



SmartBox™

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We didn't set out to design the best **UltraPure**
Water sealing system . . .

. . . but we did.

KC Multi-Ring® SmartBox™ Installation Tool

A precision-engineered control box (calibrated to the recommended bolt torque for each pipe size) combined with a Milwaukee 1/2" drive electric impact wrench. The SmartBox™ Installation Tool is an integral part of the KC Sealing System of gaskets, backing flanges and the SmartBox™ Installation Tool.

Piping and valve manufacturers provide suggested bolt torque values for each pipe size. For best results, some also suggests that flanges be installed using a 4-pass bolt-up, with 1/3 of the suggested bolt torque applied with each pass, a small waiting period, and then final torqueing with a torque wrench. Using a standard torque wrench, this is a labor intensive, and hence costly, installation step. KC Multi-Ring®'s SmartBox™ Installation Tool not only ensures a 4-pass bolt-up, it also reduces installation time.

KC Multi-Ring Products, Inc. has programmed suggested bolt torque values into the SmartBox™. Each SmartBox™ is calibrated to the Milwaukee 1/2" drive electric impact wrench which is included with the SmartBox™. Once the installer selects the pipe size (on a switch on the face of the SmartBox™), the SmartBox™ controls the torque delivered by the impact wrench so that bolts are torqued up in 1/3 increments of the suggested value.

In lab tests of the SmartBox™, KC Multi-Ring Products, Inc.'s personnel have made the 4-pass bolt-up on the 8 bolts of the 225mm/9" flanges in **2 minutes**.

Made from high-impact plastic, the SmartBox™ can remain on the floor or be hung near the work area.

Competitive Advantages:

- Controls the maximum torque delivered to the bolts to the values recommended.
- Ensures 4-pass bolt-up, with 3 of the passes done with the SmartBox™ and the final confirming pass that takes up the initial creep and relaxation of the joint with a calibrated torque wrench for a total of 4 passes.
- Provides an added layer of quality control on critical pipe installation procedures.
- Allows time-savings benefits from use of electric impact wrench in conjunction with a standard torque wrench.
- Each electric impact wrench is individually matched to a calibrated SmartBox™.
- Reduces expensive flange installation costs.
- Optimal results are achieved when used with KC Multi-Ring®'s UltraPure gaskets and backing flanges.

Our SmartBox™ is covered under US Patent #5,963,707 and others pending.



Operating Instructions

Introduction

The KC Multi-Ring Products, Inc. SmartBox™ was designed specifically to be used to tighten fasteners on flanged joints in which a KC Multi-Ring® gasket is being installed. Optimal results are achieved when the SmartBox™ is used in conjunction with KC Multi-Ring® Gaskets and AC Backing Flanges. SmartBox™ components are to be operated only by professionals experienced in the use and care of electronic and electric power equipment and tools.

The following components are provided when the SmartBox™ is purchased: Serialized SmartBox™, Serialized Impact Wrench and the High Impact Padded Carrying Case.

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General Usage

Piping and valve manufacturers provide suggested bolt torque values for each pipe size. For best results, some also suggest that flanges be installed in a 4-pass bolt up, with 1/3 of the suggested bolt torque applied with each pass, a small waiting period, and then final torqueing with a torque wrench.

KC Multi-Ring Products, Inc. has programmed suggested bolt torque values for KC Multi-Ring® UltraPure, New ANSI raised face, metric vanstone-type piping, and Schedule 10 (weld-neck) gaskets into the SmartBox™. For each pipe size, the SmartBox™ controls the impact wrench so that 1/3 of the suggested torque is delivered to the bolts during each operating cycle. By making 3 passes on each bolt in the recommended star tightening sequence, the operator has tightened each bolt to the approximate suggested bolt torque value. The operator waits a few minutes to allow for initial joint relaxation, then performs final torqueing with a calibrated torque wrench set to the suggested bolt torque value.

Detailed Component Description

Impact Wrench

The SmartBox™ comes with a Milwaukee electric impact wrench, which operates with standard 110 VAC. The impact wrench has a reversible switch built into its handle. Depressing the “top” of the switch causes the impact wrench to function in the “tighten” or “forward” mode. Depressing the “bottom” of the switch causes the impact wrench to function in the “remove or “reverse” mode.



