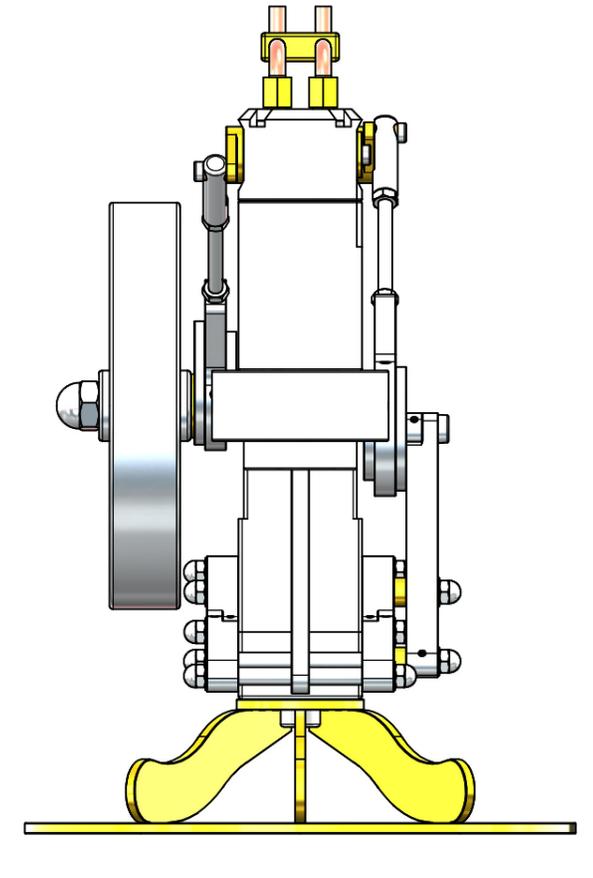
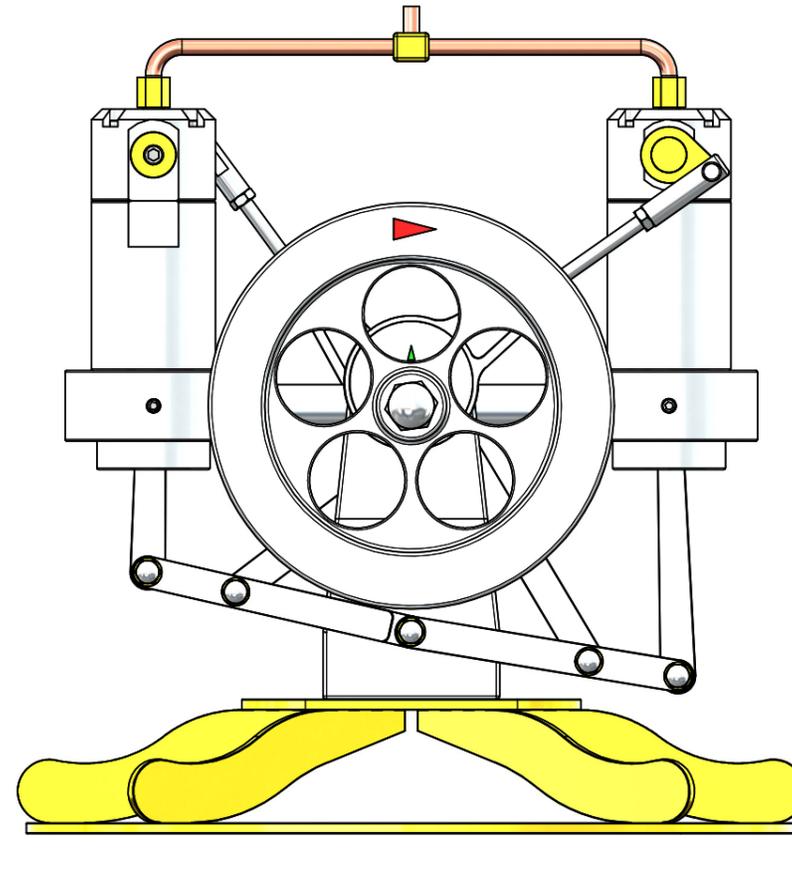
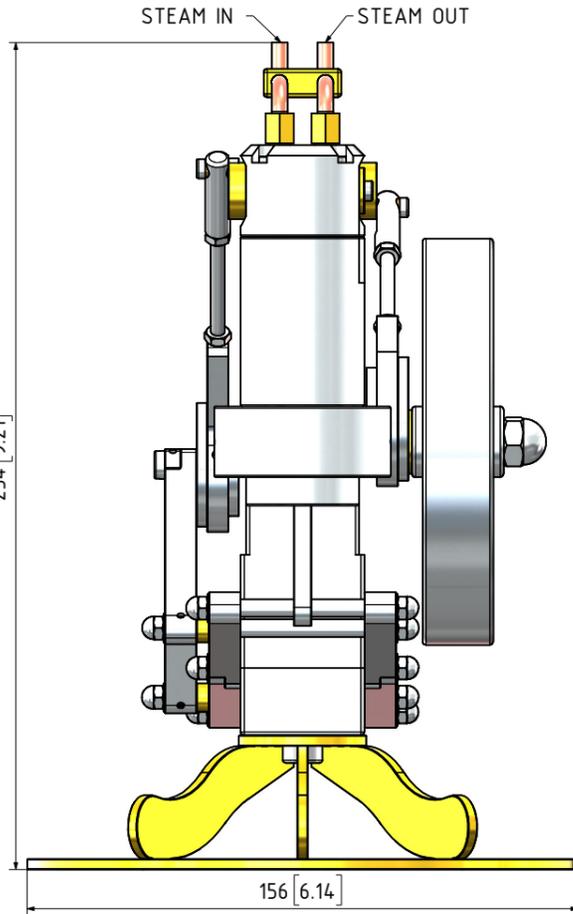
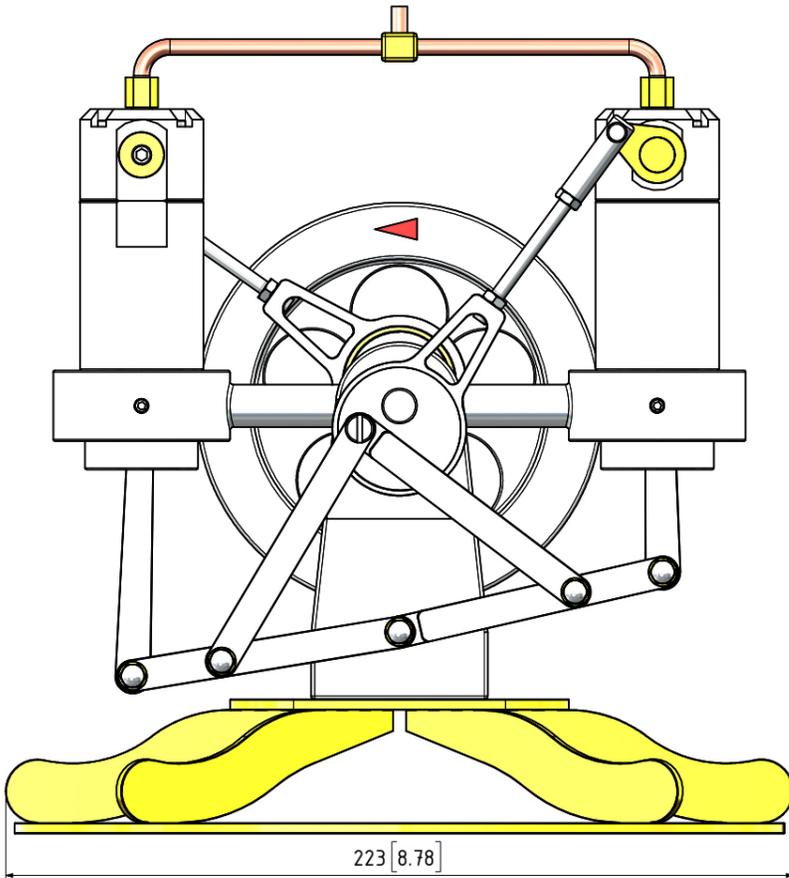


