

MACHINE SCREW ACTUATORS

1/4 to 250 Tons

Because the Duff-Norton machine screw mechanical actuator is produced in many standard models with a wide range of capacities, there is a standard model for almost any requirement. Models can be furnished to 250 Tons capacity.

Operated manually or by means of gear motors, machine screw actuator models can be used singly, in tandem or in multiple arrangements (see page 133). Since most capacities have a uniform lifting speed, added economy can be realized in raising unevenly distributed loads by operating the different capacities in union.

Most Duff-Norton machine screw actuator models with higher ratios are self-locking and will hold heavy loads in position indefinitely without creep. They can be used to push, pull, apply pressure and as linear actuators. They are furnished with standard raises in increments of 1 inch. Depending upon size and type of load, models are available with raises up to 20 feet.

Top Plate

Must be bolted to lifting member to prevent rotation except when screw is keyed.

Lifting Screw

Available with threaded end or clevis end instead of top plate.

Shell Cap

Locked into place by set screws.

Load Bearings

Bearings, top and bottom to take loads in either direction.

Thrust Bearing & Grease Seals

At each end of worm. 1/4, 1/2 and 1-Ton models do not have seals.

Worm Gear

Wear resistant Bronze. Accurately hobbled for greater gear contact.

Worm

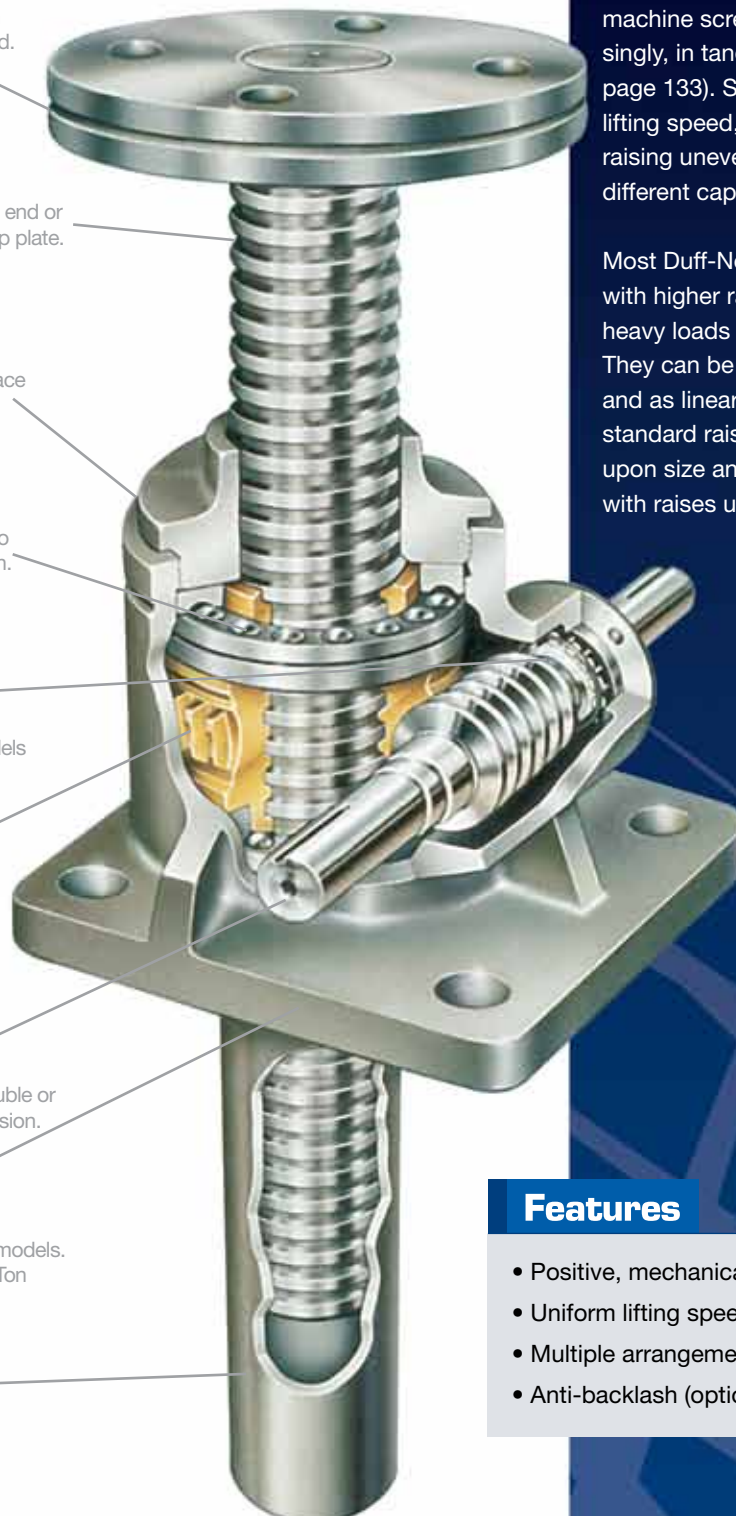
Available with double or single shaft extension.

Housing

Aluminum on 1/4 to 1-Ton models. Ductile iron or cast steel 2-Ton through 250-Ton models.

