



1.1. General Description.

The Writer family produces high quality photo tools, which are required for (ultra) high density PCB, leadframe and stencil production.

The Writer family is an external drum laser photo plotter. The external drum spins at a maximum revolution of 30 rev/sec (50/60 Hz power input).

The optical system is mounted on a carriage supported on air bearings and driven by a linear DC motor. The whole system hovers on a massive granite block, which is isolated from the ground by air cushions to eliminate vibrations during exposure.

The film is held onto the drum by vacuum, so there is no need to cover the film or tape the film. No pre-punching is needed.

Rasterization happens on the fly and is controlled by an advanced TurboRIP. (Turbo Raster Image Processor)

The Writer family can be equipped with several options:

- 4 beams optics
- 12 beams optics
- 24 beams optics
- MT8 infra red optics
- film size

While the drum is spinning, an optic system is moving along the drum axis at a synchronized speed, in order to obtain a scanning movement of the film surface.

In this way an image can be written just like on a huge TV-screen. The image pixels are calculated in the TurboRIP.

The multibeam optics system, 12 or 24 beam, uses the "syntectic plotting" principle. This is a special way in which lines are plotted to get better quality on film.

The drum vacuum system can hold different film sizes going from 18"x24" (457,2x609,6 mm) up to 32"x28" (812,8x711,2 mm) selectable in steps of one inch. (See further for details)



1.2. Technical Description and Specifications.

1.2.1. Common Machine Specifications.

- Maximum film size is 32" (812,8 mm) along the drum and 28" (711,2 mm) around the drum.
- Minimum film size is 18" (457,2 mm) along the drum and 24" (609,6 mm) around the drum.
- Photographic scaling for inner layers distortion independent in horizontal and vertical directions $\pm 5\%$ in steps of 0.001%.
- Photo-plotter accuracy:
<0.25 mil (6.3 μm)
- Photo-plotter repeatability:
<0,125 mil (3.2 μm)
- Overall absolute accuracy on film:
<0.5 mil (12.5 μm)
- Local accuracy on 1" (25.4 mm) square on film:
<0.08 mil (2 μm)
- Overall repeatability on film:
<0.5 mil (12.5 μm)

❖ Remark:

Accuracy and repeatability as specified requires air conditioning within 1 degree Celsius and 2% relative humidity. (See later)

Measurement of plots on film is subject to the dimensional stability of the film itself and measuring machine and the way the film is measured.

1.2.2. Exposing.

- Inter-active operation via terminal with user-friendly interface.
- Daylight exposure, film loading and unloading in safe light for the panchromatic films. For the dry film the loading and unloading can also be done in daylight.
- Film handling: fully automatically with queuing system, semi-automatically as system mounts the film on request and manually.
- Light source: Red Helium-Neon laser, 632.8 nm with a maximum output power of 1 mW (for Agx film) or Infra Red laser, 1053 nm with a maximum output power of 5W (for MT8 film).



- Plot switches: positive or negative, right or wrong reading.
- Possible resolutions (depending on installed optic): 394, 500, 787, 1000, 1575 and/or 2000 PPCM (1000, 1270, 2000, 2540, 4000, 5080, 8000, 10160 PPI)

❖ Remark:

Only two of the imperial or metrical resolutions are factory preset. The other resolutions are available on request, depending on installed optic.

1.2.3. Film Specifications.

- Type: MT8 film or panchromatic photographic material scanner film, depending on the installed optic.
- Size: *Around the drum:* 24" => 28"
609,6 mm => 711,2 mm
Along the drum: 18" => 32"
457,2 mm => 812,8 mm

	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
18							X	X	X	X	X				
19							X	X	X	X	X				
20							X	X	X	X	X				
21							X	X	X	X	X				
22							X	X	X	X	X				
23							X	X	X	X	X				
24	X	X	X	X	X	X	X	X	X	X	X				
25	X	X	X	X	X	X	X	X	X	X	X	X			
26	X	X	X	X	X	X	X	X	X	X	X	X	X		
27	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
28	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
29								X	X	X	X				
30									X	X	X				
31										X	X				
32											X				



❖ Remark:

This table shows us the possible film size combinations.

