

MAXTORQUE Solutions

Manual or motorized gears and accessories for subsea and surface applications

TECHNOLOGY



Table of Contents

MAXTORQUE SOLUTIONS

High-Performance Worm Gear Operators.....	2, 3
Rising Stem Applications.....	4
High-Thrust Spurs.....	5
Sure Stop.....	6
Temperature Compensators.....	7
Declutch/Manual Overrides.....	8
Subsea and Offshore Applications.....	9
CAMSERV Services for Valves and Actuation.....	10

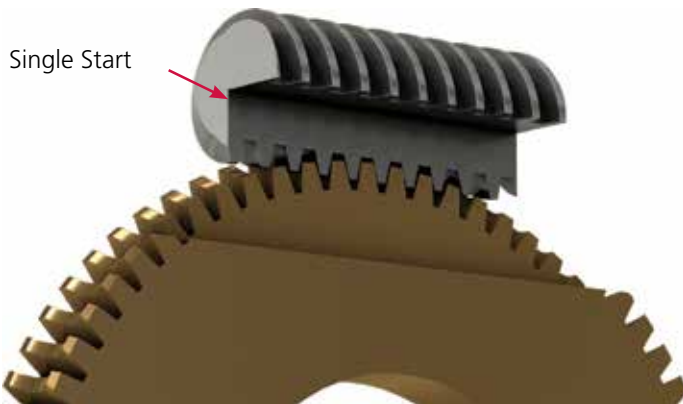
High-Performance Worm Gear Operators

FEATURES

Durability in Design

- Reduces turn-to-close by up to 75%, increasing operational efficiency
- Reduces rim pull, improving worker HSE profile
- Increases closing speed by up to 75%, improving process control
- Reduces required input torque, minimizing cost of actuation packages
- Reduces weight and piping loads with smaller actuation packages
- Double-enveloping worm design reduces backlash, minimizing seepage around the ball/disc and reducing fluttering

