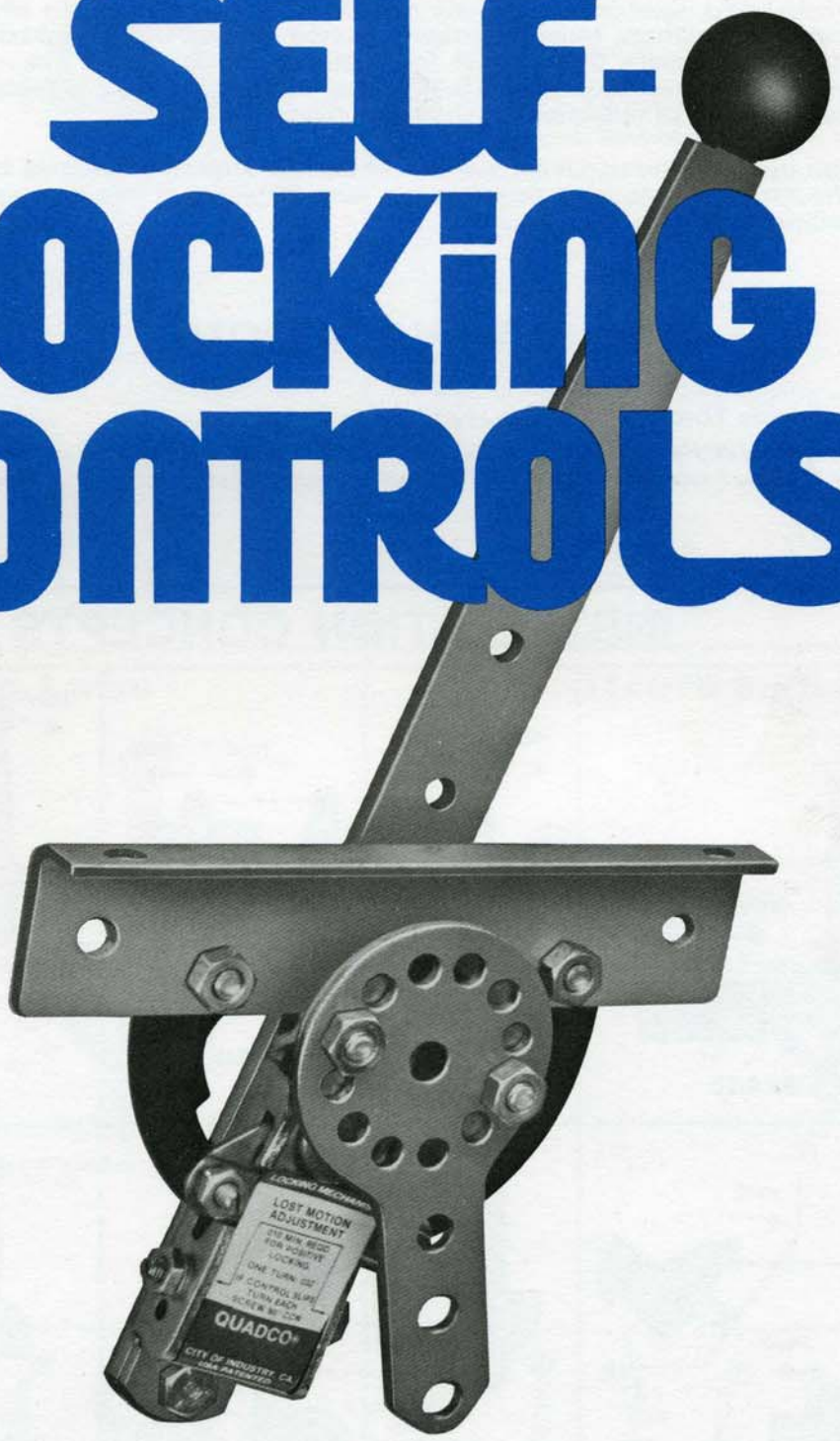
QUADRASTAT®

## Infinite Positioning

# SELF-LOCKING CONTROLS



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## Infinite Positioning
# SELF-LOCKING CONTROLS