OTHER ABBREVIATIONS  
 AS = AS SHOWN  
 DP = DEEP  
 DAA= DRILL AFTER ASSEMBLY  
 D&TAA= DRILL AND TAP AFTER ASSEMBLY  
 CF = CLOSE FIT (SIZE FOR SIZE)  
 PF = PRESS FIT  
 PFAA= PRESS FIT AFTER ASSEMBLY  
 PCD = PITCH CIRCLE DIAMETER  
 RM = REAM  
 HEX = HEXAGON, 6SIDED  
 CP = COMPRESSED  
 KNL = KNURLED  
 CSK = COUNTERSINK  
 PL = PLACES  
 DWL= DOWEL  
 SPF= SPOTFACE  
 (T)HESOP=(TAPPED)HOLES EQUALLY SPACED ON PCD  
 (T)HESOC=(TAPPED)HOLES EQUALLY SPACED ON CIRCUMFERENCE  
 OD = OUTSIDE DIAMETER  
 ID = INSIDE DIAMETER  
 MAX/MIN = CRITICAL DIMENSION  
 [SA-xxx]= SUB ASSEMBLY-xxx

MATERIAL ABBREVIATIONS:  
 ALU = ALUMINIUM  
 HALU= HARD ALUMINIUM  
 BRS = BRASS  
 PBRZ= PHOSPHORE BRONZE  
 BRZ = BRONZE OR GUNMETAL (BRZ/GM)  
 OLT = OILITE  
 CI = CAST IRON  
 CU = COPPER  
 GRA = GRAPHITE  
 MS = MILD STEEL/BRIGHT MILD STEEL  
 SS = SILVER STEEL OR STAINLESS STEEL  
 SPS = SPRING STEEL  
 PEEK= POLYETHER ETHER KETONE  
 SYN = SYNTHETIC MATERIAL SUCH AS VETON,  
 NYLON, TEFLON OR RUBBER  
 IN GENERAL SYNTHETIC MATERIALS  
 SHOULD BE ABLE TO WITHSTAND THE  
 HEAT AND PRESSURE(S) APPLIED TO  
 THEM.  
 nnn/nnn MEANS THAT EITHER MATERIAL CAN  
 BE USED