The dimensions are in inches. To convert inches into millimeters, multiply by 25,4.

- Only one film size is factory-preset and supported. It can always be upgraded in the future.
- Tolerance: Nominal size - 0.5 mm (0.02") ± 0.5 mm (0.02")
- Film feed cassette capacity: 50 sheets of film.
- Load time: < 40 seconds nominal.
- Unload time: < 20 seconds nominal.
- Maximum usable plot format: = filmsize - 1" (25,4 mm) on top and 0,2" (5 mm) for all the other sides.

1.2.4. Speed & Line Width.

Quad-beam

PPI	Nominal Plot Speed for 1" in slow scan direction in seconds	Dot Size (mil)	Min. Line Width (mil)*
1000	8.33	1	2
1270	10.58	0.8	1.6
2000	16.66	0.5	1
2540	21.16	0.4	0.8
4000	33.33	0.25	0.8
5080	42.33	0.2	0.8
8000	66.66	0.2	0.6
10160	84.66	0.2	0.5

Multi-beam

PPI	Nominal Plot Speed for 1" in slow scan direction in seconds and 12 beams *	Dot Size (mil)	Min. Line Width (mil)*
4000	11.11	0.25	0.8
5080	14.11	0.2	0.8
8000	22.22	0.2	0.6
10160	28.22	0.2	0.5

* Divide this value by 2 for 24 beams

Elise

PPI	Nominal Plot Speed for 1" in slow scan direction in seconds	Dot Size (mil)	Min. Line Width (mil)*
4000	45.35	0.25	2
8000	90.70	0.2	1



1.2.5. Line Width Accuracy.

i.e. the difference between the average straight boundary width and the theoretical width as an integer multiple of the dot size.

< ½ spot size, with a minimum of 5µm.

1.2.6. Maximum Density.

Depends on the film type and the settings of the developing machine.

For panchromatic photographic material scanner film the minimum optical density should be > 3.8.

For the dry film the minimum density is 3.6 (U.V. mode) and is guaranteed by the film manufacturer.

1.2.7. Conveyor.

The conveyor can work standalone and thus needs no interface signals from the film processor.

It can be linked mechanically with all film processors which are mechanically Linotype HELL 3030 compatible. This means that they must have a flat front, a film input height between 900 mm and 1050 mm, the minimum area of the metal front plate at the film entry should be 965 mm x 245 mm.

Barco ETS supplies a metal plate that will be screwed to the front of the film processor. This metal plate is used to couple our conveyor.

Compatible film processors are:

- Glunz & Jensen Multiline 720, 860, 950.
- Dupont Easy compact 72, 86, 95.
- Echo Graphic Hope GL 361.
- Luth Superspeed 980-D (ordering no. 5535E)
- Agfa Rapiline 72-3HT
- Agfa Rapiline 95-3
- Kodak Kodamatic 9800 (can be used with special upgrade kit supplied by Barco ETS)

❖ **Remark:**



Processors not mentioned in this list need to be evaluated after receiving the technical specifications of that processor. This information should be given as soon as possible to Barco Graphics in order not to delay or loose installation time.



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1.2.8. Operating Environment.

- Temperature : $21^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ($70^{\circ}\text{F} \pm 1^{\circ}\text{F}$)
- Temperature rate of change: 1°C (2°F) per hour
- **Relative Humidity:** $50\% \pm 2\%$ - no condensation
- Humidity rate of change: 6% per hour

1.2.9. Electrical Power.

- Main input: 230V $+5\%/-10\%$ AC single phase + ground, 1800 VA, line to be protected by 16A fuse.
- UPS input: 230V $+5\%/-10\%$ AC single phase + ground, 500 VA, line to be protected by 10A fuse.
- Heat dissipation: 2000 Watt (1725 kcal/h)

1.2.10. Air Supply.

- Compressed air: minimum 0.6 Mpa (6 bar) and a maximum of 1 Mpa (10 bar)
- Absolutely oil and water free.
- 2500 l (88 ft^3) /h minimum.
- An oil and water filter should be installed on the wall close to the entry of the plotter. The maximum distance is 3 meters. This unit should be inspected on a monthly base!

