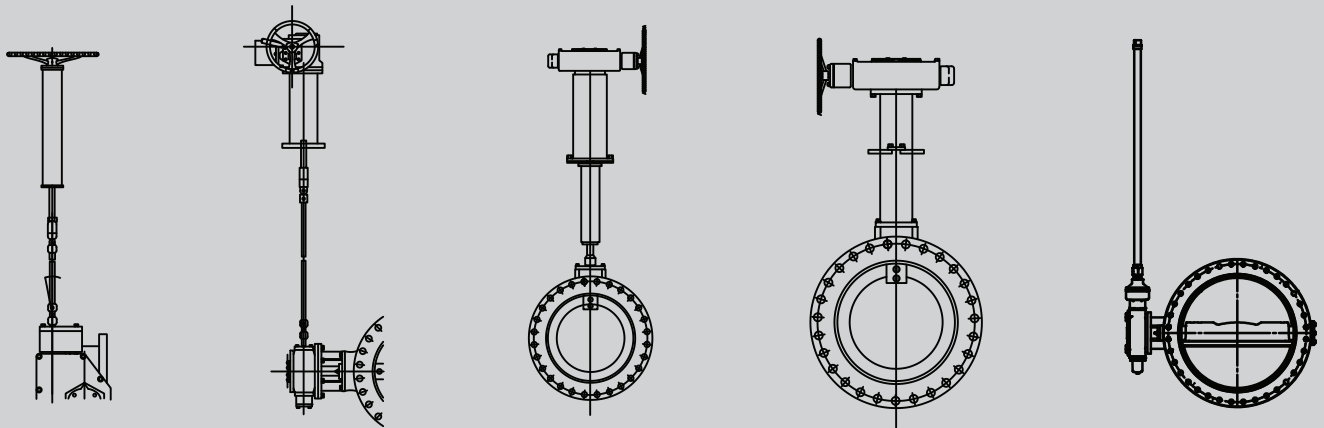


TTR Group Inc.

The Engineered Valve
& Speciality Products Company



Manual of Practice Definitions & Site Operational Details



Field Component Installation & Assembly

- Pedestals • Shaft Extensions • Wall Brackets • Actuation

Please refer to the TTR Suggested Specifications Manual for Extension Specifications

MARKETS

Water • Waste Water • Buried • In-Plant • Power • Industrial



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Valve & Application Solutions for the Municipal, Industrial, Mining and Power Industries



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TTR has no responsibility for the suitability or compatibility for the application selection of the contents of this manual and the intended use by any user or installer. Each installer or user is responsible for the proper use and suitability and compatibility for each application. It is recommended the user or installer ensures the equipment used and installed is recommended by the manufacturer and engineered for the use of the equipment. All safety standards must be followed.

Ancillary Municipal Products Glossary of Definitions

Rod Extensions

Gear Actuators mounted directly to the valve shaft

Rod Extension with 2 inch Nut – Buried

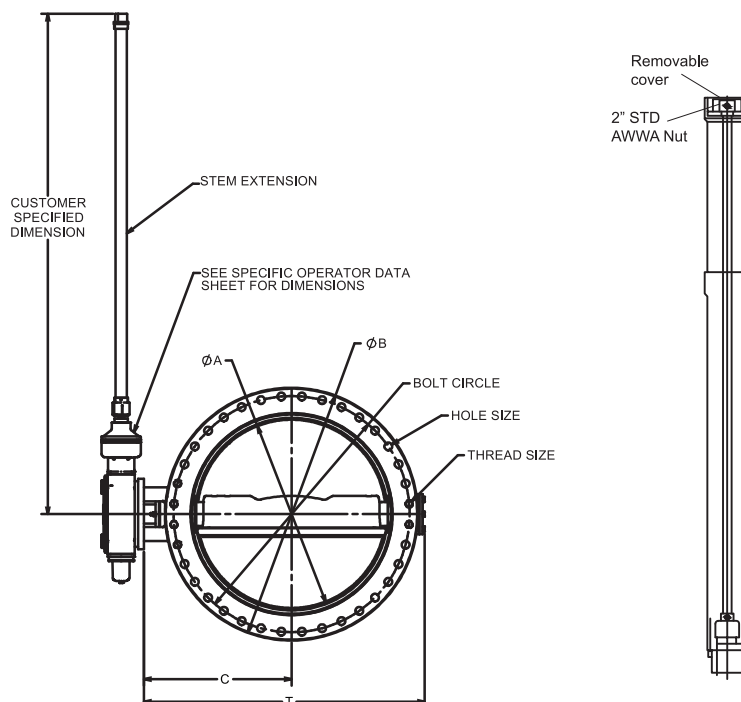
The gear actuator is mounted directly to the valve shaft and is non-indicating. The valve shaft is horizontally mounted in the pipe. The actuator input shaft is in the vertical and typically with a 2 inch AWWA nut pinned to the input shaft of the gear actuator. The inner rod extension has a female AWWA 2 inch nut that rests on the male nut and is connected with a solid pin (welding is preferred). The upper 2 inch nut is connected to the upper rod extension by means of a pin weaker than the lower pin to ensure the upper pin fails in the event of over torque to the rod extension.

A soil pipe is used to house the inner rod extension and can be supplied by the manufacturer, distributor or contractor. Valve position indication can be achieved by using a soil box valve indicator.

Maximum input torque should not exceed 300ft/lbs for all AWWA C504 Butterfly Valve Gear Actuators.

Drawing Reference & Page: 9080157, Page 4

Please refer to the TTR Suggested Specifications manual for this item.



Ancillary Municipal Products Glossary of Definitions

Rod Extensions

Gear Actuators mounted directly to the valve shaft

Rod Extension with 2 inch Nut – Chambered

Note: Chambers can be Dry or Wet (flooded). In all cases when using actuators for chambered service it is suggested that all gear actuators are non-indicating and indication is achieved at the surface. All actuators should be grease packed in the event the chamber becomes flooded

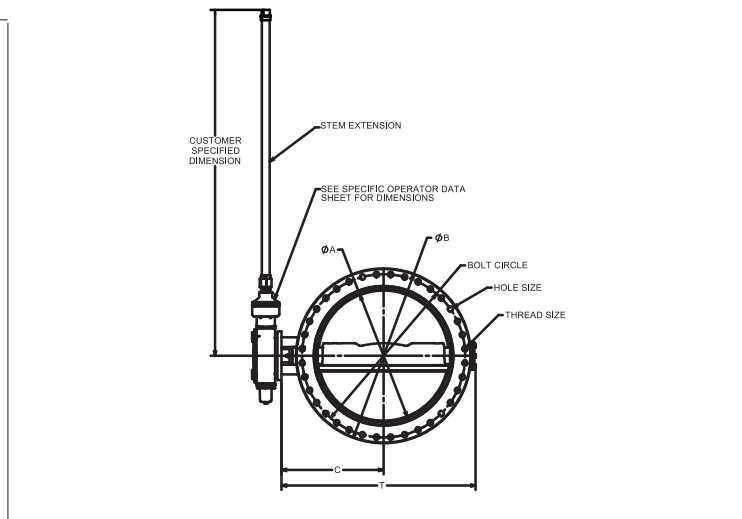
The gear actuator is mounted directly to the valve shaft and is non-indicating. The valve shaft is horizontally mounted in the pipe. The actuator input shaft is in the vertical and typically with a 2 inch AWWA nut pinned to the input shaft of the gear actuator. An option is to have a input shaft coupling connecting the rod extension to the input shaft of the gear actuator. The inner rod extension has a female AWWA 2 inch nut or direct coupled to the actuator input shaft. The upper 2 inch nut is connected to the upper rod extension by means of a pin weaker than the lower connection to ensure the upper pin fails in the event of over torque to the rod extension.

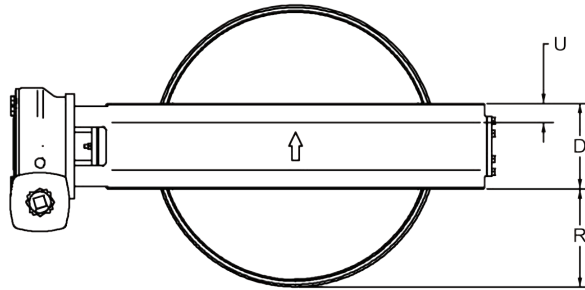
The extension will need to be guided horizontally with an adjustable wall bracket and the distance from the wall to the center of the rod extension will be required. Wall brackets should be placed at 3 meter (10 ft) intervals. The final bracket should be located beneath the nut and be sufficient to accept the vertical load of the rod extension

Maximum input torque should not exceed 300ft/lbs for all AWWA C504 Butterfly Valve Gear Actuators.

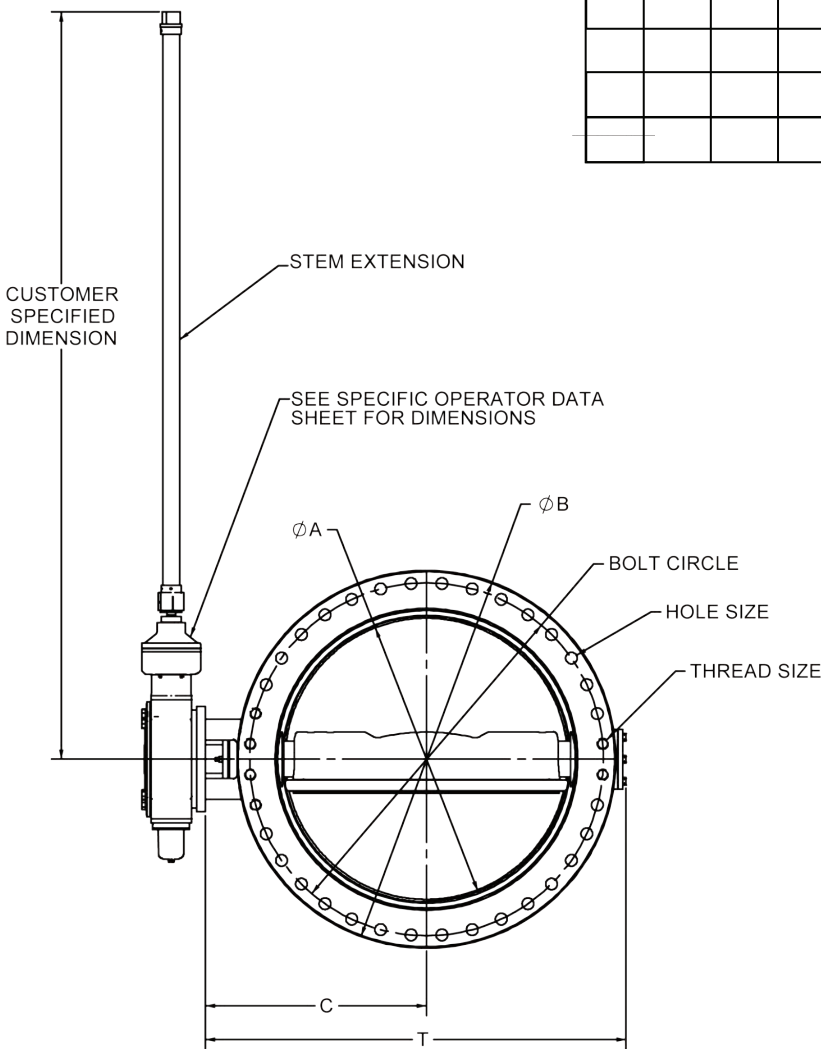
Drawing Reference & Page: 9080157, Page, 6

Please refer to the TTR Suggested Specifications manual for this item.