QTY.	PART NUMBER
1	09C-70-00-1-01-BASE RING
6	09C-70-00-1-02-BASE LEG
1	09C-70-00-1-03-BASE LEG PLATFORM
1	09C-70-00-1-04-ENGINE MOUNTING BODY
1	09C-70-00-1-05-STEAM IN-OUT PIPING
1	09C-70-00-2-01-CRANK SHAFT+FLYWHEEL
1	09C-70-00-2-02A-ECCENTRIC-1
1	09C-70-00-2-02B-CRANK PLATE
1	09C-70-00-2-03-ROCKING BEAMS TYPE-1
1	09C-70-00-2-04-ROCKING BEAMS TYPE-2
2	09C-70-00-2-05-CRANK CON-ROD
2	09C-70-00-2-06-PISTON
2	09C-70-00-2-07-PISTON ROD
2	09C-70-00-2-08-ROCKING VALVE
2	09C-70-00-2-09-ECCENTRIC STRAP
8	09C-70-00-M3x30 A-K CYL HEAD SCREW
10	09C-70-00-M4 DOME NUT
4	09C-70-00-M4 NUT
10	09C-70-00-M4 WASHER
2	09C-70-00-M4x16 A-K GRUB SCREW
2	09C-70-00-M4x8 A-K CYL HEAD SCREW
4	09C-70-00-M4x9 A-K GRUB SCREW
1	09C-70-00-M5x10 A-K GRUB SCREW
1	09C-70-00-M8 DOME NUT
2	09C-70-00-M8x18 A-K CYL HEAD SCREW



- GENERAL NOTES:
- ALL DRAWINGS ARE IN METRIC MEASUREMENTS
  - ALL ENGINEERING PRACTICES SHALL BE APPLIED WITH REGARDS TO HOLE AND SHAFT TOLERANCES.
  - WHERE SCREWS OR BOLTS ARE USED THE CLEARANCE HOLES SHALL BE APPROXIMATELY 5% TO 8% LARGER THAN THE MATCHING TAPPED HOLE.
  - PREFERABLY ALL TAPPED HOLES AND MATCHING SCREWS AND/OR BOLTS TO BE METRIC FINE (MF)
  - MATERIALS SPECIFIED ON THE DRAWINGS ARE INDICATIVE ONLY. THE BUILDER CAN MAKE HIS/HER OWN MATERIAL CHOICE.
  - ALL CONNECTIONS/JOINTS WHICH HAVE STEAM PRESSURE APPLIED TO IT SHALL BE SILVER/HARD SOLDERED.
  - COMPRESSION SPRINGS ARE DRAWN IN COMPRESSED STATE (CP), UNCOMPRESSED STATE IS APPROX 40% TO 60% LONGER THEN COMPRESSED STATE.
  - WHERE PREFERRED SCREW OR RIVETED CONNECTIONS CAN BE OMITTED AND PARTS CAN BE BONDED TOGETHER BY USING EITHER HIGH STRENGTH GLUE, EPOXY RESIN, OR SOLDER.
  - PARTS WHICH ARE DIRECTLY EXPOSED TO STEAM AND/OR WATER SHOULD BE CONSTRUCTED USING NON-FERROUS OR NON CORROSIVE MATERIAL SUCH AS BRASS, BRONZE, GUNMETAL, STAINLESS STEEL, COPPER OR MONEL.
  - THE ORDER IN WHICH THE PARTS/COMPONENTS ARE MANUFACTURED AND THE MODEL IS ASSEMBLED IS ENTIRELY LEFT TO THE BUILDER/MODEL MAKER.
  - A COLOUR SCHEME FOR THIS PROJECT IS ENTIRELY LEFT UP TO THE MODEL MAKER.
  - THE MANNER IN WHICH THE PARTS/COMPONENTS ARE MANUFACTURED IS ENTIRELY LEFT UP TO THE BUILDER.
  - USE LOCTITE, ON SCREW OR PRESS FIT CONNECTIONS OR SURFACES, WERE DEEMED NECESSARY TO PREVENT PARTS FROM LOOSENING.
  - WASHERS AND/OR SPRING WASHERS SHALL BE USED WHERE DEEMED NECESSARY.
  - USE SEALING GASKETS WERE DEEMED NECESSARY.
  - REMOVE ALL SHARP EDGES
  - XX. ERRORS AND/OR OMISSIONS MAY OCCUR IN THE DRAWINGS, DO NOT HESITATE TO CONTACT ME SO THAT THE ERRORS/OMISSIONS CAN BE RECTIFIED.

DUE TO THE LACK OF INFORMATION ON THE ORIGINAL DRAWING(S), SUCH AS VIEWS, DIMENSIONS, SECTIONS ETC AND/OR CLARITY OF COMPONENTS, OMITTED PARTS/COMPONENTS, SOME OF THE COMPONENTS MIGHT NOT BE AS CONSTRUCTED ORIGINALLY OR AS THE ORIGINAL DESIGNER INTENDED

NOTES: FOUND THE ORIGINAL DRAWINGS ON THE INTERNET. THE DRAWINGS WERE DRAWN BY: 'VEDER', DATED 5/12/2024, DRAWING TITLE : "DOUBLE GRASSHOPPER MINIATURE STEAM ENGINE". DRAWINGS HAVE BEEN CONVERTED FROM IMPERIAL TO METRIC. SOME PART APPEARANCES MAY DIFFER

