

Laser Dicing System

LDS 200 series



SYNOVA

Innovative Laser Systems

The *Laser Dicing System* series

The Laser Dicing System is available with manual loading (LDS 200 M), with cleaning station (LDS 200 C), and with cassette loading (LDS 200 A).



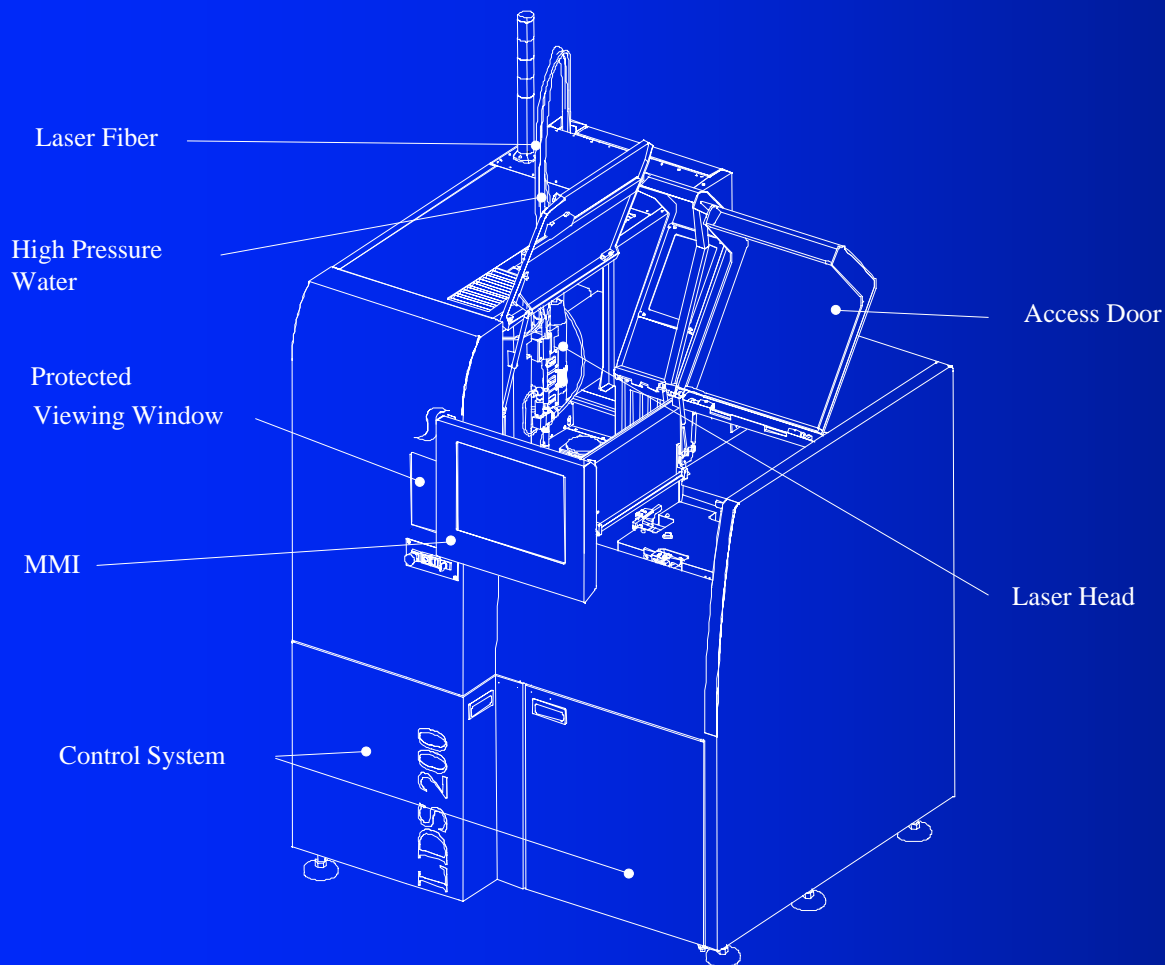
The LDS 200 M requires manual loading. Wafer alignment and kerf check are performed automatically.

The LDS 200 C includes a cleaning unit with DI water for automatic wafer cleaning after the dicing.

The LDS 200 A allows fully automated wafer cutting from cassette to cassette, including cleaning.



