

MACHINEMATE®

CNC SYSTEM

Hardware

SPECIFICATION

Feb 2005

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1 Introduction / General

1.1 Superior Capability in Technology and Productivity

The **MACHINEMATE** CNC Family provides you with innovative high performance technology to handle the ever-increasing demands of today's automation industry. The modern and fully open CNC architecture using a single powerful CPU gives you leading edge CNC performance and flexibility.

This specification provides the general information about the Hardware of the **MACHINEMATE** CNC family.

1.2 General hardware components

The basic models of **MACHINEMATE** CNC includes following hardware components:

CNC control unit with:

Motherboard	Pentium or Celeron processor (its performance depends on the order)
Graphics board	SVGA
1 or 2 serial interfaces	COM1, COM2 (RS232C)
2 PS/2 interfaces	Keyboard and mouse
1 parallel interface	LPT1 (Centronics)
2 or 4 USB interfaces	Peripheral devices (2 USB ports on the L2 & LW or 4 USB ports on the eCNC).
Network interface	EtherNet 10/100 interface. Standard on LW. Optional on L2 & eCNC (MM93).
Floppy-disk drive	1.44 MB, 3.5" L2 and eCNC are delivered with built-in floppy-disk drive
Compact Disk drive MM64	(Optional on eCNC only). 24X CD-R CD-RW
Pen Disk (64Mb)	Standard on LW

The floppy-disk, compact disk drive or pen disk can be used to load or to save:

- NC-part programs
- PLC-programs
- Axis compensation files
- Machine parameter files
- Configuration files
- or 3rd party software

Hardware Specification

Hard disk	the hard disk uses an IDE interface.
MACHINEMATE CNC	installed on the hard disk;
Windows 2000 software	installed on the hard disk;
CNC-axes board	PCI – board for analog axes interface. PCI – board for Sercos interface (1 or 2 fiber-optic rings) with 24 digital inputs and 16 digital outputs on board.
CNC operator’s panel	Available in 2 sizes that can be remotely mounted up to 33 Ft (10 meters) from the industrial computer (IPC): 1) 19 X 12.25 inches (483 X 311.5 mm) with full alpha numeric keypad and 12.1 inch TFT flat screen at 800 X 600 pixels. This 12.1 inch TFT size is also available with an optional Touch Screen. A second option in this 19-inch size is a 15-inch Touch Screen TFT. This unit does not have a built in keyboard. 2) Same size panel but with 15 inch TFT flat screen at 800 X 600 pixels. There is no alpha numeric keypad on the panel.
Basic switches & pushbuttons M166 & M167	Push buttons for ‘NC-Start’, ‘NC-Stop’, ‘Jog +’ and ‘Jog -’ are available. (Note: These switches are not mounted and wired by MACHINEMATE INC).
Gray/binary code switches M165	These switches are used for feedrate override and for spindle speed override. (Note: These switches are not mounted and wired by MACHINEMATE INC).
Machine Tool Builder’s Panel	A Machine Tool Builder’s Panel (MTBP) is available. This panel includes the basic requirements for a machine tool operator: emergency stop push button, cycle start and stop push buttons, jog plus and minus push buttons, feed rate and spindle speed override pots, and a number of auxiliary push buttons. There are two versions: 19” rack mount and slim line.
MTBP – Auxiliary Panel	A MTBP Auxiliary Panel is available. This 19” panel includes a handwheel (or manual pulse generator, MPG) and 16 auxiliary push buttons.
Handheld Operator	The Handheld Operator Station provides a remote station

Station	for the operator. This station includes the basic requirements for manual operations: a handwheel (or manual pulse generator, MPG), an axis select rotary switch, a feed rate multiplier rotary switch, an emergency stop push button, and two push buttons (typically used for the axis jogging).
External floppy or CD	An external floppy drive or CD reader or CD read/write can easily be added utilizing the USB ports.
MMMIO PLC components	The MMMIO (MACHINEMATE Modular Input Output) system is the hardware component system for the PLC. Available are digital and analog input and output modules. Each interface module is plugged into a module box and each module box can carry two interface modules. Stopping brackets and a termination plug are needed. The connection to the MACHINEMATE is done via the high speed Superbus using cables that are available in different lengths.
External Modem	An external USB Data Modem is standard on the eCNC. It is optional on the L2.
Fieldbus Master	An optional Fieldbus master is available. The supported fieldbus technologies are Interbus (MM91), Profibus slave (MM92), Profibus master (MM97), Can-bus (MM98), DeviceNet (MM99).

1.3 Static Specifications

- Temperature: -4° F (-20° C) to +140° F (+60° C)
- Maximum humidity: 80%, (non-condensing)
- Maximum permitted acceleration: 4.0 g
- Weight:
 - L2 IPC 18.5 lb (8.4 kg)
 - eCNC IPC 24.5 lb (11.1 kg)
 - LW IPC 15 lb (6.8 kg)
 - 19" operators display unit with 12.1" TFT 11.0 lb (5.0 kg)
 - 19" operators display unit with 15" TFT 16.0 lb (7.3 kg)
 - 11.4" slim line operators display unit and keypad 8.0 lb (4.0 kg)

1.4 Operating Specifications

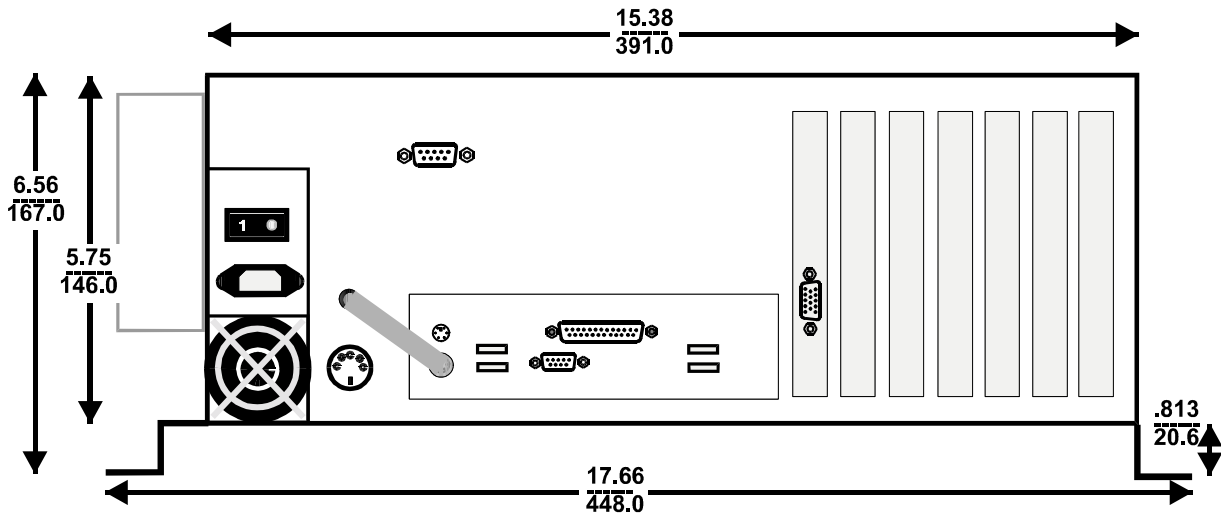
- Temperature: 50° F (10° C) to +113° F (+45° C)
- Maximum humidity: 80%, (non-condensing)
- Maximum permitted acceleration: 3.5 g
- Space Requirements:

