

# Product Announcement

Coltec Industries



**Components Operation**

Central Moloney  
Transformer Division

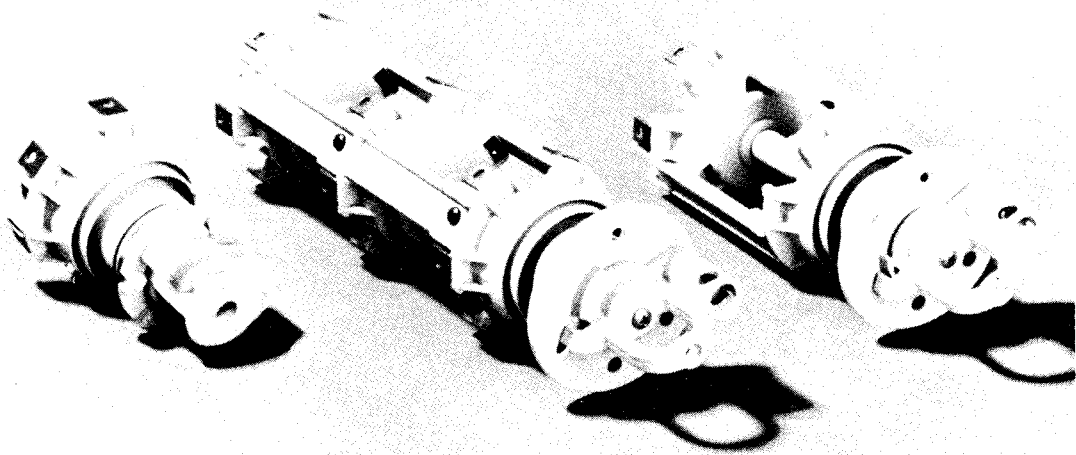
NPA: 001008

Product: 100 Amp Tap Changer

Date: August 1, 1990

Availability: Immediate

## TAP CHANGER 100 AMP

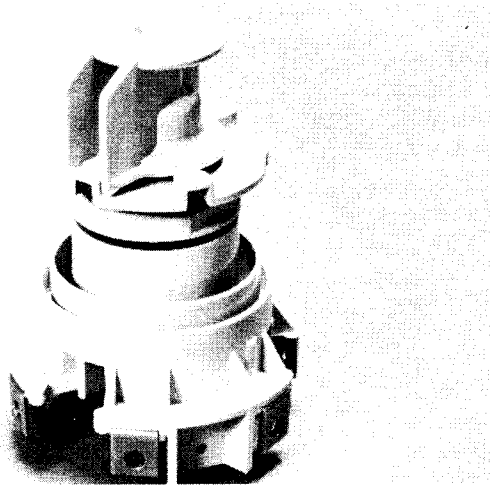


### Improved Switching Through Innovative Design

Central Moloney Components Operation is pleased to introduce a line of single and three phase tap changers. Rated at 100 Amp, 150 kV BIL, in a small compact size with several handle options.

### Material

This Tap Changer line features a body, rotor, operating handle, mounting nut, and position indicator plate molded from a 30% fiberglass filled thermoplastic polyester resin. The same material we have utilized for years in our CL Fuse Holders, H.V. Stand-Off Insulators, L.V. Bushings, D.V. Switches, and Universal Bushing Wells. This material performs exceptionally well after 20 year accelerated weathering and UV testing.



## Electrical Rating

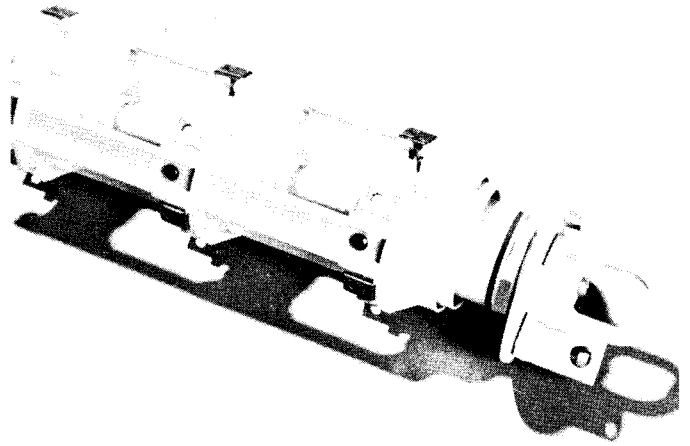
100 Amperes Continuous

150 KV BIL

50 KV 60 HZ 1 min. withstand

Max. fault current 2500 Amps for 2 sec.

