

**MITSUBISHI**  
**HORIZONTAL MACHINING CENTER**

**M-HE**

**SERIES**



 **MITSUBISHI**  
HEAVY INDUSTRIES, LTD.

# A WISE SELECTION FOR THE NEXT GENERATION

PRODUCTIVITY  
DOUBLED



M-H60E

MITSUBISHI HORIZONTAL MACHINING CENTER  
**M-HE**  
SERIES

**Mitsubishi machining centers, most popular for its high accuracy machining, has further advanced to an unbeatable higher level with a faster spindle speed, faster rapid traverse and faster tool change. Enhanced machining efficiency and reduced non-cutting time doubles productivity to achieve greater profits. A valuable new generation machine, M-HE, for users who care.**

**RELIABLE HIGH ACCURACY MACHINING**

- **Rugged construction for high precision.**  
Integrated solid bed  
Super precision 520 mm **20.5 in** diameter coupling
- **Equipped with main spindle cooling device.**
- **MP scale feedback equipped as standard.**  
Positioning accuracy:  $\pm 1.5 \mu\text{m}$   $\pm 0.00006 \text{ in}$ /full travel  
Repeatability:  $\pm 0.75 \mu\text{m}$   $\pm 0.00003 \text{ in}$ /full travel
- **Thermal displacement compensator equipped as standard.**  
 $\pm 10 \mu\text{m}$   $\pm 0.0004 \text{ in/day}$

**NON-CUTTING TIME REDUCED TO ONE-HALF**

- **Fastest rapid traverse in its class:**  
40 m/min **1,574.8 ipm** with highly rigid linear roller guide
- **Quick tool change high speed ATC:**  
Tool storage capacity: 40 tools  
Chip-to-chip: 7 seconds (Tool weight under 15 kg **331 lbs**)
- **Speedy pallet change:**  
APC time: 20 seconds (M-H60E)

**OUTSTANDING HIGH SPEED HEAVY DUTY MACHINING**

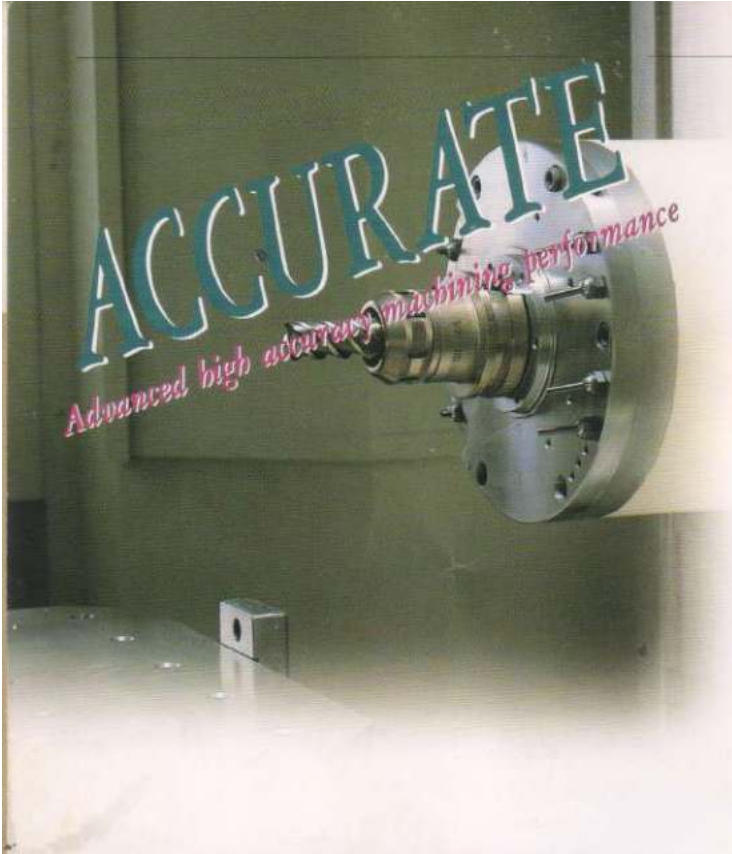
- **Power doubled with powerful built-in spindle motor.**  
AC 30/22kW **40/30hp** (30 min/continuous rating)
- **Enhanced spindle speed.**  
Standard version: 6,000min<sup>-1</sup>  
High speed version: 12,000min<sup>-1</sup>
- **Quick start-up.**  
3.0 seconds (0 → 6,000min<sup>-1</sup>)  
5.0 seconds (0 → 12,000min<sup>-1</sup>)

