TM 55-2995-223-40

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

GS MAINTENANCE MANUAL
ELECTROMECHANICAL LINEAR ACTUATOR
PART NUMBER SYLC 9190-10
(Barber-Colman)

Headquarters, Department of the Army, Washington, D. C.
30 January 1969

WARNING
PRECAUTIONARY DATA

Personnel performing instructions involving operations, procedures and practices which are included or implied in this technical manual shall observe the following instructions. Disregard of these warnings and precautionary information can cause serious injury, death, or an aborted mission.

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CHANGE No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 6 November 1974

GS Maintenance Manual

ELECTROMECHANICAL LINEAR ACTUATOR
PART NUMBER SYLC 9190-10
(BARBER-COLMAN)

TM 55-2995-223-40, 30 January 1969, is changed as follows:

Page 16. Figure 5 is superseded.

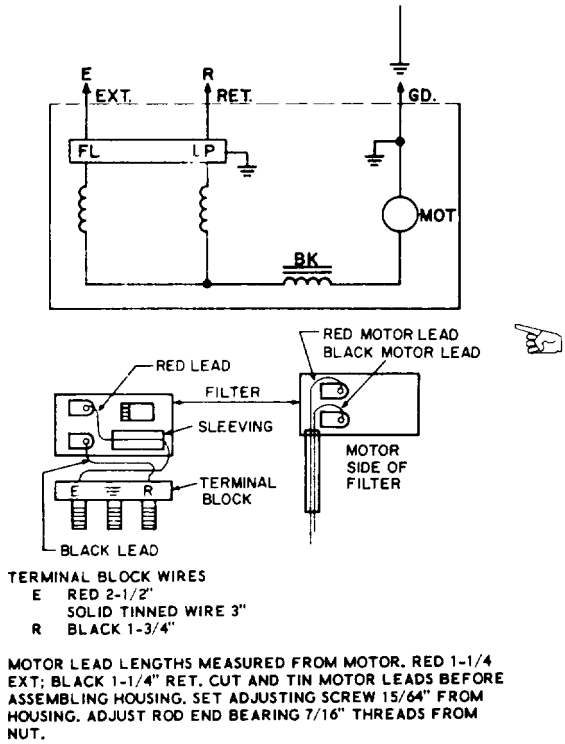


Figure 5. Wiring Diagram

By Order of the Secretary of the Army:

FRED C. WEYAND
General, United States Army
Cbief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

DISTRIBUTION:

To be disributed in accordance with DA Form 12-31 (qty rqr block nos. 337, 344, 35, 354, and 39, cumulative for all blocks) Direct and General Support Maintenance Requirements for UH-1A, UH-1B, UH-1C, UH-1D, and 1H, and AH-1G aircraft.

CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D, C,, 15 *October 1969*

GS Maintenance Manual
Including Repair Parts and Special Tools Lists

ELECTROMECHANICAL LINEAR ACTUATOR

PART NUMBER SYLC 9190-10

(Barber-Colman)

TM 55-2995-223-40, 30 January 1969, is changed as follows:

Cover. Title is changed as shown above.

Table of Contents. Add "Appendix B, REPAIR PARTS AND SPECIAL TOOLS LISTS, page 21."

Page 21. Appendix B is added as follows:

APPENDIX B

REPAIR PARTS AND SPECIAL TOOLS LISTS
(Current as of 14 July 1969)

Section I. INTRODUCTION

1. SCOPE .

This appendix lists repair parts, special tools, test and support equipment, and maintenance supplies required for the performance of general support maintenance of the linear actuator.

2. GENERAL.

This Repair Parts and Special Tools Listing is divided into the following sections:

a. Repair Parts - Section II. A list of repair parts authorized for the performance of maintenance at the general support level in figure and item number sequence. Maintenance supplies (MSUP) are listed within the section in ascending Federal stock number sequence.

b. Special Tools, Test and Support Equipment - Section III. Not applicable.

c. Federal Stock Number and Reference Number Index - Section IV, This section is divided as follows:

(1) A list of Federal stock numbers in ascending numerical sequence, cross-referenced to the illustration figure number and item number.

(2) A list of reference numbers in ascending alpha-numerical sequence, cross-referenced to the manufacturer's Federal supply code, illustration figure number, and item number.

3. EXPLANATION OF COLUMNS.

The following provides an explanation of columns in the tabular lists in section II:

a. Source, Maintenance, and Recoverability Codes (SMR) - Column 1.

(1) Source *code.* Indicates the selection status and source for the listed item. Source code(s) used are:

CODE	EXPLANATION
P	Applies to repair parts which are stocked in or supplied from GSA/DSA, or Army supply system and authorized for use at indicated maintenance categories.
M	Applies to repair parts which are not procured or stocked, but are to be manufactured in indicated maintenance levels.
X2	Applies to repair parts which are not stocked, The indicated maintenance category requiring such repair parts will attempt to obtain same through cannibalization. Where such repair parts are not obtainable through cannibalization, requirements will be requisitioned, with accompanying justification, through normal supply channels.

(2) Maintenance code. Indicates the lowest category of maintenance authorized to install the listed item, Maintenance code(s) used are:

CODE	EXPLANATION
O	Organizational maintenance
F	Direct support maintenance
H	General support maintenance

(3) *Recoverability code.* Indicates whether unserviceable items

should be returned for recovery or salvage. Items not coded are expendable,

b. Federal Stock Number - column 2. Indicates the Federal stock number assigned *to* the item and will be used for requisitioning purposes, Items source coded A, M, or X1 are not assigned a Federal stock number,

c. *Description - Column 3.* Indicates the Federal item name and any additional description of the item required. The description column contains the following subcolumns:

(1) *Reference number and manufacturer's code.* Indicates a part number *or* other reference number for the listed item, followed by the applicable five-digit Federal supply code for manufacturers in parentheses,

(2) *Usable on code.* Not applicable.

d. Unit of Issue (U/I) - Column 4. A two-character alphabetic abbreviation indicating the standard or minimum basic quantity in which the item is issued (e.g.: ea, ft, pr, etc.).

e. Quantity Incorporated in Unit - Column 5. Indicates the quantity of the item used in the assembly. A "V" appearing in this column in lieu of a quantity indicates that a definite quantity cannot be indicated.

f. Thirty-day GS Maintenance Allowance - Column 6.

(1) The allowance column is divided into three subcolumns, Indicated in each subcolumn, opposite the first appearance of each item, is the total quantity of items authorized for the number of equipments supported. Subsequent appearances of the same item will have the letters "REF" in this column. Items authorized for use as required, but not for initial stockage, are identified with an asterisk (*) in the allowance column.

(2) The quantitative allowance for GS level of maintenance will represent initial stockage for a 30-day period for the number of equipments supported.

(3) Determination of the total quantity of parts required for maintenance of more than 100 of these equipments can be accomplished by converting the equipment quantity to a decimal factor by placing a decimal point before the next to last digit of the number to indicate hundredths, and multiplying the decimal factor by the parts quantity authorized allowance for 51-100 allowance column. Example: authorized allowance for 51-100 equipments is 40; for 150 equipments, multiply 40 by 1.50 or 60 parts required.

g. One-year *Allowance per 100 Equipment8/L70ntingency Planning Purposes Colunm 7.* Indicates opposite the first apperance of each item, the total quantity required for distribution and contingency planning purposes. The

range of items indicates total quantities of all authorized items required to provide for adequate support of 100 equipments for 1 year.

h. Depot Maintenance Allowance per 100 Equipments - Column 8. Not applicable.

i. Illustration - Column 9. Illustrations appear in the narrative portion of this manual. This column is divided as follows:

(1) *Figure number - column 9a.* Indicates the figure number of the illustration in which the item is shown. Appearances of the letters "MSUP" in this column indicates maintenance supplies located in section II.

(2) Item number - column 9b. Indicates the callout number to reference the item in the illustration.

4. HOW TO LOCATE REPAIR PARTS.

a. When Federal stock number or reference number is unknown:

(1) *First.* Find the exploded view illustration of the assembly or subassembly to which the repair part belongs.

(2) Second. Identify the repair part on the illustration and note the illustration figure and item number of the repair part.