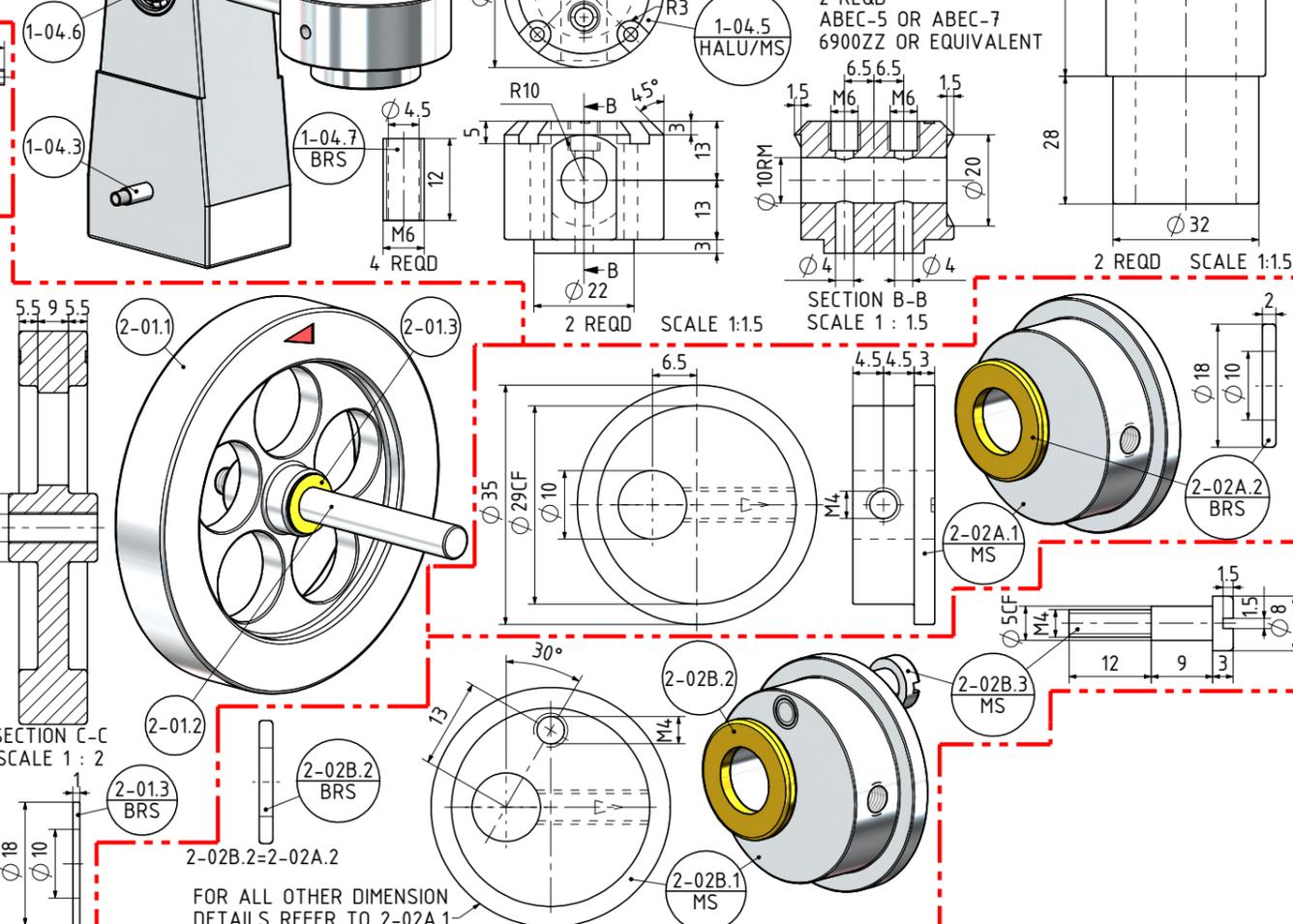
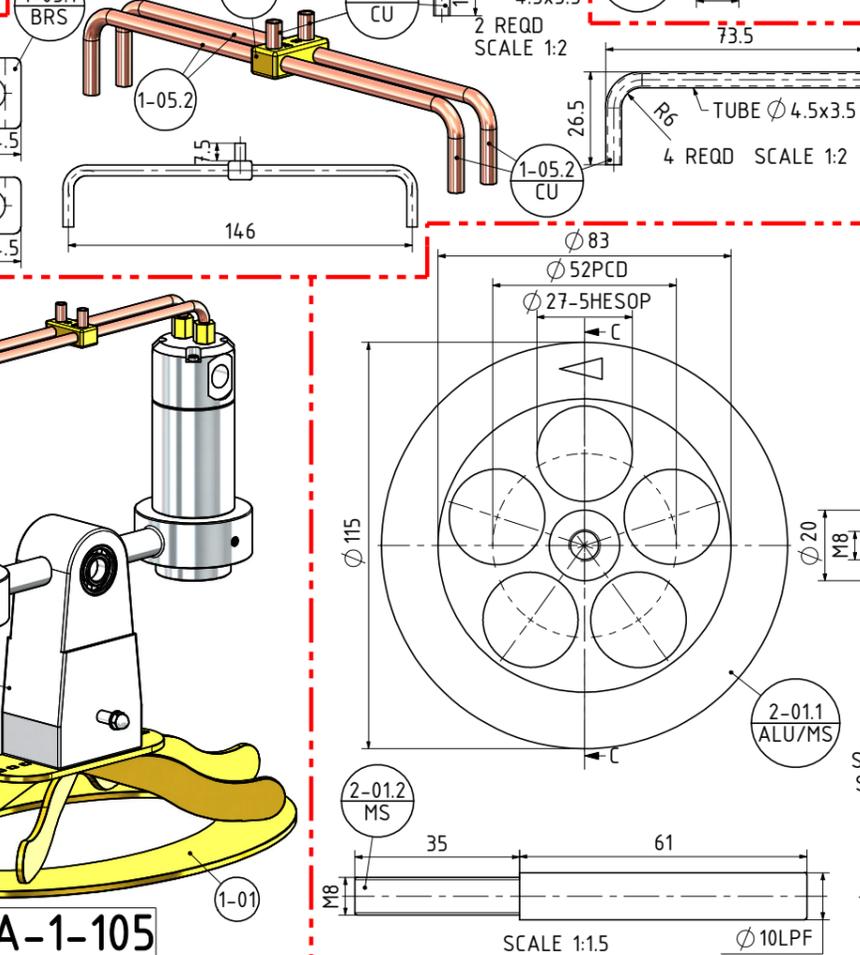