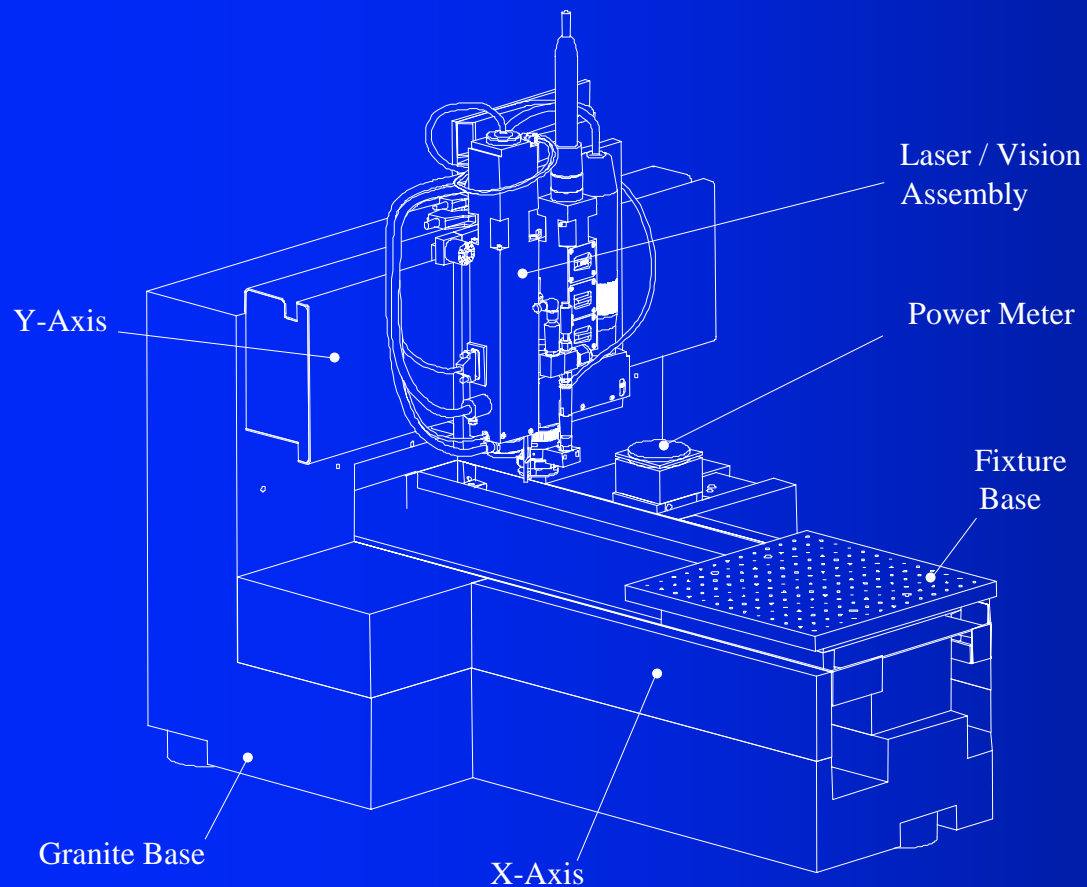
The Basic Machine



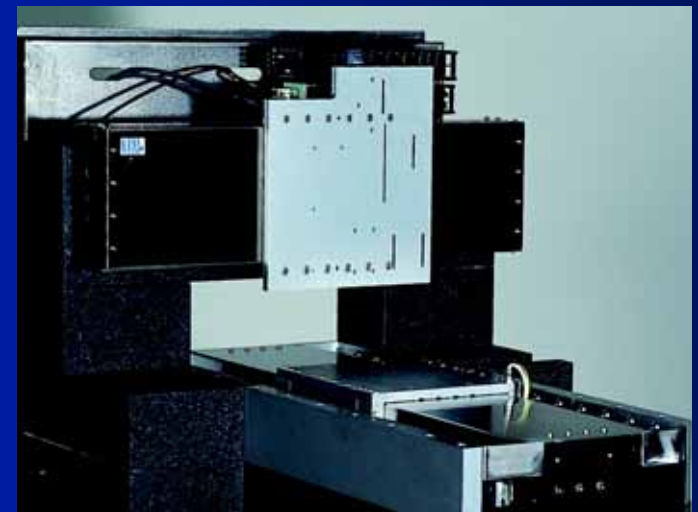
The basic machine incorporates the CNC axis system, the laser head and the machine control.



