

## overload clutches for index drives (TYPE D-SA, ADJUSTABLE)

### Installation-Operation and Maintenance Instructions Safety Instructions

1. Read your Overload Clutch Installation-Operation Instructions thoroughly before operating the unit, for your safety and the protection of the unit.
2. CAMCO Overload clutches are designed to protect the index drive only and will not protect against bodily injury.
3. Double check to be sure the power is off and cannot be turned on while working on the equipment.
4. Use extreme caution with jammed or unbalanced loads, which when cleared, may set the machine in motion.
5. Keep all objects such as hands, clothing, tools, away from rotating or moving parts.
6. Use safety glasses or equivalent to protect your eyes.
7. Dowel pins and mounting screws must not protrude from drive plate or driven member as the clutch could become a solid coupling.
8. Follow instructions to attain maximum moisture resistance. Lubricate every six months or more frequently in extreme applications.
9. The CAMCO clutch is not a "FAIL SAFE" device and cannot be used on "overhauling" or "holding" load applications.

The above list includes major safety points to be observed, but should not be considered as limiting in safety precautions to be followed.

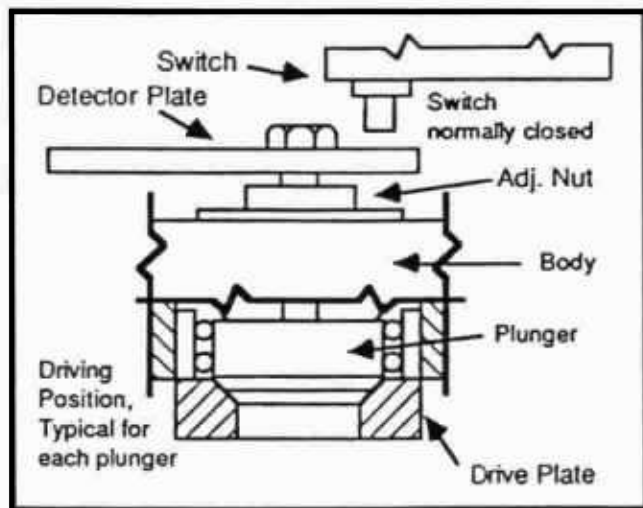


Fig. 1

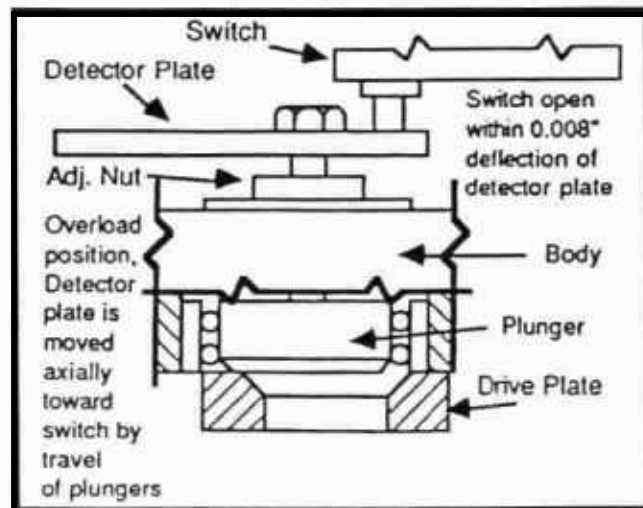


Fig. 2

### Operating Principle

CAMCO Overload Clutches are designed for mounting on the output member of the CAMCO Index Drive. An Index Drive is essentially a variable ratio speed reducer. Each index provides an incremental output to input torque ratio, which may range from 1:1 in the center of the motion, to as high as 1000:1 in the beginning or end of the motion. As output torque equals input torque times the ratio, a clutch mounted on the input side offers no protection at the beginning or end of motion.

CAMCO Overload Clutches provide zero backlash, high rigidity, low inertia and are specifically designed to be used in conjunction with CAMCO Index Drives.

