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How to Set Up a Torque Wrench Control & Error Proofing System with Tohnichi Products

Bolt Tightening for Assembly

- Torque wrench critical component in producing high product quality.

- Hand Torque Tools
  - Highly Accurate
  - Cost Effective
  - Easy to maintain and repair

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Tool Type Test Comparison

Tool Type	% Capability (Six Sigma Scatter)
Torque Wrench	9%
Adjustable Shut Off Nut runner	25%
Cordless Impact Tool with control	19%
Transducerized Pulse Tool	20%
Shut Off Pulse Tool	34%
Stall Pulse Tool	43%

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Sources of Bolt Tightening Defects

■ **Man** →
- Human Error
- Missed Tightening
- Improper Tool

■ **Method** →
- Improper Tightening
- Wrong Specification
- Wrong fastening procedure
- Wrong Tool Selection

■ **Machine** →
- Improper Equipment
- Inaccuracy
- Mechanical Failure

■ **Materials** →
- Improper Materials
- Out of Tolerance
- Defective Materials
- Insufficient lubricant

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How to Insure Proper Torque

- Use Correct Tool
- Confirmation of "Click"
- Actual Tightening Torque Data
- Confirm Tightening with Quality Torque Inspections
- Confirm Tool Function & Accuracy
- Proper Tool Usage

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Poka-yoke="Error Proofing"

Simple Effective Method to Avoid Errors.

- Behavior shaping constraints or methods preventing human errors

OPPS! What if I didn't torque that bolt??!?!

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Torque Error Proofing Methods

☑ Use Correct Tool
- ○ QSP/CSP with Colored Grips

☑ "Click" Confirmation
- ○ MPQL/CMQSP Ink Marking
- ○ LS Limit Switch Wrenches
- ○ FH Wireless Version

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QSP/CSP with Colored Grips

- Identify Preset Values
- Identify Correct Tool Type
- Set up for specific product production

Use Correct Tool

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MPQL

MPQL100N

Ink marks top of bolt only when torque setting is achieved.

No mark without torque tightening

☑ Confirmation of "Click"

LS Limit Switch Wrenches

- Micro switch sends relay signal to PLC or CNA-4mk2 when torque value is achieved
  - Cord connection
    - Controls area where tool can be used
    - Keeps tools secured in area

Confirmation of "Click"

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FH256MC Wireless Torque Wrench and Receiver System

RF Transceiver
T-FH256MC

RF Terminal
R-FH256

Model, R-FH256

Receiver Box

FH Type Torque Wrench

Available on various "click" type torque wrenches

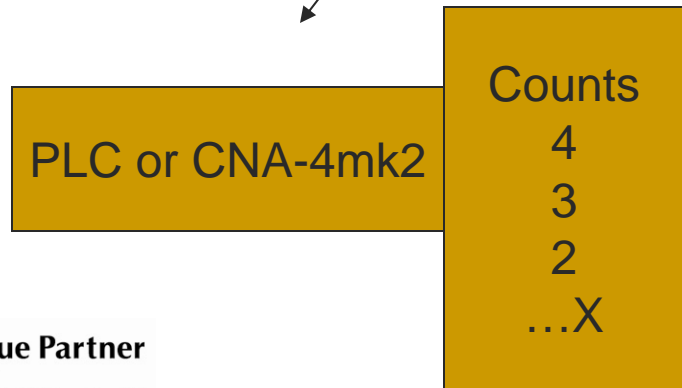✓ Use Correct Tool

✓ Confirmation of "Click"

