Engineering Change Notice

Definition

An ***Engineering Change Notice*** (ECN) is a document authorizing and recording design changes throughout the prototyping and life-cycle phases of a product. ECN documentation contains the justification for changes made to a component or system once the initial design is complete. It also forces changes to be approved by the relevant authorities (typically the project manager).

An ECN must contain at least the following information (Ullman 2009):

- Identification of what needs to be changed. This should include the part number and name of the component and reference to drawings showing the component in detail or assembly.
- Reason(s) for the change.
- Description of the change. This includes a drawing of the component before and after the change. The drawings must clearly show the detail(s) affected by the change.
- List of documents (and in industry, the departments) affected by the change. The most important part of making a change is ensuring all pertinent groups are notified and all documents updated.
- Approval of the change. As with the detail and assembly drawings, the changes must be approved by management.
- Instruction about when to introduce the change—immediately (scrapping current inventory), during the next production run, or at some other milestone.

Application for EML2322L

On any engineering project, the design work should conclude before manufacturing commences. Sometimes we rush through the design phase because we are excited to begin fabrication. Design changes made in the manufacturing phase are much more costly than changes made during the initial design phase. To prepare for what's expected of us in industry (and to do the best job possible during the initial design phase), teams must fill out an ECN for any change(s) made once the second design report is formally submitted. For EML2322L an ECN will contain the following information:

- Identification of what needs to be changed. This should include the component's name, part number and reference to the component's detail drawing(s).
- Reason(s) for change(s).
- Description of change(s). This includes a drawing of the component before (i.e. REV. A) and after the change (REV. B). *REV. is short for revision.*
- List of components and documents affected by the change (i.e. assembly drawing, B.O.M., other detail drawings, P.O., etc.). The most important part of making a change is ensuring all pertinent people are notified of changes that affect their component(s).
- Approval of the change. As with the detail and assembly drawings, the changes must be approved by management. For this course, "management" will comprise all group members plus the signature of the course instructor or TA.
- Instruction about introducing the change: modifying or eliminating an existing part, making a new part, etcetera.

Engineering Change Notice EXAMPLE

ENGINEERING CHANGE

ORIGINAL PART/DRAWING NAME/NO.	REVISION. NO.	PART DESCRIPTION	ECN NO.
EML2322L-020	A	wheel hub for Denso 150 rpm gearmotor	1
CHANGED PART/DRAWING NAME/NO.	REVISION. NO.		GROUP NO.
EML2322L-020	B	wheel hub for Entstort 44 rpm gearmotor	4B

REASON FOR CHANGE

After testing the robot, our group realized the Denso 150 rpm right angle motors coupled to 13.5" diameter wheels produce a robot that is too fast to control, given our ball manipulator design. Consequently, we decided to change the hub design so it is compatible with the 44 rpm Entstort motor shaft.

DESCRIPTION OF CHANGE

Since the 44 rpm Entstort motor shaft possesses splines, we are modifying the hub design shown in **Revision A** to engage these splines; this is accomplished by drilling a Ø0.394" (10mm) stepped bore into the motor-side of the hub, as shown in **Revision B**. The threaded portion of the motor shaft passes through the center hole which measures Ø0.315" (or 8mm) and a Ø0.75" counterbore is added on the wheel-side of the hub to allow a nut to be inserted onto the M8 threaded motor shaft and tightened with a socket.