Coverpipe

Protects lifting screw threads.



Features

- Positive, mechanical positioning
- Uniform lifting speed
- Multiple arrangements
- Anti-backlash (optional)

MACHINE SCREW ACTUATORS

Model Numbering System

FL - TKM - 9002 - 6 - 1R

Model Prefix

R - Reducer
F - C-face Adapter
H - Hand Wheel
L - Limit Switch
E - Encoder
J - Rotary Counter

Screw End & Configuration

T - Threaded End
C - Clevis End
M - Top Plate
P - Plain End
K - Keyed Screw
CC - Double Clevis
D - Inverted Rotating
U - Upright Rotating
N - Numeric Ratio

Series & Capacity No.

Series:
 Machine Screw
 (90xx, 18xx, 70xx, 25xx)
 Special MS
 (100xx, 20xx, 80xx, 35xx)

(1800 series base configurations are available only on 2 and 50 Ton models)

Capacities:
 Upright model suffixes end with the capacity number. Inverted model suffixes lower the capacity number by one digit. Rotating model suffixes raise the capacity number by one digit.

M - Base Model

Travel

1" increment travels are always represented using the exact travel amount.

Travels with fractional lengths are quoted using that length, but are serialized when the order is processed.

Serialized digits in this position may also be used for other models containing special features

Model Suffix

B - Boot
L - Single End Worm Ext. Left
R - Single End Worm Ext. Right
1 - Optional Ratio #1
2 - Optional Ratio #2
X - Supplied without cover pipe

B9003 TV - 10.50 - LX2 - BFL

Capacity

B9225 - 500 Lbs
B9250 - 1000 Lbs
B9003 - 3 Ton

Screw End

C - Clevis End Screw
CC - Double Clevis Ends
M - Top Plate Screw
P - Plain End Screw
T - Threaded End Screw

Travel

1" Incremental travels are always represented using the exact travel amount. Fractional lengths are represented and processed to the nearest 100ths.

Base Model

None - Upright Translating
D - Inverted Rotating
K - Keyed, anti-rotation
U - Upright Rotating
V - Inverted Translating

Key Accessories

B - Boot
E - Encoder
F - C-face Adapter
H - Hand Wheel
J - Rotary Counter
L - Limit Switch
R - Reducer

Model Suffix

L - Single End Worm Extension Left
N - Numeric Gear Ratio - 100 turns/inch
R - Single End Worm Extension Right
X - Supplied without Cover Pipe
1 - Alternate Gear Ratio #1
2 - Alternate Gear Ratio #2

Alphabet characters representing features and suffixes should always be used in alphabetic order to avoid questions of hierarchy.

Models for actuators with specialized features will have a serialized suffix such as B9225T-0001.

Machine Screw Actuator Performance Table

Performance Table Instructions – pgs. 17, 39, 45, 53 and 74

When reviewing any Duff-Norton Actuator Performance Specifications Table, as part of the process of selecting the best-suited actuator for your application, there are several important worm-gear ratios to consider.

Standard Ratio – is frequently chosen when higher speeds and efficiency ratings are desired.

Optional Ratio – is frequently chosen when the application requires higher lifting capacities, lower speeds, or to ease the use of a handwheel.

Numeric Ratio – is frequently chosen for applications requiring fine adjustments, higher lifting capacities, lower speeds, the easy use of a handwheel, self locking applications, and also offers the benefit of an even number of worm input turns per inch of stroke.