**ADVANCED EASE OF OPERATION**

- **Operation made easy with simplified operation procedure.**
- **Excellent access operator's door.**
- **Safety oriented design.**
- **Enhanced chip disposal system:**
  - Slant waycovers
  - Conveniently located chip conveyor
  - Ceiling shower (Optional)
  - High pressure coolant (Optional)

# ACCURATE

*Advanced high accuracy machining performance*



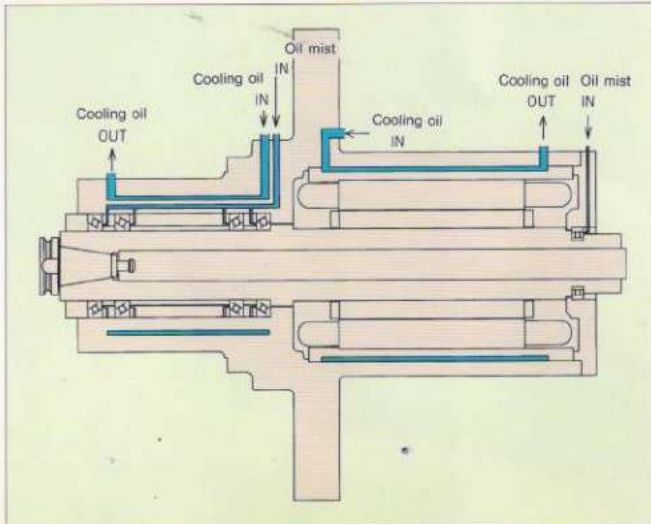
## Super High Precision 520 mm 20.5 in Large Coupling

This super high precision coupling upgrades table rigidity, improves indexing accuracy and stabilizes machining accuracy.



## High Performance Spindle Cooling System

The highly reliable headstock is enclosed with mist lubricated super precision ball bearings. Powerful cooling system suppresses spindle temperature rise to maintain excellent machining accuracy under continuous operation.



## LONGRUN, ACCURATE MACHINING PERFORMANCE LEADS TO RELIABLE UNMANNED OPERATION

### High Pallet Changing Positioning Accuracy

Accurate positioning obtained for pallet changing with the two positioning pins in the X and Z axes direction and six locating pads in the Y axis direction.

Pallet changing repeatability **0.005 mm** **0.0002 in**

### MP Scale Maintains Machining Accuracy

All axes equipped with the popular high performance MP Scale feedback. Maintains high machining accuracy and assures high quality under long run operations.

