25       |
| ARS 50 x 200  | 150    | 55                   | 200    | 50       | 25       |
| ARS 50 x 200A | 100    | 65                   | 200    | 50       | 25       |
| ARS 50 x 200B | 50     | 95                   | 200    | 50       | 25       |
| ARS 50 x 200C | 25     | 115                  | 200    | 50       | 25       |
| ARS 50 x 250  | 200    | 50                   | 250    | 50       | 25       |
| ARS 50 x 250A | 150    | 70                   | 250    | 50       | 25       |
| ARS 50 x 250B | 100    | 100                  | 250    | 50       | 25       |
| ARS 50 x 250C | 50     | 125                  | 250    | 50       | 25       |
| ARS 50 x 300  | 300    | 70                   | 300    | 50       | 25       |
| ARS 50 x 300A | 200    | 85                   | 300    | 50       | 25       |
| ARS 50 x 300B | 150    | 105                  | 300    | 50       | 25       |
| ARS 50 x 300C | 100    | 135                  | 300    | 50       | 25       |
| ARS 50 x 300D | 50     | 155                  | 300    | 50       | 25       |
| ARS 50 x 350  | 300    | 75                   | 350    | 50       | 25       |
| ARS 50 x 350A | 250    | 90                   | 350    | 50       | 25       |
| ARS 50 x 350B | 200    | 110                  | 350    | 50       | 25       |
| ARS 50 x 350C | 150    | 130                  | 350    | 50       | 25       |
| ARS 50 x 350D | 100    | 160                  | 350    | 50       | 25       |
| ARS 50 x 400  | 350    | 75                   | 400    | 50       | 25       |
| ARS 50 x 400A | 300    | 95                   | 400    | 50       | 25       |
| ARS 50 x 400B | 250    | 115                  | 400    | 50       | 25       |
| ARS 50 x 400C | 200    | 135                  | 400    | 50       | 25       |
| ARS 50 x 400D | 150    | 160                  | 400    | 50       | 25       |

## ARS 65 Series



| Model No:     | Travel | Load capacity ( Kg ) | L (mm) | A ( mm ) | B ( mm ) |
|---------------|--------|----------------------|--------|----------|----------|
| ARS 65 x 75   | 25     | 30                   | 75     | 50       | 12.5     |
| ARS 65 x 75A  | 12.5   | 40                   | 75     | 50       | 12.5     |
| ARS 65 x 100  | 50     | 35                   | 100    | 75       | 12.5     |
| ARS 65 x 100A | 25     | 45                   | 100    | 75       | 12.5     |
| ARS 65 x 150  | 75     | 70                   | 150    | 50       | 25       |
| ARS 65 x 150A | 50     | 60                   | 150    | 50       | 25       |
| ARS 65 x 150B | 25     | 75                   | 150    | 50       | 25       |
| ARS 65 x 200  | 150    | 50                   | 200    | 50       | 25       |
| ARS 65 x 200A | 100    | 65                   | 200    | 50       | 25       |
| ARS 65 x 200B | 50     | 95                   | 200    | 50       | 25       |
| ARS 65 x 200C | 25     | 115                  | 200    | 50       | 25       |
| ARS 65 x 250  | 200    | 50                   | 250    | 50       | 25       |
| ARS 65 x 250A | 150    | 70                   | 250    | 50       | 25       |
| ARS 65 x 250B | 100    | 100                  | 250    | 50       | 25       |
| ARS 65 x 250C | 50     | 125                  | 250    | 50       | 25       |
| ARS 65 x 300  | 250    | 60                   | 300    | 50       | 25       |
| ARS 65 x 300A | 200    | 85                   | 300    | 50       | 25       |
| ARS 65 x 300B | 150    | 105                  | 300    | 50       | 25       |
| ARS 65 x 300C | 100    | 135                  | 300    | 50       | 25       |
| ARS 65 x 350  | 300    | 65                   | 350    | 50       | 25       |
| ARS 65 x 350A | 250    | 90                   | 350    | 50       | 25       |
| ARS 65 x 350B | 200    | 110                  | 350    | 50       | 25       |
| ARS 65 x 350C | 150    | 130                  | 350    | 50       | 25       |
| ARS 65 x 400  | 350    | 70                   | 400    | 50       | 25       |
| ARS 65 x 400A | 300    | 95                   | 400    | 50       | 25       |
| ARS 65 x 400B | 250    | 115                  | 400    | 50       | 25       |
| ARS 65 x 400C | 200    | 135                  | 400    | 50       | 25       |
| ARS 65 x 400D | 150    | 160                  | 400    | 50       | 25       |