1.2.11. TurboRIP Specification.

- This is a Unix real time VME-bus based computer containing one processor board HP9000 series Model 700rt with 16 Mb DRAM.
- The processing speed of the 743 is 60 MHz.
- It has a built-in LAN IEEE 802.3/Ethernet interface.
- There is a hard disk of 2 Gb with SCSI-interface.
- It also includes a RIPACC board to accelerate the execution of low level pixel generation commands.



1.2.12. Dimensions.

- Height: 1863 mm
- Front width: 1600 mm
- Front width + console: 1725 mm
- Front width + drawer open: 2250 mm
- Depth: 2387 mm
- Depth towards the filmprocessor: 2537 mm

❖ Remark:

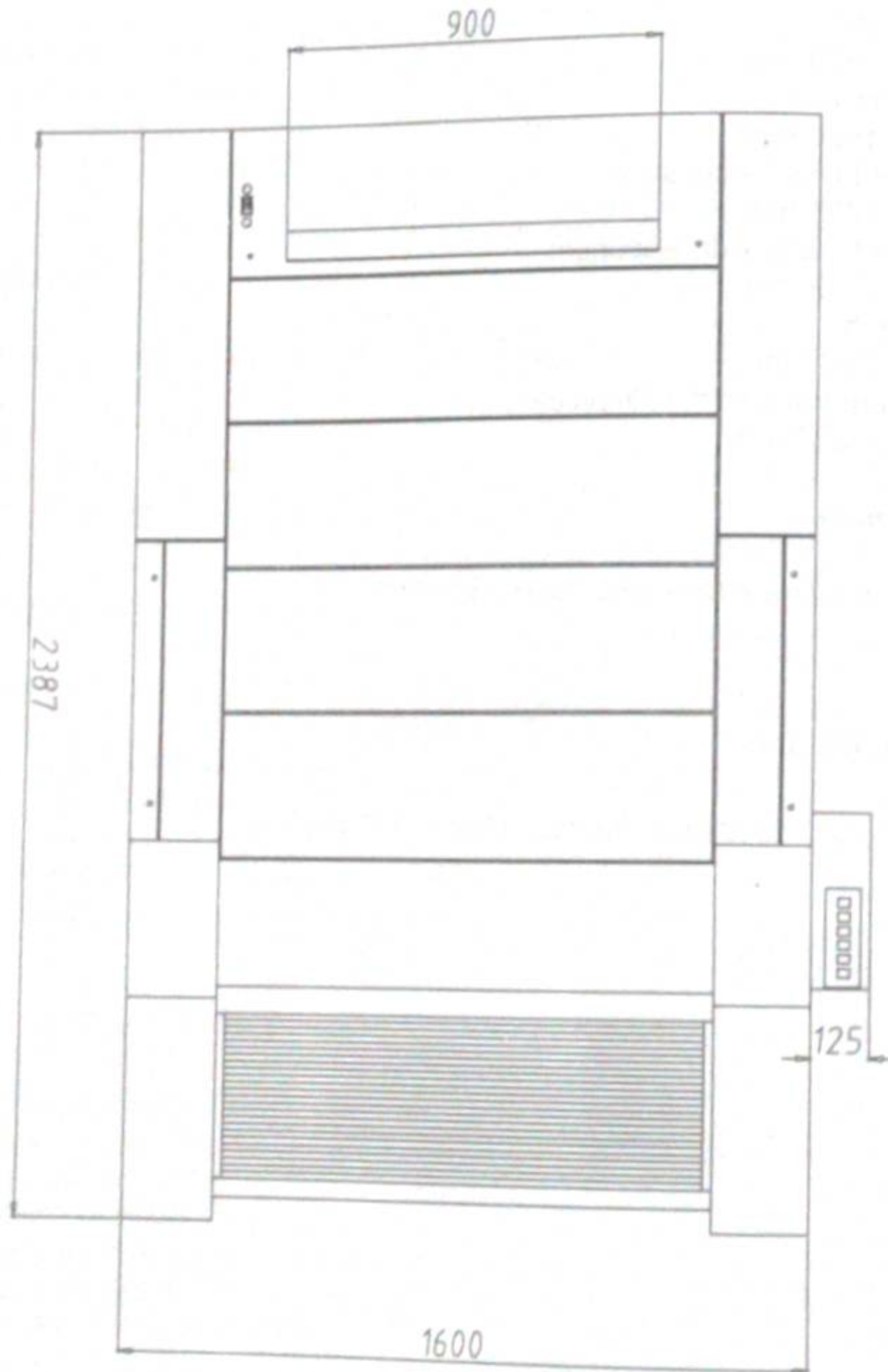
To convert millimeters into inches, multiply by 0.03937.

