
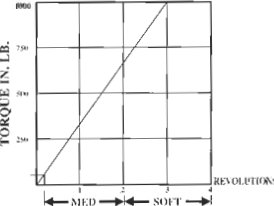

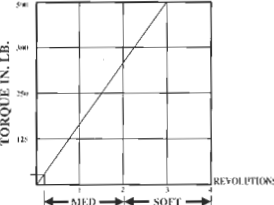


900-3-01-KIT

WASHER ARRANGEMENTS FOR VARIOUS JOINT RATES & TORQUE RANGES:

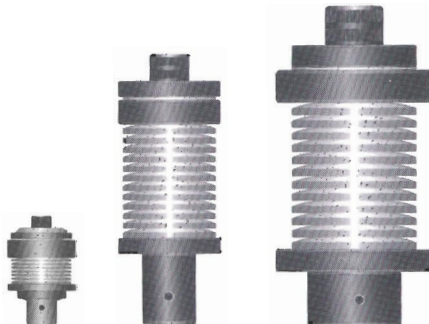
TORQUE RANGE 0-1000 IN. LB., JOINT RATE 333 IN. LB./REV.			
STACK	TORQUE/REVOLUTIONS CHART	TORQUE RANGE IN. LB.	JOINT TYPE
		650-1000 60-650 0-60	SOFT MEDIUM HARD

TORQUE RANGE 0-500 IN. LB., JOINT RATE 167 IN. LB./REV.			
STACK	TORQUE/REVOLUTIONS CHART	TORQUE RANGE IN. LB.	JOINT TYPE
		325-500 30-325 0-30	SOFT MEDIUM HARD

# OPERATING INSTRUCTIONS FOR JOINT RATE SIMULATOR

**STOCK NUMBERS:**

**900-01-KIT  
900-2-01-KIT  
900-3-01-KIT**

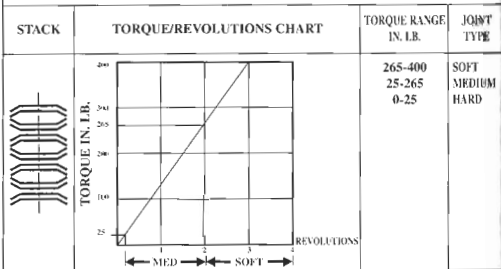


**CDI** TORQUE  
PRODUCTS  
CONSOLIDATED DEVICES

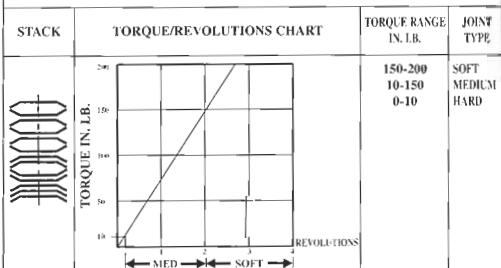
OM-JRS-CDI  
REV. 11/98

## WASHER ARRANGEMENTS FOR VARIOUS JOINT RATES &amp; TORQUE RANGES

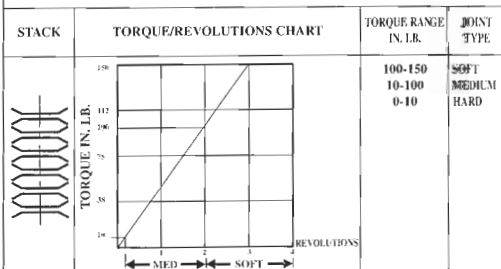
TORQUE RANGE 0-400 IN. LB., JOINT RATE 135 IN. LB./REV.



TORQUE RANGE 0-200 IN. LB., JOINT RATE 75 IN. LB./REV.



TORQUE RANGE 0-150 IN. LB., JOINT RATE 50 IN. LB./REV.