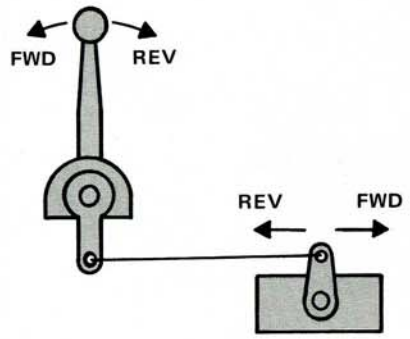
The QUADRASTAT® Control is a fail-safe mechanical device that "locks where you set it". It automatically locks out feedback forces in either direction without using ratchets, gates, friction pads or unlocking knobs. The greater the feedback force, the tighter the "lock". The operator can position the control anywhere and never need make a preliminary unlocking motion to reposition the lever. Specific details of the principles of operation are shown on the following pages.

These control units are industrial deriviations of devices originally designed for aircraft flight control systems. The irreversible locking principle has over 25 years of proven application in a variety of extreme environments.

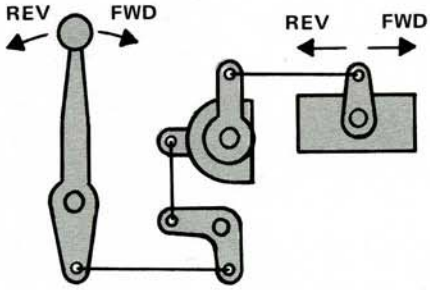
## APPLICATIONS

- Engine Throttle
- Deaccelerator
- Engine Governor
- Hydrostatic Pump
- Hydrostatic Motor
- Variable Torque Convertors
- Variable Valve
- Variable Nozzle
- Variable Sheave