1.2.13. Weight.

± 1500 kg divided over four round feet's of $\varnothing 100$ mm.



1.2.14. Top View.

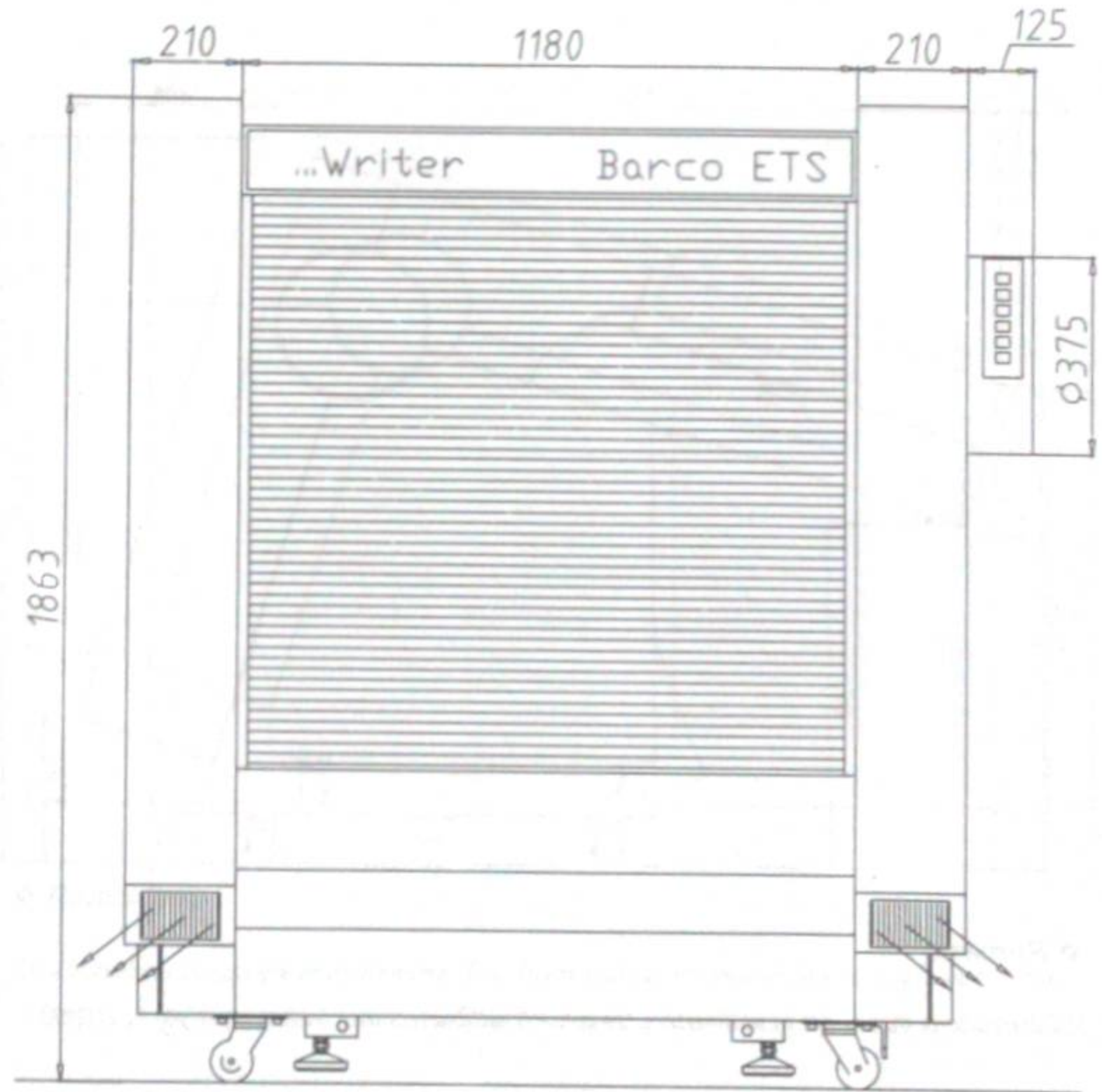


❖ Remark:

All dimensions shown are in millimeters. To convert millimeters into inches, multiply by 0.03937.