AFFECTED DOCUMENTS & PARTS

- ☒ PURCHASE ORDER(S)
- ☒ ASSEMBLY DRAWING(S)
- ☒ BILL OF MATERIALS (BOM)
- ☐ OTHER PARTS (LIST NAMES):

ORIGINATOR NAME (#1)	SIGNATURE:	DATE
James Keith	***James Keith***	6/23/15

APPROVAL

REQUIREMENTS

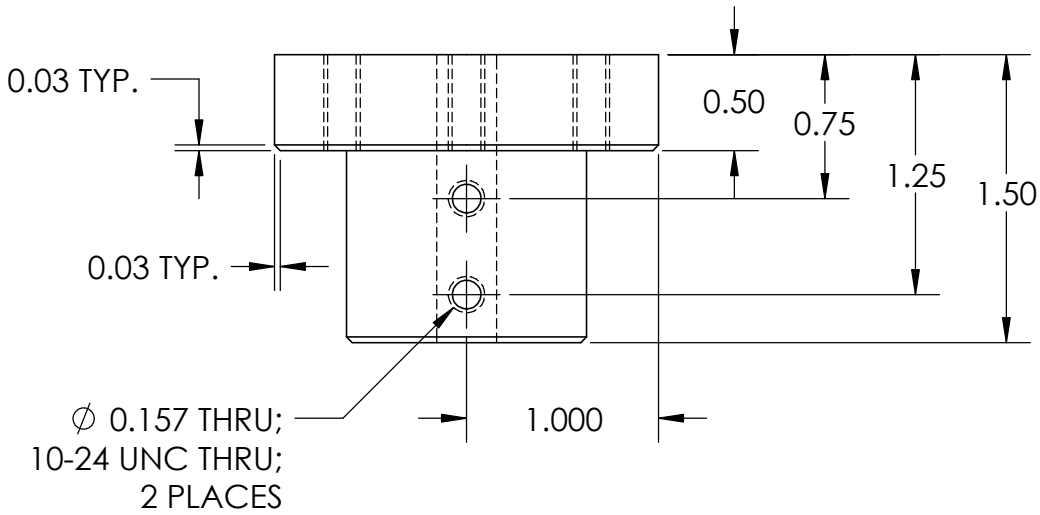
IS THE ECN FILLED OUT *COMPLETELY?*	☒ YES ☐ NO	DUE DATE
IS THE *ORIGINAL DRAWING* ATTACHED?	☒ YES ☐ NO	6/30/15
IS THE *UPDATED DRAWING* ATTACHED?	☒ YES ☐ NO	
IS THE *DUE DATE* UNDERSTOOD BY THE TEAM?	☒ YES ☐ NO	