(3) *Third.* Using the Repair Parts Listing, find the figure and item number listed in the illustration column,

b. When Federal stock number or reference number is known:

(1) *First.* Using the Index of Federal Stock Numbers and Reference Numbers, find the pertinent Federal stock number or reference number, This index is in ascending FSN sequence, followed by a list of reference numbers in ascending alpha-numerical sequence, cross-referenced to the illustration figure number and item number.

(2) Second. Using the Repair Parts Listing, find the figure and item number listed in the illustration column referenced in the Index of Federal Stock Numbers and Reference Numbers,

5. FEDERAL SUPPLY CODES FOR MANUFACTURERS.

CODE	MANUFACTURER
05624	Barber-Colman Company 1300 Rock Street Rockford IL 61101
62983	Vickers Inc Division of Sperry Rand Corp PO Box 302 Troy MI 48084

CODE	MANUFACTURER
81348	Federal Specifications Promulgated by General Services Administration
81349	Military Specifications Promulgated by Standardization Div Directorate of Logistic Services DSA
88044	Aeronautical Standards Group Dept of Navy and Air Force
96906	Military Standards Promulgated by Standardization Div Directorate of Logistic Services DSA

(1) SOURCE, MAINT AND RECOV CODE (a) SOURCE CODE	(b) MAINT LEVEL	(c) RECOV CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR CODE			MODELS USABLE ON	(4) UNIT OF ISSUE	(5) QTY INC IN UNIT	(6) 30-DAY MAINT ALW GS (a) 1 - 20	(b) 21 - 50	(c) 51 - 100	(7) 1-YR ALWPER 100 EQUIP CNTGCY	(8) DEPOT MAINT ALWPER 100 EQUIP	(9) ILLUSTRATION (a) FIG NO	(b) ITEM NO
			2995-954-3961	SYLC9190-10	(05624)	ACTUATOR,LINEAR.....		EA							1	
						SECTION II										
						REPAIR PARTS										
						LINEAR ACTUATOR										
P	H		5305-582-6606	193770	(62983)	SCREW,MACHINE.....		EA	4	*	*	*			3	1
P	H		2995-082-0528	SYLC508	(05624)	CONNECTING END CAP,ACTUATOR.....		EA	1	*	*	*			3	2
P	H		5305-614-0266	MS35265-33	(96906)	SCREW,MACHINE.....		EA	2	*	*	*			3	3
P	H		5340-871-4162	SYLC510-1	(05624)	CAP,END.....		EA	1	*	*	*			3	4
P	H		3110-155-9612	CYRB252	(05624)	BEARING,BALL,ANNULAR.....		EA	1	*	*	*			3	5
P	H		5340-205-9181	CYRD272	(05624)	SHIM.....		EA	V	*	*	*			3	6
P	H		5340-205-9181	CYRD272	(05624)	SHIM.....		EA	V	*	*	*			3	7
P	H		5310-895-6272	CYRD311	(05624)	WASHER,FLAT.....		EA	1	*	*	*			3	8
P	H		2995-878-2474	SYLC522	(05624)	GEAR CLUSTER,SPUR.....		EA	1	*	*	*			3	9
P	H		5310-895-6311	CYRD311-3	(05624)	WASHER,FLAT.....		EA	1	*	*	*			3	10
P	H		2995-878-2471	SYLC523	(05624)	GEAR,SPUR.....		EA	2	*	*	*			3	11
P	H		2995-878-2472	SYLC524	(05624)	GEAR CLUSTER,SPUR.....		EA	1	*	*	*			3	12
P	H		5340-895-6329	CYRD311-4	(05624)	SHIM.....		EA	1	*	*	*			3	13
P	H		5310-895-6311	CYRD311-3	(05624)	WASHER,FLAT.....		EA	1	*	*	*			3	14
P	H		5915-763-4149	CYZR736	(05624)	FILTER,RADIO INTERFERENCE.....		EA	1	*	*	*			3	15
P	H		5305-271-8381	AN116964	(88044)	SCREW,MACHINE.....		EA	4	*	*	*			3	17
M	H			SYLC507	(05624)	PLATE,COVER.....			1						3	18
P	H		2995-878-2486	SYLC521	(05624)	GEARSHAFT,SPUR.....		EA	1	*	*	*			3	19
P	O		3120-874-2676	CYRB251	(05624)	BEARING,PLAIN,ROD.....		EA	1	*	*	*			3	20
P	O		5310-870-0745	DYRF14	(05624)	NUT,PLAIN,HEXAGON.....		EA	1	*	*	*			3	21
P	H		5310-881-1360	JYRF183	(05624)	NUT,PLAIN,HEXAGON.....		EA	1	*	*	*			3	22
P	H		5310-045-3296	MS35338-43	(96906)	WASHER,LOCK.....		HD	1	*	*	*			3	23
P	H		2995-878-2488	SYLC516	(05624)	PLATE,INSTRUCTION.....		EA	1	*	*	*			3	24
P	H		5310-881-1360	JYRF183	(05624)	NUT,PLAIN,HEXAGON-RH.....		EA	2	*	*	*			3	25
P	H		5310-881-1361	JYRF184	(05624)	NUT,PLAIN HEXAGON-LH.....		EA	2	*	*	*			3	25
P	H		5310-876-1015	JYRF168	(05624)	NUT,PLAIN,SQUARE.....		EA	1	*	*	*			3	26
P	H		5310-882-0432	JYRF169	(05624)	NUT,PLAIN,SQUARE.....		EA	1	*	*	*			3	27
P	H		5310-817-0994	JYRD32	(05624)	WASHER,SPRING TENSION.....		EA	8	*	*	*			3	28
P	H		2995-862-3956	SYLC529	(05624)	RETAINER,ROD,ACTUATOR.....		EA	2	*	*	*			3	29
P	H		5305-882-0572	SYLC519	(05624)	SCREW,ADJUSTING.....		EA	1	*	*	*			3	30
P	H		2995-878-2496	SYLC515	(05624)	STOP,ACTUATOR.....		EA	1	*	*	*			3	31
P	H		2995-878-2492	SYLC520	(05624)	SLEEVE,ACTUATOR.....		EA	1	*	*	*			3	32
P	H		2995-869-6964	BYRZ102	(05624)	PACKING,PREFORMED.....		EA	1	*	*	*			3	33
P	H		3110-155-9612	CYRB252	(05624)	BEARING,BALL,ANNULAR.....		EA	1	*	*	*			3	34
P	H		5305-941-6403	MS35275-208	(96906)	SCREW,MACHINE.....		EA	2	*	*	*			3	35
P	H		5310-579-5554	MS35333-35	(96906)	WASHER,LOCK.....		HD	2	*	*	*			3	36
P	O		5940-879-7074	SYLC526	(05624)	COVER,TERMINAL BOARD.....		EA	1	*	*	*			3	37
P	O		5310-952-1427	DYRF257	(05624)	NUT,PLAIN,HEXAGON.....		EA	3	*	*	*			3	38

