Universal Part Number: GS-374-02
Reference Configuration #46927506

Issued 2/00

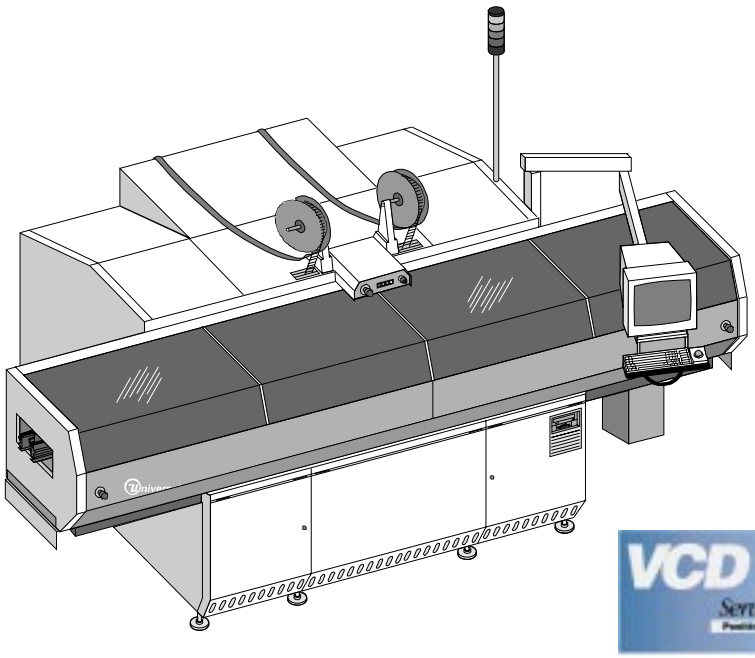
VCD Dual Head 8
Dual Head Axial Inserter
(6292C/6298C)

CE

Universal

Insertion Machine Division
Product Line

VCD DH 8
Dual Head Axial Inserter
*Model 6292C Servo Drive**
(Shown with Optional Internal Board Handling System)
CE-Compliant



Axial Lead Inserter Features

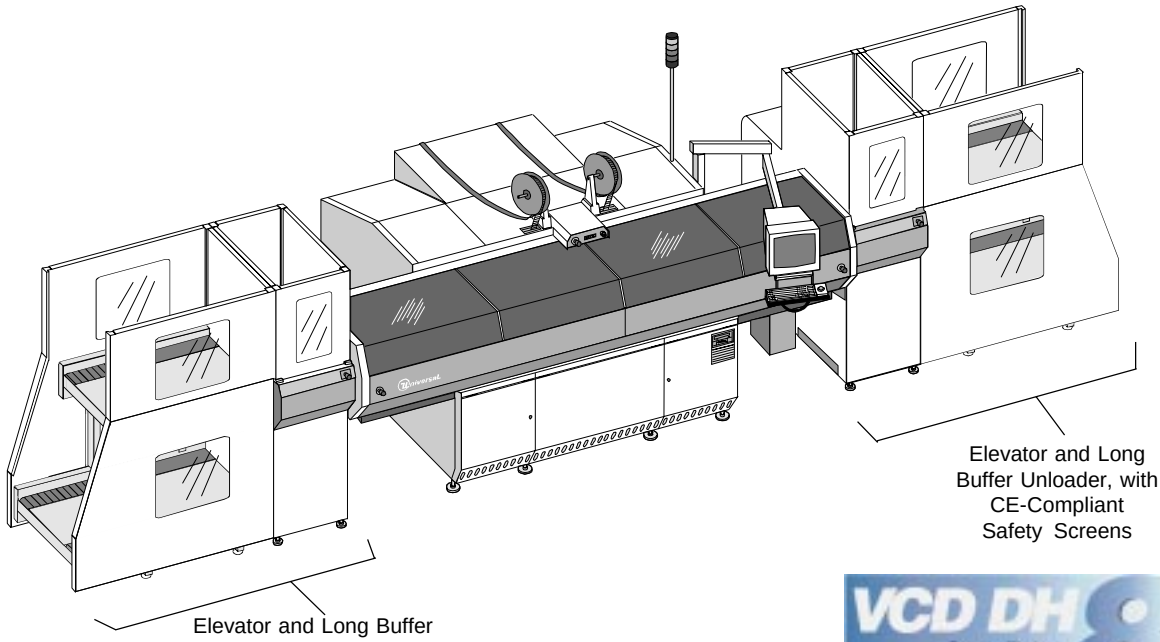
- High-performance insertion machine with insertion rates up to 40,000 components per hour with both heads, and insertion PPM of 150 or better
- Insertion span capabilities from 5mm (0.197") to 22.43mm (0.883") with standard tape input, depending on tooling selected
- VME-based control system with embedded P.C.
- IM-Universal Platform Software with graphical user interface
- Servo motor driven insertion heads, clinches, insertion span axes, and X-T table axes
- Uninterruptable Power Supply (UPS) included with each machine
- Scrap Tape Removers included with each machine

* Patent Pending

Universal

Insertion Machine Division
Product Line

VCD DH 8
Dual Head Axial Inserter with Loader/Unloader
*Model 6298C Servo Drive**
(Shown with Loader/Unloader: Magazine-to-Magazine)
CE-Compliant



VCD DH 8 Servo-Drive

Board Handling System Configurations

Same features as VCD DH 8, Model 6292C, plus...

- Internal Board Handling System (BHS)
- Auto MisMark and Bad Board Reject Station
- Loader/Unloader: Magazine-to-Magazine, CE-compliant with Long Buffers only
- Loader/Unloader: Vacuum Bare Board-to-Magazine, not CE-compliant
- Loader/Unloader: Destacker on 29", 44", or 58" Conveyor-to-Magazine, CE-compliant with 44" or 58" Conveyor and Long Buffers only

* Patent Pending

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Glossary of Acronyms and Specialized Terms

Acronym/Term	Meaning
AC	Alternating Current: type of electrical power generation
APE	Advanced Product Editor (Universal brand name)
ASCII	American National Standard Code for Information Interchange
AWG	American Wire Gauge: wire size standard
BEC	Board Error Correction (Universal brand name)
BHS	Board Handling System: means of transporting PCBs
CAD	Computer-Aided Design
CD-ROM	Compact Disc-Read Only Memory
CE	Conformité Europeanne: European safety standard
CFM	Cubic Feet per Minute: measurement of air flow
CTA	Component Transfer Assembly
DC	Direct Current: type of electrical power generation
ERV	Expanded Range Component Verifier (Universal brand name)
GEM	Generic Equipment Model
GS	General Specification (Universal brand name)
GUI	Graphical User Interface
HSMS	High Speed SECS Message Service: implements SECS2 messaging over a network link
Hz	Hertz (cycles per second): measurement of electrical frequency
IM	Insertion Machine: equipment for through hole component insertion
IMC	Insertion Machine Components
IM-UPS	Insertion Machine-Universal Platform Software (Universal brand name): operating software for Universal Series 8 through hole equipment
I/O	Input/Output
IP	Index of Protection: resistance of machine to contamination by foreign objects
LED	Light Emitting Diode: electrical component
MIT	Machine Interface Translator (VME to I/O bus)
MMIT	Mini Machine Interface Translator (VME to I/O bus)
OS/2®	Operating System 2 (IBM Corp. brand name)
PAC	Positive Axis Control
P.C.	Personal Computer
PCB (or PC board)	Printed Circuit Board
PPM	Parts Per Million: measurement of machine performance
SCFM	Standard Cubic Feet per Minute: measurement of air flow
SECS	Semiconductor Equipment Communications Standard: interface between host computer and assembly machines
SEMI	Semiconductor Equipment & Materials International
SMC	Surface Mount Components
SMEMA	Surface Mount Equipment Manufacturers Association
TCP/IP	Transfer Control Protocol/Internet Protocol: network communication protocol
UCT	Universal Control Terminal (Universal brand name): personal computer for operating IM equipment
UICS	Universal Instruments Control Software (Universal brand name)
UPS	Uninterruptible Power Supply
VA	Volt-Amps: measurement of electrical power consumption
VAC	Volts Alternating Current
VCD	Variable Center Distance
VDC	Volts Direct Current
VGA	Video Graphics Array: type of CRT monitor standard
VME®	Versa Module Eurocard (Motorola brand name): industry standard for 32-bit computer bus

Introduction

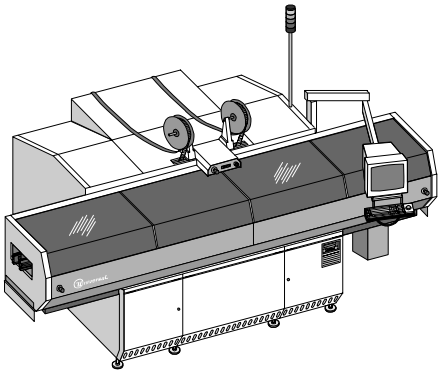
Universal's high-speed variable center distance dual head axial lead insertion machine, VCD DH 8, features VME-based control with an embedded P.C. and IM-Universal Platform Software (IM-UPS), including a graphical user interface.

The product line comes in two models: 6292C, manual load, or with internal Board Handling System (BHS); and 6298C, with automatic board handling and loaders/unloaders. Dual indexing rotary tables, high-speed, servo-driven insertion heads and cut and clinches are also featured.

Models 6292C and 6298C achieve insertion rates up to 40,000 components per hour: 20,000 CPH with each head. Insertion rates will vary depending upon PCB size and the number of axial components inserted. (See Insertion Rate Determination in the Technical Specifications section.)

In consideration of essential health and safety requirements, the VCD DH 8, Models 6298C and 6292C with BHS, are CE-compliant. The Vacuum Bare Board-to-Magazine, Destacker on 29" Conveyor-to-Magazine, and stand-alone machine without board handling configurations, are not CE-compliant.

Functional Description



Models 6292C and 6298C automatically insert axial leaded components from dual, sequenced taped input packages into printed circuit boards (PC boards). A product (pattern program) is created with information pertaining to the components, PC boards, and processing requirements. When this product is loaded, machine operation can be started.

When the machine is started, the PC boards can be located and clamped into the workboard holders. The product activates the X-Y positioning system and the component feed. The component feed transfers taped components to the insertion heads. The insertion tooling cuts the component leads from the carrier tape to the required length determined by the product, and forms the components for insertion.

After insertion through the PC board, the component leads are cut and formed (clinched) to mechanically secure them to the board. The process continues until the product is completed and all required axial components are in place. When the product is complete, the PC board can be removed from the machine.

Standard Features

Control System

The VCD DH 8 employs a control system, including input power/ distribution, VME bus, I/O, and servo system. Brief descriptions of major elements of this control system follow.

Power Input and Distribution

The input power to this machine nominally is 230 VAC, single phase, 15 amps, 50 or 60 Hz. All components of the machine can operate over the range of 47-63 Hz without configuration change. In combination with the supplied Uninterruptable Power Supply (UPS), the machine will accept a wider range of inputs (see “Service Requirements” section) and provide power to run the machine briefly in the event of a short power interruption. There are filters to prevent machine generated noise from getting on the power lines as well as to prevent noise on the power lines from interfering with machine operation. The machine has a lockable disconnect switch for safety during service.

Internal to the machine, the 230 volts is directly used for amplifier power for the heads, clinches, and insertion span drives. There is a power conditioner transformer used for creating 120 VAC for the remainder of the machine functions. This includes the fan panels, the power chassis, the VME chassis, and the monitor. This transformer will also supply 120 VAC for the attached elevators and bare board loaders.

The power chassis, in turn, provides DC power for machine operation. This includes 56 VDC for Board Handling motors; +5 and ±15 VDC for the I/O box; and 12 VDC for general purpose use (valve solenoids, sensors, indicators, etc.). The 56 VDC is disconnected from the machine when interlocks are violated. The power chassis also provides 12 VAC for the worklight and 24 VAC for the machine status light, the interlock circuits, and the scrap tape pullers.

Uninterruptable Power Supply (UPS)

An Uninterruptable Power Supply is standard with the VCD DH 8 and external to the machine, providing continuous power at all times. The UPS will seamlessly transition to battery power in the event of an electric service interruption.

Battery capacity at full charge should allow full machine operation for up to 10 minutes after loss of input power. The machine should be brought to a controlled stop until electrical service is restored.

VME Chassis

The VME chassis is a state-of-the-art, multi-processor rack-mounted controller. It has an embedded Intel®-based P.C. which is used for the main operator interface. Attached to it are standard VGA monitor, keyboard, and pointing device. The main machine controller is a 680X0-based unit. This board handles all of the machine functions and timing. It does not directly handle the motor control, but does direct the motion controllers.

Two, four-axis intelligent motion controllers are used. These are 68000-based dedicated processors. The motion controllers provide speed and destination information to the servo amps, which drive the motors. Encoders, tachometers, and resolvers provide positional and velocity feedback to the motion controllers for precise position control. Three of these motion controllers are used with the Loader/Unloader configuration.

As an interface between the VME controller and the machine controls, there is a VME/Satellite interface board in the chassis. This connects to the I/O box using a Universal MIT cable.

Input/Output Box

The I/O box has a standard Universal MIT card in slot 1, which is the interface to the VME controller. The I/O box contains two Multi-Input cards, two 32 DC Output cards, a Board Error Correction card, and, for machines with board handling, two 32/16 I/O cards.

High Power Servo Chassis

The high power servo chassis contains the high voltage servo amps used for controlling the heads, clinches, and the insertion span axes. There are contactors in this chassis to disconnect power to the amps when interlocks are violated. The high power servo chassis has additional power line filtering for the 230 VAC used in the chassis. X and Y table servo amps are located external to the high power servo chassis.

Head Drive

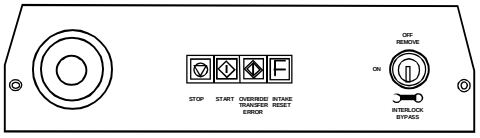
The head drive is a servo-controlled axis for precise and rapid component insertions. The insertion depth is controlled by this servo. The servo motor contains an integral resolver used for position feedback. This signal is sent back to the high power servo chassis where it is converted to a quadrature line driver

Insertion Span Axis

The insertion span axis is also a high voltage servo drive for rapid insertion span changes. There is a separate encoder on this axis for precise positioning of the heads and clinches.

Clinch Anvil Drive

The clinch anvil drive is a servo-controlled axis for precise and rapid anvil positioning. The anvil height is controlled by the servo. The servo motor employs an integral encoder used for position feedback.



Push Button Panel

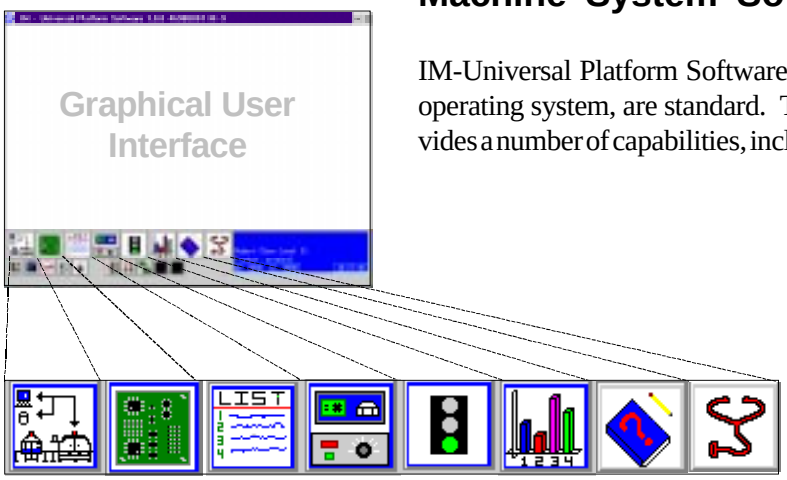
The PB panel includes the E-Stop switch, the Interlock Reset button, the Start and Stop buttons, the Override or Transfer Error button, and the Interlock Bypass Key Switch. All other machine functions are accessed through the graphical user interface via the keyboard, trackball, and monitor.

Board Error Correction (B.E.C.)

Board Error Correction allows the positioning system to compensate for lead hole location variations between printed circuit board lots. A light source and sensor are mounted relative to the insertion tooling centerline. On a maximum dimension PC board — 457.2mm x 457.2mm (18" x 18") — a small area cannot be sensed due to sensor offset. Detectable area is 457.2mm x 434.34mm (18" x 17.1"). See section in Technical Specifications on B.E.C. Detection Area.