Positioning:  $\pm 1.5 \mu\text{m}$   $\pm 0.00006 \text{ in/full travel}$

Repeatability:  $\pm 0.75 \mu\text{m}$   $\pm 0.00003 \text{ in/full travel}$

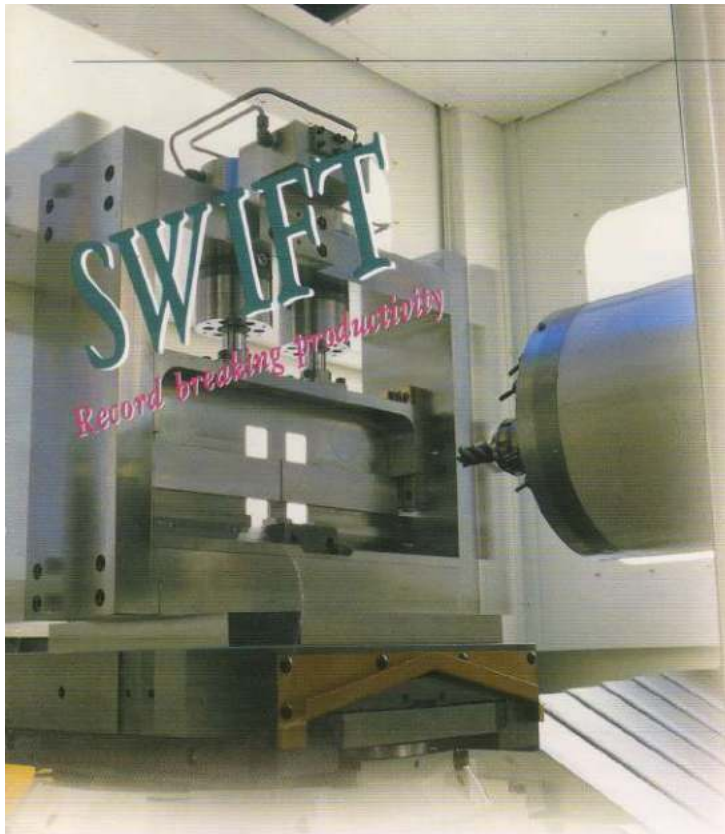
### Mitsubishi's Original High Performance Thermal Displacement Compensation System

equipped as standard maintains thermal displacement within  $\pm 10 \mu\text{m}$   $\pm 0.0004 \text{ in/day}$  right after start of machining. This helps shorten prerunning time and displays excellent performance in maintaining high accuracy under unmanned operation.

### Rugged Body, Structure Guarantees Heavy Duty Machining

The bed is of a solid integrated structure. The column and headstock are rugged box type cast structure having ample thickness and heavily ribbed.





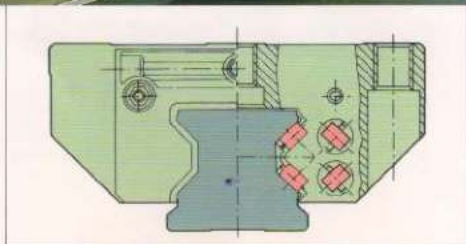
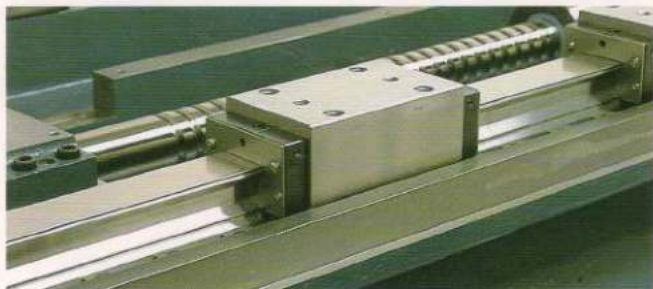
**40 m/min 1,574.8 ipm Rapid Traversing Rate Cuts Positioning Time to 1/2**

Rapid traversing, the key to reduce non-cutting time has doubled for higher efficiency. Remarkable high speed positioning made possible with 40 m/min 1,574.8 ipm rapid traversing rate applied to all axes. What's more, the acceleration time to reach speed is only 0.17 seconds! This makes quick action machining start possible.

Rapid traversing rate: **40** m/min **1,574.8** ipm (all axes)  
 Cutting feedrate: **40** m/min **1,574.8** ipm (all axes)

**Linear Roller guide Gives Smooth Rapid Traverse**

Roller guides are applied to the guideways of all axes. Smooth motion and excellent dustproof performance achieved by the combination of the rugged and precise track rail and high hermetically sealed slide unit. Moreover, the wide guideway increases stability and assures machine endurance under severe machining conditions.

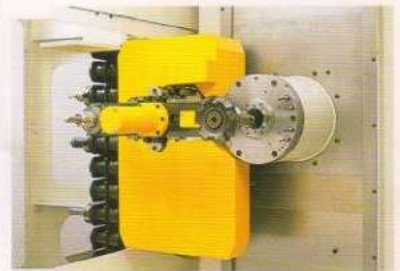


**TRAVERSING RATE DOUBLED, QUICK ATC, SPEEDY PERFORMANCE TOPS THE WORLD**

**High Speed ATC Changes Tools in Just 7 Seconds!**

Tool change time upgraded to 7 seconds (chip-to-chip) from the conventional 12-second tool change with the new quick action high speed ATC. This high speed ATC plays a big role high efficiency machining. Standard tool storage magazine capacity is 40 tools, with optional of 80-, and 120-tool storage magazine.

