

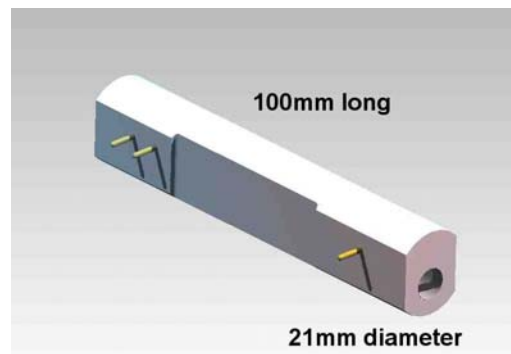


High Peak Power Compact Permanently Aligned MK-367 1064nm Laser



Complete Nd:YAG system include MK-367 laser head, MK-1000 Modular Hand Fire Controller, MK-12/24 (110 & 200VAC) Universal Regulated Transformer and MK-106 self-contained power supply.

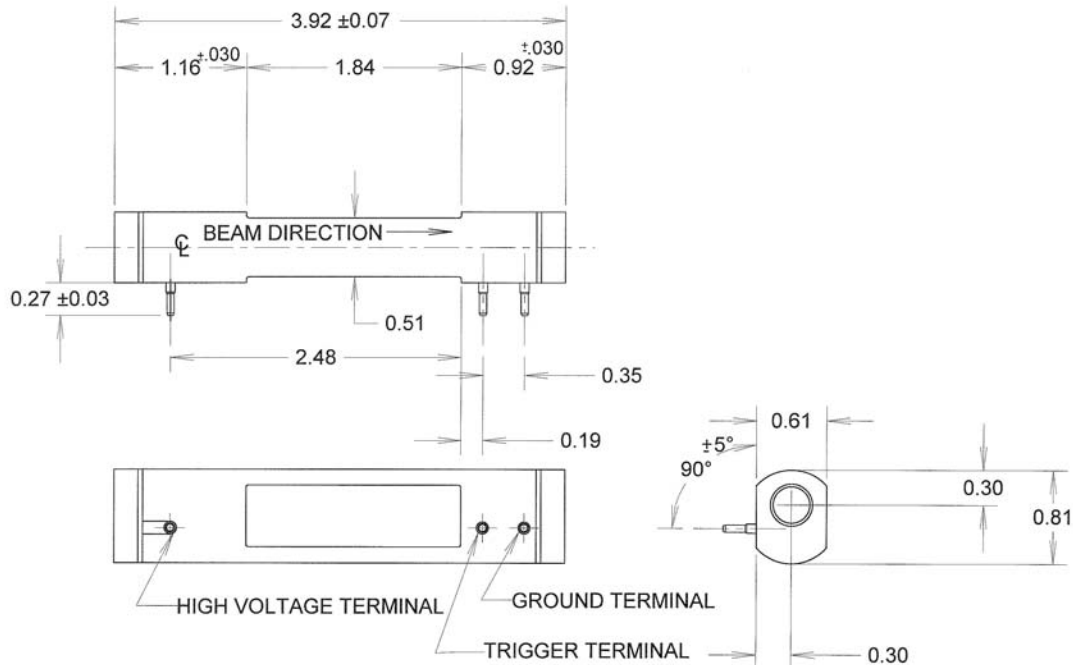
Rugged shock-proof sealed laser head design survives testing at > 3000g.



4-MegaWatt IR/ 2-Megawatt Green Option



- **Complete Nd:YAG system include LMS-367 laser head, MK-1000 Modular Hand Fire Controller, MK-12/24 (110 & 200VAC) Universal Regulated Transformer and MK-106 self-contained power supply.**
- **Rugged shock-proof sealed laser head design survives testing at > 3000g.**
- **Permanent alignment eliminates manual adjustments.**
- **Optional 4-MegaWatt/1064nm & 2-Megawatt/532nm output available.**
- **Self-contained MK-367PS power supply with integral PFN is capable of being powered by either a 12 volt D.C. source or by an optional transformer for 110/120 volt A.C. operation.**
- **Usable life is excess of 300,000 shots with fast low cost refurbishment.**
- **Sized for wide range of OEM application**
- **Higher energy 50mj and 125mj “pulse-train” marking output available.**
- **Green frequency-doubled version, MKG-367 is also available.**



MK-367 Laser Head Outline Drawing **The MK-367 Laser Head weighs 58 grams**

Electrical Requirements

Input Voltage: 12VDC
Input Current: 1.2 A charging 250mA regulating
Output Voltage: 500-1000 VDC
Trigger Output: +12 VDC-positive edge input-10 ms
minimum pulse width.

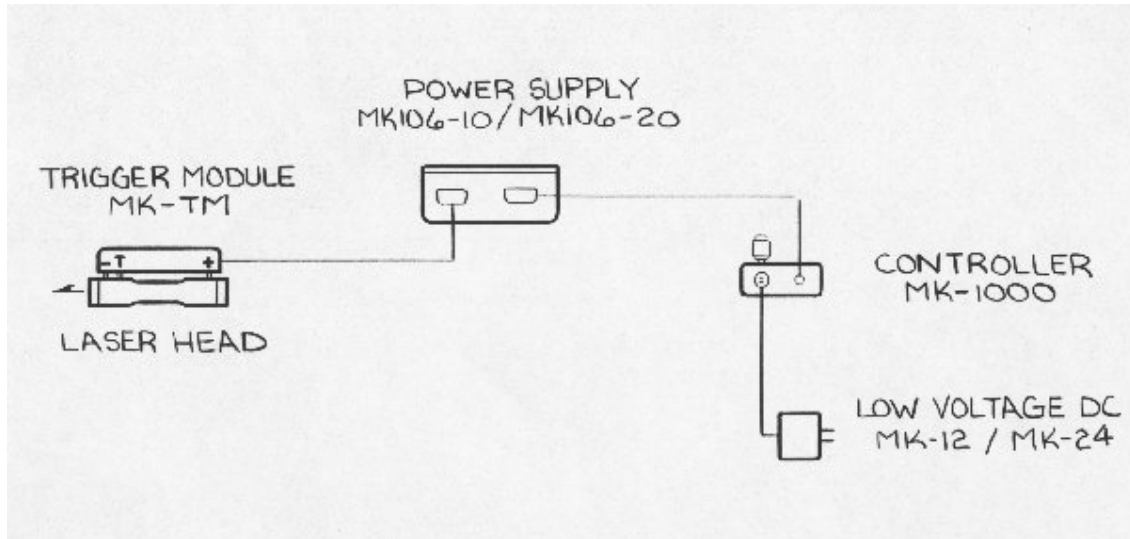
Power supply charge is inhibited until trigger signal is removed.