B.E.C. uses a four quadrant sensor and amplitude controlled light source to find the center of holes in printed circuit boards. The signals are processed and provide the X and Y corrections to the motion controller via an analog signal. The motion controller then uses the full power of the control algorithms to find the center of the hole. Screens for B.E.C. setup are now integrated into machine diagnostics.

B.E.C. is also used in “Teach” to fit an insertion pattern to a PC board. This greatly improves pattern accuracy and reduces insertion PPM.



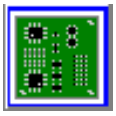
Machine System Software

IM-Universal Platform Software (IM-UPS), and an OS/2 WARP operating system, are standard. This graphical user interface provides a number of capabilities, including:

System Setup Icon

System Setup

- Machine Configuration — User configuration of machine options, such as board handling and tooling.
- Event Configuration — Configuration of events for display and control of machine status light.
- Security — Security based upon user/function.



APE Icon

Advanced Product Editor (APE)

- Graphical Program Generation and Editing — Component location can be programmed/edited in either text or graphical format. Graphically displays all component insertions relative to PC board.
- Import of CAD Data for Program Generation (see following section).

Product Changeover Icon

Product Changeover

- Load Product — User selection of previously stored product programs.

Production Control Icon

Production Control

- Counts — Allows setting inserter counts.
- Manual Control — Manually controls (zero, move) all axes of the machine.

Machine Status Ison

Machine Status

- Current Messages — Displays current controller messages and events.
- Product Status — Displays status of running product.
- Analytic Information:
  - Discrete I/O — Ability to read each input and set each output individually.
  - Message History — Ability to view message log.
- Operations — Sets machine modes: Step, Single Cycle, Insert, Pattern.
- Error Recovery — Recovery processes for operational errors, i.e., mis-insertion.

Management Information Icon

Management Information

- Timers — Collection and display of machine timers.
- Counters — Count of machine events: insertions, insert errors, boards, Bad Board Reject, Board Error Correction, circuits.
- Component Data — Counts by component ID: placements, errors.

From these databases, a variety of reports can be created.

IM Diagnostics Icon

IM Diagnostics

- IM Diagnostics — Ability to exercise machine sub-systems on an individual or combined basis outside of machine control software.
- B.E.C. Set-Up/Analysis.
- Machine Set-Up Support.

On-Line Documentation Icon

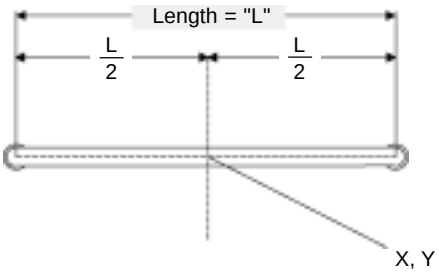
On-Line Documentation

- IM-UPS documentation is available on-line.

CAD Data Requirements

ASCII File Format — Incoming CAD files must conform to the American National Standard Code for Information Interchange (ASCII). In order to accommodate a wide variety of CAD file formats, the APE uses either a generic columnar or separator data translation technique. All data contained in the CAD file is identified by a position in a definition created by the user.

CAD File Requirements



Centroid (Top View)

X Coordinate: The X centroid coordinate location on the board.

Y Coordinate: The Y centroid coordinate location of the component insertion.

Theta: The rotation of the component on the board.

Insertion Lead Span: The distance between the centerlines of the component leads.

Reference ID: The name assigned to the component makes it unique to all other components in the product.

Component ID: The name of the component as it is found in the component database.

Alias ID: The name of a component in the database to which this component is aliased (optional).

BOM-CAD Link: A user-defined alphanumeric string which links a line of data in the CAD file to a component ID in the Bill of Material (BOM) file.

Ignore: If the CAD file contains data that does not fit any of the fields, IM-UPS may be configured to ignore this data.

A sample CAD file format is given with a brief explanation. This file format is provided for reference only and is an example of a typical CAD output.

This is a typical CAD file which may be output from a wide variety of different CAD systems.

This file includes SMC and IMC information, with component information stored for the IMC components. The component information for Surface Mount components will be obtained from the master .DEF files. IMC component information will be obtained from this file and placed into the Component Library.

Information in the CAD file:

A = REFERENCE DESIGNATOR
B = X COMPONENT CENTROID COORDINATE
C = Y COMPONENT CENTROID COORDINATE
D = ORIENTATION
E = PART NUMBER/COMP ID
F = SPAN
G = NUMBER OF LEADS
H = AXIAL BODY DIAMETER
I = MACHINE TYPE
J = DIP SOCKET
K = AXIAL LEAD DIAMETER

```
** ⇐ ⇐ ⇐ ⇐ ⇐ ⇐ ⇐ ⇐ ⇐ ⇐ ⇐          NOTE 1          ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒   **
**  Each line represents a placement/insertion on the board                **
****************************************************************************
  A      B       C    D           E             F     G    H    K           I   J
|   |  NOTE 3  |   |  | |   |                 | | |   ||  | |  | |          | | | |
0000000001111111111222222222233333333334444444444555555555566666666667777777777
1234567890123456789012345678901234567890123456789012345678901234567890123456789
****************************************************************************
C1        276    586   90   1206-CAP          NOTE 6                            *
IC1      5170    887   90   8-SOIC                                              *
C2        276   2288   90 N 1206-CAP                                            *
C3        276   2387   90 O 1206-CAP                                            *
C4        576 N  687   90 T 1206-CAP                                            *
IC2      1900 O 3200  270 E DIP-300-16        300   16                  DIP     *
IC3      4000 T 7000   90   DIP-300-8         300    8                  DIP     *
T1        877 E 2789    0 5 SOT-89                                              *
C5        877 4 1987  180   805-CAP                                             *
C6        877   2087  180   805-CAP                                             *
J1        180   2250  180   TEKA-CONN                                           *
IC4      3000   1600    0   68PLCC                                              *
IC5      2000   5250    0   DIP-600-24        600   24                  DIP     *
XIC5     2000   5250    0   DIP-600-24-SOC    600   24                  DIP SOC*
T2        877   2288   90   SOT-89                                              *
R1       3550   3200    0   RES-RAD-50        200    2                  RAD     *
IC6       877   2488  180   14-SOIC                                             *
IC7      1177   2488  180   14-SOIC                                             *
R3       7000   5000    0   RES-1/4W          500        095  025       AX      *
IC9      3520    950   90   8-SOIC                                              *
R4       5555   4444  180   RES-1/8W          300        080  020       AX      *
C7       3900   6690  270   CAP-RAD-25        100    2                  RAD     *
R5       9000   8000   90   RES-RAD-25        100    2                  RAD     *
CR1      3100   8500  270   DIODE-AX-2        600        100  025       AX      *
IC10     1177   2388   90   20-SOIC                                             *
```

Sample CAD File Format

Sample CAD File Format Notes

1. Maximum file width can not exceed 256 columns.
2. Headerlines, often output by the CAD system, may be used. The CAD Translator allows the user to define the quantity of lines containing the file header. This information is for operator use only and is not used by the CAD Translator.
3. **Format Type:** The format of file. This can be either Table or Separator format (Table is the default).

Table format uses predefined columns for each data type. For example, the reference ID column may be defined as 10 characters. The actual reference ID in the CAD file can contain up to 10 characters. It does not matter if there is data in every column.

Separator format uses a character (comma, space, dash, etc.) to separate data fields. Each line of data must contain the same data types in order for auto detect to work.

# of Fields: The number of fields in the file.

# of Lines: The total number of lines in the file.

4. The CAD file must be devoid of all special control characters such as Tabs. (Note that special characters shown are for illustration purposes only and cannot be contained in the actual CAD file. These characters include boxes, arrows.)
5. CAD data is limited to one component per data file line or row. Additional components are specified on additional lines of the CAD file. There must be no blank lines or rows between any rows of CAD data. Markers such as {EOF} must not be present at the end of the CAD file.

Additional APE Features

- Import of Existing UICS Patterns — UICS patterns are converted to IM-UPS products.
- Program Optimization — Optimization via "Nearest Neighbor" insertion path.
- Component Identifier (part number) and Reference Designator are now included in Product Information — the addition of component identifier and reference designator in programs supports improved status message reporting and management data tracking by component identifier.

  Product program generation is recommended to be off line from the machine since the machine cannot run in full production mode while in the Program Generation/Edit Mode. A 486-based P.C. with OS/2 Warp operating system is recommended. Supplied software is loadable into the machine as well as an off line P.C.

Off-Line Pattern Programming Specifications

The creation of a "product" (pattern program) can be completed on-line, utilizing the machine's embedded P.C., or off-line, using a suitable stand-alone P.C. loaded with IM-UPS software.

Universal recommends that pattern programming be generated off-line to eliminate production interruptions. The stand-alone P.C. for off-line pattern program generation is not a standard feature of the machine.

Note: IM-UPS software supplied with the machine is licensed only for use in the machine. Software for an off-line P.C. is available as an option at extra cost.

Minimum P.C. requirements for creating the product off-line (pattern programming) include:

- 486 processor
- 12 megabyte memory
- CD-ROM drive
- IBM OS/2 Warp 4.0
- 200 megabyte available disc space, on OS/2-compatible partition

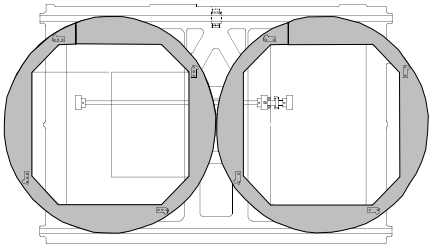
For optimum performance in generating the pattern programming off-line, the following capabilities are recommended:

- Intel Pentium® processor
- 16 megabyte memory
- 500 megabyte available disc space, on OS/2-compatible partition

Note: Installation of OS/2 on an existing P.C. system may require partitioning of the hard drive.

System Mechanics

X-Y Positioning System



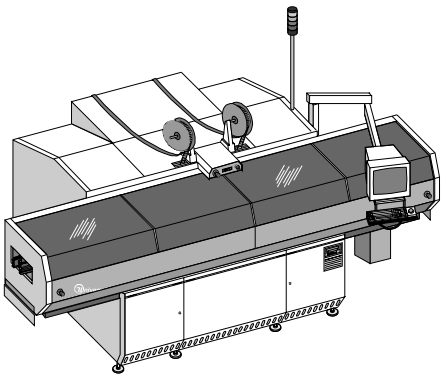
The X-Y positioning system locates the printed circuit board under the insertion tooling and is equipped with dual rotary indexing tables that index in 90° increments, from 0° to 360° in a clockwise rotation. These rotary tables are air motor driven under pattern program control and require less than one second to execute each 90° rotation.

The X-Y positioning system employs high performance brushless motors. The system is controlled by the 680X0-based motion controllers. Automatic belt tensioning assures that belts are properly adjusted.

Machine Console/Covers

The machine covers serve two primary purposes. The first is to provide safety by preventing access to dangerous mechanical and electrical hazards. The second is to further reduce the sound level of the operating machine. It is important that the machine covers remain in place and fully functional for operational safety.

On stand-alone machines (non board handling machines), the positioning system and work board holders are exposed to allow the operator to load and unload printed circuit boards. There is a hinged cover that protects the operator from the moving parts of the insertion heads. This cover is interlocked and will stop the machine if moved. Note: This configuration does not carry the CE mark. These covers are not made of an electrostatic dissipative material.



Board handling machine covers completely enclose the machine. The sliding covers on the front of the machine are interlocked with shot pins. The purpose of the shot pins is to prevent interlock conditions during machine operation. To gain access to the machine, the stop button on the Push Button Panel must be pressed. The machine will stop and the shot pins will be released from the covers, allowing them to be opened. Note: This configuration does carry the CE mark. These covers are not made of an electrostatic dissipative material.

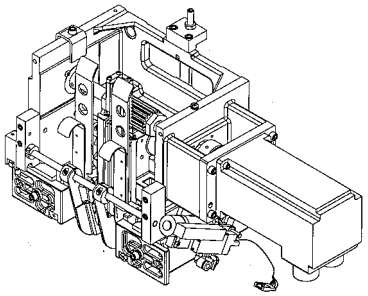
Note: Covers that are made of an electrostatic dissipative material are available as an option, at extra cost, for both stand-alone and board handling machines.

Machine Status Light

The machine status light indicates the status of machine operation. Each light is user configurable via the monitor/keyboard interface. Defaults are set as follows:

- Red - machine stop for any error.
- Yellow - normal operation, machine waiting.
- Green - normal operation, machine running.
- Blue - not configured for VCD DH 8.

Insertion Head



A servo motor activates each insertion head through a rack and pinion drive, providing insertion rates up to 20,000 components per hour. Close coupled software provides controlled acceleration/deceleration and velocity during the insertion process for increased reliability and reduced noise.

The machine handles varying component body diameters by software selectable depth stops. Depth stops, at insertions, are software selectable via the Advanced Product Editor and based on component size, programmable in 0.03mm (0.001") increments, from 0mm to 5.49mm (0" - 0.216"). Actual driver tip down position is controlled through the closed loop servo drive system.

Insertion Hole Span

The tooling span for component insertion is automatically calculated by the Advanced Product Editor and based on lead diameter and center to center hole spacing on the PC board. Insertion hole spans are dependent upon head tooling configuration and component input class and are variable under servo program control.

Refer to Technical Specifications section for insertion hole span ranges that apply to the four basic tooling types.

Insertion Tooling

Universal offers four types of insertion tooling: standard, large lead, 5mm, and 5.5mm. Tooling type is selected to provide optimum performance depending upon board density (footprint), component lead wire size and material, component body size, hole spans, and board configurations.

Standard, large lead, 5mm, and 5.5mm tooling have been designed for improved reliability, longer tooling life, and better handling of bent lead component input. This tooling incorporates generous amounts of carbide inserts and has increased cross-sections for greater robustness.

Refer to Technical Specifications section for tooling specifications.

Above board clearance beneath the retracted tooling is approximately 20.32mm (0.800"). See Tooling Footprints and Component Clearances sections relating to tooling footprints.

Standard Tooling

Standard tooling is designed to insert components with leads from 0.38mm (0.015") to 0.81mm (0.032") in diameter and hole spans from 7.62mm (0.300") to 22.43mm (0.883") at standard input class. (Maximum hole span, which is dependent upon component input class, is 32.44mm [1.277"]).

Refer to Technical Specifications for a specific application.

Large Lead Tooling

Large lead tooling is designed to insert components with leads from 0.63mm (0.025") to 1.07mm (0.042") in diameter and hole spans from 7.62mm (0.300") to 22.17mm (0.873") at standard input class. (Maximum hole span, which is dependent upon component input class, is 31.95mm [1.258"]).

While increasing the insertion ability for large leaded components, this tooling reduces the allowable component density during PC board assembly.

Refer to Technical Specifications for a specific application.

5mm Tooling

5mm tooling is designed to insert components with leads from 0.38mm (0.015") to 0.81mm (0.032") in diameter and hole spans from 5.0mm (0.197") to 20.00mm (0.787") at standard input class. (Maximum hole span, which is dependent upon component input class, is 29.89mm [1.177"]).

Refer to Technical Specifications for a specific application.

5.5mm Tooling

5.5mm tooling is designed to insert components with leads from 0.38mm (0.015") to 0.81mm (0.032") in diameter and hole spans from 5.5mm (0.216") to 20.00mm (0.787") at standard input class. (Maximum hole span, which is dependent upon component input class, is 29.89mm [1.177"]).

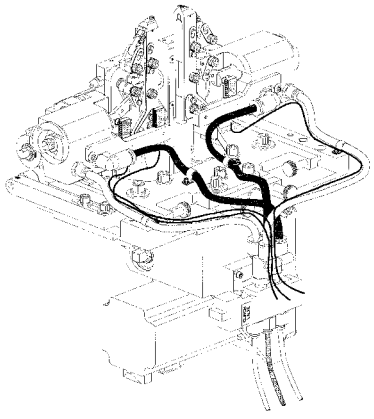
This tooling selection provides wider driver tips for more lead contact and improved insertion reliability when the application requires 5.5mm (0.216") hole spans, rather than 5.0mm (0.197") hole spans.

Refer to Technical Specifications for a specific application.