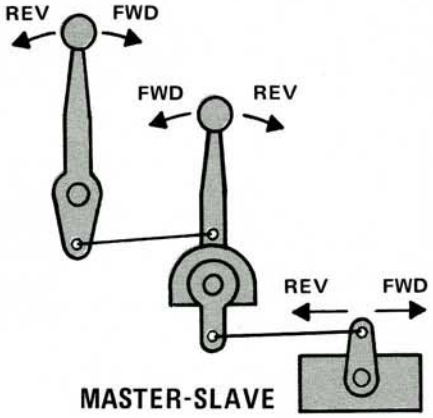
## INSTALLATION CONCEPTS



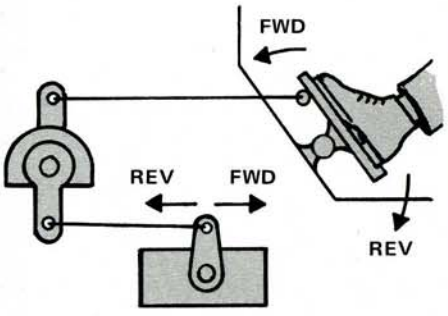

DIRECT LINKAGE



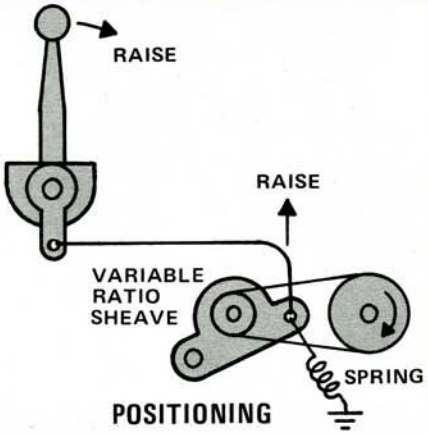

REMOTE MOUNTING
WITH BELL CRANK



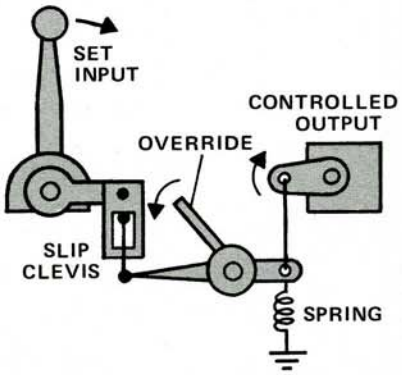

MASTER-SLAVE




ROCKER-PEDAL

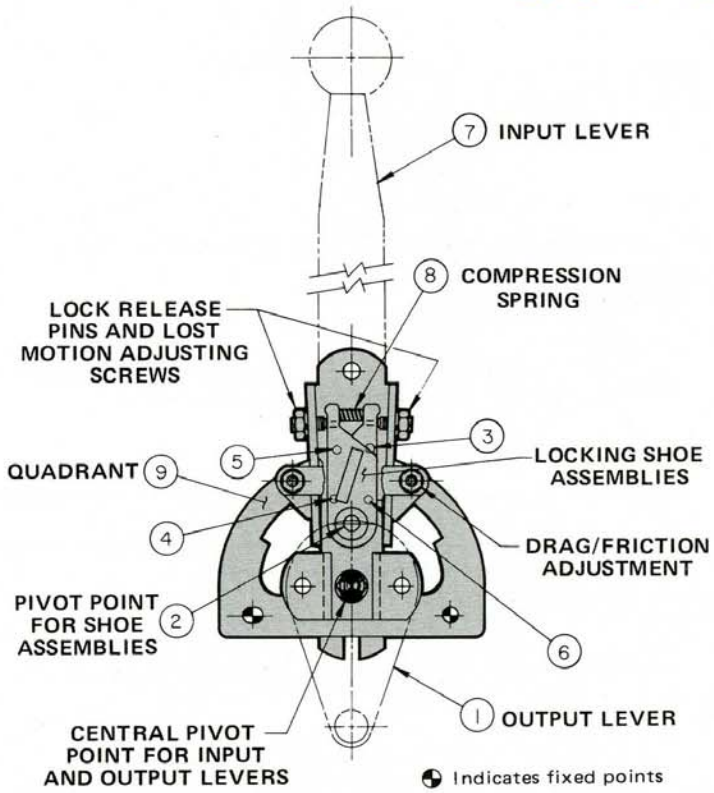



POSITIONING




SLIP CLEVIS and RETURN SPRING

# Q14 Series



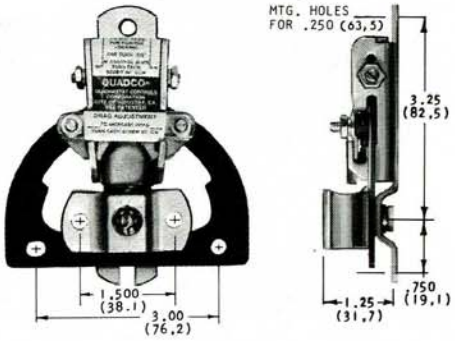

## Principle of Operation

The Q14 Series QUADRASTAT® Control mechanism has five main elements: A primary handle (input) lever, an actuating or output lever, two "scissor" locking shoe assemblies, and a stationary quadrant. The function of the assembly is to allow unrestricted movement through the use of the handle (input) lever, but to prevent any movement by forces acting through the output lever.

In the accompanying diagram, notice that a force applied in either direction at the output lever (1) creates a binding or "shear" action on the hardened steel quadrant (9) between the gripping shoes at (3) and (4) or (5) and (6), depending on the direction of the force. This binding action results from a slight rotation of the shoe assemblies about pivot (2), which is due to the pressure exerted on the shoes by the output lever as it tends to rotate slightly about its axis on the center shaft. Thus an irreversible lock is set up in both directions which effectively resists all forces acting on the output lever.

Conversely, forces applied at handle (7) cause the lock release pins to press against the shoes. This slightly rotates the entire shoe assembly about the axis of pivot (2), causing the shoes to move away from the quadrant. This unbinds the gripping action of the shoes and allows the handle to move the output lever freely. When the movement of the handle is stopped, the shoes are immediately returned to their locked position by spring (8) and any forces from the output lever serve to increase the locking action.