(1) SOURCE MAINT AND RECOV CODE (a) SOURCE CODE	(b) MAINT LEVEL CODE	(c) RECOV CODE	(2) FEDERAL STOCK NUMBER	REFERENCE NUMBER & MFR CODE	(3) DESCRIPTION	MODELS USABLE ON	(4) UNIT OF ISSUE	(5) QTY INC IN UNIT	(6) 30 DAY MAINT ALW (a) 1-20	(b) 21-50	(c) 51-100	(7) 1 YR ALWPR MAINT TOOL EQUIP ENTGCY EQUIP	(8) DEPOT MAINT ALWPR TOOL EQUIP	(9) ILLUSTRATION (a) FIG NO	(b) ITEM NO
P	H		5310-579-0079	MS35333-37 (96906)	WASHER,INTERNAL LOCK.....		EA	3	*	*	*			3	39
P	H		5305-151-0203	AN505-2R4 (88044)	SCREW,MACHINE.....		EA	2	*	*	*			3	40
P	H		2995-107-1888	SV1C514 (05624)	MOUNT ASSEMBLY,TERMINAL.....		EA	1	*	*	*			3	41
P	H		5305-893-9544	MS35265-11 (96906)	SCREW,MACHINE.....		EA	1	*	*	*			3	42
P	H		5940-847-3138	FYRE23 (05624)	TERMINAL,LUG.....		EA	1	*	*	*			3	43
P	H		6105-879-0540	DY1M73501-1 (05624)	MOTOR,SPLIT PHASE.....		EA	1	*	*	*			3	44
X2	H			SV1C5309-1 (05624)	HOUSING ASSEMBLY,MAIN.....		EA	1		*	*			3	45
P	H		6105-871-2318	DY1M525-5 (05624)	HOUSING,MULTIPLE.....		EA	1	*	*	*			3	46
P	H		5305-151-0203	AN505-2R4 (88044)	SCREW,MACHINE.....		EA	1	*	*	*			3	47
P	H		5977-539-7970	DY1M26-1 (05624)	BRUSH,ELECTRICAL CONTACT.....		EA	1	*	*	*			3	48
					MAINTENANCE SUPPLIES										
P	H		6810-184-4800	(81348)	TRICHLOROETHYLENE,TECHNICAL-..... FED O7634,TYPE 2,1B GAGE,55 GAL		DR	V	*	*	*			MSUP	
P	O		6810-264-6715	(81349)	MOLYBDENUM DISULFIDE,TECHNICAL-.... POWDER FORM,MIL-M-7866,1 LB CAN		LB	V	*	*	*			MSUP	
P	O		6850-880-7616	(81349)	INSULATING COMPOUND,ELECTRICAL-.... LIQUID FORM,MIL-I-8660,8 OZ		TU	V	*	*	*			MSUP	
P	F		8030-273-8117	(81349)	SEALING COMPOUND SEMISOLID,BLACK,.. MIL-S-7124		KT	V	*	*	*			MSUP	
P	O		9150-985-7246	(81349)	GREASE,AIRCRAFT AND INSTRUMENT-.... CORROSION,OXIDATION AND WATER RESISTANT,MIL-G-23827,1 LB CAN		LB	V	*	*	*			MSUP	
P	F		9535-232-0378	(81348)	ALUMINUM ALLOY SHEET-.063 IN.THK,.. 48 IN.W,144 IN.LG,FED QQ-A-362		SH	V	*	*	*			MSUP	
					SECTION III										
					SPECIAL TOOLS, TEST AND SUPPORT EQUIPMENT (NOT APPLICABLE)										

SECTION IV
FEDERAL STOCK NUMBER AND REFERENCE NUMBER INDEX

STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER	STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER
2995-082-0528	3	2	5310-870-0745	3	21
2995-107-1888	3	41	5310-876-1015	3	26
2995-862-3956	3	29	5310-881-1360	3	22
2995-869-6964	3	33	5310-881-1360	3	25
2995-878-2471	3	11	5310-881-1361	3	25
2995-878-2472	3	12	5310-882-0432	3	27
2995-878-2474	3	9	5310-895-6272	3	8
2995-878-2486	3	19	5310-895-6311	3	10
2995-878-2488	3	24	5310-895-6311	3	14
2995-878-2492	3	32	5310-952-1427	3	38
2995-878-2496	3	31	5340-205-9181	3	6
2995-954-3961	1		5340-205-9181	3	7
3110-155-9612	3	5	5340-871-4162	3	4
3110-155-9612	3	34	5340-895-6329	3	13
3120-874-2676	3	20	5915-763-4149	3	15
5305-151-0203	3	40	5940-847-3138	3	43
5305-151-0203	3	47	5940-879-7074	3	37
5305-271-8381	3	17	5977-539-7970	3	48
5305-582-6606	3	1	6105-871-2318	3	46
5305-614-0266	3	3	6105-879-0540	3	44
5305-882-0572	3	30	6810-184-4800	MSUP	
5305-893-9544	3	42	6810-264-6715	MSUP	
5305-941-6403	3	35	6850-880-7616	MSUP	
5310-045-3296	3	23	8030-273-8117	MSUP	
5310-579-0079	3	39	9150-985-7246	MSUP	
5310-579-5554	3	36	9535-232-0378	MSUP	
5310-817-0994	3	28			

REFERENCE NUMBER	MFG CODE	FIG NUMBER	ITEM NUMBER	REFERENCE NUMBER	MFG CODE	FIG NUMBER	ITEM NUMBER
AN116964	88044	3	17	JYRF184	05624	3	25
AN505-2R4	88044	3	40	MS35265-11	96906	3	42
AN505-2R4	88044	3	47	MS35265-33	96906	3	3
BYRZ102	05624	3	33	MS35275-208	96906	3	35
CYRB251	05624	3	20	MS35333-35	96906	3	36
CYRB252	05624	3	34	MS35333-37	96906	3	39
CYRB252	05624	3	5	MS35338-43	96906	3	23
CYRD272	05624	3	6	SYLC507	05624	3	18
CYRD272	05624	3	7	SYLC508	05624	3	2
CYRD311	05624	3	8	SYLC509-1	05624	3	45
CYRD311-3	05624	3	10	SYLC510-1	05624	3	4
CYRD311-3	05624	3	14	SYLC514	05624	3	41
CYRD311-4	05624	3	13	SYLC515	05624	3	31
CYZR736	05624	3	15	SYLC516	05624	3	24
DYLM26-1	05624	3	48	SYLC519	05624	3	30
DYLM525-5	05624	3	46	SYLC520	05624	3	32
DYLM73501-1	05624	3	44	SYLC521	05624	3	19
DYRF14	05624	3	21	SYLC522	05624	3	9
DYRF257	05624	3	38	SYLC523	05624	3	11
FYRE23	05624	3	43	SYLC524	05624	3	12
JYRD32	05624	3	28	SYLC526	05624	3	37
JYRF168	05624	3	26	SYLC529	05624	3	29
JYRF169	05624	3	27	SYLC9190-10	05624	1	
JYRF183	05624	3	22	193770	62983	3	1
JYRF183	05624	3	25				

By Order of the Secretary of the Arny:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:
KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

DISTRISUTION:
To be distributed in accordance with DA Form 12-31 requirements for Direct and General Support Maintenance Instructions for UH-1A- 1B, UH-1C, UH-1D, and AH-1G Aircraft.

SECTION 1

INTRODUCTION

1. GENERAL INFORMATION.

a. This technical manual comprises overhaul instructions for linear actuator assembly, part number SYLC 9190-10, manufactured by Barber-Colman Company (FMC 05624), Rockford, Illinois. Sections I through IV of this technical manual contain instructions for this part number. (See figure 1.)

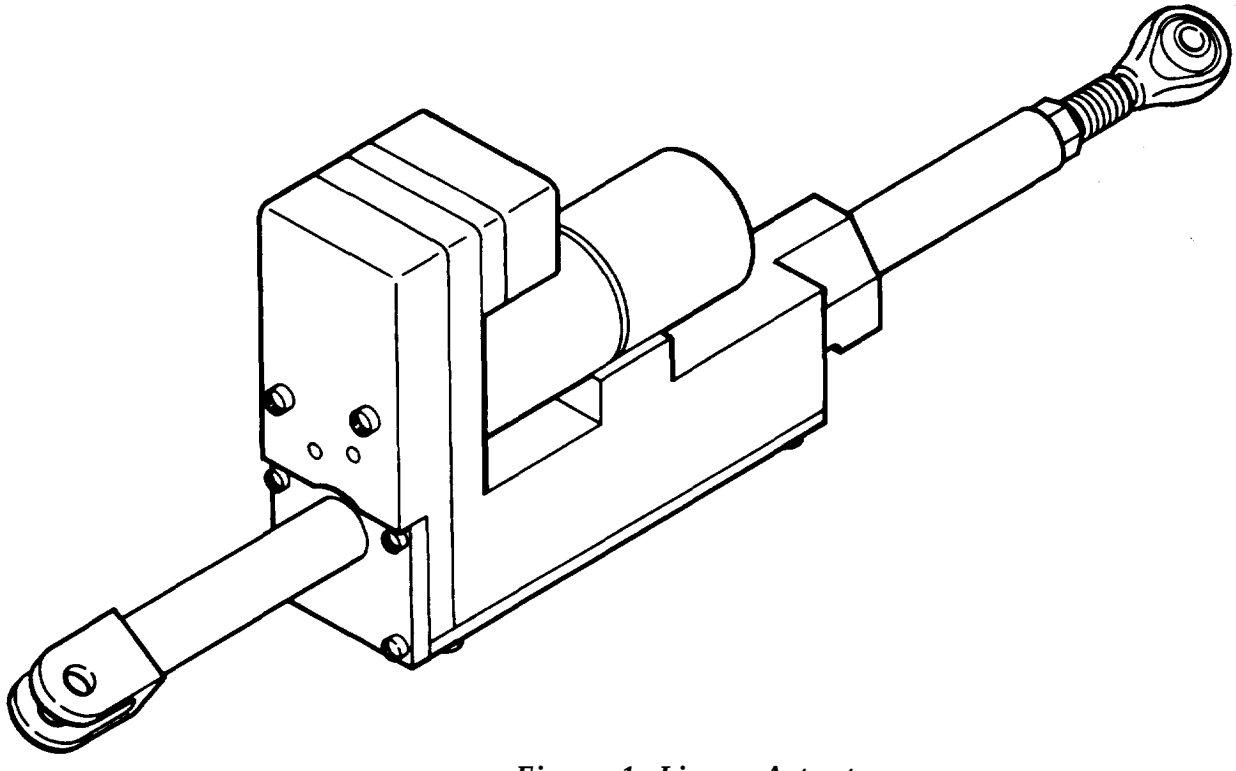


Figure 1. Lineur Actuutor.