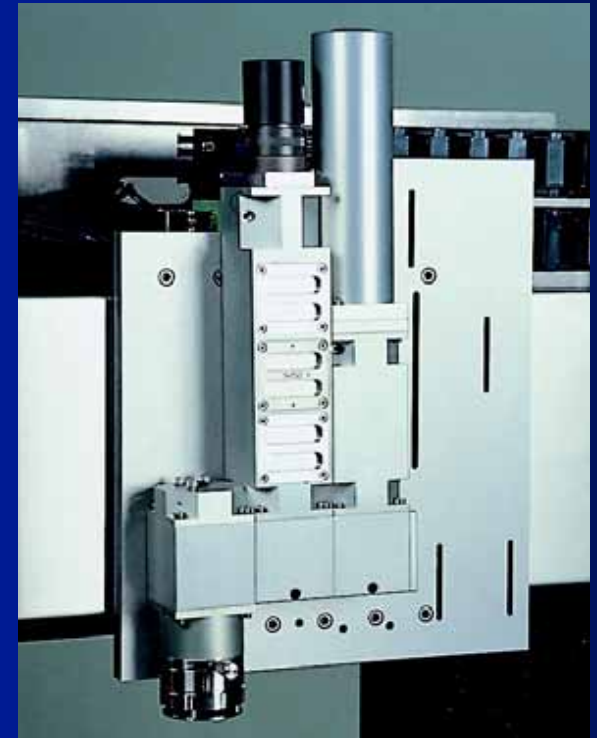
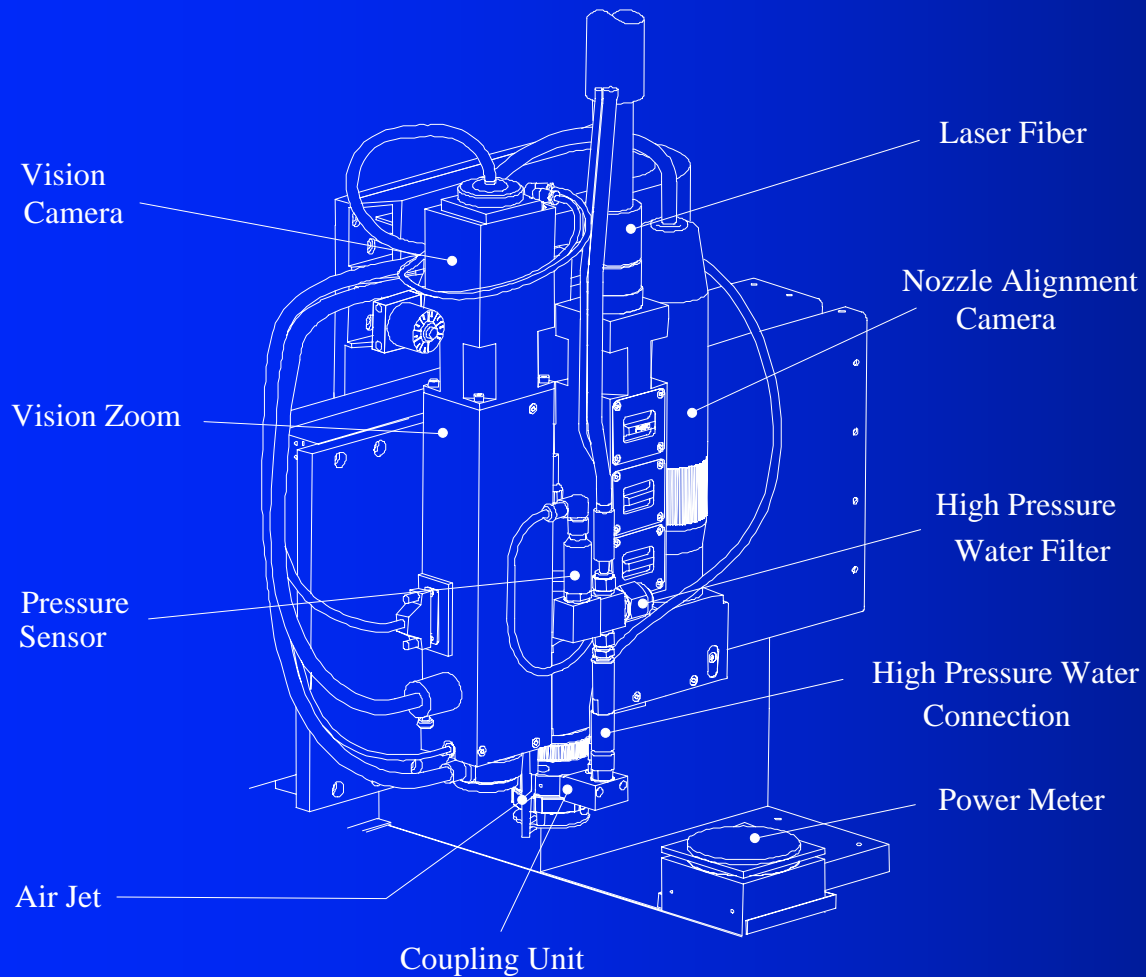
Direct Drive Axis System



A stable structure made of granite is the key for high precision, ensuring an out-standing, dynamic response. Linear motors are used in achieving high speed and accuracy. Furthermore, the system is designed for higher cutting speeds made possible by new laser sources.