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#1

#2

#3

#4
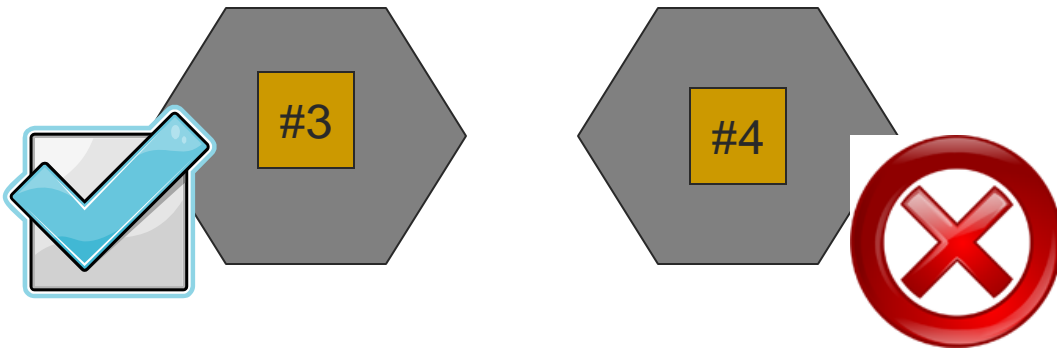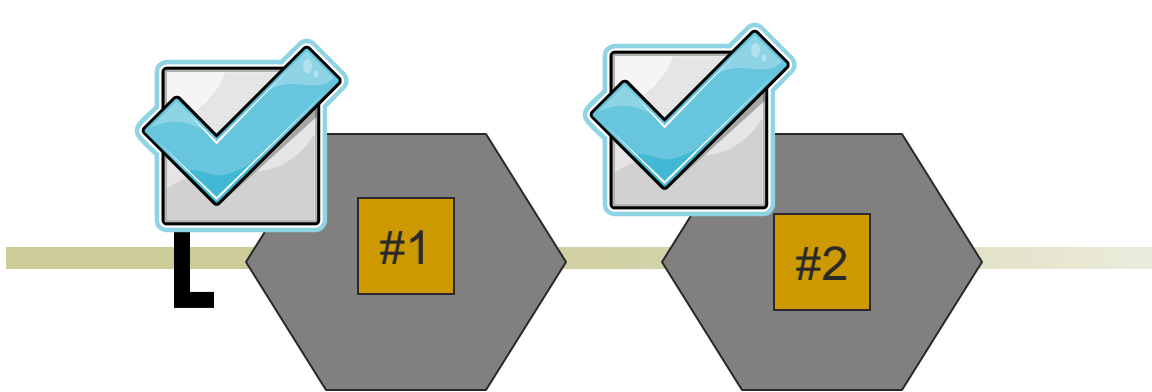
"Click"
Torque Set Achieved!

R-FH256

Recheck Work!

STOP

PLC or CNA-4mk2

Counts
4
3
2
…X

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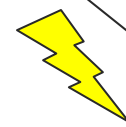
Torque Wrench "Error Proofing" System
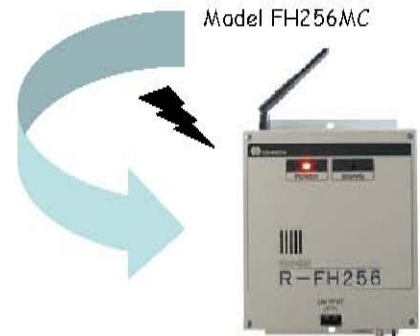
- **Wrench Style Selection**

  1)

  - **Radio Frequency Transmission Style**

  Model FH256MC

  Radio Signal Receiver Box,

  Model R-FH256

  OR

  2)

  - **Cable Connection Style (LS)**

  Model QLLS

- **Example of Work Piece**

  "Click"

  Bolt 1   Bolt 2

  Bolt 3   Bolt 4

  Once torque is achieved, wrench "clicks" and sends a signal to equipment that counts and tracks the process.

  Hard Wired

Visually Counts Number of "Clicks"

Count Checker CNA-4mk2

or

PC or PLC

OK → Go To Next Process

NG → Alert and Check Buzzer Light Stop line

How to Insure Proper Torque

- Use Correct Tool

- Confirmation of "Click"

- Save Actual Tightening Torque Data

- Confirm Tightening with Quality Torque Inspections

- Tool Calibrated and Set Correctly

- Proper Tool Usage

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Torque Data Products

- ACLSD/ CSPD "Click" with CD42 Display
- FHD "Click" with data confirmation
- CEM3 Measuring/Tightening
- ST2, Spot Checks & Automated Tool Confirmation

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CSPD Torque with Data

- **ACLSD and CSPD**
  - Wrench calibrated to display
  - Click and torque valued confirmed

Confirmation of "Click"

Save Actual Tightening Torque Data

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FHD with Torque Data

- Torque value confirmed by user
- Judgment Lights
- Compact and Wireless

☑ Use Correct Tool

☑ Confirmation of "Click"