b. Report of errors, omissions and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding General, U.S. Army Aviation Systems Command, ATTN: AMSAV-R-M, P. O. Box 209, St. Louis, Missouri 63166.

2. PURPOSE.

The SYLC 9190-10 linear actuator is an engine condition actuator which is operated from a beep switch by the pilot.

3. EQUIPMENT RECORDS.

The Army equipment record system and procedures established in TM 38-750 apply to this equipment. The applicable forms as required by TM 38-750 shall be used.

4. PAINTING REQUIREMENTS.

None.

5. PRESERVATION AND PACKING.

Instructions contained in figure 2 are considered adequate.

PRESERVATION, PACKAGING, PACKING AND MARKING REQUIREMENTS

NOMENCLATURE	STOCK NUMBER	
Linear Actuator	2995-954-3961	
	PART NUMBER	
	SYLC9190-10	

NET WEIGHT	DIMENSIONS	GROSS WEIGHT	CUBIC FEET

All specifications and standards applicable to the requirements herein shall be the issue in effect on date of invitation for bids.

PACKAGING

☒ LEVEL A ☐ LEVEL C

☒ PACKAGING SHALL BE IN ACCORDANCE WITH SPECIFICATION MIL-P-116, THE FOLLOWING DETAILED REQUIREMENTS SHALL APPLY:

UNIT PKG QTY	METHOD	PRESERVATIVE	WRAP	DUNNAGE	CONTAINER
1	IId	----------	MIL-B-121 Grade A or MIL-P-26514	MIL-C-7769 or MIL-P-26514	MIL-D-6055 or MIL-D-6054

☐ OTHER *(Specify)*

PACKING

☐ LEVEL A ☒ LEVEL C

☐ ITEMS PACKAGED AS ABOVE SHALL BE PACKED IN CONTAINERS CONFORMING TO SPECIFICATION.

☒ ITEMS SHALL BE PACKED IN A MANNER TO INSURE CARRIER ACCEPTANCE AND SAFE DELIVERY AT DESTINATION. CONTAINERS SHALL BE IN ACCORDANCE WITH UNIFORM FREIGHT CLASSIFICATION RULES OR REGULATIONS OF OTHER CARRIERS APPLICABLE TO THE MODE OF TRANSPORTATION.

☐ ITEMS PACKAGED AS ABOVE WILL BE PACKED IN ACCORDANCE WITH SPECIFICATION.

☐ OTHER *(Specify.)*

MARKING

☒ a. IN ADDITION TO ANY SPECIAL MARKING REQUIRED BY THE CONTRACT OR ORDER, SHIPMENT SHALL BE MARKED IN ACCORDANCE WITH STANDARD MIL-STD-129D, WITH CHANGE NOTICE 1 THRU 6, "MARKING FOR SHIPMENT AND STORAGE," DATED 28 DECEMBER 1964. THE MATERIAL CONDITION TAGS OR LABELS ARE REQUIRED;REF PARA 5.5.17 AND CHANGE NOTICE 6. THE CONTRACTING OFFICER WILL SUPPLY TAGS AND LABELS. THE SERIAL NUMBER AND THE CONTROL NUMBER OF DA FORM 2410 SHALL BE MARKED ON THE UNIT CONTAINER.

☒ b. EACH UNIT CONTAINER SHALL BE MARKED ON AT LEAST TWO (2) SIDES WITH A SILHOUETTE OF THE APPLICABLE AIRCRAFT. IF THE UNIT CONTAINER IS THE SHIPPING CONTAINER, IT WILL BE MARKED ON AT LEAST FOUR (4) SIDES WITH A SILHOUETTE OF THE APPLICABLE AIRCRAFT. THE CONTRACTING OFFICER WILL SUPPLY LABELS ON REQUEST. THE NOMENCLATURE OF THE ITEM SHALL BE EXTENDED TO SHOW THE END ITEM APPLICATION; e.g., GEAR BOX, MAIN, FOR *(applicable aircraft)*; WING ASSEMBLY, RIGHT, FOR *(applicable aircraft)*.

☐ c. OTHER.

APPROVED BY	ORGANIZATION	DATE
P. H. Siler	AMSAV-MK	25 June 1968

Figure 2. Preservation, Packaging, Packing and Marking Requirement.

6. DESCRIPTION.

The linear actuator is powered by a 28-vdc split-series motor acting through a 105-to-1 gear-reduction train to drive a jackscrew assembly. A movable tube is threaded onto the jackscrew and is moved in and out by it. A rod end is attached to the outer end of the movable tube and is adjustable ± 0.35 inch in any position. The movable tube is kept from turning by a positive stop which also controls the limits of the stroke. By turning a threaded shaft, the stroke is externally adjustable from 0.50 to 1.75 inches without changing nominal length. Mechanical stops are located on the threaded shaft and, because of the left-hand and right-hand threads, move equidistant from the midpoint when the shaft is turned. The positive stop hits against the mechanical stops and travel is limited between the two mechanical stops.

7. LEADING PARTICULARS.

Leading particulars of the linear actuator are shown in table 1.

Table V. Leading Particulars

Rated Load	.71bs.
Nominal Voltage	.28vdc
Rated Current (Approx.)	0.5 amp
Stroke	.1.53 inch nominal
Timing	.5 t0 9 seconds per 1.53 inches at 7 lb load
Duty	Continuous
Gear Reduction.	105 to 1
Motor Type	Split Series
Motor Brake	Magnetic
Radio Noise Filter	150 mc
Enclosure	Explosion proof
Temperature Range	–65oF to+260oF
Weight	1 lb. 14oz.
Overall Dimensions:	
Length:	
Retracted	10.28 ±0.03 inches
Nominal,	11.05 ±0.03 inches
Extended	11.82 ±0.03 inches
Height	.3.612 inches
Width	.1.380 inches

SECTION II

TEST EQUIPMENT, SPECIAL TOOLS AND MATERIALS

SPECIAL TOOLS.

No special tools are required.

9. TEST EQUIPMENT.

Test equipment required is listed in table 2.

Table 2. Test Equipment Required

PART, MODEL OR MIL DES	NOMENCLATURE	TECHNICAL DESCRIPTION
Part No. 946-29760 (FMC 05624) or equivalent	Load Travel Fixture, SYLC 9190	See Figure 6

Table 3. Consumable Materials List

ITEM NUMBER	MATERIAL	TYPE OR GRADE	GOVERNMENT SPECIFICATION
1.	Solvent	Trichlorethylene, Technical	0-T-634b
2.	Solvent	Epoxy Strip T-251-C (FMC 90973)	
3.	Grease	Aircraft and Instrument	MIL-G-23827
4.	Grease	Aircraft and Instrument, with 10% Lubricant, Molybdenum Disulfide	MIL-G-23827 MIL-M-7866
5.	Sealant	RTV108	MIL-A-46106
6.	Sealing Compound	Paste	MIL-S-7124
7.	Lubricant	Silicone Compound	MIL-S-8660b
8.	Varnish	Electrical, Insulating	MIL-I-24092

SECTION III

GENERAL SUPPORT MAINTENANCE

10. DISASSEMBLY.

Disassemble the linear actuator, figure 3, as follows:

CAUTION

Tag and identify all parts as removed for use in reassembly

a. Cut and remove lockwire from screws (1).

b. Remove four screws (1) and stationary anchor (2). Exercise care when breaking seal.

c. Cut and remove lockwire to screws (3) and remove screws.

d. Remove end cap (4). Exercise care in breaking seal.

e. Remove ball bearing (5), and washers (6 and 7).