Size	U	D	R	X	A	B	C	T



K-FLO
 BUTTERFLY VALVES
 BY
 CRISPIN VALVES
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 WWW.CRISPINVALVE.COM

SERIES 47 BUTTERFLY VALVES
 MANUAL OPERATION,
 EXTENDED STEM

REDRAWN		SIZE	DWG. NO.	REV
CHECKED		C	9080157	1
DRAWN C. GEARY	07/26/10			



Ancillary Municipal Products Glossary of Definitions

Rod Extensions

Gear Actuators mounted directly to the valve shaft

Rod Extension with 2 inch Nut – Submerged

Note: In all cases when using actuators for submerged service all gear actuators are non-indicating and indication is achieved at the surface. All actuators **MUST** be grease packed and identified to the manufacturer as submerged service requirements. The submerged depth is critical for proper sealing and potential pressure retention or relief.

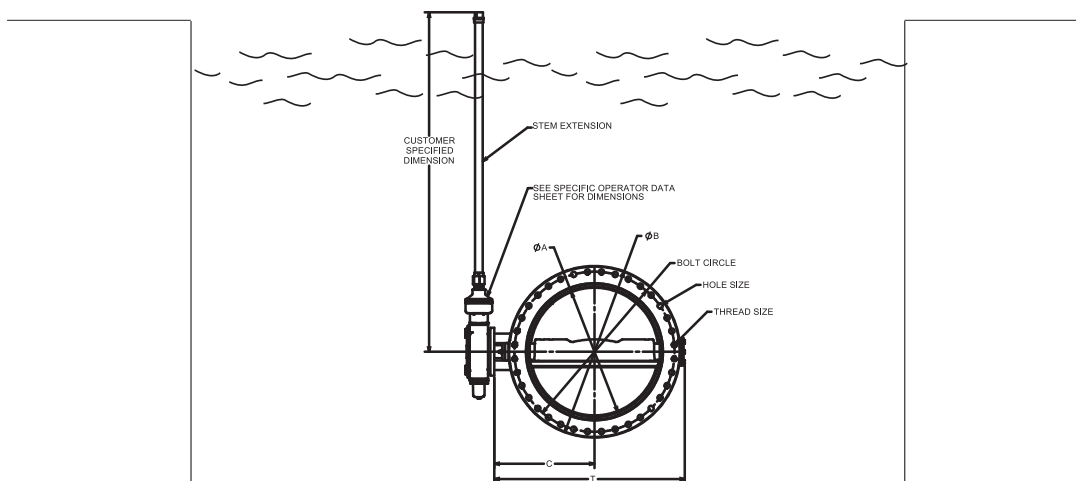
The gear actuator is mounted directly to the valve shaft and is non-indicating. The valve shaft is horizontally mounted in the pipe. The actuator input shaft is in the vertical and typically with a 2 inch AWWA nut pinned to the input shaft of the gear actuator. An option is to have a input shaft coupling connecting the rod extension to the input shaft of the gear actuator. The inner rod extension has a female AWWA 2 inch nut or direct coupled to the actuator input shaft. The upper 2 inch nut is connected to the upper rod extension by means of a pin weaker than the lower connection to ensure the upper pin fails in the event of over torque to the rod extension.

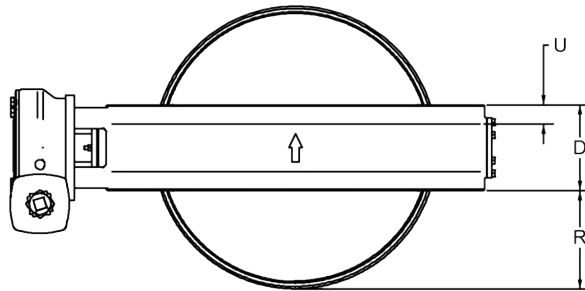
The extension will need to be guided horizontally with an adjustable wall bracket and the distance from the wall to the center of the rod extension will be required. Wall brackets should be placed at 3 meter (10 ft) intervals. The final bracket should be located beneath the nut and be sufficient to accept the vertical load of the rod extension

Maximum input torque should not exceed 300ft/lbs for all AWWA C504 Butterfly Valve Gear Actuators.

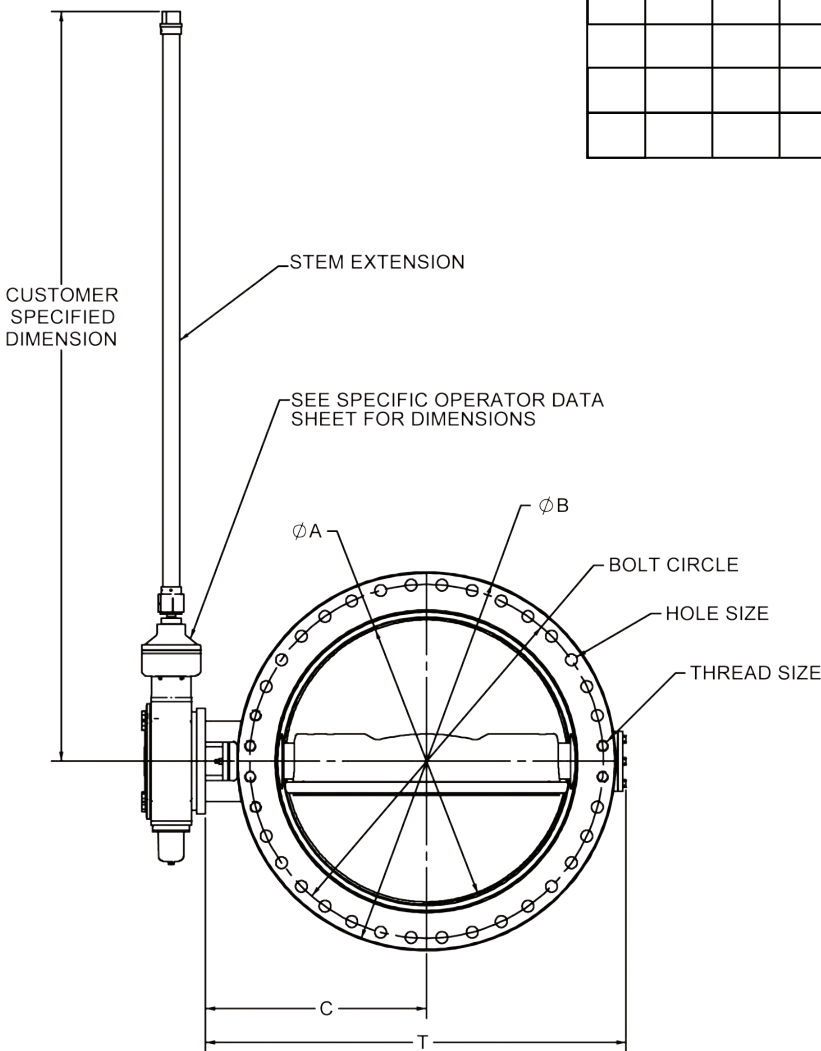
Drawing Reference & Page: 9080157, Page, 8

Please refer to the TTR Suggested Specifications manual for this item.





Size	U	D	R	X	A	B	C	T



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SERIES 47 BUTTERFLY VALVES
 MANUAL OPERATION,
 EXTENDED STEM

REDRAWN		SIZE	DWG. NO.	REV.
CHECKED		C	9080157	1
DRAWN C. GEARY	07/26/10			

Ancillary Municipal Products Glossary of Definitions

Rod Extensions

Gear Actuators mounted directly to the valve shaft

Rod Extension with Non-Indicating Pedestal & Handwheel

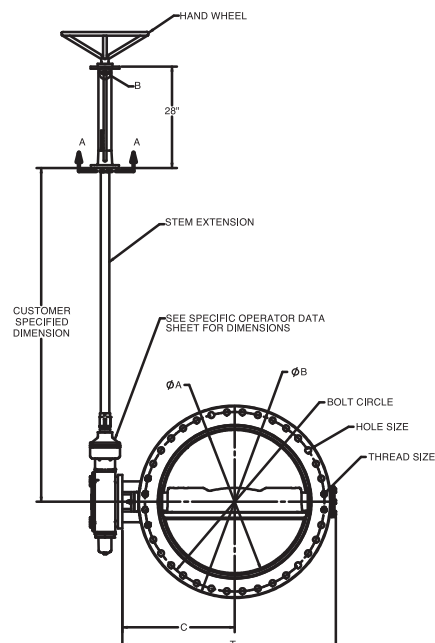
The gear actuator is mounted directly to the valve shaft and must be indicating at the actuator. This is based on DRY applications for the gear actuator. Based on the location and extension length, indication is also required at the surface in the pedestal.