Chip-to-chip **7** seconds  
 (Tool weight less than 15 kg **33 lbs**)



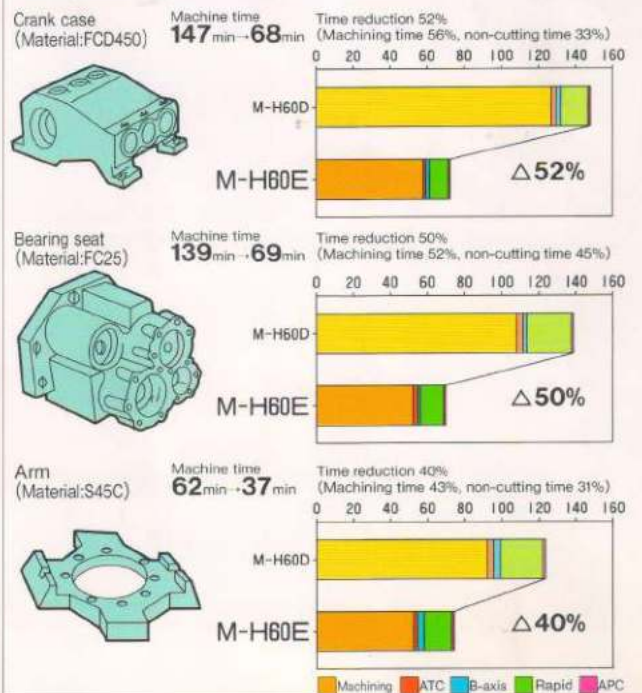
**Quick Workpiece Set-up**

The high speed APC reduces loss of time with its speedy pallet changing time. The fast 2.5 sec/90 degree table indexing enables high efficient machining of multifaced workpieces.

APC time **16** seconds (M-H50E)  
**20** seconds (M-H60E)  
**45** seconds (M-H80E)



**Examples of improved Machining Time**



# TOUGH

See the difference in machining power and speed

## THE SPEEDY, POWERFUL, HIGH PERFORMANCE SPINDLE ACCELERATES YOUR JOB

### Fast Spindle Speed Widens Machining Capability

Main spindle Speed increased to 6,000 min<sup>-1</sup>, 1.5 times of conventional machines, produces excellent high speed machining performance. The fast spindle speed along with its tough spindle power, reduces machining time even under heavy duty machining. An optional 12,000 min<sup>-1</sup> high speed motor is available for machining aluminum or other soft materials.

Main Spindle Speed: **6,000 min<sup>-1</sup>** (standard model)  
**12,000 min<sup>-1</sup>** (high speed version)

### Quick Spindle Start-up of 3.0 Seconds

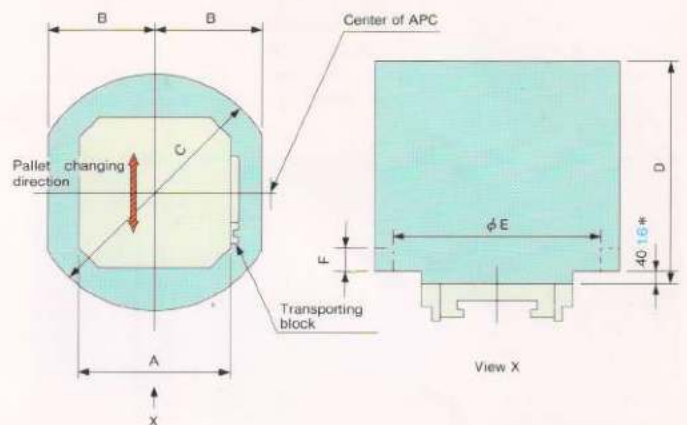
Only 3.0 seconds required for the spindle speed to reach 6,000 min<sup>-1</sup> (5.0 seconds for 12,000 min<sup>-1</sup>). This eliminates waiting time and increases productivity as the spindle starts almost instantaneously and reaches its top speed while in motion after tool change.