CAUTION

Tag all gear assemblies at disassembly to insure sets being kept together and not intermixed. Do not attempt removal of oilite bearings from gear assemblies.

f. Remove washer(8) and gear assembly (9).

g. Remove washer (10) and gear (11).

h. Remove gear (12) and washers (13 and 14).

i. Filter (15) need not be removed unless replacement is necessary. Refer to paragraph *13b* for test procedure.

j. Remove insulator (16).

k. Cut and remove lockwire to screws (17).

l. Remove four screws (17).

m. Remove plate (18). Exercise care in removing plate and breaking seal. Use knife or sharp instrument.

n. Remove jackscrew assembly (19) by turning in a counterclockwise direction.

o. Loosen nut (21) and turn rod end bearing (20) counterclockwise to remove.

p. Remove nut (22) and washer (23). Remove instruction plate (24).

q. Loosen nut (25). Run nut (25) and nuts (26 and 27) to center of adjusting screw (30) far enough to disengage from housing. List adjusting screw (30) and associated parts clear from housing. Parts need not be removed from adjusting screw (30).

r. List positive stop (31) from unit.

s. Remove ball bearing (34) from housing by tapping end of movable tube (32) with a soft mallet.

t. Remove movable tube (32) from unit by pulling straight out. Remove quad ring (33) from housing.

u. Remove screws (35) and washers (36).

v. Remove cover (37).

w. Do not remove terminal block (41) unless it is cracked or damaged. Refer to inspection section. If removal is necessary, do the following.

(1) Unsolder motor leads from one side of filter and unsolder terminal block leads from other side of filter.

NOTE

Mark which leads go to which terminal to allow for correct reassembly.

(2) Remove filter (15).

CAUTION

Use sharp-bladed screwdriver and pry only on under side of casting, as casting may be chipped by excessive pressure.

(3) Remove two screws (40).

(4) Remove screw (42) and terminal (43).

(5) Remove terminal block (41).

x. Remove motor (44) from housing (45) by unsoldering leads from filter (15) and lifting it forward.

y. Remove two screws (47) from motor (44) and remove cover (46).

z. Unsolder brushes (48). Remove and discard.

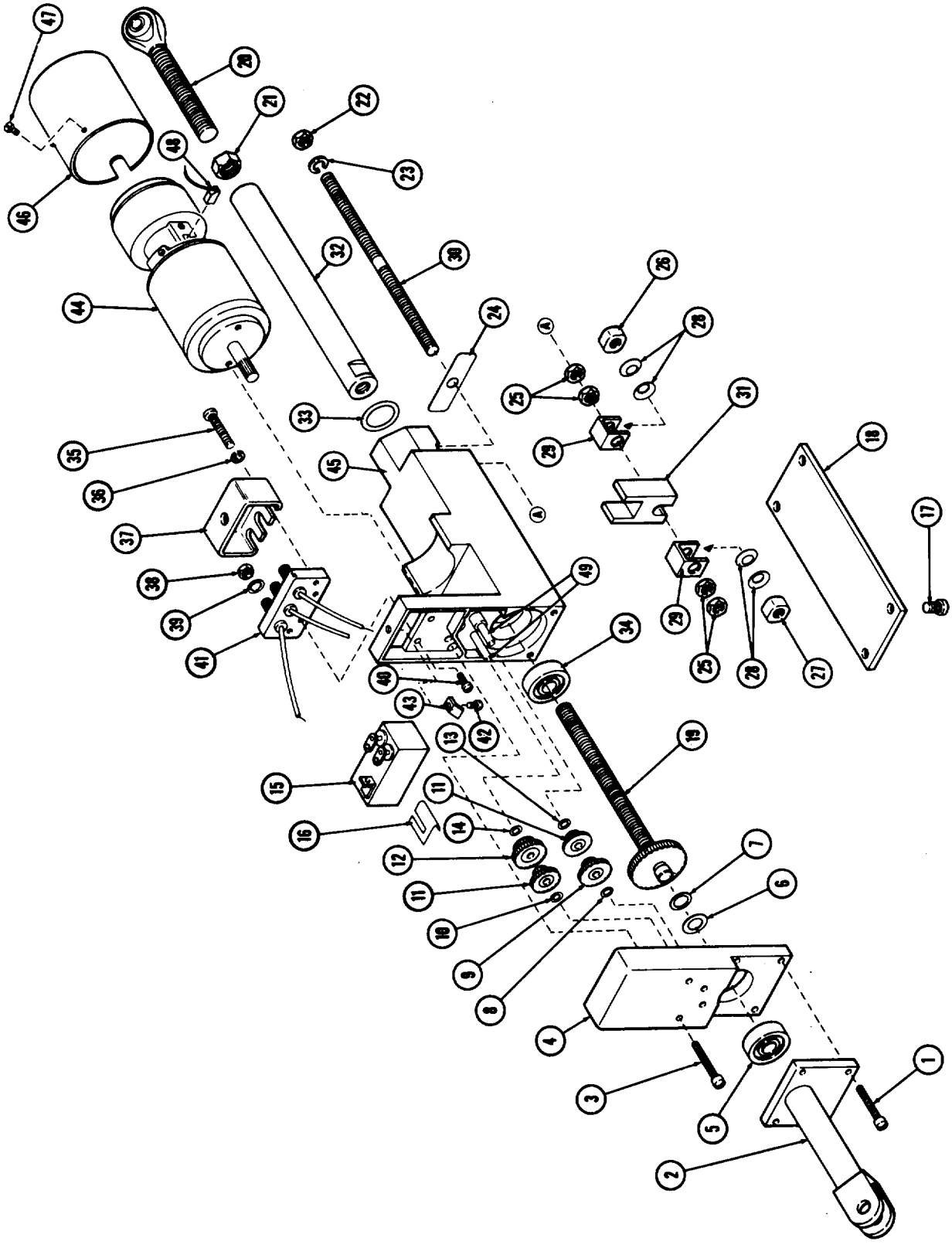


Figure 3. Linear Actuator—Exploded View.

FIGURE AND INDEX NO.	PART NUMBER	DESCRIPTION	QTY PER ASSY
3-1	JYRF 194	Machine Screw	4
3-2	SYLC 9190-10	Stationary Anchor	1
3-3	MS35265-33	Machine Screw	2
3-4	SYLC 510-1	End Cap	1
3-5	HSIK-FS160L	Ball Bearing	1
3-6	CYRD 272	Flat Washer	AR
3-7	CYRD 272	Flat Washer	AR
3-8	CYRD 311	Flat Washer	1
3-9	SYLC 522	Gear Assembly	1
3-10	CYRD 311-3	Flat Washer	1
3-11	SYLC 523	Gear Assembly	2
3-12	SYLC 524	Gear Assembly	1
3-13	CYRD 311-4	Flat Washer	1
3-14	CYRD 311-3	Flat Washer	1
3-15	CYZR 736	Radio Interference Filter	1
3-16	SYLC 566	Insulator	1
3-17	BYRF 627	Machine Screw	4
3-18	NYRZ1-22-2	Cover Plate	1
3-19	SYLC 521	Jackscrew Assembly	1
3-20	MDV 14D	Rod End Bearing	1
3-21	DYRF 14	Jam Nut	1
3-22	JYRF 183	Hexagon Nut	1
3-23	CYRD 198	Lock Washer	1
3-24	SYLC 516	Instruction Plate	1
3-25	JYRF 184/3	Hexagon Nut (2RH, 2LH)	4
3-26	JYRF 168	Nut (RH)	1
3-27	JYRF 169	Nut (LH)	1
3-28	375-20	Belleville Washer	8
3-29	SYLC 529	Keeper	2
3-30	SYLC 519	Adjusting Screw	1
3-31	SYLC 515	Positive Stop	1
3-32	SYLC 520	Movable Tube	1
3-33	BYRZ 102	Quad Ring	1
3-34	HSIK-FS160L	Ball Bearing	1
3-35	IMS35275-208	Machine Screw	2
3-36	AK936A2	Lock Washer	2
3-37	SYLC 526	Cover	1
3-38	DYRF 257	Hexagon Nut	3
3-39	AN936A6	Flat Washer	3
3-40	AN505-2R4	Machine Screw	2
3-41	SYLC 514	Terminal Assembly Mounting	1
3-42	BYRF 798	Machine Screw	1
3-43	2104-4	Terminal	1
3-44	DYLM 73501-1	Drive Motor	1
3-45	SYLC 509-1	Housing	1
3-46	DYLM 525-5	Motor Cover	1
3-47	AX505-2R4	Machine Screw	1
3-48	DYLM 26-1	Contact Brush	1
3-49	No Number	Gear Shafts	2

11. CLEANING.

Clean components of the linear actuator as follows:

a. Clean nonelectrical parts with an approved cleaning solvent, (item 1, table 3) and dry with compressed air.