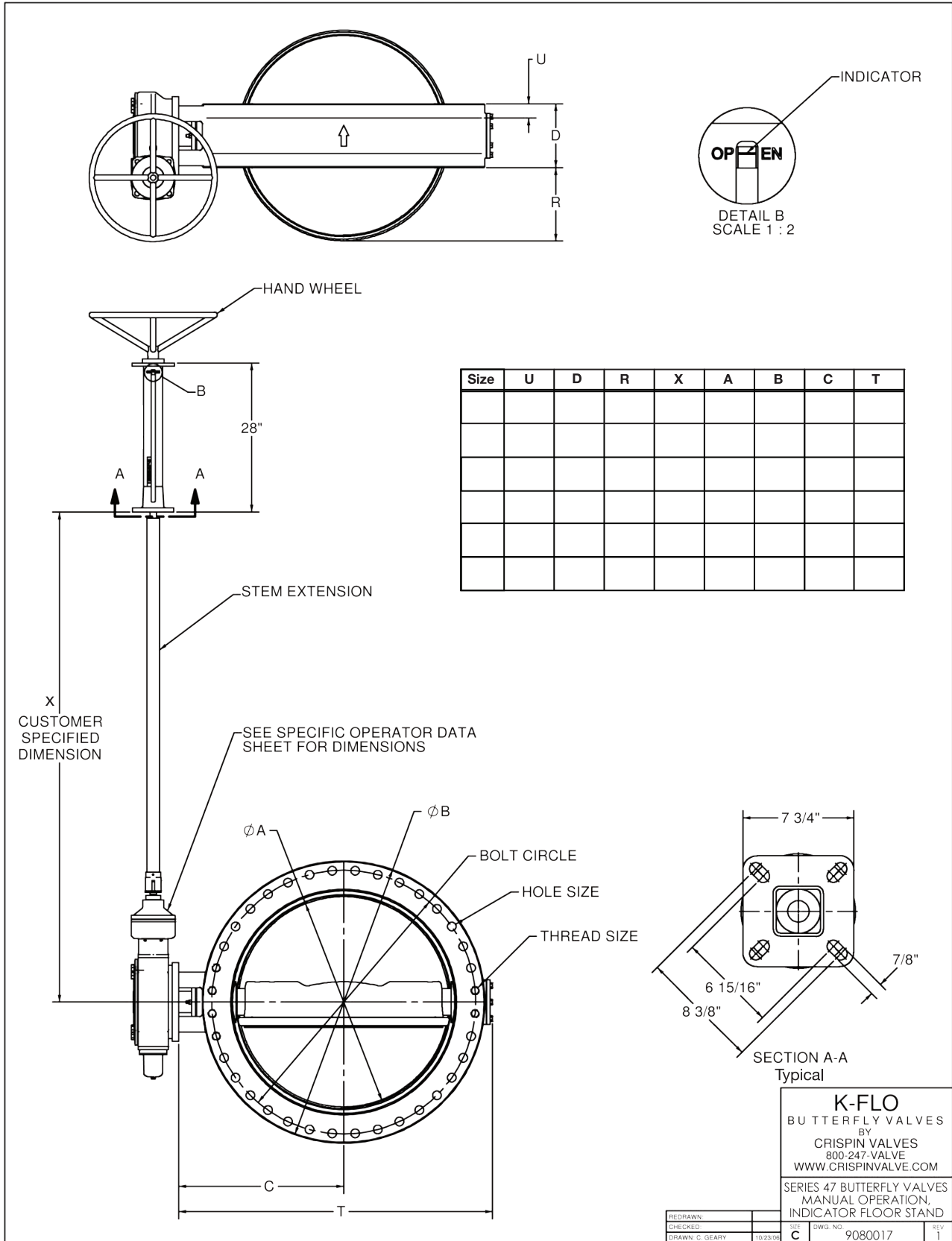
The valve shaft is horizontally mounted in the pipe. The actuator input shaft is in the vertical and typically with a input shaft coupling connecting the rod extension to the input shaft of the gear actuator. The inner rod extension has a coupling connected to the pedestal connecting rod. The pedestal can be mounted directly to the concrete floor or a bracket at the surface connected to the wall or cross beams. The pedestal mounting surface should be sufficiently designed to withstand the maximum input torque of the handwheel.

The rod extension will need to be guided horizontally with an adjustable wall bracket and the distance from the wall to the center of the rod extension will be required. Wall brackets should be placed at 3 meter (10 ft) intervals. The final bracket should be located beneath the nut and be sufficient to accept the vertical load of the rod extension

Maximum input torque should not exceed 300ft/lbs for all AWWA C504 Butterfly Valve Gear Actuators.

*Drawing Reference & Page: 9080017, Page, 10
Please refer to the TTR Suggested Specifications manual for this item.*







Ancillary Municipal Products Glossary of Definitions

Rod Extensions

Gear Actuators mounted directly to the valve shaft

Rod Extension with Indicating Pedestal & Handwheel

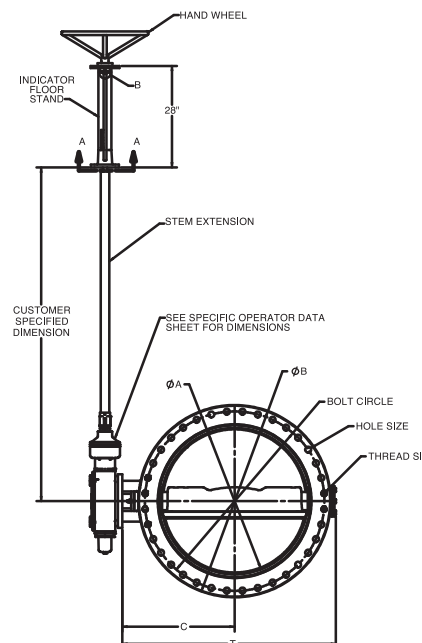
The gear actuator is mounted directly to the valve shaft and typically non-indicating at the actuator; however, the actuator can be indicating if this is a dry only condition. Indicating pedestals are typically used for WET applications for the gear actuator. Based on the location and extension length, indication is also required at the surface in the pedestal.

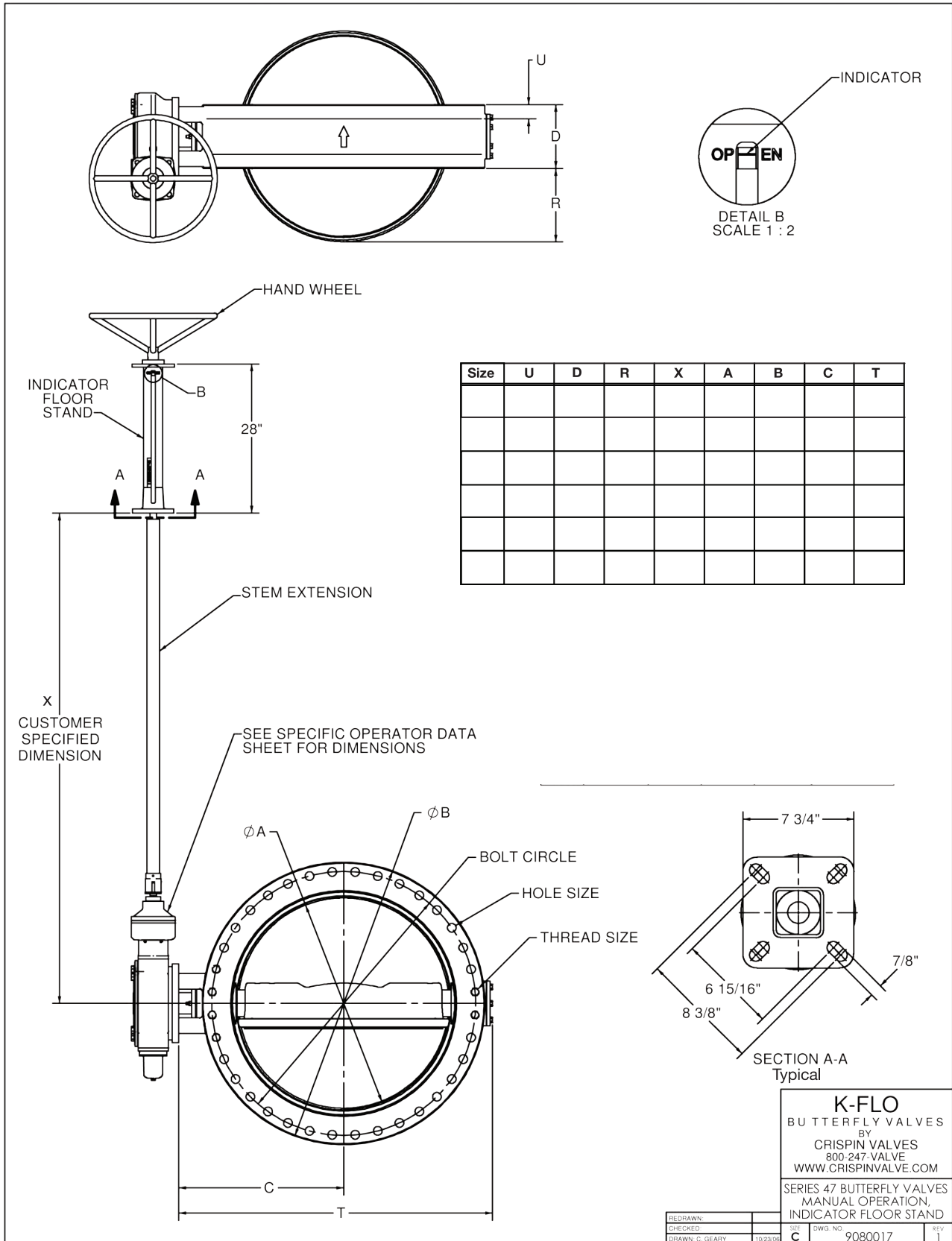
The valve shaft is horizontally mounted in the pipe. The actuator input shaft is in the vertical and typically with a input shaft coupling connecting the rod extension to the input shaft of the gear actuator. The inner rod extension has a coupling connected to the pedestal connecting rod .The pedestal can be mounted directly to the concrete floor or a bracket at the surface connected to the wall or cross beams. The pedestal mounting surface should be sufficiently designed to withstand the maximum input torque of the handwheel.

The rod extension will need to be guided horizontally with a adjustable wall bracket and the distance from the wall to the center of the rod extension will be required. Wall bracket should be placed at 3 meter (10 ft) intervals. The final brackets should be located beneath the nut and be sufficient to accept the vertical load of the rod extension.

Maximum input torque should not exceed 300ft/lbs for all AWWA C504 Butterfly Valve Gear Actuators.