Output Energy- Model 1010: 9 joules
Model 1020: 18 joules

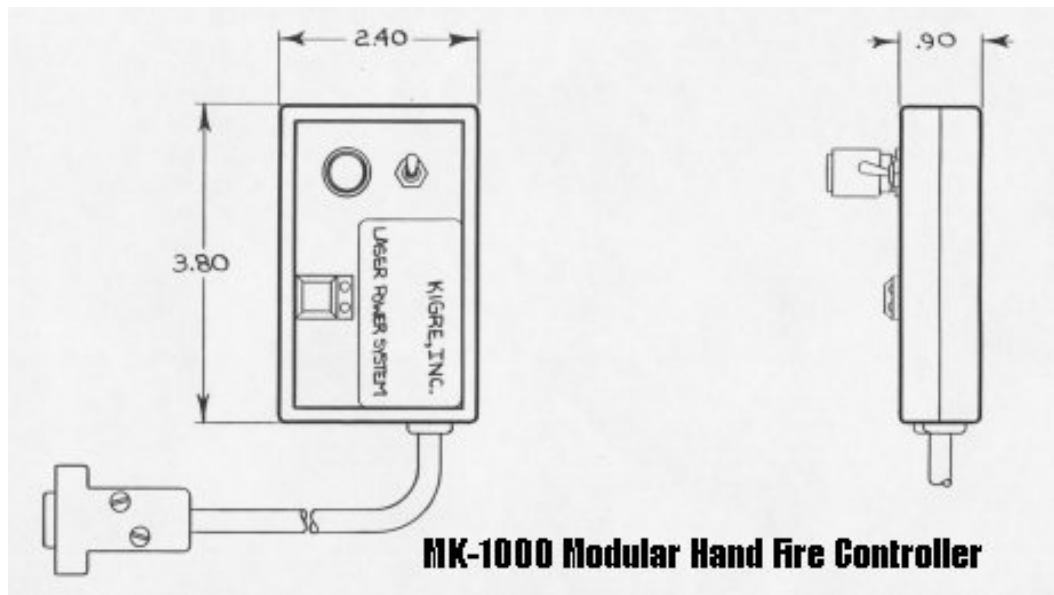
Maximum Pulse Rate: One pulse per second at 10 Joules.

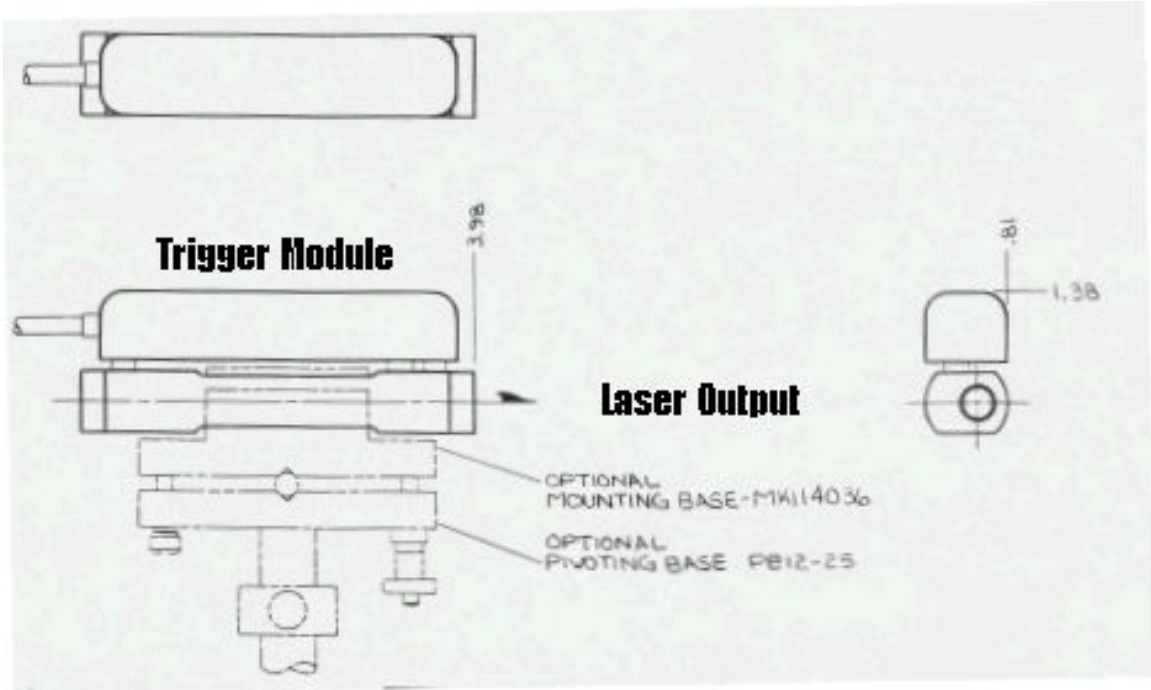
Charge Indication: Active low at full charge
(12V 20 mA sink recommended)