1.2.15. Front View.

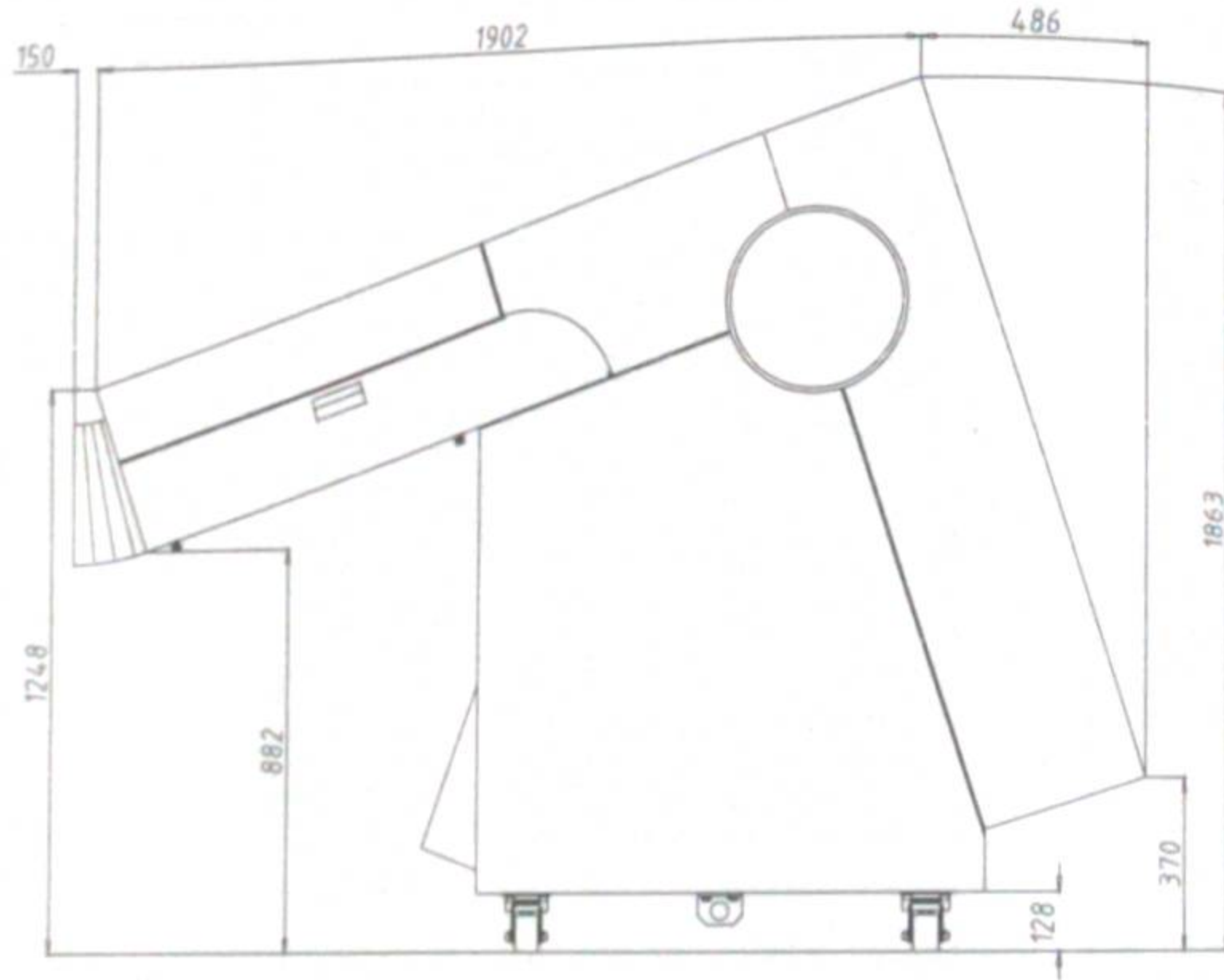


❖ Remark:

All dimensions shown are in millimeters. To convert millimeters into inches, multiply by 0.03937.