Power is transmitted from the Index Drive through the body of the CAMCO Overload Clutch. The body contains adjustable spring loaded tapered plungers that engage with mating tapered seats in the drive plate. (See Fig. 1.) Torque settings are determined by spring pressure that "seat" the plungers.

When an overload occurs, which exceeds the torque setting of the clutch, the breakaway friction between the tapered plunger and the tapered seat, forces the plungers outward from their seats. The movement of the plunger elevates the detector plate, actuating the limit switch. (See Fig. 2.)

The CAMCO Overload Clutch resets to within  $\pm 10$  arc seconds of its original position, making it an excellent choice on applications that must remain registered or timed.

## Assembly Instructions

See Fig. 1

**Important:** To obtain maximum accuracy in positioning the DIAL PLATE, the INDEX DRIVE "CAM SHAFT" must be in the EXACT CENTER OF DWELL position. See CAMCO drawing applicable to the index Drive Model.

1. Lubricate output shaft and dial mounting surface of the INDEX DRIVE with Mobilgrease 77 or equivalent.
2. Prepare the dial with center hole as required. (Refer to CAMCO assembly drawings)
3. Place SHIM and SEAL BEARING (Teflon) on the output flange of the index drive. Wipe teflon top surface with a light coat of machine oil (light). Locate dial on pilot and top of SHIM and SEAL BEARING and check if it is free to rotate.

### Assembly Note:

PLUNGERS (5) with mounted ELASTOMERIC SPRINGS (4), ADJUSTING NUTS and NEEDLE BEARINGS are factory lubricated (Mobilgrease 77 or equivalent) and assembled with clutch BODY. Detector plate mounting screws retain these plunger assemblies and are not to be removed until after final mounting of clutch and then are to be used to mount DETECTOR PLATE. DO NOT move ADJUSTING NUTS until BODY is bolted to index drive.

4. Install dowel pins in the INDEX DRIVE mounting flange to insure proper positioning of the clutch BODY.

**Note:** Dowel pins are factory installed when the clutch is supplied with the INDEX DRIVE.

5. Lightly lubricate with Mobilgrease 77 or equivalent, the BODY and adjacent DRIVE PLATE surface and then insert BODY (2) into DRIVE PLATE (3) and through the center hole of the Dial Plate.
6. Attach the clutch BODY to the INDEX DRIVE output mounting flange with the body mounting screws and align plungers with tapered seats in the DRIVE PLATE (3). Adjust all adjusting nuts to torque setting at "0" position.

**Note:** A .003" minimum to .005" maximum clearance gap must exist between the DRIVE PLATE and the BODY, around the full circumference of the clutch.

7. Clearance Procedure (See Fig. 1)
  - A. Measure dimension "A" (bottom surface of BODY to bottom surface of BODY detent).
  - B. Measure dimension "B" (top surface of DRIVE PLATE to top surface of clutch pilot).
  - C. Subtract "B" from "A".
  - D. If less than .003 add shim at surface "C" (between clutch pilot and bottom surface of BODY) to obtain clearance gap of .003" to .005".

8. Rotate the DIAL PLATE to desired position, then using BODY and DRIVE PLATE as "jig", drill, tap and ream the dial plate for screw and dowel holes. Dowel holes should not go completely through the dial plate. Dial plate dowel pins should be .125" shorter than the combined thickness of the DIAL and DRIVE PLATES.

**Important Note:** Do not remove clutch BODY until after returning tops of ADJUSTING NUTS to flush with PLUNGERS and then retain with DETECTOR PLATE mounting screws. (Same as received from factory). Failure to follow this procedure can result in plungers and needle bearings falling free from the clutch BODY.

9. Disassemble, deburr and clean all parts.

**Note:** To attain maximum moisture resistance apply a thin continuous bead of industrial silicon adhesive sealant on surface "D" at outer circumference of DRIVE PLATE and immediately mount.

10. Screw and dowel pin the DRIVE PLATE to the DIAL PLATE and place INDEX DRIVE output.

**Note:** Screws and dowel pins are factory installed when the CLUTCH and DIAL PLATE are supplied with the INDEX DRIVE.

**Warning:** Dowel pins must not protrude from the DRIVE PLATE or DIAL PLATE as they may lock against the adjacent surface, making the clutch inoperative.

