

**Sharp CNC  
SV-2412 Series  
Mini Mill & Super Mini Mill  
With Fanuc 0i-Mate MD Control  
High Precision Compact Vertical Machining Center**



The Sharp SV-2412 series of compact vertical machining centers are engineered to have unsurpassed quality and outperform all other machines in its category. This is an extremely rigid "C" frame design using hardened and ground box ways. All structural components are made of Meehanite casting with internal ribs running throughout each section. Precision hand scraping of each section provides near perfect alignment assuring long term accuracies.

Spindle choices include a 10 hp, 8,000 rpm CAT 40 for the SV-2412. The SV-2412S offers a 15 hp, 10,000 rpm CAT 40 spindle.

The new Fanuc 0i-Mate MD control with color LCD is used along with all Fanuc motors and drives. For operator convenience, a remote jog handle is standard.

Valuable standard accessories include convenient pull out coolant tank, flood coolant, halogen work light, auto-lubrication system and internal base coolant flush system.

## SV-2412 Series Standard Features

### Machine Travels:

- X = 24" / "Y" = 12" / "Z" = 18"

### Worktable

- 27.6" x 12.1"

### CNC Control:

- Fanuc Oi-Mate MD
- 8.4" color LCD
- Remote jog handle (MPG)
- All Fanuc motors & drives
- AI advanced preview control (12 blocks look ahead)
- PCMCIA memory card slot
- 4 spare M codes
- RS232 port

### Spindle:

- CAT-40 taper
- Model SV-2412: 8,000 rpm / 10 hp
- Model SV-2412S: 10,000 / 15 hp
- Spindle orientation
- Spindle air blast

### Automatic Tool Changer:

- Model SV-2412: 10 station (armless type)
- Model SV-2412S: 16 station (armless type)

### Coolant System:

- 42 gallon roll out coolant tank
- Flood coolant system
- Base coolant flush system (internal chip wash)

### Machine Construction:

- All Meehanite cast iron structural components
- Precision hand scraping on all structural components
- Full metal enclosure with removable side doors
- Full metal way covers

### Hardened & Ground Box Ways on all Axes

### Double Anchored, Pretensioned, Double Nut Ball Screws

### Rigid Tapping

### Auto-Lubrication System with Alarm

### Halogen Work Light

### 3 Tier Status Light

### Air Reservoir Tank with Alarm

### Floor Space (without chip conveyor)

- W: 73" / D: 78" / H: 94.5"
- Overall height can be reduced to fit through a 78" door opening by removing Z axis motor