#### ● Quick spindle start/stop



#### ● Working Area

Make sure that the workpiece is set up on the pallet within the limitations (enclosed by ) shown in the illustration below. However, it must be noted that interference between tool and workpiece might occur during ATC depending on tool length.



Unit : mm in

### Rugged Spindle with a Powerful Built-in Motor

Built-in with a high output 30 kW 40 hp motor exceeding its class standard. The robust 120 mm 4.72 in diameter No. 50 taper spindle, with its outstanding high power and high torque, makes speedy, heavy duty machining possible. Needless to say, high productivity is maintained under undulating loads its stable machining capability.

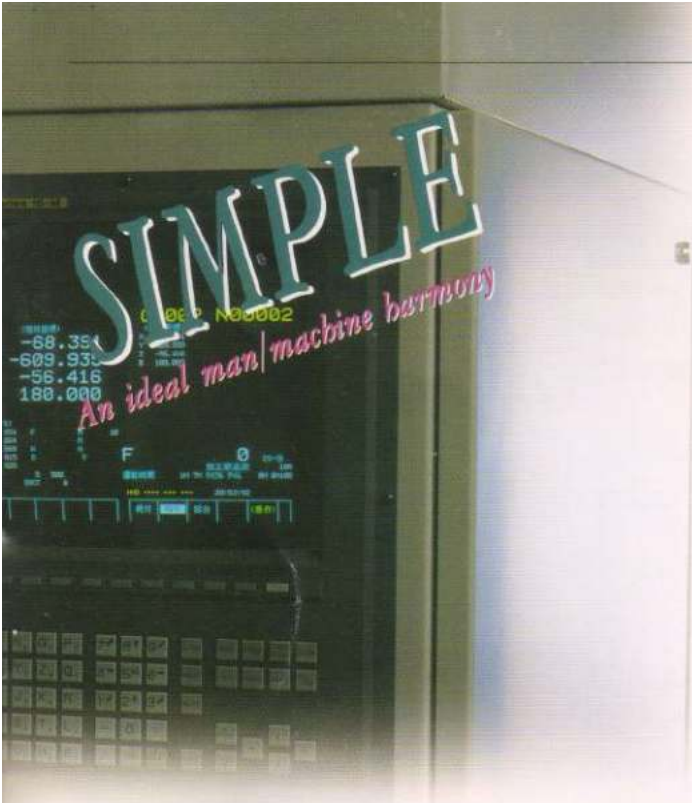
Motor output **30 kW 40 hp**

#### ● Machining Capability

Item	Milling	End milling	Drilling
Material	S55C	S55C	S55C
Spindle speed min <sup>-1</sup>	398	760	546
Cutting speed m/min ft./min	200 656	150 492	120 394
Depth of cut mm in	6 0.2	22.5 0.9	—
Width of cut mm in	125 4.9	63 2.5	φ70 φ2.8
Feedrate mm/min ipm	1095 43.1	570 22.4	131 5.2
Chip removal rate cc/min cu. in	821 50.1	808 49.3	—
Remarks	φ160 mm φ6.3 in 11 blades	φ63 mm φ2.5 in 3 blades Carbide tool	φ70 mm φ2.8 in Carbide tool

Model	A	B	C	D	E	F	Remarks
M-H50E	500 19.7	390 15.4	900 35.4	900 35.4	690 27.2	120 4.7	Standard machine and oval pallet magazine
M-H60E	630 24.8	490 19.3	1,000 39.4	920 36.2	—	—	Standard machine and oval pallet magazine
M-H80E	800 31.5	600 23.6	1,200 47.2	1,120 44.1	—	—	Standard machine and oval pallet magazine

Note: 1. Maximum workpiece indexing diameter for Model M-H50E will be limited to φE when tool length measurement system for unmanned system B, C or E is applied.  
2. Asterisk (\*) dimension will become zero (0) when edge locator is removed.