Rep. Rate-Fire signal is inhibited full charge is reached

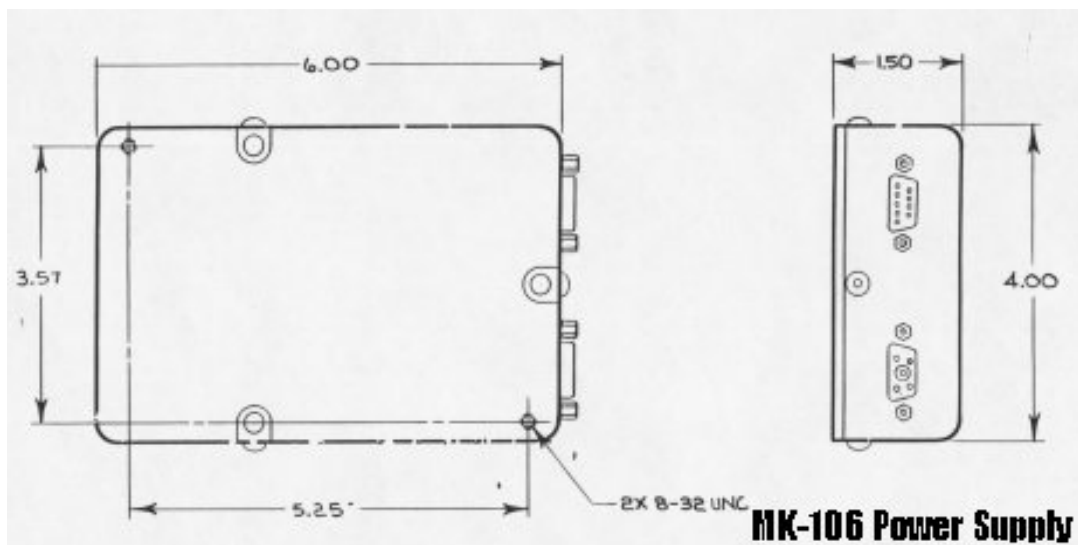


MK-367 OEM System Interconnect Diagram





MK-367 Trigger Module, Heat Sink Mount & Post Mount Tilt Base
The MK-367T Trigger Module (potted) weighs 64 grams



The 106-10 (10 Joule) OEM power supply (potted) weighs 1.13Kg
The 106-20 (20 Joule) OEM power supply (potted) weighs 1.26Kg



Developed primarily for the ophthalmic market, the MK-367 laser is a reliable, low-cost laser system requiring minimal service with a usable life in excess of 300,000 shots. The subsystem components may be purchased separately to mate to customer-supplied power sources and fire control input signals.

MK-367 SPECIFICATIONS

NOMINAL OUTPUT.....	25 MILLIJOULES*
* Single pulse output. Nominal double pulse output 45mj with ~ 25us pulse separation for multiple pulse train output. 20 Joule supply required to operate triple pulse train output.	
PULSE WIDTH.....	4 NANOSECONDS
BEAM DIAMETER.....	3mm
BEAM DIVERGENCE.....	90% LESS THAN 1
MILLIRADIAN FULL ANGLE	
OUTPUT STABILITY.....	LESS THAN +/- 10%
MAXIMUM REPETITION RATE.....	1 HERTZ**
** 1/2 Hertz typical but capable of long life 1Hz continuous duty operation with actively cooled heat sink.	
BEAM MODE.....	LOW ORDER
NOMINAL REQUIRED INPUT.....	7 JOULES PER PULSE
LIFETIME.....	> 300,000 SHOTS

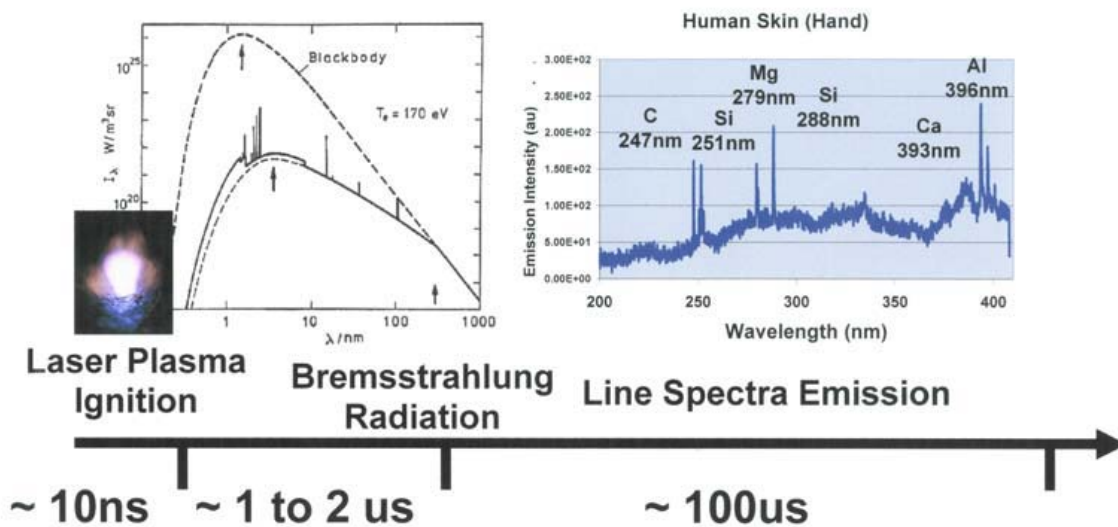
Customized un-potted electronic components may exhibit significant weight savings of up to 80%



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The MK-367 laser utilizes a passive or saturable absorber Q-switch. As such, the laser's shot-to-shot jitter is not stable and varies by 10's of μs . Applications with sensitive laser/target timing issues often use an InGaAs photo-diode with the MK-367 to "pickoff" the laser's output pulse and establish a T_0 start or benchmark for calibration of the system's event functions. An example of the use of a laser T_0 spectrophotometer gate is shown below. The figure shows an event timeline for a typical single pulse LIBS system using a MK-367 laser. A photodiode is used to "see" the laser output and open the detector gate at the most desirable moment on the event timeline.