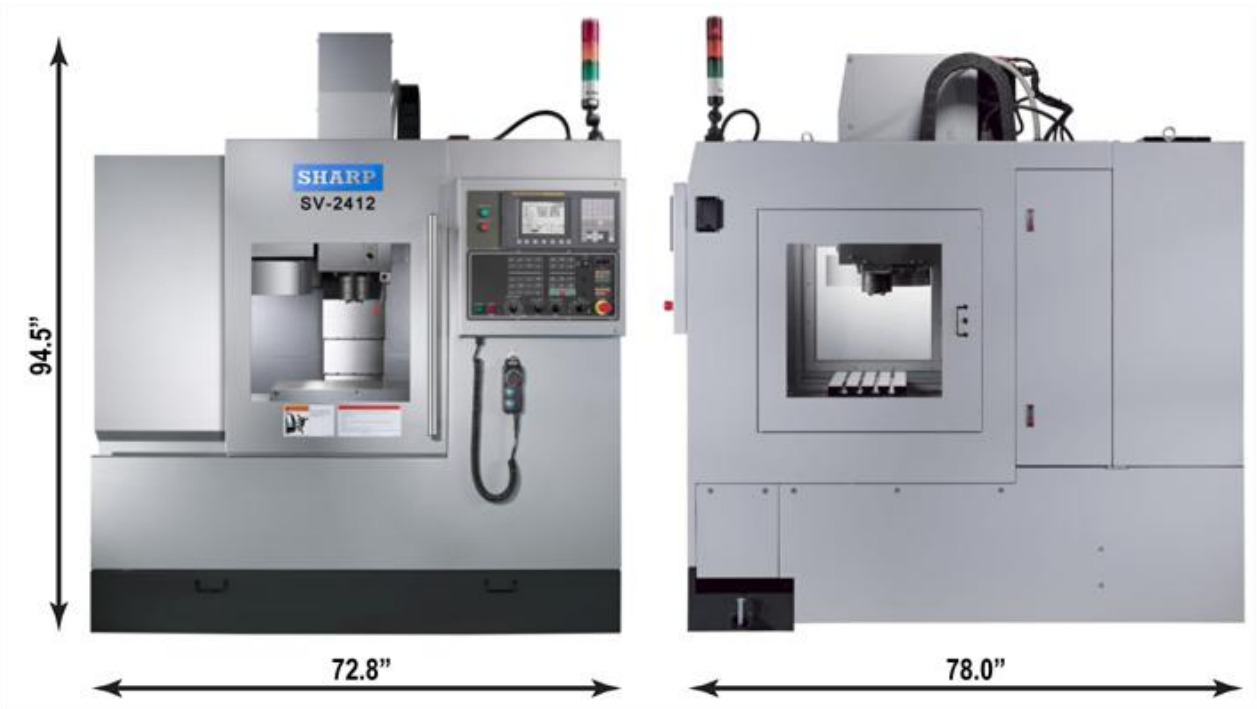
## Standard Machine Specifications

Specifications		SV-2412	SV-2412S
<b>Work Capacity</b>			
X axis travel	mm (inch)	610 (24)	
Y axis travel	mm (inch)	305 (12)	
Z axis travel	mm (inch)	460 (18.1)	
Spindle nose to table	mm (inch)	70 - 530 (2.8 - 20.9)	
Spindle center to column	mm (inch)	415 (16.3)	
<b>Worktable</b>			
Table area	mm (inch)	700 x 308 (27.6 x 12.1)	
Floor to table	mm (inch)	835 (32.9)	
Max. workpiece weight	kg (lb.)	350 (770)	
T-Slot (Number x Width x Pitch)		4 x 16 x 63.5 (4 x 0.6 x 2.5)	
<b>Spindle</b>			
Spindle taper		CAT-40	
Spindle speed	rpm	8,000	10,000
Spindle motor: cont. / 15 min	kw (hp)	5.5 / 7.5 (7.5 / 10)	7.5 / 11 (10 / 15)
Spindle torque: 15 minute rating	nm (ft-lb.)	49 (36) @ 1500 rpm	61 (45) @ 1500 rpm
Transmission		Belt	
<b>Automatic Tool Changer</b>			
ATC type		Armless	
Tool capacity		10	16
Max. tool diameter	mm (inch)	120 (4.7)	93 (3.7)
Without adjacent tool	mm (inch)	150 (5.9)	
Max. tool length	mm (inch)	300 (11.8)	
Max. tool weight	kg (lb.)	7 (15.4)	
Tool change time (tool to tool)		7.5 sec	
Tool change time (chip to chip)		8.1 sec	
Method of tool selection		Address code	
<b>Motion</b>			
Rapid traverse	mm/min (ipm)	X/Y: 20,000 (787) / Z: 18,000 (709)	
Cutting feed rate	mm/min (ipm)	1 - 10,000 (0.04 - 393.7)	
Transmission		Direct drive	
Ball screw diameter / pitch	mm (inch)	32 / 10 (1.3 / 0.4)	
Feed motor (Fanuc)	nm (ft/lb.)	X/Y: 12 (8.9) / Z: 22 (16.2)	
Max. thrust	kgf (lb.)	X/Y: 1773 (3909) / Z: 3251 (7167)	
Positioning accuracy*	mm (inch)	+/- 0.005 (0.0002)	
Repeatability accuracy*	mm (inch)	+/- 0.0025 (0.0001)	

**Specifications**

Specifications		SV-2412	SV-2412S
<b>Coolant System</b>			
Coolant tank capacity	L (gal)	160 (42)	
Coolant Flow	L/min (gal/min)	150 (40)	
<b>Machine Size</b>			
Floor space (w/o chip conveyor)	mm (inch)	W: 1850 (72.8) x D: 1980 (78.0)	
Height**	mm (inch)	2400 (94.5)	
Weight	kg (lb.)	2500 (5511)	2550 (5622)
Door opening	mm (inch)	640 (25.2)	
<b>Power Requirements</b>			
Electrical	220V / 60 Hz	3 Phase / 15 KVA	3 Phase / 18 KVA
Air		5 CFM @ 100 psi	
<b>Shipping Size</b>			
Drawer or spiral chip conveyor	inch	84 x 77 x 100	
Belt type chip conveyor	inch	128 x 84 x 100	

\* Proper foundation and environmental controls are required



\*\* Overall height can be reduced to fit through a 78" door opening by removing the "Z" axis motor.