## OPERATION TO CHIP DISPOSAL SIMPLIFIED

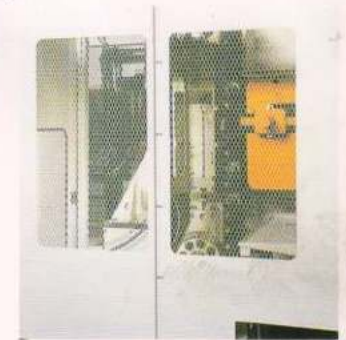
### Wide Operator's Door for Easy Operation

Excellent table accessibility with the wide operator's door. The wide open space facilitates easy workpiece loading for the operator.



### Safety Oriented Design Concept

Safety during part loading improved with the wide clearance around the table. The ATC magazine guard protects the operator from tool injury.

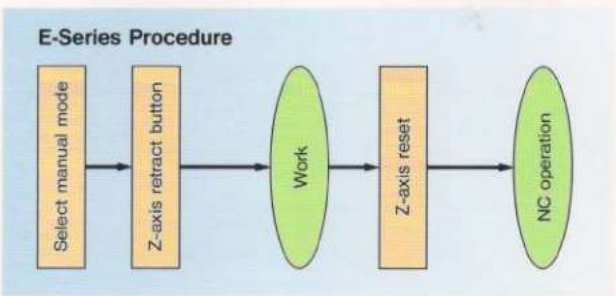


### Simple operation...No skill required

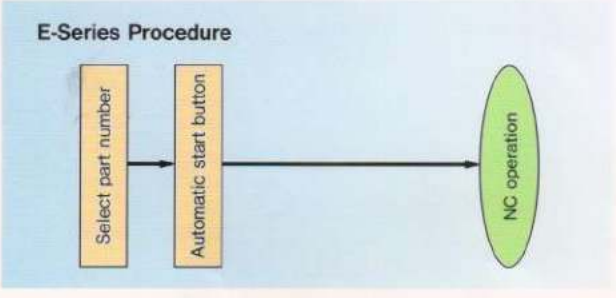
Ergonomically designed operator's control panel makes operation easy and the drastically cut operation procedure lessens operator fatigue. Repeat and single production jobs that required fussy switch manipulation now replaced with a simple touch key.

#### ● Operation Example

##### 1) Debugging (Z-axis retract and reset)



##### 2) Machining (Program search start)



### Clean Machining Environment with Automatic Chip Disposal System

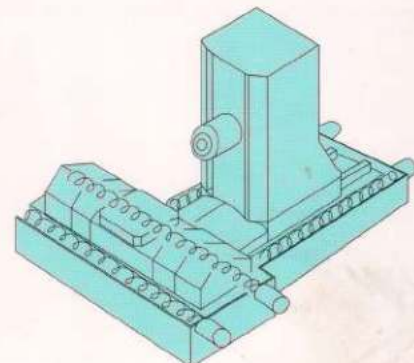
The slant waycover and conveniently located conveyors on both sides of the table and column efficiently delivers the chips out from the machine without the need of operator intervention. High pressure coolant, ceiling shower, external chip conveyor and so on are available as option.