SmartBox™ Case

The SmartBox™ has a handle for ease of carrying. The SmartBox™ can also be hung from a pipe spool, scaffolding or scissor-lift "cage" in order to physically locate it near the flanges being installed. If the SmartBox™ is hung in any way, special care must be taken to ensure that the SmartBox™ is not dropped. Even though the SmartBox™ is made from high-impact plastic, damage to SmartBox™ components may occur if it is dropped from an elevated height.

Power Connections

There is one (1) each standard 15-amp straight blade grounded 110 volt male inlet[1] and female receptacle[2] located in the base of the SmartBox™. An extension cord (not included with the SmartBox™) is plugged into the male inlet[1] to provide power to the SmartBox™. The impact wrench is plugged into the female receptacle[2]. Alternatively, the impact wrench can be connected to the SmartBox™ through an extension cord. KC Multi-Ring Products, Inc. recommends that all extension cords be sized for the load vs. length (longer length - larger wire diameter.) The SmartBox™ must be operated through a grounded power circuit. As with all power tools, a ground fault interrupter power source should be used. In addition, all other applicable federal, state and local safety and health regulations pertaining to the operation of electrical equipment are to be followed in the operation of the SmartBox™ and the impact wrench.

Serial Number

The serial number[6] shown on the front of the SmartBox™ should match the serial number of the impact wrench. **DO NOT OPERATE THE SMARTBOX™ IF THESE NUMBERS DO NOT MATCH.**

On/Off Switch

There are three (3) switches mounted on the face of the SmartBox™, which the operator must use properly. The red "On/Off" rocker switch[3] is used to control power to the SmartBox™ and also consists of a circuit breaker for overload protection. The switch will be continuously lit when the switch is in the "On" position and power is provided to the female receptacle. During operation of the impact wrench, this switch will be lit when power is provided to the wrench, and unlit when the SmartBox™ shuts off power to the wrench. There also will be an audible click as the SmartBox™ first delivers and then again when it shuts off power to the wrench.

Mode Switch

There is a toggle switch[5] located approximately in the center of the face of the SmartBox™ called the "Mode" switch. This switch determines the operation of the SmartBox™. It should be switched to the left and pointing to "Tighten" to control the impact wrench. It should be switched to the right and pointing to "Remove" to operate the impact wrench without benefit of the SmartBox™. **When this switch is in the "Remove" position, the SmartBox™ is in non-pulsing-operation.** Note that the impact wrench can be reversed even when this switch is in the "Tighten" position.

Pipe Size Selector Switch

The final control switch is a 12-position rotary switch[4], which is used to select the pipe size on which bolts will be tightened, called the "Pipe Size Selector" switch. The SmartBox™ can be used on 2" - 20" pipe. The nominal pipe size designations are shown on the "inner" ring of numbers around the dial switch. The SmartBox™ can also be used on 63mm - 250mm PVDF piping. The metric pipe size designations are shown in the "outer" ring of numbers around the left half of the dial switch. A white mark on the face of the dial switch knob points to the selected pipe size.



SmartBox™ Label

Lastly, a label on the face of the SmartBox™ contains information required for proper tool operation. The label reads "This tool should only be used for speed and ease of 3 pass progressive torqueing of pipe flanges, and always followed up with a calibrated torque wrench. Use only with impact wrench that has the same serial number as the one below."

High Impact Padded Carrying Case

The SmartBox™ is shipped with a watertight padded carrying case manufactured from high-impact plastic. This case has room for the SmartBox™ and the impact wrench, and is designed for storing and transporting the SmartBox™. We recommend that the SmartBox™ and impact wrench be stored in the carrying case when they are not in use.