## Standard Features and Accessories

### Standard Features and Accessories



#### **Hardened and Ground Box Ways**

All guide ways are induction hardened then precision ground

#### **Meehanite Cast Iron**

Meehanite cast iron is used on all structural components.

Finite Element Analysis (FEA) is used to optimize the structure for rigidity.

#### **No Table Overhang**

A wide saddle fully supports the worktable throughout the travel.

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#### **Base Casting**

The base is a rigid one piece casting.

Heavy internal ribs are used to achieve maximum stiffness.

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#### **Precision Hand Scraping**

All mating surfaces are precision hand scraped to increase the flatness and improve geometric accuracy (straightness and squareness) of the whole assembly

Scraping the base casting where the column mounts is shown

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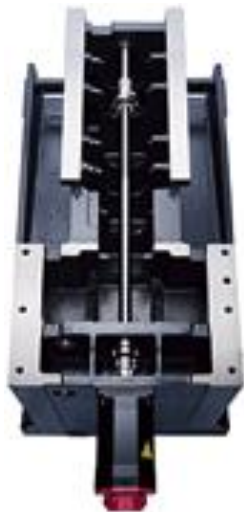
#### **Turcite B**

Turcite B is bonded to all sliding surfaces. Oil grooves are machined and then it's hand scraped to produce an excellent bearing surface.

Note that even the mounting surfaces for the ball screw nut are hand scraped. This assures that it is square to the ball screw and guideways

Underside of worktable is shown

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**Ball Screws**

Each axis is driven by a high precision double-nut ball screw that is centered between the guide ways. The ball screws are pretensioned and anchored at both ends with angular contact thrust bearings.

Double-anchored and double-nut ball screws greatly increase machining rigidity and allows for much heavier cuts. Ball screws using single nuts or ones that are not pretensioned and anchored at both ends will have much greater play and backlash which can lead to problems with chatter and accuracy.

**Axis Drives**

To reduce backlash, all axes are connected directly to Fanuc A.C. digital servo drive motors without the use of gears or belts

**Fanuc Spindle Motor**

The Fanuc spindle motor specifies horsepower during continuous operation and maximum power for 15 minutes. Torque is rated for 15 minutes of operation (see Standard Machine Specifications above).

Many other builders only give a "Max" power ratings, with no time length given. This is the estimated maximum power for only 1 minute or less. Typically these motors continuous power and torque rating are less than 1/2 of their stated maximum.

**Separate Roll Out Coolant Tank**

A large separate roll out coolant tank is used to prevent heat in the coolant from transferring to the machine base casting.

42 gallon capacity

Coolant tank with standard chip bin is shown

**Flood Coolant**

High pressure flood coolant with adjustable nozzles is standard

**Chip Coolant Flush System**

To keep chips from building up inside the machine enclosure, coolant is pumped from the sides (inside the enclosure) to flush chips down to the chip conveyor or chip basket.

**Large Side Doors**

Both sides of the machine enclosure have large removable doors. Long workpieces can be loaded through the sides. The door openings are large enough to allow full "Y" axis travel with long workpieces extending through the sides

**Air Reservoir Tank**

An air reservoir tank with alarm is used to stabilize the incoming air pressure and volume.

**Automatic Lubrication System**

Automatic lubrication with alarm is provided to all ways and ball screws. Lubrication oil is delivered by metered piston distributors to precisely control the volume of oil.

**Fanuc Oi-Mate MD CNC Control**

The new Fanuc Oi-Mate MD CNC control comes with a 8.4" color LCD, a new user interface, more memory, 12 block high speed look ahead function and a faster processor. RS232 port is also included

**4 Spare M Codes**

4 spare (user definable) M codes are included. These can be used for auxiliary equipment such as an indexer that require communication with the CNC control.