*Drawing Reference & Page: 9080017, Page 12
Please refer to the TTR Suggested Specifications
manual for this item.*







Ancillary Municipal Products Glossary of Definitions

Rod Extensions

Gear Actuators mounted directly to the valve shaft

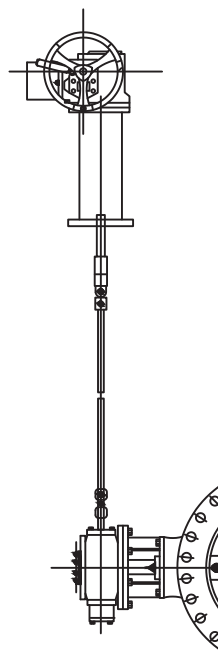
Rod Extension with Pedestal Electric Actuation Starter and Motor

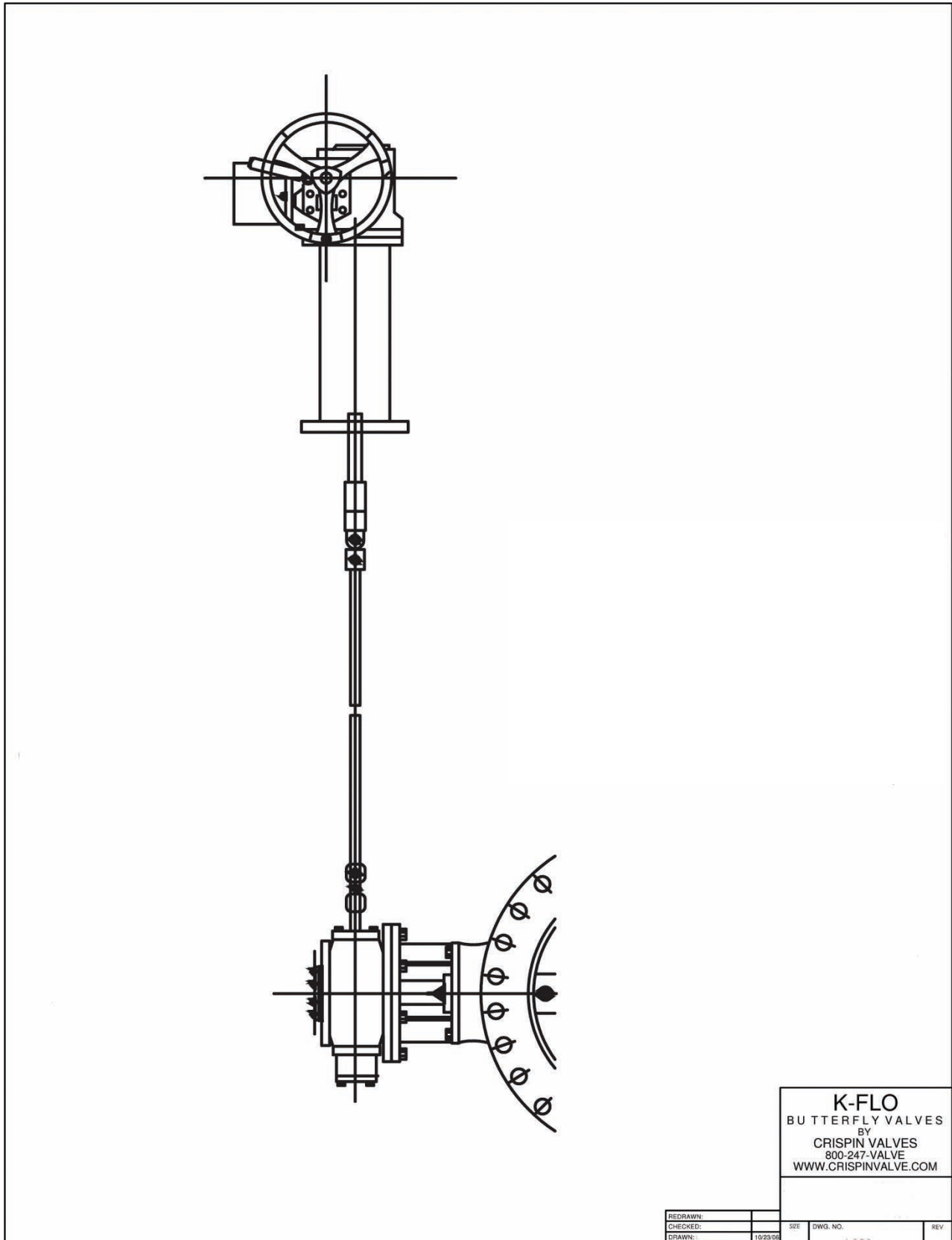
The gear actuator from the electric actuator assembly is mounted directly to the valve shaft and typically indicating at the actuator; however, the actuator can be non-indicating if this is a wet condition where the valve and actuator are located and submergence may be possible. Non-indicating pedestals are typically used in this application as the starter and motor incorporate the manual override and the visual indication.

The valve shaft is horizontally mounted in the pipe. The actuator input shaft is in the vertical and typically with a input shaft coupling connecting the rod extension to the input shaft of the gear actuator. The inner rod extension has a coupling connected to the pedestal connecting rod. The pedestal can be mounted directly to the concrete floor or a bracket at the surface connected to the wall or cross beams. The pedestal mounting surface should be sufficiently designed to withstand the maximum input torque of the handwheel. The electric actuator starter and motor are mounted directly to the pedestal and can be mounted in any orientation for local remote control operation and manual override.

The rod extension between the valve and pedestal will need to be guided horizontally with a adjustable wall bracket and the distance from the wall to the center of the rod extension will be required. Wall brackets should be placed at 3 meter (10 ft) intervals. The final bracket should be located beneath the nut and be sufficient to accept the vertical load of the rod extension.

*Drawing Reference & Page: Page 14
Please refer to the TTR Suggested Specifications
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REDRAWN:		SITE	DWG. NO.	REV
CHECKED:				
DRAWN:	10/23/06			

Ancillary Municipal Products Glossary of Definitions

Shaft Extension & Pedestal (Inner Torque Tube & Floorstand)

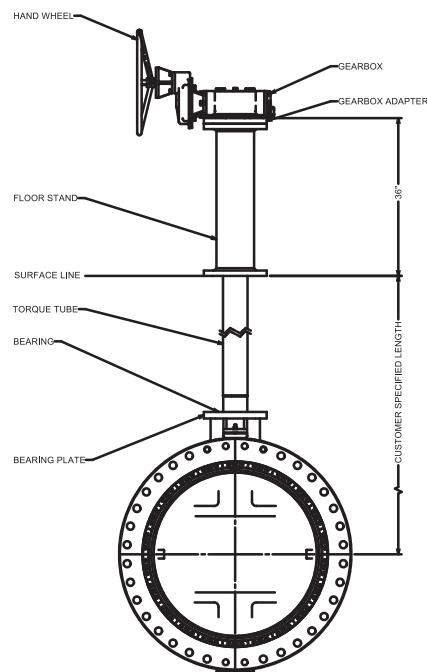
Shaft Extension & Pedestal

The manual gear or electric actuator is mounted to the pedestal. Non-indicating pedestals are typically used in this application as the complete actuator assembly is at the surface. In all cases, the valve is mounted with the valve shaft in the vertical position.

The valve shaft is vertically mounted in the pipe. The shaft extension is designed to withstand the full torsional torque requirements of the actuator and transmit the torque to the valve stem. The shaft extension must be designed for a maximum angular deflection of .75 degrees over the entire length of the extension. Increases in length after installation or assembly will require re-calculation and possibly design. The lower hubs are keyed and engage the valve shaft based on the height of the shaft. The male hub at the top of the shaft extension is keyed and designed at the same height to engage the actuator drive sleeve or hub. The pedestal must be designed to transfer the total weight of the shaft extension to the pedestal relieving the shaft extension weight from the valve stem.

The shaft extension between the valve and pedestal will need to be guided horizontally with an adjustable wall bracket and the distance from the wall to the center of the extension will be required. Wall brackets should be placed at 3 meter (10 ft) intervals.

*Drawing Reference & Page: 9100494, Page 16
Please refer to the TTR Suggested Specifications manual for this item.*



Ancillary Municipal Products Glossary of Definitions

Free Standing Torque Tube (Extension Bonnet)

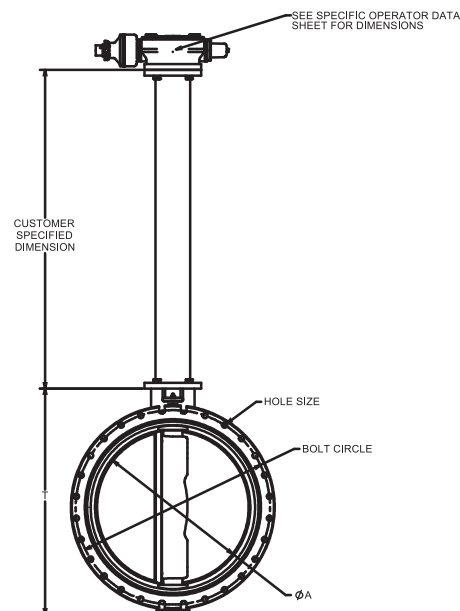
Free Standing Torque Tube

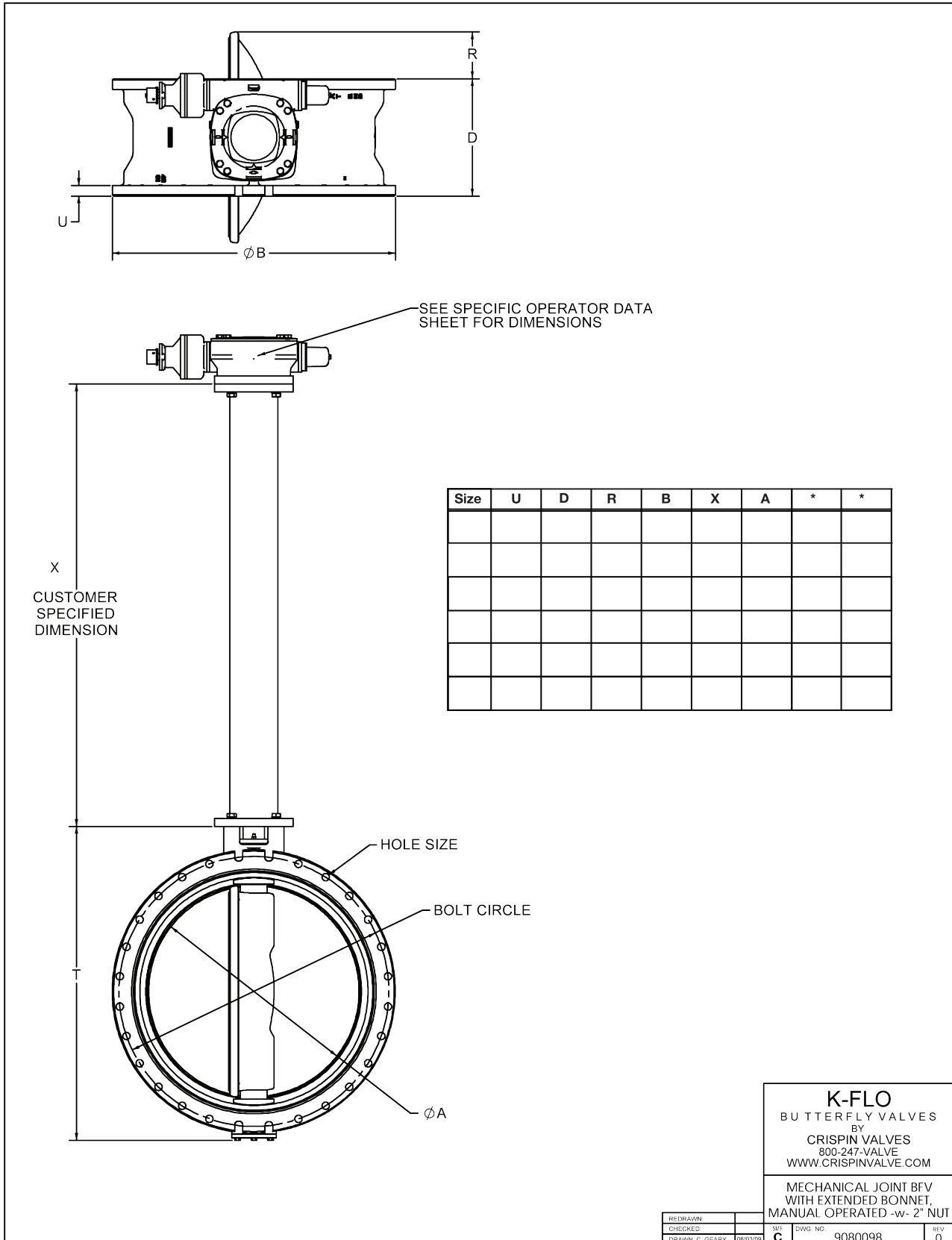
The manual gear or electric actuator is mounted to the outer torque tube at the surface. The complete actuator assembly is at the surface. In most cases the valve is mounted with the valve shaft in the vertical position. In rare buried service cases these torque tubes are used to extend the actuator into a chamber or vault and require inner shaft extension retention. Consult the factory for further details.