Multiple pulse MK-367 laser operation may be used to increase the laser output energy by 2x, 3x, etc. The laser's PFN (Pulse Forming Network) voltage setting is adjusted and increased so as to introduce additional Q-switched pulses in a "pulse train" output. The initial laser pulse is followed by additional pulses with microseconds time duration in between. For example the laser may produce three separate pulses each $\sim 4\text{ns}$ pulse duration, $\sim 20\text{mJ}$ energy and with $\sim 25\mu\text{s}$ between each pulse. When the beam is focused to a point source, the first pulse may initiate a plasma spark with the following second and third pulses feeding more energy into the plasma. The net result is higher energy plasma and a better signal to noise ratio for the optical emission and/or return.

The example MK-367 laser data check out sheet shows example single and double pulse threshold voltage settings along with the setting for "stable" single and double pulse operation at $\sim 60\%$ above the threshold voltage level. The MK-367 laser will not provide stable output operation performance if the laser voltage setting is too close to threshold. Further increasing the laser PFN voltage leads to additional pulses in the pulse train and a higher total laser output energy.

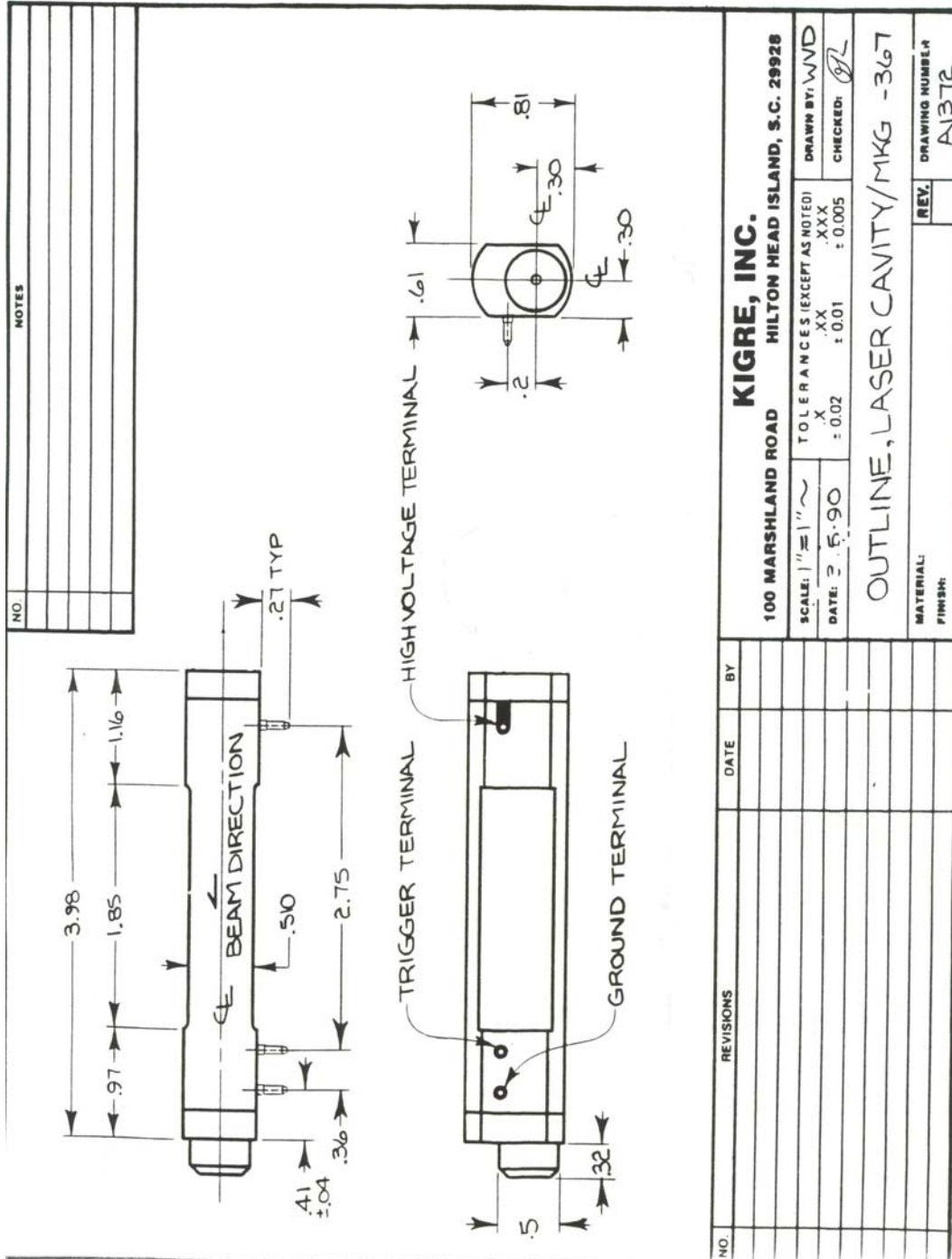
KIGRE, INC., 100 Marshland Road, Hilton Head, SC 29926
PH:(843) 681-5800 FAX: (843) 681-4559 Web Site: <http://www.kigre.com>
E-mail: info@kigre.com



MK-367 Laser Components Assembly

Green Frequency Doubled MKG-367 SPECIFICATIONS

NOMINAL OUTPUT.....	15 mJ @ 1064nm 10 mJ @ 532nm
PULSE WIDTH.....	4 NANOSECONDS
BEAM DIAMETER.....	3mm
BEAM DIVERGENCE..... MILLIRADIAN FULL ANGLE	90% LESS THAN 1
OUTPUT STABILITY.....	LESS THAN +/- 10%