Scrap Tape Remover

For ensured and continuous removal of scrap tape and leads from the rear of the machine, this roller system works with a 24 VAC motor, 50/60Hz, and is internal to the machine covers.

Cut and Clinch



The VCD DH 8 cut and clinch contains a servo-driven rocker/slide up/down mechanism and provides PC board support during the insertion cycle, then trims and clinches the component leads to the underside of the PC board with a pneumatic actuated cutter.

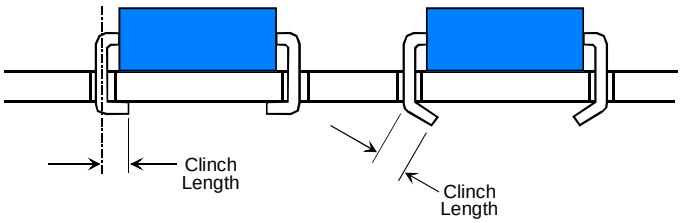
Two-step operation allows the clinch to return to its lowest position during a table rotation and only half the distance during the insertion process, saving time and wear on mechanical parts. “Half-down” position clearance between the clinch and PCB is 7.62mm (0.300") and “full-down” clearance is 15.24mm (0.600").

Insertion span is servo controlled over the same span as the insertion head, and left and right anvils are coupled. Clinch angle is inward and may be adjusted over a range from 0º to 45º from the PC board bottomside.

Clinch lead length is adjustable from 1.28mm (0.050") to 1.80mm (0.071"). Lead length is measured from the center of the hole to the end of the lead. The tolerance on the lead length is ±0.29mm (0.011").

The VCD DH 8 cut and clinch uses a dual lead continuity check to verify component insertion. The failure of either lead to pass through the PC board and be clinched will generate an insert error and cause the machine to stop.

Clinch Pattern Options



0° Clinch 45° Clinch

Board Error Correction Alignment Template

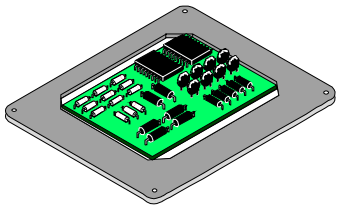
The Board Error Correction Alignment template is required, one per customer location, for set-up of head to table alignment. The template must be mounted on the rotary table to align first Head 1 and then Head 2. This template is then used to calibrate B.E.C. (Board Error Correction) on Head 1. On pass through machines, the template is also used for tooling pin set-up.

The template has been redesigned to ease manufacturing set-up by removing variability from the process and providing consistent accuracy. On pass through machines, the template has been designed so removal of the front guide assembly is no longer required, saving time and simplifying the process. It also provides a 1.57mm (0.62") edge to simulate PC board thickness, aiding in setting correct tooling pin location. The template eliminates the need for the X-Y Table Setup Bug and provides additional, tighter toleranced, tooling pin holes to check for skew and proper rotation about the rotary disc's center.

Input Components

Available for Tape Reels or Amno Pack (selectable).

Optional Features



Workboard Holders

Workboard holders are required, but must be ordered as separate items. The workboard holders used with the model 6292C are the standard dual positioning Universal 457mm x 457mm (18" x 18") style. Workboard holder ordering information is contained in GS-134. Workboard holders are not required when ordering the Board Handling System, as they are included.

Automatic Board Handling Configurations

TheVCD DH 8 is available in several material handling configurations (left-to-right, or right-to-left):

- Loader/Unloader: Magazine-to-Magazine with Short Buffer (not CE-compliant), or with Long Buffer with extra cost covers (CE-compliant).
- Loader/Unloader: Vacuum Bare Board-to-Magazine with Short Buffer (not CE-compliant), or with Long Buffer (not CE-compliant).
- Loader/Unloader: PCB Destacker-to-Magazine.
  - Destacker on 29" Conveyor with Short or Long Buffer (not CE-compliant).
  - Destacker on 44" Conveyor with Short Buffer (not CE-compliant).
  - Destacker on 44" Conveyor with Long Buffer with extra cost covers. Input PCBs, including any installed components, can not exceed 25.4mm (1") thickness (CE-compliant).
  - Destacker on 58" Conveyor with Long Buffer with extra cost covers (CE-compliant).
- Internal Board Handling System (BHS) - Internal BHS for in-line systems integration is also available. Two PC boards, one for input and one for output, quickly and reliably transfer. Board transfer from last insertion to first insertion on the next board occurs in 5.0 seconds. Transfer direction may be specified when ordering the machine, prior to manufacture, and quick and easy manual width adjustment handles a wide range of PC board sizes. The front fixed rail is standard and all operator PC board changeover adjustments are readily accessible.

Network Kit

Package for connection includes Ethernet network card and IBM OS/2 TCP/IP client software. This provides high speed, reliable communications and data transfer to all computers connected to the network.

Host Computer Interface Kit

This kit is used to interface VCD DH 8 with a Host computer using the SECS/GEM Standard. The Generic Equipment Model (GEM) Standard defines a standard implementation of the SECS II (Semi Equipment Communications Standard 2) communications interface for all semiconductor manufacturing equipment. See SEMI International Standards document E30-93 for details. Note: Requires customer's Host computer to be compliant with SECS/GEM standard SEMI E37, HSMS.

Remote P.C. Software/Off-Line Programming

Each base machine includes software licensed only to the machine. Universal recommends that "product" programs be created off-line to ensure maximum use of machine production time. This off-line software is licensed for use on a P.C. with a basic configuration as shown in the "Off-Line Pattern Programming Specifications" found on page 11 of this document.

Remote P.C.

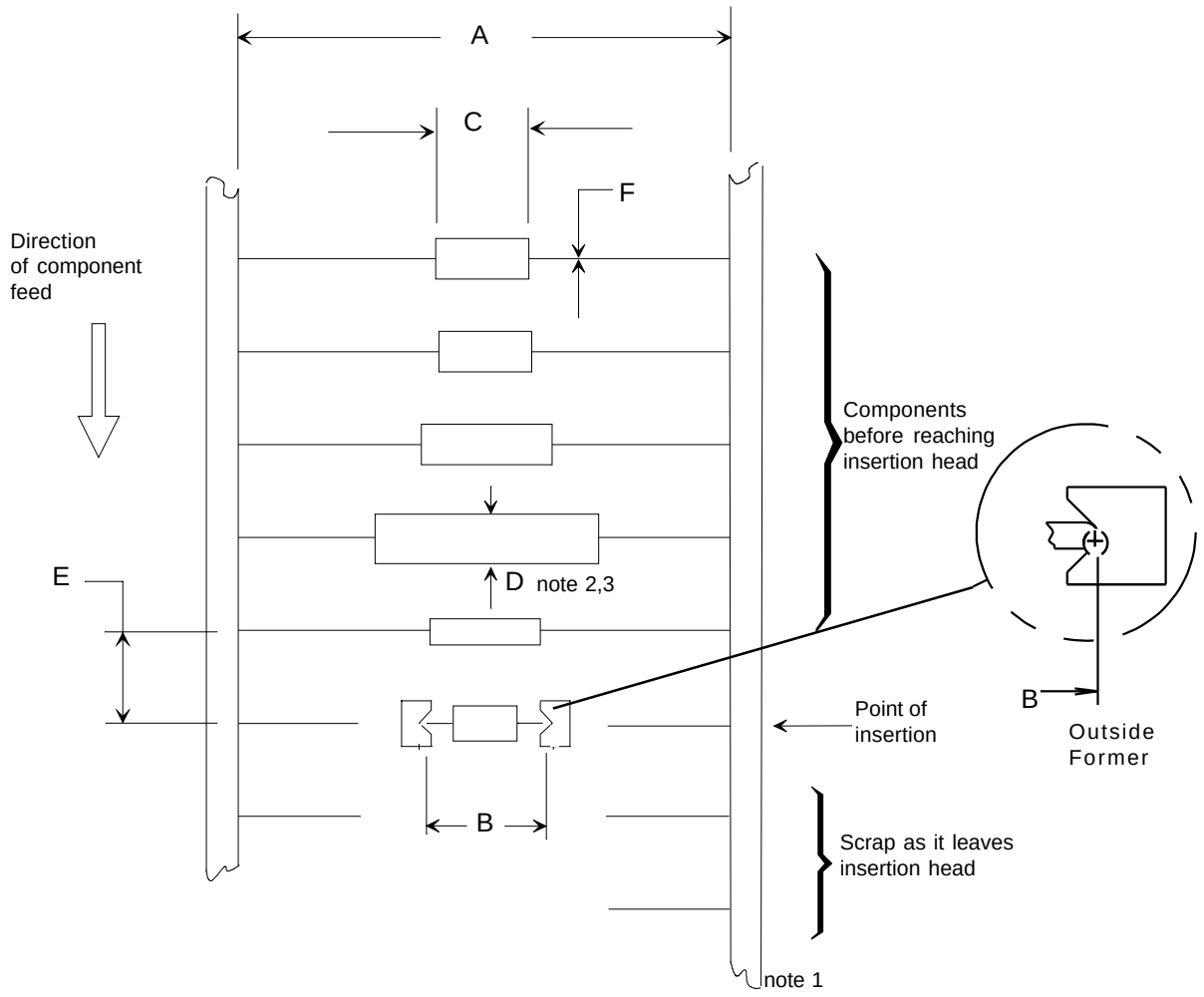
The Universal Control Terminal (UCT), using optional IM-UPS software, allows a Universal approved personal computer to be used as an intelligent terminal. It is connected to the VCD DH 8 via the optional Network Kit. This package includes a visual display terminal, keyboard, data storage unit, printer and stand, cable assembly, and manual. For additional information on this option, refer to GS-319. This can be used for off-line programming and machine data transfer.

Supporting Documents

GS-055	Indexing Rotary Tables
GS-061	Lead Tape Reel Packaging of Axial Components, Series 2500
GS-134	Workboard Holders, Series 6810
GS-354-01	Through Hole Design Guidelines
EIA RS-296-E	Lead Taping of Components in Axial Configuration for Automatic Insertion

Technical Specifications

Input Specifications for the VCD Insertion Head



Component Definitions

A = TAPE SPACING

Input Class	Distance Between Tapes
Std	**43.7mm (1.72")**

B = HOLE SPAN - hole center distance, notes 1, 2

C = COMPONENT BODY LENGTH

D = COMPONENT BODY DIAMETER - notes 2, 3

E = COMPONENT SPACING
5.08MM (0.200")
10.16mm (0.400"), note 3

F = COMPONENT LEAD DIAMETER

Notes:

1. The recommended maximum consecutive plus hole span change is 5.08mm (0.200") to prevent lead scrap problems. There is no limit to consecutive minus hole span change.
2. At 5mm hole spans, the maximum component body diameter is 2.29mm (0.090").
3. Optional 10.16mm (0.400") pitch wheels on dispensing heads are available.

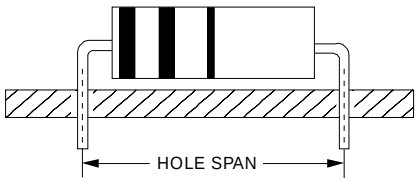
Insertion Tooling Specification[1]

		Standard	Large Lead	5mm	5.5mm
Minimum Hole Span[2] (with minimum lead diameter)		7.62 (0.300)	7.62 (0.300)	5.00 (0.197)	5.50 (0.216)
Maximum Hole Span[2] (with maximum lead diameter shown by input class)	**Std Input Tape**	22.43 (0.883)	22.17 (0.873)	20.00 (0.787)	20.00 (0.787)
Steel Wire Lead Size	**Minimum** **Maximum**	0.38 (0.015) 0.81 (0.032)	0.63 (0.025) 0.81 (0.032)	0.38 (0.015) 0.81 (0.032)	0.38 (0.015) 0.81 (0.032)
Copper Wire Lead Size	**Minimum** **Maximum**	0.38 (0.015) 0.81 (0.032)	0.64 (0.025) 1.07 (0.042)	0.38 (0.015) 0.81 (0.032)	0.38 (0.015) 0.81 (0.032)
Component Body Diameter	**Minimum** **Maximum[3]**	Wire lead dia. 10.69 (0.420) minus 2 X board thickness	Wire lead dia. 10.69 (0.420) minus 2 X board thickness	Wire lead dia. 11.68 (0.460) minus 2 X board thickness	Wire lead dia. 11.68 (0.460) minus 2 X board thickness

[1] Dimensions are given in millimeters; inches are in parentheses.

[2] Insertion hole span is defined as the hole center distance. Wider insertion spans are possible with the use of wider tape spacing. Consult a Universal Sales Engineer.

[3] At 5mm and 5.5mm hole spans, maximum component body diameter is 2.29mm (0.090").



Component Body Length Considerations

After the tooling type and the variables have been determined from the Insertion Tooling Specification table, the minimum allowable hole span can be determined for a known body length.

Machine capabilities allow components to be inserted using the minimum hole span formulas below. Due to body length variations, it is recommended to design hole spans greater than the calculated minimum.

Use the following formulas, depending on tooling type -- standard, large lead, 5mm, or 5.5mm -- to calculate the minimum insertion hole span for a known body length. The formulas apply to the body length ranges shown and are based on a ±0.41mm (0.016") component centering accuracy on the input tape.

Minimum Insertion Hole Span Formulas for Maximum Body Lengths

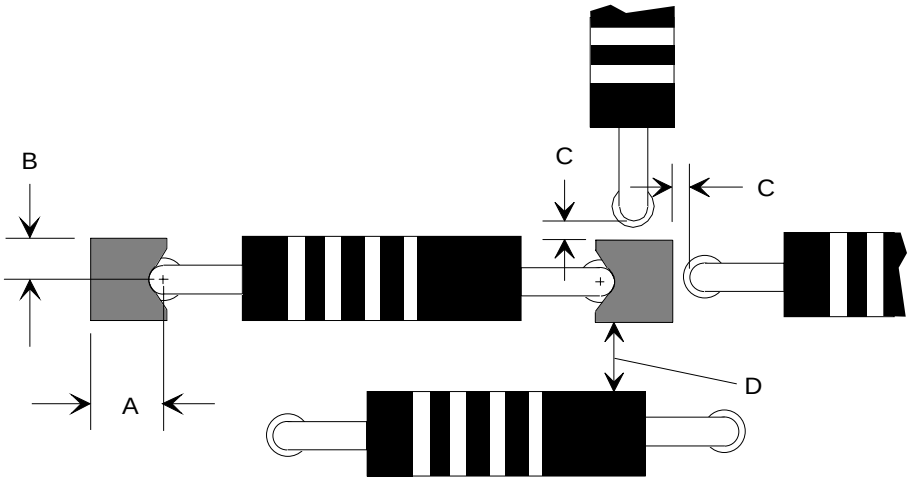
Standard Tooling	[Body Length Range: 5.08mm (0.200") to 15.75mm (0.620")]
Metric Formula:	Minimum Hole Span = [(Component Body Length[1] x 1.112) + 2.36mm] - Lead Diameter
Inch Formula:	Minimum Hole Span = [(Component Body Length[1] x 1.112) + 0.093"] - Lead Diameter
Large Lead Tooling	[Body Length Range: 3.81mm (0.150") to 15.75mm (0.620")]
Metric Formula:	Minimum Hole Span = [(Component Body Length[1] x 1.085) + 4.11mm] - Lead Diameter
Inch Formula:	Minimum Hole Span = [(Component Body Length[1] x 1.085) + 0.162"] - Lead Diameter
5mm Tooling	[Body Length Range: 3.61mm (0.142") to 15.75mm (0.620")]
Metric Formula:	Minimum Hole Span = [(Component Body Length[1] x 1.109) + 1.40mm] - Lead Diameter
Inch Formula:	Minimum Hole Span = [(Component Body Length[1] x 1.109) + 0.055"] - Lead Diameter
5.5mm Tooling	[Body Length Range: 3.61mm (0.142") to 15.75mm (0.620")]
Metric Formula:	Minimum Hole Span = [(Component Body Length[1] x 1.067) + 2.03mm] - Lead Diameter
Inch Formula:	Minimum Hole Span = [(Component Body Length[1] x 1.067) + 0.080"] - Lead Diameter

[1] Subtract an additional 0.41mm (0.016") from the maximum body length for non-symmetrically shaped components.

