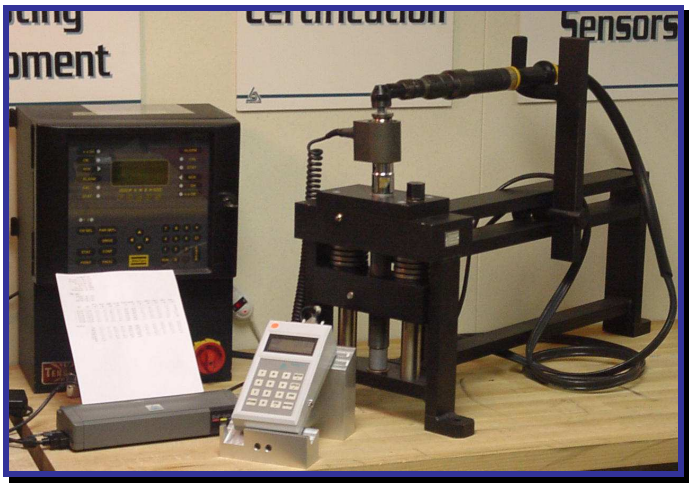
Joint Simulator
for Power Tool Setup and Performance Verification



Part Number 102000-02201

RS Products from PCB Load & Torque
A PCB Piezotronics Division
24350 Indoplex Circle
Farmington Hills, MI 48335 USA
Phone: 888-684-2894
Fax: 248-888-8266
Email: rsinfo@pcb.com
Web: www.pcb.com/fasteningtechnology

1 Operating Instructions

The Joint Simulator from RS Technologies is shipped from the factory already set up to duplicate a soft joint condition. No change is necessary to certify tool repeatability. If a different joint condition is required, follow the directions in Section 1.1 below.

1.1 Washer Stack Setup

Use the following procedure to set up the washer stack to simulate the desired type of joint. Refer to Figure 1 for part numbers.

1. Run down spring clamp block (5) to relieve tension on washers.
2. Loosen two thumb set screws (20) allowing washer guide bars (7) to retract.
3. Remove large black thrust washers (24). Then remove and change Belleville washers (14, 15) as required.

NOTE
The twin stacks of Belleville washers should always be identical, that is, the same number of washers should be arranged in the same configuration. Large black thrust washers (24) must always be on top and bottom of Belleville washers (14, 15).

4. To simulate a harder joint, stack the washers in a back-to-back configuration (refer to Figure A). Back-to-back groups should not exceed three washers per group.
5. To simulate a softer joint, stack the washers in a face-to-face configuration (refer to Figure B).
6. Washer stacks in thick-thin configurations can be arranged for specific torque ranges. For a torque range of 12 to 85 lb-ft (15 to 115 Nm), use 10 thin and 4 thick washers as shown in Figure C.
7. For a torque range of 75 to 220 lb-ft (100 to 300 Nm), use 18 thick washers as shown in Figure D.
8. The washer arrangement may be varied in any combination of above configurations to simulate joints from very hard to very soft.
9. When desired washer configuration is achieved, grasp washer guide bar and lift and insert into holes in bottom of gear box (2). While holding guide bars, tighten hex head cap screws into groove atop guide bars (7).