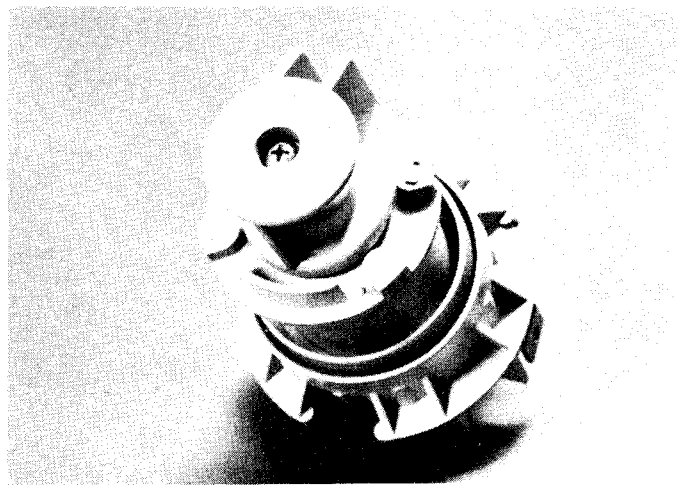
## Hook Stick Handle



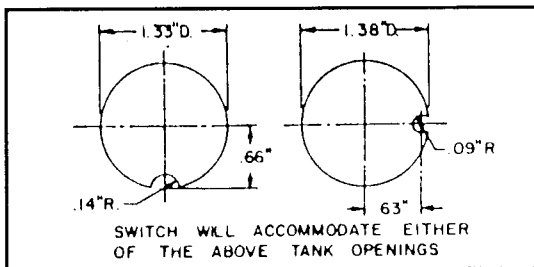
## Features

1. Positive Snap Action
2. Stationary Contacts
3. Double "O" Ring Viton Shaft Seal
4. Flange Gasket Seal is cupped to crowd the gasket toward the center during compression
5. Body and Rotor are engineered with provisions for ganging
6. Will accommodate tank wall thickness from #14 GA through #7 GA
7. The Switch Body, Rotor, Handle, Mounting Nut and Indicator Plate are molded from a proven engineered thermoplastic
8. Several handle options are available, Pull and Turn and Hook Stick.

## Pull and Turn Handle



## Mounting Hole Detail



## CERTIFIED TEST RESULTS 100 AMP TAP CHANGER

### THERMOCYCLE AND LEAK CHECK

Ten subject Tap Changers were assembled. A leak test was performed using 20 PSIG air pressure and snoop soap solution. No leaks were observed. The same ten Tap Changers were then subjected to ten cycles of 140 C for two hours then -40 C for two hours. The leak test was performed again with no leaks observed.

### ELECTRICAL TESTS

All electrical tests were conducted with the Tap Changer mounted under oil in a 20" diameter tank.

### IMPULSE

A - Tie all terminals together.  
Apply 125 KV full wave.  
Increase in 10 KV steps to failure.

Passed	215 KV
Failed	219 KV

B - Apply 75 KV full wave between adjacent terminals. Increase in 10 KV steps to failure.

Passed 85 KV  
Failed 95 KV

C - Apply 75 KV full wave across rotor with the terminals behind the rotor grounded.

Failed 132 KV (Broke Rotor)

#### HIGH POTENTIAL

A - Tie all terminals together.  
Hold 40 KV for one (1) minute.  
Hold 50 KV for one (1) minute.  
Hold 70 KV for one (1) minute.  
Increase at 500 volts per second until failure.

Held 40 KV for one (1) minute.  
Held 50 KV for one (1) minute.  
Failed 70 KV after twelve (12) seconds.

B - Apply twenty (20) KV between adjacent terminals for one (1) minute.

Held 20 KV for one (1) minute.  
Failed 29 KV.

C - Apply 26 KV across rotor with terminals behind rotor grounded.

Increase at 500 volts per second until failure.

Held 26 KV for one (1) minute.  
Failed 70 KV.

#### CURRENT RATING

Thermocouples were attached to the stationary and rotor contacts. Current values of 80 AMPS, 100 AMPS, 120 AMPS, and 140 AMPS were circulated through these contacts. Each current value was allowed to flow until the temperature of the contacts stabilized. All thermocouples were constantly monitored. The current rating of this Tap Changer was established at 100 Amperes continuously.

#### ELECTRICAL RATING

150 KV BIL — 100 Amperes continuously.

#### MECHANICAL TESTS

1. Torque Withstand of Rotor Shaft:

Five rotor shafts, mounted in Tap Changers, withstood 22 to 24 foot pounds torque before breaking.

2. Torque Withstand of Hookstick Operable Handle:

Five handles were mounted on a copper shaft and torque was applied by means of a 1/2" diameter rod through the eye.  
Failures occurred at 28 to 30 foot pounds.

3. Sidewise Force to Break Rotor Shaft:

Five rotors were mounted in Tap Changer bodies and Hookstick Operable Handles were installed. Sidewise force was applied to the handles at the top of the eye. Shafts withstood 173 to 193 pounds before breaking.

4. Sidewise Force to Break Handle:

Tested as above, except with a metal shaft, five handles broke at 243 to 268 pounds sidewise force.

5. Tension to Break Handle:

With handles mounted to Tap Changer Shafts, tension was applied by means of a 1/2" rod through the eye. Five handles and shafts withstood 391 to 439 pounds before the handle broke.

6. Compressive Force to Break Handles:

Five handles withstood 892 to 913 pounds of compressive force applied to the center of the eye.

7. Force On Padlock Holes to Break Handle:

With a 5/16" diameter rod through the padlock holes, crosswise force was applied. Five handles withstood 260 to 296 pounds before splitting.

8. Torque to Rotate Indicator Plate:

With the positioning screw in place, the position indicator plates withstood 8 to 10 foot pounds of torque before rotating.

#### TAP CHANGER #703331-60 OPERATING KNOB MTG. SCREW

A torque test was performed to establish a recommended value for installing the #10 self tapping screw into the end of the rotor shaft.

The recommended installation torque is 20 to 25 inch pounds. When installing the screw you can definitely tell when the screw reaches the bottom of its hole. Any further tightening will only destroy the screw head. We found that at 45 to 50 inch pounds the screw head socket will round out.

An attempt was made to strip the threads in the rotor shaft. After rounding out the socket in the head at 45 inch pounds, we attached vise-grip pliers to the head O. D. and continued turning the screw. The screw twisted off and did not strip the rotor threads. The knob mounting screw is made of 18-8 stainless steel.

A screw pull out test was performed where the screw was extracted using a straight pull of 705 pounds. The rotor threads were sheared and came out with the screw.

#### CONCLUSIONS:

The 703331 series Tap Changers have the required electrical and mechanical characteristics for satisfactory operation at 150 KV BIL.

Properties are not adversely affected by the temperatures encountered in transformer coil drying or normal transformer operation.

The hookstick operable handle has adequate strength for this application, and should resist any force that would be applied in normal operation.

