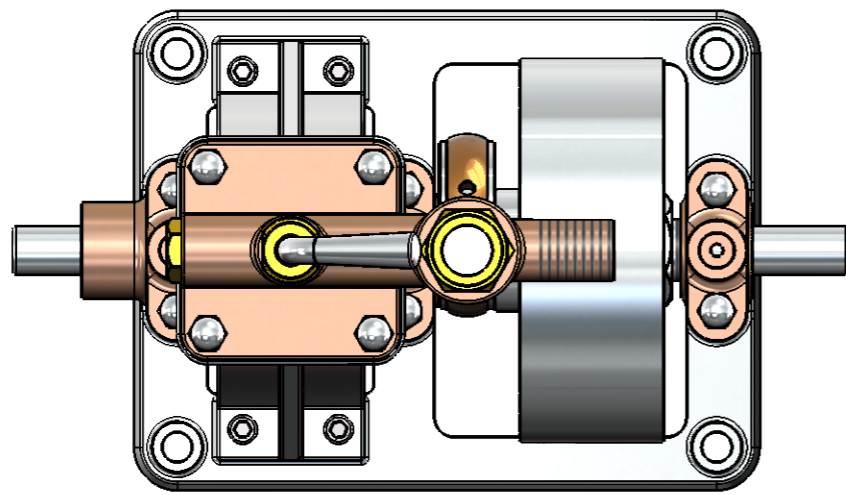


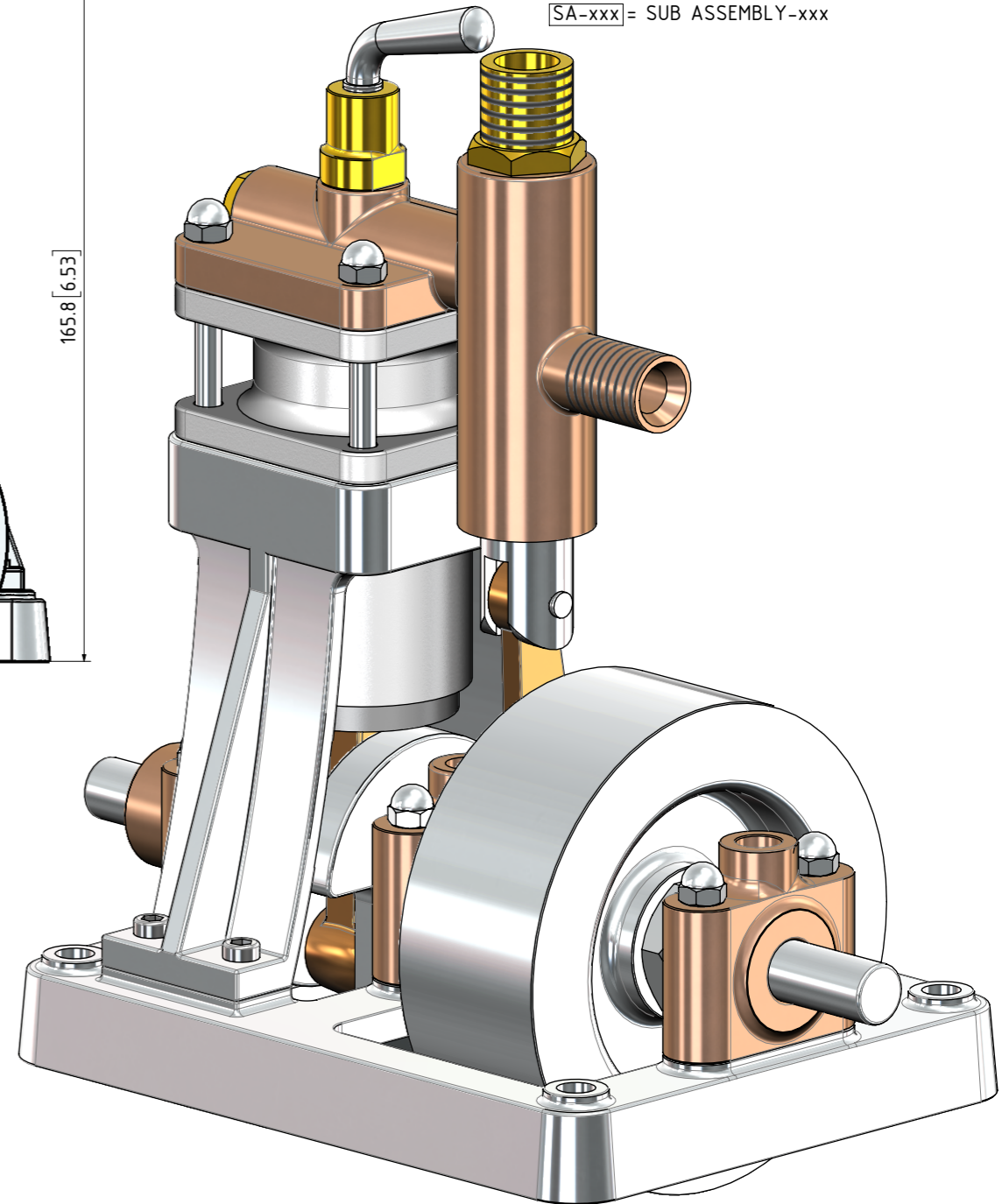
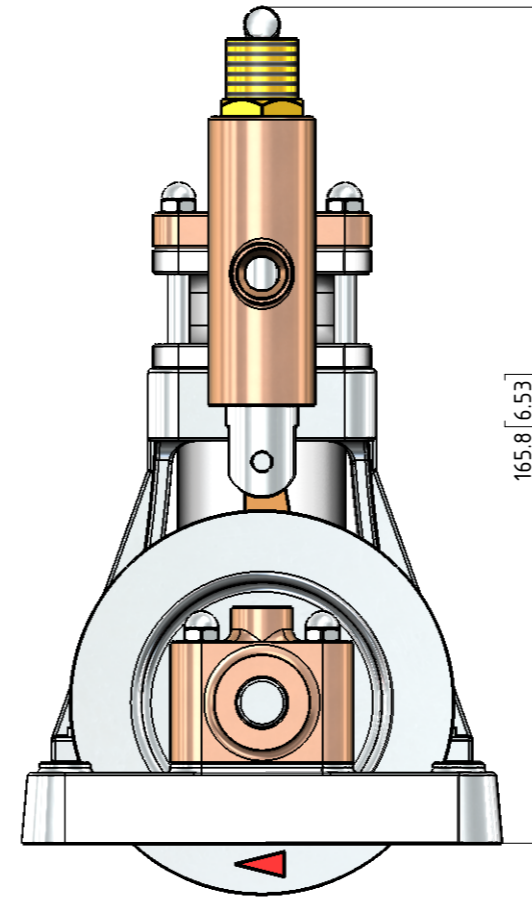
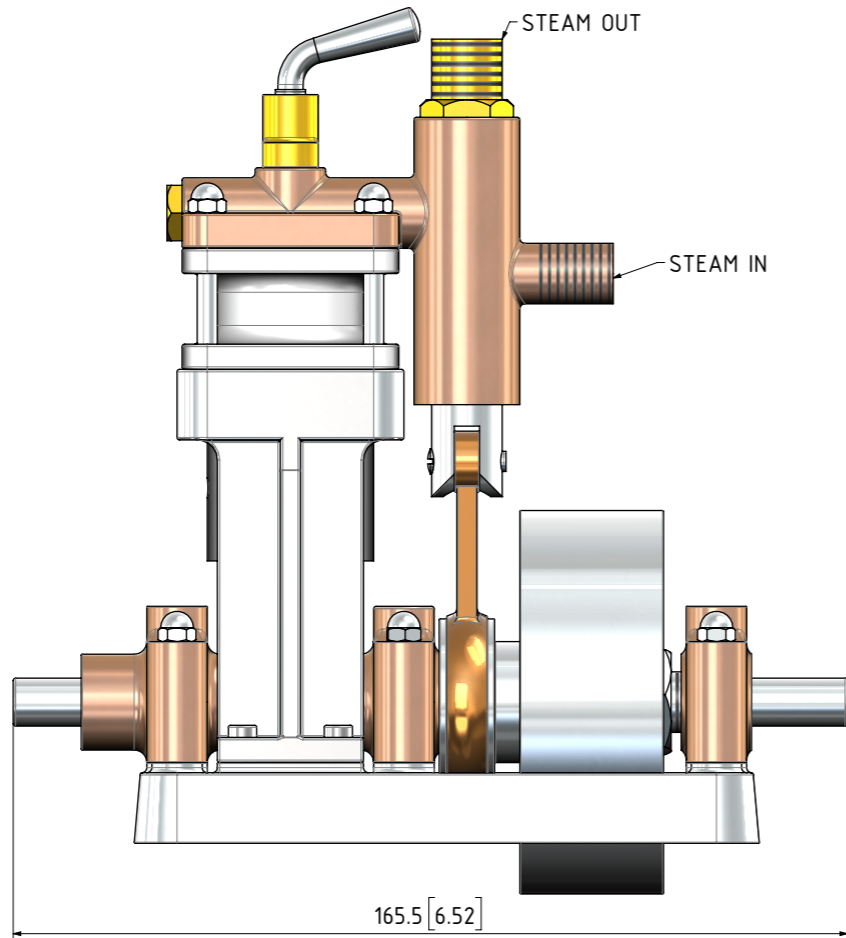
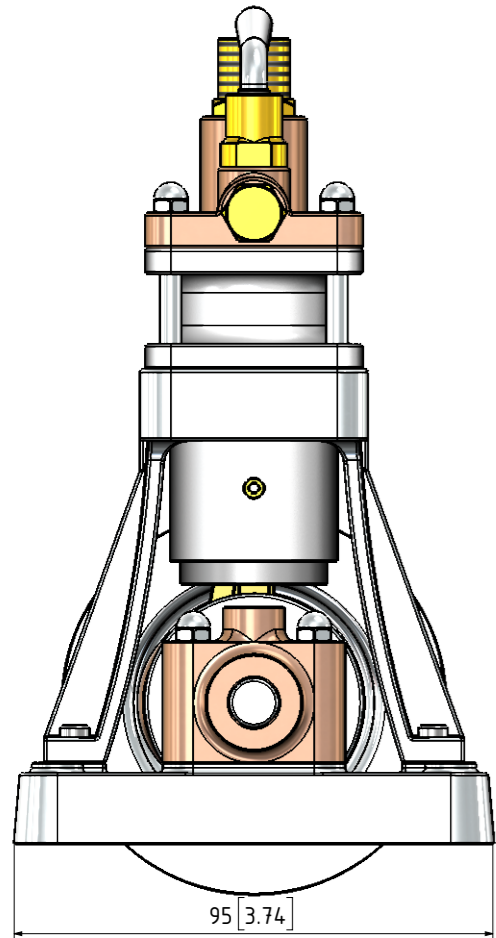
QTY	PART NUMBER
1	09C-58-01-1-01-BEDPLATE
1	09C-58-01-1-02-MAIN BEARING-1
1	09C-58-01-1-03-MAIN BEARING-2
1	09C-58-01-1-04-MAIN BEARING-3
1	09C-58-01-1-05-COLUMN
1	09C-58-01-1-06-CYLINDER
1	09C-58-01-1-07-CYLINDER TOP COVER
1	09C-58-01-2-01-CRANKSHAFT
1	09C-58-01-2-02-ECCENTRIC
1	09C-58-01-2-03-FLYWHEEL
1	09C-58-01-2-04-PISTON
1	09C-58-01-2-05-CON-ROD
1	09C-58-01-2-06-ECCENTRIC STRAP
1	09C-58-01-2-07-PISTON VALVE
1	09C-58-01-M12 NUT
2	09C-58-01-M3x8 A-K C-SINK SCREW
10	09C-58-01-M4 DOME NUT
4	09C-58-01-M4x12 A-K CYL HEAD SCREW