## ABS 90 Series

| Model No      | Travel | Load capacity (Kg) | L (mm) | A ( mm ) | B ( mm ) |
|---------------|--------|--------------------|--------|----------|----------|
| ARS 90 x 100  | 50     | 35                 | 100    | 75       | 12.5     |
| ARS 90 x 100A | 25     | 45                 | 100    | 75       | 12.5     |
| ARS 90 x 150  | 75     | 50                 | 150    | 50       | 25       |
| ARS 90 x 150A | 50     | 60                 | 150    | 50       | 25       |
| ARS 90 x 150B | 25     | 75                 | 150    | 50       | 25       |
| ARS 90 x 200  | 150    | 40                 | 200    | 50       | 25       |
| ARS 90 x 200A | 100    | 65                 | 200    | 50       | 25       |
| ARS 90 x 200B | 50     | 95                 | 200    | 50       | 25       |
| ARS 90 x 200C | 25     | 115                | 200    | 50       | 25       |
| ARS 90 x 250  | 200    | 50                 | 250    | 50       | 25       |
| ARS 90 x 250A | 150    | 70                 | 250    | 50       | 25       |
| ARS 90 x 250B | 100    | 100                | 250    | 50       | 25       |
| ARS 90 x 250C | 50     | 125                | 250    | 50       | 25       |
| ARS 90 x 300  | 250    | 60                 | 300    | 50       | 25       |
| ARS 90 x 300A | 200    | 85                 | 300    | 50       | 25       |
| ARS 90 x 300B | 150    | 105                | 300    | 50       | 25       |
| ARS 90 x 300C | 100    | 135                | 300    | 50       | 25       |
| ARS 90 x 350  | 300    | 65                 | 350    | 50       | 25       |
| ARS 90 x 350A | 250    | 90                 | 350    | 50       | 25       |
| ARS 90 x 350B | 200    | 110                | 350    | 50       | 25       |
| ARS 90 x 350C | 150    | 130                | 350    | 50       | 25       |
| ARS 90 x 400  | 350    | 60                 | 400    | 50       | 25       |
| ARS 90 x 400A | 300    | 95                 | 400    | 50       | 25       |
| ARS 90 x 400B | 250    | 115                | 400    | 50       | 25       |
| ARS 90 x 400C | 200    | 135                | 400    | 50       | 25       |
| ARS 90 x 400D | 150    | 160                | 400    | 50       | 25       |

# Single Channel Dispensing Station

**Model: HO-BL-SCDS-214P**



Holmarc's single channel dispensing station (Model : HO-BL-SCDS-214P) automates repetitive dispensing of liquids in to bottles or container in the pre determined quantities. The system consist of a peristaltic pump, conveyor belt for positioning of bottler in x axis, two axis positioning (Y & Z) for dispensing nozzle and stand alone controllers with user interface integrated in the station.

## Specifications

|                   |                                    |
|-------------------|------------------------------------|
| Type              | Single Channel Dispensing          |
| Feeding           | Motorized Conveyor System          |
| Feeding Tray Size | Standard, 96 Well Plate            |
| Dispensing        | Peristaltic Pump                   |
| Flow rates        | 0-1 to 5 ml / min                  |
| Motor             | Stepper Motor                      |
| Power supp        | 220 - 240 v 50/60 Hz supply        |
| User Interface    | 20 x 4 Line LCD & 15 Keys Keyboard |

Use of peristaltic pump with easily replaceable tubes prevent contamination or the pump liquid in this case do not touch any of the pump parts except the tubing.

# MICRO Plate 8 Channel Precision Dispensing Station

**( 96 Well Plate Standard ) Model: HO-BL-MPPD-214S**

HOLMARC Bio LABS™ MICRO Plate Dispensing Station is specially designed tool suitable for fast, repetitive dispensing of microliter to milliliter volumes into 8 channel well container. It ensures precise dispensing and offers an economical, compact, and reliable alternative to existing microplate dispensers.

Accurate and precise dispensing are guaranteed without time consuming re-calibration, cassette replacement and maintenance. Model HO-BL-MPPD-214S is a 8 channel dispenser designed for 96 well plates. It incorporates a microprocessor controlled syringe pump for optimal performance and guarantees optimal precision and accuracy. The user controlled dispense flow rates allow low to high speed dispensing for any application. Holmarc Bio LAB DI software provides a high degree of control over process parameters. Column selection offers the choice of dispensing a few columns, or a complete plate. For optimal dispensing accuracy, the software allows fine tuning the dispense volume. It can be used for any dispensing task with microtiter plates in molecular biology, immunology, genomics both in clinical as well as pre-clinical activities.

Holmarc can also under take custom modifications in the system like individual dispense heads (different fluids can be dispensed into a single microplate), optical reader, fluorescence detection unit etc.



**No recalibration required**

**Fast and accurate dispensing rate**

## Specifications

|                                        |  |
|----------------------------------------|--|
| 8 Nozzle Dispensing                    |  |
| Accurate dispense channels             |  |
| Low dead volume                        |  |
| Fast dispenses                         |  |
| Adjustable dispensing range            |  |
| Configurable for different well plates |  |
| Microprocessor-controlled syringe pump |  |
| Removable tubings                      |  |
| Small footprint                        |  |
| No recalibration required              |  |
| Minimum dispense volume of 1 $\mu$ L   |  |
| Dispense precision : $\leq$ 5% CV      |  |

# Multi-channel Precision Line Dispenser

## Model: HO-BL-MCPLD-214L

Holmarc's multi channel line dispensing system can be used for production as well as research in life science and bio-technology for dispensing reagent liquid in line or dot format on sheet substrate. Up to four lines can be printed at the same time with different dispensing rate for each line.

Independent syringe pumps are used for each line. All parameters are programmable from the front panel of stand alone controller of the system.

### Specifications

|                          |                                                      |
|--------------------------|------------------------------------------------------|
| Applicable sheet size    | Max. 320 x 320 mm                                    |
| Dispenser                | Syringe pump                                         |
| Dispensing volume : Line | Minimum 0.5 $\mu$ l / cm                             |
| Dot                      | Minimum 0.5 $\mu$ l / dot                            |
| Accuracy                 | < 1.0% deviation from expected result at full stroke |
| Precision                | $\leq$ 0.05% CV at full stroke                       |
| Feeding speed            | Adjustable                                           |
| Power                    | 110 Volt or 230 Volt, 50 Hz or 60 Hz                 |

**With precision line dispensing facility**

**Seperate pumping system for each channe**

### Features

- Precision Line dispensing Facility
- Can dispense reagent from 1 line to multi-lines or dot simultaneously
- Reversible pump allows easy purging and cleaning.
- Height adjuster for tip to control space between dispensing lines.
- Programmable parameters for adjusting dispensing volume and feeding table speed.
- Separate pumping system for each channel ensures accurate dispensing



# Flowline F100

HOLMARC FlowLine F100 can be used for printing lines and dots in various substrates. The standard machine has 3 pumps for line printing and one optional pump for conjugate spraying. Additional pump options are available. The short length tubing of this machine reduces the reagent wastage. The average out put is 120 sheets per Hour.