## Q14101
## Basic Locking Unit

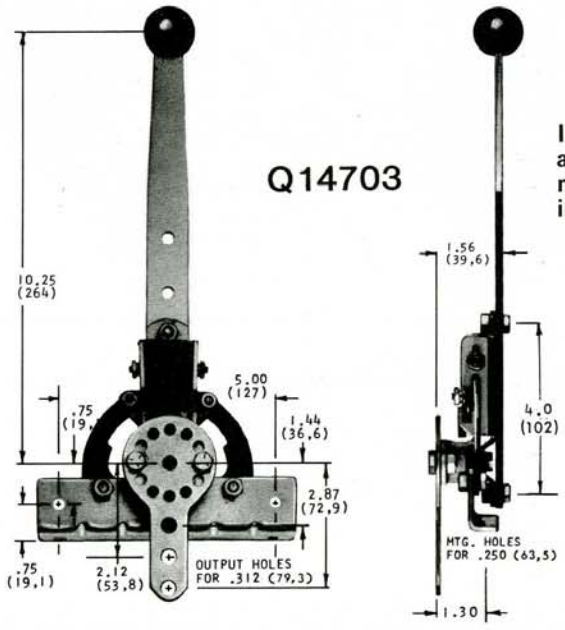



## Q14 Series Specifications

- Maximum operating load on output : 100 in-lbs.
- Maximum self-locking capacity : 200 in-lbs.
- Input lost motion* : 1°
- Output lost motion (with no load) : 0.5°
- Input torque : 1.2 x output torque
- Free running torque : 20 in-lbs.

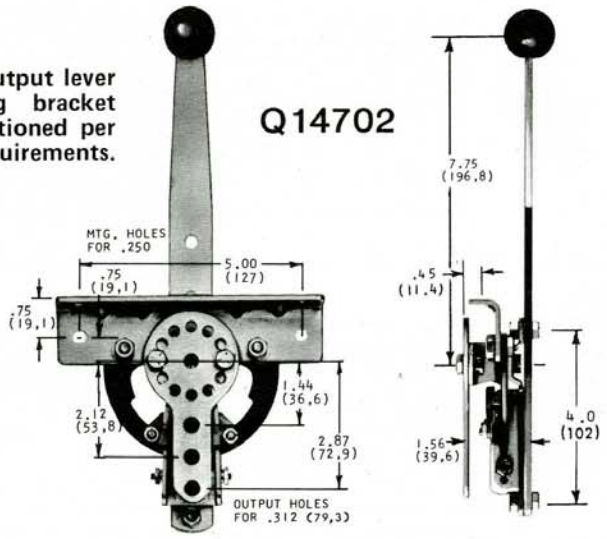
* The Q14 Series requires input lever lost motion of approximately 1/2° (or 0.010 inch at the adjustment screws) per side for positive locking. Adjustment may be required after an initial break-in period and, in some applications, throughout the unit's life.