X-Z axes slant waycover



Chip conveyor



## Machine Specifications

Item		M-H50E	M-H60E	M-H80E	
Travel	X axis (column, longitudinal)	X axis travel mm in	800 31.5	1,000 39.4	1,250 49.2
		Distance from spindle center mm in	±400 ±15.7	±500 ±19.7	±625 ±24.6
	Y axis (headstock, vertical)	Y axis travel mm in	850 26.6	800 31.5	1,000 39.4
		Distance from pallet surface to spindle center mm in	50~700 2.0~27.6	50~850 2.0~33.5	50~1,050 2.0~41.3
Z axis (table, cross)	Z axis travel mm in	650 25.6	800 31.5	850 3.5	
	Distance from table center to spindle nose mm in	150~800 5.9~31.5	200~1,000 7.9~39.4	250~1,100 9.8~43.3	
Table	Pallet type	Working area mm in	500×500 19.7×19.7	630×630 24.8×24.8	800×800 31.5×31.5
		Index	1 deg. × 360 positions 0.001 deg./pulse (B-axis)		
Headstock	Max. loading capacity kg lb	880 1,936	1,200 2,640	2,000 4,400	
		Spindle motor output (30 min. rating) kW hp			
	AC30kW 40hp (Standard high speed type) AC26kW35hp(High torque type)				
	Spindle speed (infinitely variable) min <sup>-1</sup>	35~6,000 (Standard type)	35~12,000 (High speed type)	10~3,200 (High torque type)	
	Spindle nose taper	ISO N.T. No.50 (pull stud/MAS-2 type)			
Rapid traverse	X, Y & Z axes mm/min ipm	120 4.7 (Standard type)	100 3.9 (High speed type)	130 5.1 (High torque type)	
		40,000 1,574.8			
Feedrate	X, Y & Z axes mm/min ipm	7,200	7,200	4,320	
		1~40,000 0.04~1,574.8			
Automatic tool changer (ATC)	Tool storage capacity No.	40 [80, 120]			
		Fixed address system (Bi-directional shortest path)			
	Tool selection	15 [30] 33 [66]			
	Max. tool weight kg lb	4 [6]			
Power consumption (standard specifications)	NC system	85	90	95	
		MELDAS 520M, FANUC 18MB			
Total machine weight	kg lb	14,500 31,900	16,000 35,200	19,000 41,800	

## Machine Equipment

### Standard equipment

- Self diagnosis function
- Foundation bolts, jacks and bolts for installation
- Maintenance tool kit
- Flood coolant system
- Closed type coolant guard
- Automatic pallet changer (APC)
- Oil mist lubricating device
- Program endless operation (automatic restart)
- Built-in chip conveyor

- Work completion light (Signal tower)
- Work light (fluorescent lamp)
- Spindle load meter
- Automatic power source shut-down
- MP Scale feedback for X-, Y- and Z-axes
- Automatic thermal displacement compensation system for X and Y axes
- Spindle oil coolant device
- Spindle speed override
- 100V AC outlet for I/O device

### Optional equipment

- Multiple pallets magazine
- Unmanned control system
- Extra pallet
- Standard square block:H50E:350 13.8 × H450 17.7, H60E:400 15.7 × H550 21.7, H80E:500 19.7 × H600 23.6
- Standard square block material
- Low pressure coolant system for oil-hole holder
- High pressure coolant system for oil-hole holder
- Spindle through coolant system
- Workpiece flushing gun
- Coolant protection guard for workpiece flushing gun
- Ceiling shower
- Oil skimmer (disk type)
- Air dryer
- Coolant temperature adjustment system

- Air blow for chip cleaning
- Coolant guard door interlock
- Through-the-tool air blow device
- Stopper block for oilhole holder, multi-spindle tool or reversible taper
- Floor type conveyor (general purpose, cast iron type, aluminum type)
- Chip box (with caster and lifting lugs)
- Weekly timer
- Earth (leakage breaker) activated at 200mA
- External work meter
- Signal tower (2-, 3-color)
- Extra work light
- Equipment name plates
- M code plate
- Ladder circuit diagram

## Set Options

The following set options are recommended to facilitate the machining.

### (1) Set Option A

- (A) Workpiece flushing gun
- (B) Coolant guard door interlock
- (C) No. of program storage 400 tape memory & edit total 320 m 1,050 ft
- (D) Tool offset extra memory total 200 sets
- (E) Program compensation input
- (F) Circle cutting
- (G) User macro
- (H) Variable command type B (for MELDAS)

### (2) Set option B (for unmanned operation)

- In addition to the (A)~(H) of set option A, please add the following.
- (J) Unmanned operation system B
- (K) Single direction positioning
- (L) Helical interpolation
- (M) Extra work coordinate 48 sets
- (N) Program coordinate rotation
- (O) Program re-start function
- (P) Tool life management II 100 sets