## Specifications



|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Standalone mode of operation with easy to use User Interface                                                            |
| Small machine footprint                                                                                                 |
| Automated adjustable line positions                                                                                     |
| Pumps : Precision Syringe Pumps                                                                                         |
| Standard Configuration : 3 for reagent line printing                                                                    |
| Nozzles : Stainless steel solenoid valve controlled nozzles for non contact printing. PEEK nozzles for contact Printing |
| Adjustable nozzle height and nozzle width.                                                                              |
| Operating Range : 550mm                                                                                                 |
| Dispense area : 100 mm x 550 mm sheet, can accommodate card size from 50 mm to 10 mm width and upto 550 mm length       |
| Syringe 250 µl (standar                                                                                                 |
| Tubing : Standard Teflon Tubing with Standard Connectors                                                                |
| Adjustments : Nozzle contac                                                                                             |
| Line distance adjustable from 4 mm to 10mm                                                                              |
| Conjugate spray nozzle height                                                                                           |
| Nozzle contact angle                                                                                                    |
| Easy switch from contact to non contact Printing                                                                        |



## ARS 65 Series

| Model No: | F100-01                                                               | F100-02                                                                                     |
|-----------|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|           | Contact Printer with 2 Line Printing Pumps and 1 Conjugate Spray Pump | 3 pumps with 2 Non Contact printing nozzles, 2 Contact Printing Nozzles and 1 Spray Nozzle. |

## Options

Contact or non-contact printing machine  
Optional Systems for dot printing  
Ungradable upto 10 Pumps  
Conjugate Spraying Nozzles  
Optional Sheet Feeding Trays

# Flowline F200

This 200 x 200mm printing machine is equipped with micro dispensing solenoid spray valve which can spray liquid onto the sample sheet as small as 400 micron. System can dispense patterns of dots, strips, arcs and on different planes or curved surface with automatic control panel. Continuous flow of the sample solution is achieved by a dual syringe pump with solenoid valve. It can continuously cycle allowing two syringes to dispense fluid while the opposite two syringes are refilling. Pump reverses at end of cycle and delivery continues.

Integrated vacuum table is provided for holding thin sheet stock in place by drawing air down through the table. It eliminates the need for tape while printing. For printing monitoring / inspection a 5MP CMOS camera is used.



# Glass Cutting and Slicing Machine

## Model GC 500

Holmarc's Glass Cutting and Slicing Machine Model: OptoFab GC500 is designed for precision cutting and slicing of glass substrates. Engineered with robust motorized control, high-resolution components, and user-friendly operation, this machine ensures clean, accurate slices with minimal chipping. It is ideal for research laboratories, manufacturing units, and materials science applications requiring repeatable and customizable cutting performance. This machine ensures precise control, long-term stability, and operator safety, making it a reliable addition to any professional cutting environment.

|                         |                                                  |                                                 |
|-------------------------|--------------------------------------------------|-------------------------------------------------|
| <b>Specifications</b>   | Bed Travel                                       | At least 250mm x 450mm                          |
|                         | Bed Movement                                     | Motorized                                       |
|                         | Z-axis Cutting Movement                          | Motorized                                       |
|                         | Cutting Speed                                    | Adjustable from 6 to 99 mm/min                  |
|                         | Minimum Slice Thickness                          | 5 mm                                            |
|                         | Cutting Wheel Type                               | : Diamond Cut-Off Wheel                         |
|                         | Cutting Wheel Diameter                           | 250 mm                                          |
|                         | Wheel Holding Diameter                           | 32 mm                                           |
|                         | Cutting Thickness                                | 3.5 mm                                          |
|                         | Cutting Accuracy                                 | 0.5 to 1 mm                                     |
| <b>Workpiece Holder</b> | Level Angle:                                     | $\pm 45^\circ$                                  |
|                         | Longitudinal Angle                               | $\pm 10^\circ$                                  |
|                         | Lifting Height                                   | 200 mm                                          |
| <b>Rotating Table</b>   | Spindle Speed                                    | Adjustable from 3000 to 4000 RPM                |
|                         | Power Supply                                     | 220V AC, 50Hz, 2 kW                             |
|                         | Structural Frame                                 | Mild Steel with hard-coated painted finish      |
|                         | Rotation                                         | 360° continuously rotatable                     |
|                         | Mechanism                                        | Precision worm gear with double-bearing support |
|                         | Load Capacity                                    | 10 kg                                           |
|                         | Marking                                          | Graduated rotary scale for visual reference     |
|                         | Construction Material                            | High-grade aluminum or sturdy alloy             |
|                         | Surface Finish                                   | Black anodized                                  |
|                         | Maximum Substrate Dimensions (Oscillation mode): | 350 x 200 x 85 mm                               |
|                         | Maximum Substrate Dimensions (Side cut mode):    | 170 x 200 x 85 mm                               |