Detailed Operating Instructions

The SmartBox™ was designed to be used for speed and ease of 3 pass progressive torqueing of pipe flanges on which KC Multi-Ring® Gaskets are installed. It was **not** designed to serve as a final Quality Control tool during bolt installation, or for use with any gaskets not manufactured by or under license from KC Multi-Ring Products, Inc. **After making 3 passes on the bolts in the preferred "star" sequence using the SmartBox™, the final bolt torque must be made with a properly calibrated torque wrench.**

Installation of Bolts on AC Backing Flanges

Optimal results are obtained when all components of the **KC Multi-Ring® Sealing System** (KC Multi-Ring® Gaskets, AC Backing Flanges and the SmartBox™) are used on the flanged joint. The following instructions apply to such installations:

1. Connect the SmartBox™ to a standard 110 VAC 60 cycle power source.
2. Plug the impact wrench into the SmartBox™.
3. Turn the "On/Off" rocker switch (circuit breaker)[3] to the "On" position. This switch should be continuously lit.
4. Place the "Mode" toggle switch[5] into the "tighten" position.
5. Dial the "Pipe Size" switch[4] to the size of the pipe on which the gasket is being stalled.
6. Perform a visual check to ensure that the "Pipe Size" switch[4] is set to the proper value matching the size of the pipe on which the gasket is being installed. **Improper use of the SmartBox™ and impact wrench may result in damage to the flange, the pipe and/or the gasket.**
7. Place the 1/2" drive impact socket matching the nut dimension onto the impact wrench.

The SmartBox™ is now ready for operation.

Select the joint on which bolts are to be installed.

Complete all of the steps listed below for the selected joint before moving to the next joint.



8. Perform a visual check to ensure that the "Pipe Size" switch[4] is set to the proper value matching the size of the pipe on which the gasket is being installed. Improper use of the SmartBox™ and impact wrench may result in damage to the flange, the pipe and/or the gasket.
9. Select one flange to be used to determine the bolt tightening sequence. Remember that the bolt tightening sequence is stamped onto the AC Backing Flange. The bolt tightening sequence numbers will not be the same for mating flanges. After you select the one flange to be used to determine the bolt-up sequence, use that flange for the tightening sequence for all bolts on that flange.
10. Place the appropriate size box-end or open-end wrench on the bolt head of the first bolt to be tightened.
11. Place the socket (attached to impact wrench) on the "first" nut.
12. Press and hold the impact wrench "trigger" in the forward position until the SmartBox™ causes the impact wrench to stop. Release the impact wrench "trigger."
13. Go to the "next" bolt and repeat steps 10 - 12 until all nuts have been tightened once. This will tighten the bolts to 1/3 of the recommended torque value.
14. Follow steps 10 - 13 until all bolts have been tightened a total of 3 times in the recommended sequence.

DO NOT USE THE SMARTBOX™ TO TIGHTEN ANY BOLT A TOTAL OF MORE THAN THREE (3) TIMES. IF YOU DO, YOU MAY EXCEED THE PIPE MANUFACTURER'S RECOMMENDED TORQUE.

15. When installing a gasket made from expanded PTFE, wait approximately 2 - 3 minutes — this will allow for initial joint "creep" and "relaxation" to occur.
16. Place the appropriate size box-end or open-end wrench on the bolt head of the "first" bolt to be tightened.
17. Tighten the "first" nut using a calibrated torque wrench set to the recommended torque value.
18. Go to the "next" bolt and repeat steps 16 - 17 until a final pass has been made on all bolts in the recommended sequence.

Discontinue using the SmartBox™ if the recommended torque is exceeded with the 3 pass tightening. Contact KC Multi-Ring Products, Inc. to determine corrective action.

Installation of Bolts on Conventional Backing Rings

Conventional backing rings do not have the bolt tightening sequence indicated on the backing ring. The installer must obtain the bolt tightening sequence from an external source. The bolt tightening sequences for flanges with 4 - 24 bolts are shown on our colored data sheets that are packaged with KC Multi-Ring® Gaskets. The following instructions apply to the installation of bolts on conventional backing rings:

1. Connect the SmartBox™ to a standard 110 VAC 60 cycle power source.
2. Plug the impact wrench into the SmartBox™.
3. Turn the "On/Off" rocker switch (circuit breaker)[3] to the "On" position. This switch should be continuously lit.
4. Place the "Mode" toggle switch[5] into the "Tighten" position.



5. Dial the "Pipe Size" switch[4] to the size of the pipe on which the gasket is being installed.
6. Perform a visual check to ensure that the "Pipe Size" switch[4] is set to the proper value matching the size of the pipe on which the gasket is being installed. **Improper use of the SmartBox™ and impact wrench may result in damage to the flange, the pipe and/or the gasket.**
7. Place the 1/2" drive impact socket matching the nut dimension on the impact wrench.