Recommended Component Clearances[1]

	Standard		Large Lead		5mm & 5.5mm	
Lead Diameter	0.38 (0.015)	0.81 (0.032)	0.63 (0.025)	1.07 (0.042)	0.38 (0.015)	0.81 (0.032)
A Dimension	1.78 (0.070)	2.01 (0.079)	1.80 (0.071)	2.08 (0.082)	0.97 (0.038)	1.22 (0.048)
B Dimension	1.14 (0.045)		1.57 (0.062)		1.14 (0.045)	
C Dimension	0.25 (0.010)		0.25 (0.010)		0.25 (0.010)	
D Dimension	0.76 (0.030)		0.76 (0.030)		0.76 (0.030)	

[1] Dimensions are given in millimeters; inches are in parentheses.

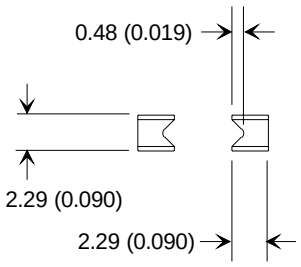
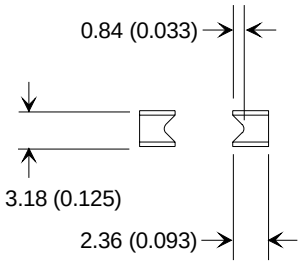
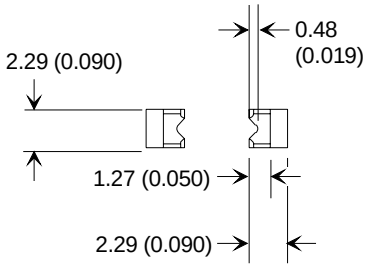
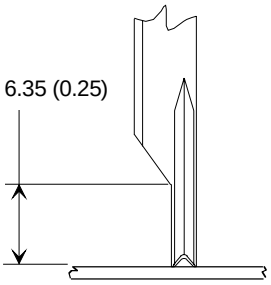
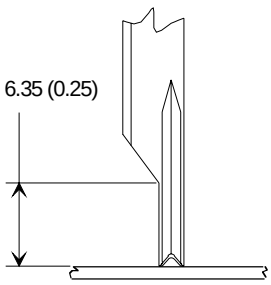
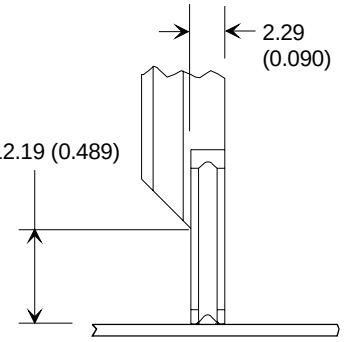
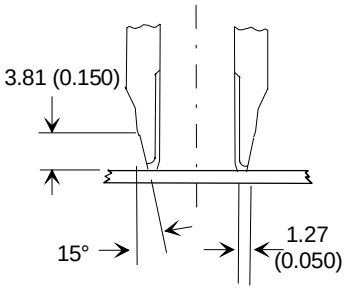
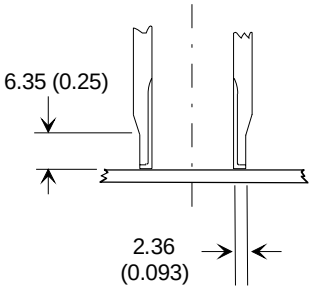
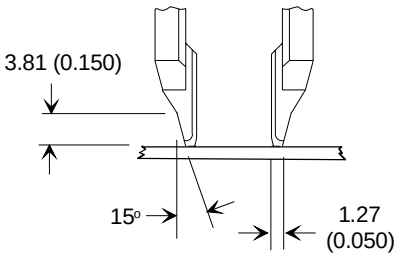


Note:
Dimension A is measured at the smallest possible footprint for 5mm and 5.5mm tooling. See Tooling Footprints for related dimensions.

Insertion Tooling Footprint

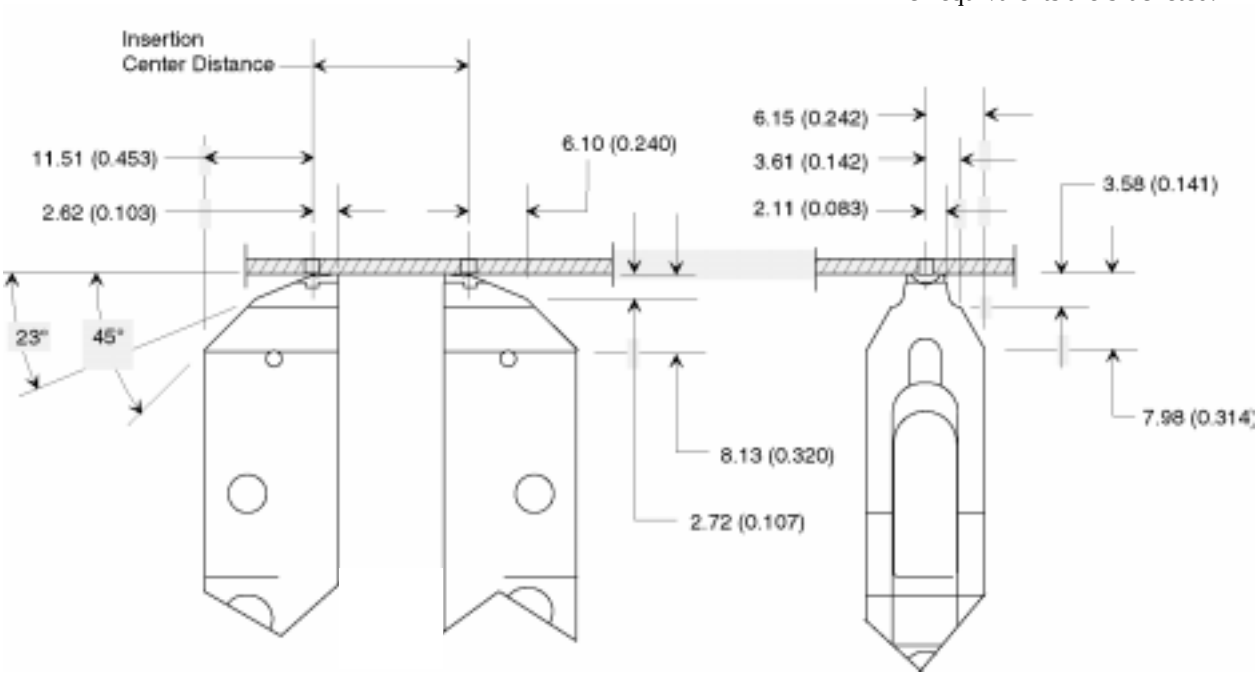
Dimensions are in millimeters;
inch equivalents are bracketed.

Tooling Footprint

	Standard	Large Lead	5mm and 5.5mm
Bottom View			
Side View			
Front View			

Cut and Clinch Footprint

Dimensions are in millimeters;
inch equivalents are bracketed.



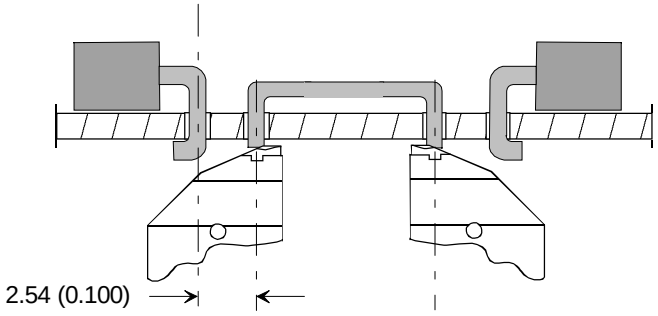
Component Clearances for Cut and Clinch Anvil Assemblies

Continuity Style Lead Sense

Dimensions are in millimeters;
inch equivalents are bracketed.

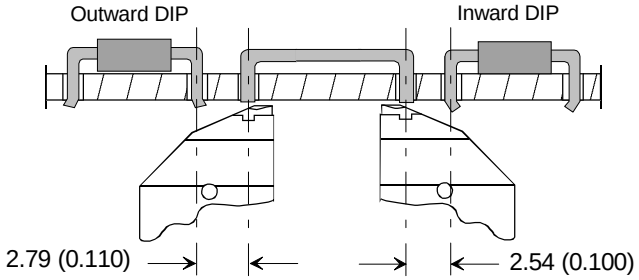
Side View

Axial leaded components to previously inserted axial leaded components.



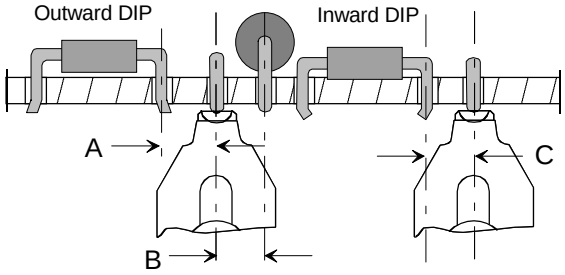
Side View

Axial leaded components to previously inserted DIP components, with both outward and inward clinch.



End View

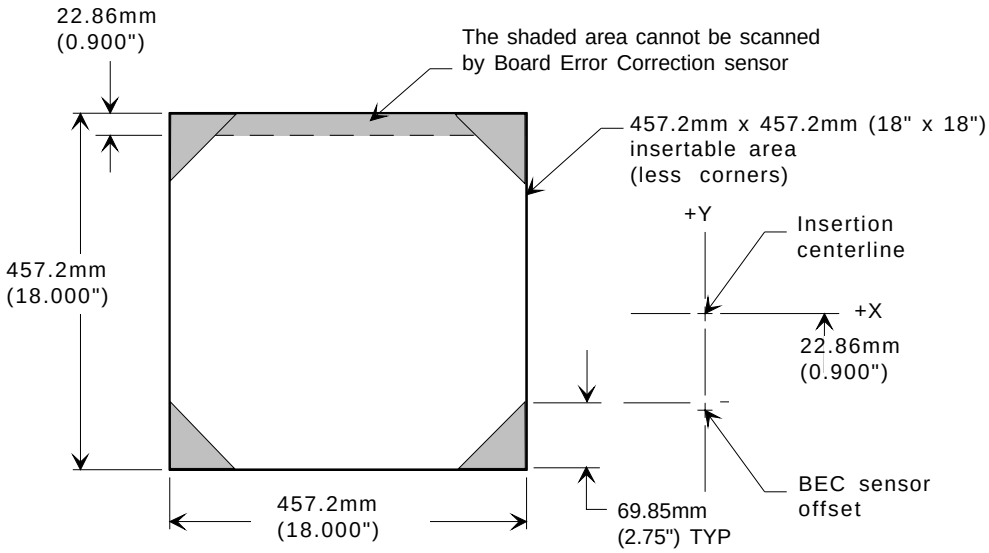
Axial leaded components to previously inserted axial leaded and DIP components shown with both outward and inward clinch.



A	B	C
3.68mm 0.125"	2.54mm 0.100"	2.54mm 0.100"

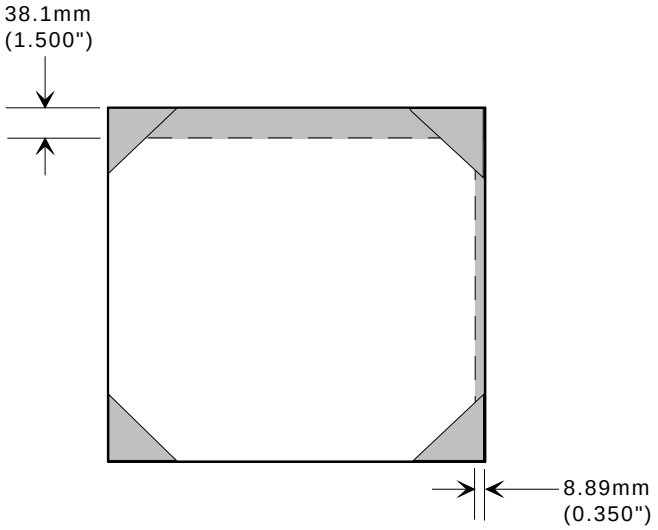
Board Error Correction Detection Area

Due to the position of the Board Error Correction sensor relative to the insertion point, there is an area which cannot be scanned by the sensor. The non-scannable area is at the rear of the positioning system regardless of rotary table rotation.



Auto MisMark

Due to the position of the Auto MisMark relative to the insertion point, there is an area which cannot be marked by the marker. The non-markable area is at the rear and right of the positioning system, regardless of rotary table rotation.



Insertion Rate Determination

Insertion Rate

Up to 40,000 insertions per hour with standard, large lead, 5mm, and 5.5mm tooling, with factory test specifications, and insertion PPM of 150 or better.

To attain the maximum insertion rate, the X and Y axis move between consecutive pattern steps must be no more than 7.5mm (0.300"). An insertion span move greater than 2.54mm (0.100") will degrade speed.

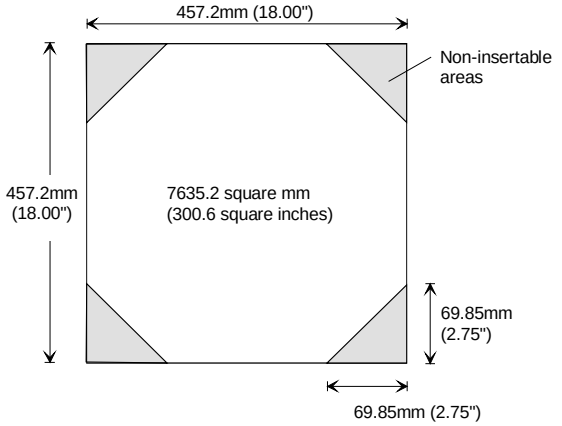
In the Production Operating Mode, the machine will automatically calculate the insertion rate for each set of PCBs processed. This actual insertion rate includes all table rotations from first insert to last insert of a product (program). It does not include PCB transfer time.

Positioning System

Table Size	457mm x 457mm (18" x 18")
Insertable Area	457mm x 457mm (18" x 18"), less corners. See appendix for dual head board handling system details.
Accuracy	±0.05mm (±0.002")
Repeatability	±0.025mm (±0.001")
Table Capacity	22.7 kg (50 pounds) maximum, including workboard holder.
Programming Capability	±0.01mm (metric dimensioning) ±0.001" (inch dimensioning)
Speed	368mm (14.5") per second 7.62mm (0.3") in 0.070 seconds

Insertable Area

Due to the shape of the rotary tables, the machine's insertable area is 457.2mm (18.00") square, minus the corners.

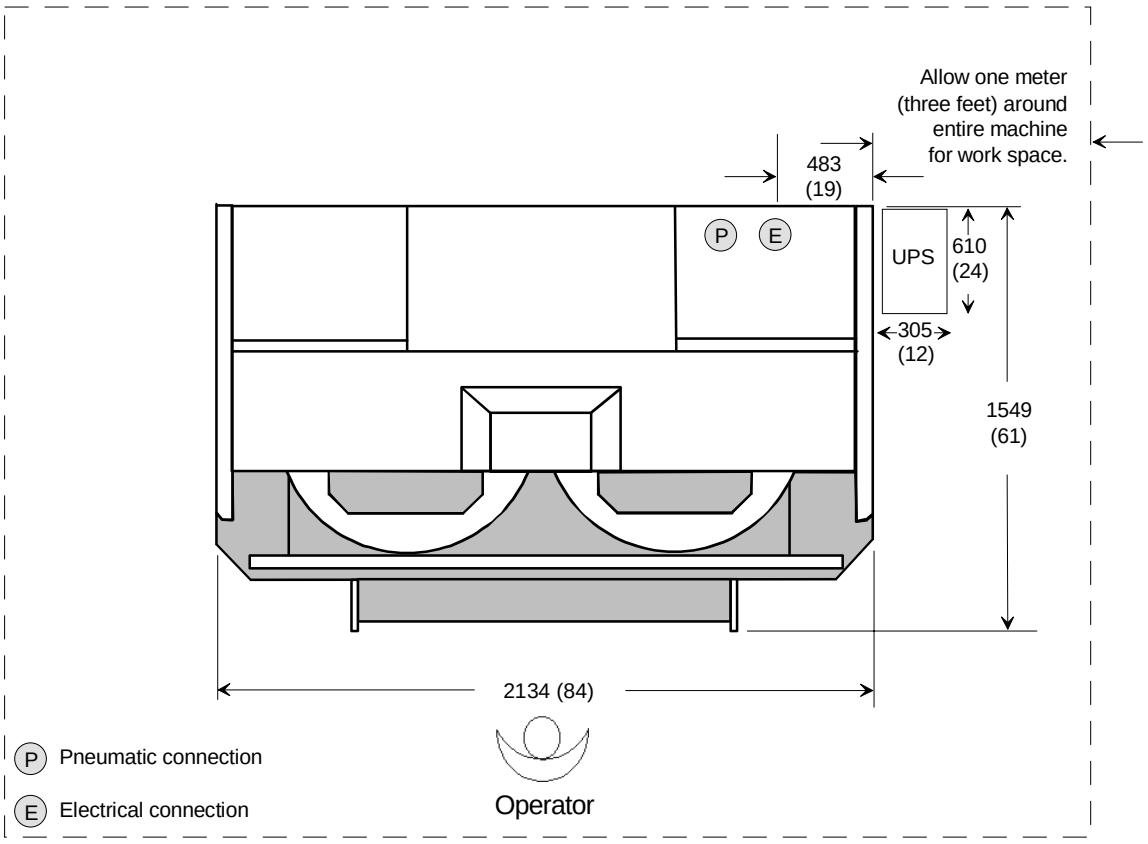


Input Specifications

Component reels or ammo packs taped for input to the Model 6292C and Model 6298C must be taped in accordance with EIA standard RS-296-E, "Lead Tape Reel Packaging of Axial Lead Components" (GS-061G), and this General Specification.