1.2.16. Left View.

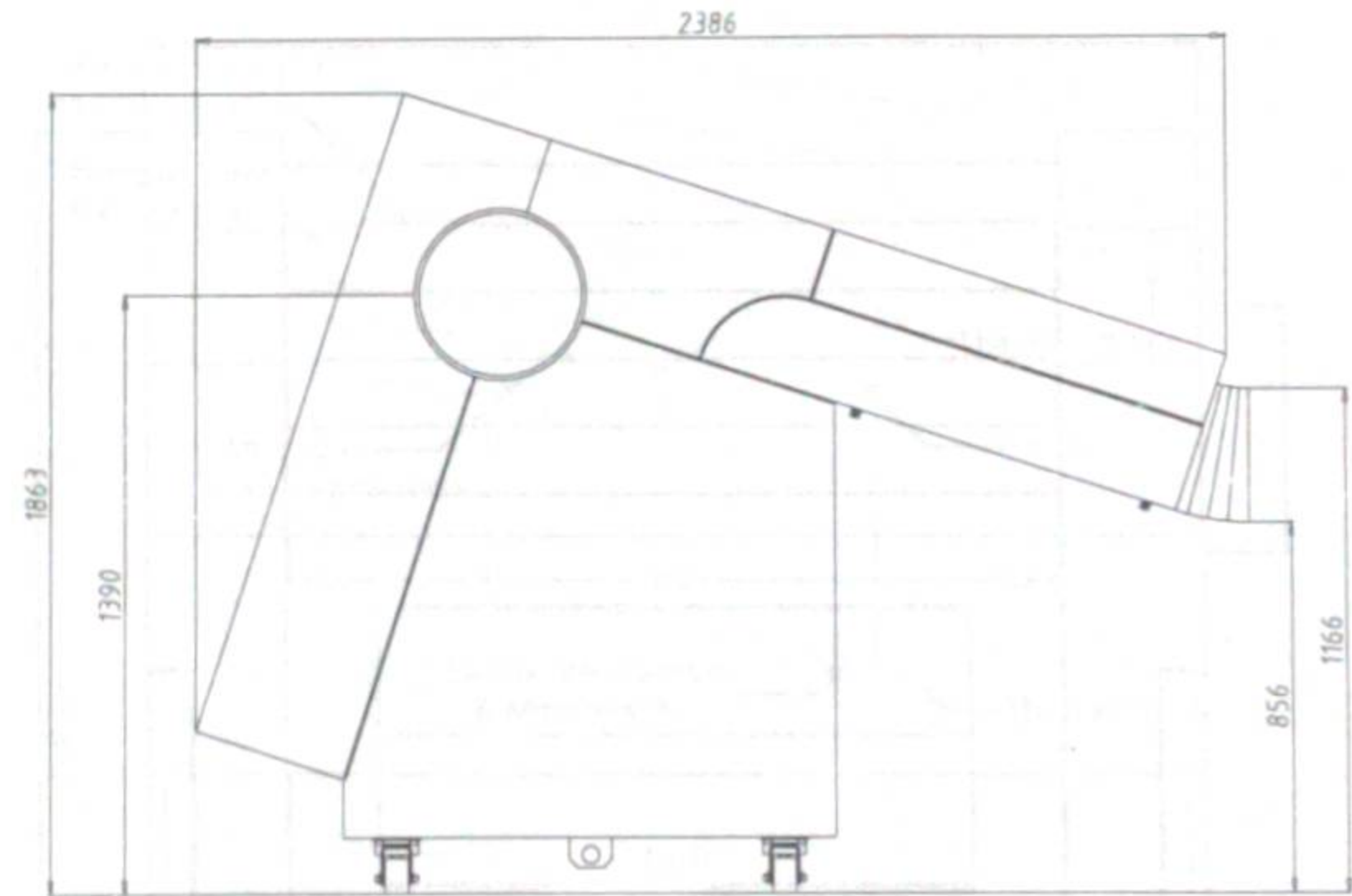


❖ Remark:

All dimensions shown are in millimeters. To convert millimeters into inches, multiply by 0.03937.