The SmartBox™ is now ready for operation.

Select the joint on which bolts are to be installed.

Complete all of the steps listed below for the selected joint before moving to the next joint.

8. Perform a visual check to ensure that the "Pipe Size" switch[4] is set to the proper value matching the size of the pipe on which the gasket is being installed. **Improper use of the SmartBox™ and impact wrench may result in damage to the flange, the pipe and/or the gasket.**
9. Determine the bolt tightening sequence (from the pipe manufacturer) or look for colored data sheets that are packaged with KC Multi-Ring® Gaskets.
10. Place the appropriate size box-end or open-end wrench on the bolt head of the "first" bolt to be tightened.
11. Place the socket (attached to impact wrench) on the "first" nut.
12. Press and hold the impact wrench "trigger" in the forward position until the SmartBox™ causes the impact wrench to stop. Release the impact wrench "trigger."
13. Go to the "next" bolt and repeat steps 10 - 12 until all bolts have been tightened once. This will tighten the bolts to 1/3 of the recommended torque value.
14. Follow steps 10 - 13 until all bolts have been tightened a total of 3 times in the recommended sequence.

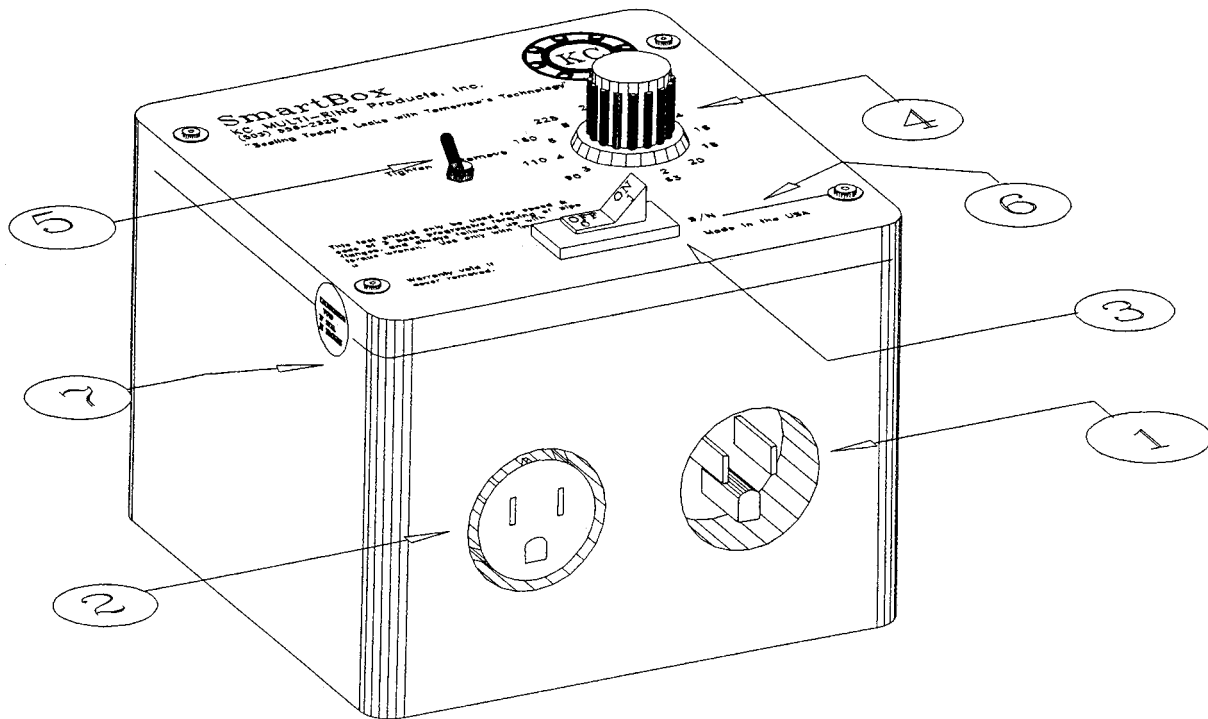
DO NOT USE THE SMARTBOX™ TO TIGHTEN ANY BOLT A TOTAL OF MORE THAN THREE (3) TIMES. IF YOU DO, YOU MAY EXCEED THE PIPE MANUFACTURER'S RECOMMENDED TORQUE.