For installation - a free space of 4" (100 mm) is required for all surfaces which have connectors or fans.
- Power Requirements: 115 - 240 V AC / 50-60 Hz
- Maximum power required: 250 VA
- Test conditions:

All controllers are subject to a run-in test of 48 hours in cycles of 50° to 113°F.
- Protection: Operator's panel IP 65

2 CNC dimensions

2.1 MACHINEMATE eCNC



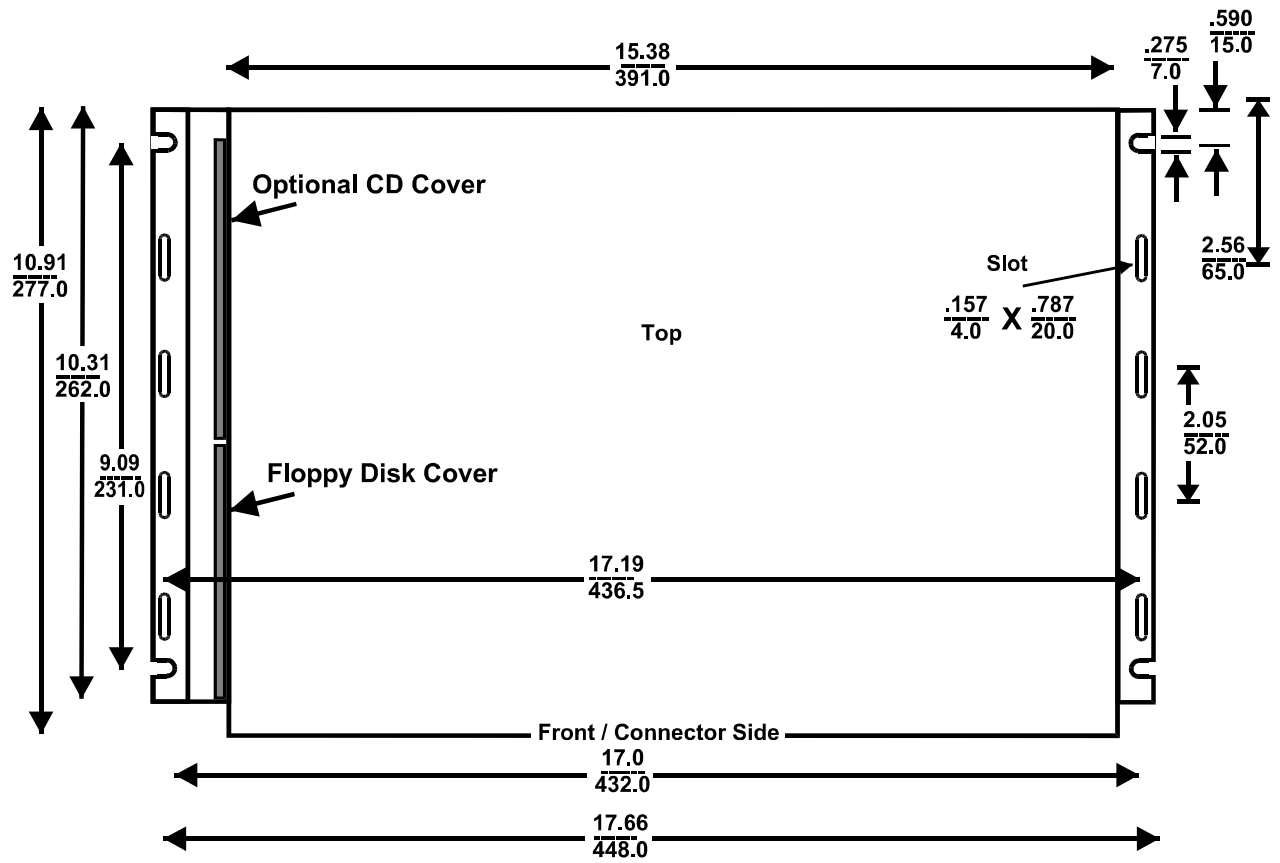
Front view

M205 – eCNC with 12.1" TFT 19" rack-mount front panel (see 3.1)

M215 – eCNC with 15" TFT 19" rack-mount front panel (see 3.1)