1.2.17. Right View.

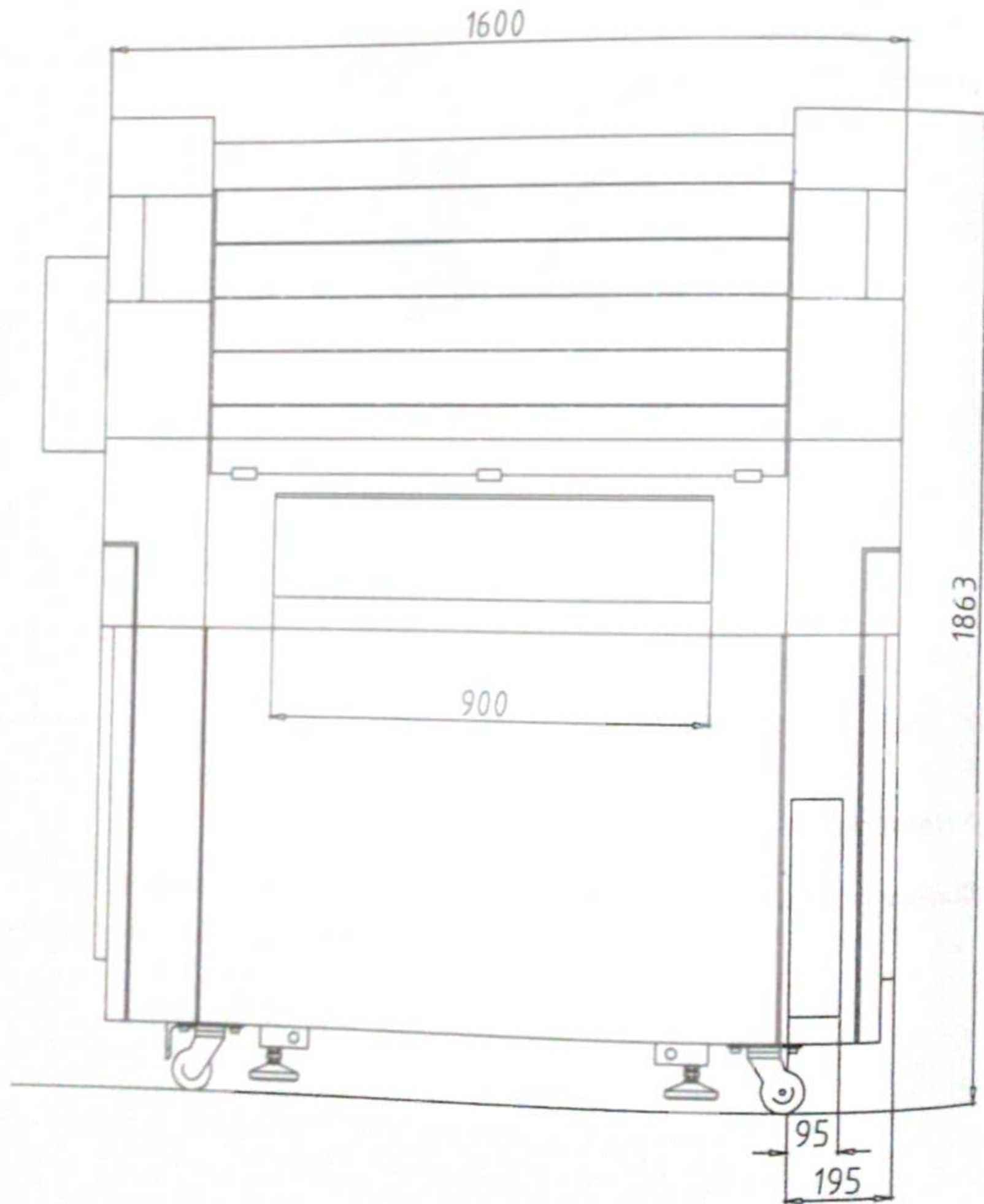


❖ Remark:

All dimensions shown are in millimeters. To convert millimeters into inches, multiply by 0.03937.



