

# Engel Injection Molding Machine

**ES 40**  
**V-SERIES TIEBARLESS**  
 Data Sheet

## TECHNICAL SPECIFICATIONS - ES 40 V-SERIES TIEBARLESS INJECTION MOLDING MACHINE

### CLAMP

Clamp force	US tons	40
Clamp opening force	US tons	2.2
Clamp stroke (max.)	inches	13.78
Mold height (min - max)	inches	7.09 - N/A
Daylight (min - max)	inches	7.09 - 20.87
Platen size (HxV)	inches	21.65 x 16.93

See platen illustration below for max. mold size applicable

Hydraulic ejector stroke	inches	3.94
Hydraulic ejector force	tons	2.9

### INJECTION

		std. screw	other available screw sizes	
Screw diameter	mm	22	18	25
Screw diameter	inches	0.866	0.709	0.984
Shot size <sup>1+2</sup>	oz	1.2	0.8	1.6
Injection capacity	in <sup>3</sup>	2.3	1.5	3.0
Recovery rate <sup>1+2</sup>	oz/sec	0.2	0.1	0.3
Plasticizing capacity <sup>1+2</sup>	lbs/hr	47	22	66
Injection rate at max. press.	in <sup>3</sup> /sec	3.2	2.1	4.1
Injection rate (regenerative)	in <sup>3</sup> /sec	4.1	2.8	5.3
Injection velocity at max. press.	in/sec	5.4		
Injection velocity (regenerative)	in/sec	7.0		
Screw stroke	inches	3.9		
Injection pressure (max.)	psi	30000	30000	23200
Injection pressure (regenerative)	psi	23200	30000	17763
Screw speed range (min=25)	rpm	360		
Screw torque <sup>3</sup>	ft-lbs	163		
Screw L/D ratio		18.2:1	22:1	16:1
Nozzle stroke	inches	7.87		
Nozzle force	US tons	3.2		

### HYDRAULICS

Pump capacity (required)	gpm	10.6
Oil reservoir capacity	US gal	30

### ELECTRICS

Power supply available	volts	*460 incoming voltage / 460 volt heaterbands		
Total rated horsepower	HP	10		
Number of heat control zones		3+Nozzle		
Total heating wattage	kw	3.6	3.2	3.6

### GENERAL

Dry cycle performance <sup>4</sup>	sec	1.5
Water requirements (max)	gpm	3
Machine dimensions (LxWxH)	inches	121 x 53 x 75
Machine weight	lbs	4846
Hopper capacity	lbs	44
Suitable Engel robots		ERTLi 21, ERC 23

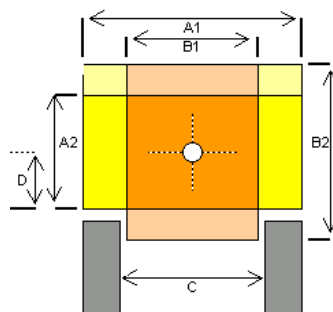
#### NOTES:

- Based on polystyrene material.
- Calculated
- Can be increased.
- Per Euromap 6 standard.

(N/A=Not Available, O/R=On Request, Std.=Standard)

\*transformer option available

All data subject to change without notice  
Per Rev. 9, 010925



#### Platen Illustration

With robot demolding,  
use A1 x A2  
With free drop,  
use B1 x B2

#### Maximum Mold Dimensions

ES 40TL	(inches)
A <sub>1</sub> x A <sub>2</sub>	21.65 x 11.00
B <sub>1</sub> x B <sub>2</sub>	13.39 x 16.93
C	14.17
D	5.59

**ENGEL**

**INCLUDED V-SERIES FEATURES**

- Bi-metallic barrel (M3) for abrasion resistance
- Through hardened (S7) screw for abrasion resistance. Includes abrasion resistant 'Marathon' (R9B) screw tip assembly
- Air blow off with timer
- 6 channel closed waterflow control
- Machine levelling & vibration mounts
- Single hydraulic corepull
- 460 incoming voltage with 460 volt heaterbands
- SPI robot interface

**STANDARD TIEBARLESS EQUIPMENT  
Injection**

- 10 step injection speed profiling
- 10 step holding pressure profiling
- 5 step back pressure profiling
- 5 step screw speed profiling
- Digital screw speed (RPM) display
- Digital injection time monitoring
- Screw recovery time monitoring
- Boost cut-off: time, stroke, and hydraulic pressure dependent
- Automatic cushion monitoring and control
- Cold start protection
- Injection unit swivel
- Quick barrel change
- Precision linear bearings for carriage movement
- Hopper discharge chute
- Feedthroat prepared for water-cooling
- Feedthroat with thermometer
- Quick disconnects for heater bands
- Increased injection speed (regen. circuit, screen selectable)
- Programs for sprue break, decompression, and intrusion

**Clamp**

- SPI mold mounting and ejector pattern
- Multi-stroke hydraulic ejection, speed and pressure controlled
- Center ejector rod
- Mechanical safety dropbar
- 3 speed opening and closing
- Hydraulic, electric and electronic safety gate interlocks
- 5 speed/pressure/position mold protection on EC100 models

**Hydraulics**

- Closed loop injection speed, injection pressure and screw back pressure; via single 'smart' pump technology on EC100 controlled TL models.
- Fully proportional linearized hydraulic system
- Automatic calibration of proportional hydraulic valves and transducers
- Clogged filter indicator
- Closed loop oil temperature regulation with prewarming system
- Oil level indicator with level switch
- Pressure selector gauge

**Controls, Electrics & Electronics**

- Microprocessor control with high resolution flat color screen
- RISC Multiple processor architecture (distributed intelligence)
- Built-in disk drive for data up/down loading. Mold set-ups stored via machine CPU.
- Quick machine set-up via single screen
- Help text system
- Linear transducers for measurement of the clamp, injection, carriage and ejector positions
- Automatic cycle monitoring and analysis
- Digital display of all actual values
- Current function display
- Self-diagnostics, monitoring, alarm & calibration
- Automatic screen shut-off
- Automatic balancing of heat zones during warm-up
- Auto barrel stand-by temperature when machine in alarm condition
- Automatic reject selection
- US/metric units conversion
- User-defined programmable text pages. Keyboard optional.
- Self-tuning temperature controls
- History reporting of alarm conditions and set-up changes
- Resettable cycle and non-resettable hour counters
- Ventilated, filtered control panel
- Energy-efficient, totally enclosed fan cooled motor

**General**

- Easy access to motors, pumps and hydraulics
- Large, open drop area for automation
- Ergonomic design for operator ease and safety
- Optically isolated control system (protection from outside noise)
- Analog/digital conversion to minimize signal noise on linear pos. transducers.
- Manufactured to ANSI/SPI B151.1 safety regulations