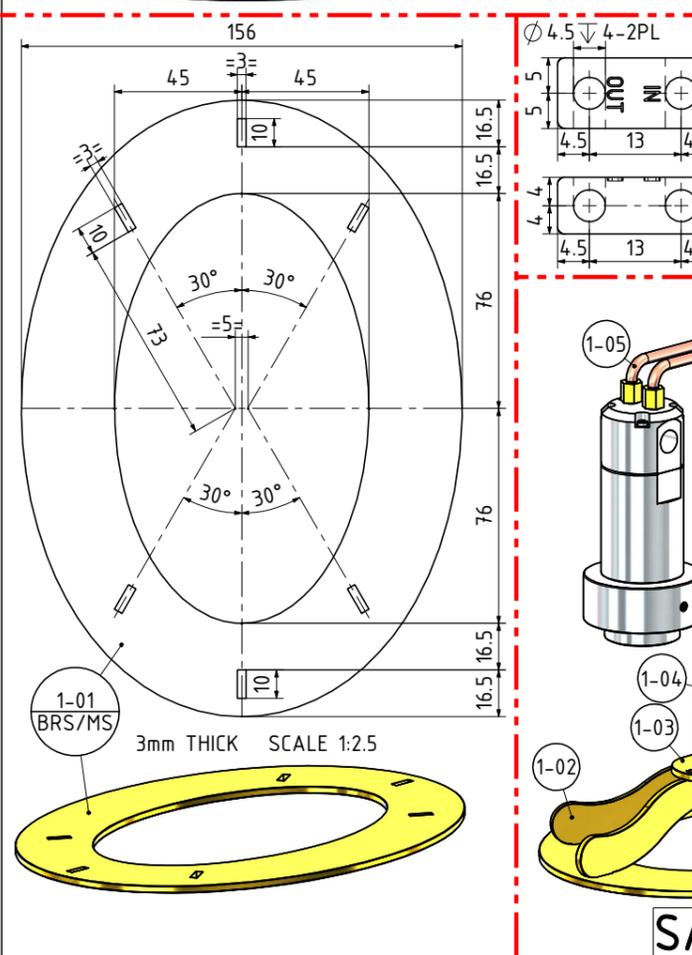
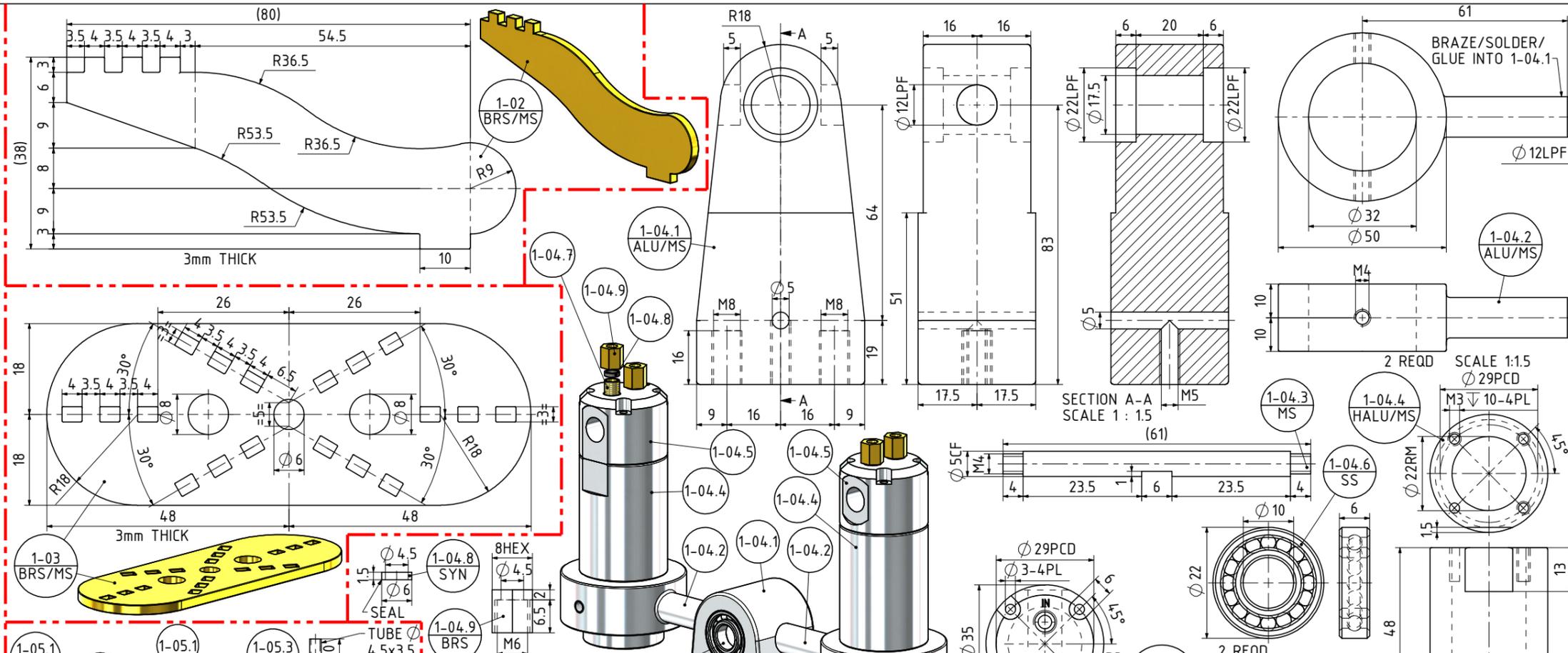
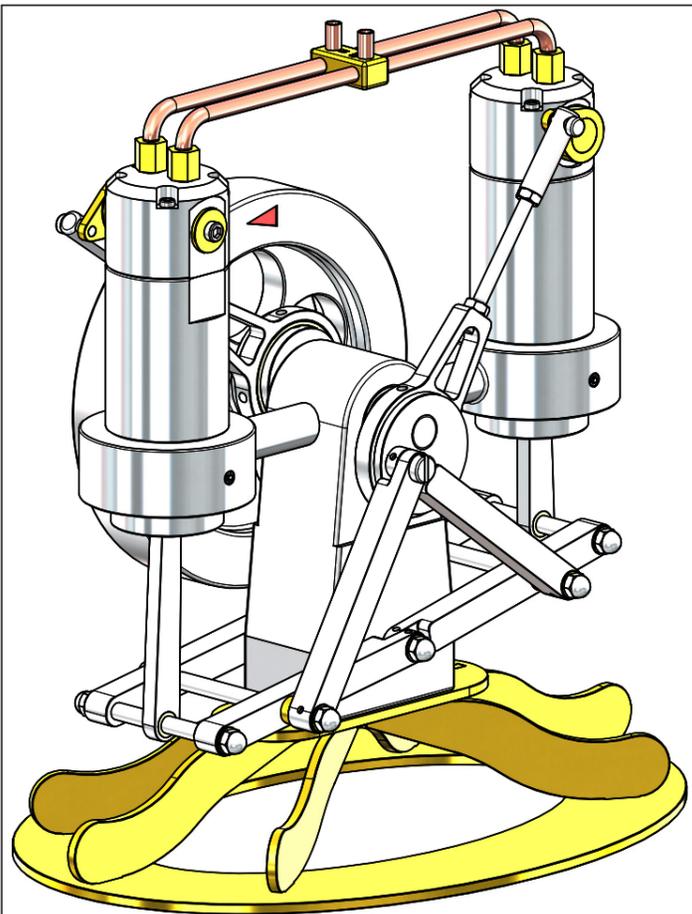
TITLE  
**2 CYLINDER VERTICAL NON REVERSABLE STEAM ENGINE. (GRASSHOPPER TYPE)**