15. When installing a gasket made from expanded PTFE, wait approximately 2 - 3 minutes — this will allow for initial joint "creep" and "relaxation" to occur.
16. Place the appropriate size box-end or open-end wrench on the bolt head of the "first" bolt to be tightened.
17. Tighten the "first" nut using a calibrated torque wrench set to the recommended torque value.
18. Go to the "next" bolt and repeat steps 16 - 17 until a final pass has been made on all bolts in the recommended sequence.

Discontinue using the SmartBox™ if the recommended torque is exceeded with the 3 pass tightening. Contact KC Multi-Ring Products, Inc. to determine corrective action.



User's Controls





Answers to Commonly Asked Questions

Is it possible to over-torque bolts using the SmartBox™?

Not if you have followed the operating instructions. If you did not follow the operating instructions, however, you can over-torque the bolts. Over-torqueing can result from making more than a total of 3 tightening passes on any bolt with the SmartBox™ or having a larger pipe size selected than you are actually working on. The SmartBox™ “adds” 1/3 of the recommended bolt torque with each tightening pass. If you make 4 tightening passes, you will have applied 1/3 more torque than recommended. If you make 6 tightening passes, you will have applied 2 times the recommended torque. (This answer assumes that you have not done anything to loosen the bolts in between passes with the SmartBox™.)

How can I use the impact wrench to loosen bolts?

There are two ways to use the impact wrench to loosen bolts. Both options require that the SmartBox™ “Power” Switch[3] be in the “On” position:

1. Press the lower part of the impact wrench reversible switch while the SmartBox™ “Mode” switch[5] is in the “Tighten” position.
2. Press the lower part of the impact wrench reversible switch while the SmartBox™ “Mode” switch[5] is in the “Remove” position.

The SmartBox™ is effectively disengaged when the “Mode” switch[5] is in the “Remove” position. Power is delivered through the SmartBox™ to the impact wrench, just as if the impact wrench was connected directly to a power source. The SmartBox™ does not control impact wrench operation whatsoever in the “Remove” position.

How can I get around the SmartBox™ control features and operate the impact wrench directly?

You can plug the impact wrench directly into an extension cord, or with the SmartBox™ “Power” switch[3] in the “On” position, switch the SmartBox™ “Mode” switch[5] to the “Remove” position. See the last paragraph in the answer immediately above.

If you choose to operate the SmartBox™ with the “Mode” switch[5] in the “Remove” position, **MAKE SURE** that you change the “Mode” switch[5] to the “Tighten” position **BEFORE** you resume progressive 3 pass tightening.



Can I use the SmartBox™ to "run up" the nuts, or do they have to be "finger" tightened?

You can use the SmartBox™ to "run up" nuts to the first pass torque value for 4" (110mm) pipe and larger. You must "finger" tighten bolts on 3" (90mm) pipe and smaller before making the first pass with the SmartBox™.

Now that I use a SmartBox™, do I still need a torque wrench?

ABSOLUTELY! The SmartBox™ was designed for speed and ease of 3 pass progressive tightening of pipe flanges. The final pass should always be performed using a calibrated torque wrench. The SmartBox™ is an installation tool and the calibrated torque wrench is a Quality Control tool.

Does a torque wrench come with the SmartBox™? If not, why not?

NO! For most SmartBox™ users, the SmartBox™ is a time and energy savings device and is used instead of a torque wrench for the first 3 passes in progressive tightening of pipe flanges. Most operators have a favorite brand of torque wrench or use a brand selected by their company.

KC Multi-Ring Products, Inc. chose not to provide torque wrenches as part of the tool kit in order to keep costs as low as possible, and to avoid providing duplicate tools for SmartBox™ users.

My torque wrench shows that the SmartBox™ torque value is not even close to the recommended value - what do I do now?

If you are not satisfied that your torque wrench is accurate, discontinue using the SmartBox™ until you have contacted KC Multi-Ring Products, Inc. for advice.

How often should I have my SmartBox™ calibrated?