☑ Save Actual Tightening Torque Data

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CEM3 Digital Torque Wrench

- ## CEM3
  - ○ Quality Inspections
    - Verify original tightened torque
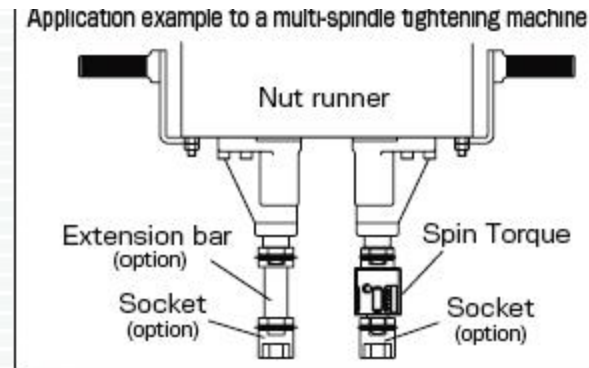 - ○ Tightening Mode
    - Light and Buzzer when Lo setting reached

☑ Save Actual Tightening Torque Data

☑ Confirm Tightening with Quality Torque Inspections

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ST2, Spin Tork

Application example to a multi-spindle tightening machine

Nut runner

Extension bar (option)

Spin Torque

Socket (option)

Socket (option)

■ Compact Rotary Peak Torque Meter

○ Inspection of Nut runner Output

○ Tightening Data Confirmation
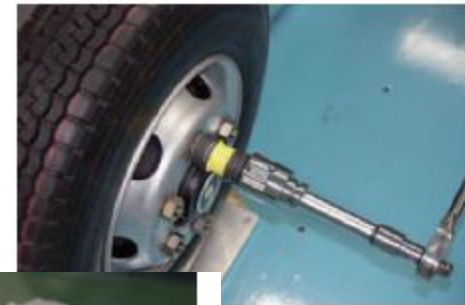
ST200N2

ST1000N2

☑ Save Actual Tightening Torque Data

☑ Confirm Tightening with Quality Torque Inspections

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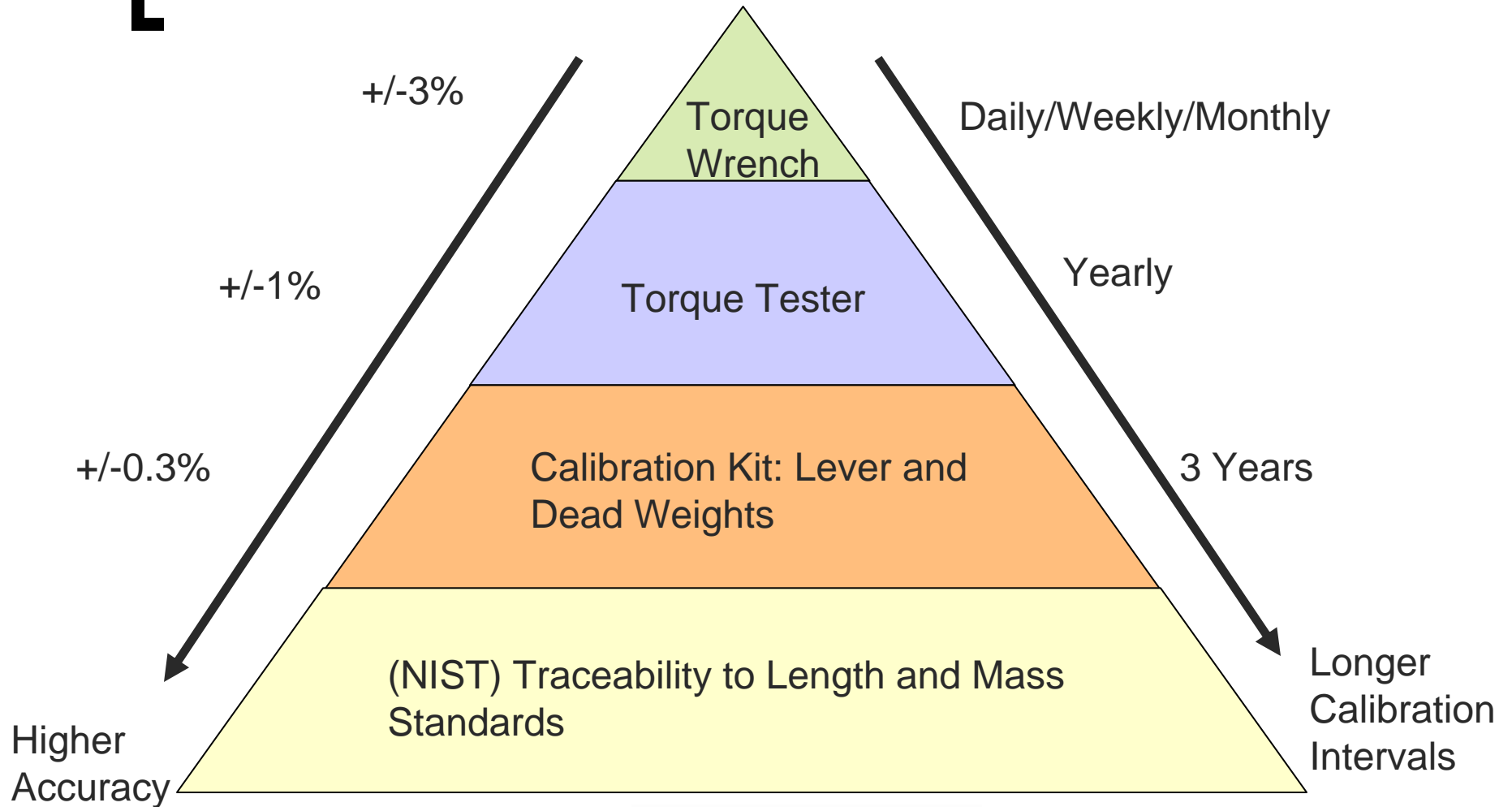
Tester vs. Checker