Green Frequency Doubled MKG-367 Outline Drawing



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Since 1973, Kigre has been a OEM, sole source and original equipment supplier for a variety of laser transmitter and laser head components used in cloud height measurement, eye surgery, surveying and range-finding. Customers include Coherent (7900 series), LaserTech (PV-135), Cielco (Cooper Laser), Kazuko, Hughes Aircraft, OEC, Litton, Northrop/Grumman, Simrad, Eltro, Selenia, Israel MOD, El-Op, Eloptro, NEC, Raytheon, Mitsubishi Electric, Mitsubishi Heavy Industries, The Governments of India, Thailand, and Ecuador, Avimo, Thales, Ericsson Radio, Iskra, Bofors, and others.

www.kigre.com

OEM MK-367 Laser Head



OEM MK-367T Trigger Module



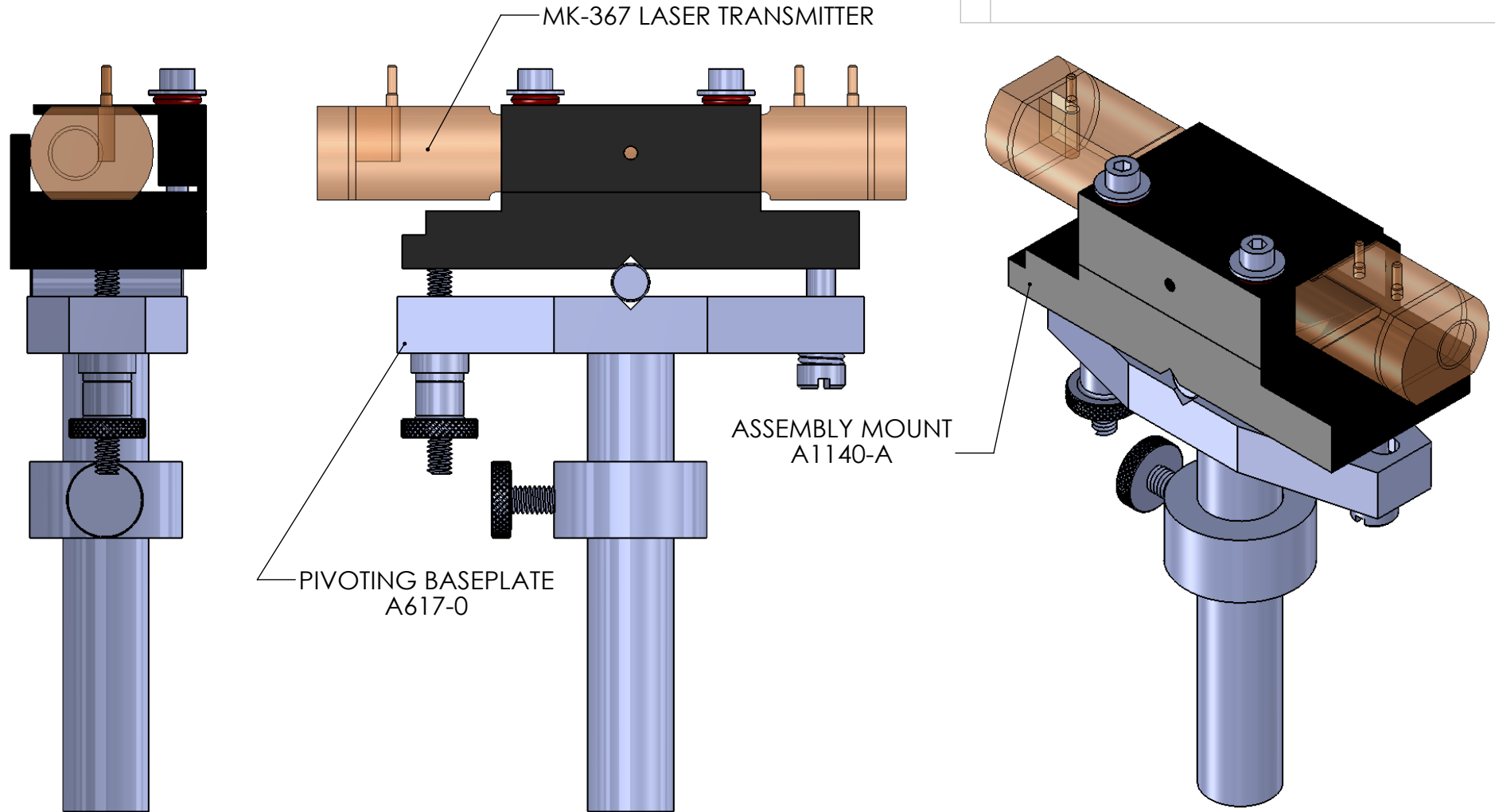
REMI-367 Laser Head Package
For use in Coherent 7900 series
(has MK-367 head inside)



KIGRE, INC.
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NO.	NOTES



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES (EXCEPT WHERE NOTED) TOLERANCES: ONE PLACE DECIMAL ±0.020 TWO PLACE DECIMAL ±0.010 THREE PLACE DECIMAL ±0.005					NAME	DATE	
					DRAWN	CXY	
INTERPRET GEOMETRIC TOLERANCING PER: MATERIAL					CHECKED	CRH	21MAY10
					ENG APPR.		
FINISH					MFG APPR.		
					Q.A.		
DO NOT SCALE DRAWING					COMMENTS:		TITLE: COMPLETE POST-MOUNT TILT BASE ASSEMBLY FOR MK-367 LASER
REV	DATE	DESCRIPTION	BY	APPR	SIZE	DWG. NO.	REV
					A	A3918	0
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		APPLICATION					