## Unmanned Operation System

Function	Description	Set Options				
		A	B	C	D	E
Measurement and alignment	Automatic workpiece measurement, compensation and alignment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Automatic coordinate rotation centering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Automatic tool length measurement and compensation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Load monitor	Conversational automatic alignment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Conversational automatic tool length measurement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Load monitor (+)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Self recovery	Simplified adaptive control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Tool life monitoring (+) and spare tool replacement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Automatic tool change of broken tool	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tool management	Automatic work change of broken work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Tool data management by tool number	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Tool storage confirmation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data management	Broken tool return to storage pot	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Management of machined parts (+)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Management of measured data (+)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintenance management	Display of periodical maintenance items	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Management data I/O interface	Print out of above asterisk (+) data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Automatic tool length measurement and compensation	Plunger type sensor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Single option
Limit switch type tool breakage detection		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Single option
Tool life management and spare tool replacement	NC option (ATC and work time)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Single option (NC)
Printer (for unmanned E type)	VP-550 (EPSON)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Single option

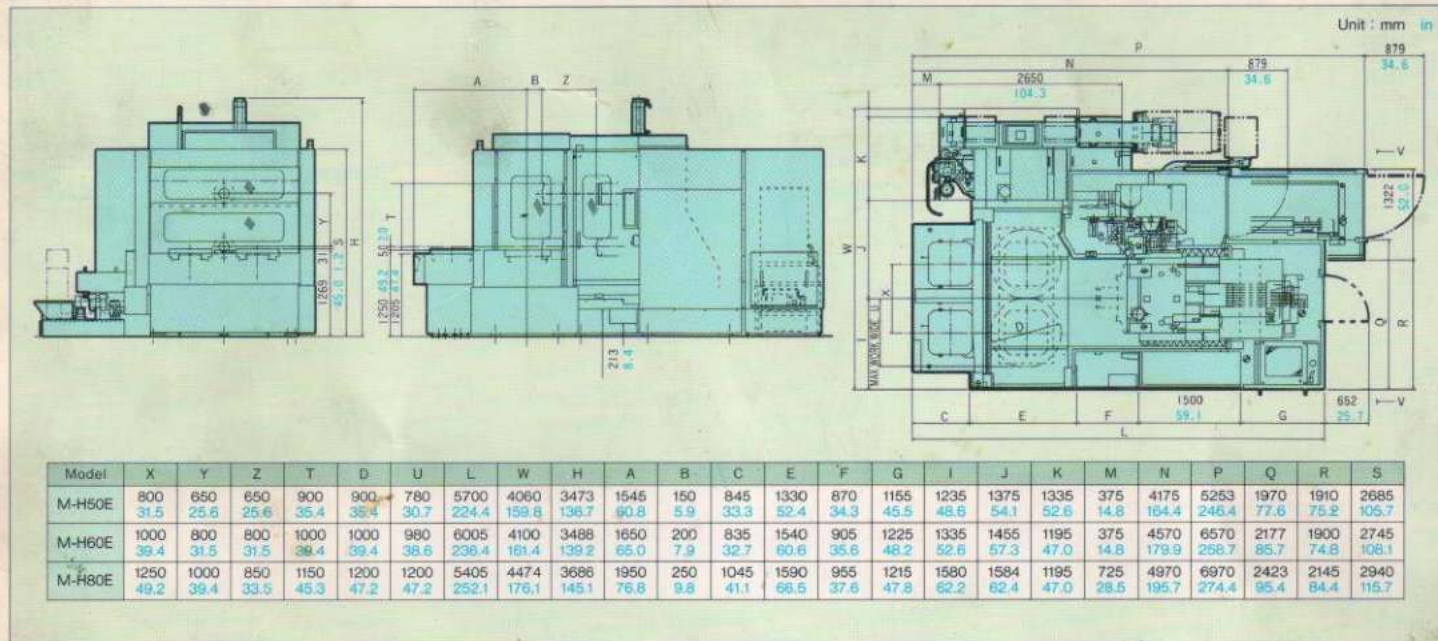
(Note 1) Thick frame is only for MELDAS specifications.

(Note 2) As there are limitations for unmanned operation system, please inquire for more detail.



# MITSUBISHI HORIZONTAL MACHINING CENTER M-HE SERIES

## Machine Dimensions



## Pallet Dimensions