**ADDITIONAL OPTIONS AVAILABLE  
Injection Unit**

- Ball check valve (for non-filled materials)
- Insulating blanket for barrel
- Hopper or drawer magnets

**Clamp**

- Additional corepull(s) and unscrewing
- Additional air blow off valve
- SPI safety key switch for clamp, ejector and core movement

**Hydraulics**

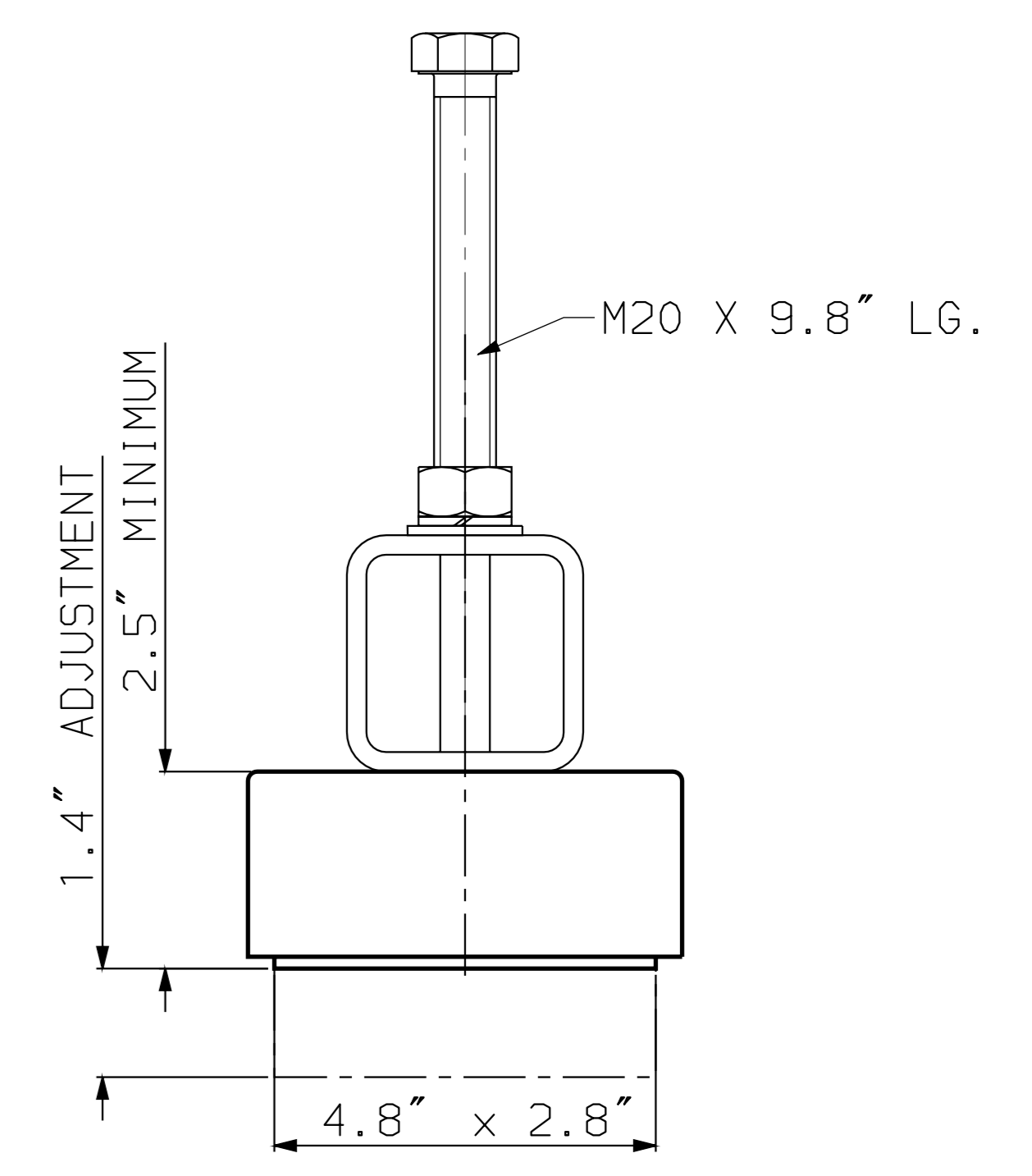
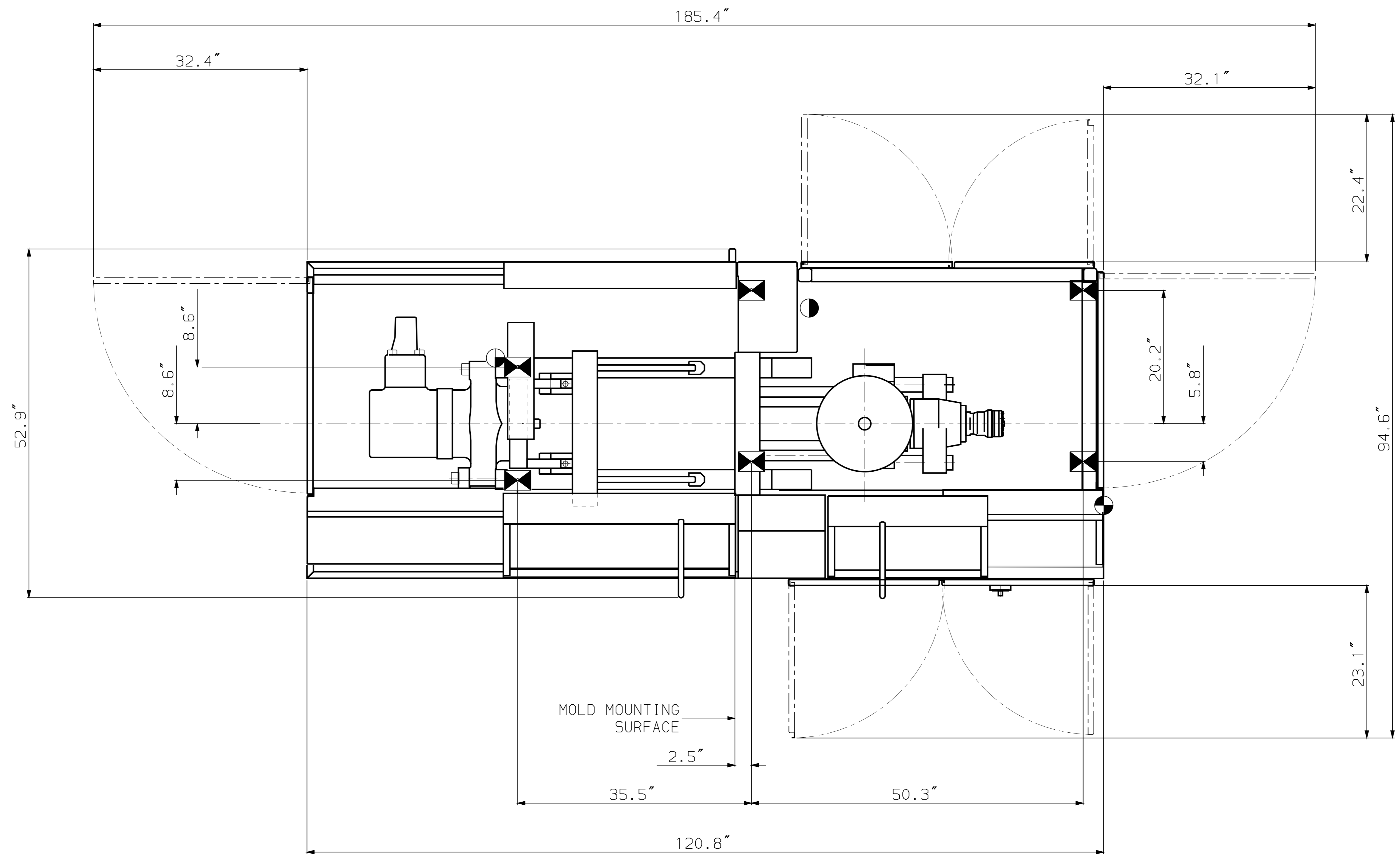
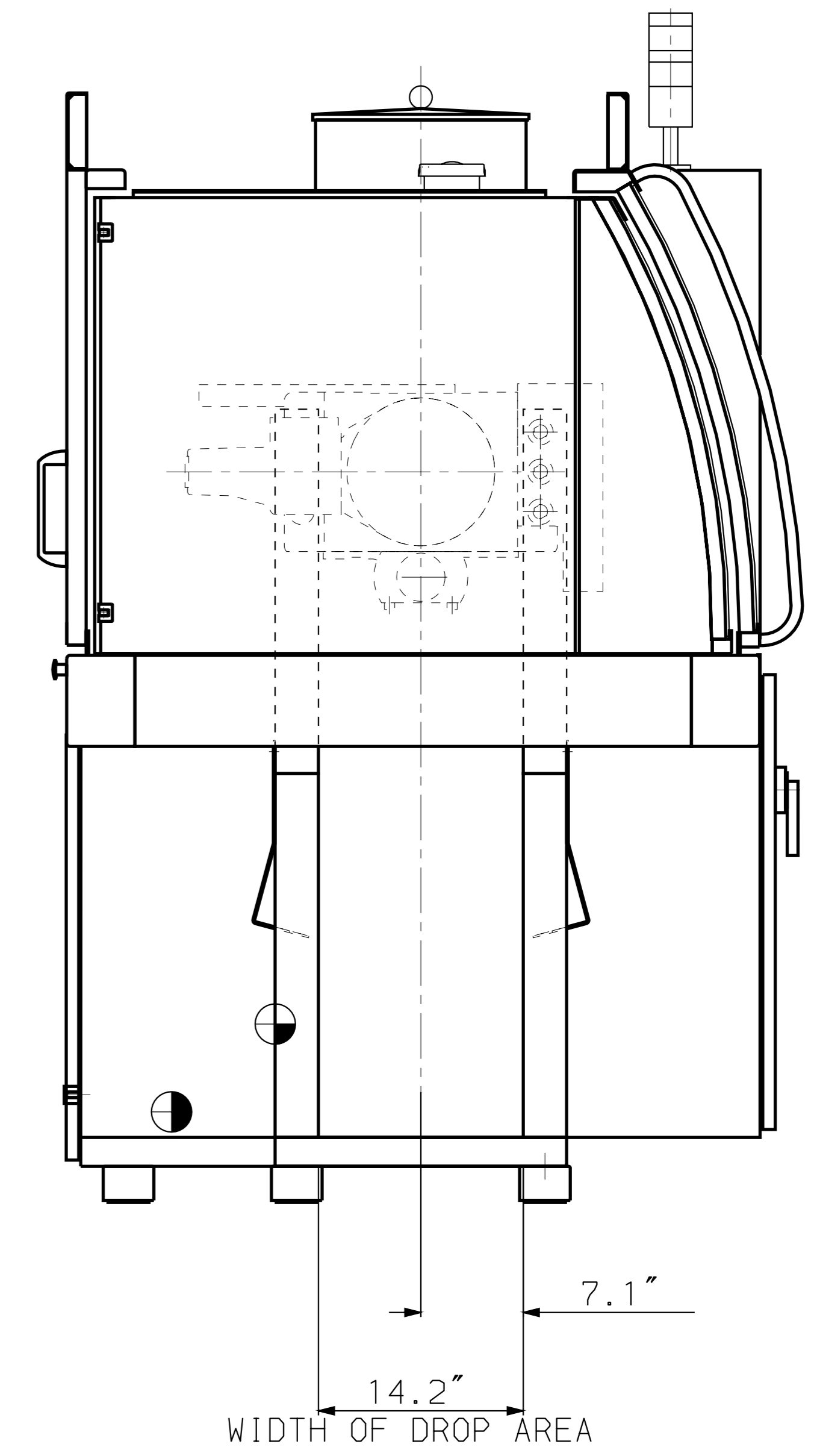
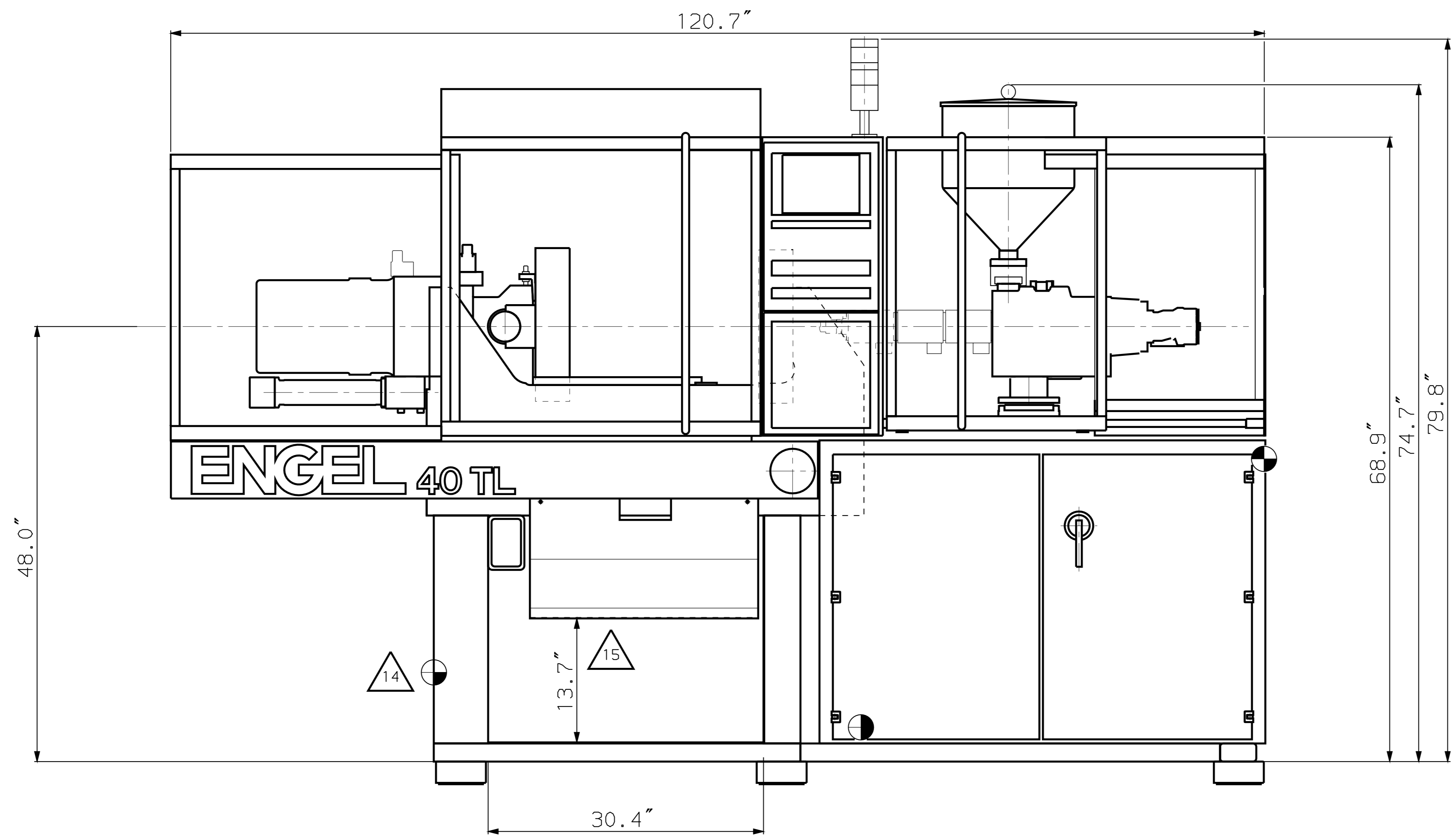
- Hot runner valve gate control (pneumatic)
- By-pass oil filtration