11. LIGHTLY lubricate the DRIVE PLATE and mating surface of the clutch BODY with Mobilgrease 77 or equivalent.
12. Position assembled clutch BODY thru DIAL PLATE to INDEX DRIVE and alternately tighten mounting screws.
13. Adjust clutch to required torque setting and then verify if DIAL PLATE can be disengaged. The clutch should disengage within 10% of torque setting.
14. Lightly grease o-ring groove with Mobilgrease 77 or equivalent and install o-ring over clutch BODY and into groove. Press all plastic seal plugs in clutch BODY.
15. Assemble the detector plate (1) on the clutch BODY and secure the DETECTOR PLATE to the PLUNGERS with the detector mounting screws.

**Note:** "0" position is when adjusting nut torque labels are flush with clutch body and scribe lines align with torque label zeros. (See "Torque Settings" on back page.)

TYPE D-SA CLUTCH \*

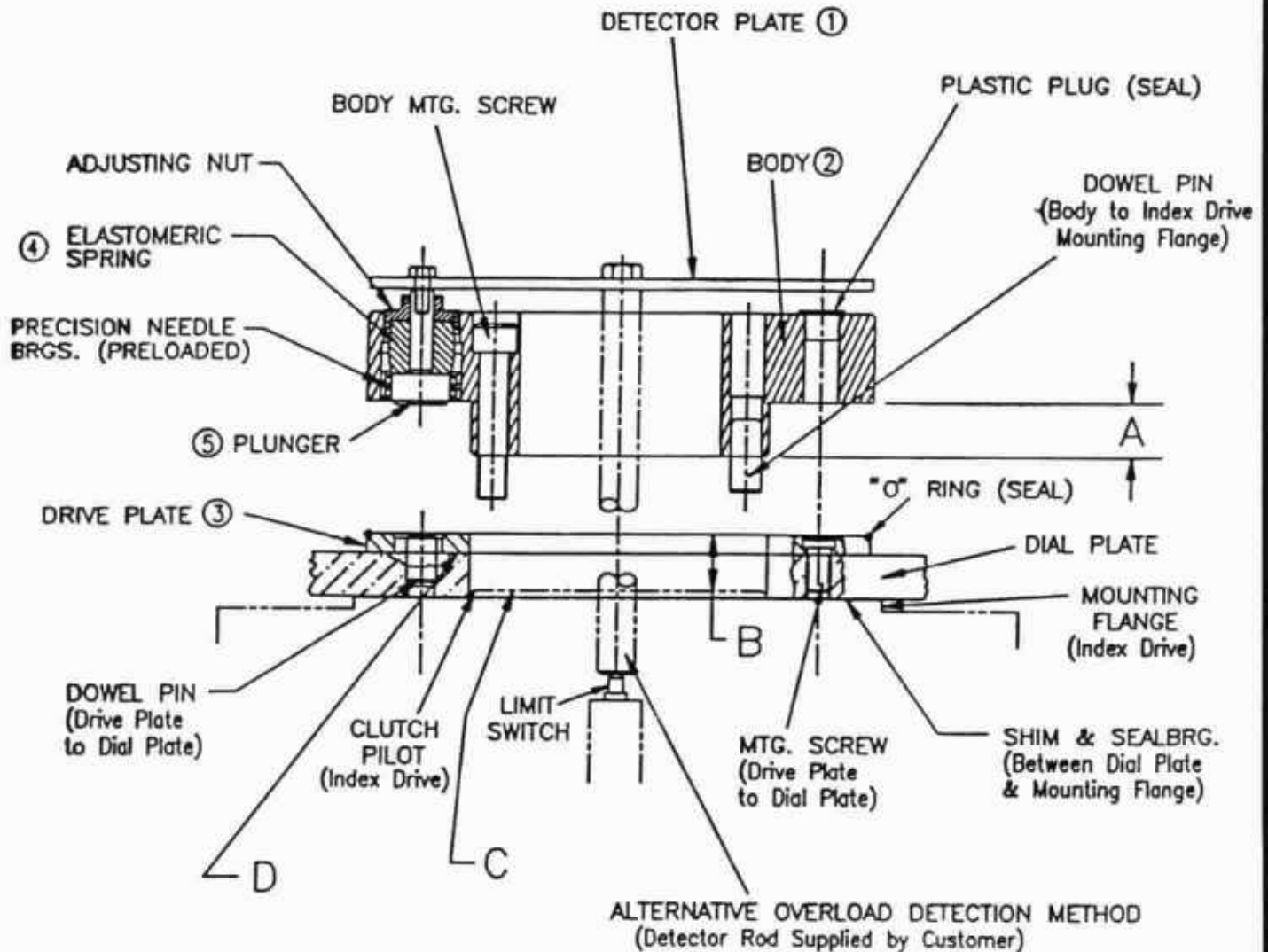


FIG. 1



# Installation Instructions Type D-SA Overload Clutch for Dial Plate Applications

## Disassembly Instructions

See Fig. 1

1. Remove DETECTOR MOUNTING screws and remove DETECTOR PLATE. Return detector mounting screws into PLUNGER threaded holes. (Bottom Out) Back ADJUSTING NUT tops to flush with PLUNGERS.
2. Alternately loosen and remove the BODY mounting screws.
3. Remove the clutch BODY.

**Note:** It may be necessary to tap under the DIAL PLATE to overcome the friction caused by the dowel pins that register the body to the mounting flange.

4. Clean and inspect all parts for wear.
5. Lubricate per assembly instructions 1 and 14.

## Application Recommendations

1. Never use the clutch with a torque setting close to the calculated operating torque. Actual torque may be higher. Torque spring tolerances and coefficients of friction vary with temperature and application. Allow 130% (1.3 service factor) when applying a CAMCO clutch.