WARNING

Provide adequate ventilation when using cleaning solvent.

CAUTION

Do not clean gear assemblies (9, 11 or 12, figure 3) containing oilite bearings in cleaning solvent. Do not allow races of ball bearings to spin in compressed air stream when drying.

b. Clean electrical parts with a clean, lint-free cloth.

c. Remove sealer from housing (45), using chemical paint stripper, (item 2, table 3).

12. INSPECTION:

Inspect components of the linear actuator as follows:

a. Visually inspect all parts for cracks, excessive wear, deformities, or damaged threads to determine their suitability for reuse.

b. If oilite bearings in gear assemblies are excessively worn (maximum new inside diameter is 0.1266 inch) replace gear assembly.

Table 4. Wear Limits for Gear Train Components

FIGURE AND INDEX NO.	NOMENCLATURE	MAXIMUM CLEARANCE (Inches)
3-9	Gear Assembly (ID)	0.003
3-11	Gear Assembly (ID)	0.003
3-12	Gear Assembly (ID)	0.003
3-49	Gear Shafts (OD)	0.003

c. Inspect all gears for excessive play between teeth and inspect gear pins of housing for wear.

13. TESTING.

Functionally test components of the linear actuator as follows:

U. Connect drive motor (44, figure 3) to a 26-volt dc supply containing a single-pole double-throw center OFF switch and check for proper operation an rotation as follows:

(1) Viewing motor from shaft end, the shaft shall rotate clockwise with the plus side of dc power supply connected to red lead and minus connected to the motor case.

(2) Motor shall reach no-load speed of 12,000 rpm within 20 seconds after start in either direction.

(3) Running current at no-load must not exceed 0.3 ampere in either direction of rotation.

(4) Minimum stall torque shall not exceed 0.075 in. lbs.

(5) Check for brake pull-in at 15.5 volts.

b. Check filter (15, figure 3) for breakdown at 200 volts dc for one minute with both terminals tied together. Allow capacitors to charge before reading and discharge after test. Connect 150 vdc for two minutes, terminal to case (terminals tied together); minimum readings should be 20 megohms. Check resistance through each section. Resistance of each section should be 0.6 ohms maximum.

WARNING

Dangerous potentials up to 200 volts dc are applied in this step. Use extreme caution in testing of filter.

14. REPAIR OR REPLACEMENT.

The design of the actuator limits repair to the removal of slight dents and deformities in covers, supports, plates, etc. All other parts found to be defective during visual inspection testing shall be replaced.

15. LUBRICATION.

Lubricate components of the linear

actuator and reassemble as follows:

a. Pack ha]] bearings (5 and 34, figure 3) 30 to 50 percent full of grease, (item 3, table 3).

b. Lubricate bearings, studs, and gear assemblies forming the gear train with a grease mixture (item 4, table 3). The total amount of lubricant shall not exceed one level teaspoon.

CAUTION

Do not pack gear train and end cap solid with grease because over lubrication will affect operation in extreme temperatures.

16. REASSEMBLY.

Reassemble the linear actuator as follows:

a. Install new motor brushes (48, figure 3) and solder leads to motor (44).

b. Replace cover (46) and two screws (47) on motor *(44).*

c. Assemble motor (44) to housing assembly (45). Put three beads of sealant (item 5, table 3) the length of curved surface of the casting. Assemble motor to housing so that motor leads extend through lead hole in casting and threaded holes in boss of motor line-up with clearance holes in casting. Put a temporary screw (3) in mounting hole farthest away from motor leads. When tightening this screw, be careful not to pinch motor leads. Add a bead of sealant (item 5, table 3) on the outside mating edges of motor and casting. Smooth off excess sealant. When finished, no daylight must be seen between motor and casting.

d. Mount terminal block assembly (41) to housing (45). Apply a thin, even film of sealer to mating surface on housing (45). Position terminal block while threading the solid tinned wire from terminal block through the end hole of terminal on housing. Install screws (40).

e. Prepare to solder motor and terminal block leads to filter (15). The identification side of the filter is referenced as the top. Motor leads are soldered to motor identified side of filter. Motor leads are routed along the top side of terminals and soldered to that side of eyelet; red to the top, and black to the bottom terminal. Solder terminal block leads so that leads so that leads extend straight away from eyelet; red to the top terminal, and black to the bottom.

f. Mount filter in cavity of housing Apply a bead of sealer (item 6, table 3) to bottom of housing cavity. Position filter in cavity, and hold firmly in place while wrapping three turns of l/2-inch masking tape around filter and casting. Allow 24 hours for sealer to cure before removing tape.

g. Solder solid tinned wire to filter lug and housing terminal. Route red and black terminal block leads in cavity below terminal lug of filter. Form solid tinned wire to filter lug eyelet and cut off excess wire. Solder leads to both terminals.

h. Assemble jackscrew (19), bearing (34) and movable tube (32). Slide bearing over threaded end of jackscrew and onto smooth surface of jacks crew. A plastic mallet and tube to drive against the interbearing race may be necessary to assembly some bearings. Apply a heavy film of grease to jackscrew threads. Thread jackscrew into movable tube until approximately half of threads are left showing. Jackscrew will thread into one end only.

i. Assembly jackscrew/movable tube assembly in housing (45), inserting from filter mounting end of housing. Apply a film of lubricant, (item 7, table 3) to quad ring (33). Start movable tube into housing. The packing installed in the opposite end of the housing will create a slight resistance. Apply a film of grease (item 4, table 3) to teeth of gear on jackscrew. Continue to push jackscrew until bearing under gear has nested in housing.

j. Remove masking tape from filter.

k. Assemble components to adjusting screw (30).

(1) Lay out adjusting screw (30) so that slotted end is to right of operator.

(2) Assemble four Belleville washers (28) and nut (26) inside keeper (29). Thread this assembly onto slotted end of adjustment screw with washers toward center of shaft. Thread down so that left edge of keeper is approximately 3/8 inch away from unthreaded area of adjustment screw.

(3) Thread two nuts (25) onto slotted end of adjustment screw keeping curved

side of nuts toward center of shaft. Thread nuts down close to previous assembly in step *b*.

(41 Assemble four Belle vine washers (28) and nut (27) inside keeper (29). Thread this assembly onto nonslotted end of adjustment screw, keeping washers of this assembly toward center of shaft. Thread down so that right edge of keeper is approximately 3/8 inch away from unthreaded area of adjustment screw.

(5) Thread two nuts (25A) onto nonslotted end of adjustment screw, keeping curved area of nuts toward center of shaft. Thread nuts down close to previous assembly in step *d*.

1. Assemble positive stop (31) and movable tube assembly (32) inside housing (45).

(1) Apply thin film of grease to sides of slot where positive stop travels inside housing.

(2) Rotate movable tube until two flats are straight up. Assemble positive stop (31) over flats and down to tube.

m. Assemble adjustment screw assembly (30) into housing (45).

(1) Lay out housing with open cavity up and filter end to the right of operator.

(2) Insert slotted end of adjustment screw assembly from open cavity side of housing and through hole on left end of cavity. Lay a thin piece of material (micarta, old nameplate, brass, etc.) underneath shaft of nonslotted end. Tap nonslotted end of shaft with a plastic hammer until assembly will fit into open cavity of housing. Remove thin piece of material and insert nonslotted end of shaft through hole on right end of cavity. The center of shaft will be in slot of positive stop (31).