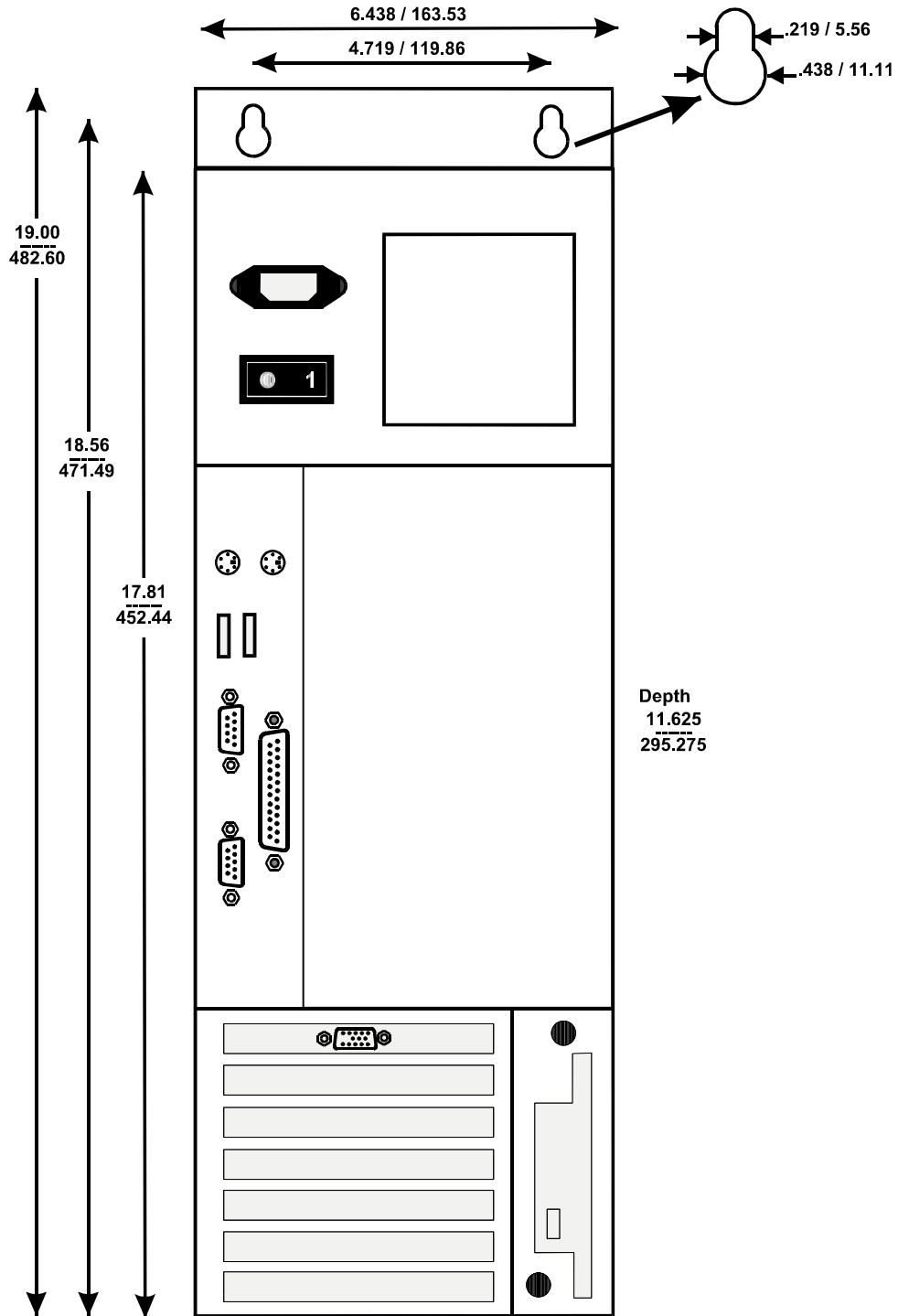
M245 – eCNC with no front panel

Each eCNC model is configured for either analog (4 servos) or SERCOS (8 servos).



Top view

2.2 MACHINEMATE L2

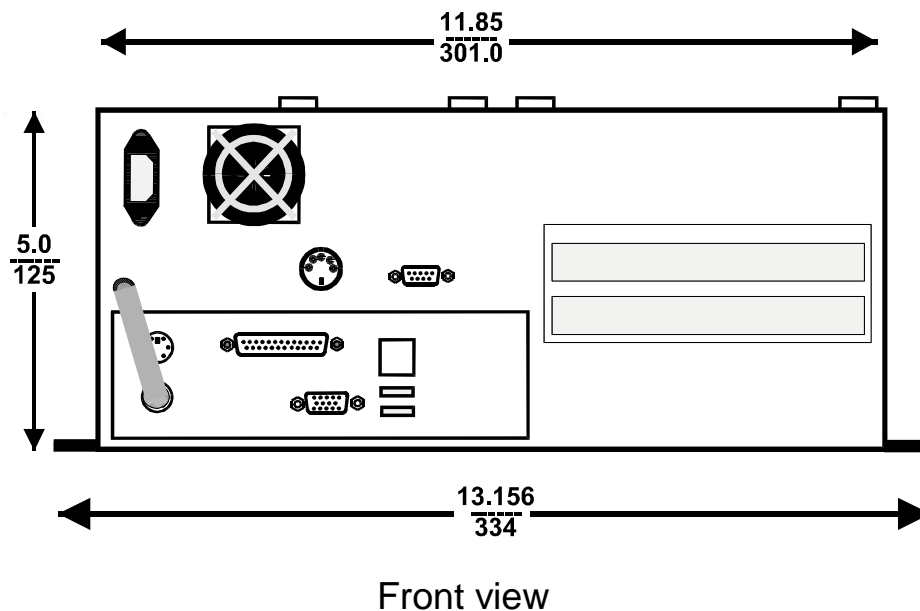


Front view

- M203 – analog L2 with 12.1" TFT 19" rack mount front panel (see 3.1)
- M210 – SERCOS L2 with 12.1" TFT 19" rack mount front panel (see 3.1)
- M211 – analog L2 with 15" TFT 19" rack mount front panel (see 3.1)
- M213 – SERCOS L2 with 15" TFT 19" rack mount front panel (see 3.1)
- M241 – analog L2 with no front panel
- M242 – SERCOS L2 with no front panel