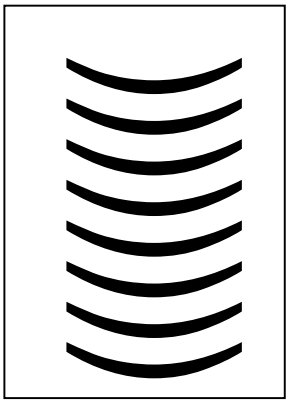


Figure A

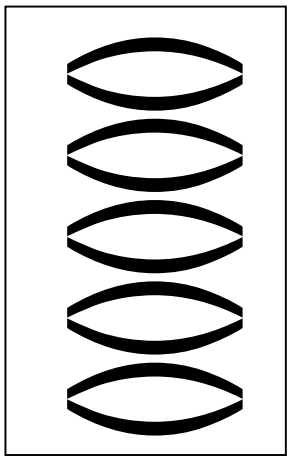


Figure B

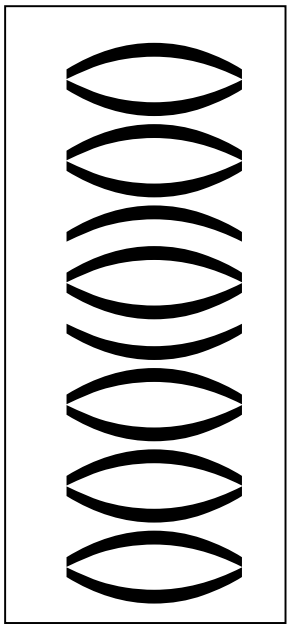


Figure C

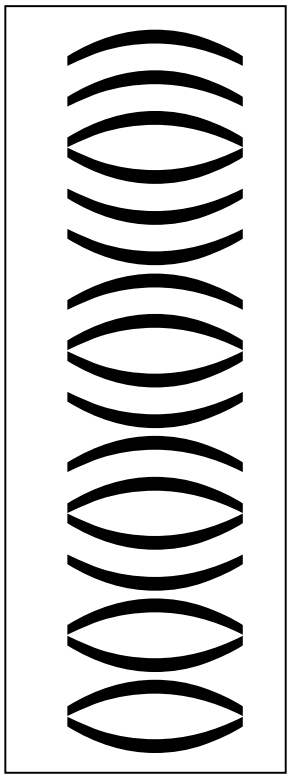


Figure D

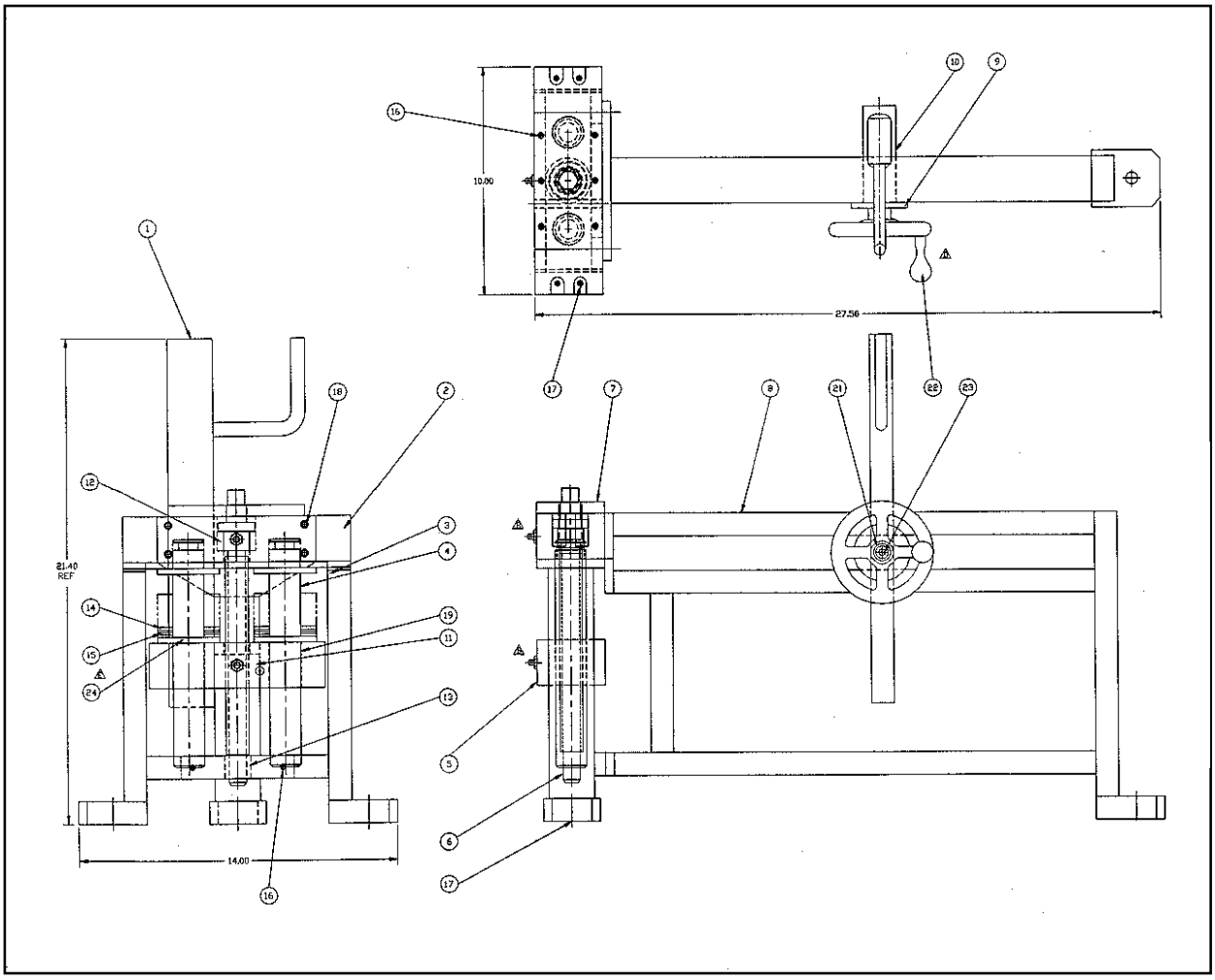


Figure 1

1.2 TOOL PLACEMENT

Use the following procedure to place the tool in the joint simulator for testing.