DRAWING CONTENTS  
**GENERAL ARRANGEMENT, NOTES, BILL OF MATERIALS.**

PROJECT No 09C-70-00  
 JDW DRAUGHTING SERVICES  
 J.A.M. DE WAAL, 12 BRIGHTWELL STREET PAPA KURA  
 2110, NEW ZEALAND. PHONE: 0064 09 2988815. MOB:  
 0211791000 E-MAIL: dewaal@xtra.co.nz.

PROJECTION  
**JDWDS**  
 DATE JULY 2025  
 SHEET: 01 OF 03

MODEL SCALE: 1:1  
 DWG SCALE: 1:1 @A3 OR AS SHOWN  
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**A3 No:09C-70-00-SHT-01**



NOTES: FOUND THE ORIGINAL DRAWINGS ON THE INTERNET. THE DRAWINGS WERE DRAWN BY: 'VEDER', DATED 5/12/2024, DRAWING TITLE : "DOUBLE GRASSHOPPER MINIATURE STEAM ENGINE". DRAWINGS HAVE BEEN CONVERTED FROM IMPERIAL TO METRIC. SOME PART APPEARANCES MAY DIFFER

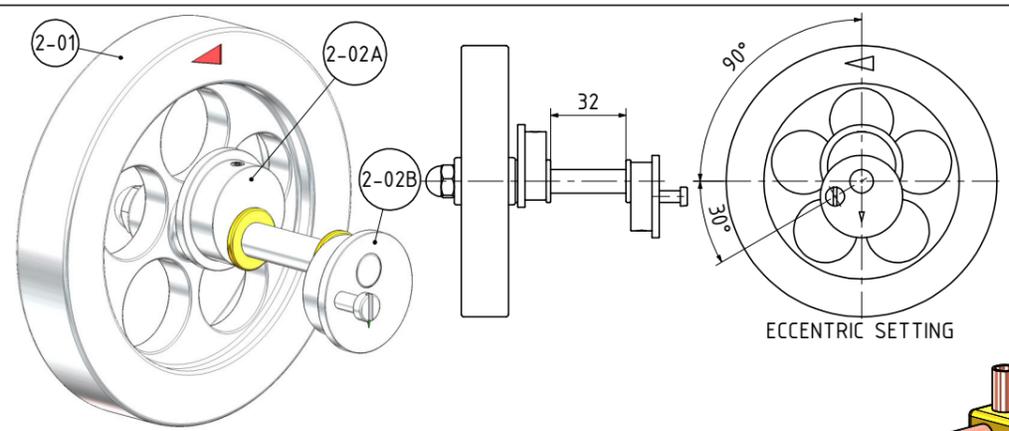
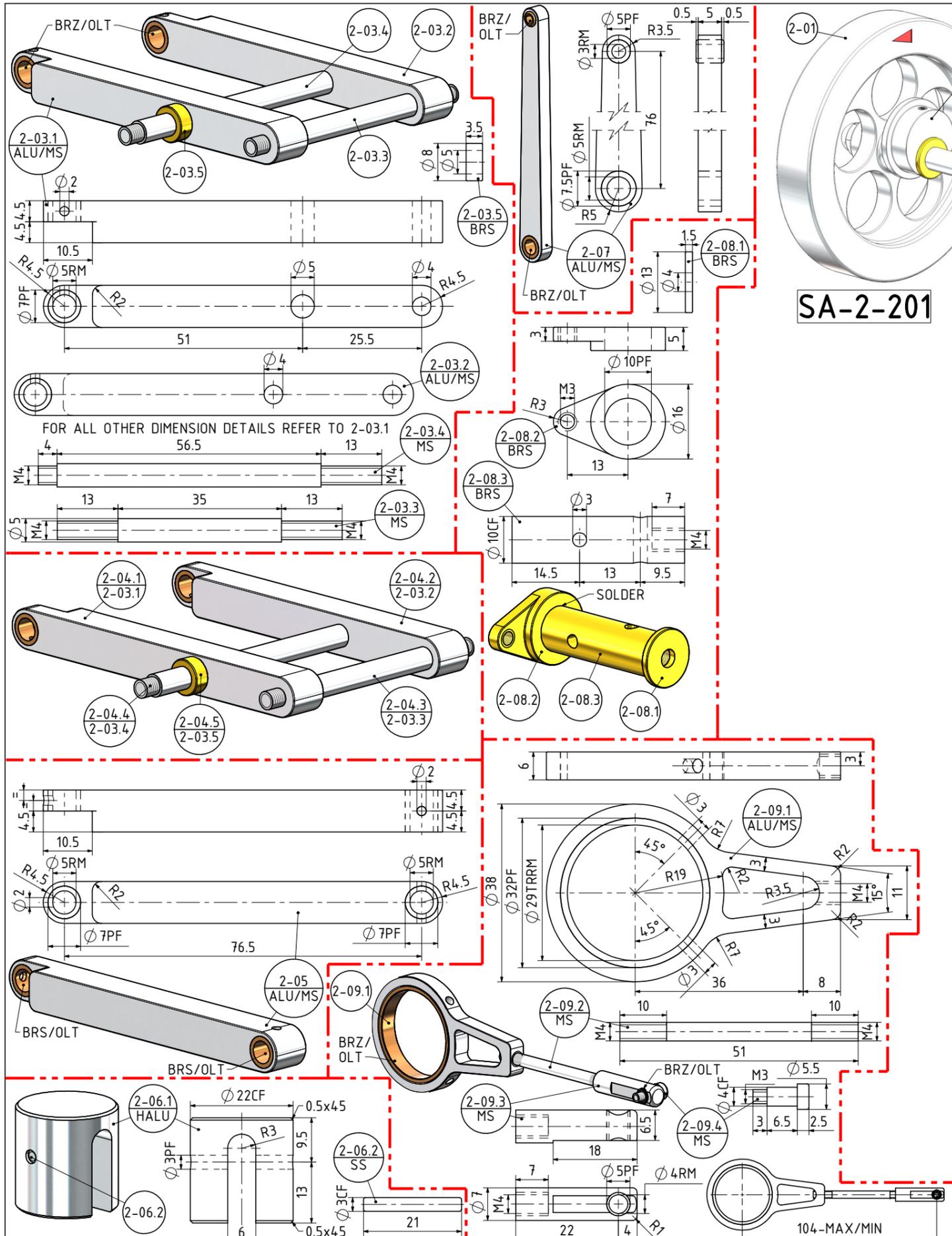
TITLE  
**2 CYLINDER VERTICAL NON REVERSABLE STEAM ENGINE. (GRASSHOPPER TYPE)**