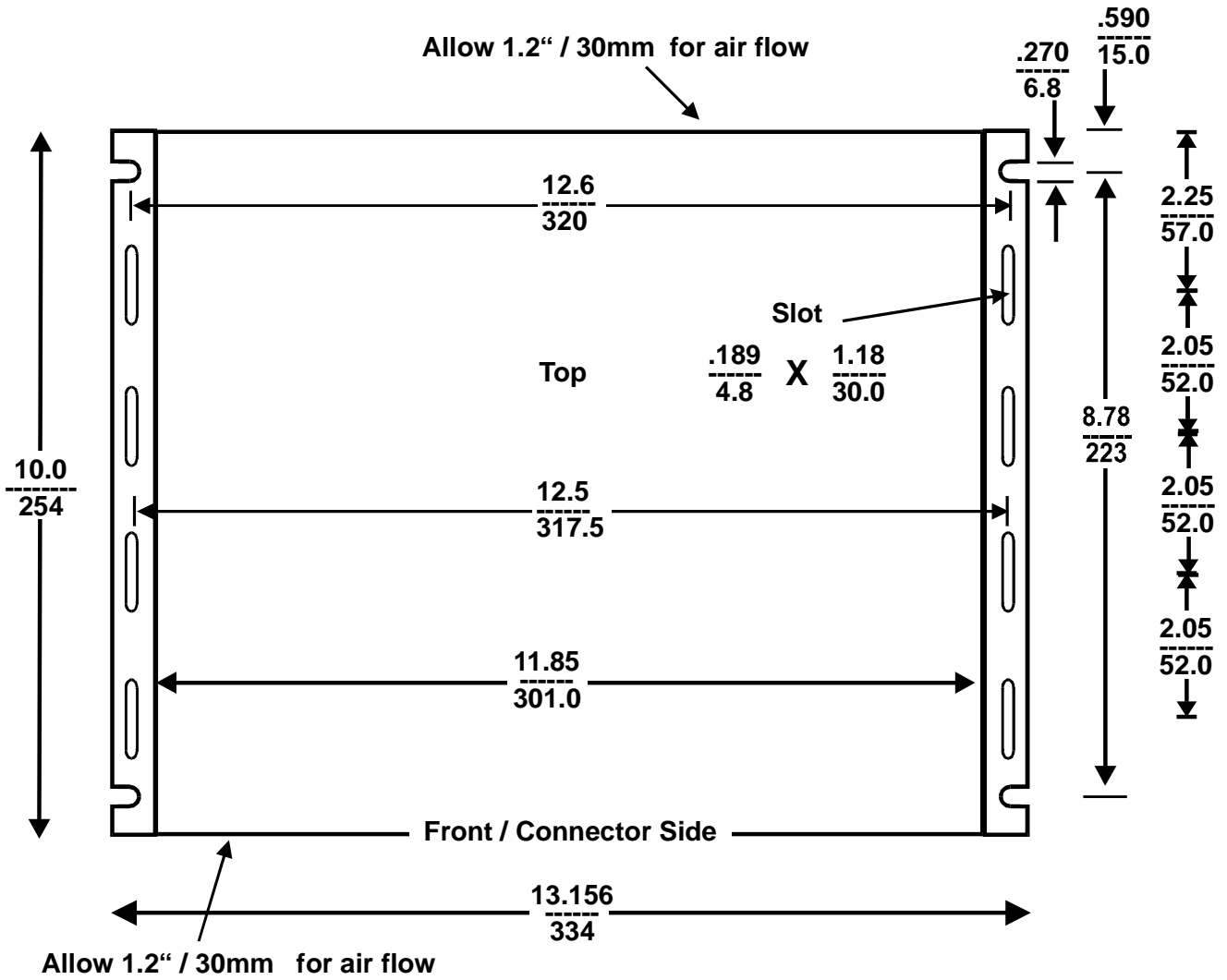
Each analog L2 model is configured for 4 servos.
 Each SERCOS L2 model is configured for 8 servos.

2.3 MACHINEMATE LW



- M222 – LW with 12.1" TFT 19" rack-mount front panel (see 3.1)
- M223 – LW with 15" TFT 19" rack-mount front panel (see 3.1)
- M227 – LW with no front panel

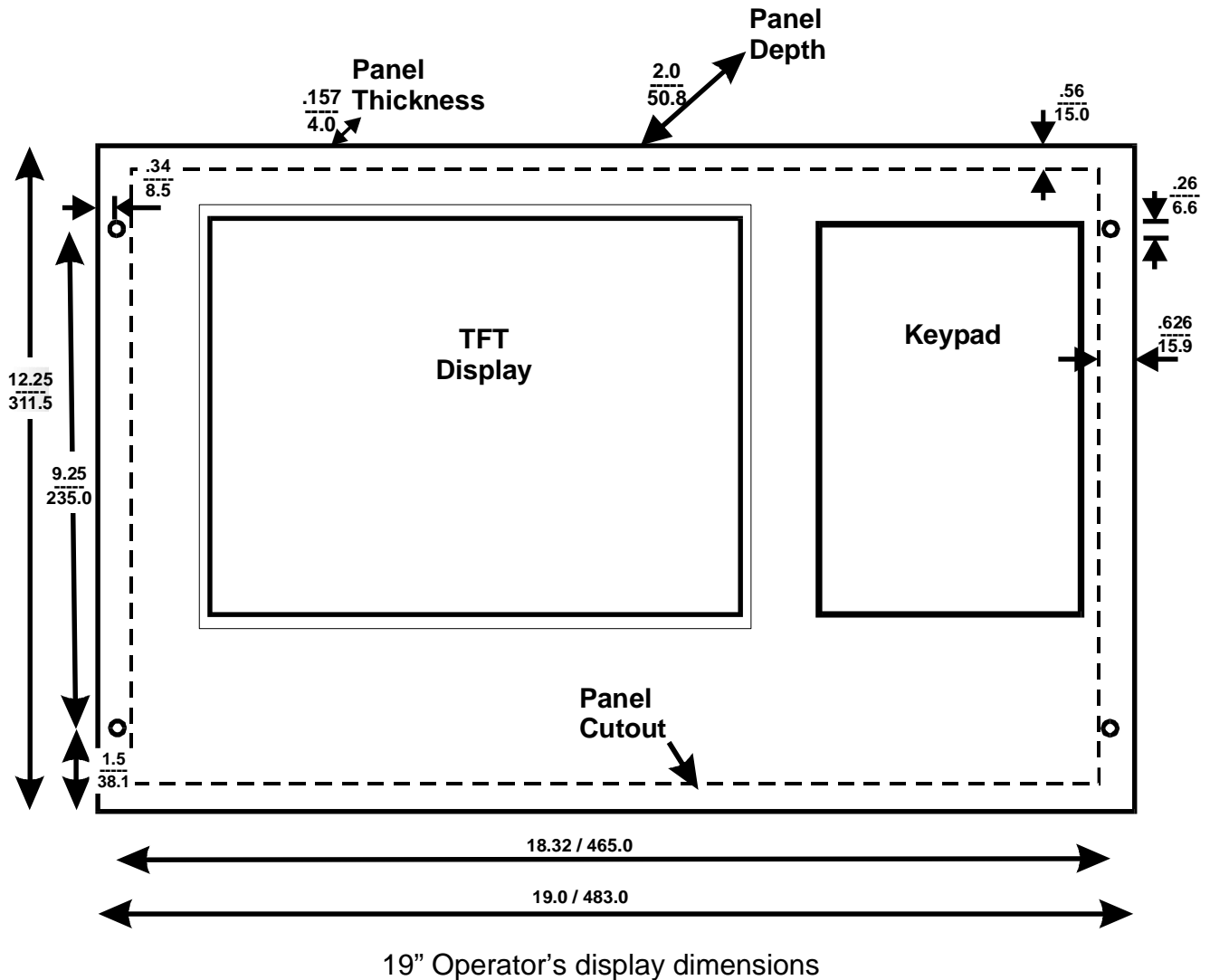
Each LW model is configured for 4 analog servos.