### Rotating Table



### Workpiece Holder:



### Control Software



### Glass Cutter



## Features

- High speed operation
- Compact & versatile
- All contact parts made from high quality Stainless Steel 316
- Machine body is elegantly finished from Stainless Steel 304
- Cartridge sensing system to avoid wastage of costly liquid
- High filling accuracy of  $\pm 0.5\%$  in single dosing
- All operations on one platform, hence less space requirement

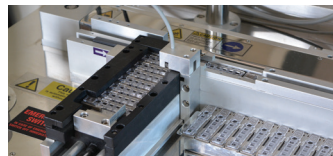
## Automated Filling & Sealing station TDU9000S

**Automated i4 Cartridge Filling / Sealing station (TDU 9000S) with QR code printing, labeling & reader online system.**

### Model : HO-BLI-TDU9000S

TDU9000S is a 3 x 6 channel Precision Automated Inspection, Filling & Sealing station. Designed for filling and sealing and optical inspection of cartridges and tubes used in pharmaceuticals, biotech and bio-pharmaceutical industry. Machine is compact and provides higher production output. It also fulfills the desires of many manufacturers to have a truly customized solution to fit their needs.

Pre-inspection Automation : System design Based on Si Photodiode photo-metric measurements and a camera based polarized bottom leak scratch detection. The onboard camera and detector unit will analyse each cuvettes for transparency, crack, scratch and other deformation.



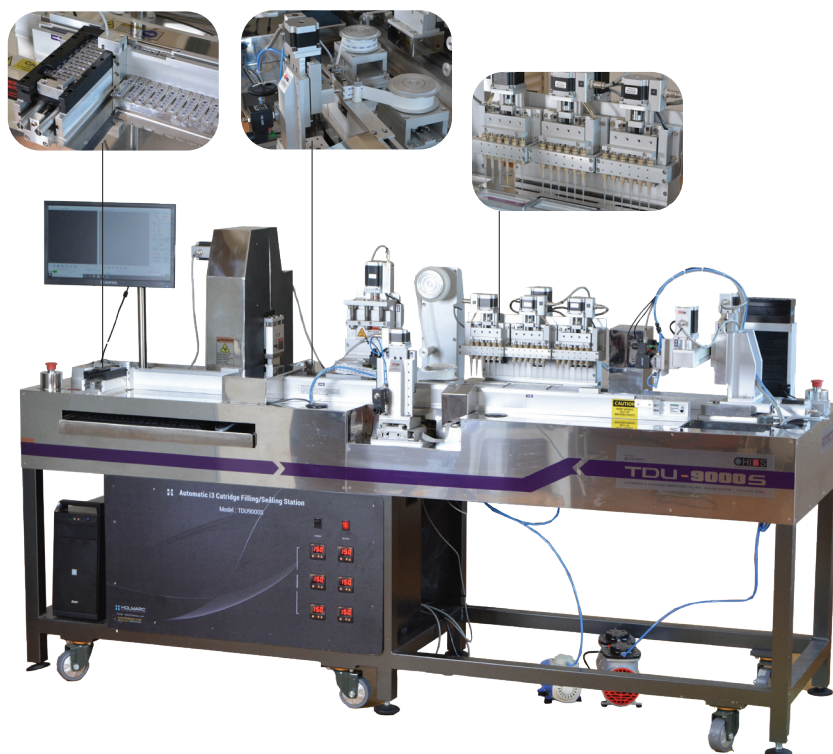
### Technical Specifications

|                                      |                                                            |
|--------------------------------------|------------------------------------------------------------|
| Output                               | 500 Cartridges / Hr                                        |
| Movements                            | Motorized conveyor system                                  |
| Controls                             | Automated rejection & counter unit                         |
| Measurement parameters for rejection | Transparency, crack & scratch                              |
| Photo-metric Unit                    | Hamamatsu Si Photodiode detector                           |
| Transmittance Range                  | 0 to 100 %                                                 |
| Resolution                           | 0.1 %                                                      |
| Absorbance Range                     | 0 to 2 A                                                   |
| Resolution                           | 0.001 A                                                    |
| Digital Imaging Unit                 | 5 MP camera based system for deformation inspection        |
| Sensor                               | CMOS, Color, 5Mp                                           |
| Optical format                       | 1/2.5"                                                     |
| Active imager size                   | 5.70mm x 4.28mm (7.13mm diagonal)                          |
| Active pixels                        | 2592 H x 1944 V                                            |
| Pixel size                           | 2.2um x 2.2um                                              |
| Dynamic range                        | 67.7dB                                                     |
| Shutter                              | Electronic rolling shutter                                 |
| Software interface                   | TWAIN / DirectShow                                         |
| Operating mode                       | Continuous output                                          |
| Adapter type                         | C' Mount                                                   |
| Polarizer type                       | Linearly polarized                                         |
| Polarizer rotator                    | 360 degree continuous                                      |
| Resolution                           | 1 degree                                                   |
| Operation Mode                       | Stand alone                                                |
| Operation                            | Microprocessor controlled unit                             |
| Drives                               | M torque BIPOLAR MICROSTEP DRIVER                          |
| Structural Materials                 | Teflon / stainless steel / Black Anodized Alluminum Alloys |
| Power supply                         | 220 - 240v 50/60 Hz supply                                 |



## Process

- Cartridge loading on tray/conveyor
- Cartridge Automatic position sensing
- Transparency photo-metric inspection
- Crack scratch and deformation detection by polarizer imager unit
- Automatic rejection module for rejecting failed Cartridges
- Rejection and filling counts will be displayed on monitor