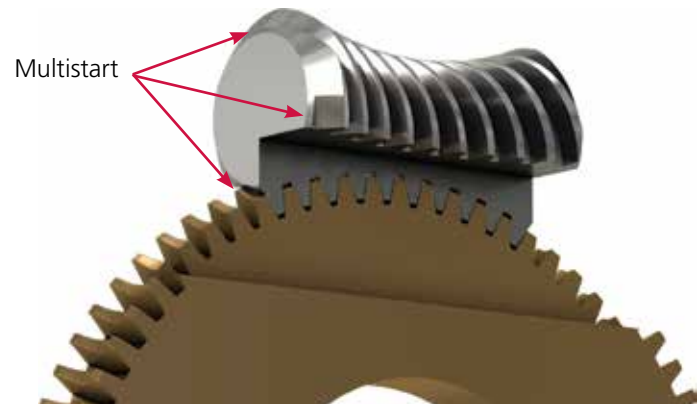
Single-Enveloping Worm Gear



Standard Worm Gears

1.23 to 2.98 teeth in contact

Double-Enveloping Worm Gear



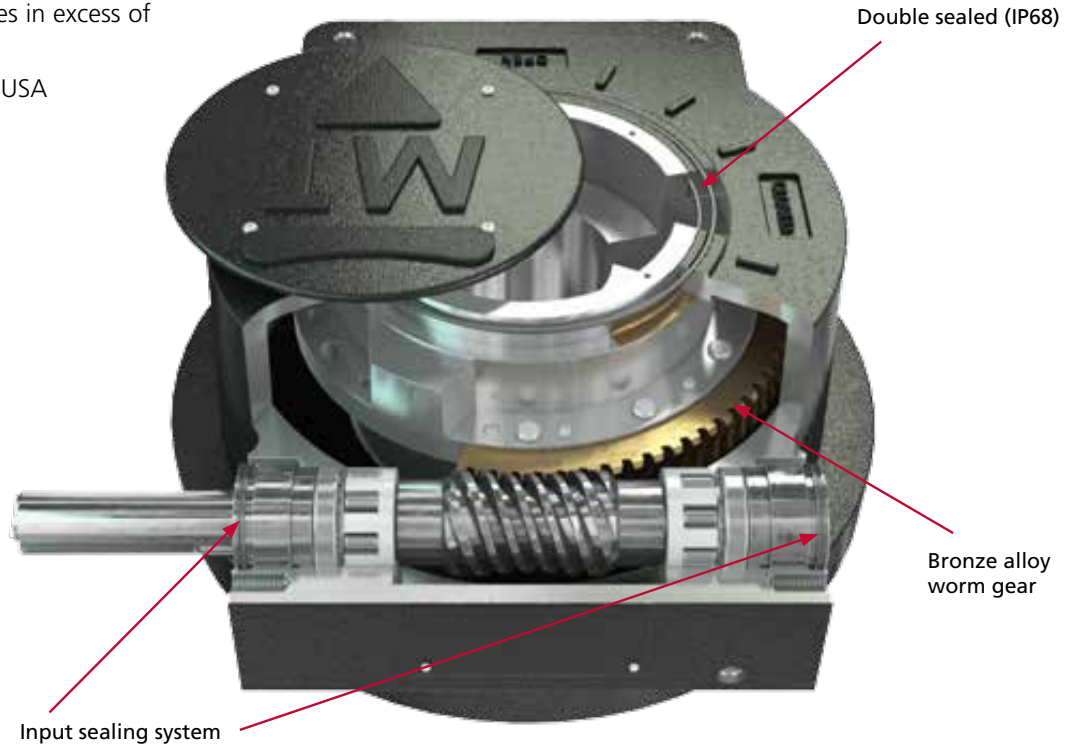
MAXTORQUE™ Worm Gears

6 to 13+ teeth in contact

- 6 to 13 teeth in contact versus 1.23 to 2.98 for standard gears
- Maximized tooth contact combined with the double-enveloping shape produces higher torque capability and significantly less backlash
- Novel tooth shape and high-contact ratio produces low-contact/bending stress
- Manganese bronze gear for increased lubricity, strength and corrosion resistance
- Rugged steel fabricated housings in the MW series; ductile iron on the LW and BW series
- Superior high graphite-based grease for smooth operation
- Roller bearings versus traditional needle bearings
- Bronze bearing on output
- Double-sealing O-ring system reduces fluid and particulate ingress into the gear

Quality in Manufacturing

- Rigorous PC/PLC cycle testing and qualification
- IP68 rating
- Designed to handle torques in excess of 1,000,000 ft-lb
- Made in Limerick, Maine, USA



Turn Reduction

Valve Size (in.)	Rated Torque (in.-lb)	Handwheel Diameter (in.)	Ratio	MA	Break Rim Pull (lb)	Turns-to-Close		Total Turn Reduction
						MAXTORQUE Technology	Conventional Technology	
16	75,000	24	150	82	55	38	112.5	75
18	100,000	24	152	82	75	38	112.5	75
20	200,000	24	156	106	76	39	190	151
24	200,000	36	156	106	76	39	190	151
30	400,000	36	391	234	62	98	297	199
36	700,000	36	470	285	75	118	297	180
40	700,000	36	730	444	76	183	428	246

Rising Stem Applications

High-Ratio, Small Envelope, Robust Worm Gear Solutions

FEATURES

- From 10,000 to 300,000+ ft-lb torque
- 2 MM+ lb thrust
- Highly efficient, double-enveloping bronze alloy worm gearset
- High-quality thrust bearings
- Manual or motorized applications
- Dual-input solution (seen below) reduces turns-to-close by three to four times on manual applications
- Smaller, stronger, faster and more cost effective compared to large bevels
- Quick delivery
- Easily accommodates mounting adaption and stem covers



High-Thrust Spurs

High-Torque, High-Thrust Rising Stem Solutions

FEATURES

- From 5000 to 300,000+ ft-lb torque
- 2 MM+ lb thrust
- Highly efficient spur gear drive train utilizing heat-treated steel
- High-quality thrust bearings
- Available double idler gearset allows for high torque while maintaining a low profile
- Stronger, faster and more cost effective compared to large bevels
- Quick delivery
- Application-engineered
- Easily accommodates mounting adaptation and stem covers
- High-temperature packages available