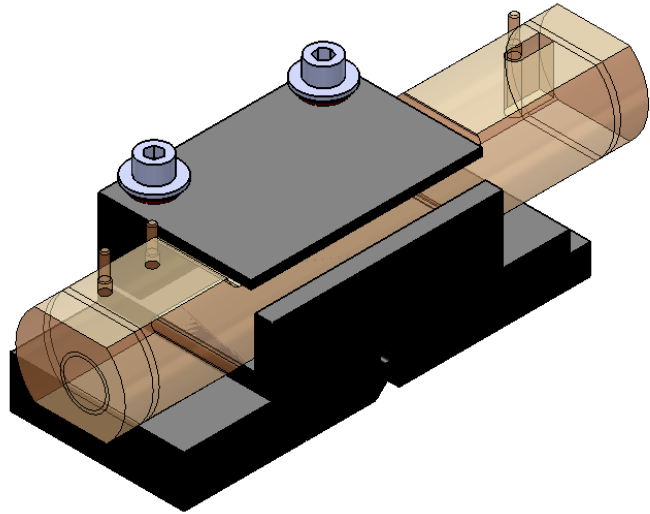
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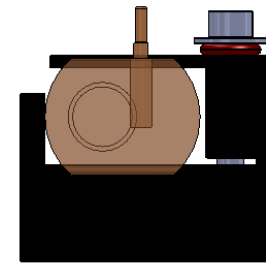
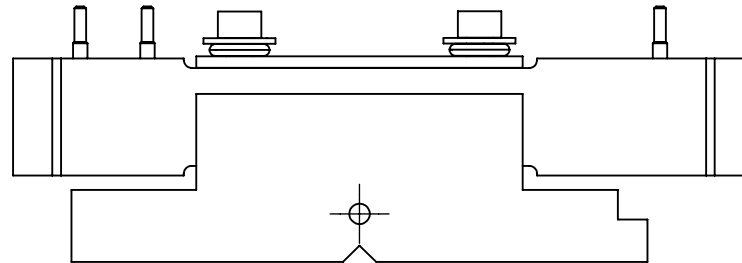
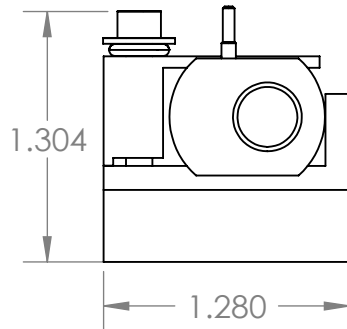
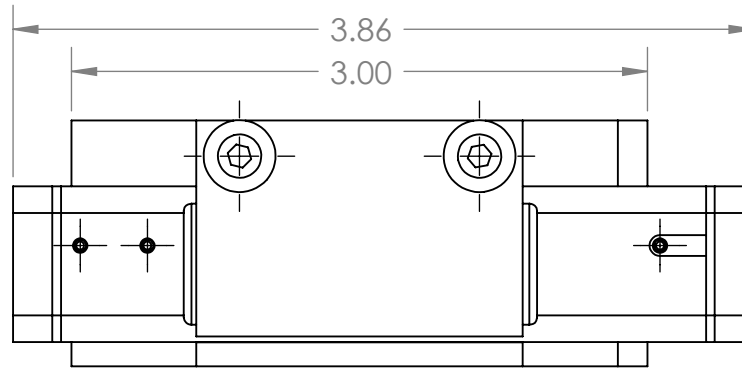
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NO.	NOTES



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TOLERANCES:
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TWO PLACE DECIMAL ±0.010
THREE PLACE DECIMAL ±0.005

INTERPRET GEOMETRIC
TOLERANCING PER:

MATERIAL

FINISH

DO NOT SCALE DRAWING

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CHECKED	CRH	03MAY10
ENG APPR.		
MFG APPR.		
Q.A.		

 **KIGRE, INC.**

TITLE:

MOUNT, LASER/MK-367, 480

SIZE

A

DWG. NO.

A1140

REV

A

SCALE: 1:1

WEIGHT:

SHEET 1 OF 2

REV	DATE	DESCRIPTION	BY	APPR

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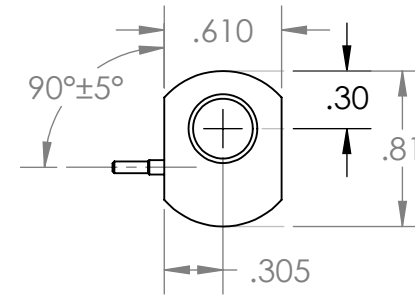
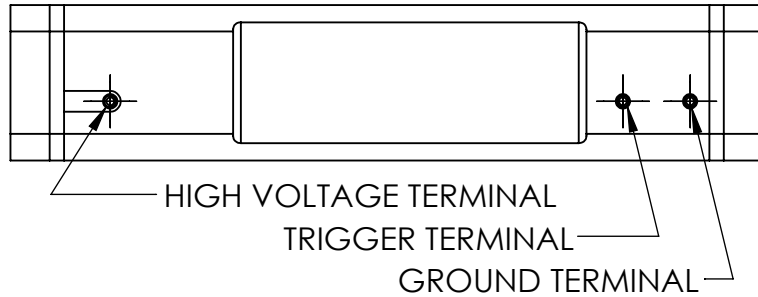
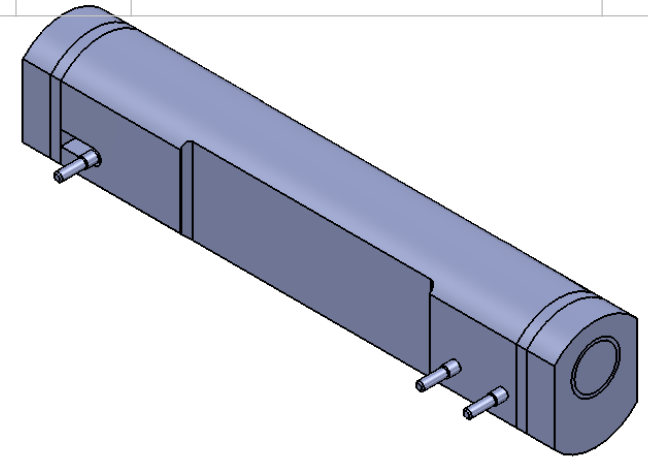
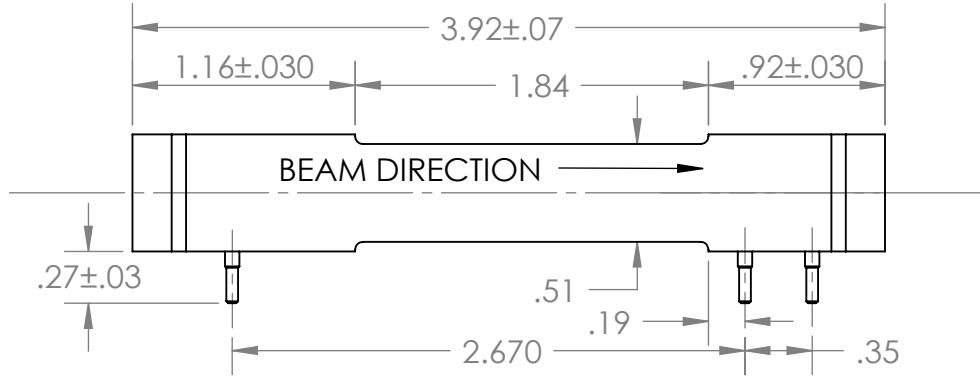
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2	9/8/88	CHANGED SLOT LENGTH FROM 2.02 TO 1.87	WVD
3	3/24/03	ADDED TOLERANCE DIMENSIONS	SAB