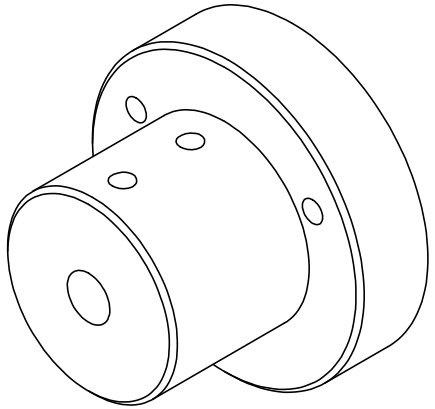
EXECUTION

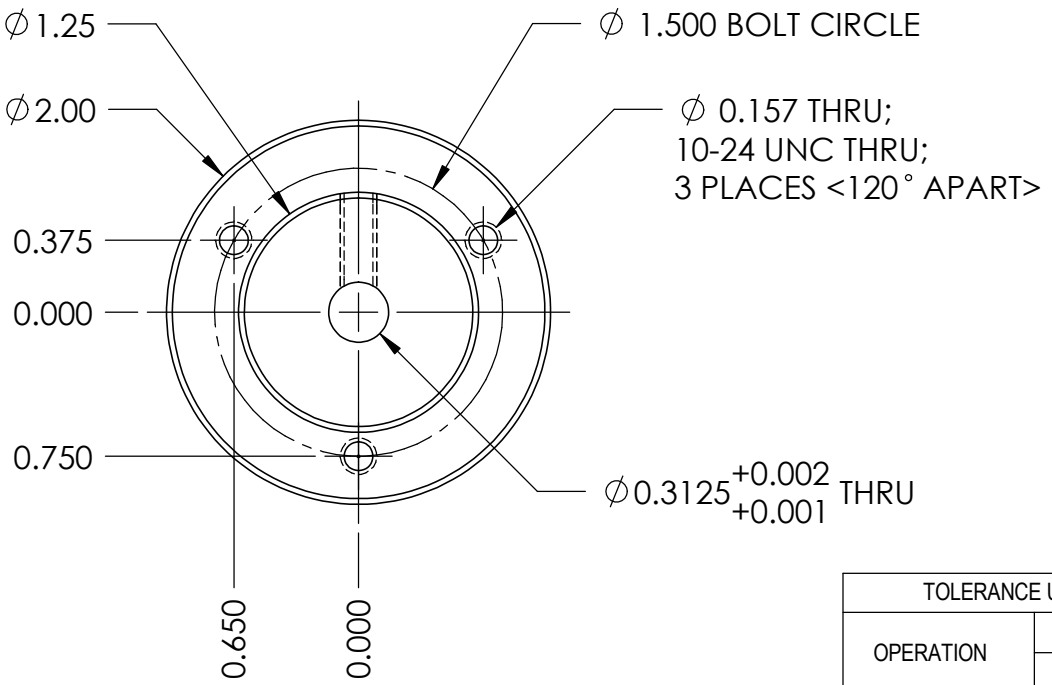
- ☒ A – MODIFY EXISTING PART
- ☒ B – CREATE NEW PART
- ☐ C – SCRAP EXISTING PART (IF MANUFACTURING ALREADY COMMENCED)
- ☒ D – DELETE EXISTING PART (IF MANUFACTURING HASN'T COMMENCED)

GROUP MEMBER NAME (#2)	SIGNATURE:	DATE
Adam Glintz	***Adam Glintz***	6/27/15
GROUP MEMBER NAME (#3)	SIGNATURE:	DATE
Jeff Koch	***Jeff Koch***	6/27/15
GROUP MEMBER NAME (#4)	SIGNATURE:	DATE
Josh Gordon	***Josh Gordon***	6/27/15
TA NAME	SIGNATURE:	DATE
Bill Hollon	***Bill Hollon***	6/30/15

NOTE: This ECN example is typed for clarity. Your group's ECNs may be hand written for convenience using the blank template included as the last page of this handout.





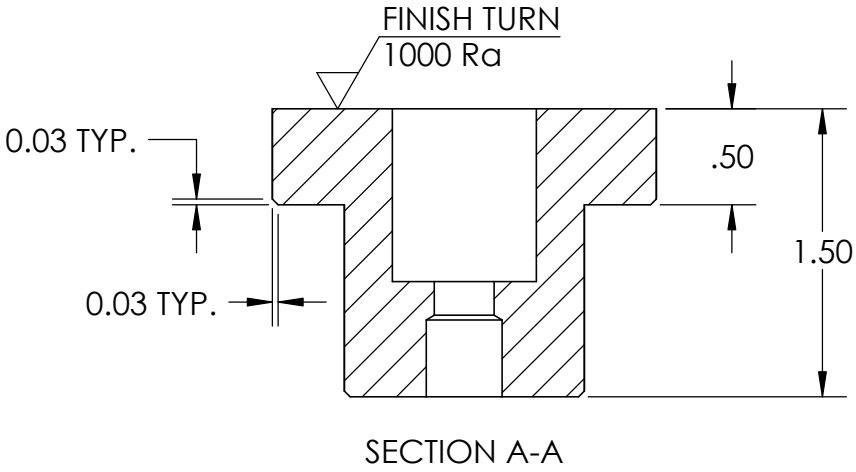


NOTES:

