

MIL-S-20708/74D
30 July 1987

SUPERSEDING
MIL-S-20708/74C
19 December 1968

MILITARY SPECIFICATION SHEET
SYNCHRO, TORQUE RECEIVER TRANSMITTER, TYPE 37TRX6A

This specification is approved for use by all Departments and Agencies of the Department of Defense. The requirements for acquiring the Synchros described herein shall consist of this specification and the latest issue of MIL-S-20708.

TABLE I. Requirements.

Requirement	Value	Unit	Tolerance
Frequency	60	Hz	±1%
Primary Voltage	115	volts	±1%
Primary Current	830	milliamps	maximum
Primary Power	9.25	watts	maximum
Impedance:			
Z _{ss}	7.0-10.0	ohms	min.-max.
Impedance Angle:			
Z _{ss}	30.0-40.0	degrees	min.-max.
Transformation Ratio	0.783	-----	±2%
Phase Shift (Lead)	3.5	degrees	maximum
Electrical Error	10	minutes	maximum
Receiver Error	36	minutes	maximum
Null Voltage:			
Total	170	millivolts	maximum
Fundamental	35	millivolts	maximum
Synchronizing Time:			
30° ±2°	1.0	seconds	maximum
Synchronizing Time:			
177° ±2°	2.0	seconds	maximum
Torque Gradient	0.9	ounce-inches per degree	minimum
Radial Play	0.0008	inches	maximum
End Play	0.0030	inches	±0.0020
Temperature Rise	35	degrees (C)	maximum
Variation of Voltage (+10%) and Freq. (-5%)	18	watts	maximum

This unit shall not be subjected to the altitude requirements of MIL-S-20708.

MIL-S-20708/74D

TABLE II. Military part number variant characteristics.

Military Part No. 1/	A ±.010	B ±.010	G Maximum	Shaft Style	Terminal End	U +.0000
M20708/74-01A	.700	.730	4.030	Splined	Terminal Board	.2405

1/Military part number M20708/74-01A shall be the NATO standard.

1/The suffix letter following the numerical dash number corresponds to the latest modification letter in the type designation.

TABLE III. Military part number cross-references.

SUPERSEDED MILITARY PART NUMBERS		NEW MILITARY PART NUMBERS
MIL-S-20708/74C	MIL-S-20708/74B	
M20708/74C-001	M20708/74-001	

NOTE: All line items shown in Table III refer to equivalent and interchangeable synchros of the same type designation modification. Part number changes do not affect form, fit, or function of the synchros listed therein.

Custodians:

Army-AR
Navy-AS
Air Force-85

Preparing Activity:

Navy-AS

(Project 5990-0334-58)

Review Activities:

Army-MI,AV
Navy-OS
Air Force-11,17,99
DLA-ES

User Activities:

Navy-MC,CG

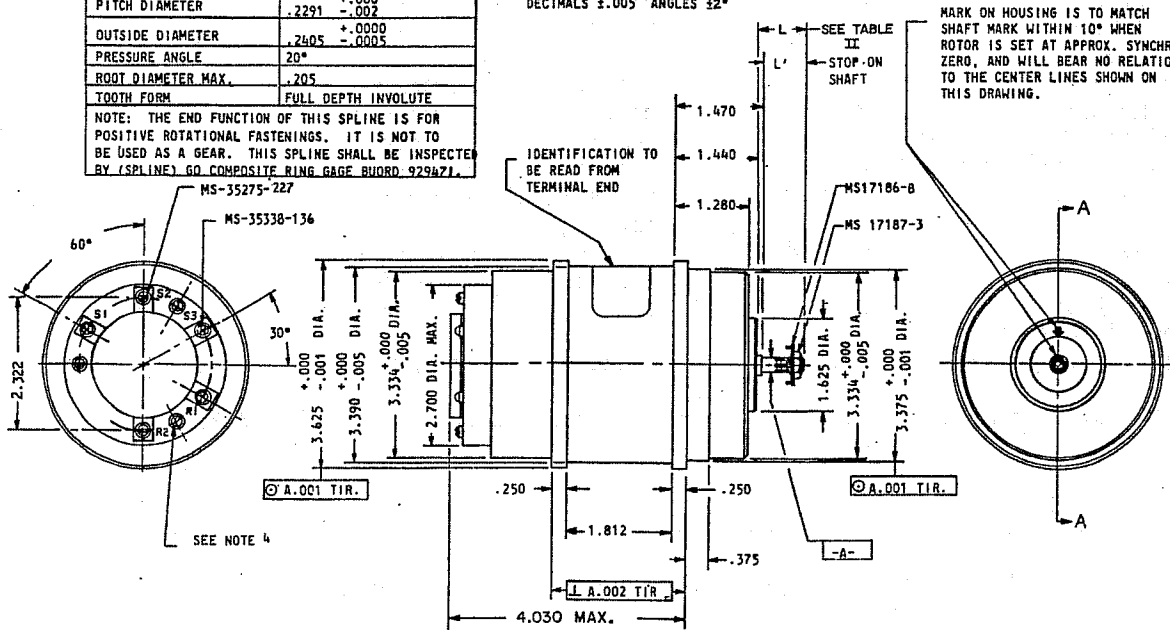
MILITARY SPECIFICATION SHEET
 SYNCHRO TORQUE RECEIVER TRANSMITTER, TYPE 37TRX6a

This Specification is Mandatory for Use by All Departments and Agencies of the Department of Defense.
 THE COMPLETE REQUIREMENTS FOR PROCURING THE SYNCHRO DESCRIBED HEREIN SHALL CONSIST OF THIS DOCUMENT AND THE ISSUE IN EFFECT OF SPECIFICATION MIL-S-20708.