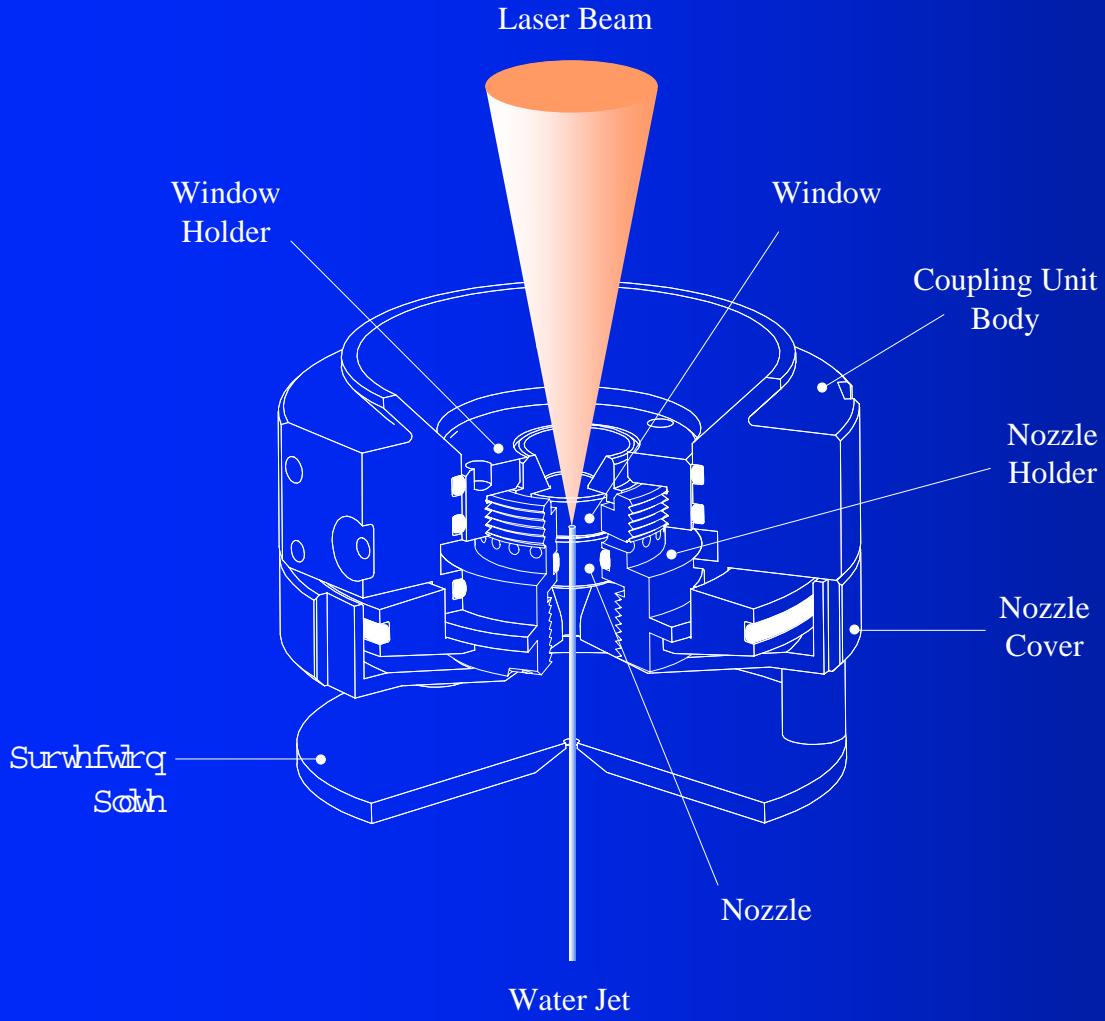


The Laser Head



The Laser head collimates the laser beam at the exit of the fiber cable and focuses it into the nozzle. A CCD camera allows accurate alignment of the focal point.