**Controls, Electrics & Electronics**

- Microplast and Microflow software pkgs.
- Micrograph for EC100 control
- Process data graphics and reports
- Magnetic security card access
- SPC (Quality Data Statistics)
- Automatic barrel/nozzle heat-up (7 day, 24 hour timer)
- ERC robot interface
- Host computer and SPI auxiliary device interface
- Automatic shutdown for "lights out" operation (ghost shift program)
- Closed loop feedthroat cooling
- Graphics printer
- Machine transformers for 230 / 575 incoming voltages (installation not included)

**General Options**

- Alarm bell in addition to alarm light
- Engel robots
- Training programs
- Spare parts packages



**MACHINE MOUNT DETAIL**  
LOAD CAPACITY 3000 LBS.  
SCALE 1:2

- ☒ -MACHINE MOUNT
- ⊙ -STD.ELE.UTILITY ENTRANCE
- ⊕ -AIR CONNECTION 1/4"NPT.
- ⊖ -COOLING WATER CONNECTION IN & OUT 1"NPT.

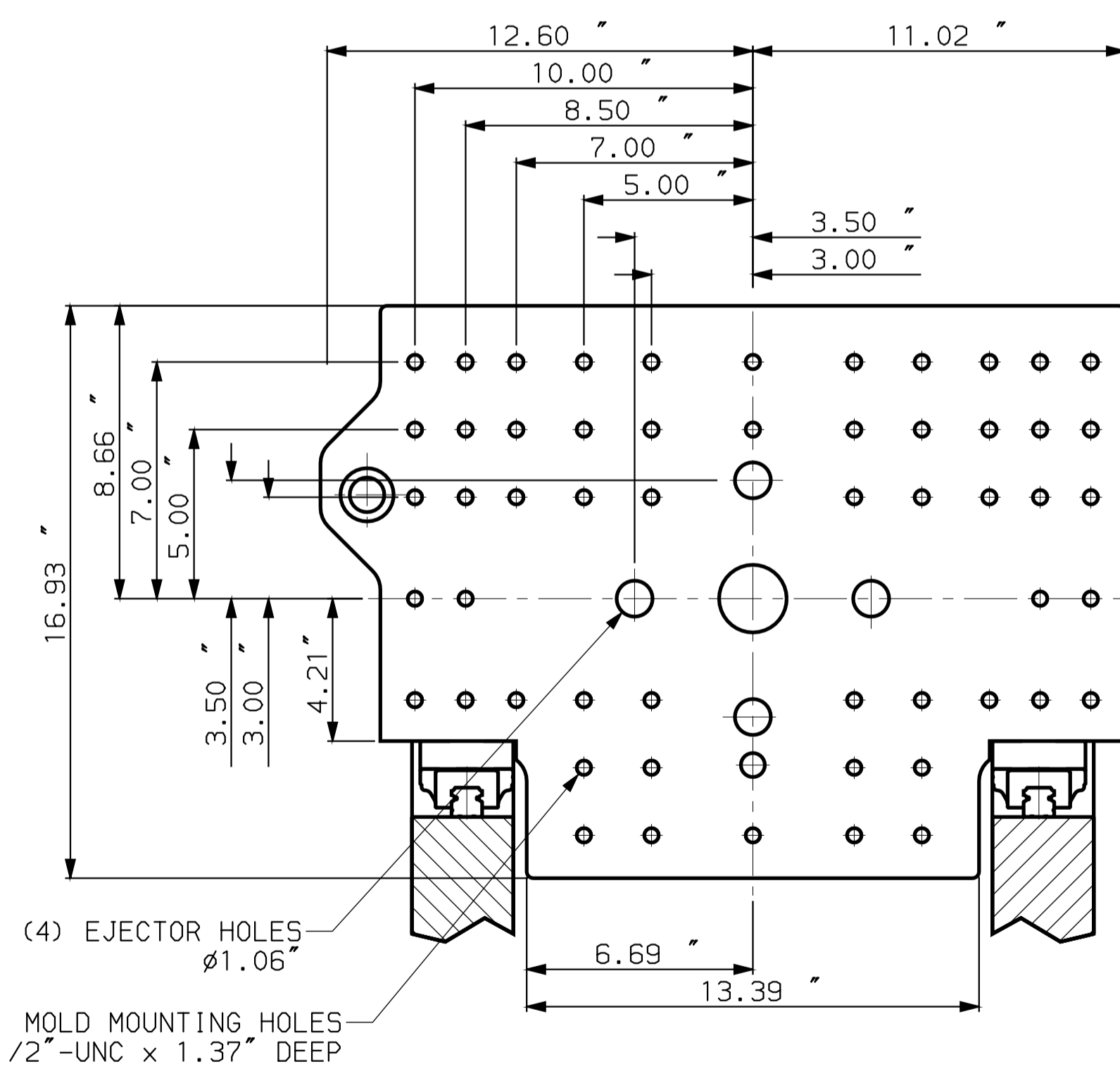
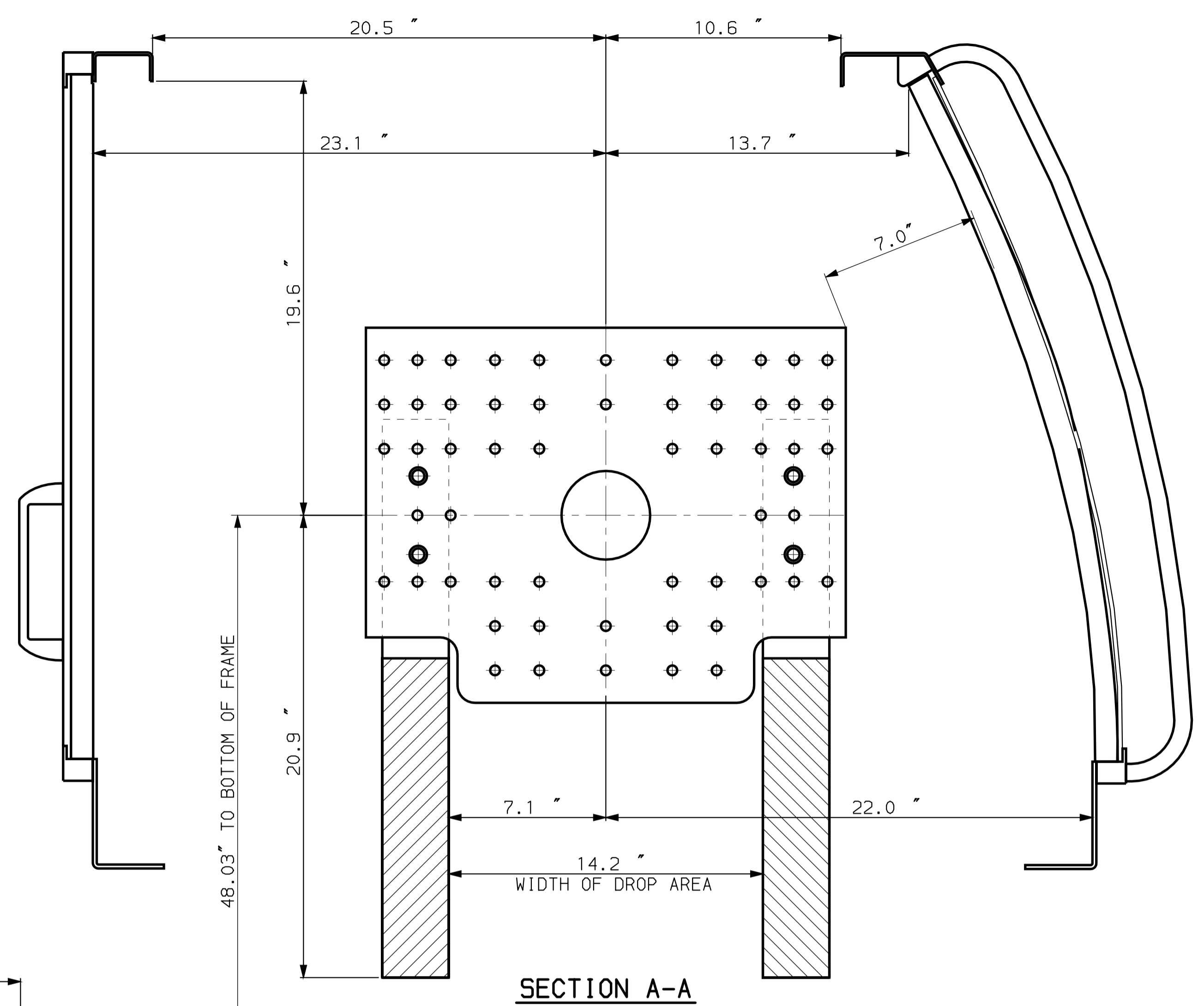
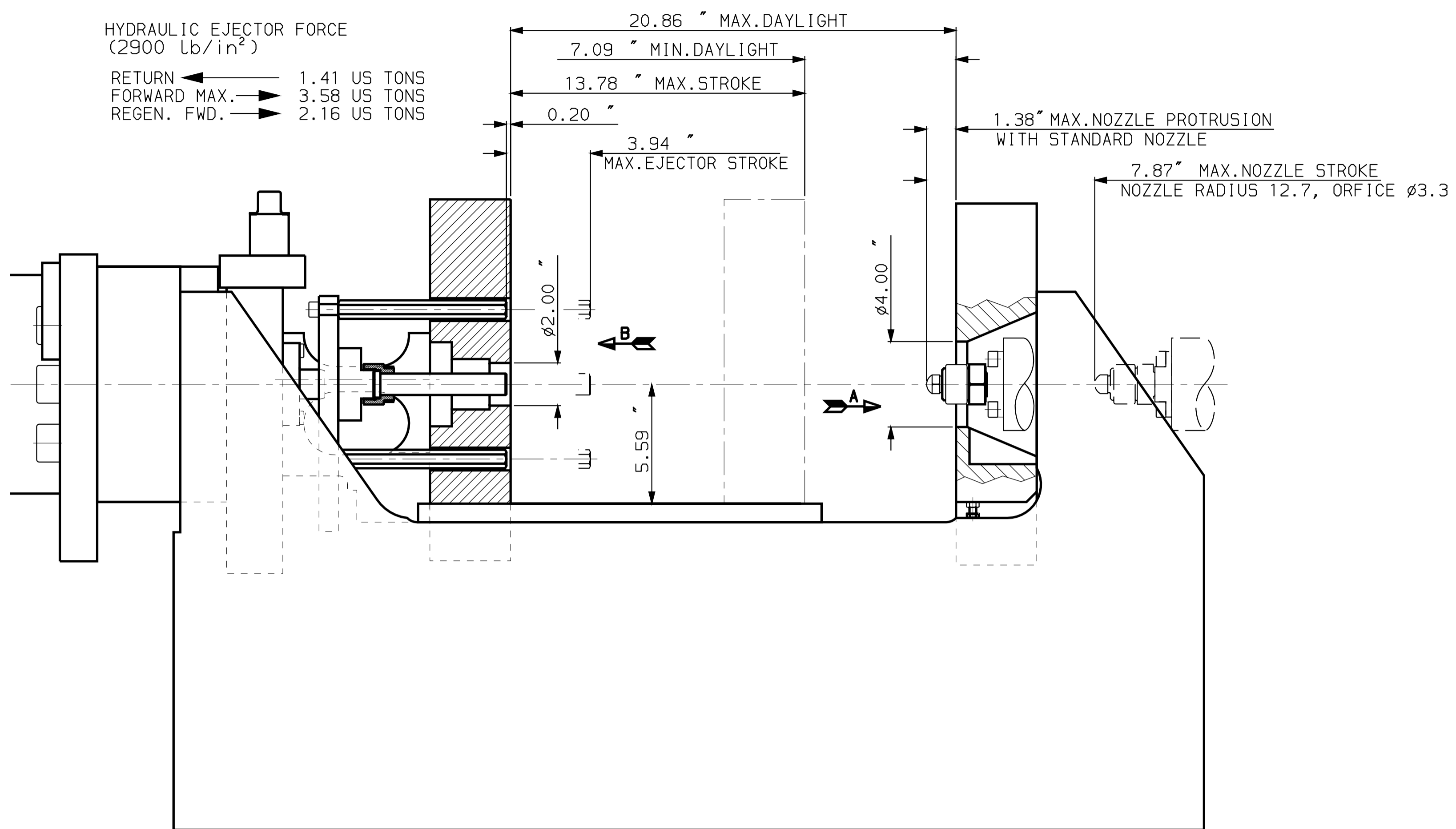
**NOTES:**  
1) DIMENSIONS ARE IN INCHES.  
2) TECHNICAL DATA SUBJECT TO CHANGE WITHOUT NOTICE.