### TDU 9000S Filling / Sealing Specifications

|                            |                                                                                                                                                   |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Cartridge Type             | i4                                                                                                                                                |
| Output                     | 500 Cartridges / Hr                                                                                                                               |
| Filling Range              | 1ul to 300ul                                                                                                                                      |
| No. of filling head        | 18                                                                                                                                                |
| No. of liquid channels     | 3                                                                                                                                                 |
| No. of filling per channel | 6                                                                                                                                                 |
| Output                     | 1000 cartridges / hr                                                                                                                              |
| Cartridge Type             | Plastic                                                                                                                                           |
| Contact Parts              | Stainless Steel 316                                                                                                                               |
| Material construction      | Stainless Steel 304                                                                                                                               |
| Filling pump type          | Syringe Pump - Micro pipettes                                                                                                                     |
| Filling Format             | 3 x 6 Channel                                                                                                                                     |
| Actuator                   | Stepper Motor                                                                                                                                     |
| Cutting Unit               | Mechanical                                                                                                                                        |
| Dispensing accuracy        | +/- 0.5% Max                                                                                                                                      |
| Sealing unit               | RT-200 Degree C variable temperature Head                                                                                                         |
| Filling Module             | 6 Channel Motorized Pipetter with aspiration / dispensing controls                                                                                |
| QR Code reader             | Integrated QR code inspection system on label feeder                                                                                              |
| Labeling                   | Automated online labeling with optical inspection (System will automatically sense the QR passed sticker and stick on the cartridges accordingly) |
| Operation Mode             | PC Based                                                                                                                                          |
| Operation                  | Microprocessor controlled unit                                                                                                                    |
| Drives                     | M torque BIPOLAR MICROSTEP DRIVER                                                                                                                 |
| Structural Materials       | Teflon / stainless steel / Black Anodized Aluminum Alloys                                                                                         |
| Power supply               | 220-240v 50/60 Hz supply                                                                                                                          |

### Process

- Cartridge loading on tray / conveyor
- Cartridge Automatic position sensing
- Sticker roll feeder movement
- QR Code Reading - sensing process
- Auto labeling and fixing by sensing the cartridge
- 6 Channel Motorized Pipetter Aspiration process
- 6 Channel Motorized Pipetter liquid Dispensing process
- Cartridge Sealing process
- Cartridge cutting/ finishing process
- QR Code/ bar-code reading process
- Rejection/warning of failed Cartridges
- Rejection and filling counts will be displayed on a monitor(All datas are saved on a computer for future analysis)
- Output Collection (Manual)

# Automated Filling & Sealing station

## Model TDU7000S

TDU7000S is a 3 x 6 channel Precision Automated Filling & Sealing station. Designed for filling and sealing of cartridges and tubes used in pharmaceuticals, biotech and biopharmaceutical industry. Machine is compact and provides higher production output. it also fulfils the desires of many manufacturers to have a truly customized solution to fit their needs.

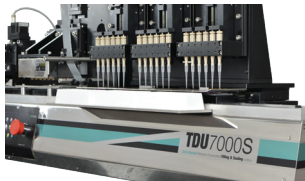
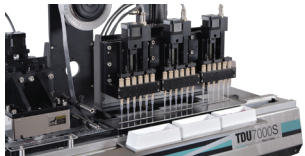
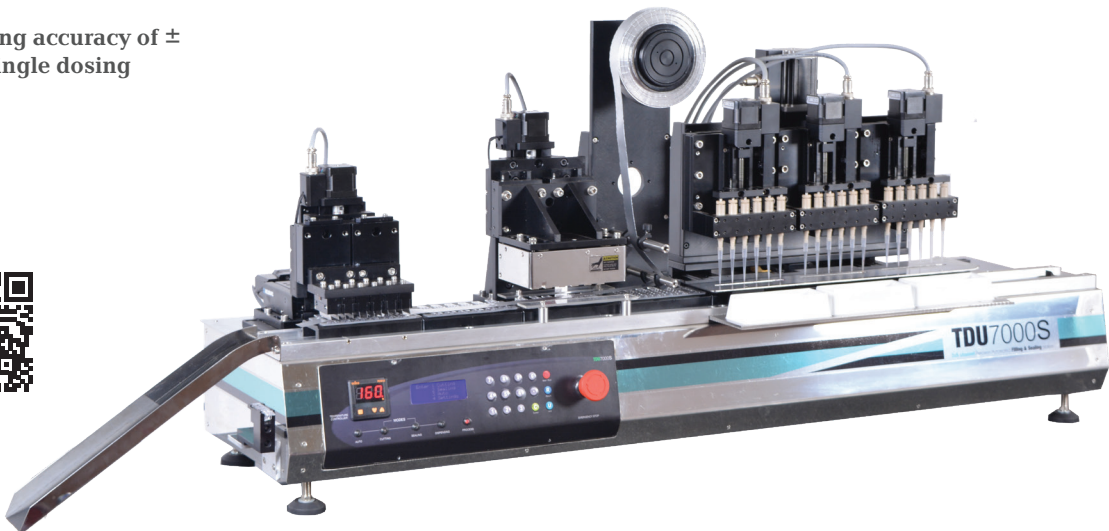
### Technical Specifications

|                            |                                    |
|----------------------------|------------------------------------|
| Model                      | TDU7000S                           |
| Filling Range              | 1ul to 300ul                       |
| No. of filling head        | 18                                 |
| No. of liquid channels     | 3                                  |
| No. of filling per channel | 6                                  |
| Output                     | 1200 cartridges / hr               |
| Cartridge Type             | Plastic                            |
| Contact Parts              | Stainless Steel 316                |
| Material construction      | Stainless Steel 304                |
| Filling pump type          | Syringe Pump - Micro pipettes      |
| Power Supply               | 230V A                             |
| Overall Dimension          | 1260mm (L) x 400mm (W) x 600mm (H) |