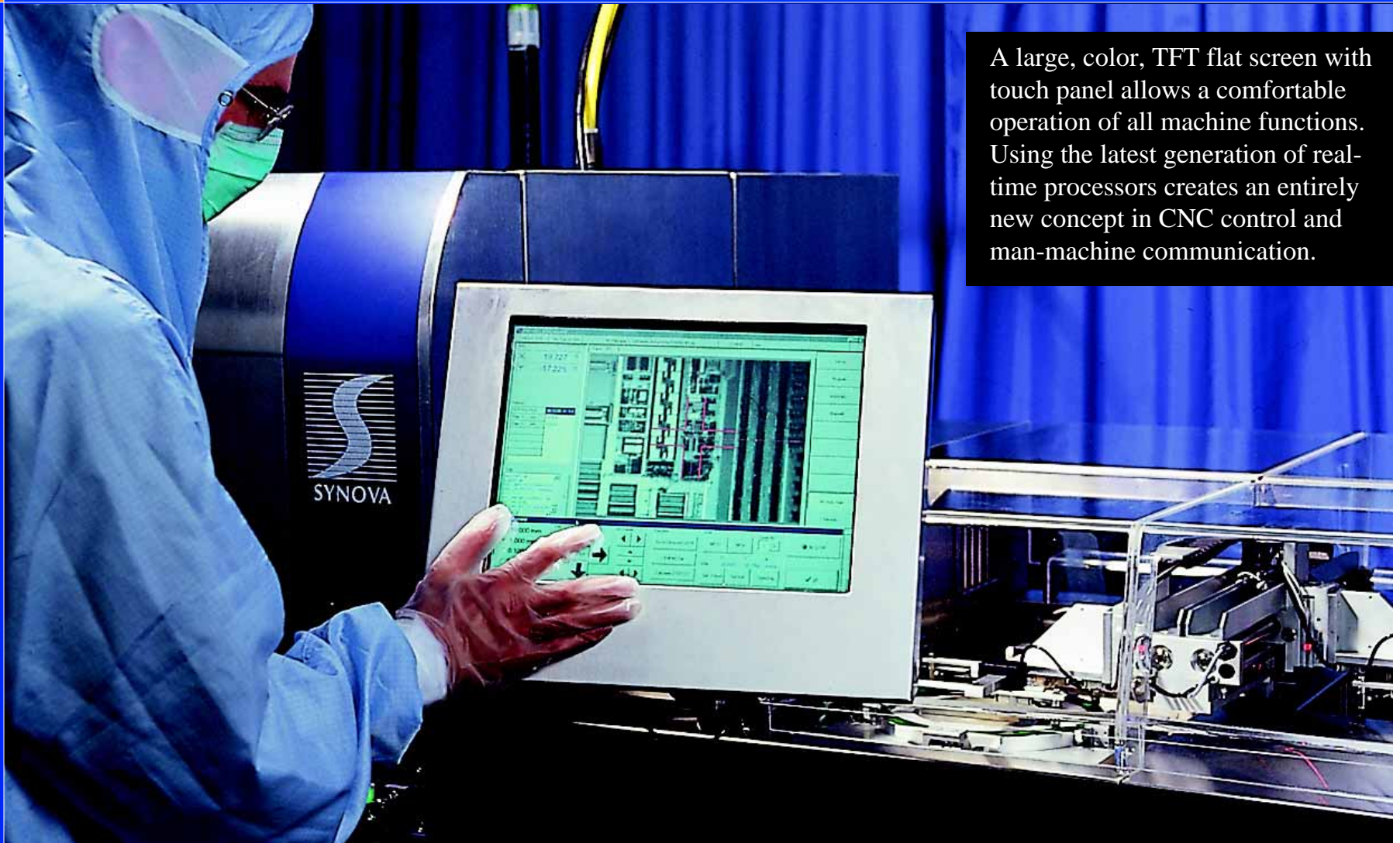
Coupling Unit



In the coupling unit, the laser beam is focused through a window into the center of a nozzle. The windows and the nozzles are easily replaceable.

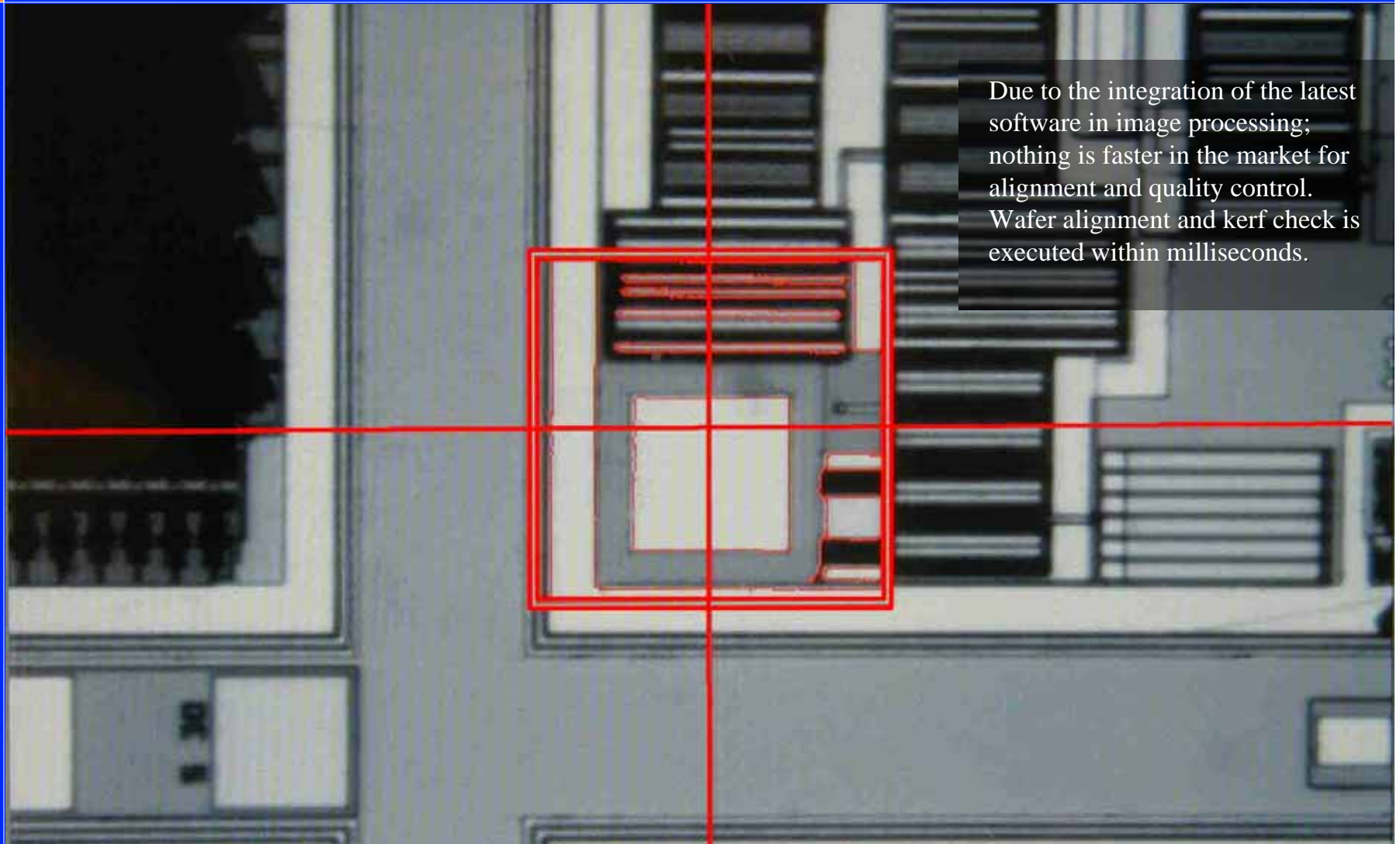


Operation Interface



A large, color, TFT flat screen with touch panel allows a comfortable operation of all machine functions. Using the latest generation of real-time processors creates an entirely new concept in CNC control and man-machine communication.