15	2-1996	UPDATED GEOMETRY FOR GUARD BASE CLA. DIM 13.7" WAS 18"	03-MAY-01	LEVIU P.
14	000000141E	REVISED AIR CONNECTION LOCATION	12-DEC-00	LEVIU P.
13	0000000040H	NEW STYLE ALARM LAMP & HEIGHT ADDED.	22-MAR-00	B.H./A.L.D.
12	02511	REVISED MACHINE POINTS	19-MAR-99	J.S./A.B.
11	5432	ADD ALAMP BASE REVISION	15-OCT-98	KEARNEY
10	5432	NEW	07-DEC-96	KEARNEY
REV#	ECOM	REVISION	DATE	NAME
SCALE	DESCRIPTION	NAME	DATE	
1: 8	MAIN DIMENSIONS	ENGEL		
	ES040TL/080	GUELPH - CANADA		
MATERIAL		DR. N.	KEARNEY	07-OCT-96
BLOCK CODE				
BREAK SHARP CORNERS				
SIZE	FROM 0.5 6 30 120 315 1000 2000	REPLACES		
	TO 8.0 30 120 315 1000 2000	COPY FROM	5840.005.3279E	
FINE #	0.05 0.1 0.15 0.2 0.3 0.5 0.8 1.2 2.0 3.0 4.0			
MEDIUM #	0.1 0.2 0.3 0.5 0.8 1.2 2.0 3.0 4.0			
TOL. IN MICRONS				
METERS	COARSE # 0.2 0.5 0.8 1.2 2.0 3.0 4.0			
THIS DRAWING AND THE INFORMATION HEREIN IS CONFIDENTIAL AND MUST NOT BE REPRODUCED OR USED IN ANY WAY WITHOUT WRITTEN PERMISSION OF ENGEL CANADA INC.				5840.005.0827E
				SHEET 2 OF 2
				REV. # 15