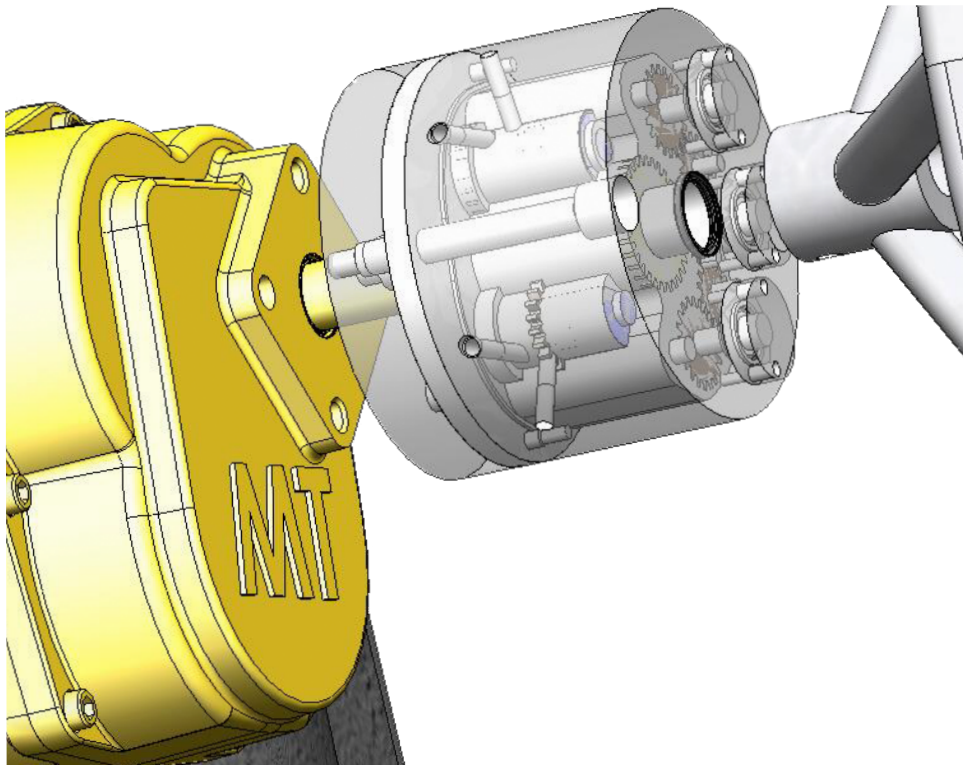


Sure Stop™

Over-Torque Protection Solutions

FEATURES

- Input stop that exceeds American Water Works Association (AWWA) requirements
- Seals at all junctions for superior service life
- Stop available in one-turn increments up to 6666 turns
- Number of turns can be adjusted in the field
- Modular design allows custom fit for specific applications
- Robust machined steel housing
- Extensive service testing