### Salient Features

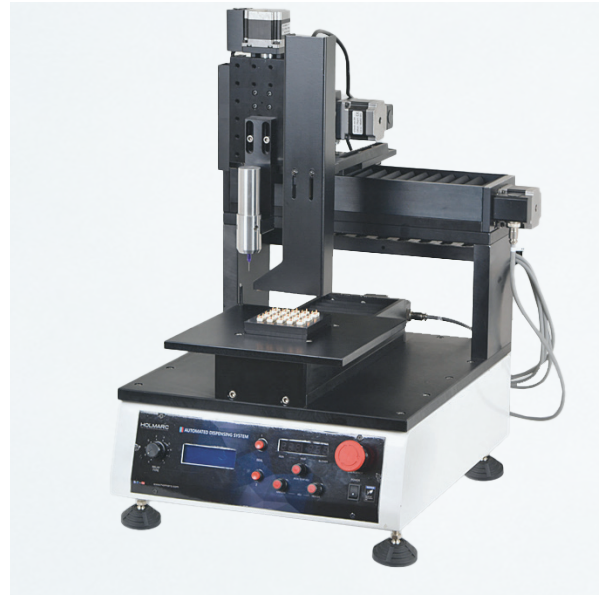
- Compact & versatile
- All contact parts made from high quality Stainless Steel 316.
- Machine body is elegantly finished from Stainless Steel 304.
- Cartridge sensing system to avoid wastage of costly liquid.
- High filling accuracy of  $\pm 0.5\%$  in single dosing.
- All operations on one platform, hence less space requirement.

With Cartridge sensing system  
High filling accuracy of  $\pm 0.5\%$  in single dosing



# Automated Dispensing System

Holmarc HO-ADS-5H Series automated Relay sealing machines are designed for accurate glue dispensing using any pneumatic syringe barrel or valve systems. The system has a preheating facility which is useful for efficient sealing when using high viscous glues. 5 axis motions handle each relay separately for heating and dispensing. The machine comes along with an easy to use software, to create different motion profiles. The software introduces simple commands like move, speed, delay, dispenser ON and dispenser OFF for the programming. Two motion profiles can be saved for a single relay. User can execute these profiles separately on use. User can save any no of profiles in the PC and 25 no's in the machine hardware.



## Specifications

|                                                                            |                                   |
|----------------------------------------------------------------------------|-----------------------------------|
| Model                                                                      | HO-ADS-5H                         |
| Platform range                                                             | 200 x 200 mm                      |
| Travel range Platform XY                                                   | 200 x 200 mm                      |
| Travel range Z                                                             | 25 x 25 mm                        |
| Travel range Relay XY                                                      | 25 x 25 mm                        |
| XYZ Repeatability                                                          | 25 x 25 mm                        |
| Resolution                                                                 | .03 mm (Half step mode)           |
| Accuracy                                                                   | .05 mm (Half step mode)           |
| Maximum Speed                                                              | 30 mm/sec (all axis)              |
| Relay Fixture Type                                                         | Anodized aluminium                |
| Relay Fixture                                                              | 2 Nos                             |
| Material Construction                                                      | Mild Steel                        |
| Power Supply                                                               | 110 ~ 230V 50Hz AC                |
| Overall Dimension                                                          | 500mm (L) x 430mm (W) x 560mm (H) |
| Note : Dispenser, Pneumatic Valve are not included in the scope of supply. |                                   |



# High Speed Shutter Mechanism with tranverse system for convective heating facility

## Specifications

|                                                                                    |                                                                                         |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Traverse mechanism                                                                 | 1 Unit                                                                                  |
| Axis 1                                                                             | X-X stage with stepper motor and positioning controller                                 |
| Travel length axis 1                                                               | 500mm                                                                                   |
| Max. Speed                                                                         | 15mm/sec                                                                                |
| Positioning accuracy for axis 1                                                    | 0.1mm                                                                                   |
| Drive axis 1                                                                       | Ball screw                                                                              |
| Axis 2                                                                             | Manual Y-Y stage                                                                        |
| Travel length axis 2                                                               | 100mm                                                                                   |
| Drive axis 2                                                                       | Manual knob with screw gauge mechanism                                                  |
| Positioning accuracy for axis 2                                                    | 0.1mm                                                                                   |
| Axis 3                                                                             | Manual Z-Z stage                                                                        |
| Travel length axis 3                                                               | 100mm                                                                                   |
| Drive axis 3                                                                       | Manual knob with screw gauge mechanism                                                  |
| Positioning accuracy for axis 3                                                    | 0.1mm                                                                                   |
| Specimen mounting plate with M6X10mm internal threaded array (16nos at 20mm pitch) | 100mmX100mm                                                                             |
| Weight of specimen will be attached                                                | 2kg                                                                                     |
| Machine table                                                                      | 1 Unit                                                                                  |
| Table surface                                                                      | Mild steel with Anti- rust coating                                                      |
| Size                                                                               | According to the traverse and shutter mechanism size.                                   |
| Legs                                                                               | Sturdy with Anti rust painting, with leveling arrangement.                              |
| Caster wheel                                                                       | Nylon wheel-4 nos                                                                       |
| High speed shutter mechanism                                                       | 1 Unit                                                                                  |
| Actuator/Mechanism                                                                 | Linear or angular movement                                                              |
| Minimum exposure time                                                              | 10millisec.                                                                             |
| Max exposure time                                                                  | 1000s                                                                                   |
| Shutter plate size                                                                 | 100mmX100mm                                                                             |
| Shutter plate material                                                             | copper                                                                                  |
| Shutter plate water cooling                                                        | water flow >3LPM, hoses                                                                 |
| End limit sensors                                                                  | response: <2milliseconds                                                                |
| controller and software                                                            | X-X axis traverse along with shutter control and programming from PC, suitable software |
| Software compatibility                                                             | Windows 10 or latest                                                                    |
| Additional accessories                                                             | Emergency cut-off                                                                       |