## Q14703



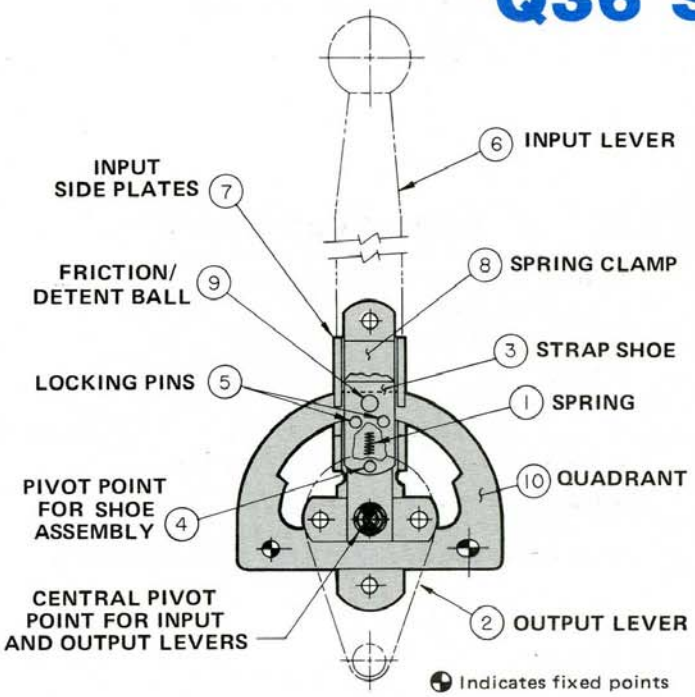

Input lever, output lever and mounting bracket may be repositioned per installation requirements.

## Q14702




Dimensions in inches and (millimeters)

# Q36 Series



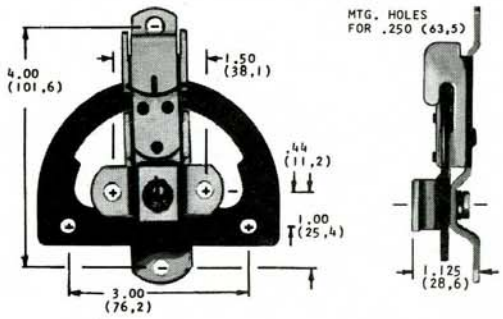

## Principle of Operation

The Q36 Series QUADRASTAT® Control mechanism uses a "strap-shoe locking mechanism" which has four main elements; a primary handle (input) lever, an actuating or output lever, a strap shoe/locking pin assembly, and a stationary quadrant. The strap shoe assembly is spring (1) loaded to the unlocked position until a load is applied to the output (2), causing the strap shoe (3) to rotate about the locking pivot (4), forcing a locking pin (5) to grip the quadrant (10). The gripping force caused by a pin (5) on the underside of the quadrant and the strap shoe (3) bearing against the top of the quadrant (10) locks the Control. As there are two locking pins (5), the Control will lock with an output load from either direction.

When the input lever (6) is moved, the input lever side plates (7) center the strap shoe/locking pin assembly to unlock the Control. Thus, the input lever is free to reset the position of the output lever (2).

The Control incorporates a heavy spring steel clamp (8) which holds a ball bearing (9) against the side of the quadrant (10) to provide static friction to prevent the input lever from creeping. The ball also holds the input in a detent position if such detents are included in the quadrant.