Stand-Alone Installation Considerations

Dimensions are in millimeters;
inch equivalents are bracketed.

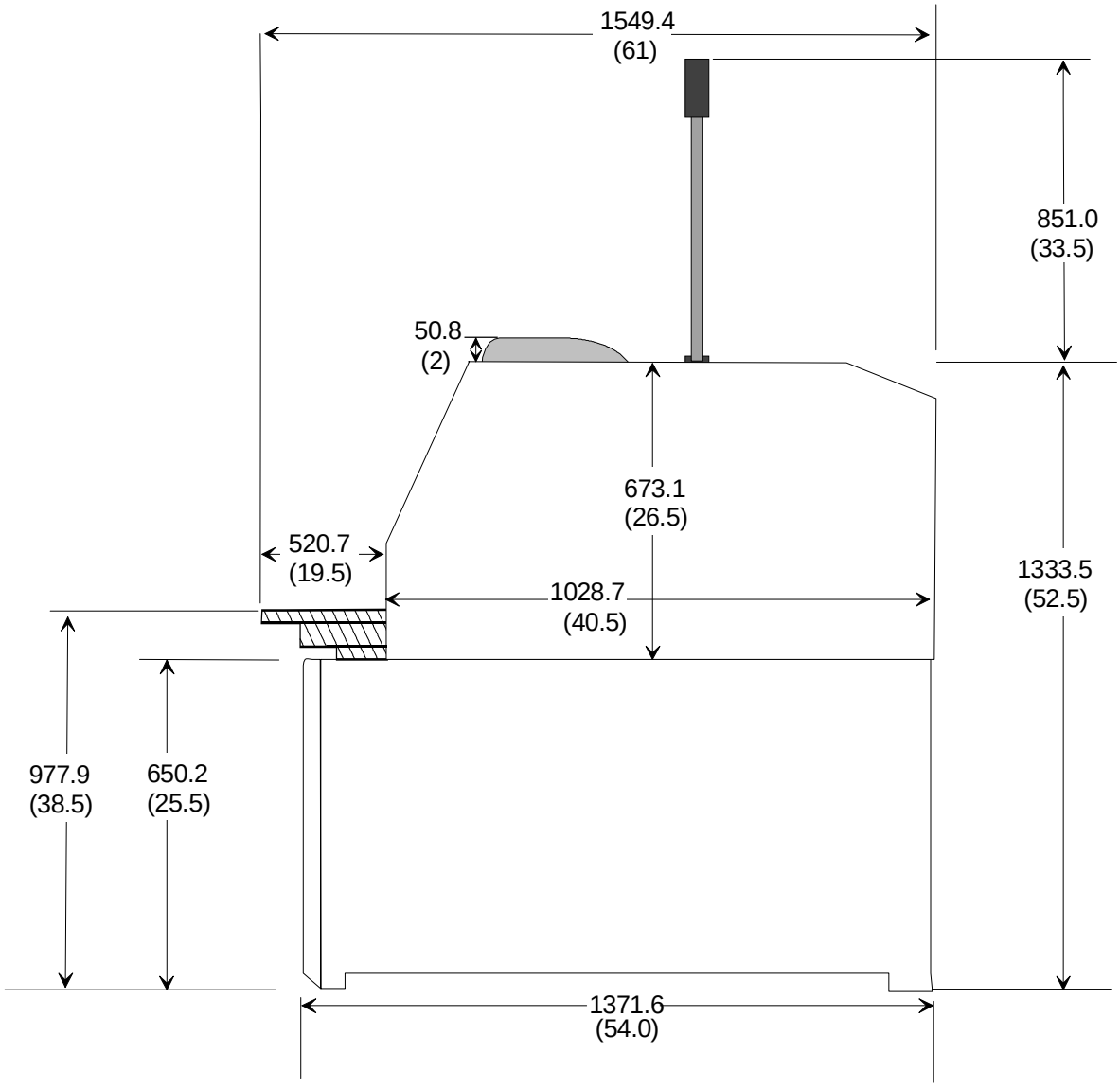


Machine Shipping Dimensions

	Length	Depth	Height	Weight
	2134mm (84")	1549mm (61")	1473mm (58")	1050.07kg (2315 lbs.)
Domestic Shipping	2591mm (102")	1829mm (72")	1549mm (61")	1334.02kg (2941 lbs.)
Air Freight	2616mm (103")	1854mm (73")	1676mm (66")	1324.49kg (2920 lbs.)
Sea Freight	2616mm (103")	1854mm (73")	1676mm (66")	1447.41kg (3191 lbs.)
Floor Space	A minimum clear area of one meter (three feet) around the machine perimeter is recommended for machine operation and servicing.			

VCD DH 8, Non Pass Through: Side View

Dimensions are in millimeters; inch equivalents are bracketed.



Service Requirements (including Uninterruptable Power Supply)

Electrical (base machine)

	Electrical connection located in the back of the machine, 482.60mm (19") from the right side and 660.40mm (26") from the floor. Machine is shipped with a power cord from machine to Uninterruptable Power Supply. A mating connector is supplied to attach the user provided power cord to the UPS.
	The UPS has an external 5mm ground stud which must be permanently connected to earth/building ground with a 14 AWG or 2.5mm^2 wire that is appropriately protected from mechanical damage.
	A circuit breaker is the overcurrent device for both the machine and the UPS. The machine breaker has a short circuit interrupting capacity of 10,000A, and the UPS breaker has a short circuit interrupting capacity of 1000A. The branch circuit supplying the machine must be protected by an approved 15 amp circuit breaker with a delay suitable for "high inrush current" or "transformer loads."
Air Consumption	A quick disconnect with a male barbed fitting for 12.7mm (0.50") ID flexible hose is shipped with each machine. Pneumatic connection located in the back of the machine, 482.60mm (19") from the right side and 660.40mm (26") from the floor.
Air Quality	Non-lubricated, dry air, maximum contamination particle size of 5.0 microns.

PNEUMATIC REQUIREMENTS (Base Machine)		ELECTRICAL REQUIREMENTS				
Minimum Air Flow Requirements	**Air Consumption**	**UPS Input Voltage**	**Input Frequency**	**Input Breaker**	**Actual Power Draw Without Loader/Unloader**	**Actual Power Draw With Loader/Unloader**
1.4 CFM @ 90 PSI	8.7 SCFM	180 - 264 VAC,Single Phase,1ø	47 - 63 Hz	15A	1150 VA 5A @ 230 VAC	1610 VA 7A @ 230 VAC

Note:

- Without loader/unloader, for voltages other than 230 VAC, current is 1150 VA (input voltage). Power factor may vary with input voltage.
- With loader/unloader, for voltages other than 230 VAC, current is 1610 VA (input voltage). Power factor may vary with input voltage.
- CFM (Cubic Feet per Minute): Volumetric flow rate at a specified pressure. This is used to describe the air flow requirement.
- SCFM (Standard Cubic Feet per Minute): Cubic foot of air at 20° C (68° F) at atmospheric pressure. This is used to describe average air consumption flow requirement.

Environmental Requirements

Ambient Temperature	10° C. to 35° C. (50° F. to 95° F.)
Operating Humidity	10% to 90%, non-condensing
Contaminants	The machine, UPS included, carries an IP code rating of 20. IP 20 signifies that the equipment has limited protection against ingress of solid foreign objects and is not protected against the ingress of water. Consequently, the intended environment is that of manufacturing/office where the machine is not subject to such elements.
Transportation and Storage	-25° C to +55° C. (-13° F. to +131° F.); not exceeding 24 hours up to 70° C. (158° F.), 10% to 95%, non-condensing humidity. Universal provides suitable means to prevent damage from humidity, vibration, stress and shock during transport.
Noise Level, Pass Through Configuration	71 dbA in accordance with National Machine Toolbuilders Assoc. Noise Measurement Technique Standard — June 1986.
Noise Level, Non Pass Through Configuration	78.2 dbA in accordance with National Machine Toolbuilders Assoc. Noise Measurement Technique Standard — June 1986.

Appendix: Automatic Board Handling Systems

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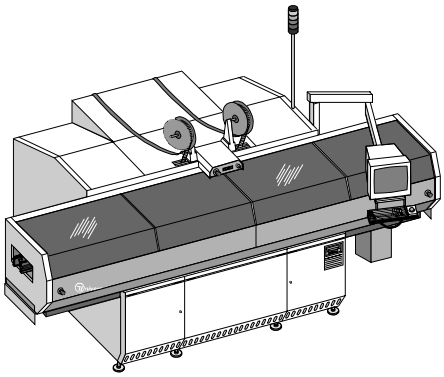
Introduction

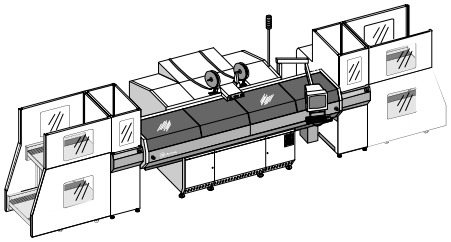


The VCD DH 8 (Model 6292C), is available either as stand-alone or with internal board handling only, for in-line configuration.

- **In-Line Configuration:** Machines can be connected in-line using the internal Board Handling System (BHS) and interconnecting conveyors. The BHS transfers two PC boards at a time: unpopulated boards in, and populated boards out. All Board Handling Systems are factory configurable for either left-to-right or right-to-left direction. This configuration is CE-compliant.

Auto MisMark and a Bad Board Reject Station allow PC boards with misinserted components to be automatically marked at the time of misinsertion and stacked off-line for later repair. When complete, the PC boards are transferred out of the machine and into the output magazine. When full, the output magazine is automatically transferred to the buffer conveyor.

The VCD DH 8 (Model 6298C) is available in a number of automatic board handling configurations:



- **Magazine-to-Magazine Configuration:** Magazines containing PC boards are placed on the input Elevator (Loader) and the PC boards are then automatically transferred into the machine for component insertion. Once completed, the boards are unloaded into an output magazine Elevator (Unloader). Each Elevator includes a magazine Buffer. Buffers are available in two sizes:
  - **Long Buffer:** 1270mm (50") for magazines up to 21" long (CE-compliant)
  - **Short Buffer:** 1016mm (40") for magazines up to 16" long (not CE-compliant)
- **Vacuum Bare Board-to-Magazine Configuration:** Bare PC boards are placed in a Vacuum Bare Board Loader and the PC boards are then automatically transferred onto a 558mm (22") conveyor, which transports them into the machine for component insertion. Once completed, the boards are unloaded into an output magazine Elevator (Unloader). The output Elevator includes a Long or Short Buffer (as above); neither of these configurations is CE-compliant. **Note: This unit is best suited for PC boards with eyelets.**
- **Destacker/Conveyor-to-Magazine Configuration:** Bare PC boards are placed in a Destack Loader and the PC boards are then automatically dropped onto a 736.6mm (29"), 1117.6mm (44"), or 1473.2mm (58") conveyor, which transports them into

the machine for component insertion. Once completed, the boards are unloaded into an output magazine Elevator (Unloader). The output Elevator includes a Long or Short Buffer (as above); only the systems incorporating the Destack Loader with the 1117.6mm (44") or 1473.2mm (58") conveyor, and Elevator with Long Buffer, are CE-compliant. **Note: This unit will not function properly when eyelets are present on the PC board.**

Board Handling Interface Standard

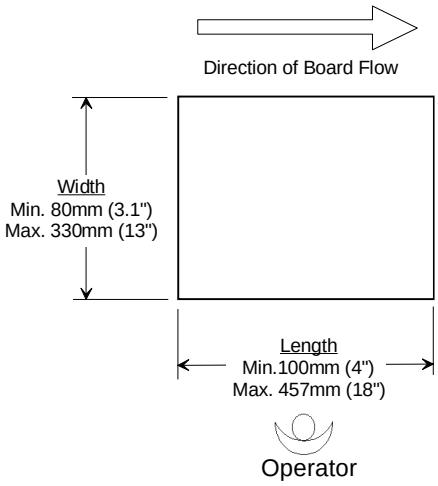
The board handling interface standard of the VCD DH 8 is SMEMA, version 1.2.

Technical Specifications for Internal Board Handling System (BHS)

Board Handling System Specifications

	Minimum	Maximum
Transfer Height[1,2]	1001.5mm (39.43") to	1014.2mm (39.93")
Board Changeover	Manual	
Direction	Select right-to-left or left-to-right.	
Edge Clearance	5mm (0.197") or 3mm (0.118")[3]	
Fixed Edge	Front	
Locator Pins	Front	
Transfer Time[4]	5.0 seconds, maximum for 1007.9mm (39.68") transfer height (upper level)	

Notes:
1. Transfer height can be configured, and alters transfer time. See transfer time specification.
2. Dual Heads are not configurable to transfer at a lower level.
3. Set at factory to 5mm.
4. Time from last insertion to first insertion on next board. This number is based on 254mm (10") positioning system moves. Larger table moves increase transfer time.



PC Board Specifications

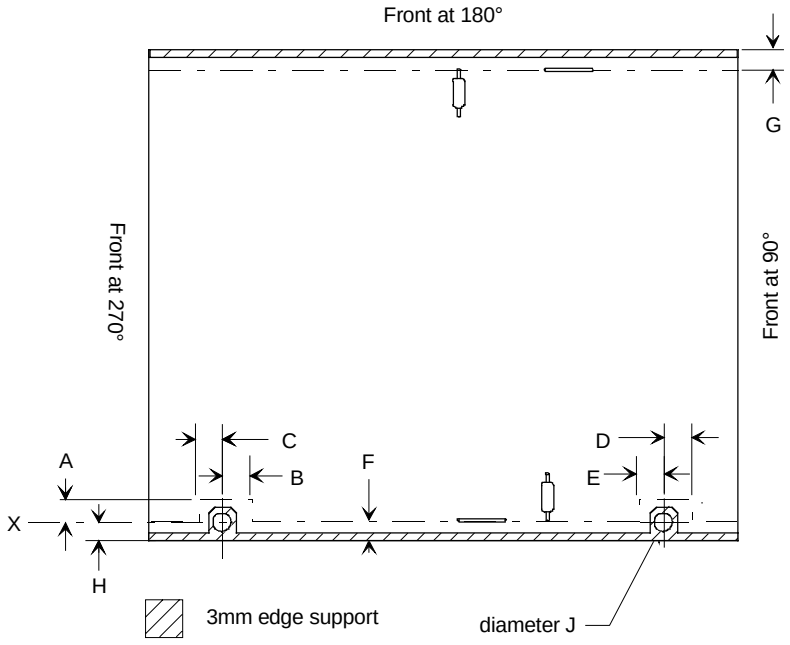
	Minimum	Maximum
Length[1] **x Width**	100mm x 80mm (4" x 3.1")[2]	457mm x 330mm (18" x 13")[2,3]
Length to Width Ratio	1 or greater: 1 is recommended	
Thickness	0.8mm (0.032")	2.36mm (0.093")
Warp	—	3.17mm (0.125")
Cutouts	Contiguous edges	
Datum Hole Diameter	3.17mm (0.125")[2]	6.35mm (0.25")[2]
Weight	2.27kg (5 lbs.), maximum	

Notes:
1. Length is in the direction of board flow.
2. Consult a Universal Sales Engineer for other than stated sizes.
3. Board widths larger than 297mm (11.70") require removal of 270° Rotary Table stop block.