Top view

3 Operator's Station Dimensions

3.1 19 inch Operator's Display Panel



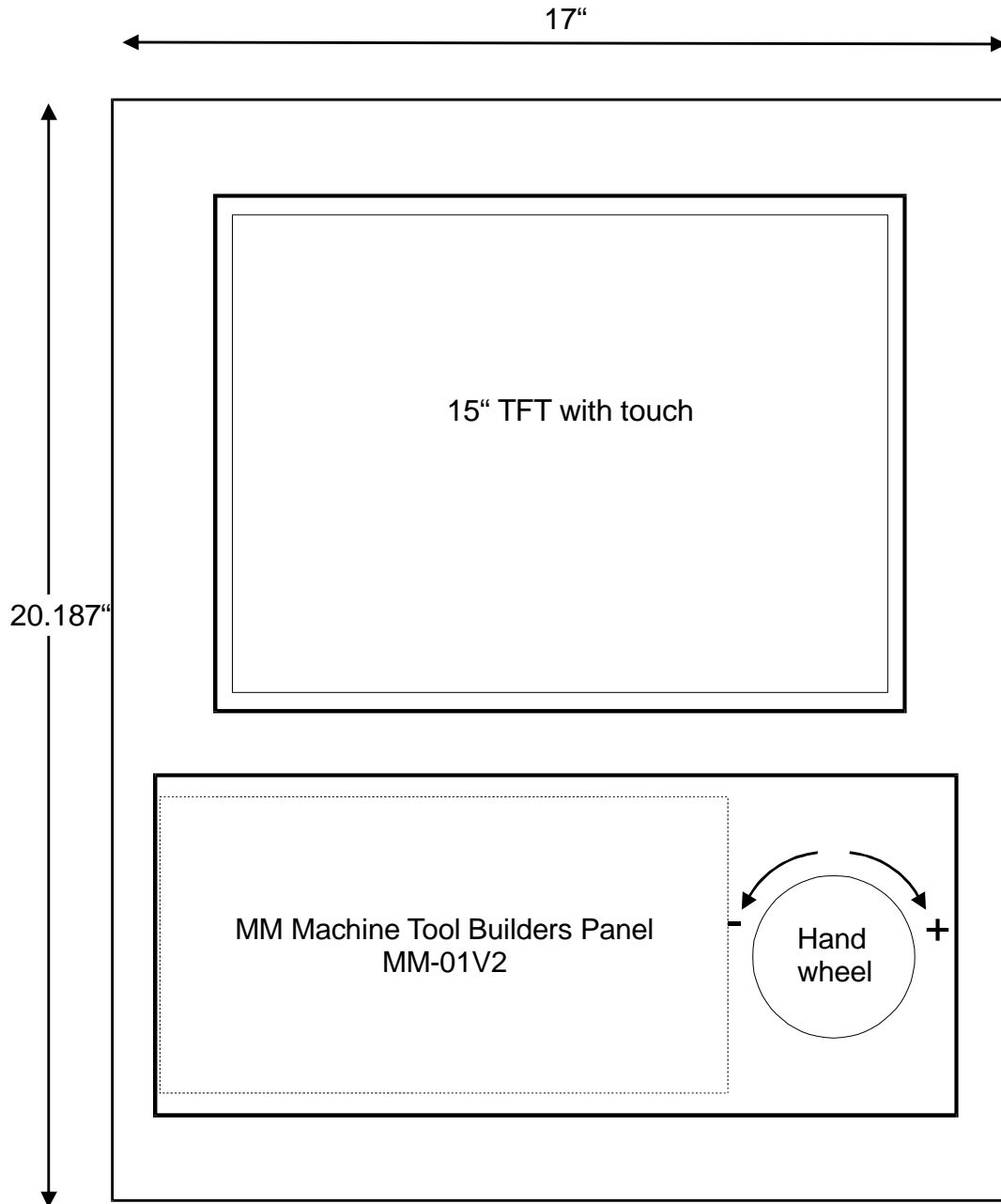
These dimensions apply to all 19" rack-mount display types.

19" with 12.1" TFT Screen with keypad – available in these CNC models:
M203 (L2 analog), M205 (eCNC), M210 (L2 SERCOS), M222 (LW)

19" with 15" TFT Screen (no membrane keypad) – available in these CNC models:
M211 (L2 analog), M213 (L2 SERCOS), M215 (eCNC), M223 (LW)

Front panel requires SVGA and keyboard cables. Different lengths are available:
M232 (2.5-meter SVGA cable for eCNC,L2,LW with 15"), M233 (10-meter SVGA cable for eCNC,L2,LW with 15"), M234 (2.5-meter SVGA/keyboard set for L2 with 12.1"), M235 (10-meter SVGA/keyboard set for L2 with 12.1"), M236 (0.6-meter SVGA/keyboard set for eCNC mounted directly on panel), M237 (2.5-meter SVGA/keyboard set for eCNC,LW with 12.1"), M238 (10-meter SVGA/keyboard set for eCNC,LW with 12.1")