The valve shaft is vertically mounted in the pipe. The inner and outer shaft extension is designed to withstand the full torsional torque requirements of the actuator and transmit the torque to the valve stem. The entire torque tube assembly must be designed for a maximum angular deflection of .75 degrees over the entire length of the extension. Increases in length after installation or assembly will require re-calculation and possibly design. The lower hubs in the inner shaft extension are keyed and engage the valve shaft based on the height of the shaft. The male hub at the top of the inner shaft extension is keyed and designed at the same height to engage the actuator drive sleeve or hub. The outer extension must be designed to carry the total weight of the inner shaft extension, transmitting the weight of the inner shaft extension to the valve body relieving the weight from the valve stem.

The torque tube will need to be guided horizontally with an adjustable wall bracket and the distance from the wall to the center of the extension will be required. Wall brackets should be placed at 3 meter (10 ft) intervals.

*Drawing Reference & Page: 9080098, Page 18
Please refer to the TTR Suggested Specifications
manual for this item.*







Pedestal-Actuation-Shaft Extension Valve Installation and Connection Suggestions and Assembly Details

Caution

It is recommended training is conducted by factory authorized personnel and completed to and for the specific staff responsible for installing the described equipment in this document. Failure to request or receive training and or follow these instructions may result in failure of the equipment to operate in accordance with the guideline and is not the responsibility of the manufacturer or supplier. **Read this manual in its entirety** prior to proceeding with any equipment handling. If another language for this manual is required please consult the manufacturer of the valve or components. Please review all drawings associated and in conjunction with this equipment. Review the valve and actuator OM&I prior to proceeding with the installation of this equipment. Review all site conditions and floor mounting details to ensure the hub of the extension will fit through the cored hole in the floor if applicable. All extensions must be vertically plumb and in line throughout the entire length of the extension from the valve shaft to the hub of the actuator. Do not increase shaft extension lengths at any time as this will alter the allowable torsional deflection of the shaft extension resulting in the inability to properly adjust the actuator, setting the valve in the fully closed position on quarter turn valves. Consult the factory for calculations should this procedure become necessary.

General | Field Mounting of Actuators

Following is an overview on mounting manual or electric actuators in the field on plain stem valves or pedestals that are or are to be installed into the pipe prior to actuators arriving on site. Do not proceed without the complete approved set of GA drawings that indicate the flow direction on the valve and actuator orientation. These instructions do not replace the requirement for field supervision. Plain stem valves must have a packing retaining device prior to installation of the valve. All plain stem valves must have installed and secured shaft locking devices with the disc in the fully closed position. It is the installer's responsibility to ensure the valve disc is in the fully closed and locked position prior to proceeding with the installation of the valve.

Proceeding without factory-trained installation training or site supervision will void all warranties. Field mounting must not proceed without the supervision of qualified factory trained staff representing the valve or actuator manufacturer. In all cases, all field safety regulations must be followed. All on site contractor training must be completed in accordance with the site and local safety regulations. Prior to any field installation a thorough review of the requirements must be presented to all individuals participating with the installation of the actuators. The following items are suggested and a more detailed comprehensive list will be reviewed during the site meeting.

Please read these instructions in their entirety. Review the manufacturers handling and installation guide before proceeding. DO NOT pressurize the piping system until this is inspected by factory-trained staff. Do not connect power, hydraulics or air to any actuators.

Based on this procedure it is not necessary to operate the valve until after the actuator is installed and a mechanical advantage can be utilized. Once the actuator is installed the disc is in a self locking position.



Valve Pre-Installation

Section A | Review Items

1. Shaft packing retaining plates must be manufactured prior to the installation of the valves into the pipe.
2. All plain stem valves must have the temporary shaft locking devices and keys securely bolted to the trunion of the valve from the factory.
3. Valve flange protectors must remain on the valve flange faces.
4. Shaft packing retaining plates must be designed to be independently secured to the valve trunion and accommodate independent actuator mounting plates.
5. Valves with factory shaft locking devices installed on the valve must be securely bolted in place and retain the packing.
6. Verify the requirements of the actuator mounting transition plates.
7. Measurements and tolerances must be recorded to ensure the field adaptation and tolerances are maintained for a precision fit.
8. Valve shaft installation must be verified, horizontal or vertical on all 3 axis.
9. Review the drawings for flow arch or flat side and actuator orientation requirements in accordance with the approved drawings.
10. Verify the tag numbers, pressure rating and location relative to the installation.
11. Protect the valve stem and key at all times.
12. The pedestal must be mounted in alignment with the valve trunion on the **X-Y** axis to ensure the keyway of the valve is at 90 degrees to the **X-Y** and will straddle the centerline ensuring correct sealing orientation.

Section B | Valve Preparation

Note: Regardless of shaft orientation in the pipe all valve discs must be placed in the fully closed position prior to installation into the pipe.

- Flange faces must be inspected and must not be damaged during the movement of the valve.
- Never move the valve without the proper shaft restraints being fully engaged and secure on the valve shaft.
- Only lift the valve using the hoist ring- if supplied. If not, please consult factory.
- Do not sling the valve through the body.
- Do not damage the coating at any time.

Section B | Valve Preparation (if the valve is not in the fully closed position)

Note: This procedure should be supervised by a factory authorized representative.

1. Lift the valve up and remove the flange protectors from both sides of the valve. Do not place the valve on the ground unless supported on timbers.
2. Place the valve on a clean flat surface with the flat side of the disc facing up if applicable, ensuring the flanges are supported on minimum 4 x 4 timbers under the flanges.
3. Loosen the temporary shaft-locking device and remove the key in the shaft.



4. The valve disc is clockwise to close.
5. Place a 4 X 4 block of wood on the high side of the flat portion of the disc.
6. Using a controlled weight slowly and carefully close the disc placing the disc edge in the center of the seat.
7. Measure the distance opposite each location to ensure the disc is centered and in the fully closed position.
8. Replace the key and temporary locking arm and securely bolt back into place to prevent any movement of the disc.
9. The valve is now prepared to be installed in the pipe; however, care should be taken while moving- ensuring the disc does not accidentally open. All staff should remain clear during this movement into the pipe.
10. Install the valve in the pipe noting the correct position of the seat relative to the flow direction as indicated on the approved drawings.

Section C | Actuator Installation: Shaft Extension with Pedestal or Torque Tube Mount

Caution - Please read before actuator installation

Note: Do not pressurize the valve piping system until all connections to the valve shaft are made. Once the temporary locking device is removed, the disc is no longer locked into position. If time or equipment prevents the completion of this section, do not proceed until actuator installation can be completed and the extensions and actuator can be connected securely fastened and operated. Verify actuator operation- open right or open left- check the tag and approved drawings. Inspect the pipe prior to operating the valve.

Section C cont'd | Field Mounting the Actuators

1. Ensure you have the correct actuator for the valve as they all look the same. Internal components and options may exist. Verify the wiring drawings with the tags and tag location on the P&ID with the valve and actuator assembly.
2. Ensure the operation or rotation is correct.
3. Verify the location of the display, conduit entry and manual override.
4. Ensure the electrical conduits are facing down to prevent migration of water into the electrical connection.
5. Verify the orientation will fit prior to proceeding.
 - If the disc is exposed downstream or downstream piping is not installed proceed with the installation of the temporary disc locks.
 - Remove the temporary shaft-locking device from the top of the shaft.
 - Remove the key from the shaft.
 - Verify the shaft packing retaining plate is secure in place.
 - Inspect the shaft clearance and packing contact.
 - Install the actuator transition plate, if required, when extensions are not used.
 - Install the actuator splined adaptor and line up the key slots of the bored adaptor and the valve stem.
 - With the key slot aligned, insert the key. DO NOT force the key into the key slot. The tolerance must be sufficient to easily remove the splined adaptor.
 - Manually operate the actuator before actuator installation and place in the actuator in the fully closed position.
 - Both the valve and the actuator are now in the fully closed position.



- If the valve is NOT located in a reservoir, lubricate the sleeve or spline with a light film of NSF certified lubricant.
- Using the installation eyebolts on the actuator, carefully install the actuator on the sleeve adaptor making sure the splines line up and the input shaft is perpendicular to the orientation.
- Once installed rotate the input shaft to align the actuator mounting bolt holes with the mounting plate.
- Install and tighten the bolts.
- Adjust the mechanical stops in the actuator in accordance with the actuator OM&I.
- Install the required lock out tags and devices for this valve and actuator.

At this stage the actuator is mounted to the valve and can be operated to set the open and closed mechanical stops. If electric motors are being installed follow the installation and set up procedure for the electric motors in the actuator OM&I.

Section D | Full Assembly Mounting and Connection

- Valve
- Shaft Extension
- Pedestal (twin plate)
- Actuator Installation

Please contact the factory with any questions regarding the assembly of any items.
Please review the pre-assembly Do's & Don'ts.

Pre-Assembly Do's & Don'ts

- Align the pedestal mounting holes with the valve to ensure the keys are on the same axis.
- Pedestals and extensions must be vertical.
- Pedestals must sit on a horizontal base plate or concrete floor with or without curbs as required.
- All nuts must fully engage the studs with a minimum of three threads exposed.
- The actuators must not be forced on the top of the pedestal or ends of the shaft extension or rod extension.
- Mounting hardware must not be used to draw down the actuator on the pedestal.
- The actuator must not be shimmed or adjusted on the pedestal and must sit flush on the pedestal mounting flange.
- Do not change the mounting hole diameter in the pedestal top or bottom.
- Do not damage the coating of the pedestal.
- Only use the keys supplied with the valve or actuator.