Specifications - Standard, Optional, and Numeric Ratios																	
Capacity (Tons)	1/4	1/2	1	2	3	5	10	15	20	25	35	50	75	100	150	250	
Max. Speed C-face Driven (in/min)** page 116	—	—	—	72.0	72.0	108.0	108.0	108.0	108.0	107.5	107.5	—	—	—	—	—	
Max. Speed Red. Driven (in/min)** page 108-109	—	—	—	14.4	21.9	21.9	21.9	21.9	21.9	22.2	22.4	12.2	—	—	—	—	
Dimensional Information Shown on page	18	19	20	21-23	24	25	26	27	28	29	30	31-32	33	34	35	36	
Lifting Screw	Diameter (in)	5/8	5/8	3/4	1	1	1 1/2	2	2 1/4	2 1/2	3	3 3/4	4 1/2	5	6	7	9
	Pitch (Std.&Opt.)	0.250	0.125	0.200	0.250	0.250	0.375	0.500	0.500	0.500	0.666	0.666	0.666	0.666	0.750	1.000	1.000
	Pitch (Numeric)	—	—	—	—	—	0.250	0.250	0.250	0.250	0.320	0.320	0.320	—	—	—	—
	Type	ACME	ACME	ACME	ACME	ACME	ACME	ACME	ACME	ACME	ACME	ACME	Mod. Sq.	Mod. Sq.	Mod. Sq.	Mod. Sq.	Mod. Sq.
Worm Gear Ratios	Std.	5:1	5:1	5:1	6:1	6:1	6:1	8:1	8:1	8:1	10 2/3:1	10 2/3:1	10 2/3:1	10 2/3:1	12:1	12:1	50:1
	Optional No. 1	—	—	20:1	24:1	24:1	24:1	24:1	24:1	24:1	32:1	32:1	32:1	32:1	36:1	36:1	—
	Optional No. 2	—	—	—	12:1	12:1	12:1	—	—	—	—	—	—	—	—	—	—
	Numeric Ratio	—	—	20:1	25:1	25:1	25:1	25:1	25:1	32:1	32:1	32:1	—	—	—	—	—
Turns of Worm for 1" Stroke	Std.	20	40	25	24	24	16	16	16	16	16	16	16	16	12	50	
	Optional No. 1	—	—	100	96	96	64	48	48	48	48	48	48	48	48	36	—
	Optional No. 2	—	—	—	48	48	32	—	—	—	—	—	—	—	—	—	—
	Numeric Ratio	—	—	100	100	100	100	100	100	100	100	100	100	—	—	—	—
Worm Torque at No Load (in-lb)	Std.	2	2	5	5	5	10	20	20	30	40	50	100	150	200	250	200
	Optional No. 1	—	—	5	5	5	10	20	20	30	40	50	100	150	200	250	—
	Optional No. 2	—	—	—	5	5	10	—	—	—	—	—	—	—	—	—	—
	Numeric Ratio	—	—	5	5	5	10	20	20	30	40	50	100	—	—	—	—
Maximum Horsepower per Actuator	Std.	1/3	1/3	1/2	2	2	4	5	5	8	8	15	15	25	25	35	
	Optional No. 1	—	—	1/4	1/2	3/4	3/4	1 1/2	1 1/2	1 1/2	2 1/2	2 1/2	6	6	11	11	—
	Optional No. 2	—	—	—	3/4	1 1/4	2	—	—	—	—	—	—	—	—	—	—
	Numeric Ratio	—	—	1/4	1/2	1/2	3/4	1 1/2	1 1/2	1 1/2	2 1/2	2 1/2	6	—	—	—	—
Worm Torque at Full Load* (in-lb)	Std.	13	21	55	120	165	450	750	1430	1811	2220	4000	7500	12000	16000	28110	20000
	Optional No. 1	—	—	25	50	75	185	400	820	1035	1401	2400	4200	6601	8600	15500	—
	Optional No. 2	—	—	—	75	105	275	—	—	—	—	—	—	—	—	—	—
	Numeric Ratio	—	—	25	48	72	175	370	640	925	1500	2411	4040	—	—	—	—
Efficiency Rating (%)	Std.	30.6	18.9	23.1	22.1	24.2	22.1	26.5	20.9	22.0	22.4	17.4	13.3	12.4	12.4	14.2	8.0
	Optional No. 1	—	—	12.7	13.3	13.3	13.4	16.6	12.1	12.8	11.8	9.7	7.9	7.5	7.7	8.6	—
	Optional No. 2	—	—	—	17.7	19.0	18.1	—	—	—	—	—	—	—	—	—	—
	Numeric Ratio	—	—	12.7	13.3	13.2	9.1	8.6	7.5	6.9	5.3	4.6	3.9	—	—	—	—
Key Torque (in-lb)	Std & Opt. 1 & 2	40	70	175	460	670	1750	4700	7580	10625	14000	26500	47110	73000	118200	216000	423300
	Numeric Ratio	—	—	175	460	670	1599	4077	6645	9369	11474	18561	30970	—	—	—	—
Max Worm Speed at Full Load (rpm)	Std.	1616	1000	573	1051	766	560	420	220	174	227	126	126	79	98	56	110
	Optional No. 1	—	—	630	630	631	278	236	115	91	112	66	90	57	81	45	—
	Optional No. 2	—	—	—	630	751	458	—	—	—	—	—	—	—	—	—	—
	Numeric Ratio	—	—	630	657	437	270	256	148	102	105	65	94	—	—	—	—
Max Load at Full Horsepower and 1750 rpm (lb)	Std.	455	527	520	2332	2521	3047	4386	3406	3370	5691	4220	5949	4939	8865	7003	26780
	Optional No. 1	—	—	400	1156	1888	1064	1791	1276	956	1839	1193	2831	1537	4670	2875	—
	Optional No. 2	—	—	—	1258	2402	2339	—	—	—	—	—	—	—	—	—	—
	Numeric Ratio	—	—	400	1210	1162	1031	1944	1646	1074	1714	1187	2946	—	—	—	—
Weight with 6" Stroke (Raise) (lb)	2	2	5	17	17	35	52	66	93	160	240	410	650	1200	1350	2700	
Weight per Additional 1" Stroke (Raise) (lb)	0.1	0.1	0.3	0.3	0.3	0.9	1.4	1.5	2.6	2.5	3.7	5.5	6.5	9.0	12.6	23.0	

*For loads from 25% to 100% of actuator capacity, torque requirements are approximately proportional to the load.

** Speed is a function of how the actuator is driven. Please see the indicated pages for more information.

Note: All actuator units can be supplied with standard raises up to 24 inches. Special raises up to 20 feet are available upon request. Closed height dimensions may increase for actuators supplied with bellows boots. See pages 146-147.