3.2 Vertical Operators station

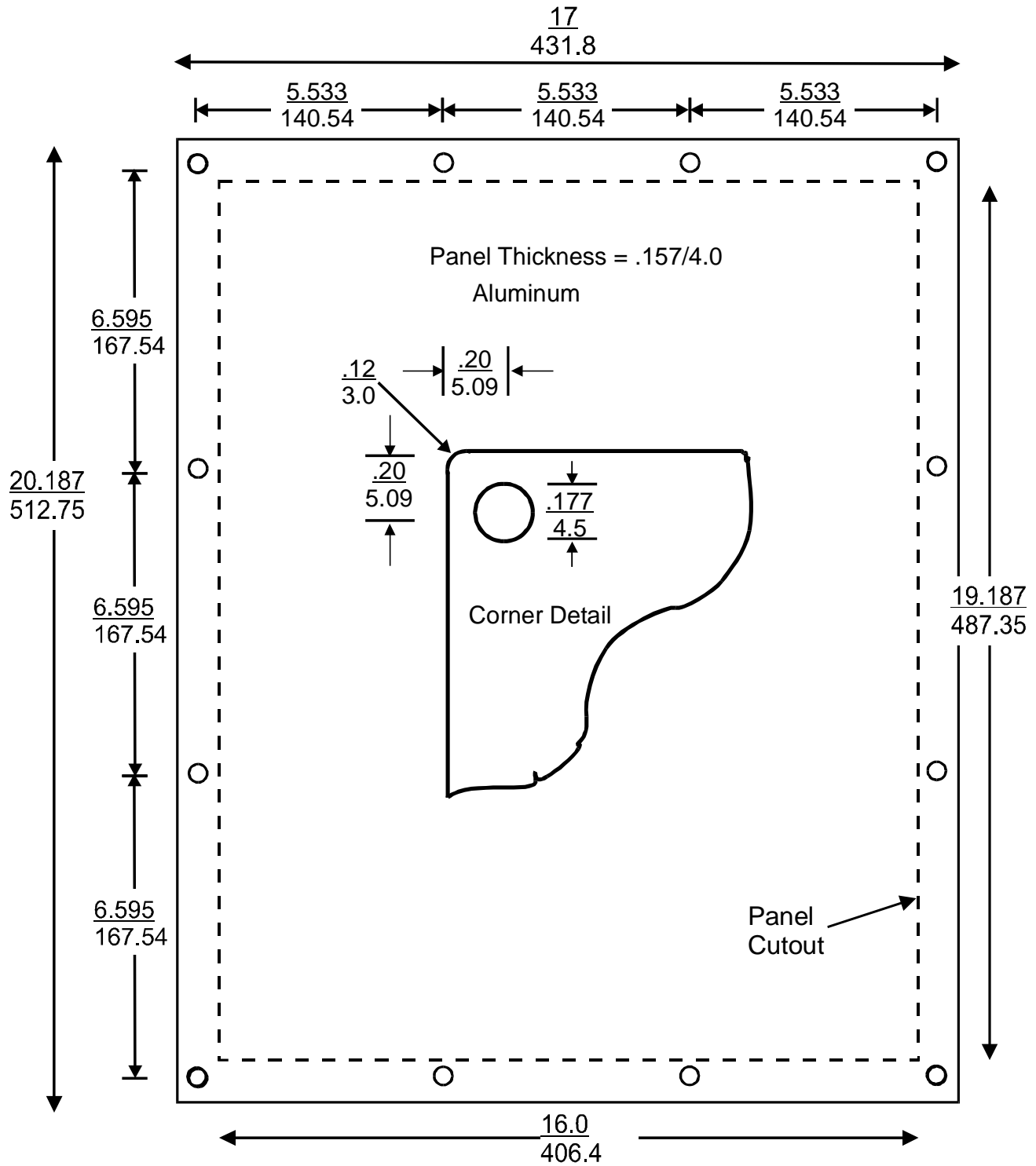


Vertical Operators Station Dimensions

M267 - Vertical Operators Station includes 15" TFT with touch screen, Slim Line MTBP (see Section 5.2) & 24V IO Handwheel.

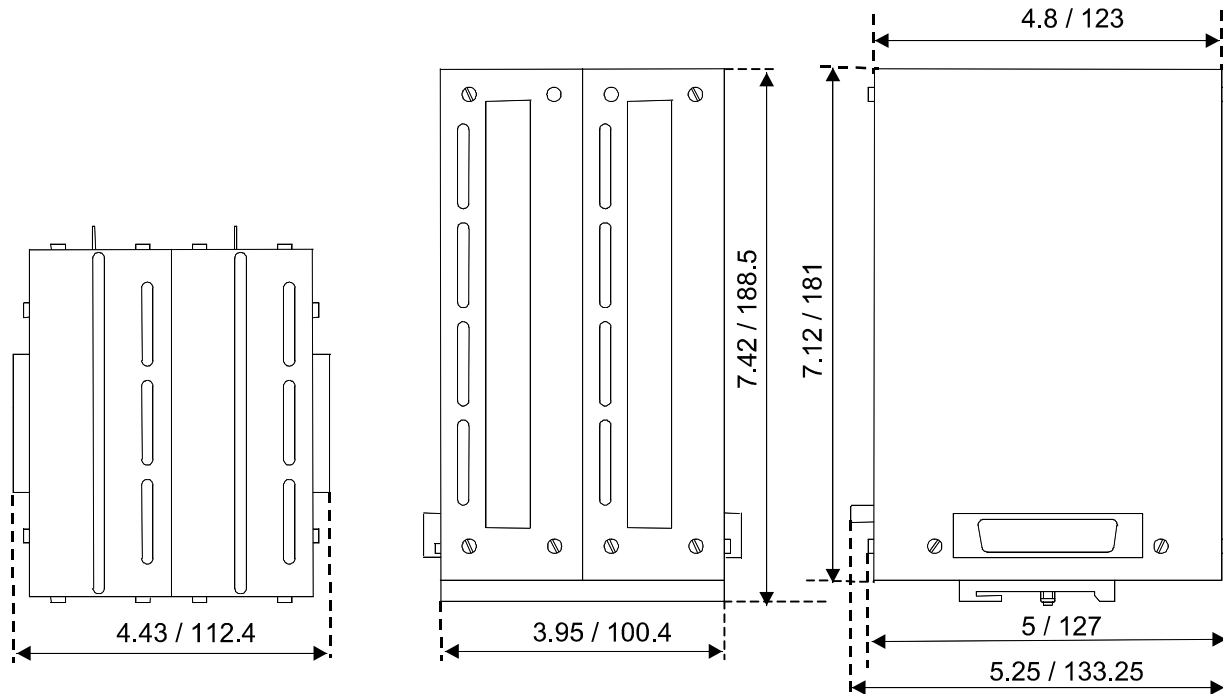
Requires SVGA cable. 2.5 and 10-meter lengths are available:

M232 (2.5-meter for eCNC,L2,LW), M233 (10-meter for eCNC,L2,LW)