## Manual XY Stage

100mm Travel with manual Knob drive at positioning accuracy of 0.1mm

Shutter Mechanism

MS Table



# Device For Testing Stiffness of Links

## Model No. HO-LSTD-02

The Device for Testing Stiffness of Links aids in automated testing and recording of strength of the links as part of functionality checks during Qualification, Acceptance, Surveillance Inspection, Endurance/ Creep Test, Life Extension/ Refurbishment etc. It is compatible with links of different caliber of rounds (30 mm, 12.7 mm, 7.62 mm). It is supported by a Windows software based user interface, capable of analyzing the recorded data for comparison and extrapolation. It is an automated device capable of precise recording the movement / expansion of links during pull, representing the strength of links. The device is designed in such a way that the link can be mounted on a two part fixture. One part of the fixture is mechanically moved away from the other part, using a motorised linear translation stage arrangement, pulling the link open. An attached load cell measures continuously the force applied on the link till the specified width of opening of the link is reached. The measured values are sent to a PC through the RS232 interface and the pull force is continuously recorded and displayed on the software. And it was developed under.

## Main frame / Table for mounting sub-assemblies and PC

The main frame design of the device is supported by an integrated steel structure that stands on the floor

|                                                                           |                                                       |
|---------------------------------------------------------------------------|-------------------------------------------------------|
| Material                                                                  | Steel table with solid wood top                       |
| Dimensions (L x W x H)                                                    | 1200 x 750 x 1000 mm                                  |
| Surface Finish                                                            | Epoxy Painted (Metallic part) & Polished Wooden Part. |
| Castor wheels with brake and leveling bolts                               |                                                       |
| Cabinets for placing accessories                                          |                                                       |
| Acrylic cover for the upper part which houses the force measurement setup |                                                       |

## Two Part Fixture for Mounting Specimen Link

The link is mounted on the two part fixture in which one part is stationary and the other part is moving. It is fabricated with non-magnetic stainless steel plate with slots to mate with the link. The moving part is connected to a motorised linear transitional stage, through a load cell. The moving part is moved by the transitional stage horizontally, away from the sample, to pull open the link and measure the maximum pulling force required for the same. The movement can be programmed in steps of 0.1 mm with provision to program dwell time up to two minutes, at each step.



## Suitable Motor with Variable Speed

|                      |                          |
|----------------------|--------------------------|
| Type                 | Bipolar                  |
| Step Angle           | 1.8 Degree               |
| Operating Temp       | -20 to 50 Degree Celsius |
| Rated Voltage        | 2.7 V                    |
| Current per phase    | 6 A                      |
| Resistance per phase | 0.45 Ohm                 |
| Holding Torque       | 8.7 Nm                   |

## Sensor / Transducer / Load Cell

|                   |                                            |
|-------------------|--------------------------------------------|
| Capacity          | 450kg                                      |
| Measurement Type  | Tension load                               |
| Cable Length      | 3 m                                        |
| Working Principle | Strain gauge in Wheatstone bridge config.. |

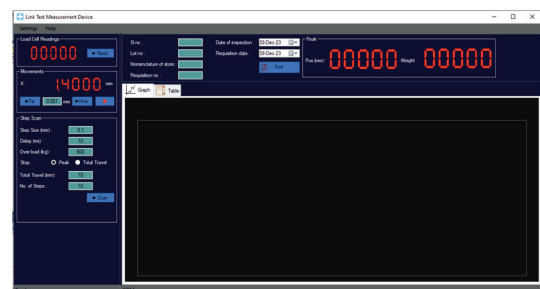
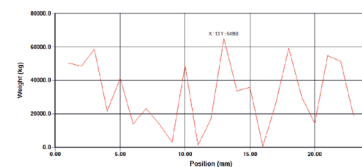
Material Alloy Steel

Resolution 1 kg

Threaded through holes

## Data Acquisition System with Monochrome Laser Jet Printer

|                   |                   |
|-------------------|-------------------|
| Type              | Desktop PC        |
| Operating Systems | Windows           |
| Port              | 2 USB             |
| RJ -45 Port       | One port          |
| Networking        | Integrated        |
| Keyboard          | USB Keyboard      |
| Graphics          | On board Graphics |



## Multi Axis Manipulator

**Model: HO-APS-300R2**



Conventional and digital radiography techniques with multi axis manipulator have been widely used by industries for routine and in-service inspection for non destructive testing (NDT). Automated positioning and movement systems (manipulators) enable quality radiography images with minimum number of exposures. Holmarc manufactures six axes manipulators for X-ray & CT applications as standard products. The system is equipped with six motorized axis and two / three manual stages. On one of the arms, X-ray source (100kgs approx.) can be mounted while flat panel with lead mask (200kgs approx.) can be mounted on the other arm. Both these arms have X-Z movement (300 mm) with accuracy of 50 micron and option to have two more additional motorized axes. At the center of these two arms, the sample stage is mounted with motorized X, Y, Z and rotation stages. The manipulator makes the alignment of the source, detector and sample easy and precise. The position (rotation) of sample and automatically acquired radiography images for each are used to create computed tomogram of objects. Optional features such as motorized shutters, mounts for additional sources and detector etc. are available. We can tailor the system to our customers needs as well.