## JOINT RATE SIMULATOR - SETUP

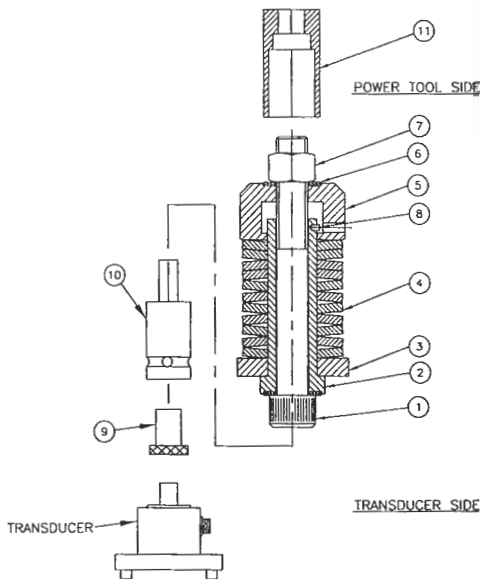


FIG. 3  
MODEL 900-3-01-KIT

Item #	Part No.	Parts List	
		Description	900-3-01-KIT Req'd.
1	10-168-80	Socket Head Cap Screw 5/8-18 x 5, Heat Treated Alloy Steel	1
2	900-3-11	Spacers	1
3	900-3-13	Spacer Top	1
4	900-3-6	Bellville Washer	12
5	900-3-14	Bearing Race	1
6	900-3-22	Thrust Washer	4
7	00-038-23	Nut 5/8-18, Grade 8	1
8	00-011-47	Set Screw, 4-40 x 3/16	1
9	2000-152.3	Adaptor 0/2 - 208	1
10	900-3-16	Socket Drive	1
11	900-3-15	Socket Adaptor	1

## DESCRIPTION AND OPERATING INSTRUCTIONS

### MODEL: 900-2-01-KIT & 900-0-01-KIT

The Joint Rate Simulator has been designed for use with the electronic torque testers and transducers to measure the torque output of electric and pneumatic power tools. The dynamic torque characteristic of a power tool and the static torque applied when using a wrench usually results in different torque readings. Spinning electric and pneumatic motor armatures contain inertia that produces a higher torque reading than what is actually "absorbed" by a fastener. The difference is also due to individual fastener installation characteristics that exhibit anywhere from a gradual increasing run-down torque, (soft joint) to a free speed, sudden dead stop, (hard joint).

A Joint Rate Simulator is required when testing a power tool to allow start-up rotation of the tool's armature. It is also experimentally adjusted to replicate the individual joint hardness of the intended work.

Some power tools may require a few free turns before the loading starts to establish inertial stabilization. In order to provide free turns before loading starts, simply unwind the nut for a few turns above the starting point. The starting point is the point where the Joint Rate Simulator is unloaded and there is no clearance between the nut, washer stack and the screw head.

The Joint Rate Simulator can be set-up to simulate soft, medium and hard joint conditions in various torque ranges by rearranging the Belleville washer stack.

There can literally be an unlimited amount of "joint conditions" created. For simplification, we will discuss the three main types of joint in general terms:

#### SOFT JOINT-

The screw in use turns more than 360 degrees for the second half of the required torque. Some manufacturers require a minimum of 270 degrees of screw rotation (instead of 360 degrees) for torque increase from 50% to 100% of required torque to classify joint as a 'soft joint'.

#### MEDIUM JOINT-

The screw in use turns more than 30 degrees but less than 360 degrees for the second half of the required torque.

#### HARD JOINT-

The screw in use turns less than 30 degrees for the second half of the required torque.

#### OPERATING THE JOINT RATE SIMULATOR:

1. Adjust the Joint Rate Simulator assembly for the desired soft-hard configuration.
2. Install the Joint Rate Simulator onto the tester or transducer and secure its set screw if necessary. Loosen the simulator load screw using the appropriate adapter supplied.
3. Couple the power tool to the Joint Rate Simulator using the appropriate adapter.
4. Apply torque until the tool's motor stalls or if the clutch slips or shuts off. Be careful not to add torque by turning the tool by hand.
5. Check or record torque values received.
6. Loosen the Joint Rate Simulator load screw. Repeat at least twice again to exercise the tester or transducer. Suggested: Run the simulator down approximately 10 times to "seat" the components of the Joint Rate Simulator. The resultant values may be more repeatable.

#### CAUTIONS WHILE OPERATING WITH THE JOINT RATE SIMULATOR:

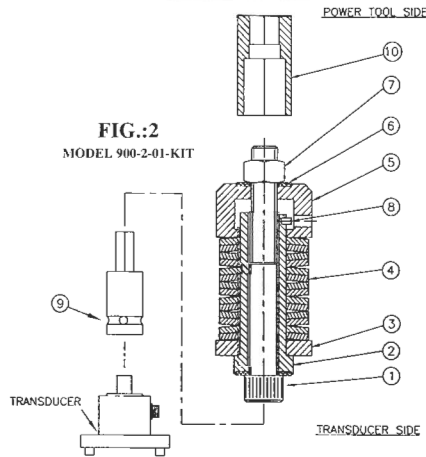
1. Be sure to operate any pneumatic or electric power tool per its manufacturer's recommendations.
2. The Joint Rate Simulator should be unwound to no-load conditions after each rundown.