1. Place tool on torque limit bar (1) with socket on center hex driver. A ¾-inch fast lead socket is recommended).
2. Loosen the reaction bar adjustment nut (21) and align bar with handle of nutrunner. Tighten nut.

CAUTION
DO NOT LOCATE REACTION BAR SO THAT IT REACTS AGAINST GEAR CASE OR EXHAUST DEFLECTOR ON TOOL. TOOL DAMAGE COULD RESULT FROM THIS CONDITION.

WARNING
WHEN RUNNING TOOL, DO NOT POSITION FINGERS BETWEEN TOOL AND REACTION BAR. INJURY COULD RESULT.

3. Run tool in forward position to compress washers and simulate a joint.

4. Remove tool and socket from center hex drive and place it on outboard hex drive. Run tool in forward position to loosen tension on washers.

CAUTION
USE TOOL IN FORWARD POSITION ONLY. GEAR DAMAGE TO THE SIMULATOR MAY RESULT IF THE TOOL BEING CALIBRATED IS OPERATED IN REVERSE.

WARNING
IN REVERSE MODE, THE TOOL WILL ALSO REACT TOWARD THE OPERATOR WHICH MAY RESULT IN INJURY TO THE OPERATOR!

1.3 CALIBRATE SIMULATOR TO A JOINT

Use the following procedure to calibrate the unit to simulate a particular type of joint.

1. Go to the line and run the fasteners with the designated tool on the joint making sure that the air pressure and lubricator are functioning properly. In addition, make sure that the air line is the same length and diameter as that used in the tool crib.
2. While running the fastener, monitor the peak torque with a peak torque monitor and rotary transducer. Record at least 10 sample readings.
3. Go to the tool crib.
4. With spring washers stacked in the appropriate configuration and with the designated tool, make a few rundowns. Check the air pressure lubricator and air hose to ensure that the line conditions are being simulated.
5. If the rundown reads the same torque ±1 lb-ft as the line readings, leave the washer stack as is.
6. If the torque is lower, then the stack is too weak. Set up the washers for a harder joint by putting some of the washers back to back. Always make sure both stacks are the same.
7. If the torque is higher that the actual line reading, the washer stack is too strong. Reposition the washers to make the stack weaker.
8. Once you have determined the proper washer configuration, record this information.
9. Repeat this procedure for each critical fastener that will be tested. The procedure will continue to produce accurate readings if the following critical factors remain consistent:

- The air pressure line is the same at the crib and at the line.
- The air hose size and length are the same in the tool crib and on the line.
- The lubricator is functioning properly.
- The same tool or type of tool remains on the job.

10. Once you have established the joint simulator stack up, test the tool and joint simulator to make sure the tool is performing properly. If so, then check the four critical factors identified above or see if something in the assembly process has changed.

1.4 AFTER REPAIRING A TOOL

Use the following procedure to check out a tool after repair.

1. Identify the line operation on which the tool will be used.
2. Reference the records to identify the correct washer stack up and set them up accordingly.
3. Run the driver and record at least five (5) readings.
4. If your readings match those of the test, ship the tool to the line.
5. If the tool does not read the same as the test, then re-do the repair.
6. If the tool fails to operate properly on the line after repairs, then check the four critical factors identified in Section 1.3 above.

1.5 CERTIFYING AIR TOOLS

Use the following procedure to certify air tools.

1. Stack the washers opposing each other and check all tools with the same stack-up.
2. Make 10 rundowns and record the reading with a peak torque monitor.
3. If all readings are within 5%, then the tools are not in need of repair.
4. Submit your report along with procedure to your customer.
5. If any further questions arise, contact RS Technologies.

1.6 MAINTENANCE

Refer to the following items to keep the joint simulator in safe operating condition.

1. Lubricate acme thread drives (11) and (12) as needed with good quality cup grease.
2. Inspect all screws, nuts, and bolts for tightness monthly.
3. Wipe debris (metal shavings, dirt, etc.) from Belleville washers as it can affect torque readings.
4. Disassemble and lubricate the gearbox yearly.

NOTE

Each joint simulator is manufactured with all assembled parts fitted and matched for best performance. Beyond the external fittings and Belleville washers, there are no user-serviceable parts available. Repair and replacement must be done at the factory.

NOTE

If you notice a chattering sound coming from the joint simulator during operation, apply lubricant to the Belleville washer stacks before proceeding.

Specifications			
Model No.	**Capacity**	**Size (H x W x D)**	**Weight**
102000-02201	15 to 148 lbf-ft	14.75 x 27.5 x 14.00 in	35 lb.
	20 to 200 Nm	374.65 x 698.5 x 355.6 mm	16 kg
102004-02451	74 to 332 lbf-ft	16.25 x 36.5 x 16.00 in	45 lb.
	100 to 450 Nm	412.75 x 927.10 x 406.34 mm	20 kg