**Useful for both X-ray & CT applications**

**Automated positioning & alignment of source, detector & sample**

## Automated Microscopy Positioning

**Model: HO-MXY-200-Z-200**

All the three linear stages are stepper motor controlled and have precision rolling contact bearings to ensure straight-line accuracy and repeatability in measurements. These stages are fitted with optical encoder having 1 micron resolution. Travel for X, Y and Z stages are 250 mm. Optical head or scanning units can be fitted to the Z stage using suitable angle brackets. Vertical measurements can be taken by repeated focusing at the points of interest.

Digital read outs with 1 micron resolution is fitted to the vertical column at ergonomic eye sight location. The read outs have large LED display and various programmable features like error compensation, calibration, etc.. We can also stack XYZ

stage according to customer's request. It is connected with our motion controller unit and can be controlled by computer software via RS232 interface.

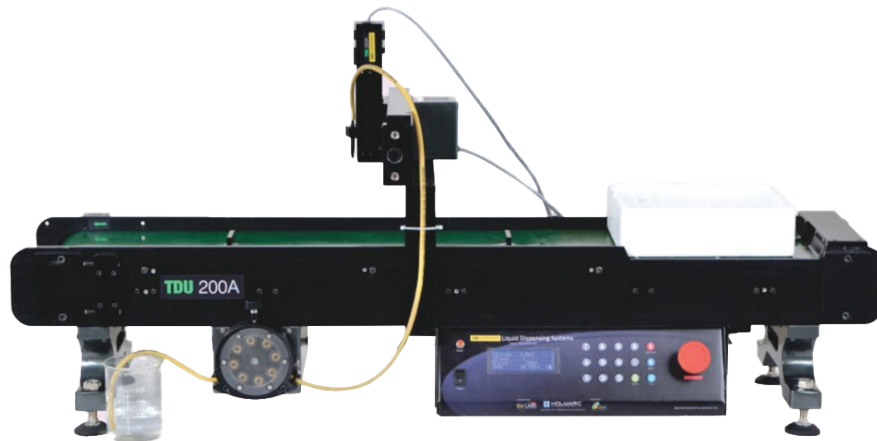
**Excellent repeatability in measurements**

**Digital readouts with 1 micron resolution**



# Vial Dispensing Station

**Model: HO-APS-300R2**

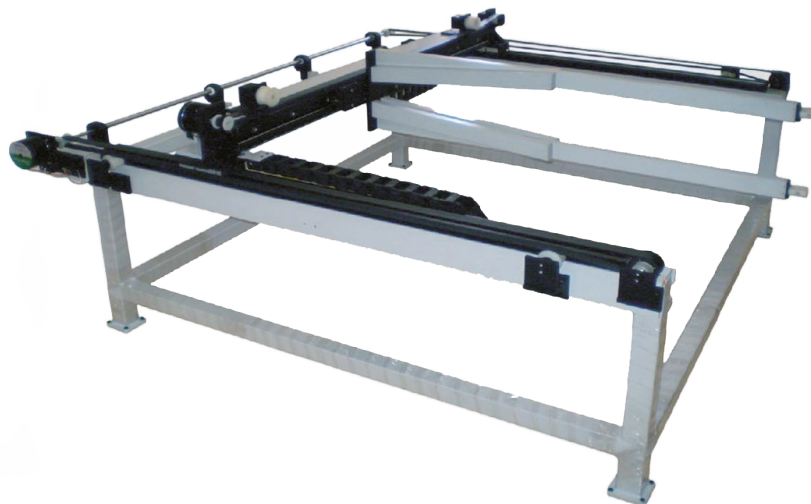


Holmarc's single channel dispensing station automates repetitive dispensing of liquids in to bottles or container in the pre determined quantities. The system consist of a peristaltic pump, conveyor belt for positioning of bottles in x axis, two axis positioning (Y & Z) for dispensing nozzle and stand alone controllers with user interface integrated in the station.

Use of 8 roller peristaltic pump with easily replaceable tubes prevent contamination or the pump liquid in this case do not touch any of the pump parts except the tubing.

# Large XY Scanning Machine

**Model: HO-XY-1000**



The 1X1meter XY stage has been developed by Holmarc for non-destructive testing of honeycomb panels by ultrasound technique. The source and detector head were fixed on carriage of the XY stage. The system is used to scan entire area of the panel under test in shortest possible time period. The stage has toothed belt and pulley system driven by stepper motor for fast XY positioning. The electronics hardware has computer interfacing facility for detector integration as well as for XY raster scan programming.



Designed @ HOLMARC Design LAB  
Cochin, May 2025



## State of the art manufacturing Quick turn customization

Holmarc is unique in its ability to design, prototype, and manufacture under one roof .  
We have well-developed optic, mechanical & electronics fabrication facilities and thin film coating unit.  
Contact us for assistance with your manufacturing needs.

# 5000+

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### Product Group

Optical Tables, Breadboards & Enclosures | Rail carriers & Accessories | Optomechanics  
Positioning Devices | Optics | Analytic Instruments | Imaging Devices  
Optical Fibers, Positioners & Accessories | Optical Sources & Detectors | Spectroscopy  
Bio-Lab Instruments | Life Science | Thin Film Lab Equipments | Holography | Physics Instruments



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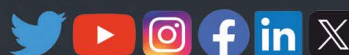
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