1.2.18. Back View.

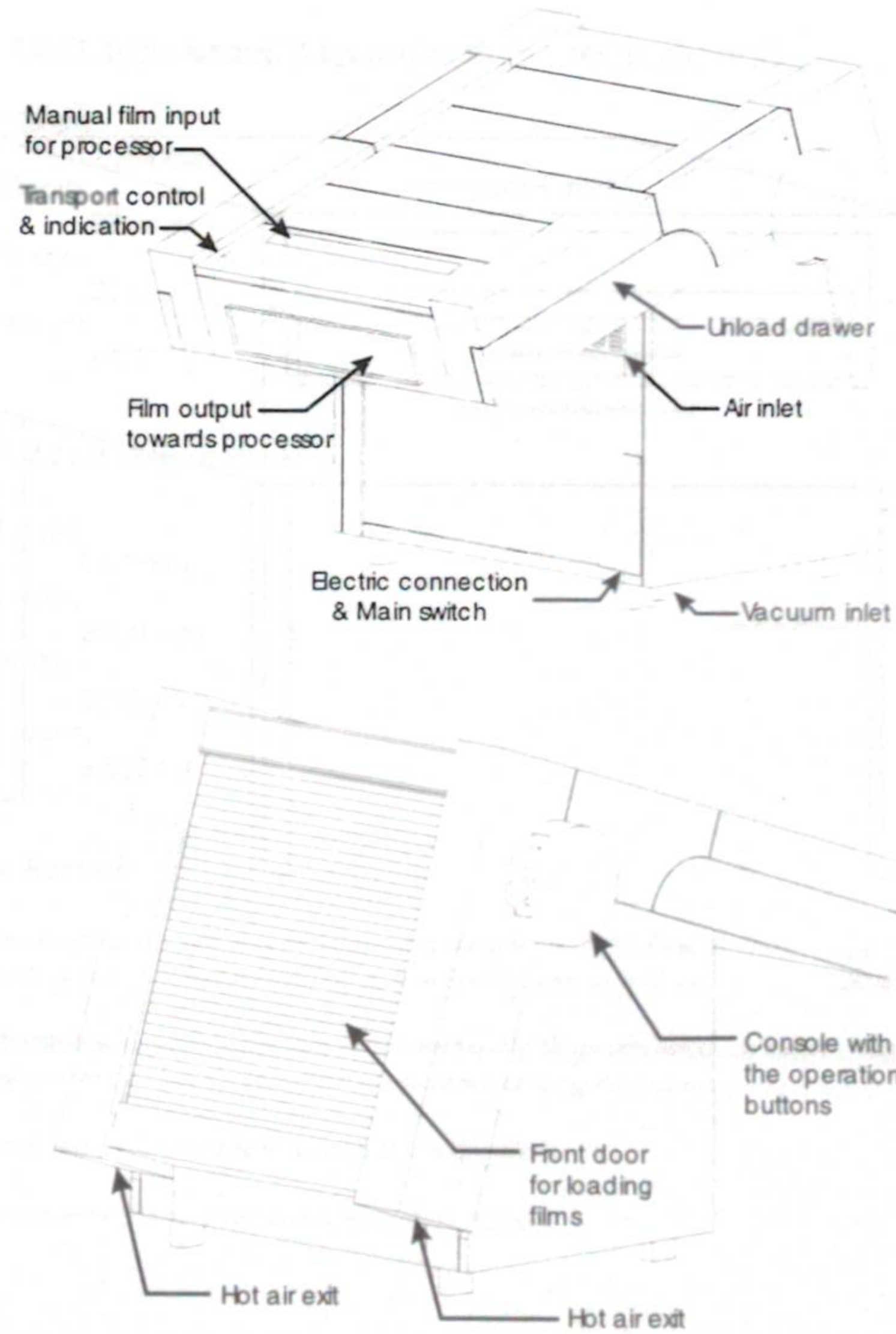


❖ Remark:

All dimensions shown are in millimeters. To convert millimeters into inches, multiply by 0.03937.



1.2.19. Basic Views.





1.3. Installed Configuration and Peripherals.

1.3.1. Block Diagram.