**Remote Jog Handle**

A hand held "Manual Pulse Generator" lets each axis move in increments of x1, x10 or x100 for easy fixture or part alignment.

## Fanuc Oi-Mate MD Control Included Functions

- 8.4" color LCD display with tool path graphic
- 32 bit microprocessor
- PCMCIA Card Slot
- Part Program storage length: 512 Kbyte
- 4 spare "M" functions
- Rigid tapping

### Controlled Axis

- 3 simultaneously controllable axes (max)
- Least programmable increment: 0.0001"
- Mirror image
- Inch/metric conversion

### Operation

- MDI operation
- DNC operation
- Program number search
- Sequence number search
- Dry run
- Single block
- Retraction for Rigid tapping

### Interpolation functions:

- Exact stop
- Circular interpolation by radius designation
- Helical interpolation
- Thread cutting, synchronous cutting
- Skip (G31)
- High speed skip
- Reference position return (G27-G30)

### Feed function:

- Rapid traverse override
- Feed per minute
- Feed per revolution
- Cutting feedrate clamp
- Automatic acceleration / deceleration
- Feedrate override
- Jog override
- Automatic acceleration / deceleration
- AI advanced preview control (12 blocks look ahead)

### Program input:

- Tape code: EIA, ISO Automatic recognition
- External memory and sub program calling function
- Absolute/incremental programming (G90, 91)
- Decimal point programming
- Coordinate system setting (G92)
- Work coordinate systems G52-59 (Fixture Offsets)
- Work Coordinate system additional (P1 P48)
- Programmable data input G10
- Subprogram call - 10 folds nested
- Custom Macro B
- Canned cycles for drilling, boring, and tapping (G73, 74, 76, 80-89)

### Tool function / Tool compensation:

- Tool function T8 digit
- Tool offsets pairs (400 pairs)
- Tool length offset (G43, 44,49)
- Tool offset memory C
- Tool radius/Tool nose radius compensation
- Tool length measurement
- Automatic tool length measurement
- Tool life management
- Extended tool life management

### Accuracy compensation functions

- Backlash compensation
- Backlash compensation for each rapid traverse and cutting feed
- Stored pitch error compensation

### Editing operation:

- Number of registrable programs: 400
- Program protect
- Background Editing
- Extended part program editing
- Password function

### Standard operation features:

- Keyboard type manual data input (MDI)
- JOG feed
- Manual pulse generator
- Spindle speed override
- Run hour and parts count display
- Input/output interface (RS232C)
- Status display
- Clock function
- Current position display
- Alarm display
- Alarm history display
- Operator message history display
- Help function
- Actual cutting federate display
- Program comment display
- Run hour and parts count display
- Actual cutting feedrate display
- Display of spindle and T code at all screens
- Self diagnostic functions
- Maintenance information screen
- Periodic maintenance screen



## SV-2412 Series Standard Equipment

### CNC Control:

- Fanuc Oi-Mate MD with 8.4" color LCD
- Remote jog handle (MPG)
- All Fanuc motors & drives
- AI advanced preview control (12 blocks look ahead)
- PCMCIA memory card slot
- RS232 port
- 4 spare M codes

### Spindle:

- CAT-40 taper
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- Full metal way covers

- **Hardened & Ground Box Ways on all Axes**
- **Double Anchored, Pretensioned, Double Nut Ball Screws**
- **Rigid Tapping**
- **Auto-Lubrication System with Alarm**
- **Halogen Work Light**
- **Air Reservoir Tank with Alarm**
- **3 Tier Status Light**
- **Tool kit**
- **Leveling bolts and pads**
- **Fanuc control and operator manuals**
- **Warranty:**
  - Machine: One year parts and labor
  - Fanuc control and motors: Two years parts and labor