Table Rotation (Dimensions shown are for standard tooling)

	0°	90°	180°	270°
A	5.99mm (0.236") [1]	7.59mm (0.299") [2]	9.27mm (0.365") [1]	7.59mm (0.299") [2]
B	7.09mm (0.279") [2]	5.49mm (0.216") [1]	7.09mm (0.279") [2]	5.49mm (0.216") [1]
C	7.09mm (0.279") [2]	8.76mm (0.345") [1]	7.09mm (0.279") [2]	8.76mm (0.345") [1]
D	7.09mm (0.279") [2]	5.49mm (0.216") [1]	7.09mm (0.279") [2]	5.49mm (0.216") [1]
E	7.09mm (0.279") [2]	8.76mm (0.345") [1]	7.09mm (0.279") [2]	8.76mm (0.345") [1]
F	5.33mm (0.210") [1, 3]	5.38mm (0.212") [2, 3]	5.33mm (0.210") [1, 3]	5.38mm (0.212") [2, 3]
G	5.33mm (0.210") [1, 3]	5.38mm (0.212") [2, 3]	5.33mm (0.210") [1, 3]	5.38mm (0.212") [2, 3]
H	3.17mm (0.125") minimum 6.35mm (0.250") recommended 7.62mm (0.300") maximum			
J	3.17mm (0.125") minimum 3.96mm (0.156") recommended 6.35mm (0.250") maximum			

1. Dimensions are to centerline of lead.
2. Dimensions are to the bottom of the 'V' groove in the former.
3. Dimension shown is for 3mm edge support. If using a 5mm edge support, add 2mm (0.079") to dimension shown.



Dimensions shown are minimum distances from either the board edge or the tooling pin hole, to either the standard tooling or the clinch.

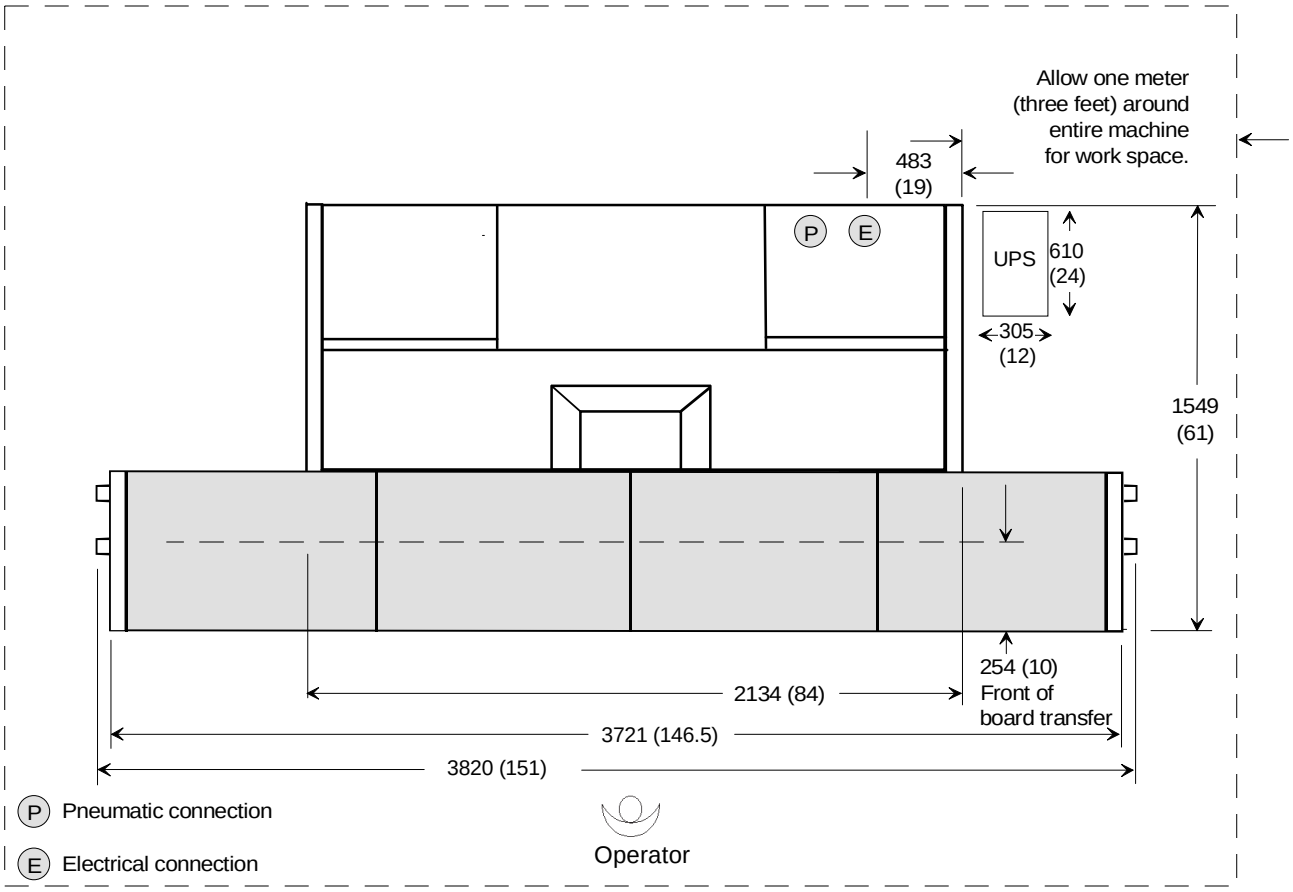
Machine Shipping Dimensions

	Length[1]	Depth	Height	Weight
	3820mm (151")	1549mm (61")	1473mm (58")	1288kg (2840 lbs.)
Domestic Shipping	4191mm (165")	1829mm (72")	1549mm (61")	1515kg (3340 lbs.)
Air Freight	4216mm (166")	1854mm (73")	1676mm (66")	1696.44kg (3740 lbs.)
Sea Freight	4216mm (166")	1854mm (73")	1676mm (66")	1809.83kg (3990 lbs.)
Floor Space	A minimum clear area of one meter (three feet) around the machine perimeter is recommended for machine operation and servicing.			

1. Length is in the direction of board flow.

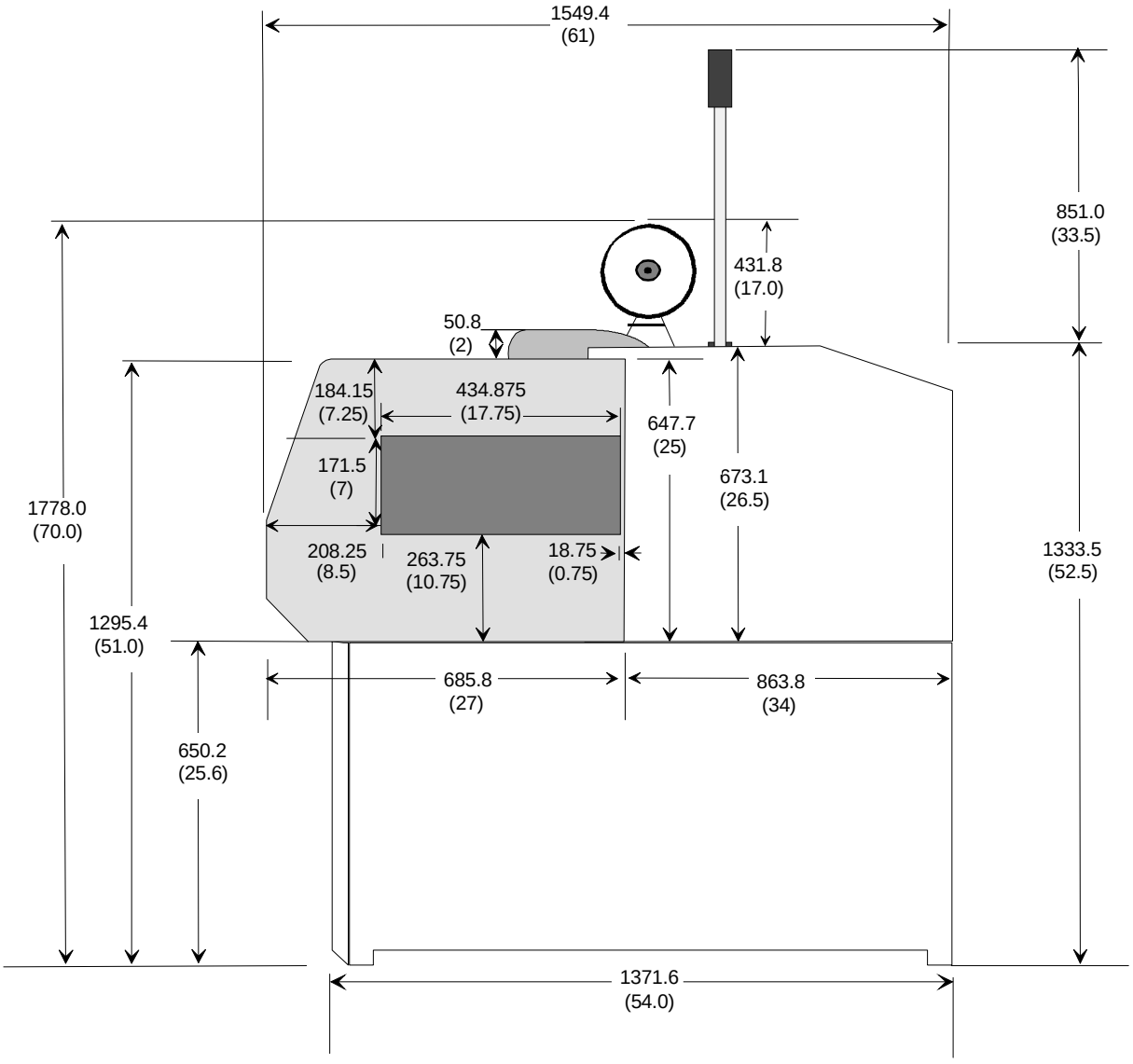
Top View of VCD DH 8 with Internal BHS only

Dimensions are in millimeters;
inch equivalents are bracketed.



VCD DH 8, Pass Through: Side View

Dimensions are in millimeters;
inch equivalents are bracketed.



Technical Specifications for Loader/ Unloader: Elevator/Buffer Configuration

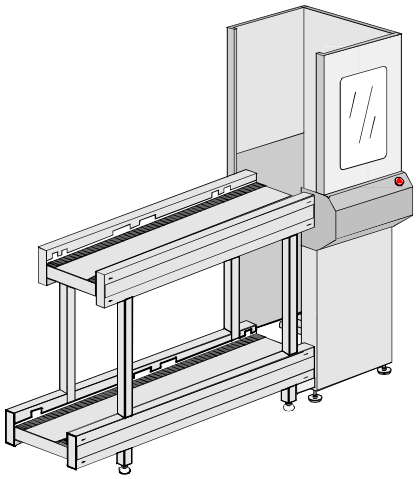
Changeover Time	Magazine, 20 seconds
PC Board	The insertion machine determines board size.

Magazine Elevators

Magazine Elevator	Controlled through insertion machine software. Power and air are supplied through the insertion machine. Elevators are equipped with emergency stops.

Elevator Dimensions	Length	Depth	Height
	635mm (25")	838mm (33")	1,835mm (72")

Magazine Input/Output Buffers

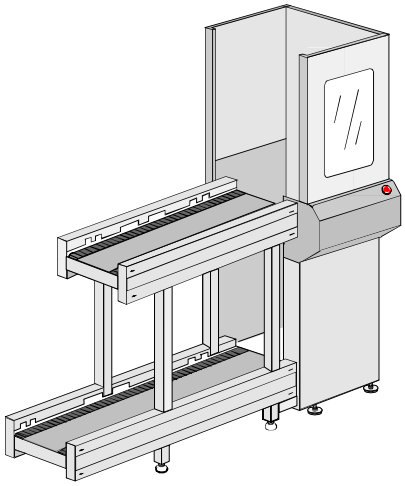


Long Buffer

Long Buffer — The Long Buffer accomodates 2 magazines (in and out) that are up to 533mm (21") in length each.

Long Buffers are available either with CE-compliant Buffer covers or without the covers. Covers must be affixed to the Buffers in order for the Buffers to be CE-compliant.

Long Buffer Dimensions	Length	Depth	Height
With Full Covers (CE-compliant)	1,270mm (50")	546mm (22")	1,835mm (72")
Long Buffer Dimensions	**Length**	**Depth**	**Height**
Without Covers (Not CE-compliant)	1,270mm (50")	546mm (22")	1,095mm (43")



Short Buffer

Short Buffer — The Short Buffer accommodates 2 magazines (in and out) that are up to 406mm (16") in length each. (Short Buffers do not accommodate Universal magazines.)

Short Buffers are not CE-compliant.

Short Buffer Dimensions	Length	Depth	Height
	1,016mm (40")	546mm (22")	1,095mm (43")

Magazine Transfer Height	Upper level magazine transfer height for both Long and Short Buffers is 1,056mm (42"). Lower level Magazine transfer height for both Long and Short Buffers is 292mm (12").

Magazines

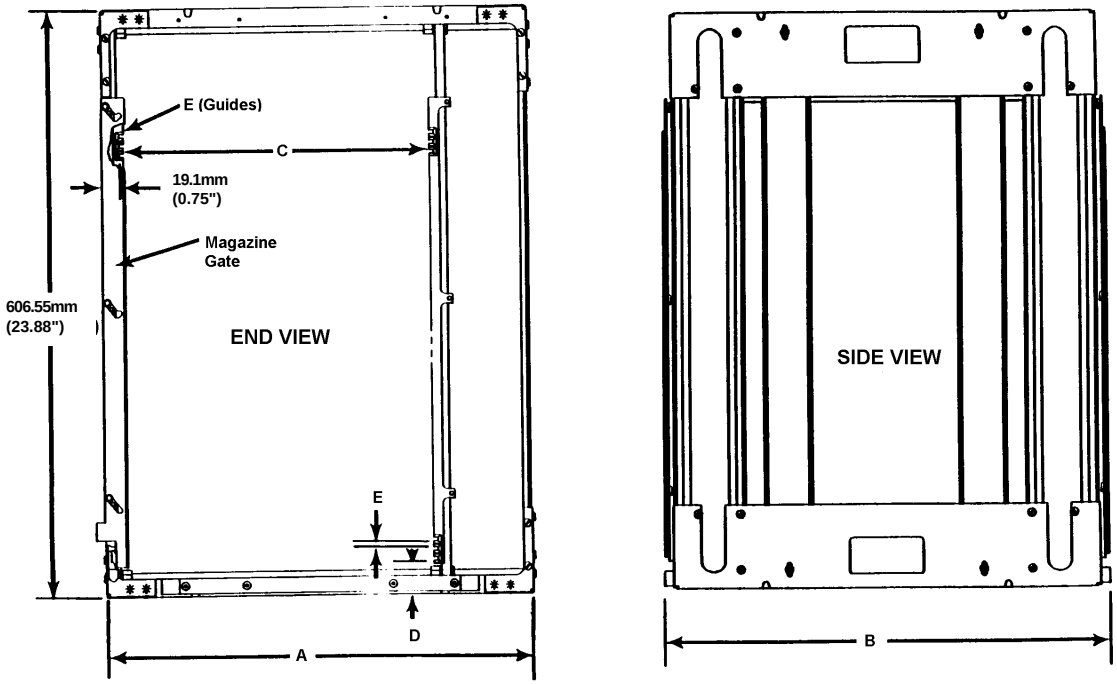
Maximum Magazine Weight	45kg (100lbs) for PC boards plus magazines. Compatible with most commonly-used magazines. Consult a Universal Sales Engineer.			
Maximum Magazine Dimensions for Long Buffer	**Maximum Length**	**Maximum Width**	**Maximum Height**	**Maximum Weight (including PC boards)**
	533mm (21")	279mm (11")	606mm (24")	45kg (100lbs)
Maximum Magazine Dimensions for Short Buffer	**Maximum Length**	**Maximum Width**	**Maximum Height**	**Maximum Weight (including PC boards)**
	406mm (16")	279mm (11")	606mm (24")	45kg (100lbs)
Optional Magazine Gate Control	An optional magazine gate control is available for use with magazines that include a spring-loaded gate, used to keep PC boards retained within the magazine.			