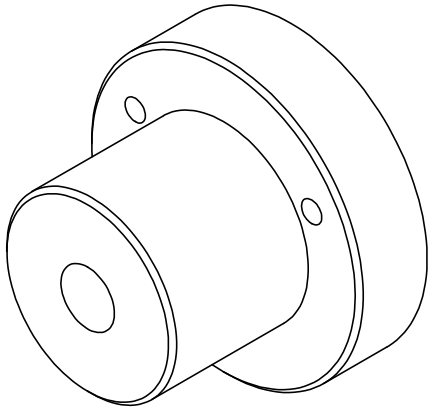
1. QTY: 1
2. ALL DIMS IN INCHES
3. MATL: ALUMINUM
4. FINISH ALL SURFACES
5. BREAK ALL EDGES

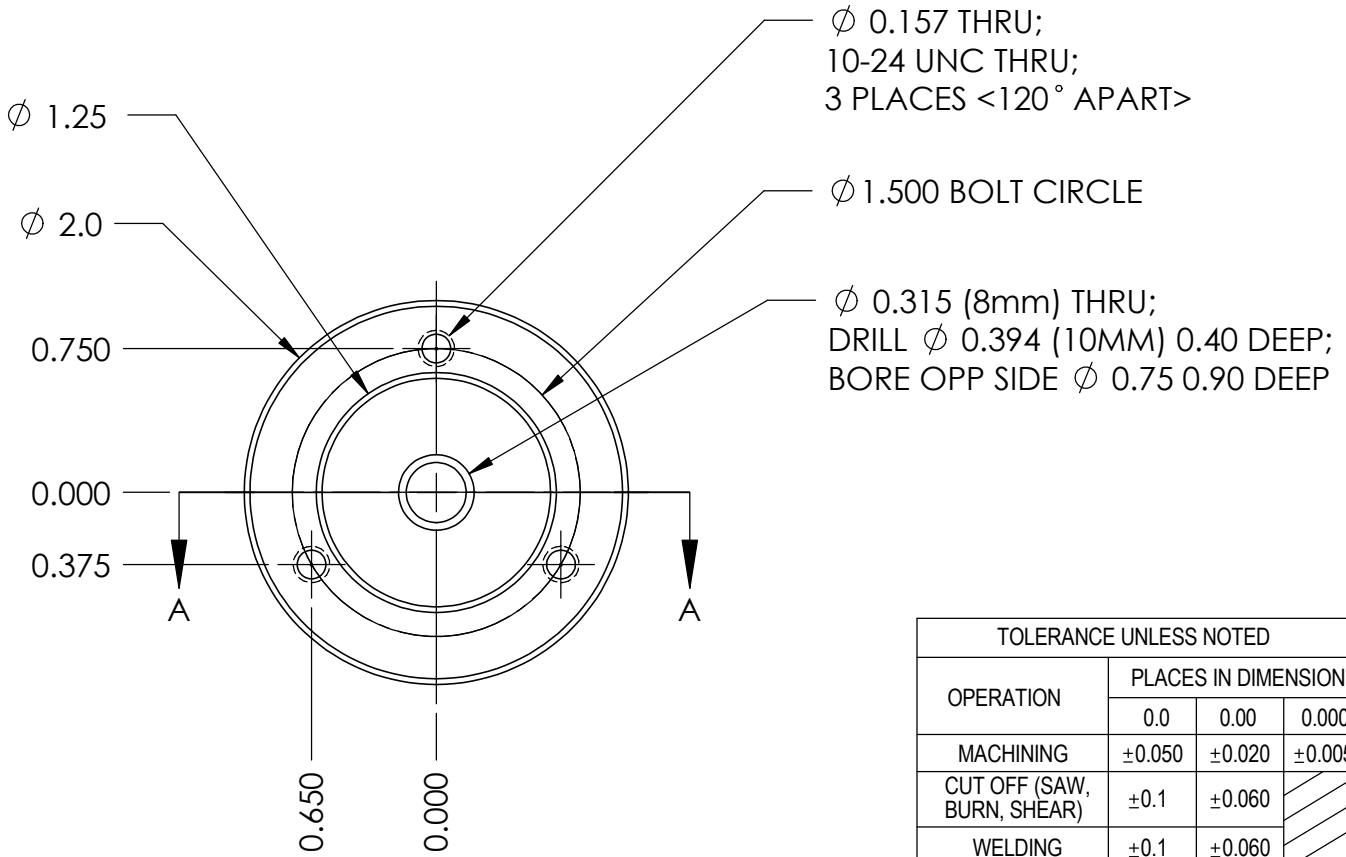
TOLERANCE UNLESS NOTED				TITLE: WHEEL HUB		
OPERATION	PLACES IN DIMENSION					
	0.0	0.00	0.000	DRAWN M. BRADDOCK		
MACHINING	±0.050	±0.020	±0.005	DESIGNED J. KOCH		
CUT OFF (SAW, BURN, SHEAR)	±0.1	±0.060		SIZE A	DWG. NO. EML2322L-020	REV A
WELDING	±0.1	±0.060				
ANGULAR DIMS	±5	±2	±0.5	SCALE: 1:1		SHEET 1 OF 1