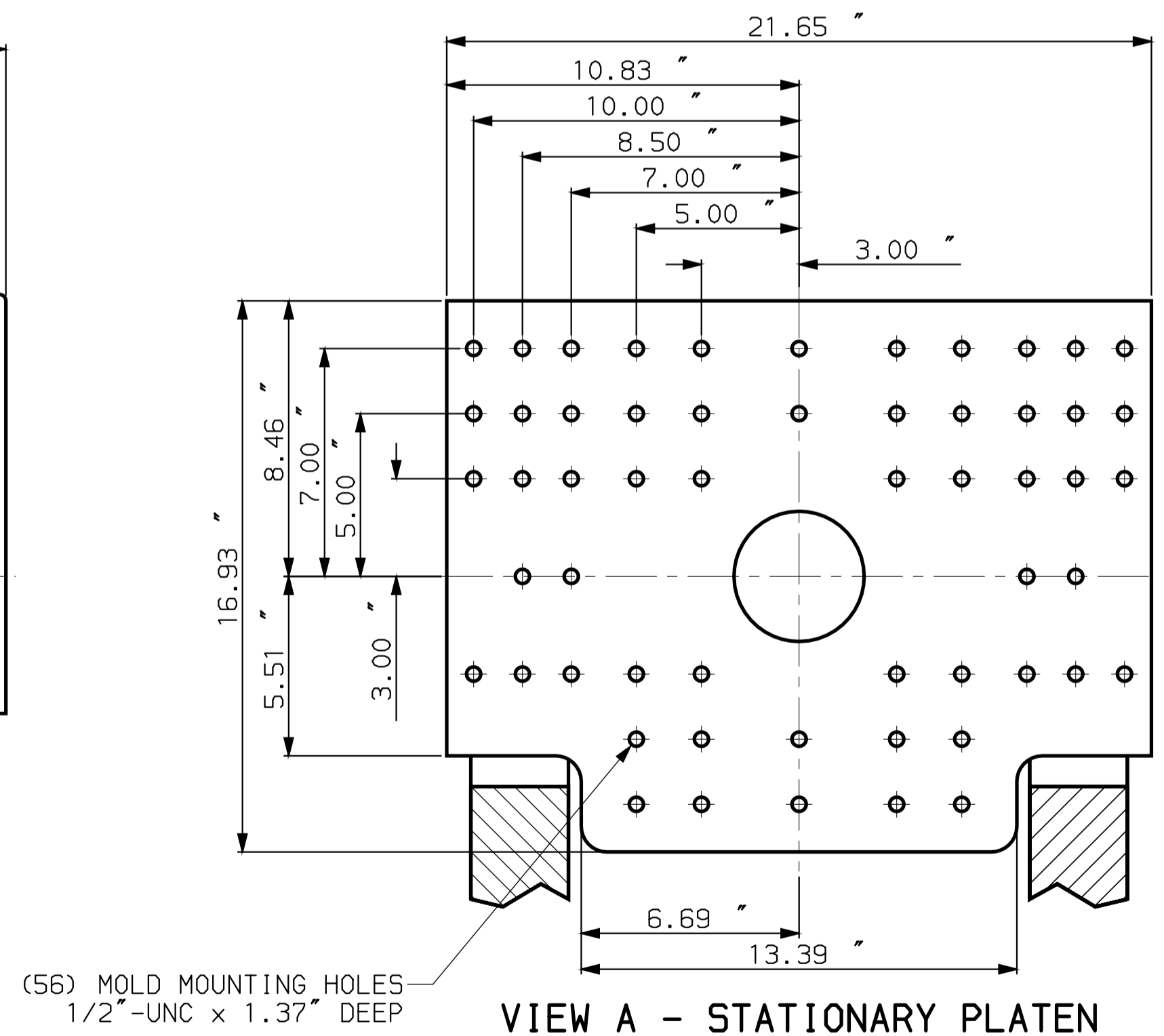
RELEASED  
MICROFILM  
REV. # 15

HYDRAULIC EJECTOR FORCE  
(2900 lb/in<sup>2</sup>)

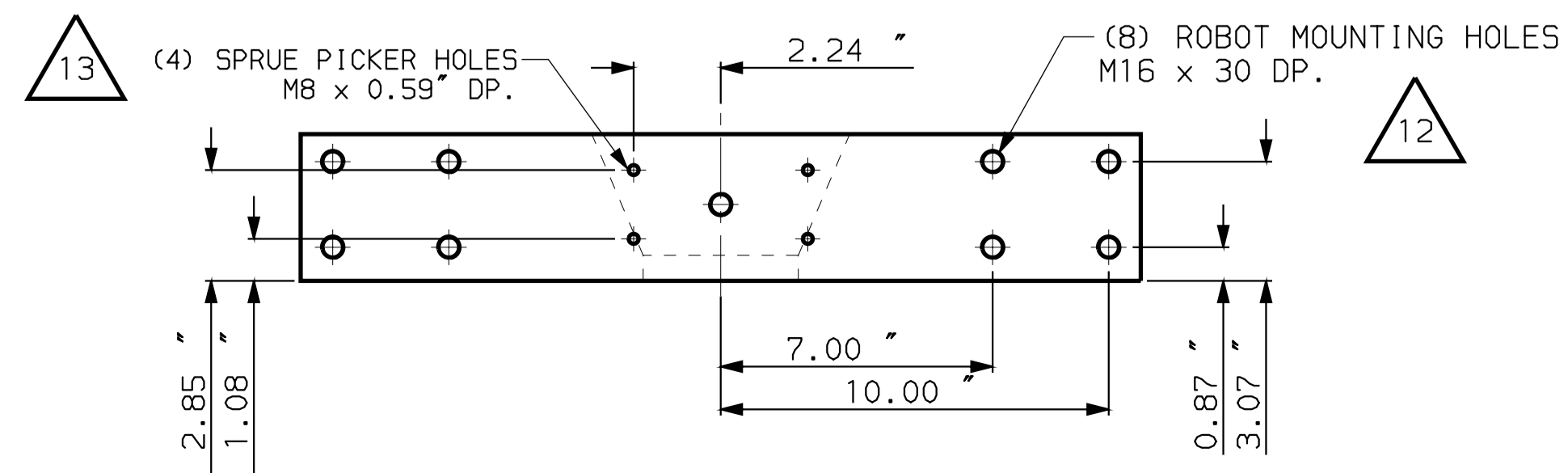