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

MATERIAL ABBREVIATIONS:  
 ALU = ALUMINIUM  
 HALU= HARD ALUMINIUM  
 BRS = BRASS  
 BRZ = BRONZE OR GUNMETAL (BRZ/GM)  
 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

OTHER ABBREVIATIONS  
 AS = AS SHOWN  
 DP = DEEP  
 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 = HEXACON, 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

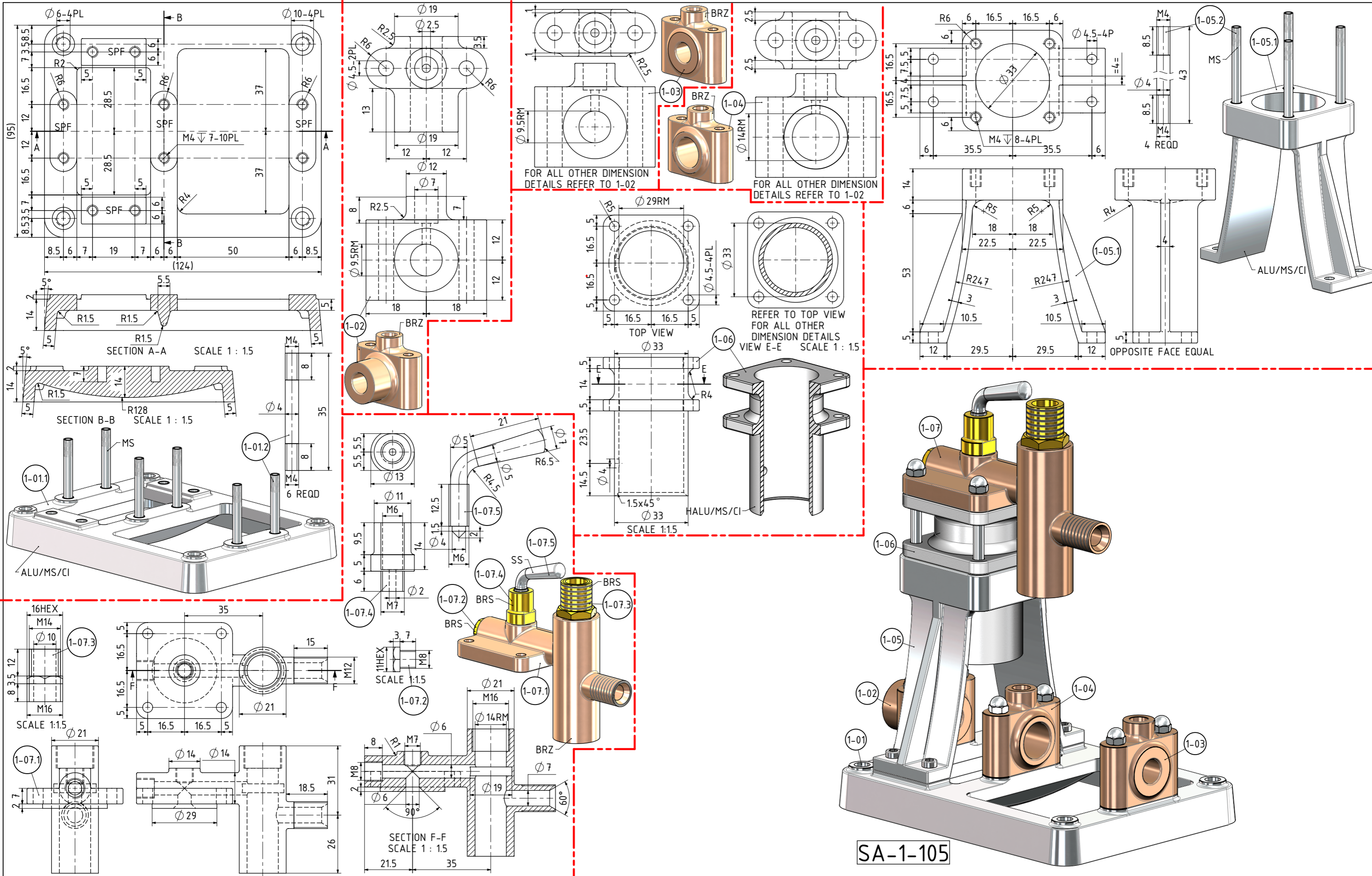


GENERAL NOTES:  
 0. ALL DRAWINGS ARE IN METRIC MEASUREMENTS  
 1. ALL ENGINEERING PRACTICES SHALL BE APPLIED WITH REGARDS TO HOLE AND SHAFT TOLERANCES.  
 2. WHERE SCREWS OR BOLTS ARE USED THE CLEARANCE HOLES SHALL BE APPROXIMATELY 5% TO 8% LARGER THAN THE MATCHING TAPPED HOLE.  
 3. PREFERABLY ALL TAPPED HOLES AND MATCHING SCREWS AND/OR BOLTS TO BE METRIC FINE (MF)  
 4. MATERIALS SPECIFIED ON THE DRAWINGS ARE INDICATIVE ONLY. THE BUILDER CAN MAKE HIS/HER OWN MATERIAL CHOICE.  
 5. ALL CONNECTIONS/JOINTS WHICH HAVE STEAM PRESSURE APPLIED TO IT SHALL BE SILVER/HARD SOLDERED.  
 6. COMPRESSION SPRINGS ARE DRAWN IN COMPRESSED STATE (CP), UNCOMPRESSED STATE IS APPROX 40% TO 60% LONGER THEN COMPRESSED STATE.  
 7. 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.  
 8. 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.  