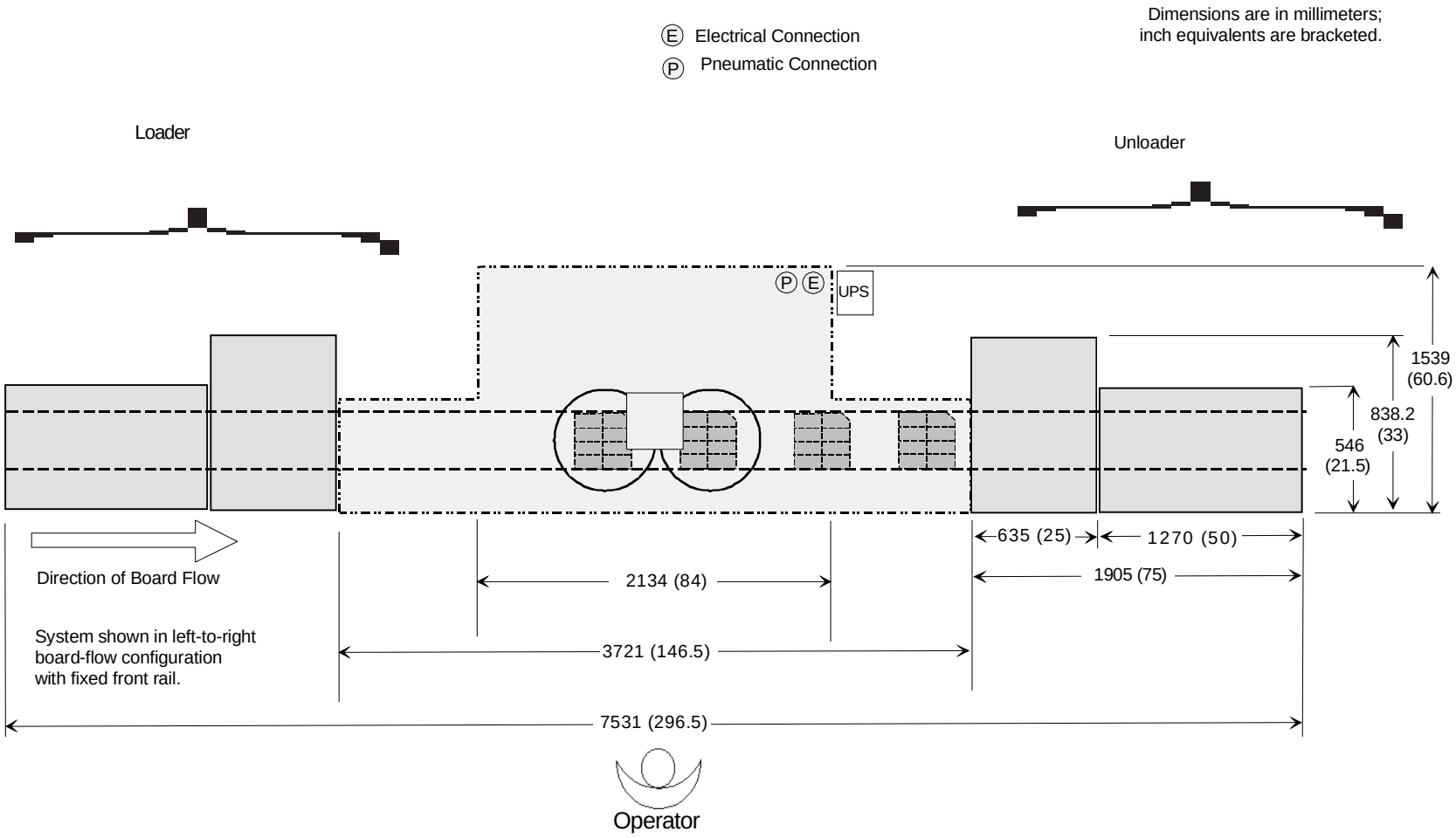
Universal Magazine Specifications

Base Pan		PC Board Size Reference				PC Board Guides	
Width A	Length B	Minimum	Maximum	Minimum	Maximum	Datum D	Pitch E
		Width C		Length			
444.5mm 17.50"	476.3mm 18.75"	108mm 4.25"	406.4mm 16.00"	149.9mm 5.90"	457.2mm 18.00"	35.1mm 1.38"	10mm 0.394"
406.4mm 16.00"	476.3mm 18.75"	108mm 4.25"	368.3mm 14.50"	149.9mm 5.90"	457.2mm 18.00"	35.1mm 1.38"	10mm 0.394"
292.1mm 11.50"	476.3mm 18.75"	108mm 4.25"	254mm 10.01"	149.9mm 5.90"	457.2mm 18.00"	35.1mm 1.38"	10mm 0.394"

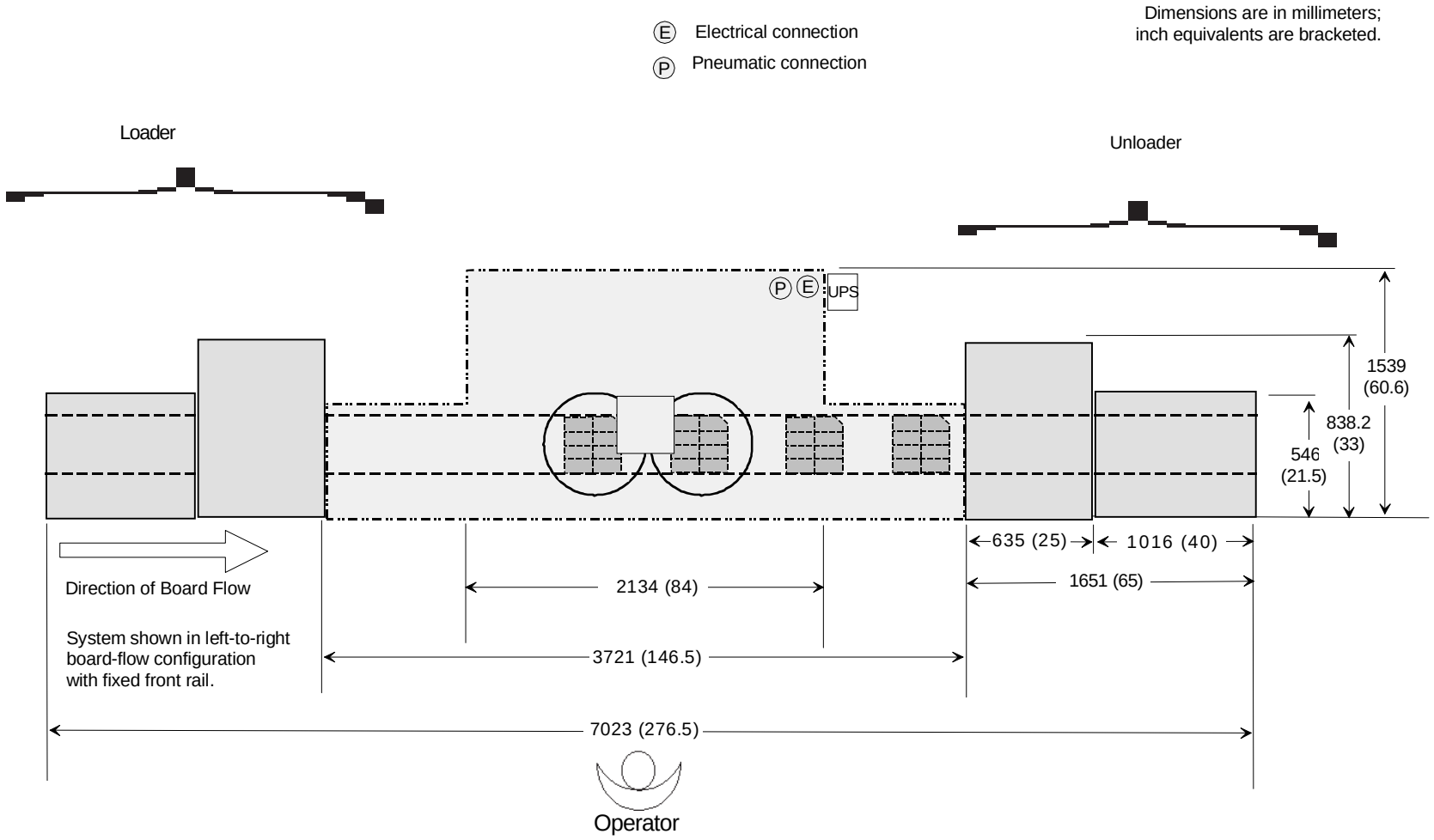
If Universal magazines are not purchased/used, user must provide magazine specifications or, preferably, a magazine to verify proper function with Universal loaders/unloaders. The maximum allowable dimensions for third-party magazines are: L 490mm (19.29") x D 460mm (18.11") x H 635mm (25.00").

Magazine Views

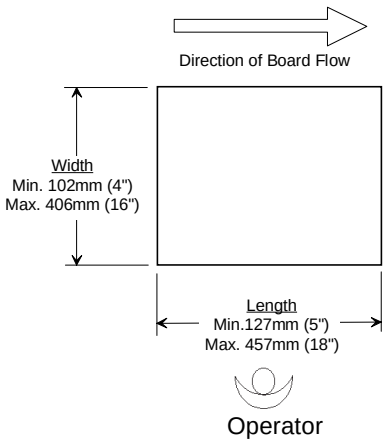




VCD DH 8, Magazine-to-Magazine Configuration, with Long Buffers



VCD DH 8, Magazine-to-Magazine Configuration with Short Buffers



Technical Specifications for Loader/ Unloader: Vacuum Bare Board-to-Magazine Configuration

PC Board Specifications for Vacuum Bare Board Loader

	Minimum	Maximum
Length[1] x Width	127mm x 102mm (5" x 4") [2]	457mm x 406mm (18" x 16") [2]
Length to Width Ratio	≥1:1 is recommended.	
Thickness	0.76mm (0.030")	2.36mm (0.093")
Warp	—	2.36mm (0.093")
Cutouts	Contiguous edges	
Stack, Maximum	250 boards at a nominal thickness of 1.57mm (0.062") is the maximum stack height of 394mm (15.5").	

Notes:

1. Length is in the direction of board flow.
2. The VCD DH 8 determines board size. Consult a Universal Sales Engineer for boards larger than 356mm (14").

	Length	Depth	Height
Vacuum Bare Board Dimensions	751.1mm (29.57")	689.1mm (29.13")	1574.8mm (62")

PC Board Specifications for Between Machines 22" Conveyor

	Minimum	Maximum
Length[1] x Width	76mm x 51mm (3" x 2") [2]	508mm x 457mm (20" x 18") [2]
Length to Width Ratio	≥1:1 is recommended.	
Thickness	0.64mm (0.025")	3.18mm (0.125")
Warp	—	3.18mm (0.125")

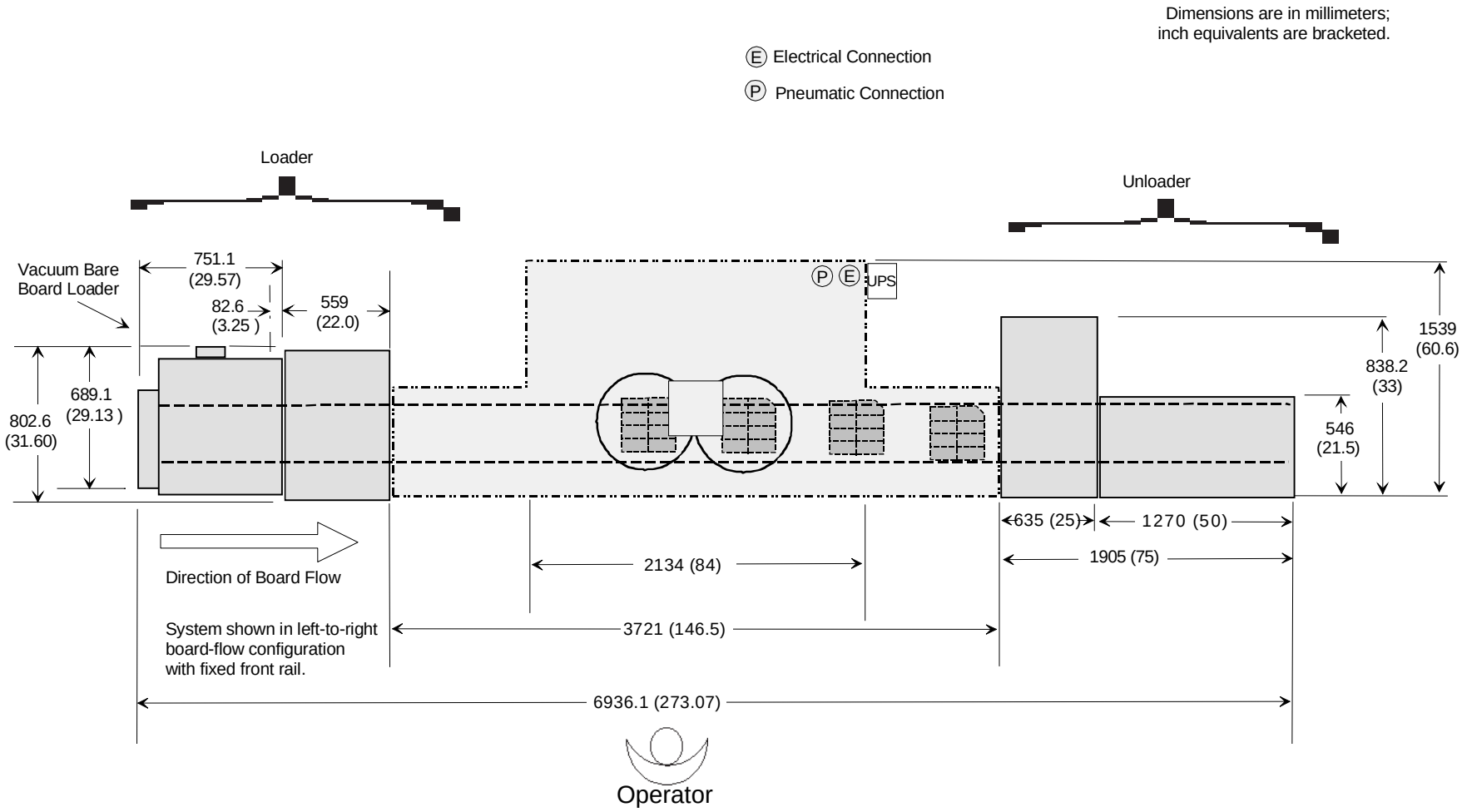
Notes:

1. Length is in the direction of board flow.
2. The VCD DH 8 determines board size. Consult a Universal Sales Engineer for boards larger than 356mm (14").