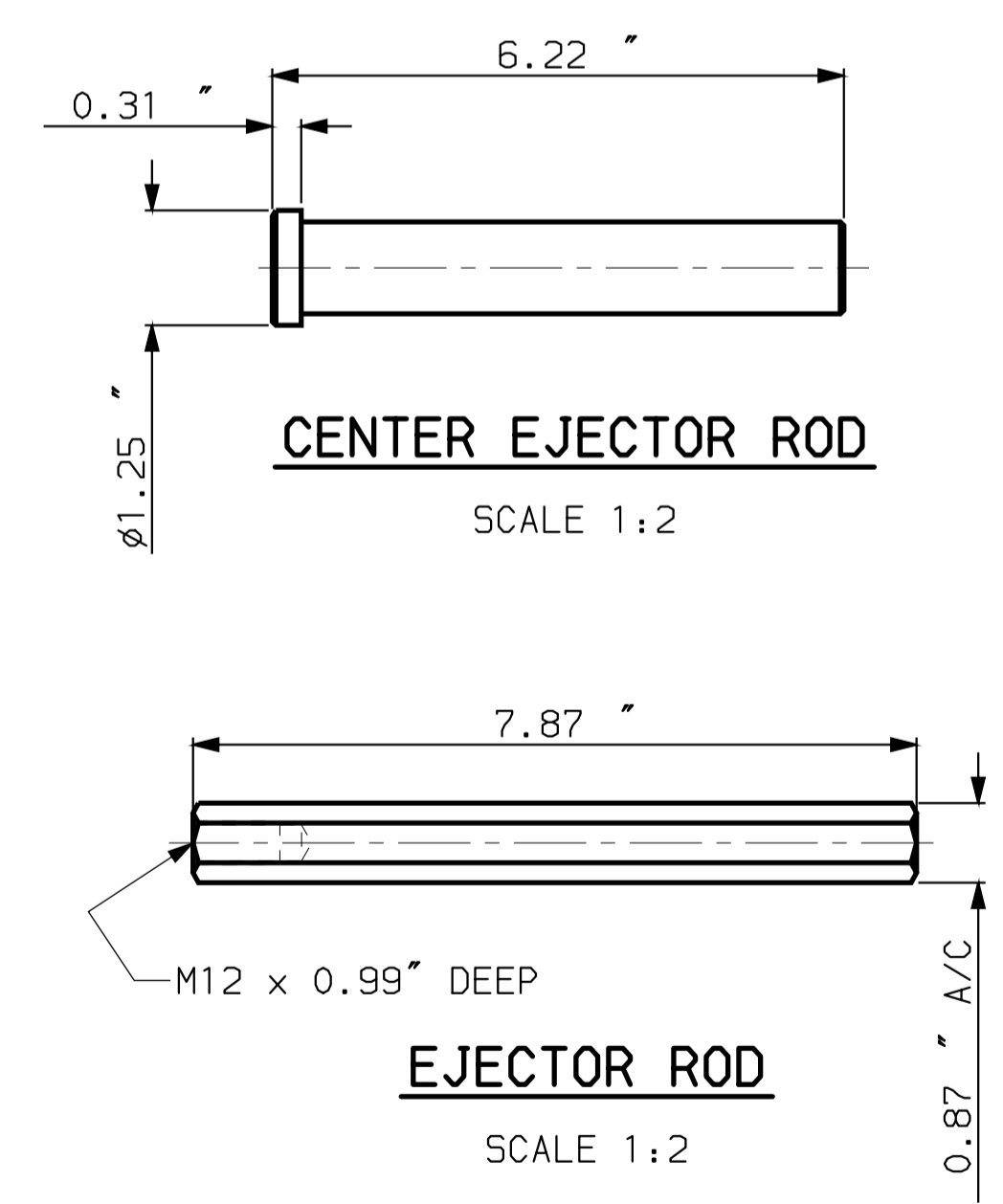
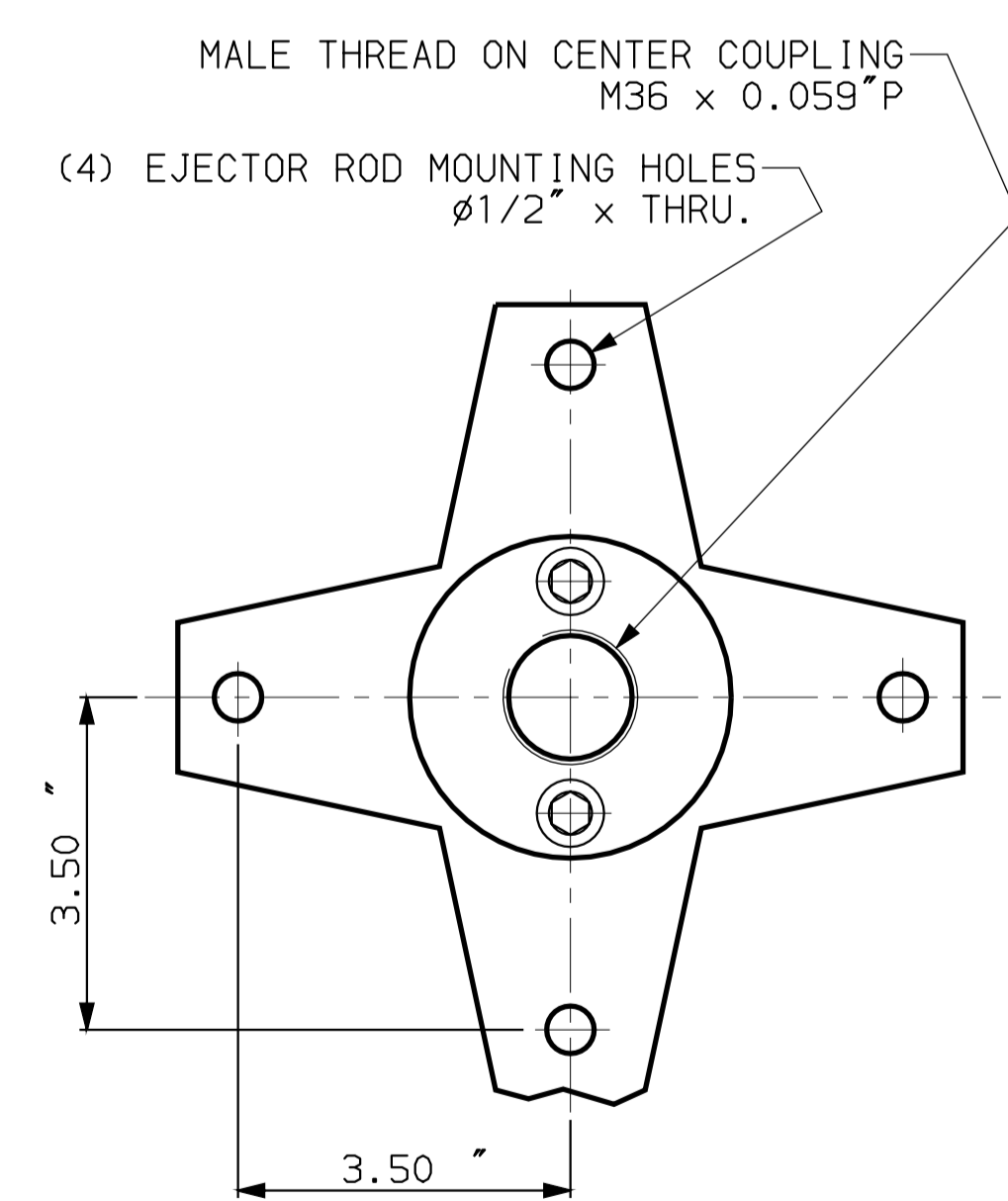
RETURN ← 1.41 US TONS  
FORWARD MAX. → 3.58 US TONS  
REGEN. FWD. → 2.16 US TONS