3. Screw and washers should be lubricated frequently. Recommended grease: G metal assembly paste or 77 part assembly paste from Dow Corning, or equivalent.
4. Protective eyewear should be used whenever operating power tools.
5. Screw and nut should be periodically checked for thread damage. It is recommended to remove screw and nut from assembly and check the threads by turning the nut on the screw by hand. If the nut moves smoothly, threads are in good condition. At any sign of thread damage, both screw and nut should be replaced with equivalent grade as specified in parts list. Using lower grade screw and nut other than specified will cause thread damage and improper function of Joint Rate Simulator.
6. For safety reasons and better performance, the Joint Rate Simulator should be used in vertical plane as shown on Fig. 2 & 3.

#### HOW TO CHANGE WASHER STACK:

To change the washer stack, first remove the screw and nut from assembly. Turn the bearing race (Item 5), until the side hole lines up with the locking set screw (Item 8) in sleeve (Item 2). Remove the locking set screw and disassemble the washer stack. Locking set screws keep the washer stack contained when bolt and nut are removed for thread inspection or replacement.

### JOINT RATE SIMULATOR - SETUP



Parts List		900-2-01-KIT	
Item #	Part No.	Description	Req'd.
1	10-168-39	Socket Head Cap Screw 7/16-20 x 3-M4, Heat Treated Alloy Steel	1
2	900-2-11	Sleeve	1
3	900-2-2	Spacer - 2	1
4	900-2-9	Belleville Washer	14
5	900-2-14	Bearing Race	1
6	900-2-22	Thrust Washer	4
7	10-138-22	Nut 7/16-20, Grade 8	1
8	10-101-47	Set Screw 4-40 x 3/16 Long	1
9	900-2-16	Socket Drive	1
10	900-2-15	Socket Adaptor	1

## DESCRIPTION AND OPERATING INSTRUCTIONS

### MODEL: 900-01-KIT

The Joint Rate Simulator has been designed for use with the electronic torque testers and transducers to measure the torque output of electric and pneumatic power tools. The dynamic torque characteristic of a power tool and the static torque applied when using a wrench usually results in different torque readings. Spinning electric and pneumatic motor armatures contain inertia that produces a higher torque reading than what is actually "absorbed" by a fastener. The difference is also due to individual fastener installation characteristics that exhibit anywhere from a gradual increasing run-down torque, (soft joint) to a free speed, sudden dead stop, (hard joint).

A Joint Rate Simulator is required when testing a power tool to allow start-up rotation of the tool's armature. It is also experimentally adjusted to replicate the individual joint hardness of the intended work.

Some power tools may require a few free turns before the loading starts to establish inertial stabilization. In order to provide free turns before loading starts, simply unwind the nut for a few turns above the starting point. The starting point is the point where the Joint Rate Simulator is unloaded and there is no clearance between the nut, washer stack and the screw head.

The Joint Rate Simulator can be set-up to simulate soft, medium and hard joint conditions in various torque ranges by rearranging the Belleville washer stack.

There can literally be an unlimited amount of "joint conditions" created. For simplification, we will discuss the three main types of joint in general terms:

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The screw in use turns more than 360 degrees for the second half of the required torque. Some manufacturers require a minimum of 270 degrees of screw rotation (instead of 360 degrees) for torque increase from 50% to 100% of required torque to classify joint as a soft joint.

#### MEDIUM JOINT--

The screw in use turns more than 30 degrees but less than 360 degrees for the second half of the required torque.

#### HARD JOINT--

The screw in use turns less than 30 degrees for the second half of the required torque.

#### OPERATING THE JOINT RATE SIMULATOR:

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2. Install the Joint Rate Simulator onto the tester or transducer and secure its set screw if necessary. Loosen the simulator load screw using the appropriate adapter supplied.
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4. Apply torque until the tool's motor stalls or if the clutch slips or shuts off. Be careful not to add torque by turning the tool by hand.
5. Check or record torque values received.
6. Loosen the Joint Rate Simulator load screw. Repeat at least twice again to exercise the tester or transducer. Suggested: Run the simulator down approximately 10 times to "seat" the components of the Joint Rate Simulator. The resultant values may be more repeatable.

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1. Be sure to operate any pneumatic or electric power tool per its manufacturer's recommendations.
2. The Joint Rate Simulator should be unwound to no-load conditions after each rundown.

3. Screw and washers should be lubricated frequently. Recommended grease: Gm metal assembly paste or 77 part assembly paste from Dow Corning, or equivalent.
4. Protective eyewear should be used whenever operating power tools.
5. Screw should be periodically checked for thread damage.
6. For safety reasons and better performance, the Joint Rate Simulator should be used in vertical plane as shown on Fig. 1.

#### HOW TO CHANGE WASHER STACK:

To change the washer stack, first remove the screw and nut from assembly. Turn the bearing race (Item 5), until the side hole lines up with the locking set screw (Item 8) in sleeve (Item 2). Remove the locking set screw and disassemble the washer stack. Locking set screw keeps the washer stack contained when bolt and nut are removed for thread inspection or replacement.