**SV-2412**

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<b>SV-2412</b>	<b>Mini Mill with Fanuc Oi-Mate MD</b>	<b>\$39,990.00</b>
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<b>SV-2412S</b>	<b>Super Mini Mill with Fanuc Oi-Mate MD</b>	<b>\$44,990.00</b>
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- General Notes:** Equipment, specifications and materials are subject to change until order is accepted by Sharp Industries. Pricing is valid for 30 days
- Delivery:** If not in stock, delivery lead time will be verified by the factory after receipt of your written, firm purchase order.
- F.O.B.:** Gardena, Ca. U.S.A.  
Sharp Industries responsibility ceases when delivery is made to the carrier. Any claim for loss and/or damages must be made by the purchaser against the carrier.
- Terms:** Sharp Industries Standard Terms & Conditions will apply.  
All factory special order machines require the following: End user purchase order to be issued to Sharp Industries as the *Seller*.
- 30 Per Cent (30%) down payment with your purchase order.
  - 60 Per Cent (60%) prior to shipment.
  - 10 Per Cent (10%) balance due net 30 days after final acceptance.
- Warranty:** Sharp Industries **Limited Warranty** will apply.

**Available Optional Accessories\***

<b>Machine Options</b>	
BT-40 tool (replacing CAT-40)	\$500.00
Spiral type Chip Conveyor	\$1,400.00
Flat type (belt) Chip Conveyor	\$2,990.00
Spindle Chiller (10,000 rpm spindle only)	\$2,585.00
<b>Rotary Table Options**</b>	
Tsudakoma 6" Indexer: Model RZ-160 with TPC-Jr Controller 0.001 deg command unit. Includes cables, AC servo motor.	\$10,400.00

*\*Price does not include labor, traveling or shipping charges*

## Sharp Industries Inc. Limited Warranty

Sharp Industries warrants to the original purchaser, other than a purchaser for resale, (the "Purchaser") that Sharp Industries machine tools shall be free of defects in materials and workmanship. For a period of one (1) year from completion of installation, or for a period of fifteen (15) months from date of shipment, whichever is earlier, Sharp Industries will, at its sole and exclusive discretion, either replace or repair any machine or part thereof defective in workmanship or material, at no charge to the Purchaser.

All warranty repairs must either be performed by or authorized by a Sharp Industries Authorized Service Organization. To obtain warranty service, Purchaser must contact their local Sharp Industries Authorized Service Organization. Purchaser must provide verification of the date of delivery/installation when requesting warranty service (dated installation report). Ground freight charges (UPS regular or common carrier truck) for all warranty replacement parts are paid by Sharp Industries. If machine is not operational, Sharp Industries will pay next-day air shipment charges for necessary parts weighing 100 lbs. or less. Materials or parts alleged to be defective shall be returned to Sharp Industries, at Sharp Industries' request, transportation charges prepaid. After the warranty repair or replacement of a defective part, Sharp Industries' warranty for such part shall continue for ninety (90) days or for the remainder of the original Limited Warranty, whichever is longer.

### WARRANTY LIMITATIONS

This warranty shall remain in effect only if the machine is used and maintained in accordance with all operating and maintenance instructions set forth in the manuals and instruction sheets furnished by Sharp Industries. Sharp Industries shall have no liability to repair or replace defective parts until the Purchaser has fulfilled its payment obligations. No allowance will be made for repairs or alterations made without Sharp Industries' prior written consent or approval. The limited warranty provided by Sharp Industries excludes the following:

1. Damage, malfunction, or failure caused by or resulting from improper maintenance, misuse, neglect, accident or any other cause beyond the control of the Sharp Industries.
2. Damage, malfunction, or failure caused by modification of the machine (mechanical or electrical) without written authorization by Sharp Industries.
3. Damage, malfunction or failure caused by installation or use of accessories or peripherals not purchased through or authorized in writing by Sharp Industries.
4. Paint, batteries, filters, fluids, fuses, light bulbs, or any commonly expendable item.
5. Damage to machines and/or components while being transported from Sharp Industries' warehouse or facility to destination.
6. Accessories or peripherals not manufactured by Sharp Industries, which shall be subject only to whatever warranty that is supplied by the manufacturer of such product.
7. CNC control, spindle and servo motors, spindle and servo drives, which are covered by a one (1) year manufacturer warranty.

No person, agent, distributor, dealer or company is authorized to change, modify or amend the terms of this Limited Warranty in any manner. Sharp Industries makes no warranties, guarantees or representations, express or implied with respect to the machine tool, or parts thereof, except to the extent such warranty is set forth herein. The equipment covered does not necessarily comply with any codes or standards unless specifically quoted, ordered, and so accepted.

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