(3) Thread nut (25) nearest slotted end of snug-to-inside wall of housing cavity. Apply a small amount of sealant, (item 8, table 3) to threads of adjustment screw, right behind nut. Thread other nut (25) so that surfaces of the two nuts are together. Hold nut next to housing wall with a 5/16-inch open-end wrench and tighten other nut against this nut with another 5/16-inch open-end wrench.

(4) Thread nut (25A) on adjustment screw assembly nearest filter end of housing, up to inside wall of housing cavity and then, back it off so that a 0.005-inch feeler gage will go between nut and housing wall. Apply a small amount of sealant (item 8, table 3) to threads of adjustment screw right behind nut. Thread other nut (25A) so that surface of the two nuts are together. Hold nut next to housing wall with a 5/16-inch open-end wrench and tighten other nut up against this nut with another 5/16-inch open-end wrench.

(5) The adjustment screw assembly should now turn freely inside cavity of housing.

NOTE

End play inside cavity must he held from 0.002 to 0.008 inch. Measure this with a feeler gage between nut (25A) and housing wall. If any adjusting is needed to attain this, adjust two nuts (25A).

(6) Assemble instruction plate (24) over slotted end of adjustment screw so that it can be read with open side of housing down. Assemble lockwasher (23) over end of adjustment screw and down to instruction plate. Apply a small amount of sealant (item 8, table 3) to threads of adjustment screw. Thread nut (22) over end of adjustment screw and down to lockwasher. Hold adjustment screw in place by putting a screwdriver in the slot and tighten nut with a 5/16-inch open-end wrench.

n. Assemble gear train per figure 4. Apply grease to gear train per paragraph *15b*.

o. Assemble bearing (5) to end of jackscrew (19). Shim between bearing and jackscrew gear with flat washers (6 and 7) as required to position bearing on jackscrew so that bearing extends 0.002 to 0.006 inch beyond face of end cap. Assemble insulator (16) over filter terminals where motor leads are soldered. The filter terminals must extend parallel to filter case; use a pair of needle-nose pliers to achieve this. Extreme care must be exercised when routing leads prior to assembling end cap (4). Motor leads must be routed in a way to prevent interference with mating surfaces of end cap and

housing and to provide clearance for end cap mounting screws. Terminal block leads must lay in cavity below solid tinned wires and terminals, and not against any sharp edges of housings.

p. Assemble end cap (4) to housing (45). Remove screw (3) holding motor. Apply sealer to mating surface of housing (45). Position end cap (4) over filter and bearing to mating surface. Be careful not to crush insulator (16) between mating surfaces. Assemble two screws (3) through end cap and into threaded holes of motor end cap. At this time check bearing shims as specified.

q. Assemble one each, nut (38) and washers (39) to three threaded studs on terminal block.

r. Assemble anchor (2) to housing (45). Apply a very thin film of sealer (item 8, table 3) to mating surface on end cap (14). Keep sealer away from bearing (5). Position anchor and assemble four screws (1).

s. Assemble rod end bearing (20) to movable tube (32). With rounded side of nut (21) facing anchor end of bearing, start threaded end of anchor into nut. A minimum of 7/16-inch of threads must be left between nut and anchor end. Start anchor threads in movable tube (32). Thread into movable tube until nut and end of movable tube meet. Do not tighten nut at this time.

f. Secure rod end bearing (20) in position. Position anchor (2) on stationary end of fixture (figure 6). With nut on rod end bearing finger tight, 7/16-inch threads must be showing from nut to bearing end. Position bearing end into fixture next, tighten thumb screw, and use wrench to tighten nut against movable end.

u. Adjust travel, check end play, timing, and current.

(1) With power supply in OFF position, attach connector to the unit.

(2) Install unit in load travel (test) fixture.

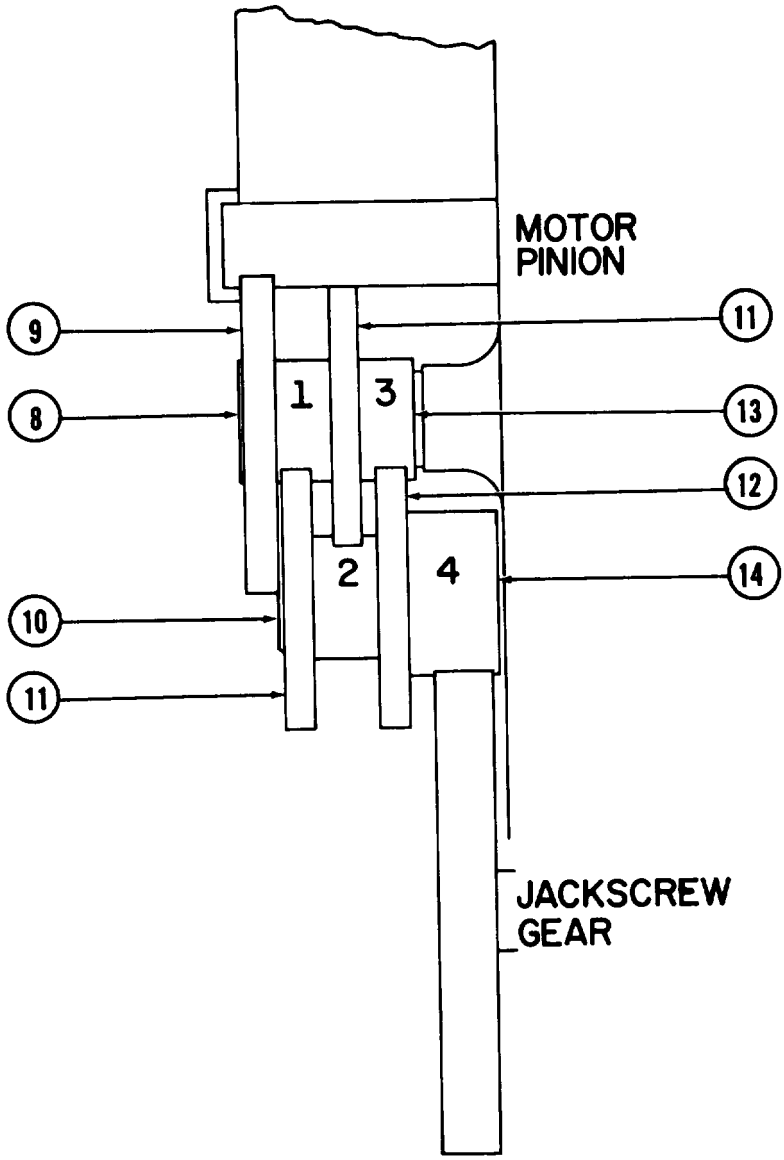


Figure 4. Gear Train Installation.

FIGURE AND INDEX NO.	DESCRIPTION	QTY PER ASSY
4-8	Flat Washer	1
4-9	Gear Assembly	1
4-10	Flat Washer	1
4-11	Gear Asseembly	2
4-12	Gear Assembly	1
4-13	Flat Washer	1
4-14	Flat Washer	1

(3) Turn torque mechanism of fixture ON. Position extend and retract lever to OFF.

(4) Inch the unit (extend or retract) so that air cylinders on the fixture are at midstroke.

(5) Adjust load to 7 lbs, reading on gage of holding fixture. Increase or decrease by turning knob on control fixture and reversing the extend and retract lever.

(6) Attach end play fixture bar to movable tube on unit. Adjust to dial indi-

cater installed in fixture so that a reading can be determined. Position torque lever to extend, set dial on indicator to zero. Reverse lever to retract, reading on indicator must not exceed 0.005 from zero.

v. Remove two screws (17) holding plate. Apply a thin film of sealer (item 8, table 3) to the mating surfaces of the housing (45). Be careful not to turn adjustment nuts on adjustment screws because of a possible travel change. Position cover plate (18), secure with four screws (17).

w. Seal area between edge of anchor (2) and end cap (4).

z. Lockwire complete.

y. Assemble terminal block cover (37). Use two screws (35) and two washers (36) to secure cover to terminal block, Screws must be started straight to prevent thread stripping. Torque screws to one inch-pound.