- DOTE3/TCC/TF

Torque Wrench Testers

- Loading Mechanism
- Consistent Force
- Stable Testing especially for reading scales
- Bi-directional

- LC2

Line Checker

- Quick Test Method
- Ideal for "Click" Wrenches
- Captures Peak
- Replicates application pull
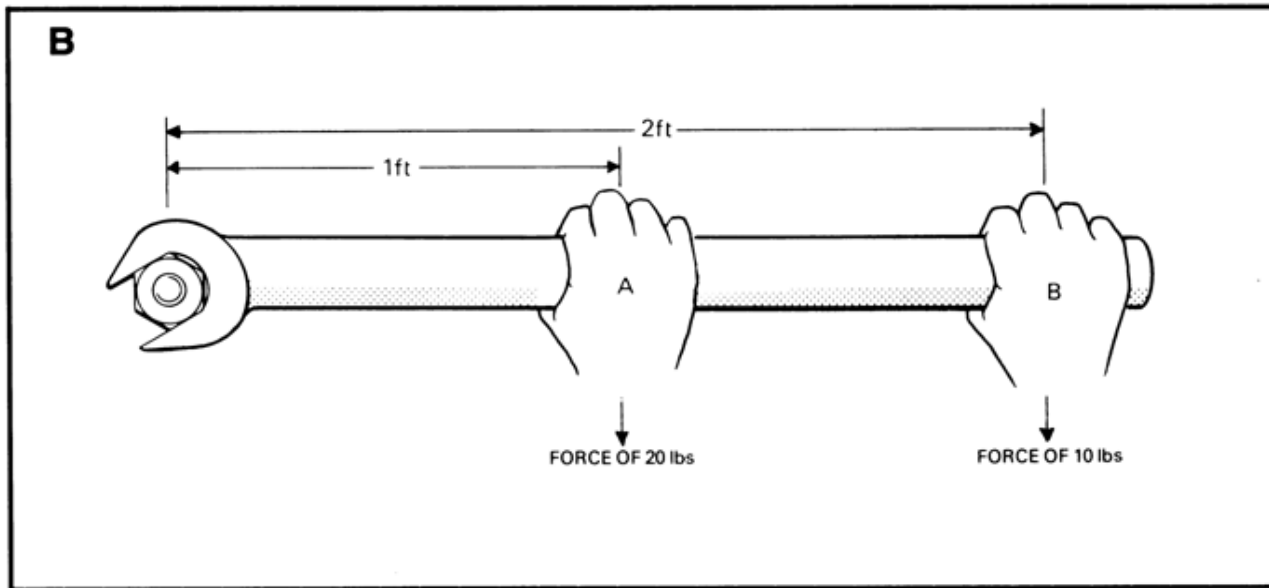
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LC2 Line Checker

- Daily Inspection Prior to Use
- Tracks Tool Performance
- Involves User and Confirms Proper Usage with Accurate Torque Values
- Easy to determine if tool is set properly and functioning correctly