NOTE	DATE	DESCRIPTION	APPR



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TWO PLACE DECIMAL ±0.010		MFG APPR.	
THREE PLACE DECIMAL ±0.005		Q.A.	
INTERPRET GEOMETRIC TOLERANCING PER:		COMMENTS:	
MATERIAL			
GRADE "A" LAVA			
FINISH			
FIRED, AREMCO SEALED			
DO NOT SCALE DRAWING			

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TITLE:
OUTLINE, LASER HEAD/MK-367

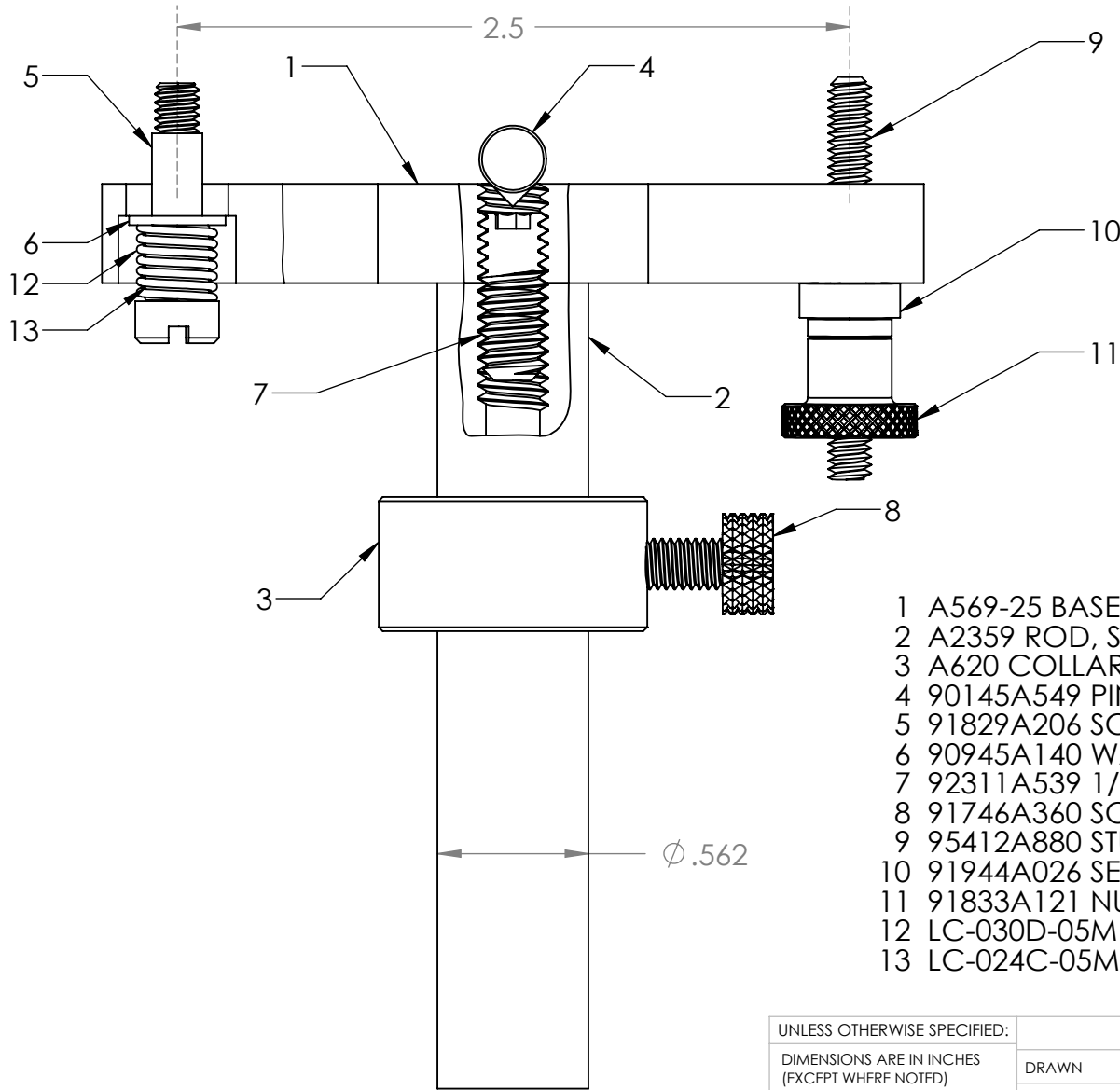
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1