DRAWING CONTENTS  
**ISOMETRIC VIEW, PARTS AND ASSEMBLIES**

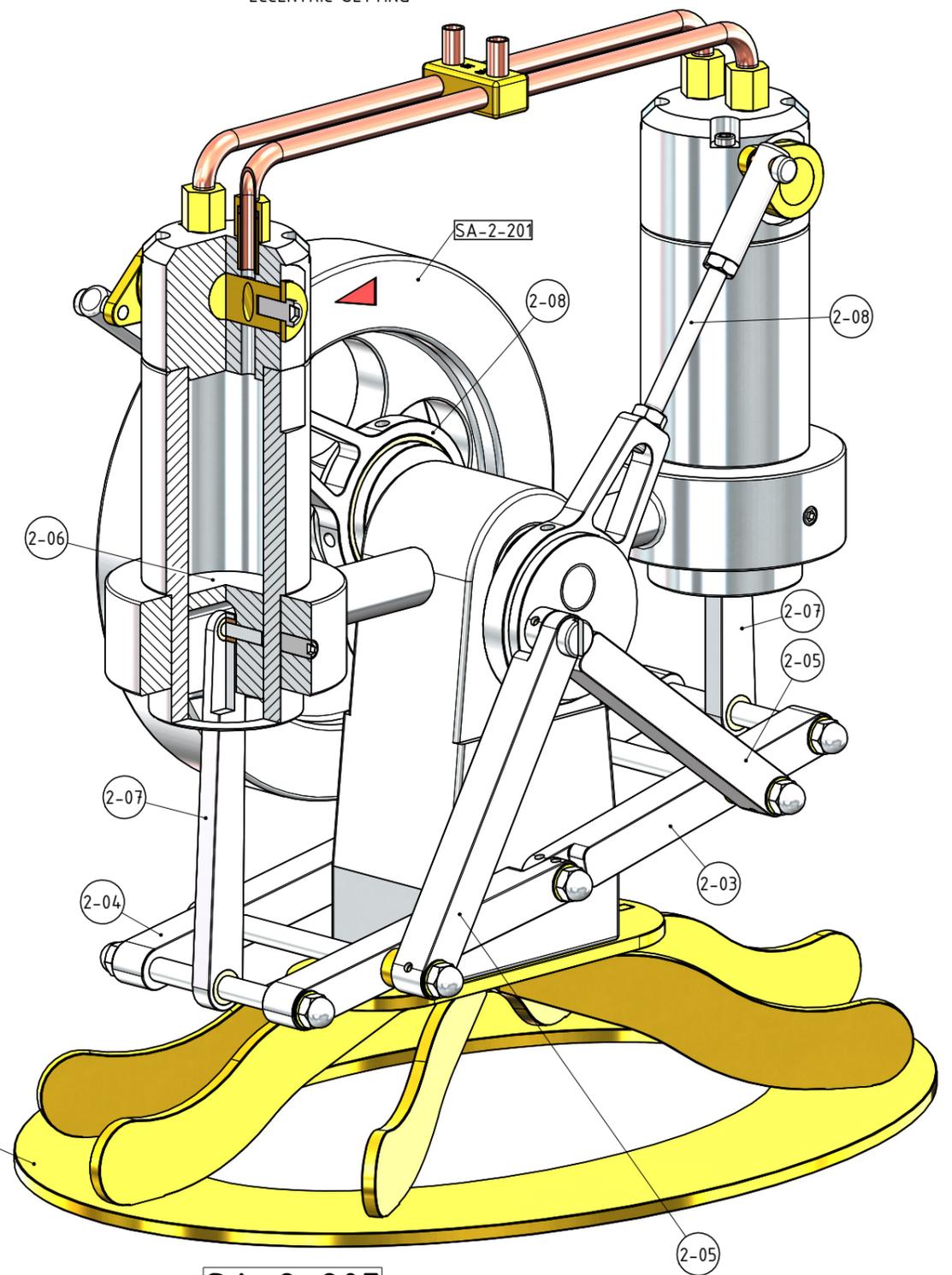
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 JDW DRAUGHTING SERVICES  
 J.A.M. DE WAAL, 12 BRIGHTWELL STREET PAPAOKURA  
 2110, NEW ZEALAND. PHONE: 0064 09 2988815. MOB: 0211791000 E-MAIL: dewaal@xtra.co.nz.

PROJECTION  
**JDWDS**  
 DATE JULY 2025  
 SHEET: 02 OF 03  
 MODEL SCALE: 1:1  
 DWG SCALE: 1:1 @A3 OR AS SHOWN  
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**SA-2-201**



**SA-2-205**

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TITLE  
**2 CYLINDER VERTICAL NON REVERSABLE STEAM ENGINE. (GRASSHOPPER TYPE)**

DRAWING CONTENTS  
**PARTS AND ASSEMBLIES**

PROJECT No 09C-70-00  
 JDW DRAUGHTING SERVICES  
 J.A.M. DE WAAL, 12 BRIGHTWELL STREET PAKAPURA  
 2110, NEW ZEALAND. PHONE: 0064 09 2988815. MOB: 0211791000 E-MAIL: dewaal@xtra.co.nz.

PROJECTION  
**JDWDS**  
 DATE JULY 2025

MODEL SCALE: 1:1  
 DWG SCALE: 1:1 @A3 OR AS SHOWN  
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