4 3 2 1



SECTION A-A





NOTES:

1. QTY: 2
2. ALL DIMS IN INCHES
3. MATL: ALUMINUM
4. FINISH NOTED SURFACE(S)
5. BREAK ALL EDGES

TOLERANCE UNLESS NOTED				TITLE: ENTSTORT WHEEL HUB		
OPERATION	PLACES IN DIMENSION					
	0.0	0.00	0.000	DRAWN	M. BRADDOCK	
MACHINING	±0.050	±0.020	±0.005	CHECKED	J. KOCH	
CUT OFF (SAW, BURN, SHEAR)	±0.1	±0.060		SIZE	DWG. NO.	REV
WELDING	±0.1	±0.060		A	EML2322L-020	B
ANGULAR DIMS	±5	±2	±0.5	SCALE: 1:1		SHEET 1 OF 1

4 3 2 1

Engineering Change Notice

ENGINEERING CHANGE			
ORIGINAL PART/DRAWING NAME/NO.	REVISION. NO.	PART DESCRIPTION	ECN NO.
CHANGED PART/DRAWING NAME/NO.	REVISION. NO.		GROUP NO.
REASON FOR CHANGE			
DESCRIPTION OF CHANGE			
AFFECTED DOCUMENTS & PARTS	☐ PURCHASE ORDER(S) * ☐ ASSEMBLY DRAWING(S) * ☐ BILL OF MATERIALS (BOM) *	☐ OTHER PARTS (LIST NAMES):	
ORIGINATOR NAME (#1)	SIGNATURE:		DATE / /

APPROVAL			
REQUIREMENTS	IS THE ECN FILLED OUT *COMPLETELY?* IS THE *ORIGINAL DRAWING* ATTACHED? IS THE *UPDATED DRAWING* ATTACHED? IS THE *DUE DATE* UNDERSTOOD BY THE TEAM?	☐ YES ☐ NO ☐ YES ☐ NO ☐ YES ☐ NO ☐ YES ☐ NO	DUE DATE / /
EXECUTION	☐ A – MODIFY EXISTING PART ☐ B – CREATE NEW PART	☐ C – SCRAP EXISTING PART (IF MANUFACTURING ALREADY COMMENCED) ☐ D – DELETE EXISTING PART (IF MANUFACTURING HASN'T COMMENCED)	

GROUP MEMBER NAME (#2)	SIGNATURE:	DATE / /
GROUP MEMBER NAME (#3)	SIGNATURE:	DATE / /
GROUP MEMBER NAME (#4)	SIGNATURE:	DATE / /
GROUP MEMBER NAME (#5)	SIGNATURE:	DATE / /
TA NAME	SIGNATURE:	DATE / /

* NOTE: ECNs submitted for EML2322L only need to include the affected detail part drawings; other documents affected by the changes / corrections (such as purchase orders, budgets, assembly drawings and BOMs) should be updated and submitted in lab the day of your group's final competition, as noted in the **Design Report Template**.