SPLINE DATA	
TEETH	22
PITCH	96
PITCH DIAMETER	.2291 $\begin{smallmatrix} +.000 \\ -.002 \end{smallmatrix}$
OUTSIDE DIAMETER	.2405 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$
PRESSURE ANGLE	20°
ROOT DIAMETER MAX.	.205
TOOTH FORM	FULL DEPTH INVOLUTE

NOTE: THE END FUNCTION OF THIS SPLINE IS FOR POSITIVE ROTATIONAL FASTENINGS. IT IS NOT TO BE USED AS A GEAR. THIS SPLINE SHALL BE INSPECTED BY (SPLINE) GO COMPOSITE RING GAGE BUORD 929471.

UNLESS OTHERWISE SPECIFIED
 DIMENSIONS ARE IN INCHES
 TOLERANCES ON FRACTIONS $\pm 1/64$
 DECIMALS $\pm .005$ ANGLES $\pm 2^\circ$

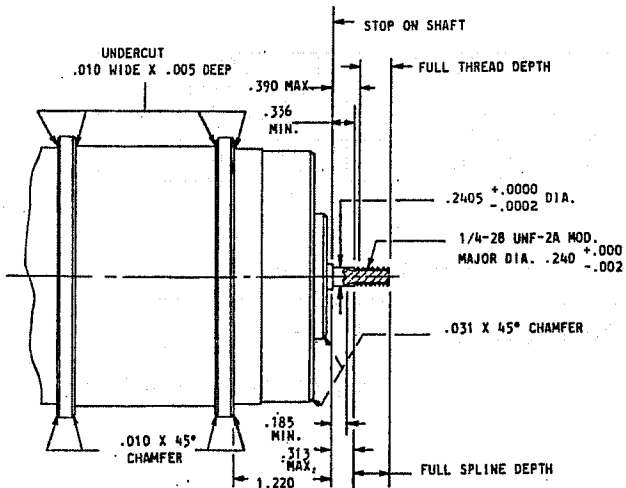


MARK ON HOUSING IS TO MATCH SHAFT MARK WITHIN 10° WHEN ROTOR IS SET AT APPROX. SYNCHRO ZERO, AND WILL BEAR NO RELATION TO THE CENTER LINES SHOWN ON THIS DRAWING.

IDENTIFICATION TO BE READ FROM TERMINAL END

NOTES:

- PERPENDICULARITY AND CONCENTRICITY SHALL BE MEASURED WITH THE UNIT IN A VERTICAL POSITION SUPPORTED BY THE SHAFT, THEN THE HOUSING ROTATED.
- RUNOUT OF FEATURE "A" (SMOOTH PORTION) OF SHAFT SHALL NOT EXCEED .0008 TIR.
- END PLAY AND RADIAL PLAY SHALL BE MEASURED DURING THE REVERSAL OF THE FOLLOWING LOADS:
 END PLAY - 1 POUND
 RADIAL PLAY - 1 POUND
- THE TERMINAL BLOCK SHALL BE SECURED BY SCREWS OTHER THAN THE TERMINAL SCREWS. RECESSES SHALL ALLOW TERMINAL LUGS MS-25036-B TO BE INSTALLED WITH THE BARRELS INBOARD OR OUTBOARD, AND PREVENT THE LUGS FROM TURNING.
- MINOR VARIATIONS OF UNIT CONFIGURATION ARE PERMITTED FOR UNDIMENSIONED DESIGN DETAIL.
- THE FOLLOWING LIST OF HARDWARE, MS-35275-227 MACHINE SCREW (5 REQUIRED), MS-35338-136 LOCK WASHER (5 REQUIRED), MS-17186-B DRIVE WASHER (1 REQUIRED) MS-17187-3 NUT (1 REQUIRED), SHALL BE PACKAGED IN A VENTILATED ENVELOPE MADE OF MATERIAL HAVING A PH VALUE OF 6-8 THAT IS COMPATIBLE WITH THE WEIGHT OF THE CONTENTS, THEN THE PACKAGED HARDWARE SHALL BE PLACED IN THE UNIT SYNCHRO PACKAGE. FOR INFORMATION ONLY, SEE SYNCHRO CLAMP MS-17183.
- PENDING ISSUANCE OF A QUALIFIED PRODUCTS LIST (QPL) A SAMPLE OF THE SYNCHROS TO BE FURNISHED UNDER THIS SPECIFICATION SHALL BE SUBJECT TO THE PREPRODUCTION TESTS AS SPECIFIED IN MIL-S-20708.