Vertical Operators Station Detail Dimensions

4 MACHINEMATE Modular IO Dimensions



Modular IO Dimensions

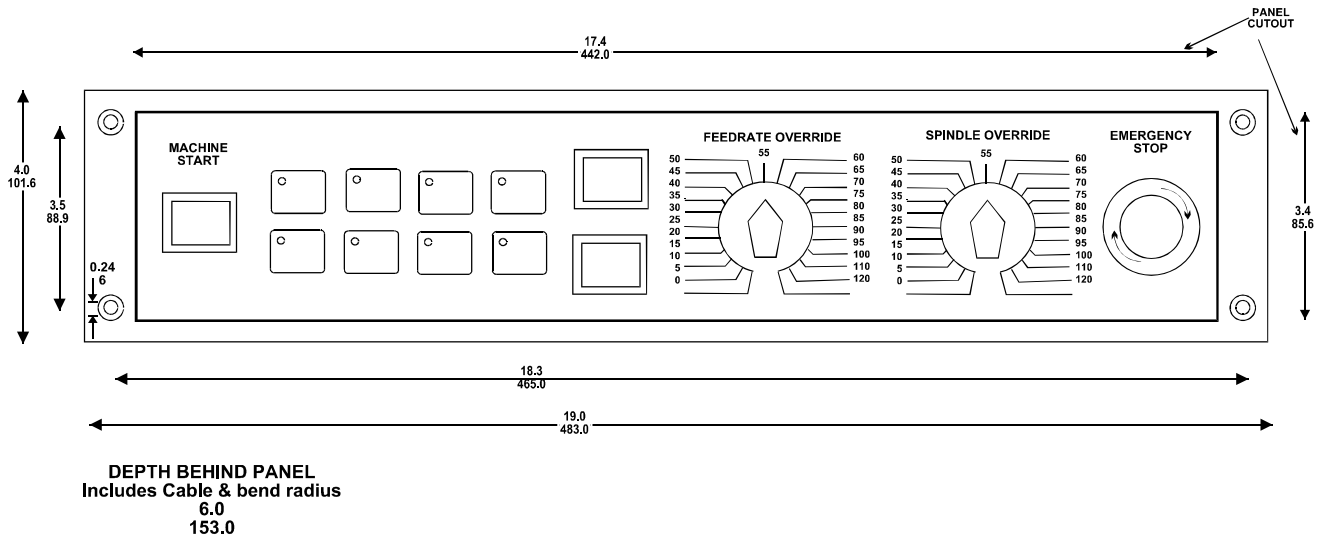
- MM72 – 16RO module - 16 relay outputs (all N.O. contacts)
- MM74 – Connector Kit for 16RO module
- MM76 – Box for two modules (box is shown above)
- MM77 – 2416 module – 24 inputs, 16 outputs (all 24VDC)
- MM80 – Connector Kit for 2416 module
- MM79 – Cover for unused slot in the box
- M148 – 4AD4DA module – 4 A/D inputs, 4 D/A outputs (all +/- 10V analog)
- M183 – Connector Kit for 4AD4DA module
- M149 – 4ENC4A module – 4 encoder inputs, 4 D/A outputs, 4 A/D inputs
- M181 – Connector Kit for 4ENC4A module
- M329 – Termination Plug (Required on the last module)
- M184 – DIN Rail Anchor (Set of 2)

Cable between IPC and IO box is available in different lengths.

MM82 (2-meter), MM85 (5-meter), MM86 (10-meter), MM87 (20-meter), MM88 (35-meter)

5 MACHINEMATE Operator's Panel Dimensions

5.1 19" Horizontal Machine Tool Builders Panel



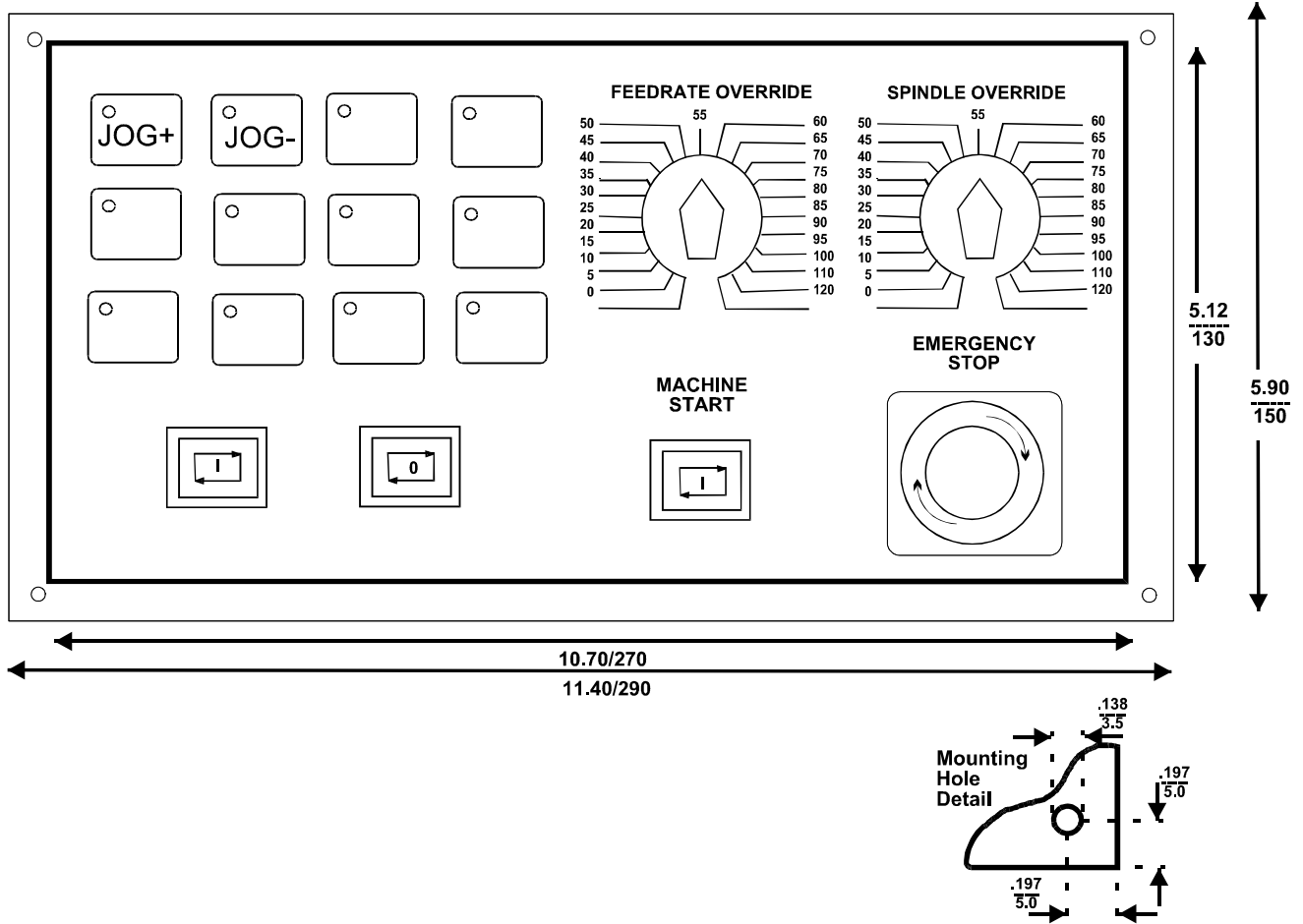
Horizontal Machine Tool Builders Panel

- M301 – Above panel with 2-meter cable
- M319 – Above panel with no cable
- M360 – Above panel with 5-meter cable

50-Pin D-shell female connector with flying lead cable can be used on any of these machine tool panels (this page and on the next two pages).