We recommend that you have KC Multi-Ring Products, Inc. calibrate your SmartBox™ with the matching impact wrench every six (6) months. KC Multi-Ring Products, Inc. will ship your SmartBox™ and impact wrench back to you within 72 hours of receipt, or we will provide you with a "loaner" until we get your original unit back to you. The SmartBox™ owner pays for shipment to and from your plant, excluding "loaner" shipping charges. During the one year limited warranty period, there is no charge for the first two calibrations. There is a charge for all other calibrations. Contact KC Multi-Ring Products, Inc. for the current calibration charge.



These tools are handy – what else do you have?

KC Multi-Ring Products, Inc. has built its business by providing innovatively designed products that outperform our competition's products. We support our products with top-notch customer service. We work closely with our customers, distributors and licensees to meet the challenges of today's highly trained customers in a competitive market place that demands timely start-ups. KC Multi-Ring Products, Inc. has designed the leading-edge technology low torque gasket, which can be cut from any gasket material. These gaskets can be purchased from licensed KC Multi-Ring Products, Inc. cutters worldwide. In addition, KC Multi-Ring Products, Inc. manufactures the **KC Multi-Ring® Sealing System** for UltraPure water applications. This system includes the innovative AC Backing Flange, AC D-Ring Flange and KC Multi-Ring® Gaskets cleaned and bagged for UltraPure applications. **KC Multi-Ring® Sealing System** components can be purchased from KC Multi-Ring Products, Inc. distributors worldwide. For the latest information on KC Multi-Ring Products, Inc. piping solutions, call one of our distributors, licensees, or contact us directly.

Warranty

This warranty gives you specific legal rights. You may also have other rights, which vary from state to state or province to province.

One-Year Limited Warranty

KC Multi-Ring Products, Inc. warrants its SmartBox™ against defects in materials and workmanship for a period of one year from date of sale as indicated by our sales invoice, or KC Multi-Ring Products, Inc. The electric impact wrench sold with the SmartBox™ has not been modified by KC Multi-Ring Products, Inc. The impact wrench manufacturer only shall be responsible for any claims for any defects in the impact wrench whatsoever. During the warranty period, KC Multi-Ring Products, Inc. will, at its option, either repair or replace products which prove to be defective. This warranty extends only to the original end user purchaser of the SmartBox™ and is not transferable or assignable to any other party.

Exclusions

The warranty on your KC Multi-Ring® SmartBox™ shall not apply to defects or damage resulting from:

- Normal wear and tear.
- Modification or misuse.
- Connection to improper electrical power source.

Voiding Your Warranty

The warranty on your KC Multi-Ring® SmartBox™ shall be null and void if any attempt whatsoever is made to open the SmartBox™ by any party other than KC Multi-Ring Products, Inc. The warranty shall be void if the SmartBox™ is operated with any device other than the individual impact wrench identified by the serial number indicated on the front panel of the SmartBox™. The warranty shall be void if the label stating "Calibration Void If Broken"[7] has been broken or removed.



Warranty Limitations

The warranty set forth above is exclusive and no other warranty, whether written or oral, is expressed or implied. KC Multi-Ring Products, Inc. specifically disclaims the implied warranties of merchantability and fitness for a particular purpose other than that of installing KC Multi-Ring® Gaskets on flange adapters on which AC Backing Flanges are installed.

KC Multi-Ring Products, Inc. shall not be liable for any consequential damages resulting from operation of the SmartBox™. KC Multi-Ring Products, Inc.'s liability shall be limited to the replacement or repair of defects in materials and workmanship in the SmartBox™ as described elsewhere herein.

Service During the Warranty Period

If your SmartBox™ should fail during the warranty period, bring or ship your SmartBox™ to KC Multi-Ring Products, Inc. The customer shall be responsible for shipping charges, if any, required to return the SmartBox™ to our plant and back to the customer.

Service After the Warranty Period

We recommend that your SmartBox™ be calibrated every six (6) months. Your SmartBox™ must also be calibrated if you replace your impact wrench. Contact KC Multi-Ring Products, Inc. for the current calibration charge. The customer pays any and all shipping charges.

Customer Support

KC Multi-Ring Products, Inc.
354 Delameter Road
Castle Rock, WA 98611-9411
360-274-0972

SmartBox™ Serial Number

Record your SmartBox™ serial number here: _____

Purchase date: _____