LC1000N2

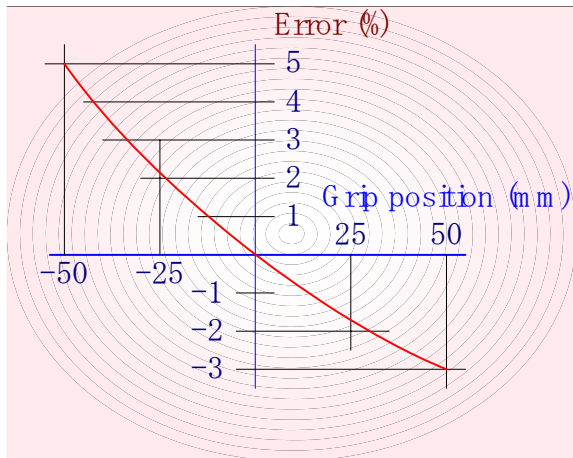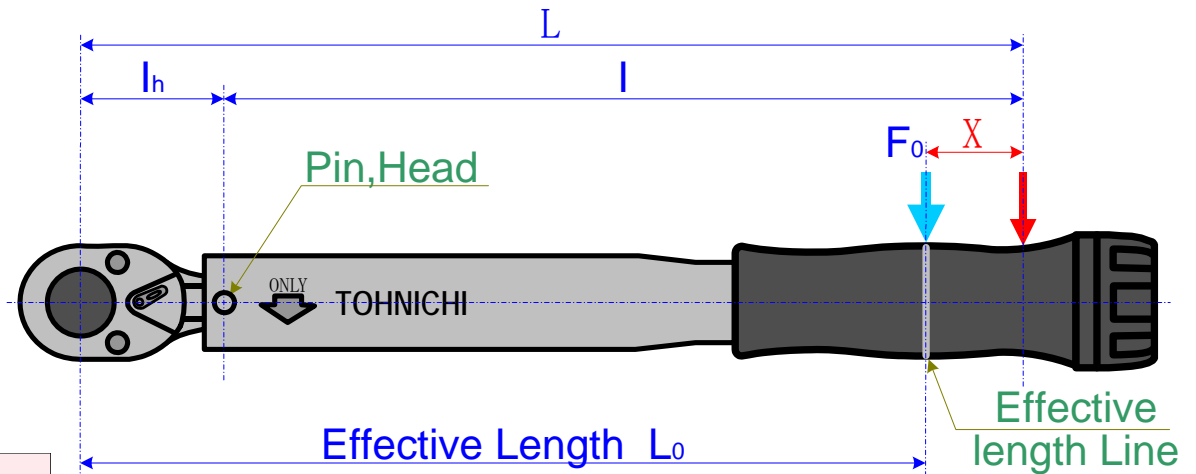LC200N2

Tool calibrated and set properly

Proper Tool Usage

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Torque = Force x Distance

T = F x L so that:

T1 = F1 x L1 = 10 lbs x 2 ft = 20 ftlbs   T1 = T2

T2 = F2 x L2 = 20 lbs x 1 ft = 20 ftlbs

Proper Use of Torque Wrench

Effective Length L_0

Pin,Head

F_0 X

Effective length Line

Error (%)

Grip position (mm)

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Proper pulling with hand centered on grip

Give consistent smooth pulling motion

Tester will capture peak torque

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Tohnichi Torque Testers

- Loading Bar
- Tool Management

DOTE3

TF

TCC

Tool calibrated and set properly

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Torque Wrench Management System

Daily Check
Tightening "Click" Type Tools

:

Model QSP, Preset Type

Model FH256MC

Model AC

Torque Check

• Quick & Easy Inspection by User

Torque Wrench Checker
Model LC

Check ➡

OK ➡ Use on the Assembly line.

NG ⬇ Send to Calibration Lab.

Periodic Calibration
Tightening and Inspection Tools

Model CEM3 Digital Type

Model DB, Dial Type

Model QLLS, Adjustable Type

Calibration ➡

Calibration and Adjustment

• Precise Inspection by
Trained Calibration Person.

Torque Wrench Tester
Model DOTE3

OK ⬆

NG ⬇

Repair or
Replace

Utilize Error Proofing Techniques

Verify with Periodic Calibration

Produce High Quality Product

Track with Quality Inspections

Confirm with Torque Data

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