**VIEW B - MOVING PLATEN**



**VIEW A - STATIONARY PLATEN**



**NOTES :**

- 1) DIMENSIONS ARE IN INCHES.
- 2) TECHNICAL DATA SUBJECT TO CHANGE WITHOUT NOTICE.

RELEASED  
MICROFILM  
REV. # 13

13	2-2024B	(4) HOLES WERE (8) HOLES	24-MAY-01	CALIN P.
12	200000003625	ADDED (8) ROBOT MOUNTING HOLES	14-APR-00	LIVIU P.
11	0141	SPRUE PICKER HOLES ADDED	29-JAN-98	KWB
10	9429	NEW	27-NOV-95	KEARNEY
REV#	ECO#	REVISION	DATE	NAME
SCALE	DESCRIPTION			
1:4	PLATEN LAYOUT ES040TL/80			
MATERIAL			NAME	DATE
STOCK CODE #			DR'N	07-NOV-97
BREAK SHARP CORNERS			CHK'D	07-NOV-97
SIZE	FROM	TO	REPLACES	
	6.0	6.0	30	120
	0.5	0.1	0.15	0.2
	0.3	0.5	0.8	1.2
	2.0	3.0	4.0	
TOL. IN MICRO METERS	FINE ±	0.1	0.2	0.3
	MEDIUM ±	0.2	0.5	0.8
	COARSE ±	0.5	1.2	2.0
THIS DRAWING AND THE INFORMATION HEREIN IS CONFIDENTIAL, AND MUST NOT BE REPRODUCED OR USED IN ANY WAY WITHOUT WRITTEN PERMISSION OF ENGEL CANADA INC.			DRAWING NO <b>5840.002.2407D</b>	
			SHEET	2 OF 2
			REV. #	13

**ENGEL**  
GUELPH - CANADA