PARTIAL SECTION

A - A

FSC 5990

TABLE I

Requirement	Value	Unit	Tolerance
Frequency	60	Hz	+1%
Primary Voltage	115	volts	+1%
Primary Current	830	milliamps	maximum
Primary Power	9.25	watts	maximum
Impedance:			
Z _{ss}	8.0-10.0	ohms	min.-max.
Impedance Angle:			
Z _{ss}	31.0-35.0	degrees	min.-max.
Transformation Ratio	0.783	-----	+2%
Phase Shift	3.0(lead)	degrees	maximum
Receiver Error	36.0	minutes	maximum
Electrical Error	10.0	minutes	maximum
Null Voltage:			
Total	170	millivolts	maximum
Fundamental	35.0	millivolts	maximum
Synchronizing Time 30° +2°	1.0	seconds	maximum
Synchronizing Time 177° +2°	2.0	seconds	maximum
Torque Gradient	0.90	ounce-inches per degree	minimum
Radial Play	0.0008	inches	maximum
End Play	0.0030	inches	+0.0020
Temperature Rise	35.0	degrees(C)	maximum
Variation of Voltage (+10%) and Freq. (-5%)	13.5	watts	maximum

This unit shall not be subjected to the altitude requirements of MIL-S-20708.

Part number: M20708/74C plus applicable dash number from Table II.

TABLE II

DASH NO.	SHAFT DIAMETER	SHAFT STYLE	TERMINAL END	L' DIMENSION TO STOP ON SHAFT	L REFERENCE FREE SHAFT LENGTH
*-001	.2405	Splined	Terminal Board	.700 ± .010	.730 ± .010

*Dash number -001 shall be the NATO Standard.

Custodians: Army-MU Navy-AS Air Force-85	Review Activities: Army-EL,MI,MO,AV,MU Navy-SH,OS,AS Air Force-11,17,85 DSA-ES	User Activities: Navy-SH,OS,AS,MC,CG	Preparing Activity: Navy-AS Project No. 5990-0243
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MILITARY SPECIFICATION SHEET

SYNCHRO, TORQUE RECEIVER TRANSMITTER, TYPE 37TRX6A

This amendment forms a part of Military Specification Sheet MIL-S-20708/74C dated 19 December 1968, and is approved for use by all Departments and Agencies of the Department of Defense.

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Table I - Make the following deletions and substitutions for the requirement values indicated below:

Requirement	Value		Unit	Tolerance
	Delete	Substitute		
Impedance Z _{ss}	8.0 - 10.0	7.0 - 10.0	Ohms	Min.-Max.
Impedance Angle Z _{ss}	31.0 - 35.0	30.0 - 40.0	Degrees	Min.-Max.
Phase Shift	3.0 (lead)	3.5 (lead)	Degrees	Maximum
Variation of Voltage (+10%) and Freq. (-5%)	13.5	18.0	Watts	Maximum "

Table II and notes above and below Table II - Delete entirely and substitute the following:

TABLE II. Military Part Number Variant Characteristics

MILITARY PART NO. <u>1/</u>	SHAFT DIAMETER NOMINAL	SHAFT STYLE	TERMINATIONS	L' DIMENSION TO STOP ON SHAFT	L DIMENSION FREE SHAFT LENGTH
M20708/74-01A	.2405	Splined	Terminal Board	.700 ± .010	.730 ± .010

1/ Military part number M20708/74-01A shall be the NATO Standard.

1/ The suffix letter following the numerical dash number corresponds to the latest modification letter in the type designation."

MIL-S-20708/74C
AMENDMENT 1

Add a new Table III and note as follows:

" TABLE III. Military Part Number Cross-References

SUPERSEDED MILITARY PART NUMBERS		NEW MILITARY PART NUMBERS
MIL-S-20708/74C	MIL-S-20708/74B	
M20708/74C-001	M20708/74-001	M20708/74-01A

NOTE: All line items shown in Table III refer to equivalent and interchangeable synchros of the same type designation modification. Part number changes do not affect form, fit, or function of the synchros listed therein."

Custodians:
Army - AR
Navy - AS
Air Force - 85

Preparing activity:
Navy - AS
Project No. 5990-0313-39

Review activities:
Army - ME
Navy - OS, SH, EC
Air Force - 11, 17, 19, 99
DSA - ES

User activities:
Army -
Navy - MC, CG
Air Force -

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity (as indicated on reverse hereof).

SPECIFICATION
MIL-S-20708/74C

ORGANIZATION (of submitter)

CITY AND STATE

CONTRACT NO.

QUANTITY OF ITEMS PROCURED

DOLLAR AMOUNT

\$

MATERIAL PROCURED UNDER A

DIRECT GOVERNMENT CONTRACT

SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?
A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

YES

NO IF "YES", IN WHAT WAY?

4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)

SUBMITTED BY (Printed or typed name and activity)

DATE

DD FORM 1426
1 APR 62

REPLACES NAVSHIPS FORM 4883, WHICH IS OBSOLETE

C-3279

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Naval Air Engineering Center
Philadelphia, Pennsylvania 19112

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