Alignment



Due to the integration of the latest software in image processing; nothing is faster in the market for alignment and quality control. Wafer alignment and kerf check is executed within milliseconds.

Data Input

Hardware



Ethernet 100 MB/s for complete net integration



CD ROM Read/Write

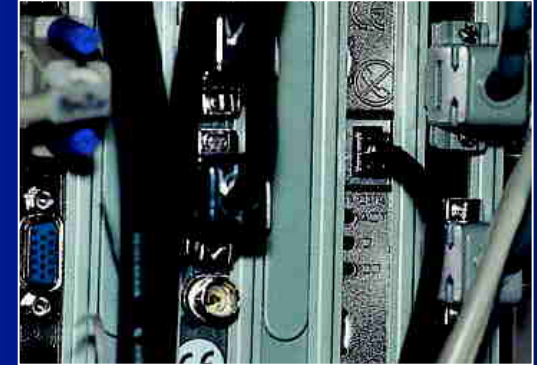


3.5inch Floppy disc

Software

DXF interface for CAD data

CNC Programs



Editing Programs:

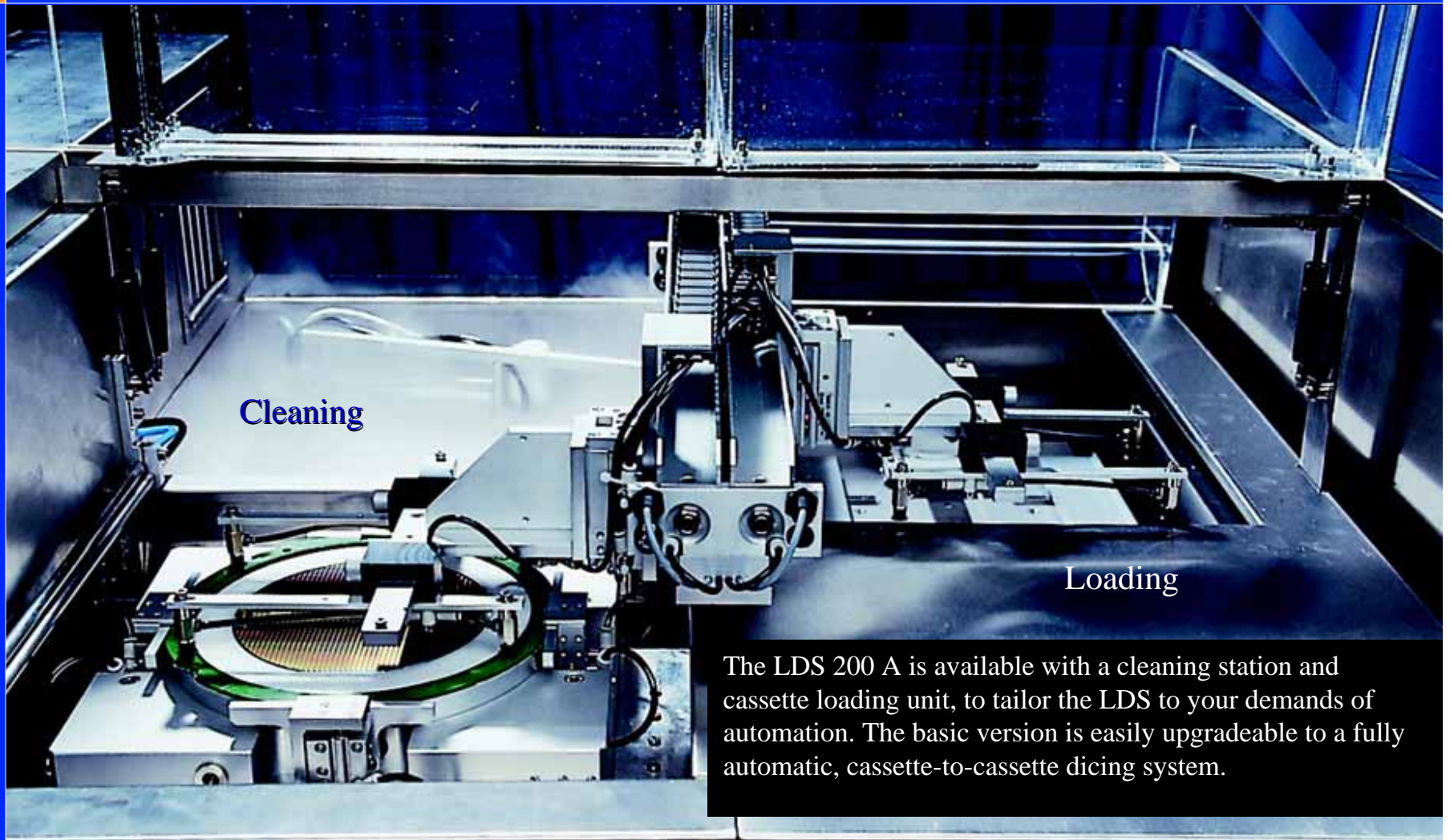
- CNC programs for advanced programmers
- Simple interface with variables for low level programmers

```
Edit-Filename: C:\jdk\data\nc\User1\Geo6.nc
M-Line M-Begin M-End [Icons] Redo Keyboard
[ Part-No. : 1001 ]
[ Count of starts :1=$COUNTY ]
[ Count of lines XY :18=$COGNTX ]
[ Distance XY mm :1.05=$VALUE2 ]
[ Cutting XY mm :17.9=$VALUE1 ]
[ Cleaning 0-no lyes :0=$CLEANING ]

-----
----- Var : -----
!Var
!i:integer;
!j:integer;
```