## Q36001 and Q36004 ** Basic Locking Units



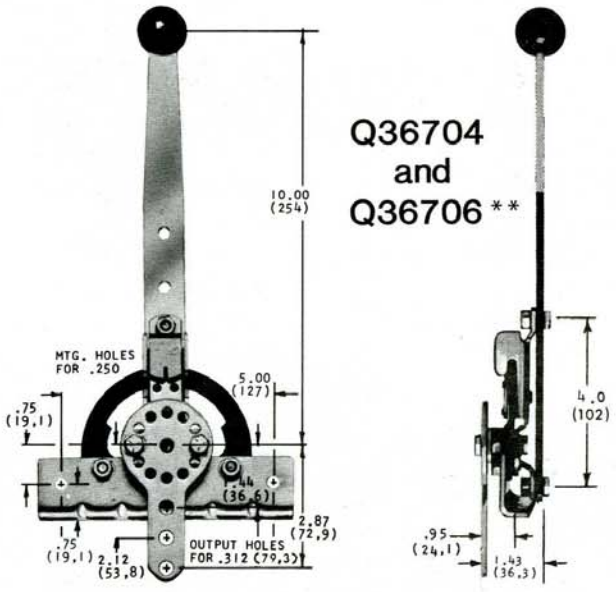

** Q36004, Q36706 & Q36707 are detented at center

## Q36 Series Specifications

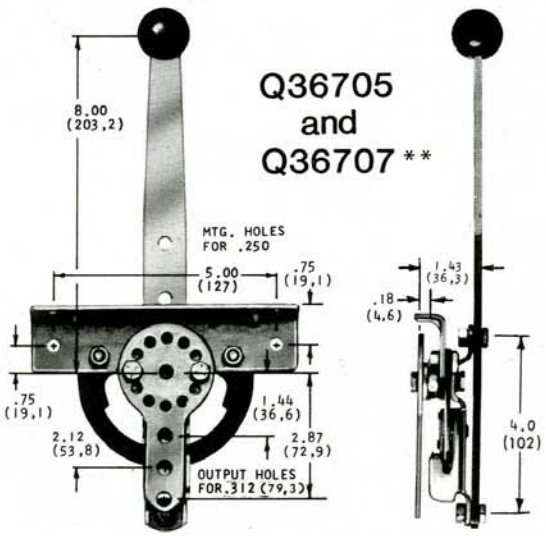
- Maximum operating load on output : 200 in-lbs.
- Maximum self-locking capacity : 400 in-lbs.
- Input lost motion – With 100 in-lbs. load on output* : 2.5° max.
- Output lost motion – With full reversal of 100 in-lbs. load : 3.5° max.
- Min. output load required for self locking : 50 in-lbs.
- Input torque as a percentage of maximum operating load on output: @ 20% = 3.0 x output torque
  @ 60% = 1.6 x output torque
  @ 100% = 1.2 x output torque
- Normal free running torque : 20 in-lbs.
- Torque to breakout of center detent : 40 in-lbs.

* Input lost motion is built in at factory and no means of field adjustment is provided.

## Q36704 and Q36706 **




## Q36705 and Q36707 **

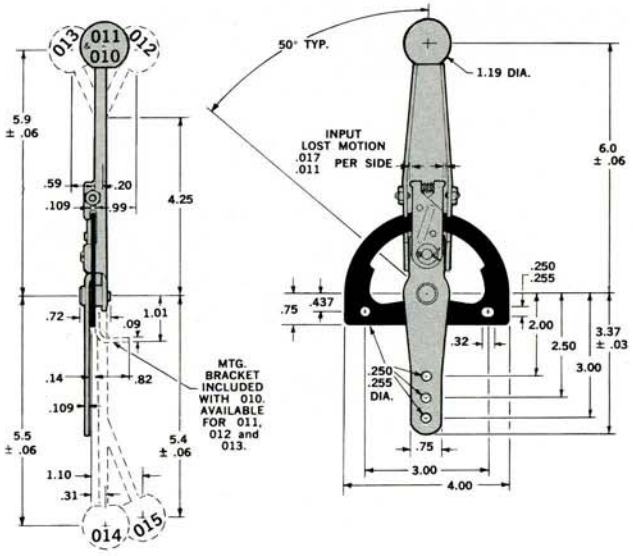


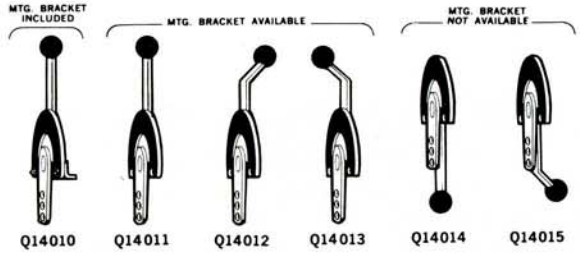

Input lever, output lever and mounting bracket may be repositioned per installation requirements.

Dimensions in inches and (millimeters)