Pedestals and Shaft Extensions See Drawing# 9100494

Twin Split Plate or Upper Pedestal Support Collar

Twin Split Plate

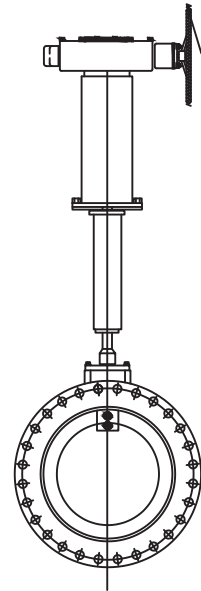
- All upper extensions for the twin plate pedestal designs will have a welded support ring approximately 33-36 inches (1 meter) below the upper shaft extension top hub.
- Place the twin split plate of the pedestal on the floor or mounting plate. Allow for the maximum diameter of the shaft extension hub or flange to pass through the split plate and hole in the support plate or floor.
- Do not completely secure the split plate at this point as rotational alignment may be required.
- Set the split plate in place and insert the support bearing into the recess.
- Insert the bottom end of the inner extension into the top of the pedestal and guide it through the lower bushing at the end (if applicable).
- Ensure the support collar on the input shaft rests beneath the split plate upper surface.

Upper Pedestal Support Collar Design

- Insert the shaft extension bearing ring in the top recess of the pedestal.
- Insert the bottom end of the inner extension into the top of the pedestal and guide it through the lower bushing at the end (if applicable).
- Ensure the support collar on the input shaft rests beneath the pedestal mounting flange to avoid interference with the mounting of the actuator and potential pre-load to the extension.
- Lower the assembly through the floor and slide the extension shaft over the valve shaft and key. Ensure the key is firmly in place prior to the assembly.
- Find the vertical center point of the pedestal at the floor level at rest to the floor or sub-plate.
- Bolt the pedestal in place using the pedestal bolt pattern and using studs into the mounting plate. Shear analysis has been based on Stainless Steel or Grade 8 studs and nuts. These grades are required.
- Install washers to the studs or Hilti bolts and tighten the nuts with uniform torque based on the bolt manufacturer recommendations.

Single Shaft Extension

- Place several .500 inch support blocks as required around the valve shaft to allow the upper shaft extension to rest on these blocks temporarily during the installation of the lower shaft extension.
- Lower the shaft extension assembly through the floor and slide the extension shaft onto the valve shaft with the key in place. Ensure the key is firmly in place prior to the assembly.
- The upper section of the extension is in place and supported by the split pedestal plate.
- The weight of the shaft extension should not be resting on the trunion of the valve and the hub is to be fully engaged with the valve shaft.
- The allowable clearance between the hub and valve trunion will range from .025 inches to 1.0 inches.
- Ensure the split plate mounting holes are aligned and aligned with the pedestal base plate that will be assembled onto the top of the split plate.
- Bolt the pedestal in place using the pedestal bolt pattern and using studs into the mounting plate. Shear analysis has been based on Stainless Steel or Grade 8 studs and nuts. These grades are recommended.
- Install washers to the studs or Hilti bolts and tighten the nuts with uniform torque.



TTR ENGINEERED SHAFT
EXTENSION AND PEDESTAL

Multiple Shaft extensions (over 20 feet or 6 meters)

Lower Shaft Extension

- Install the lower section of the shaft extension first.
- Place several .500 inch support blocks as required around the valve shaft to allow the upper shaft extension to rest on these blocks temporarily during the installation of the lower shaft extension.
- Install the lower section of the shaft extension on to the valve shaft with the key in place on the valve shaft.
- Do not force the hub on the end of the shaft. Ensure the key is firmly in place prior to the assembly.
- Support this section prior to connection using the supplied wall bracket.

Upper Shaft Section

- Lower the shaft extension assembly through the floor and slide split plate support collar to support the ring located on the upper shaft. Ensure the split collar bearing is in place.
- The upper section of the extension is now in place and supported by the split pedestal plate.
- The allowable clearance between the hub and valve trunion will range from .025 inches to 1.0 inches.
- Ensure the split plate mounting holes are aligned and aligned with the pedestal base plate that will be assembled onto the top of the split plate.
- Bolt the pedestal in place using the pedestal bolt pattern and using studs into the mounting plate. Shear analysis has been based on Stainless Steel or Grade 8 studs and nuts. These grades are recommended.
- Install washers to the studs or Hilti bolts and tighten the nuts with uniform torque.



Connecting the Shaft Extensions

- At this point the connection should be made between the two sections.
- Flanged connections will be designed to ensure the hub keyways are in line with each other at the top and bottom of the extension.
- Connecting the lower section to the upper section will slightly lift the lower section due to clearance and taking the weight of the extension of the valve shaft.
- Most designs use flanges to connect the two sections.

Field Modifications - (not recommended)

If the lower flange of the lower section is to be field adjusted review the following:

- Install the lower section of the extension first following the instructions.
- Install the upper section ensuring the upper section is completely supported by the split pedestal plate or pedestal.
- Measure the required upper shaft length.
- Remove the shaft and weld the lower flange to the pipe making sure the holes of the flange correctly align with the corresponding lower extension flange, ensuring the keyways for the hubs are perfectly aligned. This is a critical operation.
- The mounting flange must be welded on the inside and outside of the pipe preventing any distortion to the mating flange. The flange must remain square to the pipe at all times.



Typical Shaft Extension and Pedestal Installation Instructions for AWWA Butterfly Valves

1.1 General Review

1.1.1 Note

Prior to proceeding, review and read all instructions for this installation. Factory supervision is recommended. Review of these instructions with a factory representative is recommended. If you are not familiar with the terminology or the equipment please consult the factory. Safer methods may be followed as required and or governed by the utility or province. When in doubt –ask.

1.1.2 Cautions

1. Do not damage the coating of the pedestal.
2. The shaft extensions are crated to protect the hubs of the extensions.
3. The male and female hubs of the extensions are stainless steel and must not be damaged during installation.
4. Do not force any components to assemble.
5. Changes to the sequence are possible and recommend review prior to proceeding with a factory representative.

1.1.3 Preparation

1. Verify that the valve is installed properly. Review the OM&I installation manual.
2. Verify that the valve is plumb on all three (3) axis.
3. Ensure the pipe is empty and clear of all obstacles.
4. Ensure the valve is in the fully closed position.
5. Remove the shaft locking mechanical device from the top of the shaft.
6. Verify the key is secured in the valve shaft keyway and check the set screw is tight.
7. Clean the valve shaft of any dirt, debris or nicks that may have occurred during the installation.
8. If any components do not properly fit DO NOT force the assembly as these are stainless steel components.
9. Lubricate all hardware during the installation.
10. Lubricate the valve stem and key prior to assembly of the upper shaft extension.
11. The manual actuator is the last component to be assembled.
12. Before mounting the actuator rotate the gear actuator handwheel clockwise until you reach the fully closed mechanical stop.
13. Check the indicator on the actuator and verify it is reading closed.
14. The upper shafts have been drilled and tapped to accommodate a hoist ring for mounting, that has been supplied with the shipment.
15. The hoist ring is rated for 2500lbs and can be used for both upper stems.
16. The shaft extensions have been crated and shipped as a colour coded set, please install as the same set.
17. Do not tighten the main support plate on the I beams until the valve is cycled to find the center position during rotation.
18. Once operated secure the main mounting plate hardware plate.
19. Prior to assembly, if possible, pre-fit the upper shaft extension hub into the actuator bore. Consult the factory if this will not assemble.



1.1.4 Actuator preparation

1. Review the actuator OM&I installation manual.
2. Before mounting the actuator rotate the gear actuator handwheel clockwise until you reach the fully closed mechanical stop.
3. Check the indicator on the actuator and verify it is reading closed.
4. Keep the bore of the actuator dry and free of debris.
5. Verify the key is with the upper shaft or with the actuator.
6. Verify all mounting hardware is with the actuator.
7. Remove the hardware from the base of the actuator.
8. Remove the actuator indicator on the top to access the bore of the actuator for visibility of keyway alignment during the installation.
9. Lubricate the bore of the actuator.

1.1.5. Sequence of installation

1. When installing the upper and lower shafts ensure the upper and lower keyways are aligned and in the same plane.
2. Install the lower shaft.
3. Install a lower wall bracket. Allow for lateral movement at this time.
4. Insert the main split support plate, do not secure to the main plate at this time.
5. Install the shaft split support plate. Do not bolt. Allow for clearance of the 12 inch connection flange.
6. Lower the upper stem into place.
7. Place the pedestal support plate on the main plate to capture the shaft extension support ring prior to lowering.
8. Align the bolt holes of the split ring support plate with the bolt holes on the main plate.
9. Lower the upper stem so the support ring is recessed in the split support plate.
10. Install the upper and lower stem, aligning the keys and flanges at the mid point and bolt together.
11. Install the pedestal and bolt all the plates together.
12. Install the gear actuator in the pedestal with the gear actuator in the closed position.
13. Rotate the handwheel to align the actuator to pedestal mounting holes.
14. Install the bolts. Do not secure at this time.
15. The key should be lubricated and slide into position.
16. Install the key from the top. DO NOT force the key in place. Some tolerances on the key may require filing.

1.1.6. Commissioning

1. Adjusting the actuator mechanical stops will be necessary for both the open and closed position.
2. Measure the disc to ensure it is in the center of the seat.
3. Secure all hardware of the assembly.
4. Adjust the closed mechanical stop on the actuator so it is in contact with the internal segment of the actuator.
5. Open the valve.
6. Repeat the process for the open actuator mechanical stop with the disc in the full open position.



Step 1

- With the valve properly installed with the CL of the valve at an invert elevation, verify it is plumb on all three axis.
- With the disc in the fully closed position measure the disc to face distance to ensure they are equal at both sides of the horizontal plane.
- Ensure the key is on the valve shaft.
- Remove all dirt and debris from the valve shaft and keyway.
- Lubricate the valve stem.
- Install the lower shaft extension onto the valve shaft leaving a gap at the valve packing retaining plate of 50mm.
- Ensure this section can be raised back up if necessary to accommodate slight variations in elevation.
- Wedges or shim stock can be used during the assembly to maintain this 50mm clearance between the bottom of the extension hub and the packing retaining plate.
- Do not apply lateral force to the shaft extension.

Step 2

- Install one shaft extension wall bracket 500mm below the connection flange of the shaft extension.
- Adjust to allow for clearance on the diameter and prevent any interference on any axis.
- Prepare the main support split plate and the lower pedestal split plate.
- Obtain the shaft extension connection hardware from the crate.
- Install the hoist ring into the upper shaft extension hub of the matching shaft.
- Ensure the hoist ring is secured into position and tightened into place (follow the manufacturers installation guidelines).
- Verify the white UHMPE ring is located beneath the shaft support ring.