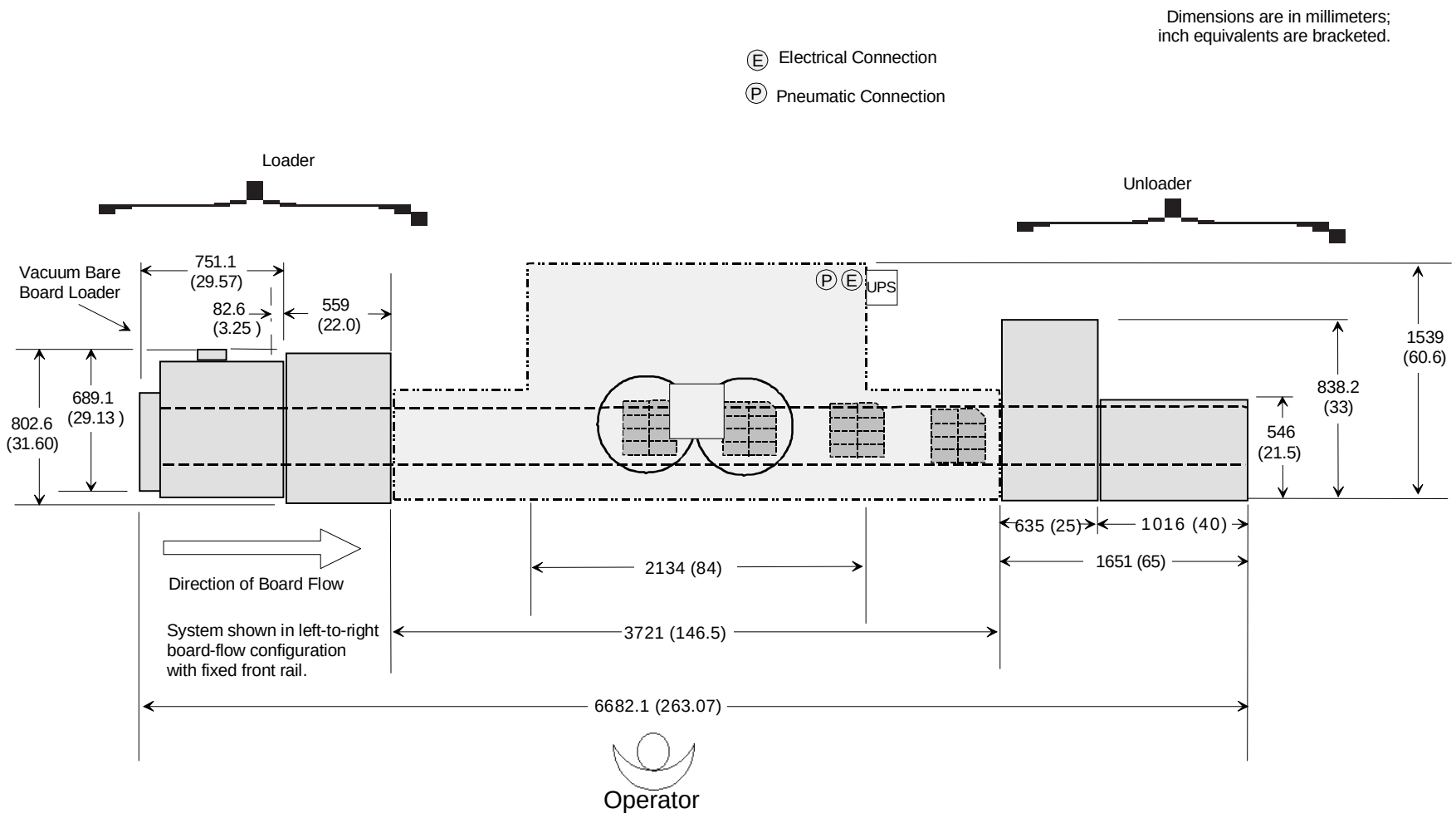
	Length	Depth	Height[1]
22" Conveyor Dimensions	559mm (22")	802.6mm (31.6")	962.7mm (37.9")

Notes:

1. Height represents pre-set transfer height of conveyor bed. Transfer height is adjustable from 812.8mm (32") to 1066.8mm (42").

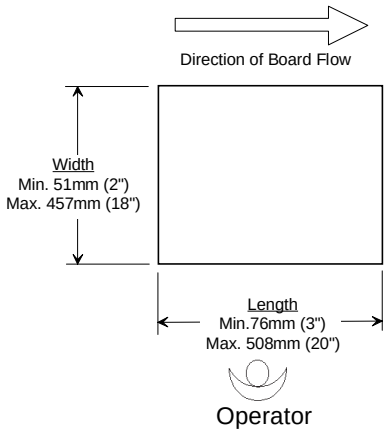


VCD DH 8, Vacuum Bare Board-to-Magazine Configuration, with 22" Conveyor and Long Buffer



VCD DH 8, Vacuum Bare Board-to-Magazine Configuration, with 22" Conveyor and Short Buffer

Technical Specifications for Loader/ Unloader: Destacker/Conveyor-to-Magazine Configuration



PC Board Specifications for Destacker/Conveyor Loader

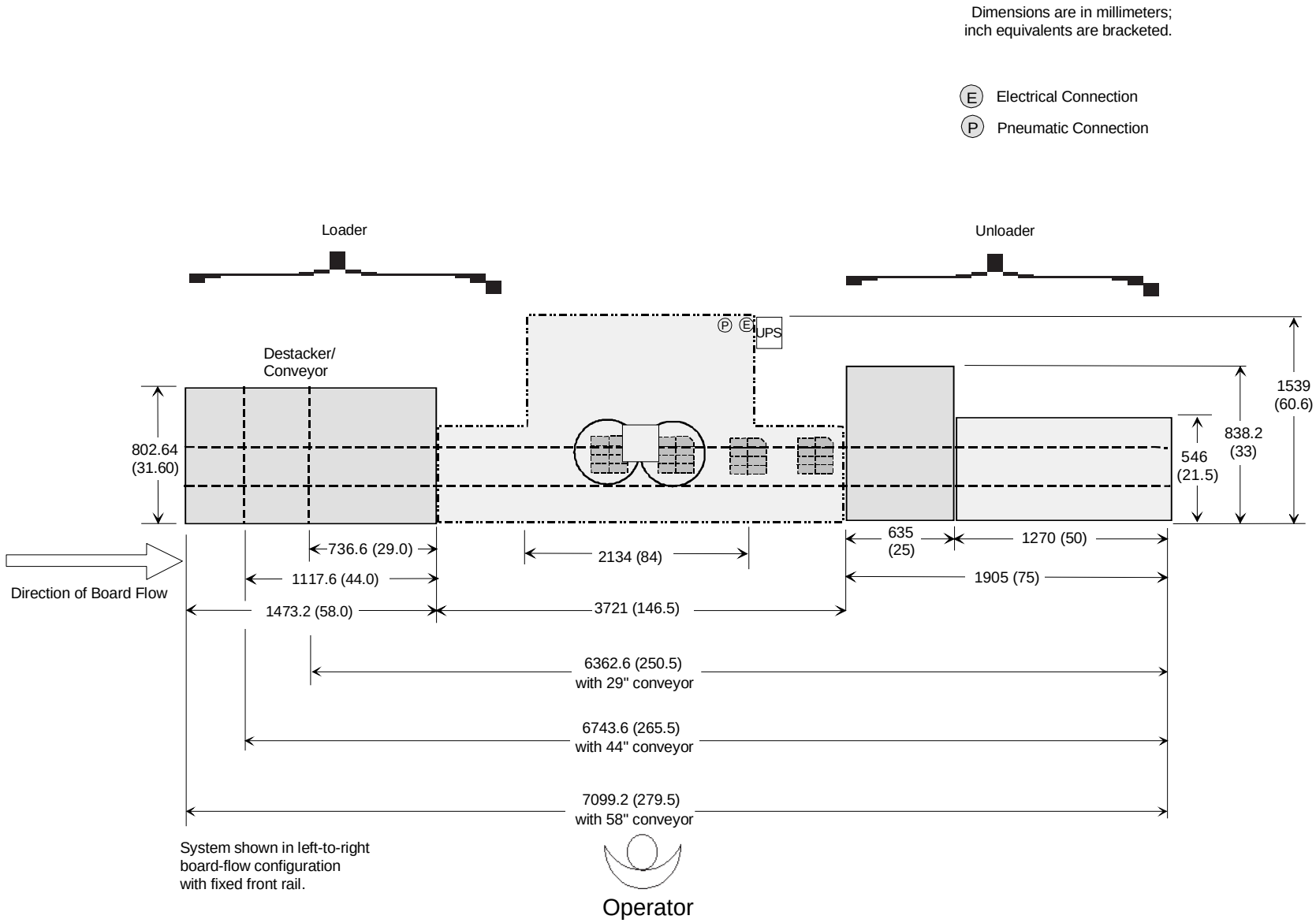
	Minimum	Maximum
Length[1] x Width	76mm x 51mm (3" x 2")	508mm x 457mm (20" x 18")
Length to Width Ratio	≥1:1 is recommended.	
Thickness	1.02mm (0.040")	3.18mm (0.125")
Warp	—	3.18mm (0.125")
Cutouts	Require Factory Review	
Stack, Maximum	190 boards at a nominal thickness of 1.6mm (0.063") is the maximum stack height of 304.8mm (12").	

Notes:
1. Length is in the direction of board flow.
2. The VCD DH 8 determines board size. Consult a Universal Sales Engineer for boards larger than 356mm (14").

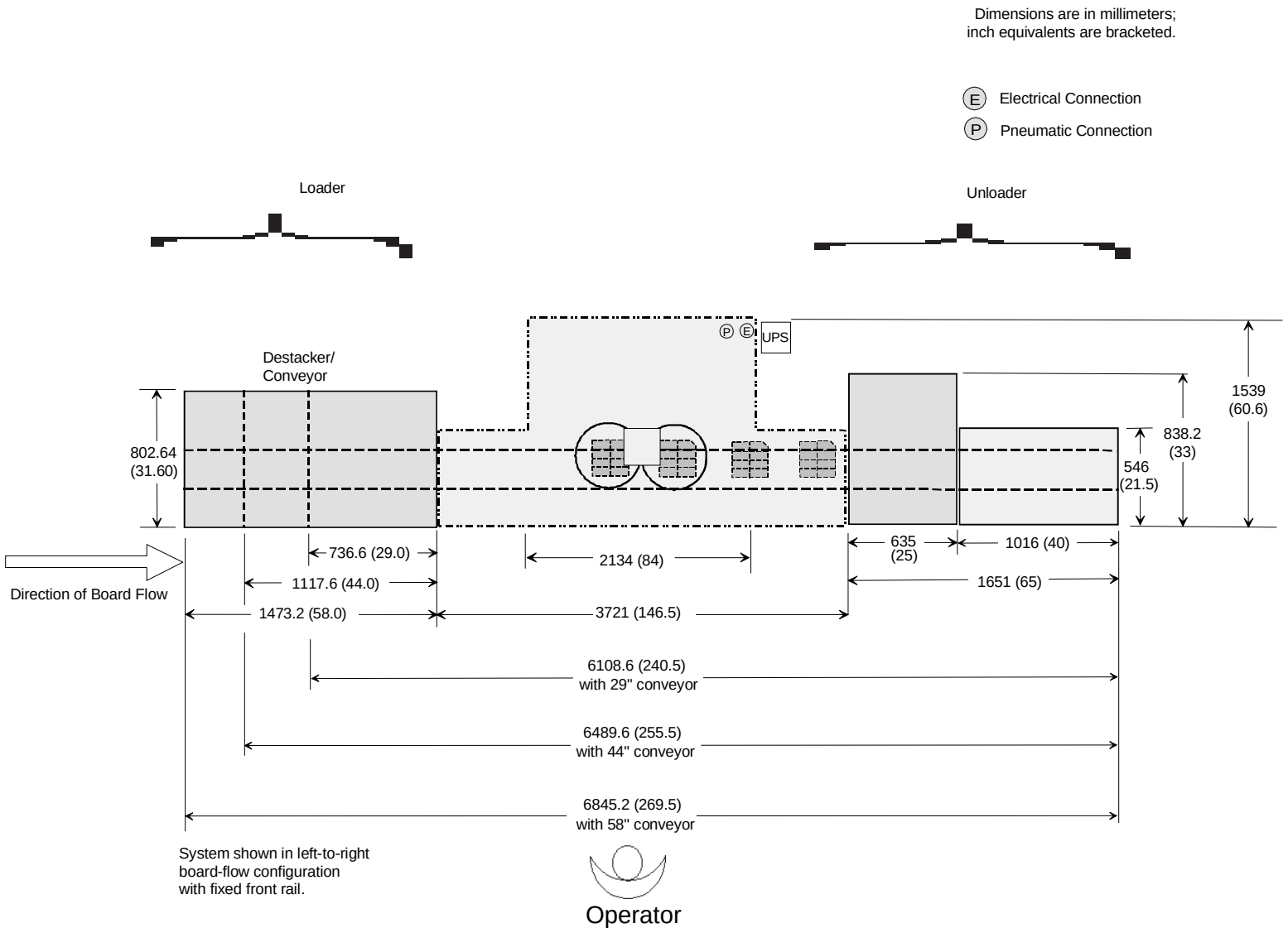
Destacker/Conveyor Specifications

	Length	Depth	Height[3]
Destacker on 29" Conveyor[1]	736.6mm (29")	802.6mm (31.6")	962.7mm (37.9")
Destacker on 44" Conveyor[2]	1,117.6mm (44")	802.6mm (31.6")	962.7mm (37.9")
Destacker on 58" Conveyor[2]	1473.2mm (58")	802.6mm (31.6")	962.7mm (37.9")

Notes:
1. Not CE-compliant.
2. CE-compliant if configured with safety covers.
3. Height represents pre-set transfer height of conveyor bed. Transfer height is adjustable from 812.8mm (32") to 1066.8mm (42"). Add 383.5mm (15.1") to transfer height for total height of Destacker sitting atop Conveyor.



VCD DH 8, Destacker/Conveyor-to-Magazine Configuration, with Long Buffers



VCD DH 8, Destacker/Conveyor-to-Magazine Configuration, with Short Buffers

Installation Considerations: Loader/ Unloader

Magazine-to-Magazine Configuration

Dimensions—Magazine Elevator Module (x2)

	Length [1]	Depth	Height	Weight
Shipping Dimensions	610mm (24")	1140mm (44.88")	1911mm (75.25")	159 kg (350 lbs.)

[1] Length is in the direction of board flow.

Dimensions—Long Buffer (x2)

Shipping Dimensions Not CE-Compliant	1270mm (50")	546mm (21")	1095mm (43")	91 kg (200 lbs.)
Shipping Dimensions CE-Compliant	1270mm (50")	546mm (21")	1835mm (72")	118 kg (260 lbs.)

Dimensions—Short Buffer (x2)

Shipping Dimensions	1016mm (40")	546mm (21")	1095mm (72")	82kg (180 lbs.)

Vacuum Bare Board-to-Magazine Configuration*

Dimensions—Vacuum Bare Board Unloader

Shipping Dimensions	1194mm (47")	889mm (35")	1753mm (69")	288kg (635 lbs.)

Dimensions—22" Between Machine Conveyor

Shipping Dimensions	965mm (38")	965mm (38")	1270mm (50")	98kg (216 lbs.)

Destacker/Conveyor-to-Magazine Configuration*

Dimensions—Destacker/Conveyor (29")

Shipping Dimensions	736.60mm (29")	802.6mm (31.6")	1346.2mm (53")	136.2kg (300 lbs.)

Dimensions—Destacker/Conveyor (44")

Shipping Dimensions	2540mm (44")	802.6mm (31.6")	1346.2mm (53")	136.2kg (300 lbs.)

Dimensions—Destacker/Conveyor (58")

Shipping Dimensions	1473mm (58")	803mm (32")	1346mm (53")	170kg (375 lbs.)

* For installations, add size and weight dimensions for one magazine elevator module and one magazine buffer module, either Long or Short Buffer.

Service Requirements

Machine Description	Pneumatic Requirements		Electrical Requirements
	Minimum Air Flow Requirement	Air Consumption	Voltage
JW DH 8 with BHS	1.4 CFM @ 90 PSI	8.7 SCFM	230 VAC (50/60Hz) (180-264 VAC)
JW DH 8 with BHS and Loader/Unloader	1.6 CFM @ 90 PSI	9.8 SCFM	230 (50/60Hz) Loader/unloader supplied from core machine
IM Elevator (Loader or Unloader)	0.2 CFM @ 90 PSI	1.1 SCFM	120 VAC (50/60Hz) Supplied from core machine
Vacuum Bare Board Loader	1.5 CFM @ 90 PSI	9.3 SCFM	120 VAC (50/60Hz) Supplied from core machine
Destacker/ Conveyor Loader	0.4 CFM @ 90 PSI	1.4 SCFM	120 VAC (50/60Hz) Supplied from core machine
22" Conveyor	None required	None required	120 VAC (50/60Hz) Supplied from core machine
29" Conveyor	None required	None required	120 VAC (50/60Hz) Supplied from core machine
44" Conveyor	None required	None required	120 VAC (50/60Hz) Supplied from core machine
58" Conveyor	None required	None required	120 VAC (50/60Hz) Supplied from core machine

Note:

- CFM (Cubic Feet per Minute): Volumetric flow rate at a specified pressure. This is used to describe the air flow requirement.
- SCFM (Standard Cubic Feet per Minute): Cubic foot of air at 20°C (68° F) at atmospheric pressure. This is used to describe average air consumption flow requirement.