# Integral Control Assemblies

## Q14010 Series



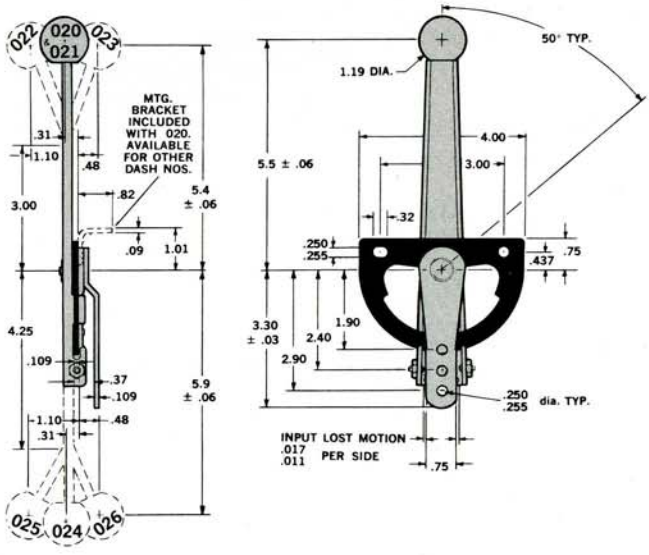

## Specifications

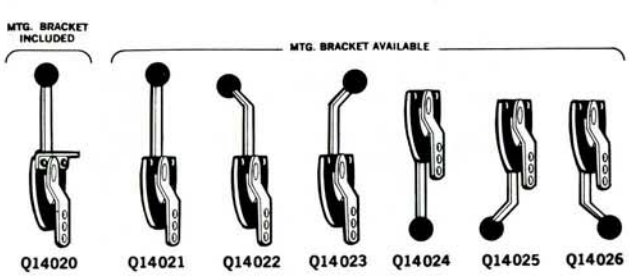
- Maximum rated load on output : 100 in-lbs.
- Input lost motion (when properly adjusted) : 1°
- Output lost motion (with no load) : 0.5°
- Maximum output travel (as shown on drawing) : 3.1 in. to 4.6 in.
- Adjustment: By setscrews in input lever.
- Material/Finish: Knob black plastic (colors red, green, blue, or grey available.) Mechanism steel with corrosion resistant finish.

How to order: Specify lever configuration as shown.

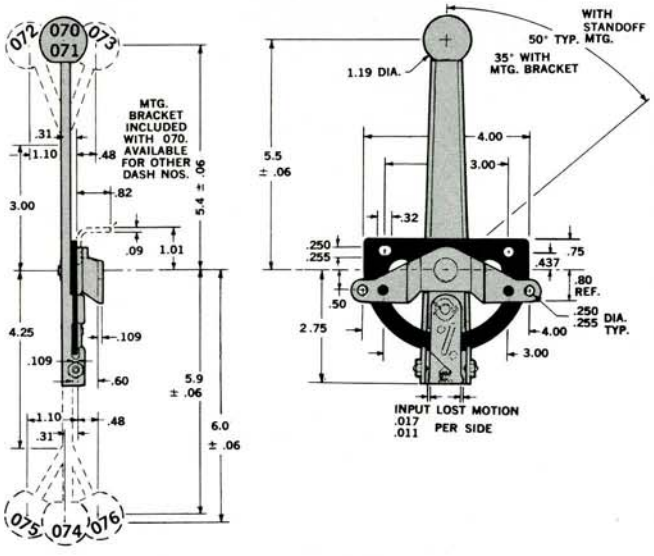
If mounting bracket is required order separately as Part No. Q10320