Step 3

- Using the supplied hoist ring, vertical align the upper and lower extensions to ensure they are guided into the required position.
- Partially lower the upper section of the shaft extension through the I beam opening.
- The support collar ring on the extension must remain above the floor grade to allow for the split plates to slide beneath the shaft extension collar.
- The sections will not be closed at this point.
- Do not attempt to bolt the sections together at this point.
- The main mounting split plate should be in position supported and not bolted to the I beam.
- Leave enough clearance to allow for the 12 inch diameter flange of the extension to pass through the opening OR slide the split plates into place after the extension is lowered with the 12 inch flange clearing the opening.
- With the upper section of the shaft extension still supported, slide the main base plate into position.
- Secure the plate to ensure it can support the vertical weight of the extension assembly.
- Assemble the two halves of the split plate on top of the main plate for the shaft extension support ring to be lowered into.
- Continue to lower the upper shaft extension into the recess of the split plate until the support ring rests.
- Rotate the upper section to align the keys in the shaft extension connection flanges.
- Bolt the two sections together using the supplied hardware 8-3/4 inch-10 UNC hex bolts nuts and lock washers using the appropriate SS anti seize media.



Step 4

- The shaft extension should be connected at this point and a 0 to 50mm gap and should be noticed at the valve stem extension hub.
- Secure the hardware for both the main and split plate leaving enough tolerance to allow for movement.
- Lower the pedestal into place- do not damage the coating.
- Align the bolt holes and install the pedestal hardware 8 x 1"-18 UNC SS hex bolts identified on the drawings.
- With the pedestal in place ensure the pipe of the shaft extension does not protrude higher than the upper mounting flange of the pedestal actuator mounting flange. Adjustments to accommodate the elevation may be required at this point.
- If this occurs the actuator may not sit flush on the pedestal.
- Do not torque the pedestal bolts down at this point.

Step 5

- Ensure the gear actuator is in the closed position.
- Remove the mounting hardware from the base of the actuator.
- Remove the indicator and ensure the key can be inserted from the top prior to mounting the actuator to the pedestal.
- Lubricate the upper stem.
- Aligning the shaft hub and actuator bore keyways carefully lower the actuator vertically over the extension hub in the ensuring the hub and bore are parallel.
- Rotate the handwheel of the actuator to align the bolt holes for mounting and the keyway.
- Insert the key. DO NOT FORCE into the key slot allowing for removal one day.
- Rotate the handwheel to align the mounting bolt holes, the shaft will not turn until the bolts are installed.
- Adjust the travel stop if necessary to align the holes.
- Install and tighten the actuator hardware using the hardware supplied with the actuator.
- Install the actuator indicator.
- DO NOT move or open the valve at this point.

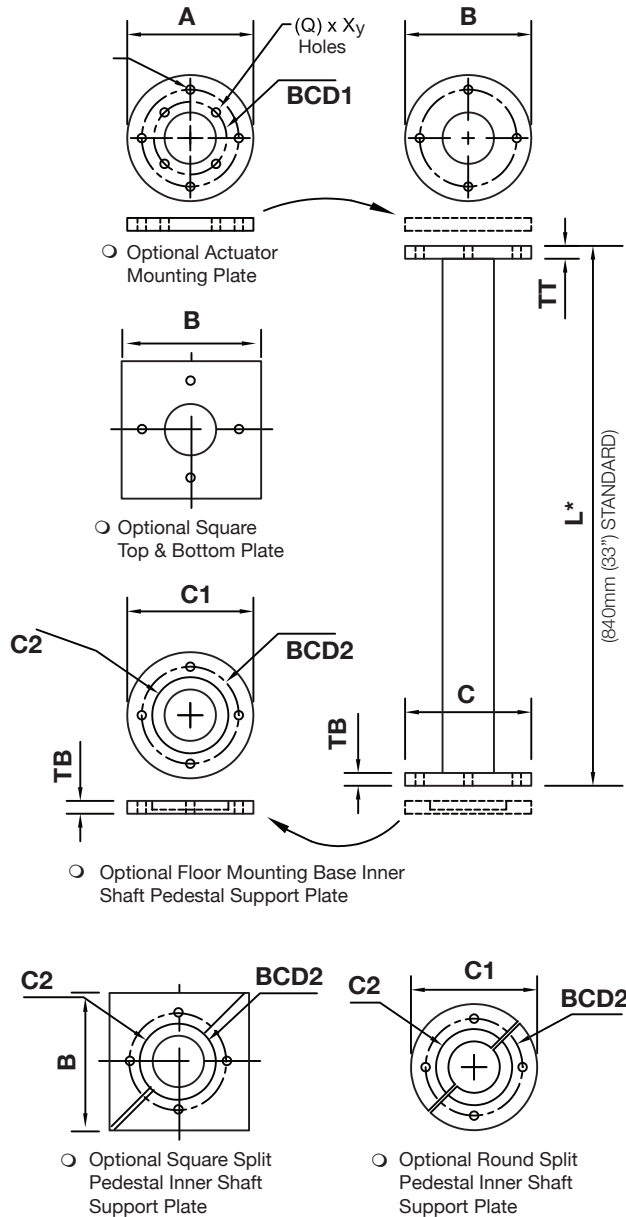
Step 6 | Setting the Actuator Stops

- Refer to the manufacturers OM&I.
- Adjusting the actuator mechanical stops may be necessary for both the open and closed position.
- Re-verify the disc has not moved and is in the center of the seat.
- Secure all hardware of the assembly.
- With the valve still in the closed position adjust the closed mechanical stop on the actuator so it is in contact with the internal segment of the actuator.
- Open the valve CCW.
- Repeat the process for the open actuator mechanical stop with the disc in the fully open position. DO NOT set or adjust the open stop until the segment has reached the open or near open position.
- Cycle the valve for repeatability and verify the disc position.
- Re-check all hardware.



ENGINEERING DETAILS & REQUIREMENTS FOR BIDDING PURPOSES

Project Reference: _____ PO Reference: _____
Quantity: _____ Diameter: _____ Schedule: _____



DIMENSIONS (in inches)

A	B	TT	Q	X	BCD1
BCD2	C	C1	TB	C2	L*

PEDESTALS

Material

Carbon Steel (Epoxy Coated) _____
 Carbon Steel (Nylon Coated) _____
 Carbon Steel (Hot Dip Galv) _____
 304 Stainless Steel _____
 316 Stainless Steel _____

NSF Approved Coating _____

To Suit

Shaft Extension - Dia. _____
 Rod Extension - Dia. _____

Actuation

Pneumatic - Model _____
 Gear - Model _____
 Electric - Model _____

Mounting Details Attached _____

Hardware: _____
 Stainless Steel Y N
 Galvanized _____

NOTE: Both Square or Round Inner Shaft Pedestal Support Plate is split to accomodate Shaft insertion through the floor from below

CUSTOM PRODUCT

NOT SUBJECT TO CANCELLATION OR RETURN

Features:

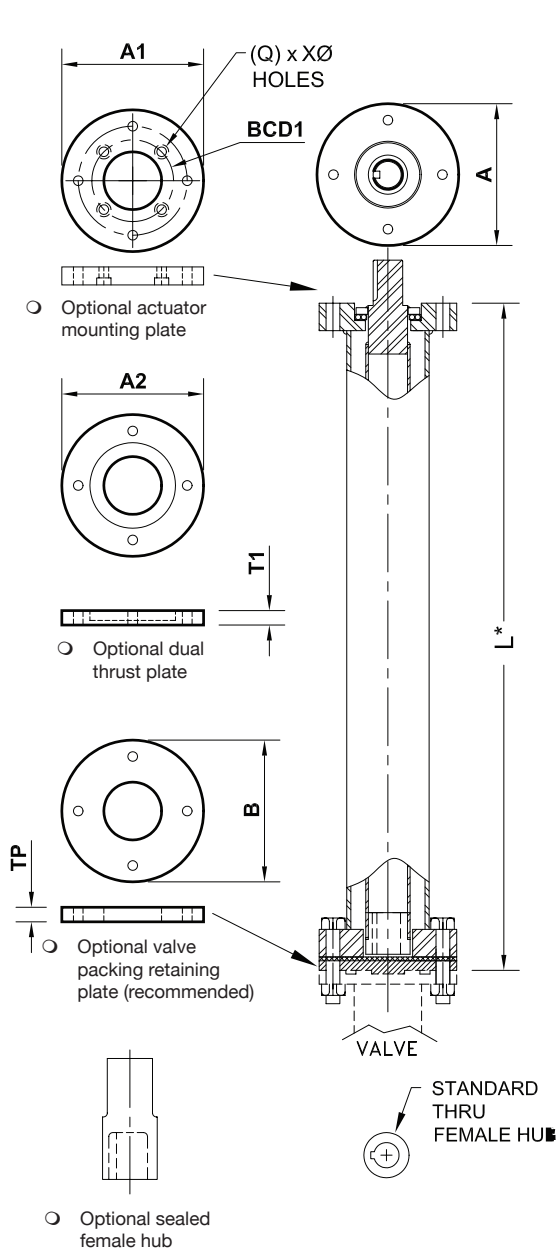
- Optional lower load bearing plate
- Removable actuator plate
- Internal coating as standard
- Inner drive to suit cored hole in floor
- Zero degrees torsional deflection
- Split pedestal support plates





ENGINEERING DETAILS & REQUIREMENTS FOR BIDDING PURPOSES

Project Reference: _____ PO Reference: _____
Quantity: _____



Features:

- Internal shaft support
- No loading on the valve shaft
- Internal and external corrosion protection
- Stainless Steel hubs (standard)
- Optional roller bearings on internal drive

DIMENSIONS (in inches)

L*	A	A1	A2
T1	TP	Q	X

TORQUE TUBE (free standing)

Material

Carbon Steel (Epoxy Coated)
Inner _____ Outer _____
Carbon Steel (Nylon Coated)
Inner _____ Outer _____
304 Stainless Steel
Inner _____ Outer _____
316 Stainless Steel
Inner _____ Outer _____