- | | | |
|----|-------------------------------------|---------------|
| 1 | A569-25 BASEPLATE | - KIGRE |
| 2 | A2359 ROD, SUPPORT | - KIGRE |
| 3 | A620 COLLAR, SUPPORT | - KIGRE |
| 4 | 90145A549 PIN, DOWEL | - McMSTR CARR |
| 5 | 91829A206 SCREW, SHLD'R | - McMSTR CARR |
| 6 | 90945A140 WASHER, FLAT | - McMSTR CARR |
| 7 | 92311A539 1/4-20X5/8" S.S. | - McMSTR CARR |
| 8 | 91746A360 SCREW, THUMB | - McMSTR CARR |
| 9 | 95412A880 STUD, THD'D (NO SHOULDER) | - McMSTR CARR |
| 10 | 91944A026 SET, SWIV.WSH. | - McMSTR CARR |
| 11 | 91833A121 NUT, THUMB | - McMSTR CARR |
| 12 | LC-030D-05M SPRING, OUTER | - LEE SPRINGS |
| 13 | LC-024C-05M SPRING, INNER | - LEE SPRINGS |

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THREE PLACE DECIMAL ±0.005

INTERPRET GEOMETRIC
TOLERANCING PER:

MATERIAL

FINISH

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CHECKED	CRH	29 JUN 10
ENG APPR.		
MFG APPR.		
Q.A.		
COMMENTS:		

KIGRE, INC.

TITLE:

**PIVOTING BASEPLATE
FOR MK-367 LASER**

SIZE	DWG. NO.	REV
A	A617-2.5in	0

SCALE: 3:2	WEIGHT:	SHEET 1 OF 2
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REV	DATE	DESCRIPTION	BY	APPR

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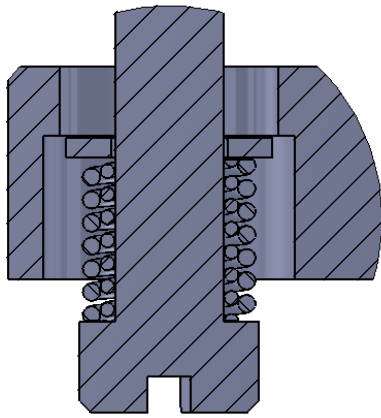
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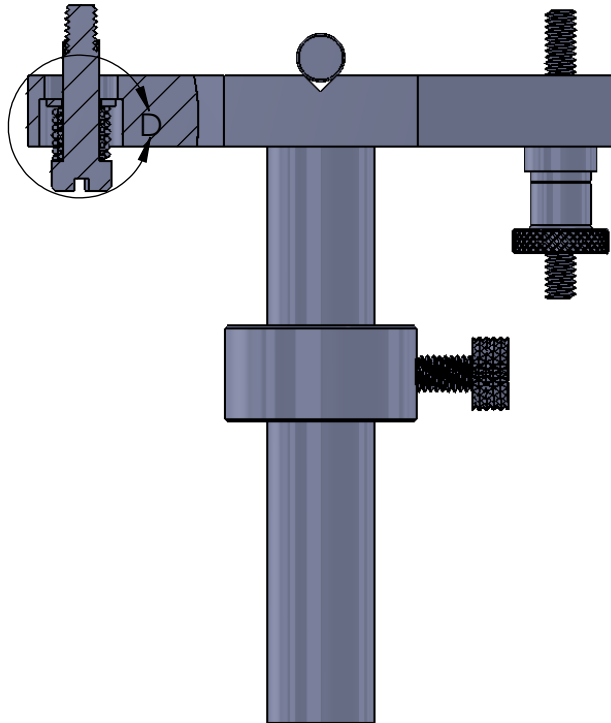
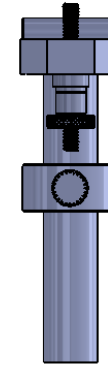
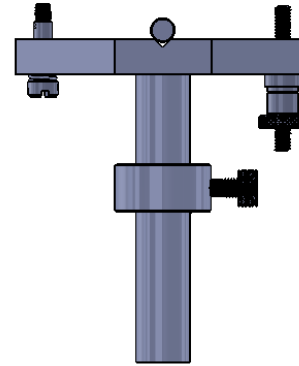
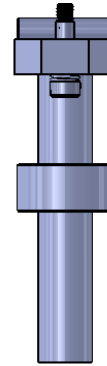
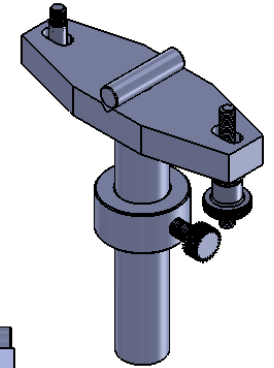
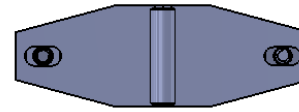
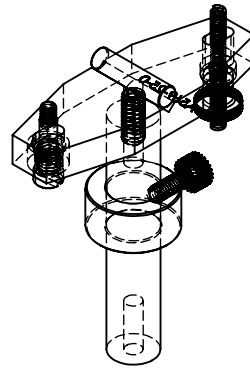
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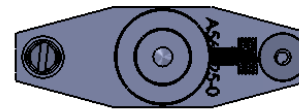
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DETAIL D
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SCALE 1 : 1



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THREE PLACE DECIMAL ±0.005

INTERPRET GEOMETRIC
TOLERANCING PER:

MATERIAL

FINISH

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NAME DATE

DRAWN CXY 29JUN10

CHECKED CRH 29JUN10

ENG APPR.

MFG APPR.

Q.A.

COMMENTS:

KIGRE, INC.

TITLE:

PIVOTING BASEPLATE
FOR MK-367 LASER

SIZE

A

DWG. NO.

A617

REV

0

SCALE: 1:2

WEIGHT:

SHEET 2 OF 2

REV	DATE	DESCRIPTION	BY	APPR

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