Temperature Compensators

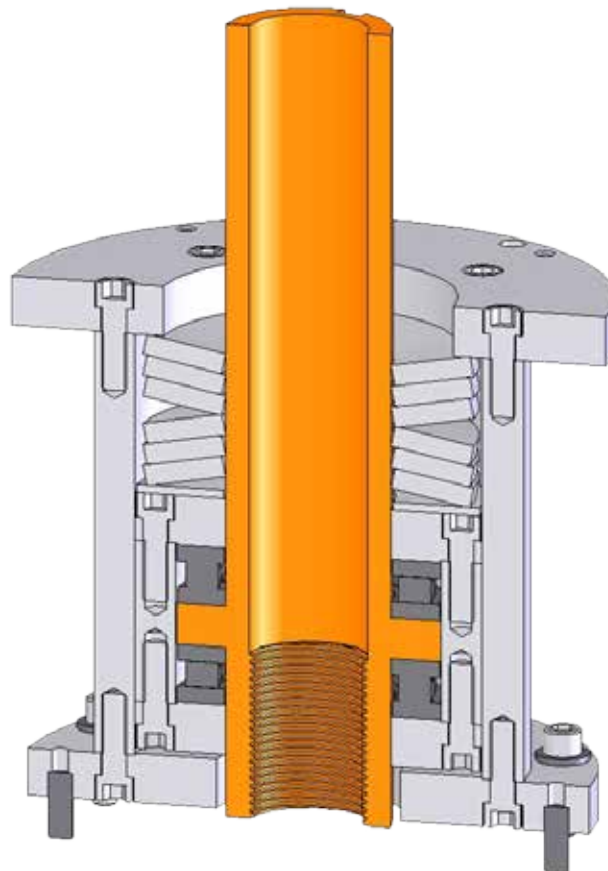
Purpose Engineered, Quality Manufactured, Performance Tested

FEATURES

- Actuator-to-valve direct interface mounting design ideal for new projects or retrofits
- Proven Belleville spring design
- Unique floating thrust bearing stem nut cartridge
- High-quality thrust bearings for robust performance
- Stem sizes up to 10" (254 mm)
- Growth up to 1/4" (6.35 mm)
- Single or double acting

BENEFITS

- Extend valve life
- Reduce wear and damage to the actuator and gear
- Quick delivery
- Application-engineered



Declutch/Manual Overrides

FEATURES

- Highly efficient, double-enveloping bronze alloy worm gearset
- Torque tube design with robust lever engagement
- From 50,000 to 5 MM in-lb
- Direct mount to valve
- One-piece drive adaptor

BENEFITS

- Reduce turns-to-operate by 50% to 75%
- Reduce rim pull by 50% to 75%
- Reduce handwheel size



Subsea and Offshore Applications

Purpose Engineered, Quality Manufactured, Performance Tested

FEATURES

- Torque ranges to 400,000 N·m
- Highly efficient, double-enveloping 4140 HT bronze alloy worm, gearset
- Active and passive pressure-compensation systems up to 2500 MM; hyperbaric tested up to 1200 MM
- ROV buckets (horizontal and vertical), panels, indicators, hot stab and flushing
- Manual operators, tethered handwheels and tactile position indicators
- Check valve lock open, special materials and other custom solutions

BENEFITS

Faster

- Reduce turns-to-close by 50% or more
- Reduce rim pull by 50% or more

Stronger

- Double-enveloping worm significantly increases tooth contact, increasing load and life capacity
- Unique double O-ring sealing system ensures integrity

Smaller

- Greater torque capacity in smaller packages
- Direct mount for reduced head height

Lighter

- Smaller actuator and gear due to increased efficiency
- Direct mount capability



CAMSERV Services for Valves and Actuation

WE BUILD IT. WE BACK IT.

STARTUP AND COMMISSIONING

Our experts understand that each project is unique. That's why Cameron's CAMSERV™ services help facilitate commissioning and start-up activities.

- Integrated solutions, onsite or at our global service centers
- Increased equipment and product performance
- The shortest possible trouble-free startup for your critical assets



SPARE PARTS AND ASSET MANAGEMENT

Cameron offers the assets and expertise to cover all aspects of valve management.

- Full inventory of quality exact OEM parts and spares
- Complete asset risk and criticality assessments
- Comprehensive inventory of your assets, including a complete recommended spare valves and parts list



OPERATIONAL SUPPORT

Cameron's ability to address valve requirements in the field is a reflection of our commitment to life-of-asset support.

- Innovative asset management solutions
- Trouble-free installation, startup and operations
- Support from commission to operation – extending through all phases of a valve's life cycle
- Extensive inventory of spare valves and parts



Cameron's CAMSERV site management mitigates the risk of project delays by identifying issues in the construction process prior to valve installation to ensure valve integrity.



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HSE Policy Statement

At Cameron, we are committed ethically, financially and personally to a working environment where no one gets hurt and nothing gets harmed.