- M387 – DB50-female with 1-meter cable flying leads
- M374 – DB50-female with 5-meter cable flying leads
- M373 – DB50-female with 10-meter cable flying leads
- M372 – DB50-female with 20-meter cable flying leads

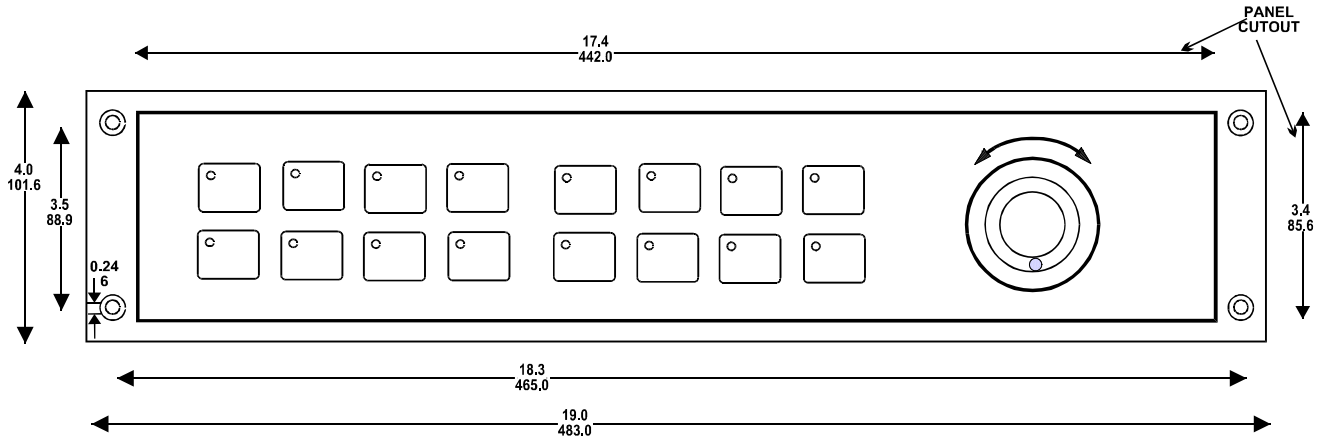
5.2 Slim Line Machine Tool Builders Panel



Slim Line Machine Tool Builders Panel

- M307 – Above panel with 2-meter cable
- M309 – Above panel with no cable
- M361 – Above panel with 5-meter cable

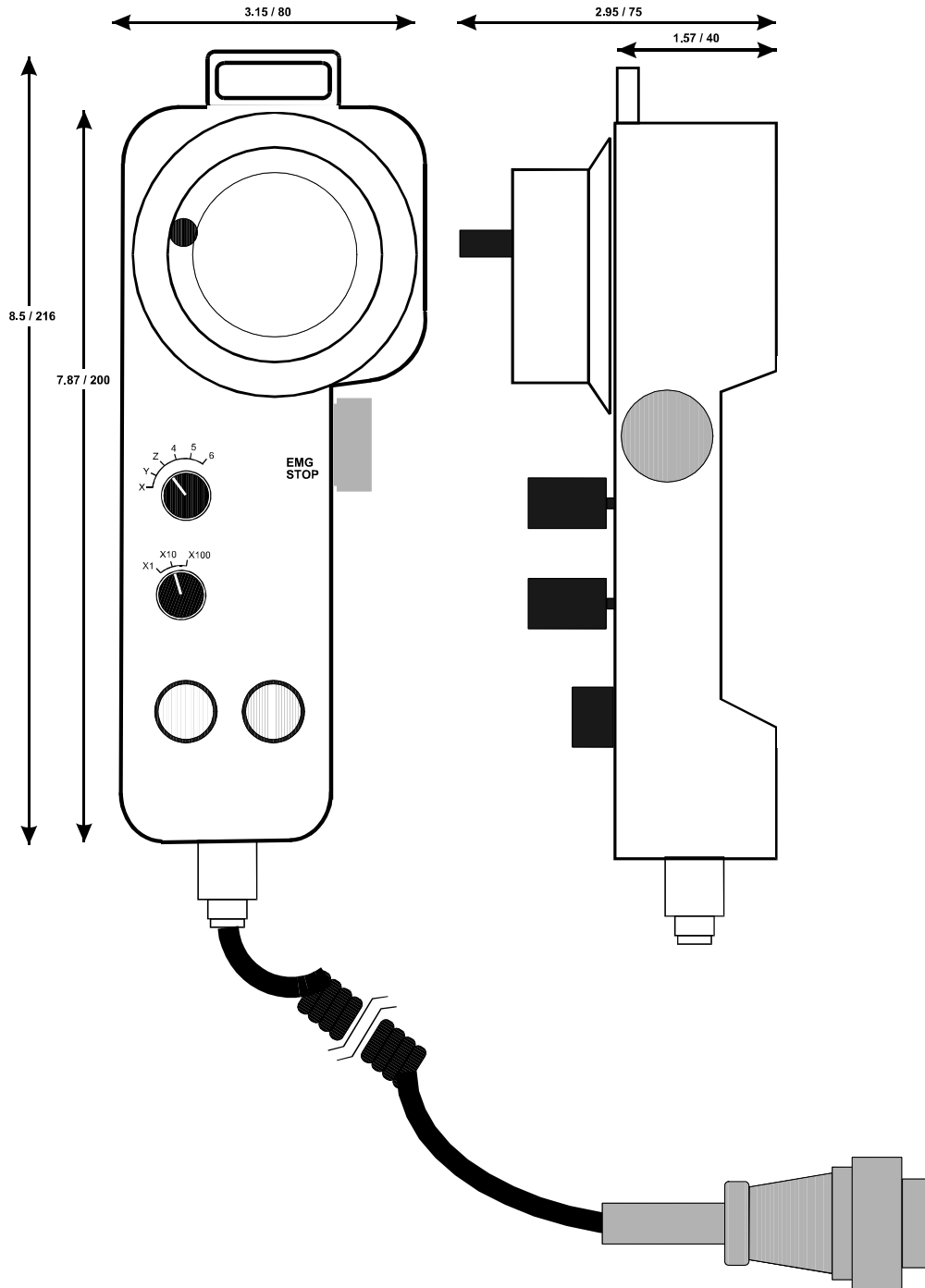
5.3 19" Horizontal Auxiliary Panel



Auxiliary Machine Tool Builders Panel

- M293 – Above panel with 24V digital MPG and with 2-meter cable
- M295 – Above panel with 5V TTL (encoder compatible) MPG and with 2-meter cable
- M362 – Above panel with 5V TTL (encoder compatible) MPG and with 5-meter cable
- M363 – Above panel with 24V digital MPG and with 5-meter cable

5.4 Hand Held Operator's Station



- M300 – Hand held MPG – 24V I/O Handwheel w 4.26' coil cord (21' extended)
- M316 – Hand held MPG – 5V TTL Handwheel w 4.26' coil cord (21' extended)
- M336 – Hand held MPG – 24V I/O Handwheel w 5.9' coil cord (34' extended)
- M337 – Hand held MPG – 5V TTL Handwheel w 5.9' coil cord (34' extended)