Part-No.	1001
Count of starts	1
Count of lines XY	18
Distance XY mm	1.05
Cutting XY mm	17.9
Cleaning 0-no lyes	0

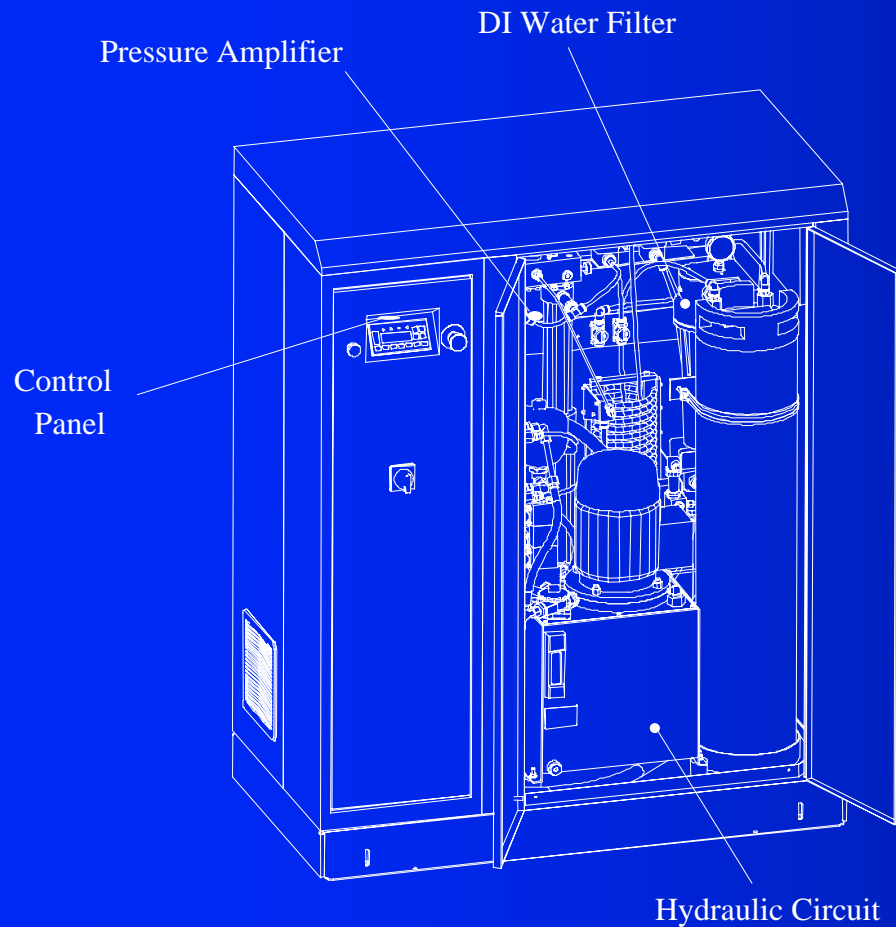
Cleaning / Loading



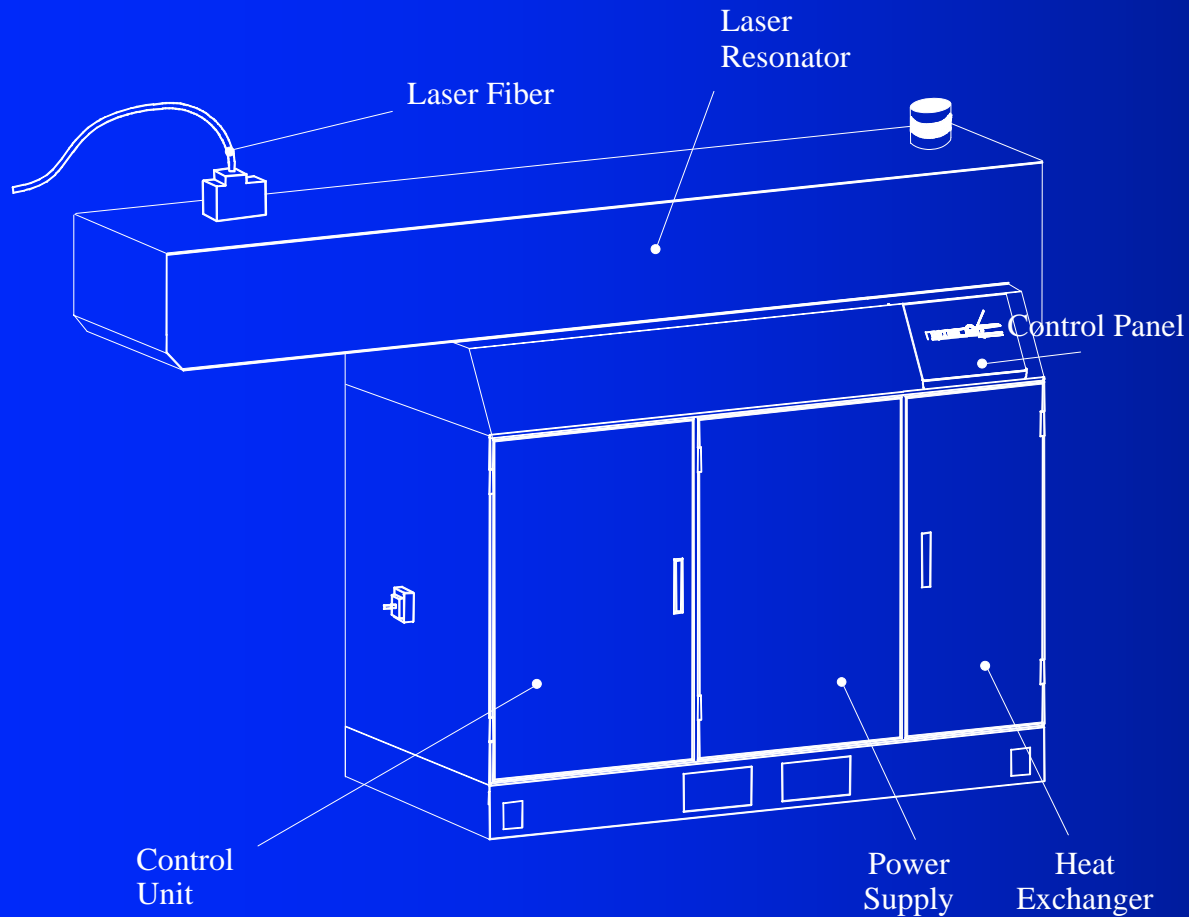
Water Pump

The hydraulic pump, based on the amplifier principle with two separated circuits, generates the water pressure which is needed to produce the water jet.

Pressure range: 0-500 bar
Flowrate: 5-100 ml/min



Laser



The Laser Source generates the laser beam, which is transmitted to the Laser Dicing machine via a fiber.

Wavelength: 1064 nm
Average power: 200 W



Emplacement

Advantages of the separation

- Small footprint of cutting station, low occupation of expensive clean room space
- No noise in the clean room, because laser and pump are outside of clean room
- No need of water cooling in the clean room
- No heat source in the clean room
- Easy access to laser source and water pump
- Upgradable: Simple and fast exchange of laser source for new, more powerful, better performing generations
- Energy sharing: 1 water pump can supply up to 5 cutting stations
- Easy exchange in the case of a failure

There is a possibility of multiple machine usage and also separating the machines from the laser and water source.

Only the primary machines are located in the clean room, the laser sources and the pump are installed in the supply room.



Specifications

AXES

Type	XY-Table with separate axes Drive Linear motors
Useable working area	240 x 240 mm
Maximum stroke (X x Y)	600 x 400 mm
Accuracy	< 3 μm
Repeatability	< 1 μm
Maximum axis speed	1000 mm/s
Maximum acceleration	20 m/s ²
Index	0.1 μm

LASER

Type	Solid state Nd:YAG, pulsed
Wavelength	1064 nm
Average power	120 W