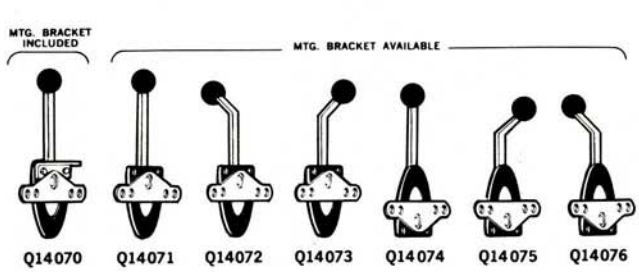
## Q14020 Series



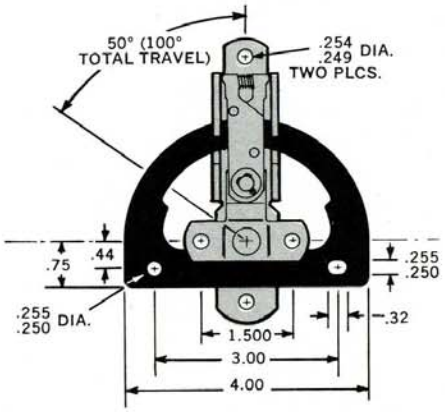

## Q14070 Series

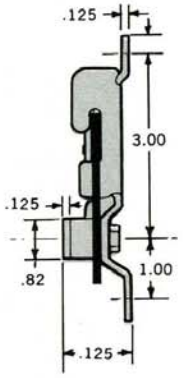


# Q12 Series

## Q12091
## Basic Locking Unit



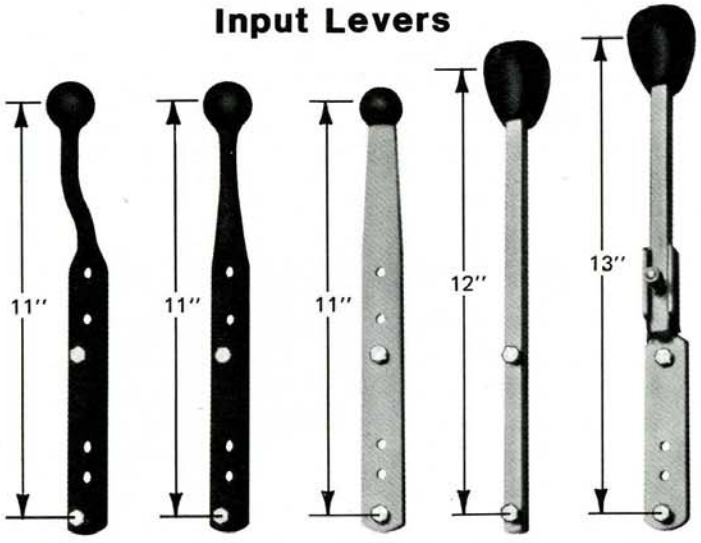

### Specifications

- Maximum rated load on output : 50 in-lbs.
- Input lost motion (when properly adjusted) : 1° or less
- Output lost motion (with no load) : 0.5°
- Material/Finish: Mechanism steel with corrosion resistant finish.

For use where load capacity, adjustment and drag features may not be as important as cost.

# Components

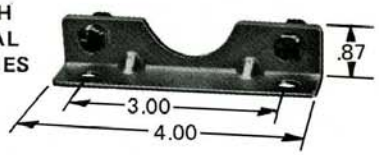
### Input Levers



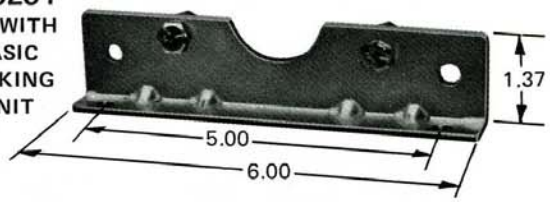

Q30254 Q30253 Q10319 Q10313 Q30314

### Mounting Brackets

**Q10320**
USE WITH INTEGRAL ASSEMBLIES

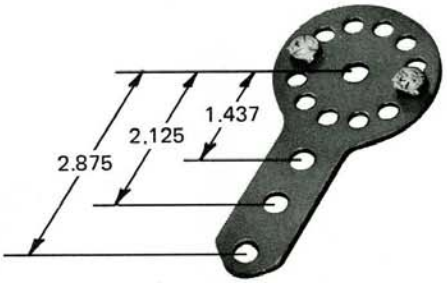



**Q30251**
USE WITH BASIC LOCKING UNIT




### Output Levers

**Q10264** (1/4" SHANK SWIVEL)
**Q10317** (5/16" SHANK SWIVEL)




### Swivels

| THREAD | 1/4"SHANK | 5/16"SHANK |
|---|---|---|
| 10–32 | Q10267 | Q10297–1 |
| 1/4–28 | Q10268 | Q10297–2 |
| 5/16–24 | Q10269 | Q10297–3 |
| M5 | — | Q10297–4 |
| M6 | — | Q10297–5 |

### Standoffs

Q10257

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