 9. THE ORDER IN WHICH THE PARTS/COMPONENTS ARE MANUFACTURED AND THE MODEL IS ASSEMBLED IS ENTIRELY LEFT TO THE BUILDER/MODEL MAKER.  
 10. A COLOUR SCHEME FOR THIS PROJECT IS ENTIRELY LEFT UP TO THE MODEL MAKER.  
 11. THE MANNER IN WHICH THE PARTS/COMPONENTS ARE MANUFACTURED IS ENTIRELY LEFT UP TO THE BUILDER.  
 12. USE LOCTITE, ON SCREW OR PRESS FIT CONNECTIONS OR SURFACES, WERE DEEMED NECESSARY TO PREVENT PARTS FROM LOOSENING.  
 13. WASHERS AND/OR SPRING WASHERS SHALL BE USED WHERE DEEMED NECESSARY.  
 14. 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.

ADDITIONAL NOTES ABOUT THESE DRAWINGS:  
 1)MATERIALS HAVE BEEN SPECIFIED ON THESE DRAWINGS. HOWEVER THE BUILDER CAN CHOOSE ITS OWN PREFERRED MATERIAL FOR THE PARTS/COMPONENTS.  
 2) FASTENERS. FASTENERS SUCH AS BOLTS, SCREWS, RIVETS, NUTS AND WASHERS HAVE BEEN SHOWN ON THESE DRAWINGS. THE BUILDER TO CHOOSE ITS OWN PREFERRED TYPE OF FASTENERS IF SO DESIRED.

NOTES: THE ORIGINAL DRAWING WAS GIVEN TO ME. THE TITLE OF THE ORIGINAL DRAWING WAS: "THE "SPARTAN" HIGH-SPEED UNIFLOW STEAM ENGINE" (WITH ALTERNATIVE POPPET-VALVE OR PISTON-VALVE GEAR) BY EDGAR T. WESTBURY. NO DATE OR DRAFTER STATED. THE ENGINE SHOWN ON THESE DRAWINS IS 1.5x THE ORIGINAL SIZE ALSO CONVERTED FROM IMPERIAL TO METRIC.