Laser beam transmission	Optical fiber, length 10 m

WATER PUMP

Type	Two-cylinder pressure amplifier
Water flow	Average 0.05 l/min
Water pressure	50 to 500 bars (5 to 50 MPa)
Pressure transmission	Flexible water hose

OPTICAL HEAD

Type	Projection of fiber exit into water jet nozzle
Image ratio	4:1, 6:1 or 8:1
Nozzle diameter	50 μm , 75 μm or 100 μm
Alignment	Vision controlled

VISION SYSTEM

Type	Pattern matching
Magnification	Two-level (high/low magnification)
Optical magnification	0.5 x to 5.0 x
Illumination	Coaxial and ring light, fiber-coupled
Automatic alignment	by image processing
Quality control	Kerf check by image analysis < 5 s

WORKPIECE

Wafer size	25 to 203 mm (1" to 8")
Applicable tape	LaserTape [®]
Applicable tape frame	Standard frame types (6" or 8")

CLEANING STATION LDS 200 C/A

Cleaning	Mega-sonic or high pressure water jet
Drying	Front and back side

LOADING STATION LDS 200 A

Cassettes	Max. 3 cassettes (5", 6" or 8")
Frames	Single frame drawer

The above specifications are subject to changes due to technical improvement.

The LDS conforms to CE, S2 and CDRH regulations.

Options

- Transformer 200V/400V
- Reference scale, +/- 1 micron precision
- Water treatment: De-ionization, filtering, de-gazing
- Uninterruptable power supply for basic machine
- Bar code recognition of frames
- CAM system with NC-editor for CAD data converting
- Chiller for laser source
- Fiber length > 10 m
- Mega-sonic cleaning of wafer



Telemaintenance

Analogue modem connection allows remote assistance and remote maintenance all over the world.

- Software upgrades can be downloaded
- Assistance in programming can be given
- Tele-diagnostic is possible in case of machine failures

Laser Dicing Video