Actuation

Pneumatic - Model _____
Gear - Model _____
Electric - Model _____

Mounting Details Attached _____

Hardware:
Stainless Steel _____
Galvanized _____

Pipe Schedule
Inner _____ Outer _____
Pipe Diameter
Inner _____ Outer _____

Maximum Torsional Deflection _____

CUSTOM PRODUCT

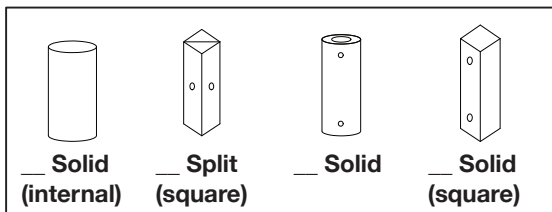
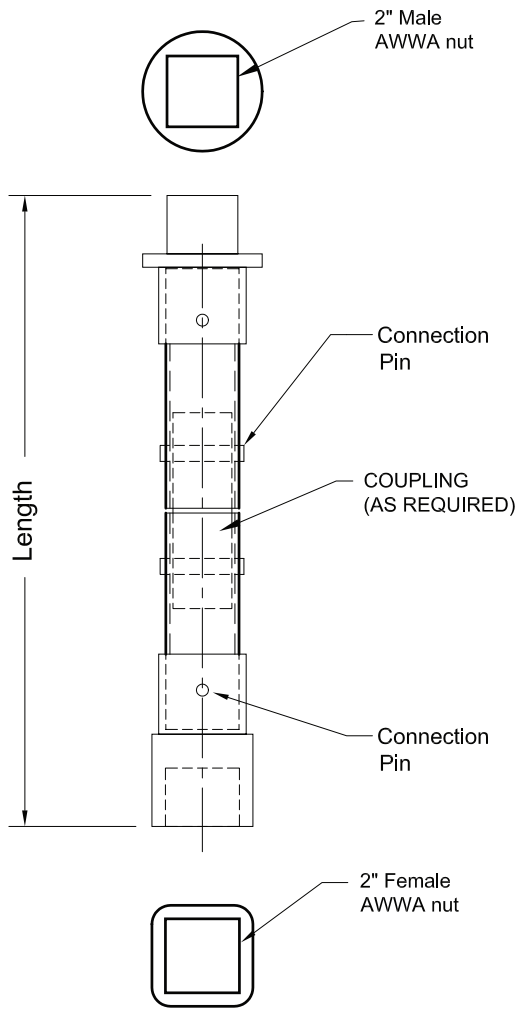
**NOT SUBJECT
TO CANCELLATION OR RETURN**





ENGINEERING DETAILS & REQUIREMENTS FOR BIDDING PURPOSES

Project Reference: _____ PO Reference: _____
Quantity: _____ Length: _____



Features:

- Solid pin design - double shear
- Solid square or round internal drive
- Modular design, easily field assembled
- Pre-drilled for field adjustment
- Zero deflection

ROD EXTENSION

Material

- Carbon Steel (Epoxy Coated) _____
- Carbon Steel (Nylon Coated) _____
- Carbon Steel (Hot Dip Galv) _____
- 304 Stainless Steel _____
- 316 Stainless Steel _____

Top Connection

- Female AWWA Nut _____
- Male AWWA Nut _____
- Other _____

Bottom Connection

- Female AWWA Nut _____
- Male AWWA Nut _____
- Other _____

Extension

- Hollow Pipe _____
- Hollow Square _____
- Solid Round _____
- Solid Square _____

- Diameter: _____
- Schedule: _____
- Thickness: _____

Coupling (if required)

- Hollow Pipe _____
- Hollow Square _____
- Solid Round _____
- Solid Square _____
- Internal Drive _____
- External Couplings _____

Connection Style

- Thru _____
- Tangential _____

CUSTOM PRODUCT

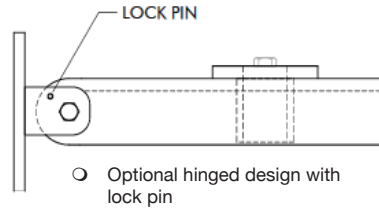
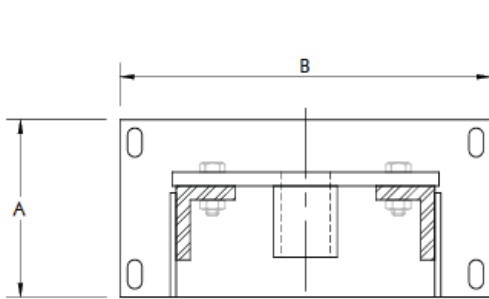
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TO CANCELLATION OR RETURN**





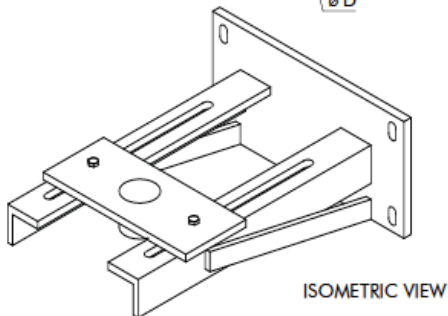
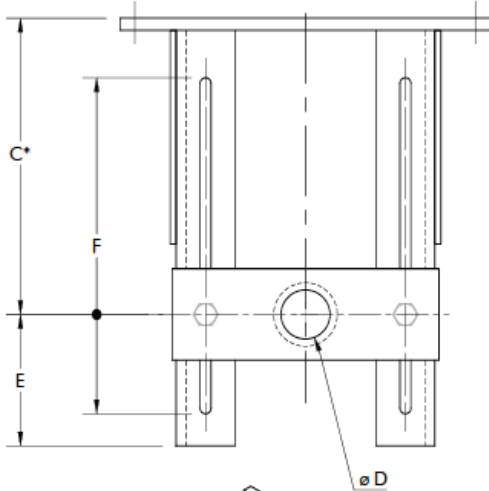
ENGINEERING DETAILS & REQUIREMENTS FOR BIDDING PURPOSES

Project Reference: _____ PO Reference: _____
Quantity: _____ Spacing: _____



DIMENSIONS (in inches)

A	B	C	D	F



Features:

- Customized bracket spacing
- Non-corrosive bearing guide
- Slotted wall mounting plates for adjustment
- Stainless Steel mounting hardware on horizontal guide
- Hinged design for inconsistent wall surfaces

WALL BRACKETS

Material

- Carbon Steel (Epoxy Coated) _____
- Carbon Steel (Nylon Coated) _____
- Carbon Steel (Hot Dip Galv) _____
- 304 Stainless Steel _____
- 316 Stainless Steel _____
- Duralon Bearings _____
- Stainless Steel Bearings _____
- Bronze Bearings _____

NSF Approved Coating _____

To Suit

Shaft Extension - Dia _____
Rod Extension - SQ. _____

CUSTOM PRODUCT

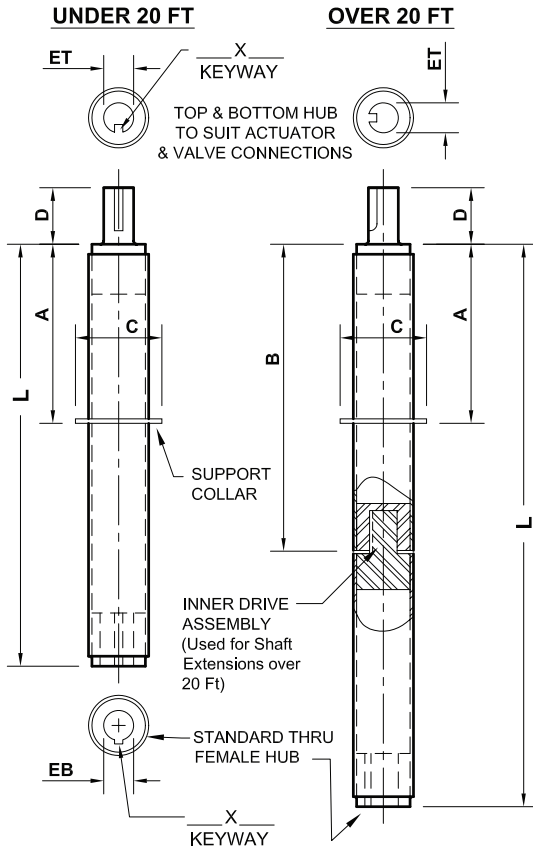
**NOT SUBJECT
TO CANCELLATION OR RETURN**



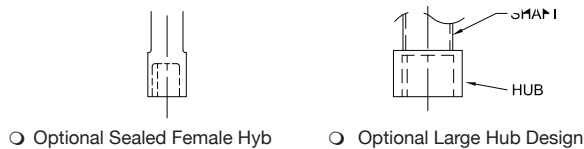
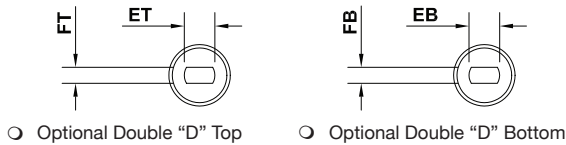


ENGINEERING DETAILS & REQUIREMENTS FOR BIDDING PURPOSES

Project Reference: _____ PO Reference: _____
Quantity: _____ Diameter: _____ Schedule: _____



NOTE: Valve Shaft Keyway to be in line with upper hub keyway.



Features:

- Support collar as standard
- Standard solid Stainless Steel hubs
- Internal and Threaded flange drives on lengths over 6m (20 feet)
- Deflections calculated at less than 0.75∞
- Ease of disassembly when mounting through floors

DIMENSIONS (in inches)

A*	B	C	D
ET	EB	FT	FB

SHAFT EXTENSION

Material

- Carbon Steel (Epoxy Coated) _____
- Carbon Steel (Nylon Coated) _____
- Carbon Steel (Hot Dip Galv) _____
- 304 Stainless Steel _____
- 316 Stainless Steel _____

Actuation

- Pneumatic - Model _____
- Gear - Model _____
- Electric - Model _____

Mounting Details Attached _____

Hardware:
Stainless Steel _____
Galvanized _____

Maximum Torsional Deflection _____

NOTE: Core hole must be greater than 'c' dimension or lower hub diameter, which ever is greater.

CUSTOM PRODUCT

NOT SUBJECT TO CANCELLATION OR RETURN



COMMITMENT TO OUR CUSTOMERS & INDUSTRY

TTR has combined quality products manufactured in North America selecting originators of these products as early as 1879 that exist today as leaders and role models in the Markets and Industry today. TTR has combined these products as a package with our speciality Engineered Products Division to meet the requirements of many applications within the same project culminating the advantages of established proven quality engineered products with over 70 years of combined field service and site commissioning experience.

Products & Services – AWWA Compliant and NSF



Products

Valve and Full Electric / Pneumatic / Hydraulic and Electro Hydraulic Automation \ Packages for In-Plant and Submerged Service

Engineered Speciality Products

- Energy Dissipating Valves and Systems / AWWA Knife Gate Valves
- Counterweighted Turbine Isolation
- Torque Tubes / Shaft Extensions / Rod Extensions

AWWA Valves

Butterfly /Resilient Seated Wedge Gate /Knife Gate / Air and Sewage Relief Globe, Silent, Tilting Check Self Piloted Control / Slide / Plug / Ball

Services - 35 Years Experience

Speciality Engineered Products / Design and Manufacturing Capabilities / FEA and CFD modelling Support / Unbiased Specification Assistance / Field Service Analysis and Support / Site Commissioning / 3rd Party Inspection / Confined Space Certified

Continuing Education Courses

OWWCO - Director Approved Training Course

TTR Training Course Name - AWWA C504 Butterfly Valves & Actuators

Follow <http://www.owwco.ca> Course ID 8733. Page 228

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Established 2009

ASSOCIATIONS