2. The torque required to re-engage the clutch is usually 25% of the setting.
3. On high inertia applications, breaking the prime mover is recommended, in the dwell cycle of the INDEX DRIVE, to minimize over travel.
4. Do not operate without the detector limit switch, electrically disconnecting the prime mover (motor), as galling of the contacting surfaces may result.
5. CAMCO recommends using limit switches with rated travel not exceeding .008" for actuation.
6. Dowel pins should not protrude from the drive plate or driven members, as they may lock against the adjacent surface.

CAMCO CLUTCHES are precision assemblies and should not be modified. Modification of clutch will VOID THE CAMCO WARRANTY.

**WARNING:** Maximum adjusting nut C.W. revolutions from "0" are to be acquired from each individual clutch torque setting chart.

Exceeding this setting will VOID THE CAMCO CLUTCH AND INDEX DRIVE WARRANTIES.

## TORQUE SETTINGS

2.8 D-SA Torque Setting IN-LBS.	4.0 D-SA Torque Setting IN-LBS.	7.8 D-SA Torque Setting IN-LBS.	Adjusting Nut Rotation From "0" (C.W. or C.C.W.)
-	-	10000	2.40 C.W. Revolutions
3200	4000	9000	2.00 C.W. Revolutions
3000	3600	-	1.50 C.W. Revolutions
2800	3400	7800	1.00 C.W. Revolutions
2400	3000	7000	.50 C.W. Revolutions
2200	2600	5700	"0" = See Note Below
1600	2400	-	.50 C.C.W. Revolutions
1400	2000	4600	1.00 C.C.W. Revolutions
1100	1600	3300	1.50 C.C.W. Revolutions
-	-	2800	1.75 C.C.W. Revolutions
900	1300	-	2.00 C.C.W. Revolutions

**Note:** "0" Positioning is when adjusting nut torque labels are flush with clutch body and scribe lines align with torque label zeros.

**WARNING:** Adjusting nut rotation must never exceed 2.00 C.W. revolutions for the 2.8 and 4.0 D-SA and 2.5 revolutions for the 7.8 D-SA C.W. from "0" Exceeding this setting will VOID the CAMCO clutch and index drive warranties.



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