TITLE <b>A HIGH SPEED UNIFLOW STEAM ENGINE WITH A PISTON TYPE VALVE CALLED "SPARTAN"</b>	DRAWING CONTENTS <b>GENERAL ARRANGEMENT, VIEWS, NOTES, BILL OF MATERIALS</b>	PROJECT No 09C-58-01 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 DATE JUNE 2023 SHEET: 01 OF 03	JDWDS Copyright © J.A.M. DE WAAL PAPA KURA NZ A3	MODEL SCALE: 1:1 DWG SCALE: 1:1 @A3 OR AS SHOWN No:09C-58-01-SHT-01
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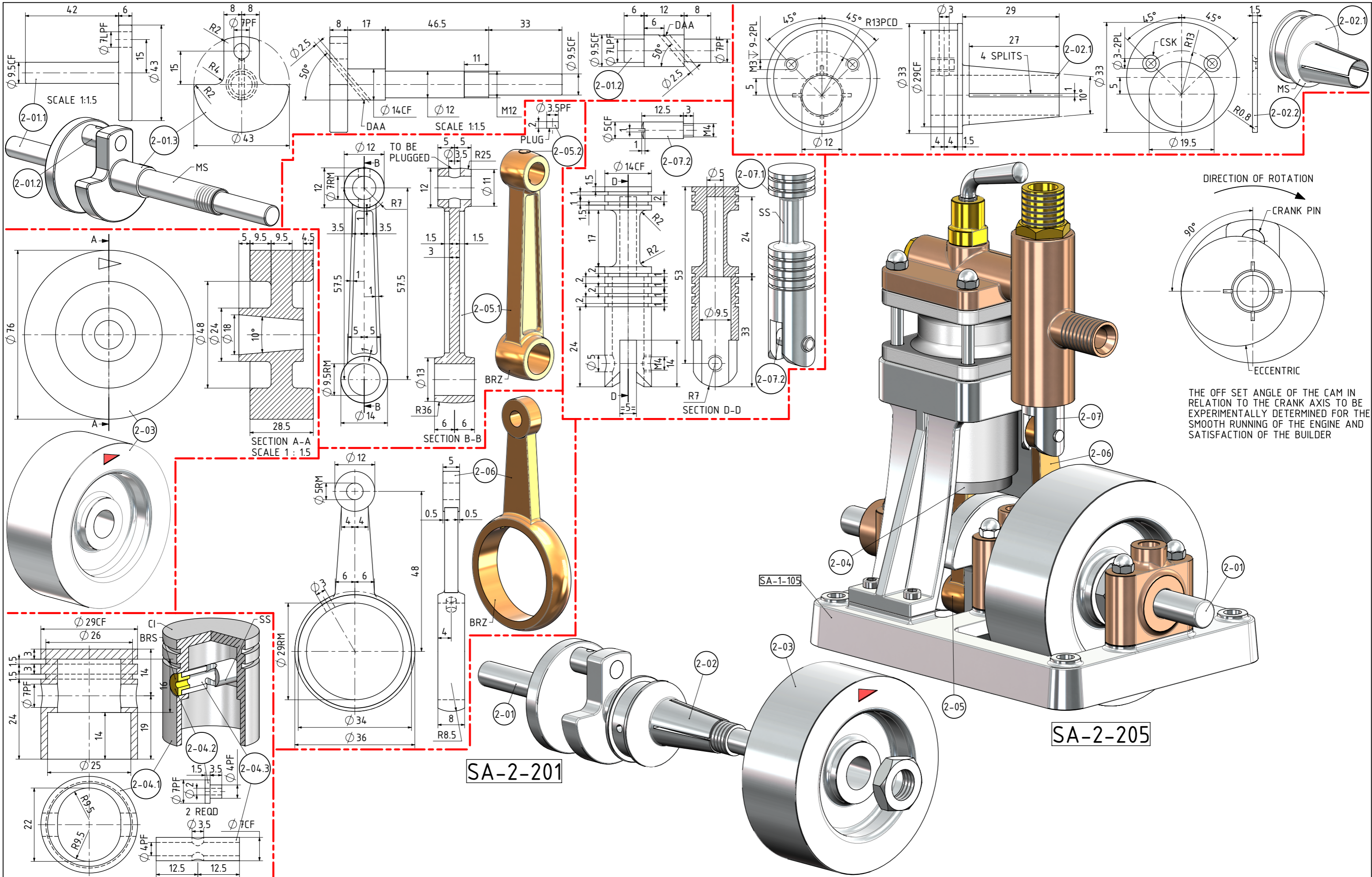
DRAWING CONTENTS  
**PARTS AND ASSEMBLIES**

PROJECT No 09C-58-01  
 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  
 DATE JUNE 2023  
 SHEET: 02 OF 03

MODEL SCALE: 1:1  
 DWG SCALE: 1:1 @A3 OR AS SHOWN  
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 No:09C-58-01-SHT-02

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DIRECTION OF ROTATION

CRANK PIN

ECCENTRIC

THE OFF SET ANGLE OF THE CAM IN RELATION TO THE CRANK AXIS TO BE EXPERIMENTALLY DETERMINED FOR THE SMOOTH RUNNING OF THE ENGINE AND SATISFACTION OF THE BUILDER

NOTES: THE ORIGINAL DRAWING WAS GIVEN TO ME. THE TITLE OF THE ORIGINAL DRAWING WAS: "THE "SPARTAN" HIGH-SPEED UNIFLOW STEAM ENGINE" (WITH ALTERNATIVE POPPET-VALVE OR PISTON-VALVE GEAR) BY EDGAR T. WESTBURY. NO DATE OR DRAFTER STATED. THE ENGINE SHOWN ON THESE DRAWINGS IS 1.5x THE ORIGINAL SIZE ALSO CONVERTED FROM IMPERIAL TO METRIC.

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PROJECTION	JDWDS	MODEL SCALE: 1:1
DATE	JUNE 2023	DWG SCALE: 1:1 @A3 OR AS SHOWN
SHEET: 03 OF 03	A3	No:09C-58-01-SHT-03

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