SECTION IV

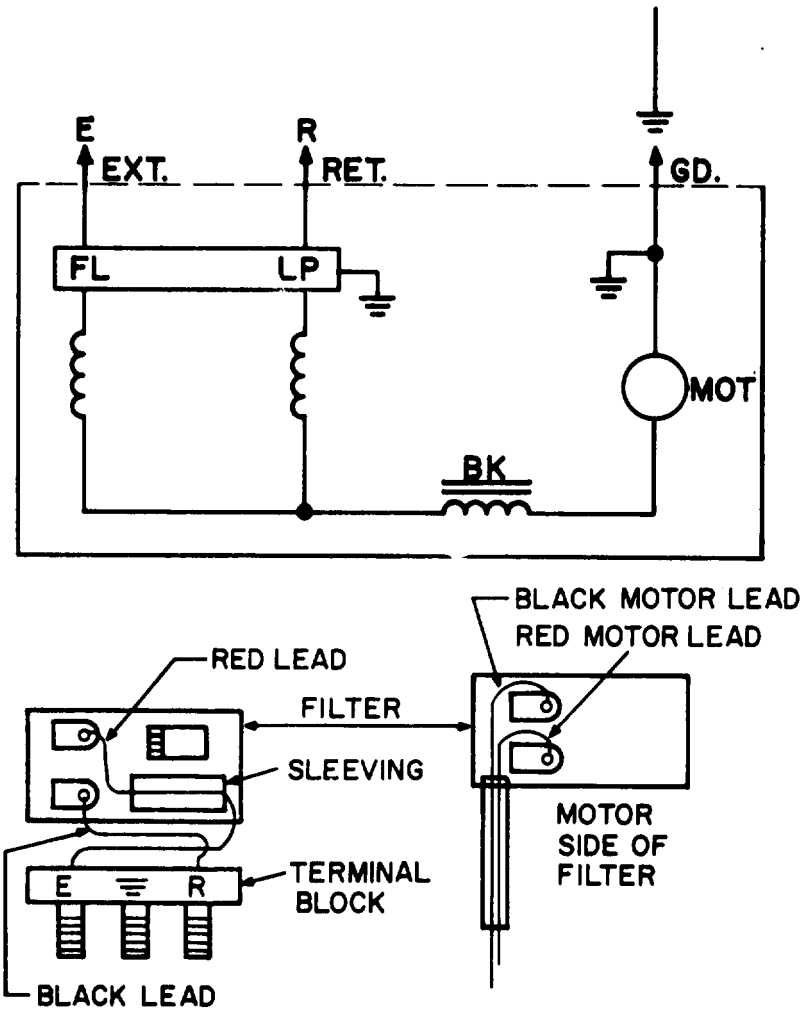
FINAL TEST PROCEDURES

17. TEST PROCEDURE.

Mount the linear actuator in a load travel fixture (figure 6). Loosen nut (22, figure 3) and turn adjusting screw (30) clockwise to full stroke position. Tighten lock nut, Perform the follwoing operational tests.

a. Attach a seven pound load to movable tube. Apply 28 volts dc to point E, figure 5, with actuator fully retracted. Actuator shall travel 1.53 ± 0.003 inches within five to nine seconds.

b. Apply 28 volts dc to point R, figure 5. Actuator shall retract completely within five to nine seconds.



TERMINAL BLOCK WIRES

E RED 2-1/2"
SOLID TINNED WIRE 3"
R BLACK 1-3/4"

MOTOR LEAD LENGTHS MEASURED FROM MOTOR. RED 1-1/4 EXT; BLACK 1-1/4" RET. CUT AND TIN MOTOR LEADS BEFORE ASSEMBLING HOUSING. SET ADJUSTING SCREW 15/64" FROM HOUSING. ADJUST ROD END BEARING 7/16" THREADS FROM NUT.

Figure 5. Wiring Diagram.

c. End play must not exceed 0.005 inch with a seven pound reversing load in either direction.

d. Apply 30 volts dc to point E and run unit into positive stop. Apply 20 volts dc to point R, unit should back off stop. Repeat procedure at other end of stroke.

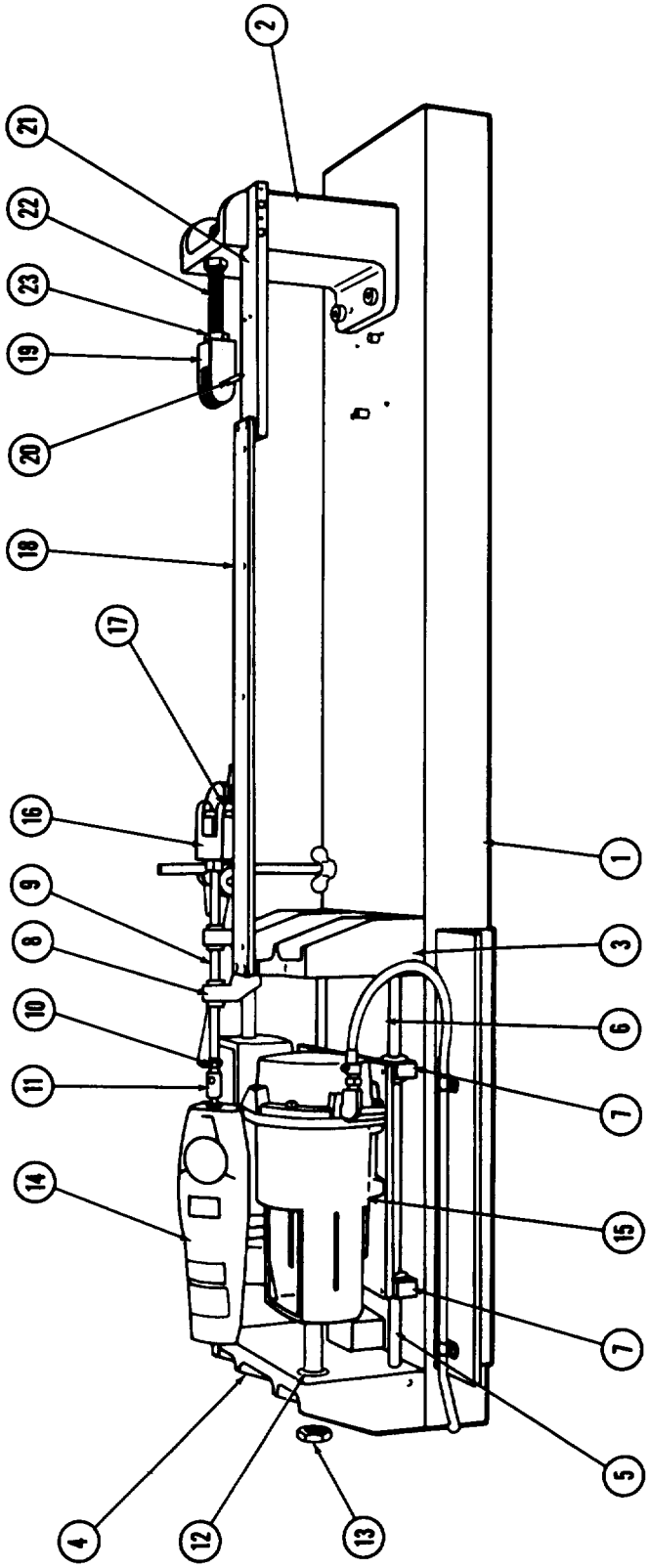


Figure 6. Loud Travel (Test) Fixture

FIGURE AND INDEX NO.	DESCRIPTION	QTY PER ASSY
6-1	Base	1
6-2	block	1
6-3	Front Plate	1
6-4	Back Plate	1
6-5	Bearing Shaft	1
6-6	Mounting Block	1
6-7	End Bearing Block	1
6-8	Bearing Block	1
6-9	Push Rod	1
6-10	Swivel	1
6-11	Adapter	1
6-12	Washer	1
6-13	Nut	1
6-14	Force Gage	1
6-15	Pneumatic Device	2
6-16	Front Anchor	1
6-17	Front Pin	1
6-18	Scale (18 in. Rule)	1
6-19	Rear Anchor	1
6-20	Rear Pin	1
6-21	Back Support Block	1
6-22	Rear Stud	1
6-23	Nut	1

SECTION V

DIFFERENCE DATA SHEETS

(Not applicable)

APPENDIX A

REFERENCES

TM 38-750 The Army Equipment Record System

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant *General.*

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